THE PRACTICE

—OF—

OSTEOPATHY

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Third edition, completely rewritten and revised, containing much new and original matter from authentic sources never before published.

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DEDICATED

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TO

ANDREW TAYLOR STILL.

PREFACE TO THIRD EDITION.

The first and second editions of this volume have been exhausted for some time and in view of continued demands from many sources I have, in collaboration with Doctor Teall, brought out the third edition.

The subject matter has been entirely revised and rewritten with copious additions of new and original matter. Many of the older practitioners have contributed ideas of interest from their observations, for which credit has been duly given. The literature of osteopathy has been diligently searched for material to bring the contents up to the point of present development. A special chapter has been contributed by Dr. Geo. M. Laughlin, Professor of Clinical Osteopathy and Osteopathic Technique, American School of Osteopathy, on Hip-Joint Diseases, a subject on which he has put much thought and study.

There are certain facts concerning disease, i. e., prodromes, course and termination, both with and without treatment, which are the result of centuries of observation, and these diseases, when they come within the realm of a definite diagnosis, have a well defined history. Pneumonia is pneumonia to the osteopath the same as it is to the allopath, homeopath and eclectic, no matter how soon or how much our treatment may later change its course. In writing on these diseases it has been necessary to use these facts, taken from medical sources, but care has been used to give them from a viewpoint based upon extended osteopathic experience. It is necessary to follow the medical classification until such time as osteopathic records shall show sufficient data on which to base a new nosology, a new symptomatology and a new terminology. That this will be the logical outcome of such tabulation, the close observer will doubtless admit. Disease is not so dependent upon the character of the irritation as it is: First, on the degree of the irritation; second, on the function of the nerve disturbed; third, on the character of the tissue involved. Future osteopathic etiology will take

these points into consideration in the development and establishment of a new classification of disease. It is well known to the osteopath that in many acute conditions, symptoms are present which would lead him to expect, in course of time, the development of some well defined disease, yet under treatment they are found to be vaso-motor or other disturbances, and, on correction of the irritation, quickly subside. These conditions have not progressed to a point where they could be diagnosed although they would often develop into a disease entity. Experiences of this kind have lead the osteopath to often give to these derangements the name of the lesion causing them and there can be no doubt as to the lucidity of such a proceeding. It has, in a way, made a start for the new order of things.

In taking from this sum of medical knowledge the authors offer no apology from the fact that nothing has yet been developed to take the place of the material of which use has been made. In the preparation of this edition the authors have had access to several osteopathic text-books, which was impossible before, as this was the first osteopathic text-book published. Frequent reference has been made to the writings of Dr. Still, Hulett's Principles of Osteopathy, Clark's Applied Anatomy, Hazzard's Practice of Osteopathy, Tasker's Principles of Osteopathy and Young's Surgery. Special attention has been given osteopathic diagnosis and treatment, emphasizing the need of the former and going into detail of technique in the latter. With but few exceptions, no conditions are described of which there is not more or less knowledge from osteopathic experience. There has been an effort to make conservation and confidence preeminent features of the entire work.

The authors wish to here acknowledge the valuable assistance rendered by Dr. Minnie E. Osenbaugh in correcting manuscript and reading proof.

CARL PHILIP MCCONNELL.

Chicago, October, 1906.

PREFACE TO FIRST EDITION.

This work on the practice of osteopathy has been written purely for the practitioner and student of osteopathy. Up to the present time there has been little attempt made along osteopathic lines in a literary way. The student has had nothing whatever to guide him in his studies but the notes he has taken from osteoptahic lectures; and the practitioner no work to guide him or to refer to in his practice; yet it is with many misgivings, on account of the science of osteopathy being in crude published form, that I publish this work and give it to the osteopathic world. Still I feel a feeble attempt will be a stimulus to all apostles of the science, and especially so as the art of osteopathic practice is being well advanced. It will never be possible to write osteopathy completely and in detail as each case is an individual study. The best we can expect is to give the philosophy of the science and to state the principles in general terms. The science is practically unlimited; its breadth and depth are unmeasurable.

Osteopathic practice consists, first, of understanding the normal so that the abnormal conditions may be recognized when met; and second, when these abnormalities are found, of giving specific treatment and readjusting the parts. Practically, to the osteopath it makes but little difference what the disease is; it is his business to locate the derangement and correct it. This practical work is included in the practice of osteopathy and it constitutes the major part of the work; although I have given hydrotherapeutics, nursing, etc., not because I do not think readjustment of the tissues is sufficient to cure many diseases, but occasionally diseases are due to errors in diet, insanitary surroundings, disobedience of hygienic rules, etc.; and besides the proper use of water, food, etc., is an important aid oftentimes in alleviating suffering, being at the same time not injurious to the patient as drugs often are; especially in diseases that are far advanced the use of hydrotherapeutics, etc., is of aid.

I have given the old classification of diseases on account of its being universally employed and an attempt at a scientific

classification might cause the loss of many points, as our students are taught according to the old classification. I hope to see an attempt made in the near future to establish a more scientific nosology. It seems to me that the classification should be based upon the cause of the disturbance or according to the physiological disturbance. The diseases are taken up and classified in a manner according to the best of our practices of medicine, as, definition, etiology, morbid anatomy, symptoms, etc. This is given in such a manner, not because there is anything special to add in morbid anatomy or symptoms, but that it makes the work a complete practice of osteopathy and is inclusive of lectures given at the American School of Osteopathy. In a few instances I have given a theoretical treatment in diseases in which osteopathy has not had experience.

I am specially indebted to Osler, Anders, Tyson, Loomis, Raue, Goss, Stephens, and Hughes' practices of medicine and to the writers in Allbutt's System of Medicine and the American Text-Book on the Practice of Medicine. Also to American Text-Books, Landois and Sterling's, Schæffer's, Foster's, Flint's, and Yeo's Physiologies and to Ziegler's, Greene's and Stengel's Pathologies for many valuable ideas. It has been my full intention to give credit when possible, but not having access to first papers it has frequently been impossible to do so.

From my wife, Dr. Agnes Russell Darling, I have received much valuable aid in the preparation of the book.

To all my colleagues in the American School of Osteopathy and the Staff of the A. T. Still Infirmary, I am greatly indebted for many valuable suggestions.

I am under special obligations to Mr. Samuel D. Barnes, a senior student in the college, who has been a most able and untiring assistant in the correcting of the manuscript.

CARL PHILIP MCCONNELL.

Kirksville, Mo., 1899.

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INTRODUCTION.

What Hippocrates was to the Allopath, what Hahnemann was to the Homeopath, Andrew Taylor Still is to the Osteopath, and it is safe to say that when another century shall have rolled away, his fame will be equal to that of either. That he is a maker of history, even the most skeptical will admit. His teachings are revolutionary but are borne out in fact, and on that as a foundation, is built the superstructure of the young therapeutic giant—Osteopathy.

It would be of great interest to trace the history of the first inception of the thought that drugs were not only unnecessary but harmful, then view the struggle to grasp something tangible to take their place, then see the development of the idea that the human body has within it all that is needed for its upbuilding and repair until he came to this fundamental: "The power of the artery must be absolute, universal and unobstructed or disease will result. The moment of its disturbance means the period when disease begins to sow the seeds of destruction in the human body; and in no case can it be done without a broken or suspended current of arterial blood," capped by the epoch-making discovery of the cause for this interrupted flow of the blood stream—the theory of obstruction by anatomical displacement. It is the only theory of the etiology of disease that will stand the test of science and its acceptance and practice means a revolution in the field of therapeutics.

As it is, he sets the exact date, June 22, 1874, when the light dawned and he saw the outline of his great philosophy—Osteopathy. Then came the years of adversity and struggle. With the eye of a prophet he saw the future of that philosophy, and with the firmness of a Spartan has defended it since birth. It must be a separate, distinct system. Outside the fact that it was to heal the sick and was founded on a knowledge of anatomy and physiology it had nothing in common with existing schools, and if it were ever to grow it must be alone, for his brother practi-

tioners would have none of it and if left to their tender mercies it would have "died a-borning." Even had it been taken up the result would have been the same for they would never have fully developed it. And so through the lean, terrible years he struggled, buoyed by the faith of a discoverer, urged on by love of this child of his brain, fanatical in his determination to win. And win he has, for it is vouchsafed to him in his vigorous old age to sit on his hearthstone and see the results of his work, his struggle and his faith. It is something to know that his fame has circled the earth, to be honored and sung by millions; a boon not accorded many a sage or philosopher. Not only has the public accepted it but the medical profession is making tardy but forced recognition of certain cardinal principles of osteopathy by using them, but, of course, without credit.

Osteopathy has been defined as "that science or system of healing which emphasizes, (a) the diagnosis of disease by physical methods with the view of discovering, not the symptoms but the cause of disease in connection with misplacements of tissue, obstruction of the fluids and interferrence with the forces of the organism; (b) the treatment of disease by scientific manipulations in connection with which the operating physician mechanically uses and applies the inherent resources of the organism to overcome disease and establish health, either by removing or correcting mechanical disorders and thus permitting nature to recuperate the diseased parts, or by producing and establishing anti-toxic and anti-septic conditions to counteract toxic and septic conditions of the organism or its parts; (c) the application of mechanical and operative surgery in setting fractures or dislocated bones, repairing lacerations and removing abnormal tissue growths or tissue elements when these become dangerous to organic life."[1] In a word, osteopathy is adjustment and the osteopath is an anatomical engineer who knows what is wrong and has the ability to correct it. Dr. Still changed diagnosis from guess work to fact and on it his fame may well stand, for when the cause of the disease was found, treatment was easy. He has ever emphasized the necessity of thorough examination

1. Littlejohn, (J. M.)—Journal of the Science of Osteopathy.

and correct diagnosis. All treatment must be based on the definite, specific object to accomplish certain definite, specific things.

"Osteopathy would expound and apply the true philosophy of manipulation. While the hands are used, it is not this alone and chiefly that distinguishes its method of operation, but the idea and purpose that lie behind manipulation."[1]

All manipulators are not osteopaths any more than all butchers are surgeons. The need for deep study of the subject is apparent from this characteristic statement of Dr. Still's: "Osteopathy is a science; not what we know of it, but the subject we are working is deep as eternity. We know but little of it. I have worked and worried here in Kirksville for twenty-two long years, and I intend to study for twenty-three thousand years yet."[2] This brings us to the point of the relations of osteopathy with other manipulative forms of treatment. They are not many, for Gerdine,[3] in closing a long article on the "Physiological Effects of Mechanical Therapeutics" says: "I have striven to show that in no way is Osteopathy similar to massage either in theory or practice if Osteopathy is conceived of, according to its founder, Dr. A. T. Still, as a system of healing in which a definite lesion in form of a bony displacement is the causative factor and a removal of the same, the curative factor in disease."

The fact that use is made of the hands to the extent it is by both osteopaths and masseurs or Swedish movement operators gives rise to the mistaken idea of similarity in treatment.

"The essential distinction," says G. D. Hulett, "between osteopathy and all other systems of healing based on manipulation, clusters around the etiology of disease. While these other systems, as indicated at least by their practice, look at disease from a peripheral standpoint, osteopathy views it from a central standpoint."[4]

Massage is a small branch of manipulative therapeutics, but conceding that it is perfect and scientific it can only resemble

1. Pressley—Encyclopedia Americana.
2. Booth—History of Osteopathy.
3. Journal of Osteopathy, May, 1905.
4. Principles of Osteopathy, p. 190.

osteopathic treatment in one ramification of osteopathic practice, viz.: relaxation of muscles.

The fact that massage is often employed by osteopaths in connection with their work shows the limitations of that form of treatment. Says McConnell[1]: "In the human body, as in any delicate, complicated mechanism, there is mechanism within mechanism; and, in order to obtain certain mechanical effects, many times there is required a series of complicated movements, all of which bear a ratio one to the other according to the energy utilized and the mechanical principle involved." No other form of manual treatment takes this principle of mechanics into consideration. It is possible, as Gerdine points out, for an undeveloped osteopath to practice massage under another name. That the two should be confounded before the public is due to his ignorance and not from any fault of the system. Massage is a valuable aid in the treatment of disease but it is not osteopathy.

"In the bright lexicon of osteopathy there is no such word as rub[2]."

Osteopathy in its relation with medicine has little in common. From the beginning, its founder realized their paths should run divergently, so the first step, its teaching, must be considered from a different viewpoint. To quote from an address by Teall[3]: "But to adequately teach osteopathy a vast amount of original work must be done. Anatomy is anatomy but there is a vast difference in its application. Physiology must be taught to mean something more than an interesting phenomenon. Pathology has an unfilled gap between cause and effect which must be bridged. The post-mortem has a great story to tell but an osteopath must tell it. A slide of degenerated tissue under the microscope is of interest, but why the degeneration? It is described at length by the authorities, but the reason for the causes and morbific changes are not carried out. Obstetrics along strictly natural and physiological lines insuring both mother and babe against injury; gynecology, minus the knife and plus common sense; all these, and

1. Journal of the Science of Osteopathy, Dec. 15, 1900.
2. Osteopathic Calendar, 1900.
3. Reported, Portland, (Me.), Advertiser, Feb. 27, 1905.

more must be put into shape to teach the osteopathic student. The archives of osteopathy were empty ten years ago. There was no precedent to follow and the ideas in teaching which had prevailed for centuries dominated. All this is changed. The colleges teach the science along strictly osteopathic lines, making the application of the truths which have escaped the notice of centuries of investigation."

All schools recognize the wonderful recuperative power of nature, as this from the introduction of a standard allopathic text book will show[1]: "There is no scientific dogma better established than this: that the living organism is in itself adequate to the cure of all its curable disorders. This natural law sustains the medical skeptic in his infidelity, enables the homeopath to report his sugar cures, and helps all physicians out of more close places than they are generally willing to acknowledge." But at times, as all will agree, nature is not able to overcome its maladies and assistance is needed. Here, again, is a divergence as to the method and character of that assistance. There is no system so trivial or absurd which cannot point to its cures, but a school of medicine should have a settled system with established methods of procedure. This is not true of any school employing drugs as its principal therapy. In the President's annual address at Cleveland he says[2]: "The observant reader of the progressive medical press is struck at once by the unsettled condition in the field of modern therapeutics. The trend is emphatically away from drugs. But, in the effort to get away from medicine, the medical investigator has wandered far afield, cutting loose from nature and resorting to the artificial." It is the last paragraph of the extract quoted which particularly emphasizes the point of divergence, natural *versus* unnatural methods. It must be understood at once that the osteopath admits the reality of drug action for "there is no doubt that the pharmacopeia records many drugs whose action is rapid and effective so far as securing activity or decrease of secretion is concerned, but the element of danger, i. e., their destructive power is great. Oftentimes their power

1. Potter's Materia Medica.
2. Teall—Journal of the American Osteopathic Association, Aug., 1903.

does not stop at the point desired or limit its effect to the therapeutic action sought[1]." This point of unreliability of the drug is emphasized by the following from recognized medical authority[2]: "We give drugs for two purposes: (1) To restore health directly by removing the sum of the conditions which constitute disease. Here we act empirically with no definite knowledge—often indeed with little idea of the action of our drugs, but on the ground that in our hands or in the hands of others they have restored health in like cases. (2) To influence one or more of the several tissues and organs which are in an abnormal state so as to restore them to or toward the normal; with the hope that if we succeed in our purpose recovery will take place. The purpose we effect by means of the influence which the chemical properties or drugs exert on the structure and function of the several tissues and organs. Minute information, therefore, of the nature of drugs and their action is essential for their proper employment." Osteopathy brings into action the latent or stagnant forces of nature by specific methods which are usually reliable. Naturally there being such a wide difference in theory of the cause of disease it would be also shown in diagnosis as well as treatment. The most striking points to the layman in medical procedure are: first, wide difference in the system of diagnosis and in its findings by physicians of the same school; second, the great variance in remedies employed by different physicians of the same school for the same disease.

Osteopathic diagnosis is so physical in its character, depending upon actual conditions found and not upon the subjective symptoms alone, that the same patient examined by a number of experinced osteopaths will be given the same diagnosis, and he will also be able to detect in each the same effort to correct in all their technique. All the methods of physical diagnosis are used plus the distinctive osteopathic procedure. Results wherever used bear out the effectiveness of the system.

The osteopath must and does consider the necessity of surgery, but his effort is always to prevent the operation if possible.

1. Tasker—Principles of Osteopathy, p. 110.
2. Allbutt's System of Medicine.

There can be no doubt that surgery is carried to extremes and there is a strong sentiment growing that much of it is unnecessary. Says Homer Wakefield, M. D.[1]: "It is to the everlasting disgrace and mortification of the medical man that the wealthy classes who are continually under the observation and direction of eminent men, in dietary, and all life habits, in health as well as in sickness, are not only the very ones who develop appendicitis and most largely go to operation, but are almost exclusively those who attain to this distinction." The operations of to-day are wonderful and the surgeon shows great skill and genius in their performance, but great as he is in these matters how infinitely greater is the man who can prevent them. The need of the osteopath today is to be trained to recognize surgical conditions and neither allow surgery unnecessarily nor make the more terrible error of not acting soon enough. Where surgery is a necessity there is always an etiological factor to be considered. The cause of the manifestation not always being removed what is to prevent a recurrence or serious sequela in spite of the operation? "The specialist.....if he has wit enough to read the lesson presented to him, that it is not sufficient to remove an ovarian tumor, e. g., and that if nothing is said at the same time or subsequently as to the causes which induced it, a positive damage may be done to the woman, who may, therefore, while considering herself cured, proceed to manufacture one on the other side, or may find herself in a few years suffering from cancer in the stump of the previous one[2]." And so the combination of osteopathy with surgery may be necessary that the cause shall be removed. Osteopathic treatment before operations in reducing congestions and inflammations, also in toning the nervous system, is particularly efficacious while the after treatment gives gratifying results. In fact, the two go hand in hand when conservatism rules both.

That diet should receive particular attention from the osteopath is not strange, for his veneration of nature peculiarly fits him to realize the necessity of correct feeding. Probably no subject is more discussed or presents a wider range of opinion than diet.

1. Cyclopoedia of Practical Medicine, June, 1906.
2. Rabagliati—Air, Food and Exercise, p. 129.

There is overfeeding and underfeeding; long intervals and short between feedings. There is the no breakfast and no supper plan, mixed diet and the vegetarian, uncooked foods, and one exclusively of milk, anything you want so long as you are hungry but chew it well, etc., ad. lib. All are represented by osteopaths in their following as they are from other professions, but probably this would more nearly represent the views of them as a school: In health, first, most people eat too much and do not thoroughly masticate and insalivate. This applies to all stations of society. Second, meat forms too large an item in the daily dietary. Third, there is not enough variety and the ration is not well balanced as to elements. Fourth, not enough care is used in preparation of foods. In illness, first, the stopping, complete or partial, of food until the system can take care of it; second, the giving of easily digested foods. The man who avoids violent extremes in diet as well as in other habits of life will usually last longest. It is to be hoped that some rational system can be evolved on which all factions may agree, for the present confusion of authorities is bewildering. The osteopath gives attention to hygiene, sanitation, exercise, environment, mental attitude, etc., as they may affect the welfare of his patient.

Osteopathy can cure all curable diseases, for the same forces which will overcome one malady will overcome another when set in motion.

OSTEOPATHIC ETIOLOGY AND PATHOLOGY.

Osteopathic Etiology.

Osteopathic etiology and pathology constitutes the most interesting chapter of osteopathic science. The primal divergence of the osteopathic schools from previous systems is to be found in the osteopathic interpretation of disease causes and processes, and not in osteopathic therapy as some may think. Osteopathy makes claim to an independent school because it possesses a distinct etiology, pathology, diagnosis and treatment. Thus osteopathic practice is not a mere method, but instead a system, a school, a science.

At no period of medical history have physicians of the older schools felt more keenly the futility of medical methods and the lack of an all-embracing principle of medicine than at the present. A recent writer[1] who claims to have discovered a principle that encompasses the entire field of medicine, says: "We found, we may say, that the backbone of medicine was the absent factor, and that if the patient labors of so many great minds had not proven as useful in the development of practical medicine as they should, it was because they lacked such a fundamental framework to afford a fixed *nidus* for each discovery, wherein its true relation to other discoveries would at once become evident."

Since the conception of osteopathy its fundamental framework has not changed one iota as to principle, although the application of the principle has been greatly elaborated. When Dr. Still proclaimed that "the rule of the artery is supreme" he gave utterance to a basic physiological truth. But when he demonstrated that osseous and other anatamo-mechanical lesions disturbed the artery and caused disease, and that readjustment of the anatomical cured the disorder, thus allowing the physiological to potentiate and revealing that the living body contains all the attributes of a vital and physical mechanism, did his teach-

1. Sajous—The Internal Secretions and the Principles of Medicine, Vol. I, 1903.

ing contain the germ of a comprehensive philosophy; this gave osteopathic science a "backbone" with a consequent fixed *nidus* for all existing facts and future discoveries. And thus, it should always be emphasized that mechanical readjustment of the component parts of the vital body is the eternal keynote of the osteopathic school of healing.

The Osteopathic Lesion.—Broadly speaking a lesion is "any morbid alteration in a tissue whether attended by a recognizable structural change or not; but especially a change in which the continuity of some of the tissue elements is broken in upon.[1]" There are several kinds of lesions expressing the tissue involved, character of degeneration, locality of same, etc. But upon analyzing the medley of arbitrarily defined lesions the fact will be evident that much of medical etiology and pathology has not been logically and consistently sifted and arranged; and, moreover, it will be found the **cause of causes** of many diseases is unknown.

Herein, arises the great significance of the osteopathic lesion, for the lesion alters the very governing and controling tissues of the body, viz., the nervous tissue and the vascular channels. Hulett[2] defined the osteopathic lesion as "any structural perversion which by pressure produces or maintains functional disorder." The constant maintenance of the structural perversion will, also, cause organic disease, although it is granted that functional disorder must necessarily result prior to any organic change.

The osteopathic conception of a lesion, functional and organic disorder caused by pressure from disturbed structures, does not bring us into an absolute new field. Medical literature of all ages contains references to diseases caused by pressure of tissues on nerves, blood vessels, or other channels. But the osteopathic idea is an absolutely new one in the application of this principle universally. It simplifies and makes uniform the arbitrariness of present semeiology.

Thus the osteopathic idea that many diseases originate, primarily, from anatomically mal-aligned, mal-positioned, or mal-related tissues causing a blockage of vital processes, imme-

1. Foster—Medical Dictionary.
2. Hulett—Principles of Osteopathy.

diate or remote, is a theory inclusive of disturbances to all tissues. This principle is fundamental and is supported by the physiological truth that uninterrupted vital channels preserve health; moreover clinical and experimental data, as will be shown later, substantiate this fundamental. It at once places interpretation of a lesion in an entirely new light from preconceived concepts, and is analagous to and co-extensive with etiology and pathology.

Etiological Factors.—The osteopath believes in the potency of inherited and environmental influences. There can be no question that a few diseases and certain disease tendencies may be inherited, the principle feature, however, from the standpoint of heredity is, various organs and tissues have less vital resistance. These should not be confounded with congenital weaknesses and diathetic tendencies.

Environmental influences are very important factors. One's surroundings and daily habits in the home, shop, or office count for much in the aggregate. Food, drink, air, rest, sleep, clothing, exercise, mental attitude, etc., all count for much in the sum total of health, and consequently ill-health may be traceable to their abuse. In fact, all hygienic and sanitary measures are duly considered by the osteopath. Various abuses, over use, and disuse of the functions will certainly be followed by physiological discord.

The germ theory contains much truth, but in the very large percentage of cases where the micro-organism is a factor its significance is only of secondary consideration. Usually the micro-organism plays the role of an exciting and determining factor; before it can multiply and grow there must be a field that is first nutritionally disturbed. Nutrition of the tissue is the one great point always to be considered. The constitution of an individual is the pivot around which predisposing, environmental, and exciting factors of disease center. Health represents the integrity of the artery as well as a maintenance of that master tissue, the nervous system, and anything that produces or influences, directly or indirectly, a disturbance of physiological functioning borders on the pathological.

Hence the osteopath recognizes many of the common medical

causes of disease, but reserves the privilege of rearranging their relative positions, for the osteopathic cause of disease greatly modifies their value.

Osteopathic Etiology distinctively emphasizes structural derangements and perversions. Of **first** importance is the **osseous lesion.** This lesion is represented by any abnormal change of position or relation of the many bony constituents of the body. The framework of the body is subject to not only any and every physical violence of any mechanism, but moreover being the corporeal foundation of a vital mechanism is subject to both direct and indirect biochemic changes and influences.

Thus the osseous lesion is caused (a) by traumatism, e. g., strains, falls, blows, etc.; (b) indirectly by atmospheric changes, over and violent exercise, etc., through the medium of muscle changes; (c) by nutritional effects disturbing the elements of bony tissue; (d) compensatorily and reflexly through the media of body distortions and muscular irritability or debility, e. g., an innominate lesion may be compensatory to a lumbar curvature, dietetic errors may cause dorsal muscular irritation and contraction and produce a constant osseous lesion which in turn may result in chronic indigestion.

The pathological changes in the osseous lesion are commonly one of structural derangement, deviation or complete displacement. The vertebral segments are of primary consideration owing to their important relations to the spinal nerves, spinal cord centers and sympathetics; the ribs owing to the close sympathetic and spinal nervous relations; and then other osseous tissues, as the innominata, clavicle, etc., depending upon their importance to contiguous vessels, nerves and organs. It should always be remembered and emphasized that mechanical changes of the anatomical structures is the primary essential in osteopathic etiology; this is the one great inception of pathological variations from the distinctively osteopathic conception, which the osseous lesion typifies. Consequently the osseous lesion factor is actually a luxation (complete, or partial, even to a very slight degree), or malalignment of the bony constituents,which by virtue of their physical malposition impinge or irritate contiguous tissues.

Second in importance is the **muscular lesion.** The muscular lesion may be an actual dislocation of either muscle or tendon, but rarely. Commonly it is a contracted, or tensed, or contractured muscle. The muscle, also, may be diseased either from primary or secondary sources and thus be an etiological feature.

The muscular lesion is caused, (a) by direct or indirect violence the same as the osseous lesion; (b) by atmospheric influences; (c) by reflex irritations; (d) by compensatory changes; (e) by disease causing hypertrophy or atrophy; and, (f) (which is of the most frequent origin) secondary to osseous lesions, being the result of impignment to the muscles' nervous control. The tensed or stretched muscle results from a separation of the points of origin and insertion.

Herein, as with the osseous lesion, the fundamental osteopathic concept is the resulting affection due to the physical encroachment, directly or indirectly, of the muscle tissue upon vascular channel or nerve fibre.

Muscular contractions, displacements, and tensions play a most important part in acute disorders, although muscular lesions that are secondary to other lesions are usually taken into account when treatment is given. Muscular lesions affect, (a) blood and lymph vessels; (b) nerve fibres. Muscular contractions, especially, impede mechanically the return of the venous blood to the heart. The lesions to the nerves may be manifested in innumerable ways, depending upon the location of the muscle and the function and distribution of the nerve affected.

Then there is the relaxed, overstretched, and atonized muscle. This condition results as a secondary effect to mechanical strains, these being so severe and constant as to cause direct stretching and possibly tearing of the muscle fibres. This should be distinguished from the exhausted or debilitated muscle, e. g., as found in neurasthenia and anemia.

Diagnostically there are, (a) contractions of more or less area, symmetrically, due to atmospherical changes; (b) the deeply seated contractions involving a very small area, caused by vertebral and rib lesions; (c) contractions due to reflex disturbances; (d) contractions caused by postural effects and de-

formities; (e) contractions from spasms of the blood vessels as a result of nervous irritations; (f) contractions due to toxicity of the blood. All of these characteristic muscular lesions give a direct hint as to both etiology and prognosis.

Third, the **ligamentous lesion** is usually of secondary importance to the osseous lesion. There are two features that should be noted in particular when considering this lesion; first, thickenings and adhesions; and, second, relaxations.

The tone and integrity of the ligaments cannot but be of vital concern to the stability, suppleness, and adaptability of the bony framework in all physical movements. No matter how slight the osseous lesion may be the ligament must of necessity be involved. The osseous derangements are either a source of irritation to the ligamentous tissue, resulting in congestion and inflammation and hence thickening and adhesions, or else the ligaments are so strained and tensed that in time atony occurs. Probably, in a fair percentage of atonized cases the first disturbance to the ligament was one of irritation and congestion, and from long continued involvement irritation was supplanted by debility.

Consequently the primary consideration of the ligamentous lesion from the etiological standpoint is the character of the tissue (ligament) changes. This, also, gives us a direct hint that is of the utmost value in prognosis. The independent displacement of a ligament is rare, thus ligamentous lesions from the viewpoint of purely physical displacements are secondary to if not an actual part of the osseous lesion. Ligaments, when displaced or tensed, readily impinge or irritate contiguous tissues, but the original cause of the structural perversion is commonly the osseous lesion. Hence, whatever factors enter into the production of the bony lesion will at least indirectly produce the ligamentous lesion.

Fourth, the **visceral lesion** is frequently overlooked as being of much moment as an osteopathic lesion. Visceral displacements acting as a source of functional and organic annoyance on the physical plane (structural perversion which produces and maintains pressure) alone are not in the least uncommon.

Any or all of the abdominal viscera, or even the organs of

the thorax, may be displaced (physically) pathologically. Actual displacement of the viscus is a prolific source of distinct disorders and many obscure symptoms. True it is the organs are most frequently displaced from indirect causes, but nevertheless the actual physical malposition is in turn a primary cause of still another train of symptoms and diseases.

Visceral lesions are caused by, (a) vertebral lesions; (b) postural defects; (c) direct violence; (d) nutritional disorders; (e) childbirth; (f) unhygienic measures (tight lacing, heavy skirts, etc.); (g) congenital weakness.

From the displaced heart due to valvular and debilitating influences to the displaced liver, the stomach, the kidneys, the intestines, the ovaries, and the uterus may arise a source of direct or indirect irritations, a train of apparent or masked symptoms, or a group of nutritional disturbances that include an extremely important chapter in etiology. Moreover not only may one organ alone be involved but several may be displaced or prolapsed as a whole as in splanchnoptosis; and even these in turn may be the direct cause of further organic displacements as the abdominal viscera prolapsing upon the pelvic organs. Here is a very fruitful field for the diagnostician, for to separate cause from effect requires keen perception, an acute sense of touch, and above all, most careful weighing of all the factors that enter into the maize.

Fifth, the **composite lesion** is not always recognized as an extremely important osteopathic factor. By composite lesion is meant a structural lesion that primarily includes the osseous, muscular, and ligamentous tissues as a whole. This may be termed a lesion *en bloc* or *en masse*.

Composite lesions are of exceedingly frequent occurrence. Indeed, many composite lesions are overlooked and instead of treating the *en bloc* disturbance as a consistent whole the component factors are treated separately with no concern or attention to the whole.

Postural defects are excellent types of the composite lesion. The various curvatures, the tilted pelvis, etc., are representative of the composite lesion. Etiologically, pathologically, diagnostically, and therapeutically the contour of the spine and ribs,

the relation of the innominata to the sacrum and spine, and the symmetry of the body generally should be recognized and appreciated. The relation of the part to the whole and of the whole to the part are of vital etiological concern. An incipient curvature may be easily overlooked, a pendulous abdomen neglected, and a slipped innominatum pass unnoticed wherein as a result the entire vertebral column is malaligned in relation to the physiological curves or to the perpendicular line of gravity.

Frequently attempts are made to correct individual lesions when attention should be directed to the composite lesion and *vice versa*, e. g., a displaced rib is usually dependent upon a corresponding vertebral lesion, and thus the transverse plane or section of the body should be considered as a whole. A single lesion may be dependent upon a composite lesion or a composite lesion dependent upon one or more single lesions. A slipped innominatum or a disordered hip joint may bring about a strain to a greater or less section of the spinal column, or a twisted vertebra may cause a curvature, whereas on the other hand postural defects may cause a strain at its maximum focal point resulting in overstretching and relaxing of ligaments so that an osseous lesion results, or a spinal curvature cause an innominatum displacement. Thus there is a constant establishing of equilibrium, physically and physiologically, through the medium of compensation, but at some phase of the change there is apt to be pathological phenomena resulting, and very frequently physiological harmony is not re-established but instead irritation, debility and other disease symptoms are constant effects until relieved.

Consequently osteopathic etiology is many sided and complicated. To know whether an osseous, ligamentous, muscular, visceral, or composite lesion is primary or secondary, compensatory, reflex, predisposing, or exciting, requires a command of theoretical knowledge backed by much actual clinical experience.

In noting the above distinctive osteopathic etiologic features the student should not lose sight of the constitutional status of the patient which may be modified by inherited, congenital, diathetic, and enivronmental influences, all of which go to make up the predisposition of the individual and has an important relation

to osteopathic factors. Then it should be recalled that disease processes may be of insidious progress, and the products and effects of pathologic changes accumulative.

Osteopathic Pathology.

In the etiologic study the osteopathic characteristics have been designated structural mal-adjustment, although at the same time not losing sight of the angle that the body is not only a physical mechanism but also a vital mechanism. Structural perversions characterize the osteopathic distinction when dealing with the physical body, and remembering the vital or biochemic mechanism, mental attitude, diet, hygiene, etc., are not forgotten. To retain or attain health, thorough appreciation of both the physical and vital mechanism should be kept in view, for there is both an independent and dependent interaction on the part of each. The living body being an entity premises a system of therapeutics both physical and vital, that acts in direct accord and harmony with physical laws and physiological functioning.

Osteopathic pathology deals with the distinctive osteopathic lesion as a factor in production and maintenance of disease. Then the province of pathology is, first, to determine whether the lesion is in reality an etiologic factor; second, the immediate character of the lesion disturbance; and, third, how organic life becomes involved.

Inspection, palpation, clinical results, dissection and laboratory experimentation include the methods employed to prove that the lesion is of practical consequence. That the lesion is an etiological factor can be known only through clinical and experimental proof; the immediate character of the lesion disturbance can be determined by dissection; and how organic life becomes involved requires the summation of histological, physiological and pathological data.

The following outline assumes that the reader is familar with anatomy, physiology and pathology. Osteopathic pathology does not add to medical pathology an absolutely new pathology in all of the present known numerous details, but instead interprets much of clinical pathology anew, and furthermore it pre-

sents absolutely new data that is exclusive, but germane to the present general medical and surgical fields.

Nervous tissue and arterial blood are the master tissues, the controlling and governing factors in health, and disturbances of these tissues are necessarily the cause of ill health. The rule of the artery and the control of the nerve must continue uninterruptedly in order that physiological functioning remains intact. The body should be looked upon as a being complete, no more or less, each tissue and organ essential to the whole and the organism as a whole essential to every part. This is fundamental and germane to a living structure, and hence disturbance to the governing and controlling tissues, the nerves and vascular channels, must necessarily cause a break in the concatenation and disease must logically follow.

Thus in the osteopathic pathology we look to those influences that primarily disturb the nerve or artery, study the disease process or extension from inception to effect and from primary lesion to morbid results, and note action and interaction of tissue upon organ and organ upon organ.

That all parts of the body are in intimate and dependent relations each with the other through the medium of the nervous system is a well known fact based upon histological and physiological grounds. The neurone being the physiological unit implies that any disturbance to the cell quickly disturbs any or all of its processes. It may be said that "nervous tissue is dependent for its integrity upon two things, blood supply and trophic influences. The nerve cell is solely dependent on a proper supply of blood, and dies when this is withdrawn. But the nerve fiber is more dependent on the trophic influence of the cell of which it is a prolongation. It dies when cut off from the cell but it can get along for a time with but little direct blood supply. On the other hand, if the nerve fiber is injured it reacts on the cell, leading to a partial but curable degeneration of the cell body."[1] Here is the immediate pathologic key to many diseases. Whatever cuts off or obstructs the artery leading to the cell is a primary etiologic factor; this then leads to degeneration

1. Dana—Text Book of Nervous Diseases.

of protoplasmic processes and axone. It should be carefully noted that if the obstructed blood vessel is one to the nerve fiber only the resultant partial injury to the cell is curable.

"When an axone degenerates the retrogressive process involves not only the main axone, but also its terminals, together with the collaterals belonging to it with their terminals."[1] This is an exceedingly important link in the explanation of osteopathic pathology, that distant organs may be affected by the osteopathic lesion. Moreover, "degenerations of a secondary character may occur in those systems of neurones which are more or less dependent upon the peripheral sensory neurone system for their impulses."[2] This is equally true with the central motor neurone, or any neurone. It shows how far-reaching a degenerative process and its effects may be. It further makes clear that nerve intactness is directly and absolutely dependent upon a normal circulation, and that it is self-evident any blockage to either blood vessels or to neurones will vitally affect those tissues that govern and control the life processes of the body.

The above is presented so the student may see how osteopathic spinal lesions, if deeply seated and effective enough, can involve remote tissues and organs. No one will doubt that fractures and complete dislocations of the spinal column will seriously affect viscus life, or a prolapsed kidney will be a cause of nutritive disturbance, or a displaced uterus the cause of ovarian congestion, or a dislocated hip the cause of atrophy of the leg muscles, but it has remained for the osteopath to offer proof that slight misplacements of the vertebræ or ribs, incipent curvatures, postural defects, slight deformities, and unsymmetrical bodies are of sufficient etiological importance on the physical plane to affect neurone integrity and obstruct artery courses, and thus organic life.

The question at once arises, what is the immediate or direct effect upon blood vessel or nerve of the osseous, ligamentous, muscular, visceral or composite lesion? The osseous lesion will be taken as a type. The direct effect is usually one of hyper-

1. Barker—Reference Hand Book of the Medical Sciences, Vol. 7, 1904.
2. Delafield & Prudden—Hand Book of Pathological Anatomy and Histology

emia or ischemia, generally the former, for as physiologists and clinicians observe irritation commonly precedes debility. In the vertebral and rib lesions the effect is to exert direct pressure upon the spinal nerve at its spinal foramen exit or on the sympathetic chain directly contiguous to the heads of the ribs. This causes congestion, inflammation, ecchymosis, and degeneration of the nerve fiber, followed by macroscopic and microscopic changes as connective tissue proliferations, arterial scleroses, etc.

Thus the cells so sensitive to altered vascular changes are directly and remotely affected, and disease characteristics dependent upon structure and function of tissue, and degree of irritant are evident. This can vary, in degree only, with the muscular lesion that involves collateral spinal cord circulation, the visceral lesion that irritates sympathetic life, or the composite lesion that deforms or perverts structure *en masse*.

But is the physical noxa as potent an etiologic factor as the chemical or bacterologic? Adami[1] informs us whether an irritant is physical, bacterial or chemical, no satisfactory distinction can be founded on the duration of the irritation; that a local irritation of the nervous system may lead apart from "direct reflex action, to changes of nervous origin, in the region of the injury and in the reflexes affecting associated regions, the higher centers; and through them the system at large, may become affected by paths that it is not always easy to trace." Again he says that "centrifugal impulses alone, apart from any local injury, may originate a succession of phenomena of inflammation in a part." And "in all probability a nervous and central origin must be ascribed to some, at least, of the sympathetic inflammations seen to occur in areas supplied by the other branches of a nerve supplying a part primarily inflamed; and again in areas supplied from the same region of the brain or cord as the inflamed organ." Other inflammatory changes, of course, may occur independently of centrifugal nervous influences, and the vessels react independently of central influences.

This, then, presents a situation postulated thus:

1. The body follows definite structural relations and is influenced by mechanical arrangements in its morphology.

1. Adami—Inflammation, Allbutt's System of Medicine, Vol. I, 1898

2. The integrity of tissue depends upon structural freedom of nutritive courses.

3. The above predicates a structural etiology as exact and precise as structural relations are important to nutrition.

What proof, then, of the foregoing have we to offer?

First, the **clinical proof.** Clinical results have been obtained in tens of thousands of cases that include disease of various types and lesions, and of all sections and organs of the body. The art of osteopathy has been perfected in many of its details, based upon actual experience and splendid results. The cure of the patient is paramount to all other consideration, and whereas the osteopathic school has been shown a superior system it logically follows on *a priori* grounds that relief and cure of suffering is of the first and final importance.[1]

Were it not for clinical results no new system of therapeutics could withstand criticism and calumny and finally triumph and be publicly, legislatively, and scientifically recognized.

Second, the **autopsy proof.** Many dissections have been made and autopsies held with the view of discovering the character and the potency of the osteopathic lesion. This very important work has borne out the osteopathic theory of disease. Vertebral and rib displacements have been noted, corresponding ligamentous tissues thickened, associated nerve tracts and vascular channels disturbed, and finally the related organ found diseased.[2]

Third, the **experimental proof.** Experimental proof appeals, logically, to the scientific mind. This proof[3] has not been extensively developed, but what has been accomplished is worthy of attention, conclusive as far as attempted, and no doubt the near future will present substantial additions.

Experimental investigation has been successfully carried out

1. See Case Reports, American Osteopathic Association.
2. Clark—Applied Anatomy.
3. McConnell—The Osteopathic Lesion, Journal of the American Osteopathic Association, Sept. and Dec., 1905, May and August, 1906.
3. Burns—Partial Report of Experiments upon Visceral Reflexes, The Osteopathic World, Aug., 1905.
3. Pearce—Some Laboratory Demonstrations of Osteopathic Principles, The Osteopathic Physician, November, 1905.

upon dogs, cats, rabbits, and guinea pigs. The experiments conclusively proved that not only spinal inhibitory and stimulatory manipulations (mechanical) were productive of immediate physiological changes in the viscera, but that the structural anatomical lesion or noxa was an important factor in the etiologic field. Pathological changes in several organs directly followed the artificially produced vertebral and rib lesions, showing beyond doubt the reality and effectiveness of the osteopathic lesion. This emphasizes the point that centrifugal impulses originate an inflammation in a previously healthy and uninjured tissue or viscus. And as "inflammatory phenomena may be sympathetically developed in regions innervated from the same area in the brain or spinal cord" it remains to prove the actuality of vertebral and rib lesions, i. e., structural perversions really affect contiguous nerve courses and vascular channels; and this has been demonstrated in laboratory experiments and at the autopsy. Consequently the vertebral, rib, or other lesion may be an important etiologic factor either to the nerve strand from cord or brain to viscus or from viscus to cord or brain.

Dr. Still says in his Autobiography "that all nerves depend wholly on the arterial system for their qualities, such as sensation, nutrition and motion, even though by the law of reciprocity they furnish force, nutrition and sensation to the artery itself." It matters little in this outline whether or not the obstruction to nervous integrity is by way of an impigned artery or by direct pressure, or both, for the primary consideration is the noting that the osteopathic lesion is a real and potent factor of disease. Sajous[1] informs us that "a neurone is directly connected with the circulation (via neuroglia-fibril) by one or more of its dendrites, which serve as channels for blood plasma," that a neurone receives its nutrition directly from the general circulation, and that from the axone the blood passes into a lymph space connected with a vein. Thus in reality a part of the circulatory system is that of the entire cerebro-spinal system.

It has not been the purpose of this section to go into details

1. Sajous—Internal Secretions and the Principles of Medicine, Vol. 1, 1903.

but rather to follow logically an outline of osteopathic etiology and pathology. The various details will be found in the osteopathic works on Principles as well as in the experimental articles referred to. It should be understood that the osteopath believes thoroughly in *vis medicatrix naturae* whether the indications are for stimulation or inhibition or for the basic readjustment. Generally speaking, however, therapeutic philosophy resolves itself (ultimately) into the principle that a cure depends upon giving an impetus to impaired, habitual and latent forces, which in the osteopathic field implies fundamentally adjustive manipulation whereby the resultant impetus or physiological stimulus is initiated.

In a word, osteopathy premises that the body is a vital and physical mechanism subject to derangements, structural alterations, and functional changes, as results of violence on the mechanical plane, as well as disturbances on the psychic and biochemic planes. Hence, osteopathic philosophy is inclusive of preventive, palliative and curative measures.

OSTEOPATHIC DIAGNOSIS AND PROGNOSIS.

Osteopathic Diagnosis.

In osteopathic diagnosis the spine is the first and greatest object of interest, for on the result of its examination will depend the treatment to be given which is in turn hoped to bring about recovery.

As it is the structure on which rests the weight of the body the practiced eye is able to detect at a glance, by the poise and gait of the patient, if there is an abnormal condition affecting any considerable area of the spinal column. It is well to observe these points, especially in the female, before having them prepare for examination, as it will often give a clue to sources of trouble through faulty carriage, improper dress, particularly corset and shoes. Slight changes of gait, unnoticed by the patient may be of great aid in determining the beginning of disease in the spinal cord.

No osteopath is justified in accepting a patient who will not permit every examination deemed necessary, as remote and obscure lesions are frequently the cause of disease, so preparation of the patient for the first scrutiny is of importance. This cannot be made with the patient fully clothed, as visual observation is second only to the touch in making one's deductions. Neither can palpation be made through more than one thickness of clothing with accuracy, and examination next to the skin is always preferable. This need in no way ever cause complaint, for with the use of a loose fitting, short, kimono, with all outer clothing removed except the knit undergarment, and with skirt bands loosed a complete survey of the whole dorsum from occiput to coccyx can be had without the slightest unnecessary exposure. It is well to remember that the patient has come for help and the osteopath is not justified in sacrificing thoroughness for any exaggerated feelings of modesty. With tact and care in the use of the garments the most sensitive ones need feel no hesitation in coming for treatment.

A complete history of the case should be taken before the examination begins, former methods of treatment, symptoms,

environment, etc., as it will aid in the final conclusions. It is well to have blanks for keeping records of all cases.

Probably the most comfortable manner to begin physical examination is to seat the patient on a table squarely with hands placed upon the knees, then raise the garment and expose the whole back. Begin by noting the texture of the skin, if it is clear, pigmented, blotched, or has eruptions. Try the capillary reflex by pinching or stroking quickly with the finger tips or the blunt end of a pencil. Find if it is moist or dry and also outline the areas of changed temperature, if any. Then observe the general contour of the spine with the patient sitting upright, to find how near it is to the normal body curve.

Occasionally having the patient alternately sit and stand will, by comparison, throw light upon the condition. With the patient bending forward place the hands on the crests of the ilia and see if they are of equal height.

Occupation may result in over development of one side. Note position of the scapulæ and habit of posture in sitting and standing.

Before taking up the subject of a critical examination of each vertebra there are certain points it will be well to consider. It is easy to know instantly, without counting, the number of the vertebræ causing the lesion if these landmarks are remembered: First, the spine of the third dorsal is on a level with the spine of the scapula. Second, the spine of the seventh dorsal is on a level with the inferior angle of the scapula. Third, the spine of the last dorsal is on a level with the head of the last rib. It will save much time for the busy osteopath to have these well in mind.

The **pathognomonic symptoms** of the osteopathic lesion are: (a), maladjustment; (b), contracted muscles; (c), tenderness; (d), limited movement. To these might be added changes in local temperature and disturbance of function, but the former is not constant and the latter may be remote. Here the primary lesion is considered for an osteopathic lesion may be, also, secondary or compensatory. Forbes speaks of compensatory changes as being an important diagnostic sign.

Diagnosis of the position of a vertebra is sometimes difficult to the beginner from its having longer or shorter spines than normal. Horsley speaks of the occasional congenital absence of a spinous process. They may be bent laterally, upward or downward and thus have all the appearances of a marked displacement, while occasionally the body itself seems much at fault. These present what might be termed normal abnormalities and make it necessary for the osteopath to be very sure of his diagnosis before attempting to correct what is not abnormal, for disappointment, at least, and injury, perhaps, may follow.

To avoid mistake carefully palpate the transverse processes and determine if they are at right angles with the adjoining normal spine. In the cervical and lumbar vertebræ it is possible to reach the tips of the transverse processes, and on moderate pressure, if a lesion exists, pain will be elicited. Further, where tenderness is associated with other diagnostic points it can be safely assumed that a lesion exists, and by outlining the suspected vertebræ with the finger and localizing the sensitive spot one can be sure of the point of greatest irritation and the character of the displacement. Associated also with these signs will probably be evidence of congestion, such as thickened tissues, contracted muscles, etc.

After having examined the condition of the spinal column thoroughly by inspection, begin at the first dorsal and examine the spinal column down to the sacrum. Place the middle and ring fingers over the spinous processes and stand directly back of the patient and draw the flat surfaces of these two fingers over the spinous processes from the upper dorsal to the sacrum in such a manner that the spines of the vertebræ pass tightly between the two fingers, thus leaving a red streak where the cutaneous vessels press upon the spines of the vertebræ. In this manner slight deviations of the vertebræ laterally can be noted with the greatest accuracy by observing the red line. When a vertebra or a section of vertebræ are too posterior a heavy red streak is noticed and when a vertebra or vertebræ are anterior the streak is not so noticeable. Thus when suspicious points are noticed a special examination of the localized point can be given. This

examination simply takes into consideration the contour and superficial condition of disordered portions of the spinal column. In a few cases such an examination will not be necessary, for the symptoms and signs of the disease will be so clearly manifested that one's attention will be called directly to the cause. Still, great care should be taken in the majority of cases, as the osteopath finds causes of disease remote from the seat of complaint. We must always bear in mind the significance of reflex stimuli and sympathetic radiation.

In making a critical and exhaustive diagnosis of the spinal condition after the foregoing general examination has been made, it will be best to have the patient lie on the side upon the operating table. When the patient is in this position a more thorough examination can be made, as then the spinal muscles are not contracted unless abnormally so, for when a person is in the upright position muscles are continually contracting first on one side and then on the other, as one of their functions is to act as sort of guy ropes in keeping the spinal column erect. The patient lying on his side, the physician should then stand in front of him and reach over upon the back and make a thorough examination of the affected portions of the spinal column, chiefly through the dorsal and lumbar regions.

Consideration should be given the contraction of the muscles along the back, chiefly the deeper layers of muscles. It may even be necessary to relax some of the muscles before a thorough examination of the vertebræ can be made. From a pathological point of view too much stress should not be put upon the contracted state of the muscles; although in a few instances the contracted muscles may be the primary cause of the patient's trouble; especially so when the affection is due to atmospheric changes. Usually the contraction of the muscles is secondary to the lesions presented in the bony frame work. For instance, a dislocated vertebra may be the cause of an irritation to the innervation of certain muscles along the spinal column and thus cause contracted muscles. Still, we must not lose sight of the importance of the contracted muscles from a diagnostic point of view. They are oftentimes prominent signs that a lesion exists in the immediate

region and are thus faithful guides in locating the cause of diseases.

In closing the general consideration of the spinal column it is well to emphasize the importance of training the faculties to grasp at a glance the story told by the back as a region, instinctively placing the proper value on each physical sign and weaving them into a composite whole so that the patient's condition stands out a vivid picture on the osteopath's mind. When this is accomplished the more detailed observations are but incidental. Relative to the examination of the spinal column Clark[1] says: "To the osteopathic physician, the most important part of the human body is the spinal column. By its changes in contour and condition the various visceral diseases can be diagnosed, in most cases. I believe that every disease is characterized by extreme changes or signs, and I further believe that every chronic visceral disorder is manifest by changes in the spinal column that can be, by the practical eye and touch, readily interpreted. In short, there are various signs along the spinal column that point out the weakened or diseased parts of the body. This method of diagnosing disease, that is by noting these spinal changes, is distinctly osteopathic, and I believe the time will come when it will become such an exact science that the character of the spinal change or lesion is diagnostic not only of the viscus affected, but the way it is affected."

Regional examinations and diagnosis will now be taken up.

Neck, Head and Face.—To make a thorough diagnosis of the condition of the cervical vertebræ probably requires more skill and a more acute sense of touch than of any other region of the body. The irregularities and variations of the cervical vertebræ, the numerous muscles and the passage of many vessels through the neck are very liable to mislead one.

One may examine the cervical vertebræ by either having the patient lie down or in a sitting posture. The former position is preferable, as then the muscles of the neck are passive, and besides it is much easier to relax the muscles if such should be necessary. Also one has better control of the field of examination.

1. Clark's Applied Anatomy, p. 334.

It is undoubtedly best for the student when learning to examine the cervical vertebræ to first examine along the base of the skull the condition of the occipital muscles (after the patient has assumed the dorsal position upon the treating table) for any contractions; for if disorder exists in the upper five cervical vertebræ the condition will be manifested by contraction of muscular fibres along the base of the occipital bone. The muscles of the occiput are supplied by fibres from the posterior branches of the upper five pairs of spinal nerves, and if lesions exist to these upper nerves a contracted state of more or less extent of the occipital muscles will occur, no matter how slight the lesion. Thus the examiner after locating contracted fibres under the occiput has a direct clue to lesions existing somewhere in the upper five cervical vertebræ. After locating these contracted fibres of the occipital region and then still keeping the finger upon the contracted muscular fibres and following them downward until the contractions are lost and seem to enter the spinal cord, one has then located the exact point of disorder that is causing the irritation to the muscular fibres involved, and most probably the cause of the affection from which the patient is suffering, i. e., provided one has reason to suspect the trouble is in the cervical vertebræ. Simply follow the contracted muscular fibre downward until it seems to enter the spinal cord and there one will find a lesion. After the osteopath has become expert in diagnosis this will not be necessary unless he has to make a very fine diagnosis or unless one is examining a stout neck where it is hard to examine through the heavy muscles. With this method one has a firm, flat, broad surface to work on (the occipital bone) making it very easy to first locate contracted muscles and second to trace the course of contracted muscles and thus find the disorder. Otherwise the beginner is apt to get confused by trying to examine the condition of the cervical vertebræ. Later, when a student becomes more expert such a procedure will rarely be necessary only in cases that require special work in the examination.

When the point of disorder has been located the diagnosis as to whether the vertebra is anterior, posterior, lateral, or a combination of these positions has to be determined. The abnormal

position of the vertebra, tenderness at the point involved, local contracted muscles, and limited motion are the four diagnostic points, although the temperature of the affected part as compared with the general cutaneous temperature and the state of the local vascular channels (blood and lymphatics) will occasionally be of aid.

Owing to the irregularity of the spinous processes of the cervical vertebræ in regard to their length, great care has to be taken in the examination. Probably there is no other region of the body that will tax the patience of the osteopathic student so much in his practical work as making a diagnosis of disorders in the cervical spine. It requires patient and persistent work to become a fair diagnostician of the cervical region, and it will take much experience to become expert in both the examination and treatment.

One can depend that lateral deviations of the spinous processes are abnormal in most instances. Placing the finger upon the spinous processes of two consecutive vertebræ the student can readily tell whether or not there is any lateral displacement; but telling as to whether a vertebra is anterior or posterior is impossible as the spinous processes vary greatly in length. When a vertebra is lateral, a slightly twisted condition will be felt by the finger when placed upon and between the two spinous processes.

To tell when a vertebra is anterior or posterior one should depend upon the symmetry of the transverse processes. Reaching anterior to the sterno-cleido-mastoid muscle, or better still, pushing the cleido muscles forward and reaching posterior to them upon the transverse processes, a very fair examination can then be given the vertebræ. When the vertebræ ared eranged, especially anteriorly or posteriorly, a slight elevation will be felt, possibly not any larger than a very small pea, either the anterior or posterior aspects of the transverse processes, depending upon which way the vertebræ are deranged. Remember that accompanying this slight elevation will be degrees of sensitiveness of the vertebra at the point deranged. In cases where the vertebra is lateral a slight eminence will be noted along the outside of the

process. Many disordered vertebræ are not entirely deranged in one direction but are oftentimes slightly rotated, so we may find them dislocated antero-laterally or in various combinations. Then again we must realize that in the majority of cases lesions exist between vertebral articulations and that the vertebra itself is not thrown off from its articular points above and below. Again several consecutive vertebræ may be deranged in like manner of direction; this condition is chiefly found in pathological curves of the spinal column. Probably the most common general lesion is a strained condition of several consecutive vertebræ, each one being quite intact but all of them as a whole somewhat strained or twisted. Thus there are many pathological states to take into consideration, although it is not surprising to the osteopath when he realizes that many of our pains and aches are due to anatomical derangement. Frequently bending the head strongly forward and downward, or downward pressure with slight rotation will produce pain at the point of lesion.

Sub-dislocations of the **atlas** are probably one of the most common lesions presented to the osteopath. Owing to the articulation of the atlas and occipital bone being an anatomically weak point and the neck muscles being exposed constantly to atmospheric changes, besides the articulation between the head and neck receiving the brunt of many jars, falls and strains, the atlas is especially susceptible to derangements. On account of the intimate relation of the atlas to the superior cervical ganglion of the sympathetic and to the vertebral blood vessels it is certainly very necessary that the atlas should be well taken care of. No other tissue maintains such a significant position in relation to the blood and nerve supply to and from the brain. To diagnose correctly the position of an atlas and to be able to correct it is undoubtedly one of the most essential achievements of the practitioner of osteopathy.

The most common disorders of the atlas are anterior and lateral displacements. Next in order come "rotary" lesions of the atlas, i. e., where the atlas has been deranged diagonally or simply twisted. It may also be luxated anteriorly and laterally, or posteriorly and laterally, etc. A posterior derangement of

the atlas is comparatively a rare disorder, although owing to the many lesions that are found in atlases one has, during the course of a year's practice, several to correct. The atlas may occasionally be slightly tipped laterally, anteriorly, or posteriorly, and in a few cases it may be somewhat impacted against the occipital bone. Many times when the atlas is displaced the axis is also deranged on account of the close relation between the atlas and axis by the odontoid process of the axis.

To examine the atlas the patient may be either in the sitting or dorsal posture; it matters but little which position is taken. Possibly the dorsal position is better, as then the neck muscles are more relaxed and if necessary an examination of the cervical spine, below the atlas, can be easily made.

By placing the middle finger of either hand on the transverse processes of the atlas when the patient is in the sitting posture, or the thumbs on the transverse processes when the patient is in the dorsal posture and comparing the two sides, undue prominence of one side or the other can be easily noted. Remember the transverse processes of the atlas are slightly above and posterior to the angle of the inferior maxillary. Always, in examining one side of the patient, compare it with the other; it may save considerable embarrassment. One side may seem abnormal when by comparing it with the other side, both sides may be found the same and still be normal. With the fingers still on the transverse processes note the distance between the process and angle of the jaw, besides take into consideration the tenderness of the locality. There should be room enough (approximately) to just comfortably wedge the end of a medium sized middle finger between the transverse process of the atlas and the angle of the inferior maxillary when both are normal. Thus with the fingers on the transverse processes an expert will be able to readily determine whether or not an atlas is lateral or anterior. If an atlas is posterior the distance between the angles of the jaw and the transverse process will be increased, besides the atlas will be quite prominent posteriorly. In conjunction with the abnormality of the tissues (prominence or depression of the bone and state of the muscles) the sensitiveness of the locality is extremely significant.

Outside of displacements of the atlas a lesion between the **axis** and **third cervical** is most common; following next in frequency are lesions of the **skull** and **atlas.** By that is meant where all the cervical vertebræ are intact as far as their individual relation is concerned, but the skull is forward, backward or lateral upon the spinal column. This condition occurs quite frequently. To determine its condition the same methods are employed as in diagnosing a deranged atlas; for if the dislocations exist between the atlas and skull the same diagnostic points are presented as far as the skull is concerned as when the atlas, or atlas and axis, are dislocated from the occipital bone or from the axis or third cervical. Following the preceding examinations, additional examination will have to be made to see whether or not the atlas is intact with the vertebræ below. If the atlas is found to be intact with the vertebræ below and lesions are presented between the atlas and the skull, then the disorder must be between the atlas and the skull and nowhere else. Occasionally there are cases where the skull is so far posterior upon the spinal column that the angles of the jaw strike against the transverse processes of the atlas when the jaw is opened widely.

Derangement of the **muscles** of the anterior and lateral regions of the **neck** are common. Especially are contractions of the muscles on either side of the larynx liable to occur. In examining the cervical region do not pay too much attention to the superficial muscles, but examine carefully the deeper muscles. It is from these that impingements of nerves and constrictions of vessels are likely to take place in the contracted fibres. In examining for contracted muscles do not gouge into the muscle nor grasp the muscle roughly, but bear down lightly (inhibitory) upon the muscles and then gradually exert firmer pressure. By carefully and firmly exerting pressure over muscular areas the deep muscles can then be felt beneath the superficial ones. Otherwise when the muscles are manipulated severely the superficial ones will contract to such an extent that the deeper ones cannot be felt. The muscles contracting on either side of the larynx tend to draw the larynx downward and thus there may arise a source of irritation. The various muscles contracting in the antero-

lateral region of the neck are very often the source of chronic irritations of the pharynx or throat. The omo-hyoid muscle may become contracted and cause slight traction on the hyoid bone and thus produce an irritating cough. To examine the muscles of the neck thoroughly it is best to have the patient flat upon the back, for then all the normal muscles are relaxed.

Lesions quite frequently occur in the **temporo-inferior maxillary** articulation. The lesion may be either unilateral or bilateral, more commonly the former. The disorder usually consists of a relaxation of the muscles and ligaments about the articulation which allows a slight but perceptible dropping of the inferior maxillary on the side involved. Lesions of this articulation particularly impinge upon fibres of the fifth cranial nerve. The points of diagnosis are clicking and tenderness at the articulation. These two points are the symptoms of which the patient complains; those noticed by the osteopath are a slight deviation of the jaw to one side or the other when the jaw is opened and a flinching of the patient due to tenderness when pressure is exerted over the articulation of the jaw. When the physician places his fingers around the jaw, anterior to the angles, and the thumbs over the bridge of the nose, has the patient open the mouth, at the same time exerting pressure with the fingers and thumb, a sharp click may be elicited by the return of the jaw into its articulation.

In disease of the **scalp** the condition of the muscles of the scalp should be taken into consideration. The muscles are usually found contracted. The contraction of the muscles is generally due, as well as the disease of the scalp, to derangement existing in the upper five pairs of the posterior cervical spinal nerves.

In the **neck,** anteriorly the **hyoid** is the only bone to consider. It is easily palpated by standing at the head of the table and with the second finger of each hand outline both ends to ascertain its relation with the thyroid cartilage. Note carefully any contracted tissue or glandular enlargements which might cause undue tension. The tilting of either end of the hyoid from these contractions is productive of much throat irritation. At the same time the **larynx** may be examined. It may be prolapsed, causing irritation of the laryngeal group of nerves. The **thyroid**

and **cervical** glands should be palpated for enlargements, and all the muscles and ligaments for contractions. Externally the **tonsil** may be felt by deep pressure in front of the angle of the inferior maxillary.

The Ribs.—Under the osteopathic diagnosis of the ribs will be included the examination of the clavicle and sternum. To be able to diagnose intelligently, the position of the ribs in detail is very necessary to the osteopath. Many of the diseases of the heart and lungs, besides a large number of the diseases of the digestive tract, may be traced to a deranged rib; also, occasionally diseases of different regions of the head and neck may be due to dislocated ribs. In making a thorough examination of the ribs each rib should be carefully noted as to its position. The ribs may be examined when the patient is sitting up; but it is better to have the patient flat upon the back and especially so if the floating ribs are to be carefully examined, because the muscular tissues of the side if contracted will interfere with the diagnosis.

An expert osteopathic diagnostician will be able to detect at once by a single passage of the hands down over the ribs if there are any disorders of them. In passing the flat of the hand, especially the flat part of the fingers over the ribs, carefully observe if the intercostal spaces are too narrow or too wide, and if any of the ribs are unduly prominent or depressed. If an intercostal space is too narrow it shows that the ribs on either side of the intercostal space are too close together. Then the question arises, which one of the ribs is crowding upon the intercostal space, or whether both of the ribs are crowded together. Usually when the sternal end of the rib is displaced upward, the involved rib is prominent; and when displaced downward the rib is depressed. Thus it is commonly easy to diagnose which is the involved rib. Besides finding an abnormal position of the rib there will be more or less tenderness over the rib. Finding a rib prominent or depressed and tender is generally quite conclusive that the rib is displaced.

If a **typical rib** is placed upon a flat surface and one end of it is depressed the other end will be elevated and *vice versa*. This

peculiarity holds true as well when the ribs (typical) are dislocated in the living body. If the anterior end is elevated the posterior end is commonly depressed and *vice versa*. Care should be taken in examining the first rib and the false ribs, for in these ribs this peculiarity is not found.

As a whole a very complete diagnosis can be made of the condition of the ribs by examining the anterior part of the thorax, although it is always best to examine along the angles of the ribs if for nothing more than to confirm the diagnosis made at the sternal ends. Still it must be remembered that the preceding only holds good when the entire rib is dislocated. Many times simply one end of the rib is deranged and the other end is practically intact.

Besides careful examination of the sternal end of the rib, attention should be paid to the condition of the costal cartilages. The costal cartilages may become deranged at either the articulation with the rib or with the sternum. The same rule holds good when the costal cartilages are dislocated as when the ribs are dislocated, i. e., when the cartilages are prominent, they are usually displaced upward and when depressed the cartilage is displaced downward toward its neighbor.

One is apt to think that a rib is only dislocated at its vertebral end, although lesions of the vertebral end are generally of greater significance as far as the etiological factors are concerned. Still the sternal end of the rib must not be overlooked. In examining the vertebral end of a rib attention should be paid the angles of the ribs, for at the angles a better opportunity for examination is given on account of the prominence. It will be necessary in many cases to find out whether or not the vertebral end of the rib is lying between the transverse processes instead of in front of them. In many severe lesions of the ribs the vertebral end of the rib is dislocated upward or downward from the transverse process of the vertebra and lies between the transverse processes of the vertebræ above or below its attachment. This certainly requires considerable skill in the diagnosis, for oftentimes the point to be found is barely an eighth of an inch in diameter. It is usually best before making such a close examination to relax the tissues well over the field of examination.

The **ribs** as a whole may be too transverse or too oblique upon one side. This is chiefly found in pathological curves of the spine, but still such conditions may exist where there are severely contracted muscles, especially in some cases of paralysis. Thus the contour of the ribs must be taken into consideration by comparing one side with the other.

In examining the **first rib** an examination somewhat different from the other ribs should be given. It is best to have the patient assume a sitting posture; then place the middle fingers of each hand upon the first ribs near their centers and compare one with the other. Also note the difference of the spaces between the ribs and clavicles. Generally the first rib is dislocated upward, rarely downward. Besides finding an abnormal prominence or depression of the rib at its center considerable tenderness will be noticed. Examinations of this region are every day experiences with the osteopath.

When diagnosing the position of the **floating ribs** it is best to have the patient lie flat upon the back with the thighs flexed upon the abdomen, so that the tissues about the lower ribs may be entirely relaxed. Then by placing the flat of the fingers carefully over the ribs the outline and position of them can be easily discerned. The floating ribs are oftentimes found deranged and are the source of a great deal of suffering through the iliac regions. These ribs may become dislocated from the vertebral ends and drop down obliquely toward the iliac crest, or else the free end may become locked beneath the rib above. Occasionally both ends of the rib drop down quite perceptibly and consequently is the cause of considerable distress. In such instances the rib is depressed inward so that the normal contour of the lower thorax is lost.

An examination of the **clavicle** should be carefully made. Always compare the clavicle with its fellow and examine thoroughly its articulation with the sternum as well as at the acromian prominence. Often the sternal end of the clavicle is slightly dislocated posteriorly to the sternum; although it may become completely luxated. The acromian end may be dislocated upward or downward.

In examining the **sternum** special attention should be given the articulation of the manubrium and gladiolus. This is due to the crowding anteriorly of the articulation of the sternal parts. Occasionally the ensiform cartilage is turned inward, producing a tender point, but this rarely occurs. Also the articulation of the cartilages in the region of the eighth, ninth, and tenth ribs may be found considerably deranged, causing local tenderness and even stomach trouble.

Dorsal and **Lumbar Spinal Region.**—With the patient sitting on the table abnormal deviations can be readily noted. There may be lateral swerves, from muscular weakness, involving the whole spine or less, or a reversal of natural curves, i. e., the spine depressed anteriorly between the shoulders and posteriorly in the lumbar making the straight spine. There may be, also, an exaggerated normal curve in the dorsal region producing a kyphosis with a compensatory lordosis in the lumbar region sufficiently great to change its relations with the pelvis. By the method previously given, now outline the spinal column for lateral and bilateral scoliosis. These, frequently, are at their incipiency, and to the casual observer would pass unnoticed. It is well to make an outline of the spine before beginning treatment, and at times following, that progress may be observed. A simple method is lead tape which can be had from any plumber shop and can be moulded to the deformity and traced on paper together with date of examination. H. F. Goetz has recently perfected an appliance for outlining and recording these deviations. Observe well the ligaments under deep palpation; from irritation they may become thickened and more or less fill the spaces about the spines and transverse processes, causing a rigid, smooth spine.

To make a detailed examination the patient should be stretched out on one side upon a treating table, although the general examination may be sufficient. Then, standing in front of the patient and reaching over him, a most careful diagnosis can be made. Do not stand back of the patient as the flat of the fingers can not be used to advantage in outlining the different vertebræ. The various contracted muscles that may be found along the spinal column will be of valuable aid in locating derangements of

the vertebræ and vertebral ends of the ribs. By using contracted muscles along the spinal column as a guide for locating lesions, reference to the large superficial muscles is not made, but to the small areas of contracted fibres of the deep muscles. It is the deep muscles that become more or less contracted when lesions of the vertebræ and ribs exist. The superficial muscles are generally contracted by atmospheric changes and are not generally the result of disorders in the osseous system. The preceding points in regard to contracted muscles cannot be too carefully observed for there is a tendency among many osteopaths to treat the contracted deep muscles as primary lesions in nearly every case. Remember that they are usually due to the motor nerve fibres of the muscles being irritated by the spinal lesion; occasionally the cause is a reflex stimulus.

Thorax.—Examination of the thorax as a region has been largely gone over in speaking of the ribs and their sternal attachment, cartilages, sternum and the clavicles, but its appearance as a whole should be carefully noted for it will be a valuable aid in diagnosis. Deviations from the normal, such as the emphysematous or barrel-shaped chest in asthmatic affections, or chronic cough, or accompanying kyphosis, the flat chest and its association with phthisis, the rachitic, etc., should be considered. Spinal deformities are reflected in the thorax by marked changes in contour, such as elevations and depressions corresponding to the spinal changes. These result in marked interference with the thoracic organs and in the young subjects are of particular interest. Rib changes are frequently the result of vertebral deviations.

Abdomen.—The position for examination of the abdominal viscera is usually with the patient prone upon the back, head slightly elevated, knees drawn up partially and supported to relieve any muscular strain, and with the hands at the side. In this position complete relaxation is obtained. Observe any enlargements from gas, fluid, or tumor, muscular changes, color, etc. The patient may, also, be placed upon the side, and in the knee and chest position for further verification of the diagnosis. Where the abdominal wall is much relaxed, or there is a pendulous ab-

domen with enteroptosis, there will be found a change of relations of the viscera by these different positions, allowing them to be palpated in another position. When there is marked tenderness it is often possible to go deeper with less discomfort with the patient in the knee-chest position. Where ascites is suspected palpation should be made with the patient in various positions in order to note changes of location of the fluid. Frequently much can be learned by inspection with the patient standing. Clues to visceral disturbance can often be had by tracing the nerve connection from the spinal lesions to the suspected part.

In examining the **liver** care must be taken that any gouging or severe bruising of the organ does not take place. The liver can be outlined by percussion and also by palpation of its lower and inner borders. Congestions, atrophy, enlargement or hardening should be noted, also, any change in position.

A rather complete examination can be given the **biliary tract** from the **gall-bladder** to the **duodenal orifice** of the **biliary duct.** By a careful inhibitory pressure over the duct the outline of the tract can be easily discerned providing the patient is not too stout. When the tract is swollen considerable tenderness will be present. The patient will complain of a stabbing or piercing pain upon pressure and manipulation if the duct is inflamed.

Usually the tenderness is greatest nearer the **duodenal orifice.** The duodenal orifice is about one and one-half inches diagnonally downward to the right from the umbilicus. In cases of impacted **gall-stones** the osteopath as a rule has very little trouble in locating the stone.

The **spleen** can easily be percussed and when in a markedly enlarged condition its lower border can be palpated. Great care must be used in the latter condition as there is danger of rupture.

In examining the **stomach** the usual methods of inspection, palpation, percussion, analysis of the contents, etc., are employed.

Palpation and manipulation over the **intestines** are practiced a great deal by the osteopath in various intestinal diseases. By his educated sense of touch he is usually able to locate at once any **impactions** of **fecal matter.** Such impactions are generally found in the ilio-cecal and sigmoid regions. In the various acute

obstructions from invagination, tumors, twists, knots, etc., many times one is able to readily locate the seat of the disturbance. There is one point to specially emphasize; that is, do not overlook prolapsed regions of the intestines; such occur frequently and are a source of considerable distress, especially constipation. Simple manipulation will never do much good, neither will spinal treatment or injections, as a rule. A specific treatment must be given, and, that is, after locating the exact point of prolapse, to reach carefully beneath the fold and replace it.

In emaciated subjects the **kidneys** can be readily located, and in a few instances when they are diseased one can feel the contracted tissues about them. Be very careful not to injure the **capsule** about the kidney. Do not punch or gouge them in the least; but locate the kidneys by a careful inhibitory palpation.

Lumbar and Pelvis.—The intimate relation between the lumbar spine and pelvis make a consideration of them as a region necessary. Outside of ordinary curvatures involving both the dorsal and lumbar regions there are certain conditions which involve but one structure and require careful differential diagnosis to determine whether the lumbar or pelvis is at fault. In the former the fifth vertebra is a weak point and is most frequently at fault. The deviations are usually a rotation, occasionally posterior, and seldom anterior. The later condition may be simulated by a lordosis which would approximate the spines and be misleading as to the real condition. A rotation or lateral displacement of the fifth lumbar may have the effect of elevating the crest of the ilium so that the innominate would appear involved. There will be a difference in the length of the legs, anterior spines out of line and tenderness of the muscles attached near them. However, other diagnostic points of innominate lesions, i. e., tenderness of symphysis and sacro-iliac articulation, and prominence of the posterior spine, will be lacking. Marked deviation of other lumbar vertebræ may produce practically the same effect, but the lesion will be so apparent that there will be no doubt as to the cause.

To be able to diagnose accurately and intelligently the pelvic region requires nearly as much skill as in examining the cervical

region. The pelvic bones are liable to many subdislocations, especially in the female. The pelvis as a whole may be tipped anteriorly or posteriorly upon the spinal column. It also may be twisted or rotated laterally upon the spinal column. The most common lesions are subluxations of an innominatum forward, backward, upward, or downward, or various combinations of these displacements, such as a tipping forward and downward of an innominatum, or a tipping backward and upward, but these combinations do not always exist in the manner given. As a rule when the ilium is anterior, the ischium posterior, then the innominatum as a whole is downward; when the ilium is posterior, the ischium anterior, then the innominatum as a whole is upward. This is only a rule, there are exceptions to it; for in some few cases when the ilium is anterior, the ischium posterior, the innominatum may be higher, and when the ilium is posterior and the ischium anterior the innominatum may be lower.

To be able to diagnose such derangements will require skill and practice, still there are symptoms and signs that are characteristic of such disorders. In examining the pelvic bones have the patient flat upon the back at first. Be sure they are flat upon the back for a very slight variation may make considerable difference in the relation of the pelvic bones, one to the other, so far as the diagnostic points are concerned. Then go to the feet of the patient and grasp the ankles firmly, rotate laterally both legs, first to one side and then to the other, as well as pull and push both limbs slightly, and then bring the heels together directly in the median line of the body and compare the length of the limbs at the heels. If there is any disorder whatever in one innominatum, and the thigh muscles have been relaxed thoroughly by the preceding movements and the heels are brought together in the median line of the body, a difference in the length of the limbs will readily be observed at the inner malleoli or the heels. For if the ilium is forward the ischium must be backward and as a rule the innominatum is thrown downward, thus causing an apparent lengthening of the limb which will be noticed by comparing the heels; if the ilium is backward the ischium must be forward and as a rule the innominatum is then upward, causing

an apparent shortening of the limb on the affected side. A very slight variation in the pelvis will make considerable difference in an apparent lengthening or shortening of the limbs. Such conditions are generally met with several times a day by osteopaths. The object of the lateral rotary movement and the pushing and pulling of the limbs is to make sure that all the thigh muscles are thoroughly relaxed, for it is a very easy matter for contracted muscles in one thigh to produce an apparent shortening of the limb. Also be very careful in comparing the length of the two limbs at the heels where they come together that they are exactly in the median line of the body, for if they should be to one side or the other, however slightly, there would be an apparent lengthening of the outer limb as compared with the limb near the median line. While the patient remains flat upon the back it is a good plan to compare the anterior spines of the ilia. It may be readily noticed that one is higher or more depressed than the other, which will help to confirm the diagnosis. It is a good plan also to have the patient sit up squarely upon the table and compare the crests and posterior spines of the ilia, thus one may be seen to be higher than the other.

There are **three diagnostic points** exclusive of all other signs that are quite conclusive when coupled with the preceding examination. If an innominatum is dislocated or subdislocated there will be tenderness over the symphysis pubes on the side affected, tenderness over the ilio-sacral articulation on the side affected, and tenderness along the crest of the ilium where the abdominal muscles are attached. When tenderness is found at these three points it is quite conclusive that the innominatum is deranged, for at the symphysis pubes and ilio-sacral articulation tenderness must exist if the innominatum is disturbed, and by a change in the crest of the ilium the abdominal parietes will be affected, provided they are not too much debilitated. Marked tenderness of the external cutaneous nerve as it passes over the crest of the ilium below the anterior spine will be noticed on the unaffected side (Dr. Still). There will be, on rectal examination, marked tension of the tissues on the affected side. Possibly the patient may complain of pain exclusively in one side along the pelvis and limb and thus be a leading symptom telling which side is affected.

Additional diagnostic signs will be rigidity of muscles along the ilio-sacral articulation and abnormal prominence or depression of the ilium at its articulation with the sacrum, depending upon which way the innominatum has slipped. Considerable deviation of the pubic bones may be noticed. The pubic bone on the side affected may be either thrown upward or downward.

The X-ray machine in the American School of Osteopathy has shown subluxations of the innominate bones in several instances. This is certainly quite conclusive in confirmation of the osteopathic ideas in regard to the pelvic bones becoming dislocated so many times.

Sacrum.—Examination of the sacrum is best made with the patient lying on the side, with the osteopath standing in front and with the hand palpate its posterior surface. In the sitting posture its relation with both innominates can be determined. It is displaced posteriorly but seldom, the most frequent being anterior, downward, and a combination of the two. In the anterior conditions tenderness at the sacro-iliac articulations is a good point, but it must not be confounded with an innominate lesion. The downward displacement is shown by comparison with the lower lumbar vertebræ. Observe the relation between the sacrum and fifth lumbar and carefully differentiate between the two, as a change in contour of the spine will also change the angle of the sacrum and *vice versa*.

Coccyx.—With the patient and operator in same position as for the sacral examination outline the coccyx, first, as to **contour;** second, **rigidity;** third, **sensitiveness.** If abnormalities are detected go to the other side of the table and with a well lubricated index finger palpate its anterior surface. Changed contour, displacements, and old fractures can be readily determined. The most common deviation is anterior at its union with the sacrum. The lateral form generally resulting from muscular contraction is next, with posterior but seldom. "If the lower part of the sacrum is rotated backward, the sacro-coccygeal articulation or angle is affected or becomes more acute, since the tip of the coccyx is not displaced, but held in position by structures attached to it. If the sacrum is displaced downward the effect is about the same.

Often this sort of sacral lesion is mistaken for an anterior luxation of the coccyx."[1]

Uterine, ovarian and **rectal** examinations are largely of the same nature as those given by other practitioners, although osteopaths find that oftentimes other practitioners are mistaken in regard to the etiology of many diseases to which these organs are subject.

Arms and **Legs.**—There is comparatively little that is exclusively osteopathic in regard to the diagnosis of disorders of the arms and legs. One important feature that the osteopath finds in examining the arms and legs is that many of the disorders supposed to originate in the affected member is found to be caused from vertebral or rib dislocations. Innominate lesions are particularly fruitful sources of trouble in the legs and feet. Always carefully examine the spine in the region of innervation to the arms and legs when they are diseased. The shoulder and hip joints, as well as all joints, are subject to partial dislocations. Many times when pain or other symptoms are presented in the arms or legs the trouble is at the shoulder or hip joint or in the spinal column. There are two regions that are very apt to be overlooked in the examinations of the arms and legs and they are the elbow joint and the fibula. The small bones of the **ankle** and **wrist** as well as of the foot and hand are subject to many dislocations which are easily discerned upon examination and often overlooked. Special emphasis should be given in regard to many supposed diseases of the knee joints which are really caused by lesions in the spine or at the hip joint.

Osteopathic Prognosis.

Everyone is of the opinion that to forecast the probable result of a disease is one of the most difficult problems the physician has to meet. To state the duration, course, and termination of an attack of disease as presented by its nature and symptoms implies an accurate knowledge of both disease processes and changes, and an insight into the individual's idiocyncrasies backed by ripe clinical experience. And after each of these factors

1. Clark's Applied Anatomy, p. 331.

has been carefully considered to balance one against the other, nothing short of superhuman knowledge may present a sufficient insight in order to render an accurate prognosis. A prognosis represents the culmination of one's learning, an understanding of disease characteristics, and an insight into temperament.

C. M. T. Hulett[1] says: "Only when we can know all the conditions, causative and sequential, with their possible complications and terminations, together with a full history of therapeutic results in a large number of similar cases, and carefully analyzing and weighing these various elements, are we prepared to really make a prognosis." Nettie H. Bolles[2] writes as follows: "The prognosis depends upon the cause of the disease, the possibility of removing the cause, or the likelihood of recurrence of causes, and the chances of avoiding such recurrence. The circumstances to modify the outlook are various and deserve careful consideration." It is not the purpose here to go into the many essential details, for that would mean an outline and forecast of all disease processes, and the effect of numerous extenuating circumstances. The medical profession have been gathering data for these three thousand years and prognosis with them is still inaccurate and incomplete. Osteopathic science will add just so much to the accuracy of prognosis as the sum total of the knowledge displayed in the fields of osteopathic etiology, diagnosis, pathology and therapeutics. Suffice it to give here a few salient practical hints as noted in the osteopathic treating room and at the bedside.

Osteopathically it may be said that prognosis depends, first, upon the true conception of osteopathy; second, upon the relative value of all factors pertaining to health and disease; and, third, upon the skill (technique and native ability) of the osteopath. The first and second being granted the third includes a remarkably practical and pregnant field, for in no school does the physician get into as close touch and understanding of the actual condition of the patient's disorder as in the osteopathic. Although the fundamentals and principles of the osteopathic conception of diseases are really broad, liberal, and all-inclusive, still

1. Prognosis—Journal of the American Osteopathic Association, Jan., 1906.
2. Prognosis—Journal of the American Osteopathic Association, Nov., 1902.

owing to the fact that each individual (and thus each disease) is more or less a law unto himself should there not be absolute tables and prescriptions to be governed by; remember, however, this does not imply our fundamentals are not basic or our principles are not truths, but rather the application and execution of the same are as varied as the individual's constitution, temperament, and disease. Herein rests the really difficult practical consideration of etiology, pathology, diagnosis, treatment, and prognosis. In other words, if the diagnosis and treatment are accurate the result rests entirely with the patient.

First, too much emphasis cannot be placed upon the fact that prognosis is dependent upon the osteopath—his education, training, ability, experience, and technique. One's fitness is most important. And fitness and personality complement each other. An osteopath may know theory and still not be practical; still one cannot be practical unless he knows theory.

Second, osteopathic treatment frequently changes the usual course of acute disease. It is well known that many diseases have a certain regular course in their history. Many times the osteopath will be able to abort, lessen the severity, or cut short the ailment, thus changing the recognized symptoms and termination.

Third, the knack of treatment, or knowing how to treat, not only one region of the body but all regions, not only one temperament but all temperaments.

Fourth, the preparatory treatment before correcting the lesion. Prevention, palliation, or cure, and thus prognosis, may be dependent upon a necessary preparatory treatment. Here is where a study of the patient's temperament is very essential.

Fifth, a prolonged treatment may defeat one's purpose. As a rule a comparatively short, thoroughly indicated, specific treatment is best.

Sixth, much, relative to prognosis, can be told by the tone of the vertebral ligaments. When a lesion corrects too easily or does not remain well in place it shows a lack of tonicity on the part of the ligaments and muscles. Improvement is in direct ratio to the increase of tonicity.

Seventh, special care should be taken with the irritable spine. This spine commonly precedes the debilitated spine. Unless precaution is taken to apply inhibition before treating specifically a cure may be prevented or at least the disorder prolonged.

Eighth, relaxation of muscles is not always essential, although the lack of it may prevent the correction of primary lesions. The relaxation should be carried out with care in order that all shock and irritation may be kept at a minimum.

Ninth, needless stretching, traction, extending, rotation, and snapping of the neck is not only useless but may be positively dangerous. Rarely is it necessary to go through the above "movements" as many are accustomed to do.

Tenth, it may be necessary, but not always, to give as additional treatment, after the anatomical defect has been specifically treated, a certain amount of stretching and molding of the parts.

Eleventh, owing to the close personal relations of physician and patient, personality has a powerful influence on prognosis.

Twelfth, too much emphasis cannot be placed upon the uselessness and injurious effects of over and misapplied treatment.

All of the above have a positive bearing on prognosis. The osteopath should study his technique well. He will find that it gradually changes and improves from year to year. In a word, as he gains in experience he will become more skillful by giving careful attention to the development of the sense of touch, by noting the resistance of the tissues, and a score of details that are very hard to describe but the sum total of which determines and indicates the successful osteopath.

Another practical point that bears upon prognosis as well as upon the health of the osteopath is the manner of giving treatment. First, the height of the treating table should correspond to the height of the practitioner. The table should be made for the practitioner and not the practitioner fitted and warped according to a certain table. Second, give part of the treatments on a treating stool. Here there is greater freedom of movement on the part of the patient; hence greater and more effective leverage can be obtained. Suit your treatment to the patient, not your patient to the treatment. Third, make your weight count for energy ex-

pended in the treatment. As soon as one set of muscles become tired substitute another set, e. g., the back muscles and the arms, the arms and the hands. Fourth, whenever possible substitute the weight of the patient for expended energy. Fifth, when lifting keep the spinal column straight; do the bending of the body at the knees. Hence a better treatment and a more favorable prognosis, and besides that new occupation neurosis, the **"osteopathic back,"** will be materially lessened in both severity and frequency.

OSTEOPATHIC TECHNIQUE.

The technique of treatment is, in a sense, a personal factor, for it is a well known fact no two osteopaths treat just alike. Nevertheless, the principles of technique are constant and universally applicable, and he who applies them with specificity manifestly secures the best results, and exhibits a technique that is finished and characteristically osteopathic. General manipulations are not essentially osteopathic, although by employing them a few definite results may be obtained; still such technique should not be classed as distinctive osteopathic therapy. Every case is a law unto itself and must be studied individually in order to be able to understand it perfectly. So much depends upon the ability of the osteopath in the treating of a case, that in order to meet the indications intelligently he must have command of the various anatomical details of the body, not only in his mind but upon his finger tips.

The **sense of touch** should be very acutely developed, and this requires months of persistent, practical experience. A carefully educated sense of touch is the key-note to both osteopathic diagnosis and operative technique. From the very nature of the osteopathic conception—the physical body viewed as a mechanism whose disordered or diseased conditions demand anatomical readjustment—it is imperative that a delicate and educated sense of touch be acquired in order to logically and successfully apply its tenets. Proficiency means not only being able to note certain small physical irregularities, and various degrees and areas of muscular contractions, and variations in body temperature, but the extent and state of vital resistance, that is, tissue condition, and the feeling of organic resistance, e. g., the heart, lungs, the liver. These are the special features wherein osteopathic fingers detect disease causes and traces. To know the difference between normal and abnormal structural deviations and distortions, as well as organic changes, requires an accurate, detailed knowledge of anatomy and pathology with a systematic daily

education of the sense of touch; but to realize, appreciate and know by tissue resistance feeling that nutritional condition is improving requires much more practical experience.

Thus two very practical points should be taught to and thoroughly impressed upon every osteopathic student: First, **the sense of resistance of the tissues.** This gives us an absolute clue to the vitality of the patient. As has been stated, there is a vast difference between the feeling, the sense of resistance, of normal and abnormal tissues; for instance, a normal muscle and a contractured muscle, a normal liver and a congested liver, a normal intestine and a prolapsed intestine.

Second, **the receptivity of the patient to treatment.** This is dependent upon the vitality of the tissues. The sense of resistance to touch gives us an important diagnostic clue; the receptivity of the patient to treatment tells us much as to prognosis. After a few treatments the receptiveness will be positive or negative; that is, the patient is, or is not, responding to treatment. Consequently the receptivity of the patient usually tells much as to the state of nutrition.

Definite principles should be followed when applying the technique, for the osteopathic lesion is a "structural perversion," thus indicating mechanical readjustment for its correction. The time is coming when the technique will be taught graphically and mathematically. This would not be a difficult thing to do, and it could not but prove invaluable aid to the student. He can then the more readily and comprehensively grasp the principles involved. To resolve and illustrate manipulative readjustment to and by the principles of mechanics would add considerable to osteopathic development. For example, how nicely the correction of innominata readjustments illustrates the principle of the wheel and axle. Vertebral and rib displacements when readjusted make application of the principles of the simple machines. If our distinctive dynamics and therapeutics were taught in this manner the average osteopath would be more specific and comprehensive in his work and as a consequence more scientific. And consequently the principles involved in each and every case would stand out clearly. Hence diagnosis would be more exact, routine

pommelling discarded, and better all around technique executed.

Two general rules are applicable to all dislocations, whether partial or complete: 1. Exaggerate or increase the dislocation. This is to relax the tissues about the dislocated articulation and to disengage the articular points that have become locked. 2. Reduce the dislocation by retracing the path along which the parts were dislocated. Hence to **correct** a **lesion,** for example, a vertebral lesion: (1)Exaggerate the lesion. (2)Place the fingers of the hand that are not employed in exaggerating the lesion over the extended portion of the lesion. (3)Extend the region that is flexed when the lesion was exaggerated. (4)When the lesion is being extended produce traction and slight rotation of the region. (5)At the same time extension, traction and rotation is being produced push in upon the extended portion of the lesion. To this might be added for sake of clearness and greater assurance of success: (a.) Be positive the focal point absolutely corresponds to the lesion, or else most if not all of your effort will be useless. (b.) Just before reaching the maximum of exaggeration have your fingers correctly placed for the readjustment, and at the very moment of maximum exaggeration or just a fraction of a second prior begin to correct or readjust, or else you will lose the vantage gained and the operation will probably be a failure. (c.) The general traction and rotation are to aid in unlocking the lesion, not to readjust as some may think. All rough handling, needless snapping of parts, and excessive rotation and stretching are not only apt to tighten the lesion more, shock the system and irritate the parts, but it may be absolutely dangerous.

It should not be forgotten that the osteopath includes many measures in his treatment of various diseases, as nursing, dieting, hygiene, sanitation, hydrotherapy, antidotes, antiseptics, etc., and does not depend upon readjustive manipulation alone, although correcting disordered anatomical structures and perversions are paramount in the treatment.

The General Treatment.—A general treatment but accentuates the ignorance, in a majority of cases, of many so termed osteopaths. It is a deplorable fact that there is a tendency among some osteopaths to give general treatments in every case presented.

The only explanation of such a procedure that one can think of is a lack of conception as to what osteopathy really is. To give a general treatment in every case is not only actually detrimental to the patient but it is the height of folly on the osteopath's part, for it gets him into a slovenly habit of procedure from both scientific and curative points of view, besides giving the outside world an impression that osteopathy is but little different from massage and Swedish movements instead of skillful, mechanical engineering of the human body.

A general treatment, broadly speaking, should be given only under three conditions: (1) Constitutional diseases that are to be treated symptomatically. (2) Anemic cases. (3) When one is ignorant of the real cause of the disease. Each of these conditions is self-evident why a general treatment should be given. A fourth might be added, for those individuals who think they are not getting value received unless they are treated from head to foot. Such patients are usually ignorant of the philosophy of osteopathy and it is the osteopath's duty to teach them differently.

The general treatment consists in stretching the spinal column from the atlas to the coccyx and relaxing all contracted muscles along both sides of the spinal column, besides giving special treatment to the cervical region, between the scapulæ, the splanchnics and internal and external rotation of the legs. It is no wonder that fake osteopaths do cure a case occasionally. They are quite certain to correct some disorder by pulling and hauling a patient around in such a manner. Still on the other hand they are very likely to do injury to the patient. Those who claim that no injury can come from osteopathic treatment are mistaken. One can injure a person by treatment if he is not careful. It does not stand to reason that the most delicately constructed mechanism should stand any amount of manipulation and misdirected force that may be given it.

Positions of the Patient and Physician in Treating.—The position of the patient when a treatment is given depends altogether upon the affection to be treated. Probably about one-half of the cases can be treated to advantage upon a table, the

remainder sitting on a stool. Many osteopaths treat nearly all their patients upon a table. It is much better to change back and forth, because to correct a certain disorder may be hard upon the table, but will be comparatively easy when the patient is on a stool, and *vice versa*. Besides constantly changing back and forth rests a physician greatly.

Learn to treat in various positions, because it will be impossible to have all cases assume a certain position when being treated; and especially in treating acute cases one is obliged to suit his treatment to the patient and not the patient to the treatment. There is also a tendency for one to get into slovenly habits of treating when patients are all placed practically in one position, and certainly one cannot treat all cases in one position to equal advantage. Also learn to treat as well with one hand as the other. Many times one will be in such positions that equal use of either hand will be required. Carefully educate the sense of touch in both hands.

Another point should receive consideration: learn to shift the strength exerted in treating from one set of muscles to others. For example, when one is standing for a long time he will continually shift his weight from one limb to the other. In the same manner in treating use the strength of the hands awhile, then the arms, then the muscles of the back, then the weight of the body, etc.; all in such a manner that there is a constant change by utilizing certain groups of muscles for the same work, as well as utilizing the weight of the body of both physician and patient to advantage. It rests a physician greatly and thus allows him to perform a maximum amount of work with a minimum amount of strength and labor.

It is frequently an advantage to the physician to treat upon the nude skin, thus preventing the fingers from becoming tender. Gowns can be easily made that open down the back so that the patient does not have to disrobe.

The Neck and Head.—In the treatment of the neck the patient may assume the sitting posture or lie flat upon the back. The latter is preferable, as then one has complete control of the neck and head. Absolute control of a part is always necessary

and when this is secured the dangers are reduced to a minimum, provided always that reasonable discretion as to the amount of strength, is used. Before correcting the various deviations of the cervical vertebræ it is usually best to thoroughly relax all the muscles, superficial and deep, about the field of operation. In relaxing muscles two methods may be employed. The muscle may be firmly grasped and manipulated until relaxed, or a firm pressure may be exerted upon the muscle and thus inhibit its nerve force until the muscle relaxes. The latter method is comparatively slow and is usually given in acute cases where the patients are so weak and exhausted that they cannot stand any severe manipulation.

In relaxing muscles by manipulation, grasp firmly the belly of the muscle and draw outward on the muscle several times until it relaxes. If the patient is sitting, place one hand upon the head of the patient or about the chin in such a manner that complete control of the head is maintained throughout the procedure; then with the fingers of the other hand upon the contracted muscular fibres a manipulating or kneading of the muscle can be given. It is best to flex the neck and head to the side where the contracted muscles are, so that a better hold of the muscle may be maintained; then by a series of flexions and extensions with manipulation of the contracted muscles outward, results can be readily obtained. When the patient is lying on the back the physician may stand to one side of the patient's head and with one hand on the forehead of the patient and the other hand around the opposite side of the neck, a rotary motion of the head and neck, which is equal to flexion and extension in the sitting posture, may be given by the hand on the frontal region while the other hand relaxes the muscles; or the osteopath may stand at the head of the patient and with either hand on the side of the head and neck of the patient a series of rotary movements of the head and neck may be given with manipulation of first one side of the neck and then the other; the hands and fingers being placed in such a manner that when the fingers of one hand are relaxing the muscles on its side the other hand is executing the movements of the head and neck, each hand continually alternating in the work. This latter meth-

od requires some practice in order to do the work readily and successfully, for quite a variety of movements are required.

In the former method after one has worked on one side he is obliged to change to the other side and go through the same process. Movements may, also, be given to stretch the contracted muscles, thus overcoming the contraction and producing relaxation of the muscles.

After having relaxed the muscles over the field of operation, correcting the vertebræ will generally be easier to accomplish. In readjusting an atlas it matters but little whether the patient is sitting up or lying down. A firm hold of the atlas can be gotten in either instance. In correcting the middle and lower cervical vertebræ it is best to place the patient upon the back.

In correcting dislocations, as heretofore suggested, two general rules should be followed: (1) Exaggerate or increase the dislocation. This is to relax the tissues about the dislocated articulation and to disengage the articular points that have become locked. (2) Reduce the location by retracing the path along which the parts were dislocated. One can readily see that a dislocated ball and socket joint could be reduced only by the dislocated bone retracing the path by which it left its socket, for the capsular ligament would at once prevent its returning to the socket by any path other than that taken when dislocated. This applies to all dislocations to a greater or less extent.

After locating the exact position of the abnormal vertebra the first rule is applied, i. e., exaggerating the lesion by flexing the head in the opposite direction to which the vertebra is dislocated. Then with one or two fingers placed firmly upon the side of the vertebra in the direction dislocated, so that when the proper time comes the vertebra may be pushed or slightly rotated back into its normal position, with the other hand produce flexion of the neck, so that the angle of flexion is exactly over the involved vertebra; next produce slight traction, so as to be sure that the articular points will be disengaged; and then with rotation and extension of the head to a normal or upright posture, at the same time pushing in on the disordered vertebra, are the movements to be executed in reducing a dislocated vertebra.

It takes considerable practice to be able to correct a vertebra and to know when it is corrected. The amount of force applied varies greatly in different cases. Cases of recent subdislocation require but little force while in long standing cases many times the amount of force required is about all that one wishes to exert; although remember that often it is a slight rotary movement or twist given that aids the most in executing rule second. No matter whether a vertebra is anterior, posterior, lateral or rotated the principles applied are the same in each case.

Be very careful when flexing, extending or rotating the neck that too much strain is not brought to bear upon the ligaments. Some osteopaths seem to take delight in rotating and flexing the neck to a great degree. It is a dangerous procedure and moreover does not accomplish anything in particular. It should be kept in mind that osteopathic treatment is scientific and not a number of general movements of various regions of the body. Locate the lesions exactly and then a specific treatment can be given in every instance. To illustrate the treatment according to the preceding rules we will assume that a certain cervical vertebra is anterior, say the fourth cervical. First, hyper-extend the head in such a manner that the fulcrum comes exactly over the fourth vertebra, thus throwing the fourth vertebra still more anterior, or in other words, exaggerating the lesion or increasing the space anteriorly between the third and fifth cervicals, so that when the head is flexed forward and pressure is exerted upon the anterior part of the vertebra (body or transverse process) the vertebra will have room enough to occupy its normal position. Second, when the head is hyper-extended place a finger anterior to the transverse process of the dislocated vertebra and with the other hand around the head, that is producing the hyper-extension, throw the head forward with slight traction and rotation and at the same time push posteriorly quite strongly upon the dislocated vertebra. The method is simple and scientific and any other treatment is not necessary. Follow out the same principles in all cases, no matter in which way the vertebræ are deranged.

In cases where the lesion is between the skull and atlas have the patient sit on a stool with the back part of his head against your chest, and reach around the head with one hand under the chin; then with the other hand around the transverse processes of three or four upper cervical vertebræ pull the spinal column toward the median line, while at the same time lifting up on the skull with the other hand and throwing the skull toward the median line. The object of lifting up on the skull is to relax and disengage the articulations between the occipital bone and atlas. This is applicable to the various lesions of the occiput, and which are of frequent occurrence.

The steps to be followed, as heretofore stated, in correcting the various lesions are: (1) Exaggerate the lesion. (2) Place the fingers of the hand that are not employed in exaggerating the lesion over the extended portion of the lesion. (3) Extend the region that is flexed when the lesion was exaggerated. (4) When the lesion is being extended produce traction and slight rotation of the region. (5) At the same time extension, traction and rotation is being produced push in upon the extended portion of the lesion. This is repeated for emphasis.

In treating the **pharynx, tonsils** and **larynx,** outside of correcting spinal lesions, an anterior treatment to these organs is very effective. Examine the deep muscles beneath the angle of the jaw when the pharynx and tonsils are involved; and when the larynx is affected note the condition of the muscles on either side of the larynx. After locating deeply seated contracted muscles in the region of the angle of the inferior maxillary place the fingers over the contracted tissues, and then by a downward, inward sweeping motion toward the median line the muscles may be readily relaxed. When treating the larynx relax the tissues on both sides by an upward, inward movement. These treatments are very effectual when applied directly to the disordered tissues.

To treat slight lesions of the **inferior maxillary** articulation, stand at the head of the patient when he is lying down and hook the fingers about the jaw just in front of the angles, and with the thumbs over the bridge of the nose have the patient open the

mouth while considerable force is exerted against his effort. This reduces any slight dislocation of the inferior maxillary. When the jaw is completely dislocated place a piece of wood or hard substance between the molars and exert pressure upward and backward on the chin. If the dislocation is bilateral work on one side at a time.

The object of treatment to the **face** is to stimulate or inhibit points of the fifth nerve that come near the surface (see neuralgia of fifth nerve). While the patient is lying flat upon the back carefully stimulate these various points, especially the supra-orbital and nasal, with a downward and outward movement, or inhibit as indicated.

In treating the **scalp** relax the muscles over the scalp thoroughly. This is secondary treatment to correcting the innervation to the scalp at the upper four or five cervical vertebræ.

In cases of pharyngitis, tonsilitis, croup, hay fever, etc., an effective local treatment may be given through the **mouth** upon the soft and hard palate. Introducing a finger into the mouth clear back upon the roof of the soft palate, and with a downward and backward sweeping movement from the median line on either side toward the tonsils, considerable relief can be given the patient. This treatment relaxes the tissues, relieves the congestion, and gives a stimulating treatment to the local nerves. A treatment of the same nature may be given over the hard palate to effect the palatine nerves, especially in hay fever, when the itching of the palate and sneezing are extreme. In cases of young children it is best to protect the finger by wrapping a piece of cloth around it.

An osteopath should never give a manipulation or movement unless he understands why. Just as soon as one gives general imitating movements, from that moment his work is not of a scientific osteopath, but of a Swedish movement curist and masseur and a poor one at that. The osteopath's work is to locate the anatomical derangement and correct it, as a mechanic would adjust any disordered mechanism. General treatment amounts largely to naught, although in some few instances it is of benefit.

To give a detailed description of the treatment of all lesions

that may be found in the cervical vertebræ would be impossible; only a general survey of the work can be given. Each case calls for special treatment, but the same general principles are applicable in each case. If there is any one thing that should be eliminated from osteopathic treatment it is those mechanical routine movements of rotating, flexing, extending, and various Swedish-movement-massage-like manipulations that certain osteopaths give in each and every case. It shows that he is an imitator and does not have a correct conception of osteopathic therapeutics. True, it is, that routine movements will have stimulating and other effects upon the system. But does the body require such treatment? Is it lack of exercise on the part of the patient? If it is, then let the patient exercise himself. You do not want to lower yourself to be a mere "engine wiper," or an exerciser. If it is, not the lack of exercise and the system is in need of certain treatment, then seek the cause and apply a specific treatment. Do not hide behind generalities.

The Ribs.—In correcting dislocated ribs many methods may be employed, but all are subject to the same principles as given under the treatment of the neck and head.

One of the best methods to correct typical ribs is to have the patient upon the side with the side of the affected ribs upward. Find out exactly the nature of the dislocation, i. e., what is the relation of the dislocated rib to the other tissues. Note whether the rib is upward, downward, inward or forward, locate exactly the dislocated rib. Then, while standing back of the patient, place your fingers upon both ends of the rib. Place your fingers in such a manner that when the proper time in the procedure arives all that will be necessary will be to push the ends of the rib into their articulations. For instance, if the rib is raised anteriorly and lowered posteriorly, you will place the fingers on the sternal end, above the affected rib and the fingers on the vertebral end, below the rib, so that when the rib has been released from its abnormal position it may be slipped into normal position. After having placed the fingers in the exact position necessary, have an assistant take the arm and draw it obliquely across the face, while at the same time the patient takes a forced inhalation. The

object of drawing the arm across the face and the deep inhalation is to exaggerate the lesion—to draw the ribs out of their locked position—so that the fingers upon either end of the rib may push the rib into normal position. Drawing upon the arm raises all the upper ribs as well as the dislocated typical rib, principally by the use of the serratus magnus; also inhalation has an effect to throw the rib outward and upward and thus away from its articulation. Thus after the lesion has been increased sufficiently to loosen the rib from its abnormal position, the arm is relaxed, the patient exhales, and the fingers upon the ends of the rib correct the dislocation. This treatment is used to the greatest advantage when there is a complete dislocation of a typical rib; it can be given while the patient is lying down or sitting up, alalthough the former position is preferable.

An excellent method, when the **sternal end** of the rib is dislocated, is to have the patient sit upon a stool with his back toward the physician; then by placing the knee in the back (while standing up, or easier still for the physician to sit upon an operating table back of the patient) over the vertebral end of the rib so that the rib may be held rigid posteriorly, reach around with one hand over the dislocated end of the rib and place the fingers upon the rib in the direction dislocated, so that when the rib is sufficiently released from its abnormal position it can be readily pushed into place; then with the other hand under the axilla of the arm on the affected side, pull up and back on the shoulder, so that the rib may be pulled away from its sternal articulation; and at the same time have the patient take a deep inhalation so as to aid in throwing the rib outward, upward, and away from its sternal attachment; then when the end of the rib has been released sufficiently, relax the hold underneath the axilla, have the patient exhale, and slip the rib into its normal position by the fingers over the end of the rib. This is a most excellent method. It is easy to give and does the work admirably.

Practically, the same procedure may be gone through when the **vertebral end** is dislocated, by changing your position to the front of the patient, but there is danger of the knee slipping off from the sternum during the operation and injuring the ribs.

Several other treatments may be given to correct dislocations of the vertebral ends of the ribs. For example, while the patient remains sitting the osteopath stands in front of the patient and reaches around both sides upon the angle of the ribs; then with an outward and upward movement of the fingers upon the angle of the ribs, they are pulled away from their locked position and allowed to slip into normal articulation. This treatment is applicable only when the ribs are dislocated downward, but it is one of the best treatments for such cases.

Another method oftentimes employed in correcting dislocations of the vertebral end of the ribs is to have the patient lie flat upon the side with the affected side upward; then by flexing the arm on the forearm and placing the elbow against the chest or abdomen reach over the patient upon the angle of the dislocated rib and pull it away from the vertebra; when it is pulled away from the spinal column sufficiently, push upward or downward on the angle of the ribs, as the case may demand. The elbow placed against you gives complete control of the patient and aids, by your weight, in throwing the rib upward or downward.

A treatment somewhat like the preceding one which is commonly employed, is to reach underneath the patient's upper arm, when he is lying upon his side, with the arm extended upward across the face; then by placing the fingers of the hand underneath the patient's arm over the angles of the affected rib or ribs and reinforcing the hand by the fingers of the other hand an upward, outward and rotary movement can be given the ribs, which pulls them out of their abnormal position and allows them to return to their normal articulations.

An effectual treatment to spread and raise the upper ribs is to have the patient flat upon the back, and with the fingers of one hand underneath the angles of the ribs and the other hand upon the elbow of the patient's arm of the same side throw the patient's arm across the chest transversely and bear down upon the elbow, at the same time spring upward and outward on the angles of the ribs with the other hand. By throwing the arm across the chest and bearing down upon the elbow a strong

leverage can be obtained upon the upper ribs, especially those between the scapulæ. This treatment is very efficacious in lung and heart diseases.

Still another method of adjusting ribs is to have the patient flat on his face upon an operating table with the arms hanging down on both sides of the table and a small pillow or folded blanket beneath the upper part of the chest; then standing beside the table, or better still, place one foot upon a low stool and the knee of the other limb upon the table in such a manner that you are directly over the patient's dorsal region, one is then in a position to have full control of the vertebral end of the ribs. If the ends of the ribs are displaced downward, placing the thumbs over the angles of the ribs and pushing upward and outward on the angles, the ribs can be very readily crowded into position. If the ribs, especially between the scapulæ, are dislocated in any direction, they may be quite readily corrected by placing the hand over the shoulder posteriorly and throwing it outward and upward and away from the spinal column in such a manner that the ribs are pulled away from the abnormal position; then upon relaxing the hold upon the shoulder with the one hand, the fingers of the unemployed hand may push upward or downward, as the occasion requires, on the angles of the affected side so that the ribs may be slipped into place.

Many times one is obliged to treat the ribs of one side as a whole. In such instances the ribs are almost invariably thrown downward except on one side, of scoliosis of the dorsal region. Several methods may be employed to raise the ribs. Probably the best method is to have the patient upon the side and with one hand upon the angles of the ribs and the other hand holding the wrist of the upper arm of the patient, an upward lifting movement is given both upon the angles of the ribs and upon the arm of the patient while the patient inhales. The work upon the angles of the ribs is to raise the ribs directly; the work upon the arm is to raise the ribs indirectly, principally by the use of the serratus magnus. Another effective treatment is to have the patient upon the back and with one hand over the anterior ends of the ribs and the other hand over the angles of the ribs an upward movement

is given them by springing the ends of the ribs toward each other and by strong inhalation on the part of the patient. This treatment is most effective where the false ribs are at fault and especially in case of hemiplegia. While the patient is upon the back an assistant may take hold of the arm and draw it upward over the head of the patient, producing considerable additional upward tendency of the ribs, and the physician giving the same treatment of the ends of the ribs as before; or the physician may take an arm in one hand and raise it above the head of the patient and with his other hand around the angles of the ribs, and the patient inhaling deeply, the ribs may be raised.

A treatment used a great deal in raising the ribs as a whole is to have the patient sit upon a stool, and reaching around the patient from the front, place the fingers upon the angles of the ribs and raise them upward on both sides at the same time. This treatment can also be given by standing behind the patient and reaching around upon the anterior ends of the ribs and lifting upward while the patient aids you by deep inhalation. Remember that many times the ribs are drawn downward by contraction of the muscles, due to atmospherical changes. One should begin at the upper ribs in all treatments where the ribs are to be raised, as a whole, and work downward.

To correct the **first** and the **floating ribs** a different treatment has to be given than the foregoing.

An **upward displacement** is the most common lesion of the **first rib.** To correct such a dislocation, have the patient sit upon a stool and with one hand pull the head to the opposite side in order that the lesion may be exaggerated by traction of the lateral muscles of the neck (principally the scaleni) upon the rib; this disengages the rib from its abnormal position; then with the fingers of the other hand upon a point midway of the ends of the rib, exert a downward pressure at the moment the extended head is relaxed. If the patient is unable to sit up, and it is not best to give the foregoing treatment, have the patient flat upon the back, with one hand take hold of the arm on the affected side and pull down and out upon the shoulder so that the rib may be somewhat drawn away from its articulation and released from its posi-

tion; then with the fingers of the other hand upon the center of the rib, or its highest point, press downward when the hold upon the arm is relaxed. Correction of an upper displacement of the first rib is an every day occurrence. **Downward dislocation of the first rib** is rare. To reduce this dislocation, place the thumb beneath the vertebral end of the rib, and with the other hand lift up strongly on the shoulder from beneath the axilla, at the same time exert pressure upward with the thumb on the end of the rib.

The **floating ribs** may be dislocated obliquely downward, or the free end of the rib may be caught underneath the end of the rib above. In either case, in order to correct the displacement, place the patient upon the back with the thigh on the affected side flexed upon the abdomen so that the tissues about the field of operation are relaxed; then bear down carefully but firmly over the free end of the rib with the fingers until one finger can be hooked underneath the end of the rib; then with the other hand over the vertebral end of the rib, have the patient take a deep breath, at the same time springing the ends of the rib toward each other, thus relaxing the rib from its locked position; then have the patient exhale quickly and at the same time spring the rib into its normal position. It oftentimes requires repeated trials, especially in stout persons, and quite often the operation is painful to the patient. It is necessary that one should understand this operation thoroughly, as it is one of the most common treatments in osteopathic practice. The floating ribs are very liable to dislocations and may be the cause of many pains in the side, disturbances of the vessels as they pass through the diaphragm and inflammation in the iliac region. A palliative treatment may be given the floating ribs by having the patient lie flat either on the back or on the side; then place the hand near the vertebral end of the ribs and raise them upward while the patient takes a deep breath.

Treatment of lesions between the **manubrium** and **gladiolus** are best given by placing the patient with the face downward upon the operating table, and having the articulation of the manubrium and gladiolus just over the edge of the table. An assistant should

hold the patient firmly upon the table while hyper-extension or flexion, as the case may require, with traction, is exerted upon the head, neck and shoulders, and manipulation of the articular points is given to reduce the dislocation. The same principles are employed here as in correcting lesions elsewhere.

Correction of the **cartilages along the sternum** is very easily accomplished by having the patient sit upon a stool and the osteopath standing behind the patient places a knee in the back; then reaching around with one hand over the cartilages and the other hand underneath the axilla, execute the same movement as given in correcting dislocations of the sternal ends of the ribs.

A treatment sometimes used to release a depressed condition of the **cartilages** of the **false ribs** is to stand behind the patient while he sits upon a stool and reach around him with fingers underneath the cartilages and raise them upward as he inhales. By having the patient take a deep breath and then exhaling quickly while the fingers are over the cartilages a much better grasp of them can be obtained. This treatment should be carefully given, as there is danger of tearing the cartilages loose from the ribs.

The Dorsal and Lumbar Spinal Regions.—Here, as in other regions of the body, before an attempt is made to correct the vertebræ the muscles should be thoroughly relaxed. The easiest method to relax the muscles is to have the patient lie upon the side, and then by standing in front of the patient and reaching over him with the fingers upon the contracted muscles an upward and outward rotary manipulation is given; or the patient may sit upon a stool while the physician stands in front with the arms around the patient and the fingers over the contracted muscles manipulating them upward and outward. Another very easy method is to stand behind the patient while he sits upon a stool and place a thumb over the contracted fibres, with the other hand underneath the axilla lifting the shoulder upward and backward so as to favor a relaxation of the muscles, while the thumb manipulates them.

In relaxing the **muscles** of the **lumbar region** have the patient on the side upon the table; then flex the thighs upon the abdomen

with your weight against the knees so as to control all movements of the patient; reach over the patient with the fingers upon the contracted tissues and manipulate them outward and upward on either side until they are relaxed. A method sometimes employed to relax the muscles of the dorsal, lumbar and sacral regions is to place the patient flat on his face upon the table; then by pushing up on the muscles from above downward with the flat of the hand they are easily relaxed. This treatment should be especially given when the patient's muscles are contracted by atmospherical changes and from standing in one position for a long time. When the muscles of the back are contracting they draw downward and many times draw the ribs with them, as well as tensing the tissues over the sacral foramina and obstructing or irritating the sacral nerves.

To correct **vertebral lesions** of the **dorsal region** the same rules should be followed as in treating lesions of the cervical vertebræ. Treatments may be given with almost equal ease whether the patient is lying on the side or sitting up.

To illustrate the treatment of the dorsal region when the patient is lying down, assume that there exists a lateral lesion between two vertebræ; if the lesion is below the seventh dorsal use the legs as a lever, and if the lesion is above the seventh dorsal use the head and neck as the lever. Have the patient lie upon the side toward which the lesion is pronounced, either reach under the neck or around the limbs with one hand, and with the other hand upon the lesion bend the head and neck or the thighs in such a manner that the angle of the flexion is directly over the break in the spinal column, this is to exaggerate the lesion; then by lightly lifting up on the neck or limbs and with a slight rotation of this lever the flexed parts should be extended, at the same time exerting pressure with the hand over the lesion in such a manner that the vertebra is pushed forward toward its normal position.

Practically, the same treatment is given when a patient is sitting up, with the exception, of course, that the limbs cannot be used as levers. Lesions of the dorsal region or even the lumbar region can be corrected while the patient is sitting up. By

this method considerable lifting is done away with. In fact, the weight of the patient can be used to great advantage by substituting it for one's strength. No matter in what direction the lesion is, the physician reaches around the patient's shoulders so that he just holds the weight of the patient from falling to one side or the other; thus with one hand manipulating the lesion the other arm is around the patient guiding the weight of the body in flexion, rotation and extension. It is not necessary to lift up on the patient, but just let the weight of the patient act as strength applied to the power arm. Always make it a point when working upon dislocated vertebræ in any region that just as soon as one has obtained a slight movement in the lesion **do not attempt** to correct it any more for the time being. A slight movement toward the right direction may be all that is necessary to relieve the ill effects of the lesion. In fact it might be impossible to get the lesion anatomically correct as the shape of the vertebra may have conformed in a greater or less extent to its abnormal position.

When **posterior** or **lateral pathological curves** exist in the dorsal region, have the patient lie on the side, with one hand over the spines of the vertebræ and the other hand pulling forward and upward on the arm of the patient separate the vertebræ as much individually as possible. Another excellent method is to pass one of the arms underneath that of the patient while the patient has his arms thrown above the head; then with both hands upon the vertebræ, the fingers of one hand reinforcing those of the other, considerable strength can be exerted upon the vertebræ. The osteopath may also stand in front of the patient while he is sitting upon the stool and reach around with the hands upon the vertebræ and manipulate them. (See Spinal Curvatures).

To reduce vertebræ that are **deviated anteriorly** in the dorsal region, especially between the scapulæ, is often a hard matter to do. A satisfactory method is to stand behind the patient, while he is sitting upon a stool, and reach around both sides of him upon the sternal ends of the ribs corresponding to the anterior vertebræ; then have the patient relax with the head upon the chest, and at the same time take a full inhalation while

pressure is exerted posteriorly upon the sternal ends of the ribs. The object of this method is to pull back the rigid ribs (the lungs being filled with air) which are attached to the anterior surfaces of the transverse processes of the vertebræ, and thus upon the anterior vertebræ pushing them posteriorly; all of the muscles of the body being quite passive and the head relaxed on the body, a separation of the vertebræ is accomplished thus favoring a crowding posteriorly of the sub-dislocated vertebræ.

To correct **vertebræ** of the **lumbar region** is on the whole much easier than in the dorsal region. Here the legs can be used as levers to great advantage. By the same method of flexion, rotation, and extension, as employed in the dorsal region when the patient is lying on the side, the result can generally be obtained.

The lumbar region is frequently the seat of various lesions. Very common lesions of the lumbar region are slight posterior or lateral curves; also, lesions between the twelfth dorsal and first lumbar, and lateral and rotary lesions between the fifth lumbar and sacrum.

The Abdomen.—Direct treatment of the abdomen is given in many diseases of its organs. The patient should lie flat upon the back, the legs flexed upon the thighs and the thighs flexed upon the abdomen, so that the abdominal muscles will be thoroughly relaxed; and then the various organs of the abdomen can be manipulated with ease. Remember that in many diseases of the abdominal viscera the treatment of the splanchnics and vagi will be the primary treatment rather than direct abdominal treatments.

In treating the **liver** directly, the ribs over the liver should be raised and separated, and the lower border of the liver manipulated directly, as considerable therapeutic results can be obtained, particularly when the liver is congested and enlarged. Manipulation of the **bile ducts** is very essential in all liver diseases, especially in "bilious" attacks. The treatment relieves congestion of the ducts and removes any collections of mucus in the ducts due to the congestion, as well as freeing obstructed flow of bile. The manipulation should be a deep, downward one, direct-

ly over the path of the ducts (from about the cartilage of the ninth rib to the duodenal orifice of the biliary tract, the latter being about one and one-half inches diagonally downward and to the right of the umbilicus). Be very careful when first manipulating, and bear down lightly over the duct so that the structures superficial to it may be relaxed as the duct is deep below the surface of the abdomen. Usually the gall-bladder can be emptied by light pressure over the skin above the cartilages of the eighth, ninth and tenth ribs. The light manipulation acts, probably, by way of the spinal segment, as a stimulus to the dilators of the sphincters of the gall-bladder.

Manipulation of the **stomach** has considerable effect in strengthening its circular fibres and toning up the coats in general. In cases of gas formation, the gas in some instances may by manipulating over the stomach, be forced through the cardiac or pyloric orifices.

Direct treatment over the **spleen** by raising the eighth, ninth, tenth and eleventh ribs of the left side is very effectual in congestion and enlargement of the organ.

In thin subjects the **kidneys** can be treated directly by pressing down carefully but deeply over the kidneys, and lightly crowding them upward and outward. This treatment also has some effect in relieving contracted tissues about the renal vessels and kidneys.

Treatment to the **intestines** through the abdomen is an effective treatment. In the various obstructions to the intestines, constipation, etc., the direct work is essential. Treatment of the intestines is to correct any abnormal position that they may have assumed, to relieve constrictions of the gut caused by contracted tissues, to relieve impactions, to increase peristalsis and to tone up the intestinal coats in general. The treatment consists in a manipulation of the intestines, especially in the right and left iliac fossæ, as impactions and prolapses of the gut are more liable to occur at these points than in any other locality. In manipulating the instestines, work for a definite purpose and not give a general kneading treatment unless the walls of the abdomen and the coats of the intestines are weakened; in the

latter case the spinal treatment is the primary one. In treating over the iliac region, draw upward and inward on the folds of the gut. It is claimed by some authorities that nerves pass from the cutaneous surface of the abdomen directly to the intestine by way of the peritoneum; if such is the case, manipulation of the abdominal walls would have direct effect upon these nerve fibres. The abdomen may be treated when the patient is sitting up, but the treatment is not satisfactory. (See Prolapsed Organs).

The Pelvis.—The treatment of the pelvis is easy, but the difficult work is in making a diagnosis of the position of the pelvic bones. The pelvis is especially apt to become deranged by jars and falls. Some of the most successful osteopathic results have been obtained in correcting the pelvic region.

To relax the muscles over the pelvis, the patient should be on the side or upon the face; then relax the muscles by manipulating them upward, chiefly those over the sacral foramina. The easiest method to correct the innominata is to have the patient lie upon his side; then by standing in front of the patient slip one hand between the thighs and grasp around the tuberosity of the ischium, and with the other hand upon the crest of the ilium, the innominatum can be moved upward or downward and forward or backward (wheel and axle principle). Simply pulling or pushing upon these two points in whatever direction necessary is all that is required. By having the patient flat upon the back practically the same treatment can be given, but not to so great an advantage. In cases where the ilium is posterior and the ischium anterior, the physician may stand back of the patient, while he is lying upon his side, and place one knee against the sacrum and with one hand upon the ilium, with the other take hold of the ankle of the affected side (the involved side being uppermost in all cases where the patient is lying upon his side), pressure can be exerted upon the ilium and the limb pulled backward, thus correcting the derangement. This treatment should be avoided as much as possible, as there is considerable danger of pulling back too severely and injuring the patient; the lever is long and the amount of force exerted upon it cannot be judged precisely.

To correct a rotary lesion between the pelvis and fifth lum-

bar the patient should be placed upon the side, and with the body held firmly, the pelvis can be forced backward or forward as the occasion demands. (See Coccyx).

The Legs.—The origin of many symptoms manifested in the legs, as in the arms, are due to spinal lesions corresponding to the region of innervation to the affected tissues. The derangements of the pelvic bones are a frequent source of symptoms that are referred to the legs and feet. The osteopath finds that a slight dislocation of the hip may occur which is especially likely to affect the knee. This partial dislocation is apt to be an upward-posterior one; the head of the femur resting in the upper and posterior part of the acetabulum. Many diseases of the legs and feet are due to local displacement of the bones. The method of treatment is the same as given in surgical works. (See Sprains).

A general treatment of the legs and thighs is oftentimes necessary; it consists of flexing the thighs quite firmly upon the abdomen, and executing thorough external and internal rotary movements of the thighs and legs. In a few cases both limbs are flexed strongly at the same time upon the abdomen. After giving these movements manipulation over the saphenous opening and beneath the popliteal space is performed. This general treatment tends to increase the circulation of the entire limb and to relax thoroughly all contracted fibres.

The Arms.—In treating the arms, care has to be taken that the affection is not due to spinal derangements; otherwise the arms are manipulated according to the disorder. Complete dislocations of the shoulder comes under the province of surgery. Many times the osteopath locates slight or incomplete dislocations of the shoulder. Partial dislocations of the shoulder are generally anterior. (See Sprains).

In cases where pain exists in the shoulder or arm, outside of locating the cause in the shoulder joint, the affection may be due to fibres contracting over the coracoid process, or a dislocation of the second or third rib, and in some instances the clavicle is deranged. Occasionally muscular fibres may slip out of the bicipital groove. Dislocations of the bones of the arm are treated according to surgical methods. The pains and various trouble-

some symptoms that may be manifested in the fingers or the hands are oftentimes caused by slight dislocations of the elbow, shoulder, ribs, or vertebræ, as low as the sixth to eighth dorsals.

The coccyx.—The coccyx, owing to its exposed position and rather unstable attachment, is subject to many injuries; more indeed than come to notice. Its injury results in many local and general disturbances owing to its close relation to the sympathetics. Successful treatment of deviations often bring startling results. They may be divided into **fractures** and **displacements.**

In **complete** or **partial** fracture of the coccyx, as well as in dislocation, if the patient can be seen with reasonable promptness after the accident much can be done for relief of the pain and the prognosis is good for complete recovery.

Examination should be made externally and internally and after the condition is diagnosed about the same procedure is indicated for any of the conditions. With the patient on the left side introduce the right index finger, well lubricated, into the rectum and carefully relax all tissue within reach of the tip. If there are spasms of the coccygeal muscles, inhibition of the anterior nerves will quiet them. When this has been done place the left index finger externally along the body of the coccyx and holding it firmly both within and without put it into position. After this has been done it is well to hold it there until all danger of returning spasm, which might displace it again, is over, when the finger can be withdrawn.

The pain following will depend on the severity of the injury, but will keep up more or less constantly for several days. When severe, relief is often given by introducing the finger and relaxing contracted tissue which is pulling it from its position. Hot water bags placed next to the part will be of benefit. The bowels should be kept confined for forty-eight hours if possible in cases of fracture. Watch carefully the progress of union that the bones are *in situ* so there will not be deformity.

In diagnosing the first injury be sure that there is no splitting of the first segment or splinters which may require surgical interference. In old cases of fracture where there is complete bony ankylosis it is not justifiable to attempt any change, but

where there is motion and a fibrous union, after preparatory treatments about one week apart, it can usually be pushed into position. Look well to any muscular contractions which might interfere with it. Force must never be used nor any attempt to replace until it has been first released from its articular attachment. In the various forms of **displacement** the same technique applies as in fractures, or the finger and thumb of one hand may be used, the tip of the finger internally at the sacro-coccygeal articulation and the thumb externally at the same point. Complete control of the part is secured in this manner. Great care must always be used in treatment of any displacement of the coccyx. Contractions of its muscular attachments will often cause deviations in contour. Removal of the irritation and relaxation will allow it to assume its normal position.

The sacrum.—Adjustments of the sacrum as distinguished from the ilium in strictly innominate lesions are not many. When posterior, with the patient on a stool the knee of the osteopath covered by a pillow and placed against the sacrum and both hands grasping the anterior borders of the ilia, strong traction will move it into position. In a downward displacement with the aid of an assistant from behind holding the crests of the ilia firmly as the patient sits on the table, the osteopath in front clasping both arms about the patient and with a rocking motion from side disengages the sacrum and at the same time lifts it into position.

For anterior displacements use the technique described in replacing upward and backward innominate dislocation first right side and then left, which will result in correcting the lesion.

The preceding osteopathic technique includes the majority of treatments given by the osteopath. Although many osteopaths use methods not given here, they have been left out, as some are dangerous treatments and should be excluded from osteopathic therapeutics, and besides those outlined are sufficient for treatments in all practical work and will be found extensive enough for all illustrative purposes. A point which cannot be too thoroughly impressed upon the student is that osteopathic treatment is in reality **constructive** work, that is, re-adjustive, not

only in detail, but in viewing the body structure as a whole. Detailed readjustment is an essential, still do not lose sight of the relation of the part to the whole. In our distinctive work anatomical construction is the basis of physiological function, although physiological stimulus is essential to anatomical development.

How often to treat.—How often to treat a case depends entirely upon the nature of the disease from which the patient is suffering. Just as in giving drugs the frequency of treatment is entirely dependent upon the seat of the disease and its severity. Acute cases require a thorough treatment at least once daily, and many times in severe cases the treatment has to be repeated several times daily. In subacute and chronic cases, as a rule, treatment should not be given as often as in acute cases; possibly once a day, but usually alternate days is better. In office practice cases are commonly treated two or three times weekly. Still it is better not to treat some cases oftener than once per week.

There is more danger in treating too often than in not treating often enough. The distinctive work of an osteopath is to correct disordered anatomical structures; and when a certain derangement has been corrected the tissues should have rest and plenty of time for repair. When treatments are given often, it simply keeps the tissues in an irritated state and nature does not have time to heal the diseased tissues. Always make it a point at each treatment to correct some definite lesion, and when the work is accomplished let the parts alone until the tissues have recovered as much as possible from the effects of the previous treatment before another treatment is attempted. The reason why some cases do not get cured under osteopathic treatment is simply because the osteopath keeps the diseased tissues in an aggravated state by the constant treatment so that they do not have the least chance to heal; the physician is thus adding irritation to the disease.

It is only by experience that one can tell how often to treat. Each case is a special study; what would be quite sufficient for a certain individual with a given disease would not be at all suitable for a second individual with the same disease. As in drugs

what is suitable for one person would not be adapted to another, because the make-up of each individual is entirely different from others; but here the parallelism diverges, for in drugs there is a foreign agent introduced into the system, while in osteopathic treatment the curative agent is entirely harmonious with the idiosyncrasies of the individual. It is for this reason that experience in practice is so essential.

Most cases should not be treated, as a rule, after a meal unless the patient is suffering from some digestive disturbance; for in treating other regions of the body outside of the digestive tract causes more or less stimulation of the parts treated and thereby draws blood away from the organs of digestion. Cases of disordered brain circulation, where the patient is unable to rest or sleep at night, should be treated at about their retiring time so that the circulation of the body may be equalized, thus giving the patient undisturbed rest.

To show in a practical way the methods of experienced osteopaths in this matter G. J. Helmer[1] is quoted: "I submit the following table to illustrate the frequency of treatment in one hundred cases taken from my practice: one case three times per week, sixty three cases two times per week, twenty-two cases one time per week, nine cases once every two weeks, five cases once every four weeks. Comparing the present with the past, I find I am lengthening the time between treatments with much better results."

Another very practical side of the question and one which will be greatly appreciated by the patient, is the lessened cost for the same result in the less frequent treatment, as well as the saving in time. With the loss in going to the office, rest after treatment, not to mention possible wait while there, three times weekly represents more time than the average person can well spare and not infrequently will deter him from continuing. More especially is this true of those coming from a distance.

Length of Treatment and Overtreatment.—Naturally the length of treatment depends upon the case at issue and nothing more. There is no reason why any two cases should be treated

1. Journal of the American Osteopathic Association, Dec., 1903.

for the same length of time unless they present identical lesions and then the personal equasion of the two might present such a wide difference of aspect as to forbid such a proceeding.

The question of time has no place in the matter, save that it must not exceed physiological limits and be sufficient for the needs of the case. The patient should understand at once that it is to accomplish a specific purpose that the treatment is given, just as definite as a surgical or dental operation, and when the work is done it is time to stop. He would hardly be attracted to the dentist who guaranteed to use forty-five minutes in extracting a tooth. Good judgment is required in this as in all matters pertaining to osteopathy. There is a generally expressed opinion among the older osteopaths, based on experience, that: first, a short specific treatment is productive of best results and, second, treatments given under high tension when quick work is necessary are most satisfactory. Long treatments are debilitating and over stimulation amounts to inhibition. Further, in a long treatment it is necessary to go over the whole body, thus dispersing the vital forces (which have been stimulated for healing and upbuilding the pathological area) to parts not involved, thus defeating the very purposes intended. Dr. Still has always advocated and given the short, specific treatment.

The point always to be considered is the individual characteristics of the patient, and effects of the first treatment should be carefully observed. After a patient has been under treatment for any considerable time it is well to give him a vacation from treatment, and it is remarkable what improvement will be shown at times by such a measure and how seldom he will lose ground. Dr. Still presents this subject vividly in his late work as follows: "To treat the spine more than once or twice a week and thereby irritate the spinal cord, will cause the vital assimilation to be perverted and become death producing by effecting an absorption of the living molecules of life before they are fully matured and while they are in the cellular system, lying immediately under the lymphatics. If you will allow yourself to think for a moment of the possible irritation of the spinal cord and what effect it will have on the uterus, for example, you will realize that I have told

you a truth. Many of your patients are well six months before they are discharged. They continue treatment because they are weak, and they are weak because you keep them so by irritating the spinal cord." It is not a rare experience for a patient to leave apparently with little or no improvement only to report a complete recovery a little later.

Misapplied Treatment.—Probably in spinal treatment more risks are taken than in any other region of the body. To us as a school it is by far the most important and interesting area we have to treat, consequently it is not surprising that various general treatments and methods have been devised with the idea of getting quicker and easier results. Herein lies the danger outside of mistaken diagnosis, for short cut treatments can never take the place of time and skill. Technically speaking, if one thoroughly understands the philosophy of osteopathy and is conversant with the underlying principles of its therapeutics, there is absolutely no danger of even the slightest injury. It is the one who takes chances by not properly diagnosing and by not being cautious enough with delicate people when applying his treatments that is apt to overstrain some tissue or organ and otherwise do bodily harm. Of the treatments considered dangerous not one of them is without merit if judiciously applied, but unfortunately in many cases they are in general and indiscriminate use. It is well to remember that we are moving structures which have never been moved before and that time enough has not elapsed to observe what the ultimate result may be. Again, in adjusting a subluxation of the spine do not forget that the force necessary for that adjustment, if misapplied, is sufficient to produce a lesion, and there is no doubt that this has happened. Your patient's interests are above everything and must never be sacrificed for any reason whatever, so if at any time there is uncertainty always give the patient the benefit of the doubt. On the other hand the osteopath must have the courage of his convictions and fortunately when these are coupled with good judgment the results are all that could be desired. The following should be used with great caution if used at all:

First, **Indiscriminate stretching** of the spinal column with the aid of an assistant. It is not good osteopathy although there are some cases where it may be beneficial. While not specially dangerous, generally, in delicate patients, elderly people, arterio-sclerotic conditions, and in some stages of Pott's disease it is absolutely contra-indicated. Moreover in most spinal cases except impacted vertebræ and symmetrical curvatures the stretching of the vertebral ligaments locks the lesion firmer.

Second, **Extreme rotating** of the cervical region. This cannot be considered good treatment in any case with the exception of the muscle stretching. On the contrary it is dangerous; first, it is not osteopathy for it is not specific; second, the nervous shock is severe, an important consideration in delicate people; third, the cervical ligaments become stretched and the vertebræ are easily displaced, while damage to a diseased vertebra, an aneurism or in arterio-sclerosis would be irreparable. No other region of the body should have greater care in treatment than the neck.

Third, **Hyper-extension** of the spine with the patient on his face. This treatment is rarely indicated. In fact, it is barbarous and a relic of an early day. Possibly more cases have been injured by this treatment than all others combined.

Fourth, **Rough separating** of the vertebræ and ribs while the patient is on his face. This is a most excellent treatment in many cases, but great judgment is necessary. Delicate patients, heart disease, and necrosed vertebræ and ribs should be carefully excluded.

Fifth, **Innominate adjustments** such as placing the patient on the side and putting the knee against the sacrum while grasping the leg at the knee. Or, the placing of the patient face down with one hand on the sacrum and the other holding the knee. In both these there is a tremendous leverage and in the latter the strain is at the lumbar rather than where needed. There are other unnecessarily risky methods for this operation, while it is easy to perform in most cases and without danger.

Sixth, **Abdominal treatment** gives wonderful results when intelligently applied, but it may be productive of great harm in conditions of tumors, malignancy, and pus formations.

Misapplied treatment is always dangerous, no matter to what part of the body given, and it is proof of wrong diagnosis when given. As a rule treatment is given without proper diagnosis in such cases, so a misapplied treatment has two interpretations—first, ignorance; second, laziness. In the former lies the greater danger for ignorance coupled with force and lack of skill is an appalling combination.

Cases are frequently reported where tumors have passed from the vagina, rectum, nose, etc., the osteopath thinking it was the result of good treatment, without considering that it was simply the breaking of a long pedicle with great danger from hemorrhage. The greatest care should be exercised in treating cases where aneurism, osteomalacia, and arterio-sclerosis are present, also in the leg treatment of tabes dorsalis and in the weak, thin ribs of elderly people and those with a gouty or rheumatic diathesis. Imagine treating an abscess directly, yet it has been done, as have varicose veins with the terrible danger of rupture and embolism. Aneurisms have been ruptured in the same way.

One could go on indefinitely with this subject, but to sum up: if the osteopath is not familiar with the feel of the living anatomy in its giving and resisting under treatment both in health and disease and does not know his osteopathy, nothing can prevent him doing harm. A successful practitioner means an understanding of pathology, then experience plus common sense.

OSTEOPATHIC CENTERS.

"Osteopathic spinal centers" was a term commonly used in the early period of osteopathic development. From the facts, first, that a few centers have been actually determined in the cord, viz., genito-urinary, vaso-motor, etc.; second, that the innervation from the spinal segment to various thoracic, abdominal and pelvic viscera correspond with a considerable degree of accuracy to certain vertebral sections, and third, displacements of the spinal column tissues affect viscus integrity, depending upon the locality of the structural perversion as to the organ involved and is a clinical observation of great import, arose the misnomer "osteopathic centers." For one to ask what "centers" should be "treated" in this or that disease shows a lack of the conception of osteopathy as if he asked what "movements" to give when "treating" a certain disorder. It is as unosteopathic, as unscientific, broadly speaking, to suppose osteopathic technique implies the application of movements to certain nerve centers.

Osteopathic Stimulation.

"Osteopathic stimulation" is another term loosely used without extensive clinical experience to support it. Mechanical stimulation is frequently utilized in the physiological laboratory. But to employ it extensively and comprehensively in the treating room or at the bedside the therapeutic potency of it will be found wanting; that is to employ it to the exclusion of that most important basic treatment, readjustment, is a great mistake.

Clinically, the pathologically slowed heart may be stimulated by a stimulus to the cervical sympathies, the gall-bladder emptied by a stimulus near the costal cartilages of the ninth and tenth ribs (this is probably via the spinal segments), etc. Normally, these organs and others may be temporarily stimulated. Experimentally, Burns[1] of Los Angeles and Pearce[2] of San Fran-

1. Burns—Partial Report of Experiments upon Visceral Reflexes. The Osteopathic World, Aug., 1905.
2. Pearce—Some Laboratory Demonstrations of Osteopathic Principles. The Osteopathic Physician, Nov., 1905.

cisco have shown the potency of osteopathic mechanical stimulation. For example, stimulation (mechanical) in the middle and lower dorsal regions irritates and increases peristaltic action and vaso-constriction in the stomach and intestines.

Osteopathic Inhibition.

Likewise the term "osteopathic inhibition" has not always been scientifically employed. Mechanical inhibition is probably used less frequently than stimulation but still it is of more importance.

Clinically, to relax contracted muscles by inhibition, to relieve neuralgia by impinging nerve courses, to relax the cardiac orifice of the stomach by pressure at the ninth or tenth dorsal vertebra on the left side, etc., are excellent examples of the therapeutic value of inhibition. Experimentally Pearce and Burns produced the opposite results to that of stimulation. Inhibition in the middle and lower dorsal region caused relaxation of the muscles of both the stomach and intestines, decreased peristalsis, and caused dilitation of the blood vessels.

The employment of stimulation and inhibition rounds out to a certain extent our therapeutics, that is, makes it more practical and specific. We should not, however, over-rate the relative value of stimulatory and inhibitory treatment as compared with the readjustive treatment. Not but what the former is of considerable practical importance, but the point to be emphasized is that it gives a scientific demonstration of how pathological effects result, if long continued, from the various osteopathic lesions. In a word it shows the physiological process from cause to effect, or rather a step in the beginning pathological (perverted physiological), in many disturbances.

Therapeutically, all will agree with Cherry[1] that "stimulation and inhibition should be employed in all forms of acute disease as palliative measures until such time as the primary lesion may be removed."

1. Stimulation—Leslie E. Cherry, Journal of the American Osteopathic Association, Feb., 1905.

Osteopathic Re-Adjustment.

Readjustment or adjustment is many times particularly emphasized in this work as the key to osteopathic therapeutics.

If the theory of readjustment can not stand the most searching tests of science osteopathy will have to be relegated to a most subservient place, on a par with massage, Swedish movements, and various medical gymnastics. Consequently the readjustment theory is again referred to, and especially so when the subjects of osteopathic centers, stimulation and inhibition are outlined.

No doubt many stimulatory (so-called) and general treatments exert their greatest influence by inadvertently readjusting tissues. Then how much more effective would the readjustment treatment be if applied intelligently. In certain acute disorders, e. g., "colds," immediate relief is often obtained by relaxing muscles through either stimulation or inhibition; in reality the final result, as far as the muscle is concerned, is one of readjustment. Likewise in stretching and rotation of tissues and sections of the body the effect may either be stimulatory or inhibitory, and still it may be, also, readjustive.

After all has been said the ultimate physiological effect of any of these treatments, if of any therapeutic value, must be one of stimulation to a part or to the body generally. But there is a vast difference between physiological stimulation and the one method of obtaining the same termed mechanical stimulation. It is not the purpose here to enter into anything like an exhaustive survey of stimulation and inhibition but simply to outline a few practical hints on the relative values. Everyone is aware that over-stimulation is equal to inhibition, and even applying it to very delicate subjects the therapeutic end we may wish to obtain may be lost and as a consequence the patient exhausted. And whereas at the same time readjustment possibly could have been employed and real permanent effects secured.

So we should whenever possible utilize the basic principle of our therapeutics, readjustment, for this represents in the majority of cases, first, permanent results; second, a saving of much

time, and third, less exhaustion on the part of both patient and physician.

McConnell[1] has shown in his series of laboratory experiments on animals the reality and potency of the readjustment fundamental. The effect of malaligned vertebræ and ribs upon contiguous vascular channels and nervous tissues, not only affects immediate skeletal muscles (simple contractions or even produces interstitial myositis), but through narrowing of the intervertebral foramina and tension upon the fibrous tissue anchoring the spinal nerve in its exit, and through pressure and strain of the sympathetics in contact with the heads of the rib and secured thereby the parietal layer of the pleura, organs of corresponding cavities become diseased. Some of the diseases produced in the series of experiments were catarrhal and parenchymatous changes in the stomach and intestines, congestion of the liver and spleen, acute nephritis, goitre, inflammation of the lymphatics, edema of the cornea, and degenerations of nervous tissues.

The osteopath, as stated, may inadvertently correct osteopathic lesions. *Vis medicatrix naturae* undoubtedly corrects many osteopathic lesions; this is evident from the fact that many bodily strains, sprains, and injuries are overcome naturally or involuntarily, that is, without any voluntary assistance from an osteopath. On the other hand all osteopathic lesions are not due to outside influences or forces, e. g., in pneumonia the severely contracted dorsal muscles often partially dislocate the vertebral ends of the ribs and thus increase the seriousness of the disease; and this is true in many acute conditions wherein visceral changes will reflexly contract spinal muscles and also through these contractions produce osseous lesions. Herein is where osteopathic treatment in acute diseases will not only correct the primary lesion but also these secondary ones and thus abort, or shorten, or lessen severity, or prevent complications of the disease. But it should always be borne in mind that when certain disease processes occur it will take a definite time at best for curative changes to predominate. In other words pathological changes are just as real and potent

1. McConnell—The Osteopathic Lesion,—Journal of the American Osteopathic Association, Sept. and Dec., 1905, May, 1906.

as physiological facts or anatomical data and the character of the same should always be considered.

Consequently in readjustment work a distinctive etiology and pathology has to be taken into account. The color, contour (whether the lesion is simply a local one or there is a composite or group lesion), condition (irritation, debility, contractions, and tenderness), and movement of the several regions, and the spine as a whole should be noted. And the student should always keep in mind the osseous vertebral lesion may be, (a) a twist between two vertebræ (this generally means a rotation of one section of the spine on another section), (b) malalignment of several vertebræ (the composite or group lesion), and (c) the impacted or strained lesion, (this is a lesion that Clark attaches considerable significance to, wherein there is injury to the articular surfaces and ligaments without osseous derangement, followed by exudation and other inflammatory products, limited motion, etc.).

Vaso-Motor Nerves.

It is extremely important that the osteopath should be thoroughly conversant with the regions where he may effect the vaso-motor nerves to various tissues and organs. Many anatomical derangements undoubtedly involve the vaso-motor nerves, and it is therefore necessary to know where they may be affected. The following table is taken mostly from the physiology of Landois and Stirling, but many of the statements have been noted at various times; it is, therefore, impossible to give full credit.

The vaso-motor center is in the medulla, consequently, the osteopath gives cervical treatment to influence this center. Treatment of the upper cervical region has undoubtedly a marked effect in tending to equalize the vascular system of the body, when it is disturbed.

Head.—The cervical sympathetic for the same side of the face, eye, ear, salivary glands, tongue, etc., and possibly the brain. Lesions are found in all the tissues about the cervical region, but usually in the vertebræ, which influences these nerves. Deep contracted muscles oftentimes involve them. The spinal

vaso-constrictors for the vessels of the head are from the first five or six thoracics. Many lesions are located in the upper five or six dorsal vertebræ, or corresponding ribs, that have apparently a direct influence upon the vessels of the head. Not only congestive headache and congestion of the brain tissues are influenced by lesions in this region, but disease of the eye, ear and face occasionally arise from such derangements. It is always best when the head, neck or even the arms are involved, to examine carefully this region. Vaso-dilator fibres for the face and mouth are found from the second to the fifth dorsals; these fibres unite almost entirely with the trigeminous, and pass from the superior cervical ganglion of the sympathetic, to the ganglion of Gasser. This fact is of great importance to the osteopath, for oftentimes when inflammation of the face and mouth occurs, lesions may be located along the upper dorsal vertebræ or ribs, or in the deeply contracted muscles of this region. Observation revealed in several cases of erysipelas that the causative lesion was located in the upper dorsal region; and the cases were cured by correcting these lesions, thus showing that probably the vaso-motor nerves were the seat of the trouble. Other dilator fibres arise apparently in the trigeminous, for stimulation of this nerve between the brain and Gasser's ganglion causes dilation of the vessels of the face. The lingual and glosso-pharyngeal nerves are the dilators of the lingual vessels. The sympathetic and hypo-glossal are the constrictors; these arise in the sympathetic and reach the nerves by way of the superior cervical ganglion. Stimulation of the cervical sympathetic causes constriction of the retinal vessels. This point is extremely interesting to the osteopath, because diseases of the retina and optic nerve, are oftentimes due to subluxated cervical vertebræ, usually the atlas or third cervical. The retinal fibres leave the sympathetic at the superior cervical ganglion and pass along the communicating ramus to the ganglion of Gasser, from whence they reach the eye through the ophthalmic branch of the fifth nerve, the gray root of the ophthalmic, the ganglion and the ciliary nerves. Most all the fibres to the anterior part of the eye are found in the fifth nerve; this, also, is another important point for the osteopath's

consideration. Cases of conjunctivitis, keratitis, corneal astigmatism and diseases about the eyelids and tear ducts are usually caused by lesions to the fifth nerve, due to a deranged atlas or third cervical. The vaso-dilators for the anterior part of the eye, and also dilating fibres to the iris may be effected at the first and second dorsals. This point is also taken advantage of by the osteopath, for lesions of these fibres occur oftentimes at the upper dorsal. It is claimed that important fibres, that aid in the control of the metabolism of the retina, may be affected at the fourth and fifth dorsals.

Lungs.—Reflex constriction by stimulation of the intercostals, central end of the sciatic, abdominal pneumogastric and abdominal sympathetic. The essential feature to the osteopath is that the vaso-constrictors to the lungs and bronchial tubes are very likely to be interfered with by rib and vertebral dislocations, from the second to the seventh dorsals, inclusive, but chiefly at the third, fourth and fifth. The heaviest innervation being from the third, fourth and fifth spaces, probably, accounts why asthma is usually due to a dislocation of the third, fourth or fifth rib.

Heart.—Vaso-motor fibres to the coronary arteries are found in the vagi.

Intestines.—Sympathetic, chiefly through the splanchnic nerves. Vaso-constrictors of the jejunum from the fifth dorsal down, for the ileum slightly lower and for the colon still lower. There are none below the second lumbar. Dilators are present in the same sheath, but more abundant in the last three dorsals and the upper two lumbars; all probably end in the solar and renal plexuses.

Receptaculum Chyli.—Stimulation of the splanchnics causes dilatation.

Liver.—The splanchnics chiefly on the right side. The vagus contains vaso-dilators. There are also fibres from the inferior cervical ganglia of the sympathetic.

Kidneys.—Vaso-motor nerves from the sixth dorsal to the second lumbar, but principally from the ninth to twelfth dorsals, inclusive. In the large majority of kidney diseases, lesions are

found from the tenth to the twelfth dorsals. Stimulation of the sciatic centers causes contraction. There are also fibres from the superior cervical ganglion.

Spleen.—Vaso-motor fibres are in the splanchnics, principally, on the left side. There are some fibres direct from the brain. Stimulation of the vagi contracts the spleen.

Portal System.—Fifth to ninth dorsal.

Generative Organs.—For Fallopian tubes, uterus, vagina, vas deferens and seminals vesicles, vaso-motor fibres are found in the lower dorsal, and the second, third, fourth and fifth lumbar nerves, principally.

Coccyx and Immediate Region.—Third lumbar down.

Back Muscles.—Dorsal branches of the lumbar and intercostal nerves. These nerves arise from the gray ramus of the corresponding sympathetic ganglia.

Arm.—From the brachial plexus, the sympathetic, inferior cervical ganglion and first thoracic ganglion, and sometimes lower.

Leg.—Second dorsal down, the sciatic and crural nerves, and the abdominal sympathetics.

Sensory Nerves.

Inhibition of various regions along the spinal column is frequently given by the osteopath to lessen pain. It is only a temporary or palliative treatment, but many times gives great relief. One should inhibit usually over tender points and contracted muscles. These (tender points and contracted muscles) are signs to the osteopath that disturbances exist at these points. The following table is taken from Quain, which is Head's classification:

Heart.—First, second and third dorsals.

Lungs.—First, second, third, fourth and fifth dorsals.

Stomach.—Sixth, seventh, eighth and ninth dorsals. Cardiac end from sixth and seventh. Pyloric end from ninth.

Intestines.—(a) Down to upper part of rectum, ninth, tenth, eleventh and twelfth dorsals. (b) Rectum, second, third and fourth sacrals.

Liver and Gall-bladder.—Sixth, seventh, eighth, ninth and tenth dorsals.

Kidney and Ureter.—Tenth, eleventh and twelfth dorsals. Upper part of ureter, tenth dorsal. At lower end of ureter, first lumbar tends to appear.

Bladder.—(a) Mucous membrane and neck of bladder; (first) second, third and fourth sacrals; (b) over distension and ineffectual contraction, eleventh and twelfth dorsals, and first lumbar.

Prostate.—Tenth, eleventh (twelfth) dorsals. First, second and third sacrals, and fifth lumbar.

Epididymis.—Eleventh and twelfth dorsals and first lumbar.

Testis.—Tenth dorsal.

Ovary.—Tenth dorsal.

Appendages, etc.—Eleventh and twelfth dorsals, first lumbar.

Uterus.—(a) In contraction, tenth, eleventh and twelfth dorsals, and first lumbar. (b) Os uteri; (first) second, third and fourth sacrals (fifth lumbar very rarely).

Other points are used by the osteopath to relieve pain of certain regions, for such the reader is referred to the article on neuralgia; besides many tender points are found along the spine by the osteopath, where inhibition gives relief to the patient, provided such points have a connection with the case in question. (For further detailed information relative to vaso-motor and sensory centers see Riggs' Theory of Osteopathy, p. 95).

PATHOLOGICAL SPINAL CURVATURES.

Spinal Curvatures.

Any deviation of two or more consecutive vertebræ from the normal curves of the spinal column is usually termed by the osteopath a pathological curvature. Of the common pathological curvatures of the spinal column there are found: (1) scoliosis or lateral curvature, (2) kyphosis, or excurvation, an antero-posterior curve with the convexity backward, and, (3) lordosis, or incurvation, an antero-posterior curve with the convexity forward.

Osteopathic Etiology.—Of primary importance in the causation of pathological curvatures of the spinal column, are injuries to the spine, such as strains, falls, blows, and various physical forces, acting directly or indirectly, as injuries to the chest, pelvis and limbs. The osteopath in his daily work finds more curvatures, as well as acute and chronic diseases, resulting from some simple injury to the spine, as a slip, strain or twist, than from any other cause. The dire effects of any violence to the spinal column cannot be overestimated.

Among **predisposing causes** may be mentioned, continued ill health, general weakness, rapid growth, rachitis, tuberculosis, etc. Any habitual one-sided position may result in a curvature. An injury to the chest, adhesions from pleuritis, chronic liver disease, obliquity of the pelvis producing unequal length of the legs, carrying heavy weights on one side, and various morbid growths of the chest and abdomen, may all produce curvatures. Many cases are found in school children who are growing rapidly, and whose muscular strength and development do not keep pace with their growth. Unilateral atrophy of the muscles, due to central changes or overuse, may be the cause of deviations of the spinal column. Sacro-iliac disease in some instances is a potent factor. Thus there may be a great variety of causes productive of the incipiency, and the spine being strained or irritated at a single point and in a certain way gradually develops a curvature.

Scoliosis.—This is the most common spinal deformity and is characterized by lateral deviation from the median line. In most cases the curve is to the right in the upper dorsal region, with a compensatory curve in the opposite direction in the lumbar region. The curve being to the right, in the majority of cases, is probably due to the fact that most people are right-handed.

Morbid Anatomy.—The vertebræ in the region involved are rotated so that their spinous processes point toward the concavity of the lateral curve. The bodies of the vertebræ on the side next to the concavity are thinner, due to absorption; the intervertebral discs are made thin on the same side by pressure and absorption. The ribs are considerably distorted, depressed on the concave side and prominent on the convex side. The ligaments on the concave side are contracted, and stretched on the convex side. The muscles on the concave side are more or less contracted, and on the convex side they are stretched, causing atrophy and fatty degeneration of their tissues.

Kyphosis.—This may be a slight posterior curve really amounting to nothing, or it may be a very grave pathological condition as in Pott's disease. Therefore it is very necessary that one should make a most careful diagnosis (see Pott's disease).

The most common **causes** of kyphosis are, Pott's disease, rachitis, occupation, general weakness, rheumatism and old age.

In Pott's disease, the posterior curve is characterized by a sharp angle, and by the spine being very rigid. This, taken in conjunction with the history and other symptoms should be sufficient to enable one to make a diagnosis.

The condition of round shoulders, which in time produces marked kyphosis, is rarely a habit as it is usually termed. In nearly every case it indicates, either a weakness of the back muscles, or what is more apt to be the cause, a strained posterior condition of the dorsal vertebræ, commonly of the lower dorsal region.

Morbid Anatomy.—In mild cases there is simply a relaxation of the ligaments of the vertebræ and a separation of the laminæ and spinous processes. In severe forms there may be absorption of the anterior portion of the intervertebral discs and the bodies of the vertebræ (Pott's disease).

Lordosis.—This may be a congenital condition, especially when occurring in the lumbar region. Anterior curves of the spine are generally found in the lumbar or cervical regions, but occasionally occur in the dorsal region, causing the spinal column to be more or less straight, and thus weakening the individual. This curve is commonly compensatory to kyphosis, hip-joint disease and congenital dislocations of the hip.

Treatment of Spinal Curvatures.—The treatment of pathological curves of the spinal column, by osteopathic methods, has been highly satisfactory to both osteopath and patient. The success of the osteopath in these cases has been due to his comprehensive and exact knowledge of each vertebræ, and of the spinal column in general. He recognizes curvatures that the ordinary practitioner, and it is safe to say the orthopœdic specialist, would not even notice or recognize. On account of the highly developed sense of touch of the osteopath, he is capable of detecting the slightest deviation of one vertebra from another, and of the spine in general, from the normal. Thus by the uniqueness and peculiarity of his work he is capable, not only of discovering a curvature, but also of reducing a curve when found.

The work consists of, first, relaxing any muscles that may have become rigid over the seat of the curve. Then follows a treatment to each vertebra involved, by attempting to replace it, and treatment to the curve in general by springing it toward its normal position. At each treatment effort should be made to accomplish something toward correcting the spine; too many treatments are given in a "general" way, and being unspecialized amount to nothing. One must become familiar with the exact location of each vertebra involved, to attempt a correction of a curvature intelligently. Upon this one point it is impossible to speak too strongly, for a great many treatments have been wasted and improvement of cases retarded by not paying enough attention to the details of the diagnosis, either from pure slothfulness or from an imperfect conception of osteopathy.

Lateral curvature in the dorsal region is undoubtedly the hardest to correct on account of the ribs, which complicate the condition. A marked curve in the dorsal region is sure to be

accompanied by a dislocation of the vertebral end of one or more ribs. Treat each distinct lesion separately, follow by general stretching, replacing and molding of the tissues. Forbes advises direct springing of the prominent ribs of the convex side by pressure exerted in the direction of a line drawn from the outer third of the ribs of the convex side to the vertebral ends of the ribs of the concave side. This treatment tends to counteract the rotary progress of the vertebræ and overcome the rib deformity

The **dislocation** of an **innominate** sometimes complicates matters, but is a simple point to remedy, and should not be overlooked.

The correction of a curvature presents a special study to the osteopath, whether it be scoliosis, kyphosis or lordosis, and special rules cannot be laid down for treatment. Cases of rare occurrence are what might be termed "symmetrical" curves; i. e., no vertebra presents separately a marked lesion, the column on the whole being simply bowed. Such cases can be treated by springing back the spinal column, and by the use of methodical exercises. Unfortunately most curvatures are characterized by various lesions between the vertebræ, and thus each lesion requires special work.

In simple curves the use of braces, jackets, and the various mechanical appliances are of very little use to the osteopath, in fact, more harmful on the whole, than beneficial. Naturally they would apply to a "symmetrical" curve, or where the patient is too weak to sit or walk, but they can be of very little use to the average patient, in place of correct osteopathic treatment. Mechanical appliances confine the movements of the patient, interfere with the development of the muscles, and impinge to a greater or less extent the spinal nerves. Due attention to hygienic surroundings and diet are certainly of aid. Proper exercises and occupation for the sufferer should be advised.

Straight Spine is a term used particularly by osteopaths for a condition seldom recognized by orthopædic surgeons. The following is from H. W. Forbes[1]: Straight spine is "a departure from the normal in the conformation of the chest; characterized

1. Journal of the American Osteopathic Association, July, 1905.

anatomically by bilateral diminution in size, decrease in the antero-posterior diameter, relative increase in the transverse diameter and flattening of the anterior and posterior walls; characterized clinically by diminution of respiratory capacity, lowered lung and heart resistance, impaired general nutrition and predisposition to neurosis.

"Of the many possible manipulations that may be used to lift and overcome the morbid bend of the ribs I will attempt the description of but one.

"Relax the musculature of the back and chest. Rotate, flex and extend the dorsal spine. Examine all the ribs on each side and loosen any that do not move freely. Having done this, the patient is prepared for the specific treatment. Have the patient sit on a stool and lean forward on a table. Have him separate the elbows, flex the fore-arm, place one hand over the other and his forehead on the hands. Tell him to relax all the muscles of the shoulders and arms and to breathe deeply without using the muscles. After a few trials he is able to fully expand his chest without contracting the muscles connecting the upper extremity with the trunk. The physician then takes a position at side (either side) of the patient and places the weight of his trunk on the ribs of the side he is on, a little external to their angles. He passes his arms around the patient's body, the arms passing across the front of the chest are carried around far enough to allow the hand to be placed on the ribs just external to their angles. The other hand is placed on the top of this one. In this position the physician's body on one side and his hands on opposite occupy similar positions. The patient is now told to inspire deeply and at the same time to relax the shoulder muscles, as before instructed. As the chest expands drop the weight of the trunk on one side and make pressure forward (forward meaning toward the anterior surface of patient's body) with the hands on the other side. This lifts the ribs to a greater extent than the patient unassisted could lift them. At the end of inspiration and during the first third of expiration the chest is compressed laterally. The compressing force, if applied correctly, will fix the ribs in a position of less obliquity and will also correct the increased

lateral bending of them. The dorsal spine becomes more convex posteriorly at the moment of lateral compression of the thorax if correctly made. Great force should not be used at the beginning. Repeat the manipulation five to twenty times each treatment. Give treatment three times a week. A similar movement may be given on the table.

"The greater number of flat chests in patients under thirty years of age may be corrected. If the patient is above thirty, although complete correction may not always be accomplished, the results are satisfactory. Two to six months treatment is required."

A "typhoid spine" comes as a sequel to typhoid fever. There is constant pain, tenderness along the lumbar region and rise of temperature. The pain is generally increased when the spine is moved forward or sidewise. Such a condition is clearly understood by the osteopath. There is always found distinct vertebral lesions along the region that is tender on pressure. In fact these very lesions may have been the real cause of the attack of typhoid fever. The treatment is rest and the indicated manipulation to correct the derangements. It is of great interest to note that where the typhoid patient is treated osteopathically the condition just described seldom results. Observations by C. M. T. Hulett confirm this statement.

The **Neurotic Spine** may be the result of injury but the subject is usually of a nervous, neurasthenic type. It occurs from the age of puberty to adult, much more often in females than males.

The patient has dull pain in the back of the neck or in the lumbar or sacral region, complains of a constant tired feeling and often of a sharp neuralgic pain in certain parts of the spine. Generally there is a drooping posture in the upper dorsal with shoulders thrown forward, which is a sign of weakness. There is extreme tenderness along the spine and usually the pain is confined to the sensitive places.

Treatment consists of a constitutional toning up, and increasing muscular strength through judicious exercise. The posterior curve may be pushed toward the median line by laying

the patient on the face, also with the knee in the back and the flat of both hands on the sternal ends raise the ribs, or by the arms making use of the pectoral muscles accomplish the same result. Deep breathing is also effective. Relief can usually be given and a cure will depend upon the patient's general condition.

The **Hysterical Spine** is usually considered the same as the neurotic spine, but there are many cases which have the sensitive spine without being hysterical. There is more deformity usually present, particularly in the lumbar region. Probably there will be a history of some injury.

The treatment is to correct the curvature and build up the general health. These conditions are stubborn and progress is slow. In both the neurotic and hysterical spines the ligaments of certain areas will be found atonized and relaxed. This is especially noticed upon attempting to spring a group of vertebræ when all of a sudden the section relaxes. In either of these spines the lesions will irritate or obstruct nervous courses, produce venous stagnation or arterial starvation, and disturb lymph channels. H. F. Goetz has observed that in functional nervous diseases the dorsal spine is flat, while in visceral displacement the dorso-lumbar spine is posterior.

POTT'S DISEASE.

An article on Pott's disease does not really come within the province of a practice of medicine, still it will be acceptable to the practitioners and students of osteopathy, as one of the objects of osteopathic work is to improve, not only medical and obstetrical practice, but, also, surgical practice, and besides the osteopath will have many cases of spondylitis to treat. "Pott's disease, or caries of vertebral bodies, was first described by Percival Pott in 1779. It consists of a destructive ostitis affecting the spongy tissue of one or more of the bodies of the vertebræ. The ostitis is tuberculous, and is similar in character to tubercular ostitis seen in the epiphyses of the long bones. Owing to the superincumbent weight of the head and shoulders pressing upon the carious vertebral bodies, the spine and trunk become peculiarly and characteristically distorted. The morbid process is limited, as a rule, to the bodies; the transverse, articular, and spinous processes are rarely primarily affected." (Park).

The first consideration in the **treatment** of Pott's disease is rest. If the disease is a progressive one rest in bed in the recumbent position is necessary. Naturally, the object of the treatment is to secure resolution of the tubercular ostitis as soon as possible. To do this careful manipulative treatment should be applied to the diseased vertebræ. The treatment must not be harsh, for there would be danger of greater irritation to the parts, and possibly infected particles from the destroyed tissue might gain entrance to the vascular system. The osteopath must be extremely careful how he manipulates the spinal column in Pott's disease. The object of the manipulation is not primarily to overcome the deformity, as some may think such an act possible, but to separate the vertebræ enough to allow a freedom of the circulation, and to remove impingements of the nerve tissue. It is impossible to overcome the deformity to any extent when part of the body of the vertebra is destroyed; but if one could treat the case at the incipiency most probably deformity would be prevented. There is another danger in treating cases too severely, and that is causing exhaustion of the patient. Treat

the spinal column not only to separate each vertebra slightly, but to carefully crowd the diseased vertebræ toward their normal position. When the disease is in the dorsal region considerable attention has to be paid to the ribs, as they are invariably involved, when the spinal curvature is great. Hence it is necessary to treat each rib separately, and try to correct them at least, and remove any obstruction to nerve fibres or vessels that may be found. One of the strongest arguments against the indiscriminate use of braces, jackets and various mechanical appliances in spinal deformities, is that they tend to straighten the spine, by simply crowding the vertebræ and ribs as a whole into place, besides interfering with the cutaneous circulation. The osteopath should realize that each vertebra and rib has to receive special treatment, in order to correct the spinal column, and that mechanically exerting pressure upon all the vertebræ at one time tends to lock the vertebræ and ribs all the more securely. It is like trying to correct a certain subdislocation of the cervical vertebræ by pulling and twisting the neck instead of applying specific treatment—the lesion is all the more firmly fastened. Young[1] in his Surgery makes this observation: "Like chronic abscess or chronic bone disease, this affection has its origin in the fact that the tissues of the anterior parts of the bodies of the vertebræ have been partly deprived of their nutrition because of luxated ribs or subluxated or twisted vertebræ."

After the tissue destruction has been limited, and the deformity corrected as much as can be, an ankylosis should be secured if possible. To promote ankylosis, depends altogether upon the preceding treatment—rest and an improved nutrition of the parts. A truss or brace, if correctly applied, is often beneficial in such cases. The treatment of spinal abscesses is entirely in accordance with surgical treatment.

In all cases the general health of the patient has to be well taken care of. The osteopath must not be over zealous for quick results. It takes many months to perform a cure; however, there is always a tendency toward a cure. Treatment of the spinal muscles and of the limbs, and pure air, sunlight, massage and good food are very necessary.

1. Young's Surgery, p. 317.

SPRAINS AND FRACTURES.

Sprains.

The osteopath is often called upon to treat sprains of various sections of the body as well as to relieve after effects of fractures and restore function to the part. The osteopathic treatment is very effectual; therefore, an outline of the purpose and method is given.

Sprain is defined by Dorland as "the wrenching of a joint with partial rupture or other injury of its attachments, and without luxation of bones." From an osteopathic viewpoint the above definition is not fully explanatory, for there is in most cases a partial luxation of the bones. The most common cause of a sprain becoming chronic is owing to partial bony displacements. Rupture of tissues may be the cause of a chronic state but is not nearly so frequent as the bony dislocation. In most sprains the wrenching causes a displacement of the bony tissues, which may or may not return to normal position and relation. The function of the muscles is not primarily to hold the bones in place; this is left to the ligaments, so when a wrenched joint is so severe as to cause rupture of muscles or tearing of ligaments partial luxation of the bones is almost certain to follow; and even where such damage does not occur a change in the relation of the bones is a frequent occurrence.

Unless a sprain can be seen very early it may be difficult to detect just what has happened; whether it rests with a rupture of the areolar and connective tissues, a displaced cartilage, tendon, or bone, a torn ligament, or ruptured muscle. Hemorrhage and swelling takes place so rapidly that no time should be lost in critically examining the joint. When in doubt as to the structural disturbances, particularly in acute cases if there is a possibility of a fracture, and in chronic cases any supposition that tubercular involvement is present, have a radiographic examination.

There is comparatively little to be found in medical literature relative to the **pathology** of sprains. Probably Moullin in

his excellent monograph on Sprains has given as good an outline as can be found. He says that "generally speaking, the tissues on one side of a joint are overstretched and torn; those on the other compressed and crushed together; but there is always so much twisting, and such a difference in the strength and power of resistance of various structures, that unless the part is examined with the greatest care it is almost impossible to say what actually has given way." Hemorrhage due to torn vessels is the cause of most of the swelling within the first few hours. Later on there is considerable lymph mixed with the blood. There is not only extravasation of blood into the surrounding tissues but also into the synovial wall and cavity. This causes considerable irritation and pain owing to the roughening of the membrane and the joint becomes inflexible. And if the joint or any strained tissue is kept too long at rest the mass becomes organized and is the cause of much discomfort and annoyance.

Similar changes may occur in the bursæ due to the extravasated blood. Strong ligaments may be torn across, but not frequently. The tear is usually a separation from the bone. Occasionally inter-osseous ligaments, as for instance in the knee, may be injured.

The muscles may be severely torn, but more often they are "hurt by their own sudden and spasmodic effort at recovery than by anything else." In a few cases the tendons and muscles will be found bruised, lacerated, and dislocated.

The veins occasionally rupture and thus results more or less effusion, so that rigidity and edema may persist for a long time. The bones are very frequently damaged. This may be a simple bruising of the tissue but more often, as osteopathic diagnosis shows, there is partial displacement of the bony structure.

A point of great importance that every experienced osteopath will agree to is the following from Moullin: "Diseases of the spine, hip, and other joints in children may be due, in great measure, to some constitutional taint, though it is open to question whether the influence of this is not overrated; but it is quite certain that the immediate starting-point in nine cases out of ten

is some chance sprain, often so slight as scarcely to have been noticed at the time."

Before treating a sprain there are one or two points the osteopath should carefully note: first, that there is no complicative fracture; second, in children that there is not an epiphysial separation, and, third, note peculiarities of a constitutional character that would complicate matters. Whatever is done, always give the patient the benefit of the doubt.

If the patient can be seen early, before swelling has reached the maximum, many times a very quick cure can be secured. Do not at once put the part at rest and apply cold, but examine the sprain most carefully and thoroughly and readjust first of all any bony defects; then replace the softer tissues if displaced, and next relax contractions; follow this by light massage and passive movements to reduce and combat hemorrhage and swelling. This treatment alone in a fair percentage of cases will be all that is necessary provided frequent subsequent treatments of massage and passive movements are continued to reduce and counteract inflammation and to prevent rigidity and stiffness of the softer tissues. Where the osteopathic treatment is distinctly indicated is in the readjustive manipulation. This is the reason why the treatment is so efficacious, and the patient is cured in a fraction of the usual time, and few sprains result in complications and become chronic. In sprains that have become chronic there will be found almost invariably some osseous tissue slightly displaced; and after correcting this, apply careful and thorough manipulation and massage and movements to break up adhesions, to remove effusions and extravasations, to relax muscles, and to promote normal circulation. Care should be taken that there are no displaced cartilages, ligaments, tendons, or muscles.

It is well to keep in mind that the osteopathic readjustive manipulation is not an exercise or movement, but definite, specific correction of the tissues anatomically. Do not treat the displacement by any general "pommelling," but apply the mechanical principles indicated as in any dislocation. This will mean much to the patient in more ways than one, and especially so

should the sprain be so severe and complicated as to demand anesthesia for correction.

There is no objection to the employment of cold and heat; in fact, both are beneficial. Cold to prevent extravasation and swelling, and heat to remove and relieve the same is a sound and practical method. But do not apply a wet bandage. Pouring cold water over the sprain is the best method; even better than immersing the part. An ice bag is another good way to apply cold. When the skin begins to look blanched and dull the maximum amount of benefit has been secured. Heat at the very first may be employed instead of cold, for it has a tendency to prevent bleeding and inflammation, but the temperature of the application must be as hot as can be borne or else the desired effect will not be obtained. Later on to relieve pain and rigidity, and to relax the muscles so that a better circulation will be secured, moderate heat will be beneficial. Then the application of heat and cold alternately will be of service, employed as a douche for a tonic effect, when the part is weak, inactive, and powerless after the elapse of several days. It should always be remembered that the employment of heat and cold is only of temporary benefit, so if used too long opposite effects to those desired will result.

Bandaging the sprain may be helpful but not always. Great care should be taken as to how pressure is applied. Bandaging from periphery toward the trunk, seeing that the bandage is smooth, and padding all depressions so that the bandage does not touch bony prominences only, are necessary. Unless the bandage is applied so that an even pressure is secured, the material used not too warm and the bandage attended to each day, the effectiveness will amount to but little.

Next, do not make the mistake of resting the injured joint too much. The function of a joint is movement, and it has been observed that prolonged rest of a healthy joint may result in rigidity, stiffness, and distension of the soft part, and even serious organic changes in the ligaments, synovial membrane, and cartilages have occurred. Consequently continued passive movements should be kept up from the inception of the injury, although it must not be carried to extremes so that inflammation, hemor-

rhage, or laceration will be aggravated. Moullin says: "As a rule, passive movement may be commenced from the second day with the certainty of preventing adhesions, and without the least fear." Osteopathically, with due attention to readjustive manipulation, and care as to correct position and rest, passive motion will be allowable usually from the first day.

There is much corroborative evidence in current medical literature that bears in a general way upon part of the foregoing. The International Text Book of Surgery says: "Massage should begin early, in order to avoid, as far as possible, weakness of the muscles, and to ensure security to the position of the joints by the retention of a proper tone in them;" besides early movement tends to reduce the effusion into the tendon-sheaths around the articulation, which in some cases, particularly the ankle and wrist, may be a very prominent feature. The Reference Hand Book of the Medical Sciences voices the same opinion; and Mumford is referred to as follows: "Immobilization for more than a few days, as under the older methods, is objectionable because adhesions are apt to form, thus causing impairment of function, and because when there is a **tubercular taint,** proper conditions for a localized tuberculosis are established." Among other statements Holder Sneve in the Journal of the American Medical Association of June 1, 1901, says: "Immobilization of muscles is not rest. On the contrary in all sprains the muscles should have passive exercise the first few hours and days, and active exercise after that. In the majority of cases active exercise should be instituted from the beginning. The plaster cast should not be used at all, even in cases where we have a fracture, unless it be impossible to maintain a proper position of the joint."

Again quotation is made from Moullin. These quotations are taken from the chapters on Manipulation and Massage. It will be observed he makes a distinction between the two methods. And the osteopath should carefully keep in mind not only the difference between the two but beyond these the more fundamental treatment, readjustment. The characteristic feature of osteopathy is anatomical readjustment, and this in sprains should be supplemented by massage (superficial work), and, also,

manipulation (deep and more or less forcible work) in order to remove stiffness, rigidity, and fibrous ankylosis.

The following is relative to forcible manipulation: "Manipulation is much more useful than division; it can be employed for such a variety of purposes. In the early stages it prevents the occurrence of stiffness or the formation of adhesions. Later, when the swelling and heat have disappeared, it is no less successful in restoring freedom and ease of movement, and afterward, when all mechanical obstructions have been cleared away by its use, it is one of the most effectual methods known for bringing back the circulation and nutrition of the part, and giving again to the muscles and nerves the energy which has so long been wanting." . . . . . .

"To carry this out effectively two things are needed beyond all others. The one is a sense of touch so delicate that it can appreciate the least resistance or irregularity of movement; the other an accurate knowledge, not merely of the ordinary anatomy of the part but of the different degrees of tension that fall on the ligaments in every position of the limb.

"Each joint requires a different kind of manipulation according to its construction." . . . . . .

"There should be no jerking. The movements must be vigorous and forcible, but perfectly smooth; and they must be carried out thoroughly, the joint being moved to its full extent in all directions that are natural to it. Each kind of action should be combined successively with the rest, one by one, so that the tension may fall in turn upon all the different parts of the capsule.

"Movements which are especially restricted or painful of course require most attention, but the others, though they may not be affected to the same extent, are not to be neglected. It sometimes happens if these are dealt with first that a considerable proportion of the main obstruction is cleared away, as it were, by side attacks, so that when its turn comes it yields more readily than it otherwise would.

"Recent slight adhesions give away at once without a sound, though the sensation is generally conveyed to the hand. When they are older the noise may be as loud and clear as when a bone is broken." . . . . . .

"The after treatment of these cases (cases where there has been tearing and breaking of adhesions) should be in all respects the same as that of a recent sprain, only if passive motion at an early date is advisable to prevent the occurrence of stiffness in the one, it is absolutely necessary in the other."

The following pertains to massage of sprains: "Massage, in the strict sense of the term, is a great deal more efficacious, especially with older sprains. Its action is not limited to the skin and superficial structures. These undergo immense changes, it is true; they become softer and finer while under manipulation; their strength and elasticity increase, the extreme tenderness diminishes, and the natural appearance and texture return. The surface loses its dry, harsh character and becomes warm and moist again; the livid bluish color gives away to a brighter hue, and the deeper layers of fibrous tissue yield and stretch, so that the hide-bound, shrunken condition that is often present after long disease gradually passes off. But the good effect is not by any means limited to, or even most conspicuously shown by this. When properly carried out massage exerts a simultaneous influence on muscles, nerves, and vessels; in fact, on all the tissues within its reach.

"The circulation is the first thing to feel its power. It has already been explained how, after prolonged rest, the blood, as it were, lies almost stagnant in the tissues, slowly circulating through them, and neither giving them sufficient for their nutrition, nor removing from them the waste products of their action. This is changed at once. The life of the part is quickened. The veins and absorbents are emptied first, and the fluid they contain driven out into the heart, which fills more rapidly, and contracts more vigorously and firmly. Then the pressure falls in the smaller vessels, and the tiny irregular spaces, full of lymph, which extend in all directions through the tissues. These, in their turn, are compressed and mechanically emptied, their contents being driven on into the empty vessels, from which any backward flow is prevented by the valves. The circulation becomes more rapid; nutrition is carried on with greater energy, and the actual amount of the blood in the tissues at any one time so much increased that

they become full and soft to the touch and regain the even and rounded contour of active health." . . . . . .

"It is most essential to commence as gradually and as gently as possible, only working on the deeper tissues after the more superficial ones have become thoroughly accustomed, and have been unloaded of their surplus fluid. The skin, the soft subcutaneous tissue, the muscles, and the deeper layers, must all be worked in turn. Nor should the manipulation be confined to the injured part. In a sprain of any standing the whole of the limb is affected more or less. It is usually better to devote attention first to the parts nearer the trunk than to deal with those around the injured area, and only afterward, when the circulation is thoroughly re-established, to manipulate the joint itself.

"The tendency is to make the sittings last too long. Deep manipulation itself rarely requires more than **five minutes;** but in dealing with a recent injury it may be advisable to spend a longer time than this over the friction and other preparatory measures, so that a quarter of an hour soon passes by. When the tenderness is very great, and the amount of swelling excessive, much longer than this may be necessary, but short, frequently repeated sittings are of greater benefit than one long one. A skillful operator, too, will often effect more in a few minutes than an ordinary rubber will in as many sittings."

A summary of the general treatments of sprains would be as follows:

1. Readjustment of parts and removal of obstructions. Osteopathy is especially adapted in these cases, for two of the primal therapeutic factors in all cases from an osteopathic viewpoint are to re-adjust the anatomical and to remove obstructions. One should constantly keep in mind, "a temporary displacement followed immediately by a return to place, constitutes a sprain." The osteopath often finds that a perfect returning does not take place, and even remote lesions may affect a joint.

2. Manipulation, and massage of soft tissues, to restore circulation and to prevent and remove debris from rupture of vessels and inflammatory products.

3. The employment of cold, heat, and pressure, and a certain amount of rest.

4. Anatomical readjustment and manipulation in chronic cases to break up adhesions, to remove exudates, and to cure synovitis.

5. Movements both passive and active to stimulate and exercise functions of the joint.

The Spinal Column.—The osteopath is especially cognizant of the fact that many sprains occur to the spinal column. These may affect a single joint, or more or less of a section may be involved. The bones, ligaments, tendons, muscles, or spinal cord may be found injured. Even distant organs, through involvement of the circulation to the cord, or through irritation or impingement of spinal nerves and sympathetics, are frequently disordered. It is not necessary to go into detailed description, for the points bearing upon this will be found under Osteopathic Diagnosis, Etiology, and Technique. And the general description will, also, apply. Readjustment, heat, massage, manipulation, ironing, stretching of muscles, etc., have their place. There is no doubt that sprains, strains, and blows to the spinal column are the causes of most spinal disorders and of many visceral disturbances.

The Ribs.—Sprains of the vertebral ends frequently occur, resulting in a partial luxation, stretching of ligaments, contraction of muscles, and exudative formation in the joint structures, which often is the cause of irritation to the sympathetic nerves. The costal cartilages are frequently strained, and may so irritate the intercostal nerve as to cause considerable pain both locally and reflexly. The treatment is essentially one of replacement, and relaxation of the softer tissues. Adhesive strips to limit movement due to respiration may be helpful.

The Innominata.—Sprains of the innominata are also commonly met with. Besides being a source of discomfort to the patient they are an important cause of pelvic disorders and leg affections. Partial displacements are the rule, the correction of which gives quick relief.

The Hip Joint.—Sprains involving the hip joint may be readily corrected, and again may be the exciting cause of serious involvement. Previous tubercular disease can be aggravated in this manner, or syphilitic changes in the joint disturbed. Care should be taken that there are no complicating displacements of the innominata or irritations to the spinal nerves. It is possible that the hip may be so strained as to cause a twist of the femur in the socket and thus simulate a partial dislocation; this, in fact, would probably be termed a partial dislocation. Strain of one set of muscles about the hip joint is uncommon, and spinal lesions may disturb the innervation to one set of muscles. In cases of **intracapsular fracture** considerable can be done by careful massage and manipulation after union has taken place, to secure greater freedom of movement and strength of the limb. Likewise in **hip-joint disease,** after the disease is healed, massage and manipulation will be very beneficial. Care must be taken if the treatment causes spasticity of the muscles; this shows the treatment is irritative and should be stopped until the spasticity has ceased. Where the limb is shortened from either hip-joint disease or intracapsular fracture apparent lengthening may be secured by careful abductive and hyperextensive stretching.

The Knee.—The knee is the most complicated joint, and sprains are apt to be very serious. The usual treatment for sprains is employed. Occasionally the semilunar cartilages are displaced and may be a source of difficulty in diagnosis. Another point frequently overlooked is the innominate. In a number of knee cases that terminate in chronic synovitis there will be found a displacement of the innominate that is preventing recovery. Injury to the hip-joint, also, may cause strain or irritation at the knee. Occasionally tender points about the knee, especially at the inner side are due to irritation at the hip, or possibly from the spine.

The Ankle and Foot.—The ankle is very commonly sprained. One should examine carefully for a possible fracture of the malleolus, and for fracture of the tibia. There may be a dislocation of the fibula, also a separating of the tibia and fibula at the ankle. The common bony displacement takes place between the astragu-

lus and os calcis. Then the cuboid is frequently displaced, and occasionally the navicular. The treatment should first of all be directed to correction of the osseous lesions. The arch of the instep may be weakened from the ligamentous strain and be an immediate step in the production of **flat foot.** Teall is of the opinion that lumbar and innominata displacement are common predisposing causes.

Bunions result from a malposition of the joint. **Morton's disease** due to a pinching of the metatarsal nerve will often yield to osteopathic treatment alone. There is generally displacement of the metatarsal bone. A pad worn directly under the painful point will be of benefit. In many of the local neuralgias some anatomical displacement will be found as the exciting cause. **Hammer-toe** if not complicated with gout, rheumatism, etc., will yield to treatment if kept at persistently, otherwise surgical interference will be necessary.

Likewise various deformities of the foot and resulting neuralgias may be traced to local sprains, ill-fitting shoes, or anatomical maladjustments higher up of such a character as to affect the pedal circulation.

The Shoulder.—Exclusive of muscular and other strains there may be a partial dislocation. In these cases the acromial end of the clavicle is frequently dislocated, and owing to a general lack of muscular tone may be very hard to keep in place. The lower and inner part of the capsule is often affected, so that freedom of function is lacking and there is considerable pain. This is due to the thinness of the capsule and the large amount of soft tissue, so that when the arm hangs at the side the tissue is thrown into folds; and being very vascular is easily injured, so that the vascular lymph readily organizes and the part becomes stiff and unyielding. It requires patient, laborious treatment to break up and absorb this fibrous tissue. Then the long tendon of the biceps in some shoulder sprains is dislocated, but rarely. In shoulder injuries, also, examine the upper ribs.

The Elbow.—The elbow is another complicated joint. One should be careful that there is no fracture, and in children that there is not **epiphysial separation.** Extending, flexing, pronating

and supinating the arm will aid much in the diagnosis. Examine well the rotation of the radius at the elbow joint, and be positive that the olecranon process drops normally into its fossa at the end of the humerus.

The Wrist and Hand.—The wrist is another joint commonly sprained. Here, also, care should be taken that a fracture does not exist. Colle's fracture is frequent. The bursal and tendon sheaths are usually markedly involved. The scaphoid and semilunar are apt to be displaced; also, the os magnum and the unciform.

Sprains of the **fingers** are often met with. Outside of strains to the muscles, ligaments, and other tissues the joint is apt to be somewhat impacted. Traction will correct the latter. **Dupytren's contraction** occurs from sprains or injuries, as the result of contraction of the fascia. The ring and index fingers are members usually affected. In some cases the affection will be found in both hands (symmetrical), and a spinal lesion will be the predisposing factor. Treatment every day, by straightening the fingers and stretching the tissue will at least retard the deformity, but in a number of cases surgery will have to be resorted to.

A **ganglion** or "weeping sinew" is a swelling in connection with the tendon sheath. It presents a round, firm outline, usually upon the back of the wrist. There is generally found a displacement of one or more of the wrist bones. If treatment of the joint and tendon sheath does not remove the ganglion surgery may be utilized. **Trigger-finger** is a rare disorder. There is usually a history of local strain, which probably resulted in some thickening of the tendon. Manipulation and passive motion if continued will generally give relief.

E. C. White has treated successfully by osteopathic methods over one hundred cases of synovitis.

Fractures.

Immobilization and rest have been the paramount points with most physicians in the treatment of fractures and sprains. They have claimed that a sprain should be manipulated but rarely, much less a fractured bone. Rest, quiet, and fixation of

an injured joint or bone have been rules that should not be violated under any consideration. In cases of sprain the great cry has been to let the joint alone for fear of spreading a possible **tubercular infection.** It is well to recall Mumford's statement that if immobilization is too long continued, should there be a tubercular taint proper conditions for a localized tuberculosis is established. And still a word of caution here, that an osteopath should not be over zealous and should carefully weigh all possible factors, both local and constitutional, may not be amiss. In previous tubercular, syphilitic, and other diseased states discretion should be employed.

Reducing rest and immobilization to a minimum means much to the patient, not only in the loss of valuable time but in annoying and serious after effects. Many cases of sprains and fractures come to the osteopath. In sprains that have become chronic through too much rest of the part and improper treatment, almost invariably there is found displacements of bone and adhesions that should never have existed; then has followed organized exudates and chronic synovitis. In fractures and even in complete dislocations the osteopath continually observes that too much rest has been given the part, resulting in unnecessary adhesions, contractions, atrophy of muscles, and impairment of function. Treatment almost always cures the condition, or at least materially relieves. How much better if the proper treatment had been first instituted and thus a large percentage of cases prevented from becoming chronic.

Of particular interest to the osteopath is the paper prepared by Eisendrath on "Early Massage and Movements in the Treatment of Fractures and Sprains," and the discussion that followed before the Chicago Medical Society. The Illinois Medical Journal, December, 1903, contains a report.

Eisendrath said in part: "The former routine of immobilizing all fractures and the adjacent joints for a period of four to six weeks must, I feel, be subject to slight modification in the light of recent experience, and it shall be the aim of this paper to show what these changes are. When we are called to a case of fracture, it should be one's first duty after its reduction to consider

how can I best aid the patient in recovering the usefulness of his or her limbs? Can we shorten the long convalescence with its resultant loss of valuable time and earning capacity? How can we most rapidly restore to the limb its normal joint functions and prevent an atrophy of muscles and an ankylosis which will require many months to overcome?".....

"The use of massage and of active and passive movements in the treatment of fractures and of severe sprains has been gradually gaining in the number of its advocates through the writings of Lucas-Championniere of Paris. We owe him a great debt for calling the attention of the profession to the employment of these methods in order to prevent atrophy and ankylosis as well as to promote healing.".....

"Before taking up my subject in detail permit me to recall a few salient points in the surgical pathology of fracture. Soon after the injury the blood clot around and between the ends of the fragments is absorbed and replaced by a jelly-like mass of young connective tissue cells called the callus. It corresponds to the solder which the plumber places over the ends of two pipes he desires to join. Bone begins to form at the periphery of the callus about the tenth day and advances toward the center rapidly, forming a ring of bone around the ends of the fragments so that by the end of the third week there is but slight abnormal motion at the point of fracture (exception to this is the femur). This entirely disappears by the end of the fourth week, especially in young people, and the union is firm. In the case of the femur it requires six or eight weeks. The greater the displacement of the ends of the frgament, the larger the callus and the slower the healing of the fracture.

"During these changes (callus formation) the muscles which supply the immobilized joints atrophy and the circulation in the skin and neighboring tissues is sluggish, resulting in swelling, etc., of the limb. The enforced rest causes more or less fluid to accumulate in the tendon sheaths and joints. This becomes organized and results in fibrous ankylosis of the joints and great impediment to the free action of the tendons within their sheaths. It is this atrophy, fibrous ankylosis and teno-vag-

initis which interferes with the restoration of the normal functions of the limb."....

"Can we decrease the amount of wasting of muscles and control the stiffness of joints and tendons after fractures?

"It is the belief of the writer, based on a large experience, that the earlier use of massage, active and passive motions, will to a great extent eliminate the above conditions, which retard convalescence and in some cases cause permanent disability.

"Massage of an injured limb increases the amount of blood supplied to it, promotes the absorption of the swelling and prevents atrophy of muscles. In the case of a joint injury the exudate rapidly disappears and the articular surfaces can be again approximated so that movement is facilitated. By the cautious use of active and passive movements, either with or without the aid of apparatus, the normal functions of a joint can be rapidly restored."....

"The active and passive movements of the limbs can be carried out immediately after the massage, but should only be permitted for a period of **five minutes** at first and the time then gradually increased. When a severe sprain, say, the elbow or ankle, is first massaged, the pain seems to be almost unbearable, but this discomfort as well as the swelling rapidly disappears, and it is surprising to those who have never applied this treatment how quickly the normal functions of the joint reappears. The same applies to the synovitis which accompanies fractures in close proximity or even into joints."

The relief given these cases by massage, movements and manipulations by the osteopath is a daily experience, and results to him are not surprising. Then in addition to what the surgeon would do, the osteopath applies his principles of careful detail readjustment.

Eisendrath continues his paper by referring to the principal varieties of fractures and giving the treatment for each. He says that if correct treatment is carried out with proper massage and movements in fractures of one or both bones of the leg the patient will be at work in six or seven weeks instead of three or four months, that in Colle's fracture some surgeons do not employ a splint, that

in fractures of the olecranon, massage from the first week on is of the greatest use, etc. This part is very interesting but space forbids giving it.

He then concludes his article with citation of several very interesting cases of fractures and severe sprains. These cases are exceptionally interesting to the osteopath, but still the same good treatment and results are duplicated every day in the osteopathic school.

The doctor's contraindications to the use of early massage in fractures or sprains are the following:

"1. Tendency to displacement of fragments in oblique fractures. Under such conditions it is best not to begin either massage or movements until the union is firm (fourth to fifth week).

"2. In compound fractures until the wound is healed.

"3. Whenever the condition of the skin is such as to permit of infection; for example, the presence of blebs, or extensive abrasions.

"4. The presence of fragments which project but do not penetrate the skin."

His conclusions are:

"1. Massage, active and passive motions prevent atrophy of muscles, tenovaginitis and ankylosis so frequently accompanying and following fractures, especially those close to the shoulder, elbow, wrist, knee and ankle joints.

"2. They give far better results than complete immobilization in the majority of fractures."

In the discussion that followed Henrotin said that for some time, "I have never put a restraining apparatus of any kind, nor have I used any lotions on any sprain, no matter how severe." ....

"It has taken many years to bring this subject before the profession. It is a method that is absolutely effective as regard sprains and some forms of fractures. I have treated several hundred such cases with the greatest success." He also said that, "In treating an inflamed joint it is improper to use a restraining apparatus of any kind. I consider that the plaster cast is the bane of all inflamed joints unless there is a **specific form of infection,** a traumatic condition." Neither does he believe that

an inflamed joint should be put at rest. He says the patient is a good judge as to the amount of quiet the joint needs. He has treated four Colle's fractures and two fractured clavicles without bandages or apparatus.

To sum up the osteopathic procedure in the treatment of fractures would be as follows:

1. Immobilization in those cases especially demanding it, from the character of the fracture, until formation assures solid and firm union.

2. Manipulation and massage and movements of parts at an early period, compatible with the above, to render soft tissues pliable, to remove stiffness and adhesions, to restore a normal circulation, and to exercise and function the parts.

3. In cases of laceration of soft tissues, abrasions, etc., great care should be taken so as not to infect the parts.

4. Great care should be taken where fracture is compound, and where fragments exist.

5. In all cases, both acute and chronic, critically examine for slight anatomical deviations locally and remotely.

In dislocations the fundamentals of the above are applicable. Do not let chronic stiffness, or rigidity, adhesions, or synovitis supervene if possible.

An important consideration in all cases of sprains, fractures, and dislocations that become chronic is the probable effect upon dependent tissues by way of nerve impairment and vascular obstruction; for examples, the sprained back may readily impair organic life, the fractured elbow prevent use of the arm, the injured leg predispose to flat-foot. (See J. B. Littlejohn—Osteopathic Surgery, including Treatment of Fracutres, Journal of the American Osteopathic Association, Nov., 1905).

POSTURAL DEFECTS.

A postural defect is any unnatural or acquired position of the body assumed in sitting, standing or walking. This leads to unsymmetrical development, causes structural changes, and as a sequel disturbance of function and organic life results.

Defects in posture are of very common occurrence. A perfect posture, in fact, is somewhat rare. Considerable is being accomplished, especially of late years, by the laity through various physical methods and exercises to correct the many defects of position in sitting, standing and walking. The originators of the many so termed systems of exercises have gone so far as to advertise to even cure various diseases of the body as well as attempting to improve the normal tissues and structure.

Exercises, undoubtedly, have their place, particularly in the life of those of sedentary habits. Most of us do not exercise enough, neither do we as a rule get enough fresh air and pure water. But there are many defects of the anatomical that mere gymnastics can not adjust. And there are still other defects that gymnastics may decidedly aggravate. In these cases the mechanism of the body has become so deranged and disturbed that nothing short of actual readjustment can be effective.

In the consideration of postural defects there are a few points that should be particularly emphasized. First, these defects may not only be the result of laziness or carelessness, but of more frequent occurrence is some previous strain or injury to the spinal column or other parts of the body framework. Some defect of position or symmetry of the body may easily follow as a result. Here gymnastic work may reduce the defect to a minimum, but rarely can the compensatory forces of nature entirely obliterate the structural disorder, unless assisted by actual, specific readjustment. Second, in the examination and treatment of the patient due attention should be given the symmetry and figure of the body as a whole so that relation of the part to the whole and *vice versa* may be rightly proportioned. Remember

that the spinal column is only one part of the body outline, thus one should consider the transverse section of the body in relation to the spinal column and not the spinal column alone. In a word, correction of postural defects implies both structural rearrangement and molding of the contour. Do not make the mistake, for example, when correcting a deformity that involves the chest, of paying attention to the spine alone, but take into consideration the thorax as a whole of which the spine is only a part.

Round Shoulders.

Round shoulders are a defective posture with which everyone is familiar. How many children have escaped the parents' criticism to sit, stand, and walk erect? And not a few of the afflicted have not succeeded after persistently doing their best.

Round shoulders or stoop shoulders are commonly attributed to indifference. Probably a few cases are due simply to laziness and indifference, and others may be carelessness, and usually when they arrive at an age where pride of their physical demeanor and powers enters as a life factor, the child soon overcomes the postural weakness. With still others the correct, persistent physical training, as exemplified in military schools, will readjust the defect. But there is a class, and by far the larger, where round shoulders are a very real and active weakness of the physical body. And the weakness is not primarily in the shoulders as nearly everyone thinks. The stoop is a result. The origin is in the lower dorsal spinal column. Here will be found a posterior curvature that involves nearly the entire dorsal and lumbar areas. This is the real, the original cause of the larger number of round shoulders.

This backward curve of the spinal column, instead of the forward curve as it should normally be at the waist, obliterates the brace or truss of the spinal column that is so essential in maintaining an erect posture of the shoulders. It allows the individual to "fall into his stomach," to drop the shoulders, and as a consequence the chest cavity is depressed. The spine is one continuous backward bow, and when he does try to sit straight, and it is always with a constant effort, the normal, the physiological curves of the spine are not apparent.

First, then, there is a spinal weakness in the region of the innervation to the digestive organs. Indigestion of various forms is a common accompaniment. Second, there is lessened lung and heart capacity. The ribs are depressed, interfering with perfect aeration and elimination on the part of the lungs and with normal activity and tone of the heart muscles. Phthisis is predisposed. Is it any wonder the child's blood is impoverished and anemia results from the insufficient aeration and poor digestion and assimilation? And, third, the shoulders are "round" from the spinal weakness and flattened chest, really an effect, but the most noticeable and still the least serious.

It is evident from careful observation and study of these cases that the treatment resolves itself into the treatment of a posterior spinal curvature. Shoulder braces, steel braces and jackets, and casts have very little place, if any, although there may be diseased bone of such character and severity that a cast will be necessary; this, however, would refer to treatment of Pott's disease and similar conditions.

Hence, the **treatment** is, first, to replace and readjust the malaligned vertebræ. There must be an actual physical manipulation in order to correct the vertebræ at fault. This is the essential, and by far the primal treatment, for the key to the truss or brace that holds and retains the body in an erect position is then replaced.

Second, raising the depressed ribs. Remember the depressed ribs are dependent upon the spinal condition. The thorax should be treated as a comprehensive whole, not the spinal column alone.

Third, exercises are a valuable aid. The individual's part is as necessary, in a way, as the physician's, for in order to accomplish the maximum there should be consistent and appreciative work on the part of the patient. Holding the shoulders back, the head erect and the chin in, drawing the abdomen in and up, all with deep breathing by the use of the chest muscles, the patient will be able to retain the correction obtained during treatments. Thus the patient must be conscious of the work required of him and act in concert with the physician. Minute instruction on the requirements of each case is demanded.

Good food, pure water, and fresh air are necessary, particularly in the anemic. Right living and correct environment are always in order.

The Prominent Hip.

A hip that is prominent and larger than its fellow is of frequent occurrence. It may not be necessarily conducive to a defect in posture, but it often is. The female is more frequently afflicted with this anatomical irregularity than the male. In the first place, the female pelvis is not so stable and rugged as the male pelvis, i. e., a mechanical wrench or fall will more easily displace the relative position of the tissues in the female. Then, in the second place, the dress of the woman accentuates irregularities of the figure, so that possibly in some instances the defect, from a diseased or deformed point of view, is more apparent than real. But of still more importance is the fact that many cases of a prominent hip are due to a lateral curvature of the lumbar spinal column. Lumbar curvatures are of common occurrence in the woman; first, the spinal column is not so strong as in man, simply on account of the physique not being so strong; second, modern dress constricts the waist by the use of corsets and many waist bands, and the weight of heavy skirts upon the waist, hips and abdomen and, third, severe strains from childbirth.

Thus the principal **cause** of a prominent hip is the lateral lumbar curvature. This, through compensatory action, renders the hip on the concave side prominent and high, while the hip on the convex side is depressed and less pronounced in appearance. Dressmakers and tailors are all too familiar with this feature of the irregularly outlined figure, and, consequently, have to resort to "padding" to round out the symmetry of the body. The mere irregularity of the figure, unfortunately, is by far the less serious part of the defect. Many ailments and diseases can be readily and directly traced to this. Not that the prominent hip itself necessarily always plays a leading part, but rather the lumbar curvature is the cause of very much suffering and misery. To enumerate the many disorders that arise from mal-aligned lumbar vertebræ may be unnecessary but a few will be given. A

point to be emphasized is the prominent hip often plays the role of a sign or symptom, or an effect, that an ailment or disease may be elsewhere.

In the female one of the most common causes, if not the most common cause by far, of disorders of menstruation, whether painful, profuse, or irregular, is irritation or obstruction of the lumbar spinal nerves due to lumbar curvatures. It is well known the lumbar spinal nerves control, to a large extent, the pelvic organs; consequently the osteopath pays particular attention to this area. Then certain intestinal disorders, such as appendicitis, typhoid fever, dysentery, rectal diseases, owe their origin to predisposing lesions here; also, bladder ailments, and sexual diseases of men, and many affections of the legs, as sciatica, varicose veins, etc.

In a number of instances the prominent hip will be due to a displaced innominatum. Then a lumbar curvature will result as a compensatory condition. This reverses the compensatory act as heretofore referred to; the prominent hip, in this instance, is the cause and not the effect. To diagnose which is cause and which is effect will frequently require considerable technical knowledge and experience. The slipped innominatum then produces symptoms and disorders directly from its changed anatomical relations; the points of diagnosis are given in the chapter on Diagnosis. The prominent hip can easily be detected when the subject sits down upon an even, firm surface, or stands up, and the one side compared with the other. In some cases where the prominent hip is due to a lumbar curvature, and the prominence is a secondary feature, the legs will be found uneven in length, but not always, for the lumbar curvature may straighten out when the patient lies flat upon the back. To diagnose the cause from effect and to differentiate the maize of signs and symptoms that may be present is not always easy even for the skilled practitioner.

The **correction** of a prominent hip is not ordinarily a difficult matter. In the cases where lumbar vertebræ are principally at fault, and these include the greater number, the problem is one of correcting the spinal curvature. Lumbar curvatures are the

easiest of any of the curvatures to correct, for one is not hampered by the rib articulations and the lumbar section presents an area where a leverage can readily be obtained. Where the innominatum is primarily at fault it is simply a matter of readjusting this, with probably some attention to the lumbar region. Care should be taken that the prominent hip is not caused by a tubercular sacro-iliac disease, by hip-joint disease, by a dislocated hip, or by an overlapping of thigh or leg bones from fracture.

Standing erect will, of course, be valuable help, for standing with the weight on one foot will tend to make the hip on that side more prominent. But generally the reason why one favors a certain side is because the other side is weaker; a weak back, a slipped innominatum, or an injured leg are common causes. There are many cases where the skirts will have to be considerably altered after the hips have been made symmetrical.

Pendulous Abdomen.

The **pendulous abdomen** is another defect that is all too common. A great many people have prominent abdomens because they do not stand properly, but a pendulous or prominent abdomen is not necessarily synonymous with a stout abdomen. They attempt to stand erect by drawing the shoulders back and extending the abdomen. If they would hold the head erect and the chin in with the shoulders back and the chest forward, and draw the abdomen inward and upward, their figures and physiques would undergo shortly a wonderful transformation. These directions also apply to pregnant women. Drawing the abdomen upward and inward will at first require considerable effort. It certainly will not be an involuntary act for the first few days.

The sagging of the abdomen not only causes an unsightly appearance but results in great relaxation of the abdominal muscles, interferes with digestive functions, displaces the pelvic organs, and weakens the action of the lungs and heart.

The laxness of the abdominal muscles allows the abdominal organs,—the intestines, stomach, kidneys, etc.,—to displace downward. This tends to indigestion, constipation, inactivity of the liver, etc., and causes a score of reflex symptoms. The organs

become simply weakened from a lack of proper tonus. This is a frequent cause of nervous prostration. Also it is one of the common causes of prolapsed and displaced pelvic organs, because the abdominal organs sag down upon them and the pelvic organs thus receive the brunt of the gravitative effect. Internal local treatment of the pelvic organs can only be a makeshift in these cases. The lungs and heart are weakened because the abdominal organs are dragging on the chest. The lungs can not aerate the blood freely owing to the abdominal weight and to the blood being obstructed in passing from the abdominal organs through the liver to the heart and lungs. The heart is handicapped in its work through lessened chest capacity and obstructed circulation. Just "suck" up the abdominal organs and see how much easier it is to expand the chest and to breathe.

There are other causes for a pendulous abdomen, such as a weakened spinal nerve supply to the abdominal muscles and organs. The weakened nerve supply may cause a loss of tone to the abdominal organs themselves, so that certain organs, as the stomach and intestines, become dilated and prolapsed; to the ligaments, and to the tissues and organs as a whole so that they become gravitated.

Through childbirth muscular fibres of the abdominal walls often rupture, leaving scars and a relaxed condition. Actual ruptures, hernia, of the abdominal muscles occur and cause a pendulous abdomen. Then there are cases of obesity where the pendulous abdomen is a symptom.

Much can be done with all of these conditions through osteopathic work; the patient must also help himself. The center of gravity of the body must be changed, and kept changed; correct posture and a constant effort will accomplish considerable. The "setting up" military exercises are excellent. Even in some cases of obesity the abdominal prominence can be markedly lessened by careful exercising and keeping the abdomen drawn in so that the abdominal muscles, the diaphragm, and the chest may be strengthened. For the relaxed, flabby abdomen, self manipulation of the weak muscles when in a lying posture will materially aid.

Postural Curvatures of the Spinal Column.

Undoubtedly, the great percentage of postural defects are dependent, directly or indirectly, upon weaknesses in the spinal column. As was seen, round shoulders, the prominent hip, or the pendulous abdomen, are often initiated by spinal deviations and deformities, so naturally spinal column curvatures are a most fruitful source of direct defects of posture.

It is somewhat uncommon to find an anatomically true spinal column, although this does not preclude that one's posture is defective, for often through pride and effort one may consciously overcome a defective posture.

It is the purpose here to offer a few suggestions relative to the development of a greater symmetry of the body. Nearly every one is more or less interested in physical exercises and development. And especially to those of sedentary habits do means and methods of exercise appeal. Curiously enough, in a way, nearly every layman looks upon defects in posture, symmetry and stature as an effect arising from lack of, or improper, exercise. He seems to be imbued with the idea that the body in most instances is practically permanent in construction and when irregularities in figure occur certain exercises will correct the defect. Thus have individuals been prone to look upon osteopathy as a method of passive exercises. Osteopaths should believe most thoroughly in exercising, personal hygiene, etc., but the idea of osteopathic manipulation is primarily one of anatomical reconstruction, and not muscular development. The work of the osteopath is to re-adjust or to re-mold the body framework and the many tissues that clothe it so that normality of function may predominate. The manipulation is not routinism but mechanical rebuilding of the tissues so that perfect freedom of vital forces may be forthcoming.

The spinal column presents the most frequent as well as many extremely interesting phases for re-correcting work. The number of abnormalities as to contour to which it is subject are many and varied. Any variation or combination of variations with the normal or physiological curves constitutes an abnormality

or pathological curve. And as a consequence defective posture, unless thoroughly compensated, is readily initiated. Not only may the normal curves be exaggerated, lessened, eliminated or reversed, but lateral and rotary curvatures are of frequent occurrence.

Curvatures involving the cervical region to the extent of producing noticeable defects of posture are principally lateral deviations of several vertebræ. Wry-neck is probably the most noticeable disturbance. The head and neck being drawn and possibly slightly twisted to one side is a defect that is both noticeable and painful. Another common source of postural affection is an exaggerated forward curving of the neck vertebræ. This produces a stooped appearance of the neck.

The dorsal vertebræ are often curved backward too far. This produces roundness with too decided a fullness of the upper back and shoulders. The chest may be somewhat flattened as a secondary effect but not necessarily so. Neither are the shoulders what may be termed "round shoulders," still such a condition may occur, for "round shoulders" are more often caused by a backward swerve of the column at the waist line. The dorsal vertebræ may be forward or what is termed a "straight" spine; this results in an exaggerated "braced" back position. Then lateral curvatures of the dorsal spine are common, which in time may develop into a rotary curvature; that is, the vertebræ are actually rotated on their axes. Lateral curvatures of the dorsal spine are slow and difficult to correct, for the ribs complicate matters very materially.

Curvatures of the lumbar spine, whether posterior, lateral or anterior, are common. Both dorsal and lumbar curvatures, as any one can readily see, are extremely common sources of postural defects. Erect positions of the body are maintained through the support of the dorsal and lumbar vertebræ. Stooped shoulders, one shoulder lower than its fellow, sitting humped over, sitting on the sacrum instead of squarely on the buttocks, the prominent hip, standing first on one foot and then on the other in order to rest the back, and the many allied variations of incorrect postures are largely dependent on the condition of the lumbar and dorsal spines.

It is not to be supposed that the above defects are the only ailments and disturbances that spinal curvatures cause, for, indeed, the defective posture may be by far a minor consideration. Disorders of body functions and affection of organic life itself are very often traced to the mal-alligned vertebræ.

The **causes** of spinal curvatures are many, but without question the most common cause is mechanical wrenching or twisting of the column from falls, jars, etc. Often the strain or sprain of the sections are readjusted through the inherent powers of the body, but there is a point where *vis medicatrix naturæ* requires extraneous help to correct the perversion; and, naturally, such aid, by virtue of the cause of the disturbance, should be physical force mechanically applied. Other causes of spinal curvatures are contractions of muscles on one side of the column or paralysis of the muscles on one side; in either instance, muscular action is greater on one side than the other, which easily results in a curvature. And among still other causes may be noted, bone diseases of the spinal column, compensatory deformities, and constitutional weakening and irritating diseases. Also, some occupations predispose to certain curvatures.

One can readily see that the **treatment** which is directed specifically to the cause of the vertebral deviation would be the most scientific. This is just what osteopathic work implies, direct readjustment of the sections at fault—not exercises, or routine stretching, or braces; although these latter methods may in some cases have their place as secondary aids. Of course exercises are usually physiological and may be employed, in many instances, as an auxiliary.

Where curvatures are extreme, complicating and deforming the ribs, and absorbing the bodies of the vertebræ so they become wedge-shape, and resulting from abscesses, no one can expect within reason to absolutely correct the posture. Some aggressive work can be accomplished, but a perfect symmetry will not be forthcoming. It may be well to again emphasize that where the ribs are involved the osteopath is not contending with the deformity of the spinal column alone, but in addition the entire transverse area of the body. (See also Spinal Curvatures).

Conclusion.—In concluding this rapid survey of a number of postural defects the principal lesson to be drawn is not one of developing the physique and thus perfecting a better stature, so much as curtailing and eliminating insidious beginnings of disease. These little ailments and deformities, of which postural defects may be the most noticeable, are so often the inception of more serious disorders. The anatomical being mal-adjusted, -alligned, or -positioned, easily and readily leads to consequences that require much time and patience to overcome.

Poise of body represents much to every one. Poise or correct posture coupled with careful and methodical exercise and correct breathing are material aids in constructive development, as well as in eliminating disease, for not alone may abdominal, pelvic and thoracic integrity be benefited, but the upper respiratory tract may be toned.

The most important goal that osteopathic science and art is striving for is that of a fully developed and rounded out prophylaxis or preventive treatment. When the public realizes that the proverbial ounce of prevention is an established medical reality then it can truly be said our science has reached its ultimate good. To those who are familiar with osteopathic theory, facts, and development, it is an open secret that this school holds the key to successful preventive treatment. The time is rapidly approaching when the actual lessening of diseases will be an established fact. Then will be the universal practice of the layman going periodically to his osteopath to see if there are any small or insidious beginnings of disorder or disease.

PROLAPSED ORGANS.

Prolapse of various organs or tissues are among the very common ailments that afflict all classes. Prolapse of the stomach, a kidney, the uterus, or the rectum is a familiar term to every one. But this condition may also rest with the intestines, the liver, an ovary, or even the heart.

Outside of injuries, congenital weaknesses, and so-termed surgical disorders, there are commonly two constant forces predisposing to prolapsed organs, viz: gravitation and weakened innervation; the one, of course, is a constant factor in either health or ill health, the other is dependent upon acquirement. Here the latter, or acquired nervous weakness, will specially demand our attention.

Where tissues are torn or lacerated, or congenital malformations are present, or tissues are weakened from ulceration and with a resultant scar tissue, or certain tumors are present, the disorder must be amenable largely to surgical measures if at all.

The perpendicular position of the body favors a decided gravitation of the abdominal and pelvic organs. This gravitative effect being a constant one, many methods, both surgical and mechanical, have been devised to hold in approximate and relative position certain organs and tissues that may be prolapsed. But it is well known that outside of a certain few instances where surgical measures are clearly indicated the prevalent use of braces, bandages, supports and the like are usually poor makeshifts.

The one great feature in these cases is that tonicity to organs and supporting muscles and tissues is more or less impaired. The tissue atony may vary from mere weakness to actual tearing and separating of the fibres. The indications in the cases about to be described are to stimulate a lowered nerve supply and to increase a lessened blood supply; if this can be accomplished, supporting muscles, ligaments and other tissues will be able to restore the prolapsed organs to normal positions, thus improving functions and eliminating disease symptoms.

In discussing the prolapse of the following organs, perhaps it should be noted here that all of the abdominal organs may be prolapsed as a whole. The intestines, stomach, liver, kidneys, etc., may actually prolapse together. This is more apt to occur in persons whose abdominal walls are thin and flabby. In women pregnancy is a common cause. When the abdominal organs have gravitated, the pelvic organs, also, are very likely to be disturbed and displaced; in fact, the pelvic organs are frequently disordered this way.

Prolapse and Dilatation of the Stomach.

Dilatation of the stomach is a much more common and serious affection than prolapse of the stomach, although usually the two are associated. Prolapse, or ptosis, of the stomach means simply a downward displacement of the organ. This is apt to take place in those cases where all of the abdominal organs have gravitated. There is invariably some dilatation of the organ as well.

Weakness of the abdominal walls and of the supports of the stomach constitute the principal **causes** of the prolapse. Spinal deviations that impinge or obstruct the nerve strands (or obstruct the blood and lymph supply to these strands) to the supporting stomach tissues is the most frequent cause of the ailment. General debilitating diseases, as anemia, cancer, etc., are indirect causes of weakened organs with consequent displacements.

In dilatation of the stomach the condition may be either acute or chronic. The former is found where immense amounts of food or drink have been introduced.

One of the principal causes of chronic dilatation is some obstruction to the opening from the stomach into the intestine, so that the stomach contents do not pass readily into the bowel. This leads to chronic disturbances of the stomach walls, and the food remaining in the stomach somewhat indefinitely weights down and stretches the walls of the stomach. The obstruction may be a tumor, or some stricture or adhesion from scar tissue resulting from ulceration or inflammation. The treatment of these cases comes within the province of surgical interference rather than other methods.

The second important cause of chronic dilatation is muscular weakness of the walls from poor nerve supply. This is a common cause and osteopathy is very successful in curing these cases. The splanchnic nerves are below normal, usually from a slight lateral or posterior spinal curvature. The nerve force to the walls of the stomach not being normal causes atony of the muscles and dilatation results. This nervo-muscular atony, also, results from a chronic catarrh, or from a general nutritional disorder as tuberculosis or anemia. The treatment of the former would imply direct correction of nerve and blood supply with attention to diet; the latter can be cured only through relieving the nutritional disorder of which the stomach condition is a symptom.

Dilatation of the stomach is most common in people of middle age or older. The disease is usually easily diagnosed. The symptoms may not be indicative of the trouble beyond showing that the stomach is disturbed. Indigestion, uneasiness, and nausea are common. Vomiting of large quantities of material from the stomach is likely to occur. The patient is generally emaciated, the skin is dry, the bowels constipated, and the urine scanty.

The **diagnosis,** as a rule, is not hard to make. Through the media of inspection, palpation and percussion, the careful osteopath will have little trouble to determine the size of the stomach. Kemp's[1] distinction between gastroptosia and dilatation of the stomach is as follows: "In dilatation the lesser curvature retains its relation to the diaphragm. The distance between the lesser and the greater curvature is increased, but the lesser curvature still maintains its relation to the diaphragm, with the exception that the pyloric end may extend farther over and somewhat farther down." Another instructive point relative to diagnosis the above authors make is the importance of the splashing sound. Owing to the fact that the stomach in health closes concentrically about its contents and thus adapts itself to the volume of ingesta, no splashing sound can be elicited. Three different degrees of relaxation are diagnosticated as follows: "Splashing sound, which can be elicited only during the normal period of digestion, means

1. Rose and Kemp—Atonia Gastricia, 1905.

simple atony; splashing sound produced after the legitimate time of digestion has expired means motor insufficiency; and splashing sound produced in the morning, after the night's fasting, before liquid or food has been introduced, may mean stagnation, dilatation of the stomach, as understood by most writers." (For a more complete outline see Dilatation of the Stomach. The object of this section is to present an outline of prolapsed organs as a whole, and to refer especially to the effectiveness of osteopathic treatment in this condition).

This is a disease that osteopathy has been particularly successful in not only relieving distressing symptoms, but in actually curing the disorder. This refers to the nervo-muscular atony type, for where there is obstruction due to stricture or tumor of the pylorus, resulting in stomach dilatation, the treatment, from the very nature of things, must be largely surgical. Stomachs that have been dilated and prolapsed several inches have been entirely restored to function and organic integrity. To **cure** these cases is a matter of stimulating nerve control and blood supply to the stomach tissues, and, often of greater importance, removing spinal impingements to the stomach nerve fibers, thus allowing nature to fully assert herself. In reality, outside of so-termed surgical cases and other cases where the stomach dilatation is merely a symptom of general nutritional disorder, the primary treatment, by far, is the spinal one. Treatment over the stomach is a decidedly beneficial treatment; it aids materially in toning both abdominal and stomach muscles; still this is mostly a secondary treatment.

Dieting is essential. Careful dieting lessens the tendency to catarrhal inflammation and reduces the work of the stomach to a minimum. Still, nourishing food is necessary and the dieting can easily be carried to an extreme. Liquids should not be taken freely. Fatty and starchy foods should be eliminated. Give the patient food at short intervals. Various nutritious meats are excellent.

In dilatation, and also general abdominal relaxation daily abdominal treatments may be indicated. If the relaxation is pronounced keeping the patient in bed with thorough spinal

treatment two or three times a week, daily abdominal treatment, having the patient exercise abdominal parietes by drawing the walls in and up, upper thoracic breathing, and frequent feeding will accomplish comparatively quick results. The progress of each case depends very materially upon the general health, the physical status of other tissues, constitution, inheritance, environment, age, etc. Some cases will yield in two or three months, others will require two or three years in order to obtain the greatest possible benefit.

The Prolapsed Kidney.

A **prolapsed kidney** is often termed a floating kidney, or movable kidney, or dislocated kidney. It is of common occurrence, especially in thin persons. Some authorities state that one woman out of every four has a floating kidney. It is more common in women than in men, and among the working class than other classes.

The condition is usually an acquired one, following severe strains from lifting, falls, injuries, etc. It is claimed by some that a floating kidney arises from congenitally weakened and relaxed tissues about the kidney, that is, the tissues that keep the kidney normally at anchorage. Thus a congenital looseness of the kidney would easily be a predisposing cause whence mechanical violence, repeated pregnancies, an enlarged liver, or tight lacing would act as an exciting cause. Undoubtedly in some instances there is a congenital predisposition, the peritoneal fold attaching the kidney to the spine being loose and the capsule of fat retaining the kidney being scanty, but osteopathic experience has amply demonstrated that the tissues anchoring the kidney may in many cases become atonized and relaxed from lower dorsal spinal lesions. Rarely is a case presented to an osteopath that does not exhibit two apparent characteristic causative features, viz: spinal irregularity in the lower dorsal spine, and constriction of the zone about the waist, i. e., dropping and constricting of the floating ribs. Furthermore, correction of these lesions will almost invariably lessen the mobility of the palpable kidney.

The **symptoms** of a floating kidney are many and variable.

The kidney may be slightly movable or it may be so loose that one can easily grasp it through the walls of the abdomen. Most of the symptoms are of a nervous reflex nature. Indigestion, which is likely to be very persistent, flatulency, heart palpitation, painful menstruation, irritable bladder, etc., are the most common symptoms. Still, blueness, depression and morbidness are frequently present. The most distressing direct disturbance is the feeling of weight in the abdomen, especially on standing, running or lifting. Sometimes the ureter becomes twisted and severe pain, colic and even collapse occurs.

The **diagnosis** of a dislocated kidney is not a particularly difficult matter. A little experience coupled with a delicate sense of touch will usually readily detect abnormal mobility of the kidney. A point to always remember is that the kidney normally descends about one-half an inch with each inspiration. Care should be taken not to mistake a floating kidney for a movable spleen, although this is not likely, as the shape of the spleen is different.

The **treatment** of a movable kidney under osteopathic measures is usually succesful. In the first place a number of cases require but little attention, simply toning up the general health, and especially directing attention to the abdominal walls and organs. There are a number of cases where the kidney prolapse is incidental to general abdominal laxness and weakness. In more severe cases, treating the spine, raising the floating ribs, carefully manipulating over the abdomen, keeping the bowels open, and lessening liver congestion should it arise, will suffice; in fact, will remedy a good percentage of the cases. With others, a well fitting, medium width, elastic bandage with pad underneath will be beneficial. In these cases the patient should be taught how to treat the abdominal organs, to manipulate the abdominal walls, and to replace the prolapsed kidney, particularly after going to bed; this can be done successfully by the patient and will prove a wonderful help in obstinate cases.

Surgical measures for fixing the kidney should seldom be resorted to. If the patient will live a careful life, avoid unduly straining himself, keep the bowels normal, and have the ana-

tomical lesions corrected, he will come very near being entirely relieved, if not absolutely. Surgical measures are not always a success. Surgeons are not operating for this disorder so often as in past years. (See Movable Kidney,—Diseases of the Kidney.)

Liver Prolapse.

This is commonly termed a **floating liver.** There is prolapse of the organ as well as its being abnormally movable. It is not of frequent occurrence; women suffer from it much oftener than men.

Normally, the liver is partially held in place, in the concavity of the diaphragm, by a number of peritoneal folds. The attachment of these ligaments is to the spine and the diaphragm, their principal function is to prevent extended lateral movements. Of greater importance in supporting the liver in a normal position is the integrity of the abdominal walls, and the position of the stomach and intestines. If the abdominal walls are of normal tone the liver is very apt to be in correct position. And the rest of the abdominal organs, especially intestines and stomach, act as a cushion support. Often when the liver is displaced the remaining abdominal organs are, also, out of normal position and relation to each other; in fact, general prolapse of the abdominal viscera is a frequent cause of liver prolapse. An additional support of the liver is a certain cohesion of the liver and diaphragm, and the elastic traction of the lungs.

Foremost among the **causes** that predispose to inelastic and atonized abdominal walls are spinal irregularities, deviations, and curvatures, which impinge nerve force and obstruct blood supply. These same lesions weaken ligamentous supports of the liver and lessen tonicity of the other abdominal organs, so that local or general displacements are readily forthcoming. Strains, injuries, frequent pregnancies, etc., also act as causes that weaken the supports of abdominal tissues and organs. In a word it is very often the pendulous abdomen that is the immediate cause of a floating liver.

It is not common to find the liver displaced to the lower region of the abdomen, the symphysis pubis. The ptosis is usually

somewhat slight. The organ generally rotates on descent, the right lobe being the lowest portion, owing to the attachment of a ligament, the ligamentum teres, to the umbilicus. Probably in some cases there is a congenital tendency to relaxation of the ligaments, and, thus violent exertions and atonic and flabby abdominal walls are secondary but important factors.

The principal **symptom** of a floating liver is a tumor in the right side, which may be very low down. Palpation will usually determine this. Then the abdominal walls are flabby. Pain and bearing down of the right side are common. There is apt to be considerable indigestion. Variotus reflex symptoms are often present. The floating liver will seem larger than normal, as the liver is below the costal arch and much of it can be felt. Percussion will be of value in determining the extent of the disorder.

Much can be accomplished by **treatment,** especially where the displacement is of a lesser degree. Correcting the spinal lesions, toning up the abdominal walls, and replacing the displaced organs will be extremely effectual. The abdominal bandage may be of service. Certainly abdominal exercises will be beneficial.

A point to remember is, stimulation over the abdomen beneath the right costal arch will cause the liver to contract and retract. This is of considerable osteopathic note. The liver will often recede at least a half an inch. This is a liver reflex (Abrams).

Surgery has attempted to correct displacements of the liver, but on the whole it is as yet experimental.

Prolapsed Intestines.

Prolapse of the **bowels,** as a whole, or, more frequent still, of a part, is undoubtedly the most common form of organ prolapse. The intestines are so situated that they readily feel the effect of gravitative influences, of atonic and anemic states, and of weaknesses and disorders of other abdominal organs.

Spinal irregularities come first as potent **causes** of bowel prolapse. The spinal nerves to the supports of the intestines, to the muscular coats of the intestines, and to the abdominal

walls are obstructed in their normal activity, and consequently those tissues to which these nerves are distributed are affected. Wasting diseases, as anemia, consumption, cancer and the like predispose to intestinal atony.

The severe mechanical wrenches, strains,frequent pregnancies, tight lacing, heavy skirts, large abdominal tumors, obesity cause more or less general or local weakness.

The pendulous abdomen, from wrong or careless posture, and exclusive of other causes, is a common source of general bowel displacement. This form of disorder, besides being unsightly, favors abdominal stoutness. There are a number of instances where simply voluntarily holding or "sucking" the abdomen in place, until it becomes strong enough to support itself, has reduced one's weight by five, ten or fifteen pounds. These were cases where most of the adipose tissue was about the abdomen. Thus exercising and toning the abdominal organs by keeping them in normal position rectified a dormant blood and lymph circulation, which was followed by absorption of the abdominal stoutness.

Congenital weaknesses are to be considered in a number of cases. The muscular ligaments may not be developed, the mesenteric attachments may be too long, and various other abnormalities may result from congenital disturbances.

Of particular local interest to the osteopath, outside of the bowels dislocating as a whole, are: first, the hepatic flexure; second, the ileo-cecal region; third, the sigmoid flexure; fourth, the rectum; and fifth, hernias. Each of these sections are of separate interest and will be considered presently.

The **symptoms** are extremely variable. Constipation, a feeling of discomfort in the bowels, nervousness, depression, lassitude and anemia are frequent. Colicky pains in the intestines, indigestion, hysteria at times, are, also, among the symptoms. In reality a great variety of symptoms may be present. The patient is likely to be emaciated. In some cases exhaustion is marked.

Diagnosis, as a rule, is not a difficult matter. The various neurasthenic symptoms in a lean patient with constipation, in-

digestion, and stomach and intestinal distress would lead one to suspect intestinal displacement. The outline or contour of the abdomen will often reveal the character of the trouble. The atonic, thin and relaxed walls of the abdomen may readily give view of the displaced organs. Then careful examination by palpation and percussion will help very materially in the diagnosis.

The **heaptic flexure** is frequently prolapsed. The bowel (colon) ascends from below upward to beneath the costal arch and then angles sharply into the transverse colon, which extends directly across the abdomen to the left side. The ligaments that support this flexure are apt to become weakened or stretched and allow a descent of this section of the bowel, which is followed by constipation, indigestion, etc. The ligament especially involved is the colo-hepatic ligament.

The **ileo-cecal region** is an area that readily becomes congested and catarrhally inflamed, especially from constipation or inpaction at this point. The section often becomes atonic and prolapsed with resultant clogging of fecal matter. Owing to the close proximity of the vermiform appendix, appendicitis frequently results from the above condition. The osteopath can do much in these cases of appendicitis. Lesions are invariably found in the lumbar vertebræ or the floating ribs are depressed.

The **sigmoid flexure** is, also, frequently prolapsed. The fecal mass often becomes impacted here, owing to a settling or prolapse of this part. In some cases the prolapse is so marked that it extends to the rectum below and drags on the splenic flexure above.

Lumbar and innominate lesions are the usual causes, although, it seems in a number of instances, that relaxed walls of the abdomen cause a "contraction of the diaphragm resulting in kidney displacement and followed by intestinal prolapse." The vertebral lesions, probably, first weaken the muscular coat of the bowel, then, second, the bowel supports (other than its own inherent tonicity) and the abdominal walls.

Prolapse of the **rectum** is of such separate importance that it will be but partly outlined here. As stated above a source of rectal displacement arises from the section of the bowel above settling

downward and ultimately causing invagination of one or more coats of the rectum. Dislocation of the coccyx is a potent cause of rectal disorders. Lumbar lesions, especially twists between the fourth and fifth, and fifth and sacrum are common causes of rectal weaknesses. Slips of the innominata are other causes of prolapse.

Osteopathy has had marked success in these cases. Cures may result from a single treatment to readjust the coccygeal displacement or temporarily relieve excessive physiological activity by dilating the rectal sphincter, or the treatment may demand a number of months' work in correcting general abdominal prolapse. Raising the sigmoid is effectual.

A **hernia** is "the protrusion of a loop or knuckle of an organ or tissue through an abdominal opening." Two of the common hernias of the intestines are inguinal and femoral. These conditions are most often acquired from severe straining, so that a loop of the bowel protrudes through a weakened and stretched area of the abdominal walls.

Mention of the hernia is here made because, in a way, it is a form of bowel prolapse; that is, a limited form, and osteopathy contains certain possibilities for a successful treatment. Hernia has always been looked upon as purely a surgical disorder; i. e., remedial to surgical measures only. Where a truss has failed to give relief surgery has been resorted to. This is true in most instances, but where the hernia is in the incipiency careful abdominal exercises (this should be carried out with great care, for severe exercise may produce a hernia or increase one already existing), massage to the tissues about the hernia, attention to the bowels, and spinal stimulation corresponding to the weakened tissue, and avoidance of strains may strengthen the tissues materially about the hernia.

Occasionally a loop of the intestine will prolapse into the cul-de-sac back of the uterus. A heavy dragging pain low down in the center of the abdomen and constipation or complete obstruction are the pronounced symptoms. Two cases have occurred in the experience of the authors. Careful lifting of the loop of bowel by pressure within the vagina and traction from

above with a hand outside, when the patient was on her back with the buttocks elevated gave speedy relief.

The **treatment** of the prolapsed bowels represents those measures that will replace and keep in position the displaced organs. Naturally, the spinal and abdominal treatment come first; this strengthens intestinal ligaments, tones intestinal muscles, and contracts the abdominal parietes, and at the same time the bowels are regulated, digestion and nutrition improved, and the general health built up. In some cases abdominal supporters will be of value. Right living, which is represented by proper diet, sufficient outdoor exercise, regular habits, is invaluable.

The really specific treatment is to correct spinal, rib and innominata deviations and abnormalities. But direct local work will be, in many instances, necessary. General abdomina lmanipulation is good, but this should be supplemented by careful local treatment. The hepatic flexure requires a direct stimulating and replacing treatment. The ileo-cecal section should be raised, stimulated and emptied of the fecal mass. Direct upward manipulation of the sigmoid flexure in the left iliac fossa and of the splenic flexure beneath the left costal arch is extremely efficacious. Care must be taken not to bruise the parts. Getting beneath the prolapsed area and gently and intelligently raising the bowel so that it is emptied, toned up, and vascular congestion relieved, are the indications. This requires careful work and the necessity of gentleness can not be emphasized too much. Still in all of this treatment we should never forget the absolutely essential spinal readjustment.

Rectal prolapse requires local internal treatment, external tissue recorrection, especially the coccyx, an innominatum or the lumbar spine, and, of much importance, deep, careful and thorough work over the sigmoid section.

Cases of bowel prolapse are every day experiences with the osteopath. The osteopathic treatment is of great value in these and a successful issue is very often the result. Cases of pendulous abdomen, of obstinate constipation, of chronic indigestion, of many nutritional disorders, of feeling pain, weight or dragging,

locally or generally, in the abdomen, are very apt to be suffering from prolapsed intestines.

A number of cases of bowel prolapse are associated with general prolapse of abdominal organs; that is, displacement of the stomach, kidneys, liver, spleen, etc. This general condition is termed enteroptosis or Glenard's disease. It usually requires several months to treat it successfully. These patients are neurasthenic, mal-nourished, and often hysterics. The symptoms from which they suffer are innumerable. Mechanical weaknesses, lowered vitality, poor innervation and blood supply, and auto-intoxication are causative factors.

The Prolapsed Uterus.

Prolapse of the **uterus** is of common occurrence. The prolapse may be incomplete or complete; the latter when the organ is presented to the external world. Of special interest are those affections exclusive of surgical cases. Ptosis of the abdominal organs upon the pelvic organs is a common cause of uterine prolapse. The abdominal prolapse crowds uterine space, congests the uterus, weakens the ligaments, and drives the uterus downward as a wedge.

Lumbar spinal curvatures are frequent causes of prolapse, as well as other displacements of the uterus. In this region vaso-motor nerves to the pelvic organs make their exit, and, consequently congestions, inflammations, and weaknesses of supports are results. Also, slips of the innominata disturb the pelvic circulatory balance. Weakness of the uterine support from below, vaginal walls and perineum, most often arises from lacerations at child-birth. Still, the vaginal walls may become relaxed through other causes. Tumors and extreme congestions are causes of prolapse. Heavy lifting is quite a frequent source of uterine displacements. Osteopathy is very successful in uterine prolapses; that is, any displacement of the uterus not of a surgical character. Correction of the external causes comes first. Then local treatment to replace, tone, and relieve congestion, and break up adhesions is necessary. The external treatment is usually the primary treatment. Local work is not always necessary. Lacerations and other surgical indications, of course, require surgery.

Ovarian Displacement.

The ovaries may be prolapsed, the left much oftener than the right. When prolapsed, it drops backward, downward and inward.

Ovarian congestion, tumor, retroverted or retroflexed uterus, tubal disease, and pregnancy are among the principal causes. Back of these congestions, tumors and uterine displacements are the osteopathic causes, particularly spinal and rib lesions from the ninth dorsal downward. Specific lesions at the ninth and tenth dorsals and corresponding ribs, affecting directly ovarian tissues, and lumbar and innominata lesions and abdominal prolapse disturbing uterine and tubal tissues, are the most frequent osteopathic causes. A retroverted or retroflexed uterus is often found. Uterine displacements bear down upon the ovary and cause its descent, and, also, disturb ovarian circulation.

As has been stated, the left ovary is more apt to be displaced than the right. This is owing to the abscence of a valve in the ovarian vein on the left side, and, also, this vein opens at a right angle into the renal vein; this anatomical feature easily leads to passive congestion of the ovary, and thus to diseases of the organ. Then the rectum is on the left side and large fecal masses are apt to crowd against the ovary, which tends to its displacement.

Thus it is readily seen that osteopathic treatment is very applicable to ovarian displacement unless the indications are surgical. A more or less constant burning or sharp pain in the ovarian region, with probably some feeling of weight, profuse and painful menstruation, depression, irritableness, etc., are **diagnostic.** However, a local examination will reveal the status of the ovarian position and congestion.

The same **treatment** as in other organ prolapse is indicated; toning weakened tissues, relieving congestions, replacing organ, with careful attention to the bowels and the general health. There are no tissue disorders of any part of the body wherein osteopathy is more thoroughly indicated and the results more generally satisfactory than in prolapse. And especially should it be remembered that in prolapse of various organs many vague intestinal

and pelvic disorders and even ureteral and bladder disturbances may be traced to bowel dislocations and excessive kidney mobility in which osteopathic measures are often successful.

Conclusion.—The purpose of this section on Prolapsed Organs has been to supplement the various articles on Dilatation of the Stomach, Movable Kidney, etc., with an outline that may include relaxation of a part or of the whole of the abdominal viscera. The physician is all too prone to simply note the most offending or conspicuously disturbed organ instead of carefully analyzing all the features, great and trivial, that may be either apparent or marked. A general relaxation of the abdominal and pelvic organs may be found, and a nearly complete restoration take place under treatment, but still a lacerated perineum may have to be repaired before a cure is completed. Or it may be in a general abdominal ptosis that a floating kidney will resist all measures for restoration, short of surgery, and before much improvement can be obtained the kidney will have to be stitched into place. An enlarged liver may crowd the kidney out of place or a transverse colon may prolapse and drag on contiguous tissues and still the annoying symptoms be referred elsewhere. Then the primal point of general relaxation may not be one organ, but a simultaneous displacement of several.

The thorax itself may be distorted from various diseases so that the chest is narrowed, the diaphragm displaced with consequent descension of the abdominal organs, and from the latter a displacement of the pelvic.

"Far down displacement, marked changes of form, and real disfigurements of the stomach are found in some cases of kyphosis and scolio-kyphosis."[1] The osteopath will not only find this true in some cases, but in many cases, although he recognizes as causative factors injuries to the spine causing curvatures and postural defects as prolific sources of abdominal relaxation.

"Glenard's whole theory of splanchnoptosia is based on the relaxation of the suspensory ligaments of the intestines, especially that of the transverse colon; and Stiller, the discoverer of the floating tenth rib, says that splanchnoptosia is a descent of the

1. Rose and Kemp—Atonia Gastricia, 1905.

atonic stomach, of the colon (especially the transverse portion), of the kidney (the right or both kidneys), exceptionally of the liver or the spleen. A descent which has been developed mostly in tender age, in consequence of general relaxation, especially of the peritoneal suspensory ligaments in individuals with congenital general dyspeptic neurasthenia, tender muscles, lean habit, and slender bone structure, manifested in a higher degree by a floating tenth rib." Stiller observed that when there is a floating tenth rib there is a displaced stomach and a floating kidney, although it is not found in every case, but never missing if the case is pronounced. The tenth ribs in these cases have only a ligamentous fastening and are as freely movable as the eleventh and twelfth.

That abdominal relaxation plays a very important part in many diseases of the abdominal and pelvic organs, in cardiac and pulmonary affections, disturbs the circulation of the legs, and is the source of many reflex affections no one can gainsay. The osteopath should always pay particular attention to tonic condition of the abdominal viscera, for relaxation of the suspensory tissues and walls, and atony and sluggishness of the organs are frequently paramount etiological factors. And the osteopathic treatment is the remedy par excellence.

DISEASES OF THE EYE.

Anatomical derangements affecting the eye may be found anywhere from the sixth dorsal, including the ribs, to the occiput. A majority of the lesions, however, in diseases of the eye are located in the upper and middle cervical vertebræ. The principal influence to the eye is reflexly through the superior cervical ganglion, to the cavernous plexus and then via the fifth nerve or the sympathetics, and with these the blood supply to the optic nerve and eyeball. Some direct treatment is given to the ball of the eye and nerves of the orbit for the same purpose. This is the only means by which the metabolism of the eye can be affected and the only way a natural cure may be obtained. This, with surgery and refraction, should be sufficient for all curable disorders.

In diseases of the anterior part of the eyeball, lesions are generally found in the upper cervical region (atlas, axis and third cervical). These diseases include such as the various forms of conjunctivitis, keratitis, etc.; in fact, any disturbance of the tissues supplied by the fifth nerve. When the fifth nerve is involved, it is almost invariably caused by a subdislocated atlas or axis. Other lesions to the fifth nerve may result from disturbances of the third cervical vertebra, subdislocations of the inferior maxillary, and contracted deep muscles of the upper cervical region. The treatment given in these cases, besides correcting displacements of the upper cervical tissues, is springing the inferior maxillary open, so as to release contracted tissues about its articulation; stimulating treatment to the facial points of the fifth nerve, and, if necessary, as in cases of granulated eyelids, a thorough local treatment of the eyelids. After carefully cleansing and oiling the fingers place a finger and thumb on either side of the eyelid and lightly massage the parts, so as to re-establish a normal circulation, to stimulate the local glands and to remove the granulation. In cases of pterygium, the object of the treatment is to correct the vascular supply of the surface of the eyeball, which is principally controlled by the fifth nerve. A light treat-

ment to the growth directly with a blunt instrument will be a helpful measure. When the tear-duct is found obstructed and not due to organic growths, simply a stricture caused from irritation of motor nerves, the lesion is usually found in one of the upper three or four vertebræ. (Dr. Still).

When diseases occur to the inner eyeball, lesions may be located anywhere in the cervical or upper dorsal vertebræ, but especially in the middle cervical region. The pupil may be contracted by stimulation of the middle cervical region; and it may be dilated by inhibition at the second or third dorsal. The lymphatics of the axillary and cervical regions have important relations to the eyes, as well as to the various tissues of the cranium. Lesions to the axillary lymphatics occur, principally from dislocations of the ribs in the immediate region, and to the cervical lymphatics, from subdislocations of the middle and inferior cervical vertebræ. It has been suggested, that possibly the mammary gland's internal secretion is essential to the metabolism of the eye, as extirpation of the breasts may weaken the eyes (Dr. Still). If such is the case lesions from the third to the sixth ribs, inclusive, will affect the mammary secretions.

Structural changes of the eyeball, as in myopia and hypermetropia, and in cases of astigmatism, may be remedied by osteopathic treatment if such conditions are acquired. The treatment is to re-establish an unimpaired blood supply to the eyeball, so that all parts may be equally nourished. In cases of corneal astigmatism, impairment of the fifth nerve is generally found. What is necessary in such cases is an equal distribution of nourishment to all the meridians of the cornea. When the crystalline lens is impaired, as in cataract, osteopathic treatment may be able to cure the condition in a few instances, the principle of the treatment being to correct an obstructed circulation to the eyeball, due to lesions in the cervical vertebræ, so that the condition may be absorbed.

The muscles of the orbit may become involved by lesions in the cervical region, but especially by lesions in the upper dorsal vertebræ. A few cases of strabismus have been cured by correcting lesions of the upper dorsal vertebræ. It is impossible to state

the nerve connection in such instances; it is probably through the sympathetic system. Treatment over the eyeball would have some influence in such cases.

Treatment of the optic nerve itself is given principally through the cervical spine. It is claimed by some that a few fibres of the optic nerve arise in the cervical spine. Also, lesions of the cervical spine would influence the circulation to the optic nerve.

Our principal work in all cases of eye diseases is through the superior cervical ganglion to the cavernous ganglion, and then to the fifth nerve or the sympathetics to the eye; also, to the blood supply to the optic nerve and eyeball. In a few instances the vertebral end of the first rib may be displaced and impinge the vertebral vessels. The treatment to the eyes externally is largely a secondary treatment to aid in stimulating the venous circulation.

It should be remembered that the general health profoundly influences the eye and it must be carefully considered in all its bearing on the case. The best results cannot be obtained in a debilitated patient, while the eye may, on the other hand, be the disturbing factor. Treatment of the eye includes: first, osteopathic measures; second, hygienic care; third, aseptic procedure; fourth, correction of refractive errors, and, fifth, surgical interference.

The following outline of diseases of the eye is given largely for differential diagnosis and with a hope of preventing any errors from useless and misdirected treatment or in emergency and surgical cases. This outline was prepared by an oculist of wide experience with frequent reference to the works of Fuchs, May, Posey, and Wright and others.

Affections of the Eyelids.

Blepharitis.

A chronic inflammatory condition of the margin of the lids associated with the formation of scales and crusts. The margins of the lids are swollen and reddened. They present numerous whitish scales at the bases of the lashes. The latter fall out readily, but are replaced, (except in the ulcerative form), since there

is no destruction of the hair follicles. There is itching, soreness, running of tears down the face, and sensitiveness to light. Almost invariably there will be found lesions of the upper and middle dorsal region involving the vaso-motors of the fifth nerve, although occasionally lesions to these nerves occur as low as the fifth or sixth dorsal vertebræ and ribs. Also examine carefully the inferior maxillary articulation. Poor hygienic surroundings, debilitated condition of the system (especially after measles), exposure to smoke and wind and dust, late hours, insufficient sleep, and uncorrected errors of refraction are other important causes. The disease occurs at all ages, most commonly in children.

Treatment.—Removal of the cause if possible. Cleanliness—the edges of the lids must be cleansed with soap and water to which a little borax has been added, using enough friction with a piece of cotton to release the scales, after which a bland ointment or vaseline may be rubbed along the edges of the lids. In addition to the cervical treatment careful treatment over the lids will benefit.

Hordeolum or Stye.

A circumscribed acute inflammation of the tissues about the follicle of an eye lash. They occur at all ages, but are more common in children, and often occur in crops, and are associated with deranged conditions of the general system, constipation and uncorrected errors of refraction.

Treatment.—A stye may sometimes be aborted by the use of cold applications; when this cannot be done, hot applications, which will hasten suppuration, are used. As soon as the yellow point is seen the pus should be evacuated by pulling out one or more lashes, or by opening the pustule with an aseptic needle. Osteopathic treatment to the eyelid will sometimes abort the affection, and treatment to the innervation, as well as attention to the general health, will frequently be a preventive.

Chalazion.

An enlargement of one of the Meibomian glands in consequence of the stoppage of its duct. It occurs most frequently in adults. The process develops slowly, with little or no symptoms, until

weeks or months later it has reached the size of a small or large pea. Then it presents a noticeable swelling, which feels hard and is attached to the tarsus, but not to the skin.

Treatment.—When small and causing no irritation it need not be interferred with except on account of the disfigurement. They can often be absorbed by direct massage. If this does not take place a small incision may be made into them from the conjunctival surface, and the contents well scraped out, destroying the wall, or they are apt to reoccur.

Trichiasis.

Trichiasis is an inversion of a number of lashes so that they rub against the cornea.

Distichiasis is usually a congenital condition in which the lashes are separated into two rows; the posterior one is directed backward and rubs against the cornea.

Treatment.—The lashes may be pulled out with a cilia forceps, but an operation should be done on the lids to turn the lashes out.

Entropion.

A condition in which the margin of the lid is turned in. It may be spasmodic or cicatricial. In the cicatricial variety an operation is necessary. The spasmodic condition can usually be cured by putting collodion on the skin or using an adhesive plaster to hold the edges of the lids out, in addition to thorough and careful treatment of the fifth nerve, especially in upper cervical region.

Ecchymosis.

Black Eye is usually of no importance, merely disfigurement, which lasts one or two weeks. If seen immediately, cold compresses may be of service. After a day or two, gentle massage will promote absorption of the extravasated blood. In fracture of the skull, blood may travel along the floor of the orbit and after a day or two appear in the lower lid and in the bulbar conjunctiva.

Diseases of the Lachrymal Apparatus.

(Dacryocystitis).

An infection of the lachrymal sac, which may be chronic or acute. The symptoms of the chronic form are the running of tears down the face (increased by exposure to cold, wind or dust), and when pressure is made upon the lachrymal sac with the finger tip a viscid fluid of whitish or yellowish color escapes from the puncta. Sometimes the accummulation is pressed the reverse way and emptied into the nose. This condition extends over a long period of time. As a result of the infection by micro-organisms from the conjunctival sac an acute purulent inflammation of the lining of the sac is often set up; the skin then becomes reddened and swollen. This swelling and redness often extend to the lids and conjunctiva and is accompanied by great pain.

Treatment.—In the chronic form the patient should press out the contents of the sac many times a day. A stricture of the opening of the sac into the nose is the cause and should be removed if possible, by the passage of probes; in several instances strictures have been cured osteopathically, by attention to the innervation and direct treatment. Dr. Still has had many successful cases and he always gave attention to the third and fourth cervicals. The sac should be washed out daily by means of a syringe filled with a boric acid solution, the fluid being passed through the canaliculus into the sac and through to the nose.

In the acute form if the case is seen early, try to press out the contents of the sac and prevent suppuration by syringing with four per cent. boric acid solution. If this cannot be done, hasten suppuration with hot compresses. As soon as the fluctuation occurs a free incision into the anterior wall of the sac is made. This is kept open by a strip of gauze, and after all purulent discharge has ceased try to restore the nasal duct. In some cases it is advisable to extirpate the sac, but never until the acute symptoms have subsided. On account of an uncured sac always containing pus that is teeming with bacteria, ulcer of the cornea is apt to develop from the slightest abrasion.

Diseases of the Conjunctiva.

Catarrhal Conjunctivitis—(a) acute, (b) chronic, (c) follicular.

In **catarrhal conjunctivitis** the patient complains of the eyes itching and smarting, a feeling as of sand or a foreign body in the eye, and heaviness of the lids. The eyes are somewhat sensitive to the light and tire easily. These symptoms are, as a rule, worse at night. The conjunctiva is red and swollen and secretion is increased in amount and in character. It may dry on the edges of the lids at night and the lids may be stuck together in the morning. Lesions of the cervical vertebræ and deep muscles predispose to this disorder. These lesions interfere with the innervation and also with the venous drainage. The causes are mechanical, (foreign bodies, exposure to wind, dust and smoke), poor hygienic surroundings, eye strain, and infections by various micro-organisms, through contact with fingers, towels or handkerchiefs of patients suffering from the disease. The acute epidemic form, "pink eye," is usually due to the Koch-Weeks bacillus.

The injection of conjunctivitis should be differentiated from ciliary injection in order to differentiate conjunctivitis.

Conjunctival Injection.	Ciliary Injection.
1. Derived from posterior conjunctival vessels.	1. Derived from anterior ciliary vessels.
2. Accompanies diseases of the conjunctiva.	2. Accompanies diseases of the cornea, iris and ciliary body.
3. More or less marked muco-purulent or purulent discharge.	3. Free lachrymation and no conjunctival discharge.
4. More marked in the fornix conjunctiva.	4. More marked immediately around the cornea. Hence called "circumcorneal."
5. Fades as it approaches the cornea.	5. Fades towards the fornix.
6. Bright brick red color.	6. Pink and lilac color.

7. Composed of a net work of coarse tortuous vessels anastomosing freely and placed superficially so that the meshes are easily recognized.	7. Composed of small straight vessels placed deeply so that the individual vessels cannot be recognized easily, but are seen indistinctly as fine straight lines radiating from the cornea.
8. Can be moved with the conjunctiva by pressure on lower lid.	8. Cannot be displaced by movement of the conjunctiva.

Treatment.—Removal of the cause if possible. Attention to the innervation and direct treatment to stimulate circulation is invaluable. If due to eye strain, advise the wearing of proper glasses. Local cleanliness is of the greatest importance. Wash the eyes out frequently with a four per cent. boracic acid solution. Massage of the conjunctiva once daily with a piece of cotton wrapped around a toothpick dipped in boric acid solution is also valuable, the lids being everted during the process.

Gonorrheal Ophthalmia.

This condition is due to infection from gonorrheal secretion either directly, by a finger of the patient transferring the virus from the genitals, or indirectly by means of towels, etc., and in the case of the new-born the infection is obtained from the genitals of the mother during parturition. Symptoms occur after a period of incubation varying from a few hours to a few days, (the severer the case the shorter the period); great swelling and redness of the lids occurs, so that they cannot be opened voluntarily, and can be separated only with the greatest difficulty. The conjunctiva of the lids and fornix is extremely swollen and reddened. The secretion is at first serous, somewhat colored with blood and contains a little pus. The eye is tender to the touch, and feels hot; there is dull aching pain in the temple and some constitutional disturbance; slight fever, and some swelling of the preauricular glands. This is followed in about two days by a thick creamy purulent discharge, which escapes continuously between the lids. This symptom continues for from two to three weeks, all symptoms gradually diminishing. The eye may now return to normal in

two or three weeks more. Frequently there remains a chronic inflammation of the lids, an uneven granular and velvety appearance of the conjunctiva, especially over the tarsus. A very frequent and important complication is corneal ulceration. This begins with a small gray infiltration, which breaks down to form an ulcer. This ulcer may perforate, and be followed by healing of the ulcer or incarceration of the iris; staphyloma or other sequelæ of corneal ulceration may result. Suppuration of the whole eyeball may take place leaving nothing but the sclera.

Treatment.—Great precautions should always be observed to prevent infection of the eyes of the physician, nurse and attendants during the examination and treatment, because of the spurting of the discharge when opening the lids protection glasses should be worn, the fingers must be carefully disinfected, and materials which have been used should be burned. The non-affected eye of the patient should be protected by a bandage or Buller's shield, or in the case of the babe, laying it on the affected side. In the first stage applications of cold are used continuously. The eye must be carefully cleansed, and the secretion removed as often as it forms. The tension in the lids may be so great that when separating them dangerous pressure would be exerted on the eyeball; in such a case the external canthus s hould be cut. When the secretion becomes purulent in the second stage, the eye should be cleansed every fifteen minutes with a few drops of a ten per cent. solution of argyrol, which is heavy and sinks to the bottom of the cul-de-sac and in this way floats the pus out. It is also antiseptic. This should stop most of the discharge in a few days, when the eye can be cleansed every half hour with boric acid solution, the argyrol being used four or five times daily. The treatment of the corneal complications will be described under corneal ulcer. The prognosis as to sight is always grave, much more so in the adult than in the infant. In addition to the above careful treatment to nerve and blood supply will aid in lessening the severity of the disease, but be particularly careful about cleansing the hands.

Granular Conjunctivitis or Trachoma.

This should be differentiated from follicular conjunctivitis, which always disappears in time without leaving any changes behind. Trachoma is a disease of lengthy duration, accompanied by hypertrophy of the conjunctiva, the formation of granules, with subsequent cicatricial changes. The trachoma granules are gray, or yellowish rounded translucent bodies showing through the conjunctiva. They appear principally in the upper fornix; in the tarsal conjunctiva they are less numerous. In follicular conjunctivitis the granules are found mostly in the lower fornix; they are larger, and arranged in rows. In trachoma the process progresses up to a certain point, and is then followed by cicatricial changes. The papillæ and granules disappear, but the conjunctiva does not return to normal. Cicatricial changes and contraction leave certain sequelæ, the seriousness of which depends upon the severity of the process and the treatment carried out. The most frequent complication is pannus, which consists of newly formed vascular tissue, and usually covers the upper part of the cornea. The affected part of the cornea presents a cloudy appearance and is uneven and vascularized, the blood vessels springing from the conjunctival vessels. This progresses until the upper half of the cornea is covered, in which case the vision is reduced to the perception of light. Unless subsequent changes occur complete clearing up is possible. Other sequelæ are trichiasis and entropion (which occur as a result of the cicatricial contraction of the conjunctiva); corneal ulcers, and a dried, scaly condition of the conjunctiva and cornea result in severe cases. Trachoma is **caused** by infectious material being transferred from one person to another by means of towels, handkerchiefs and the fingers. It is found most frequently among the poorer classes of Russian and Polish Jews, Hungarians and Italians. It occurs very frequently in Egypt.

The **treatment** is cleanliness, use of boric wash, expression of the granules, vigorous massage of the conjunctiva with a glass rod once a day to promote absorption and prevent formation of scar tissue. This must be continued over a period of months.

The patient should be instructed how to prevent infection of other people by having separate wash-basin, towels, etc. In the cases which have gone on to entropion and trichiasis, operation is the only treatment. If these cases can be seen early considerable can be accomplished by osteopathic treatment, but do not delay surgical measures when indicated, as has been done in a few instances.

Pterygium.

A triangular fold of conjunctiva extending from the inner or outer canthus, with its apex immovably attached to the cornea. A recent pterygium is rich in blood vessels and of a red color, but when older and non-progressive changes to a white tendinous membrane. It grows slowly towards the center of the cornea and finally becomes stationary. It is most common in elderly persons and the exciting cause is wind and dust. The non-vascular pterygium is not progressive.

Treatment.—The vessels can sometimes be cut off by making pressure across them with the back of a knife which is so dull that it will not cut the conjunctiva. If the condition is progressing and interferes with vision by encroaching on the pupil, or is disfiguring, it should be transplanted. Many cases have been treated successfully by correcting lesions of the upper three or four cervicals and by local treatment.

DISEASES OF THE CORNEA.

Ulcers of the Cornea.

An infiltration followed by suppuration and loss of substance of the cornea. The subjective symptoms are pain, sensitiveness to light, lachrymation, and spasm of the lids. Sometimes these symptoms are slight, or altogether absent. The ulcer may travel on the surface or become deeper, or extend in both directions. If the ulcer is small and superficial it will usually cleanse itself in a few days. When the ulceration is more extensive there is a formation of pus in the anterior chamber called hypopyon. The more serious cases (those caused, as a rule) by the pneumococcus are apt to go on to the destruction of the eye if not treated vig-

orously and early. The predisposing causes are poor general health and old age; they are very common in scrofulous children. The ulcer is always due to an infection, therefore frequent after foreign bodies in the cornea (in cases of inflammation to the lachrymal sac, the discharge of the sac supplying infection). They are also common in gonorrhoeal ophthalmia, trachoma, phlyctenular conjunctivitis, and disturbances of the nutrition of the cornea, such as paralysis of the trigeminus. In **treating** ulcers, the tone of the general system should be improved, attention should be paid to diet, fresh air, hygienic surroundings, the condition of the bowels, etc. Foreign bodies are to be removed from the eye. Various forms of conjunctivitis and dacryocystitis must receive attention. The local treatment, which is of the most importance in this condition, is a pressure bandage, which must be removed several times a day to cleanse the eye; hot compresses, antiseptic locations, scraping and cauterization of the ulcer, and enough of a one per cent. solution of atropine should be used to keep the pupil dilated, especially if the ulcer is in the center of the cornea, to prevent incarceration of the iris in the case of perforation, also to keep the eye at rest (as it paralyzes the ciliary muscles). The use of atropine is considered imperative by all oculists and is given here so that errors may be avoided, besides the osteopath appreciates that its value is due to the mechanical effects and can in no way be confused with internal medication.

Neuroparalytic Keratitis.

Neuroparalytic Keratitis is due to the paralysis of the trigeminus. The changes in the cornea are partly trophic in character and are also due to exposure and lodgement of foreign substances on the insensitive cornea. There is no pain or lachrymation. The **treatment** consists in keeping the eye bandaged and cleansed; hot applications may be of service, and treatment of cervical lesions when found.

Interstitial or Parenchymatous Keratitis.

This is a cellular infiltration of the middle and posterior layers of the cornea. It occurs frequently in children, is chronic in

its course, and does not lead to ulceration. The affection begins either in the center or margin of the cornea with the presence of a gray infiltration. After the infiltration has become general the cornea will become softened and of a dense grayish or yellowish-gray color, so that the iris can no longer be seen, and the vision is reduced to little more than perception of light. The surface of the cornea resembles ground glass. At this period, or before, deep seated blood vessels make their appearance and pervade more or less of the cornea. This gives rise to a dirty red or yellowish red discoloration. The progress thus far is accompanied by irritative symptoms and lasts one or two months. The inflammation then begins to subside, and the cornea clears up in the periphery. After a year or more, in favorable, cases nothing but a faint central opacity can be seen; this time has frequently been shortened by osteopathic treatment. In more severe cases there is inflammation of the iris, choroid or vitreous, these conditions leaving a serious impairment to sight. Furthermore, the clearing process may leave a dense opacity. The subjective symptoms are sensitiveness to light, lachrymation and impairment of vision. Both eyes are usually involved, the second eye usually becoming inflamed some weeks or months after the first eye. The cause of the majority of cases is inherited syphilis, and occurs usually between the fifth and fifteenth year.

The **treatment** is constitutional (building up the general health), protection of the eyes by means of dark glasses, the use of hot applications and atropine. Treatment of the cervical and upper dorsal and the venous circulation of the face is particularly beneficial. When the cornea begins to clear, massage to the cornea through the lids will hasten absorption of the infiltration.

DISEASES OF THE IRIS.

Iritis.

Iritis may be divided, according to its **cause,** into (1) Syphilitic; (2) Rheumatic; (3) Gouty; (4) Diabetic; (5) Gonorrheal; (6) Tuberculous; (7) Traumatic; (8) Sympathetic; (9) Secondary, and, (10) Idiopathic.

The objective symptoms are: the iris looks altered; it appears swollen, dull, loses its lustre, its markings become indistinct, its color changes. These changes are due to the congestion of the iris and exudation of cells and fibrin into its substance, also into the anterior chamber. The pupil is contracted, grayish and sluggish in action, and when dilated with atropine is irregular in shape, and there may be more or less punctate deposits on Descemet's membrane. The tension of the eyeball is usually normal. There is always marked circumcorneal injection (see differentiation of Ciliary and Conjunctival Injection under Conjunctivitis). Pain is often severe, neuralgic in character, radiating to the forehead and temples, and is worse at night. The eye is sensitive to light; there is lachrymation and interference with vision. The eyeball is sometimes tender, a symptom showing involvement of the ciliary body. Its course may be acute or chronic, and may involve one or both eyes.

Iritis is most frequently mistaken for acute conjunctivitis and acute glaucoma. In acute conjunctivitis there is no change in the iris, the pupil is normal, the injection is conjunctival in place of ciliary, there is mucous or muco-purulent discharge, no ciliary tenderness, no interference with vision except blurring caused by mucous discharge smeared over the surface of the cornea. In acute glaucoma the iris is congested and discolored, the pupil is dilated, oval, and immobile. The cornea is steamy and insensitive; the tension is increased and there is severe pain in or about the eye, with headache and marked dimness of vision. Examination with the ophthalmoscope (if possible at this time) shows cupping of the optic disc, and the field of vision is contracted on the nasal side. The complications of iritis are inflammations of the choroid, vitreous, optic nerve and retina.

Sequelæ.—There is often an attachment of the iris to the anterior lens capsule as a result of the plastic exudate. If the iris is bound down throughout its entire pupillary margin, the communication between the anterior and posterior chambers is cut off, the iris bulges forward, secondary glaucoma results, and if not quickly relieved by operation the eye is lost. The pupil may also fill with an opaque exudate.

The **treatment** is the instillation of atropine (see Corneal Ulcer); this puts the parts at rest and is used chiefly for its mechanical effect, as it causes dilatation of the pupil, thus prevents the serious consequences which are bound to take place in severe cases if it is not used (for example filling of the pupil with opaque exudate or numerous adhesions between the iris and lens occur if pupil is not dilated). The rest of the treatment consists in treating the underlying constitutional conditions, the application of hot compresses for several hours each day, absolute rest of the eyes and protection from light by dark glasses. A number of cases have been treated successfully by osteopathic measures alone, but there is considerable risk run unless one is perfectly familiar with all phases and complications of the disease. There is no reason why strict osteopathic procedure should not be invaluable, still the serious risk is the likelihood of adhesions between the iris and the lens capsule and the filling of the pupil with opaque exudate, and by means of the mechanical effect of pupil dilatation the risk is reduced.

DISEASES OF THE CHOROID.

Inflammation of the Choroid.

The subjective symptoms (on which the diagnosis cannot be made) are: diminution in the acuteness of vision, distortion of objects, flashes of light, and in the later stages, defects in the field of vision. The diagnosis must be made by means of the ophthalmoscope.

The **treatment.**—Rest of the eyes, correction of the blood supply, avoidance of bright light, the use of smoked glasses, and the elimination of toxins by way of the bowels, kidneys and skin.

Sympathetic Ophthalmitis.

This inflammation is due to the entrance of infectious material into the eyeball by means of injuries; foreign bodies, even if sterile, when in the interior of the eye are also very apt to excite this disease. It sometimes follows perforating corneal ulcers. It usually begins five to eight weeks after the injury to the exciting eye, rarely before three weeks, and sometimes as late as forty years. (The eye which has been originally affected is known

as the exciting eye; the one secondarily affected as the sympathetic eye). The symptoms of sympathetic irritation are: the sympathizing eye is irritable, there is marked sensitiveness to light, neuralgic pain in the eye and neighboring parts; dimness of vision occurs when the eyes are used for near work; the exciting eye usually presents an iridocyclitis, and, as a rule, if the exciting eye is not removed sympathetic inflammation results, which has the above symptoms, added to which are, tenderness of the ciliary region, circumcorneal injection, punctate deposits on Descemet's membrane, contracted pupil and increased tension. In severe cases this runs on to plastic uveitis; plastic exudate fills up the pupil and more or less of the anterior chamber. The choroid and retina participate, the eye becomes soft, shrinks, and the condition passes into one of atrophy.

Prophylactic treatment is of the greatest importance. One should remove the injured eye if it be sightless or its condition is such that one cannot hope to preserve useful vision. This is imperative if it is irritable, has ciliary tenderness, presents signs of iridocyclitis, or contains a foreign body which cannot be extracted. When, however, there is useful vision in the injured eye, the question is a difficult one. All eyes which are blind as the result of an injury or plastic inflammation, or eyes which contain a foreign body should be removed to prevent the danger of this disease, no matter if they cause any irritation or not. If sympathetic inflammation has started enucleation of the injured eye has little effect upon the progress, but should be done if the injured eye is blind. The **prognosis,** after inflammation has taken the place of irritation, is very unfavorable, as most cases result in total blindness. Cases have been treated osteopathically with but little effect; the osteopath should be particularly cautious in this disorder.

Glaucoma.

Glaucoma is one of the most common and one of the most important of the diseases of the eye. It may be primary or secondary. The primary occurs in two forms, the inflammatory or acute glaucoma; the non-inflammatory, non-congestive or simple glaucoma. The symptoms of **acute glaucoma** are divided into three

stages: The **prodromal stage,** in which there will be diminution in the acuteness of vision, the sight appears to be obscured by fog, a ring of rainbow tints will be seen around lights, there will be a feeling of dullness or slight pain in the eye, the anterior chamber is rather shallow, the pupil is somewhat dilated and sluggish in reaction, the tension of the globe is increased, there is often circumcorneal injection. These symptoms last for a few hours and then entirely disappear; the eye returns to the normal condition except, perhaps, the near vision is not as good as it was before. At first the attacks are separated by intervals of weeks or months, but they soon become more frequent. In the **second stage** the onset of the disease is such that there is rapid failure of sight; there is contraction of the visual field, especially on the nasal side, and severe pain in the eye accompanied by violent headache; the pain is so severe that it often causes nausea, vomiting and general depression. Such attacks will often be mistaken for bilious attacks. On examination an increase of tension is found, the ocular conjunctiva is markedly congested, the cornea is cloudy or steamy and is somewhat insensitive. There is marked circumcorneal injection, the anterior chamber is shallow, the pupil is dilated, oval and immobile, the iris is congested, discolored and dull. During this attack the details of the fundus cannot be seen with the ophthalmoscope on account of the clouding of the media. In many cases decided improvement takes place in a few days or weeks; the pain subsides, the congestion disappears, and the sight improves, but the eye does not return to a perfectly normal condition. It is left in a condition which is the **third stage** of glaucoma, in which the visual field is contracted on the nasal side, the pupil remains dilated and sluggish, and the anterior chamber shallow, the tension is increased and the power of accommodation is decreased. After a period of quiescence of variable time another similar attack takes place. These are in turn succeeded by others, each attack causing reduction of the vision. The optic nerve when seen with the ophthalmoscope shows what is known as the glaucomatous cup. These attacks continue until total blindness ensues. The pupil is widely dilated and immobile, the iris is atrophied.

Chronic Inflammatory Glaucoma.

In chronic inflammatory glaucoma, which is more common than the acute, the symptoms are less intense and more gradual in their onset. The prodromal stage passes uninterruptedly into the stage of active glaucoma, and there is no succession of attacks.

Simple Glaucoma.

In simple glaucoma there are no marked external symptoms; no inflammatory attacks and no pain. The **diagnosis** is made by the picture presented when the ophthalmoscope is used, and by the increase in tension. This form develops very gradually, with foggy vision, colored halos around lights, and contraction of the visual field on the nasal side. The course of simple glaucoma is very insidious and its duration is for years; if unchecked it terminates in total blindness.

Treatment.—In the acute form operative treatment is the only treatment to be relied on. In simple glaucoma, massage of the eyeball applied gently to the closed lids for a few minutes each day, proper and sufficient food, rest, relief from constipation, correction of errors of refraction, avoidence of excess in eating and drinking, plenty of sleep, and the use of eserine or pilocarpine to keep the pupil contracted. Acute glaucoma is frequently confused with iritis and if the treatment of iritis—atropine—is carried out in glaucoma it will cause blindness. Woodall reports a case (See Case Reports, series V,) cured by osteopathic measures alone, and several other cases are known to have been cured. On the other hand cases have been treated unsuccessfully. Probably the greatest danger lies in not recognizing the disease. It is certainly advisable to have an experienced oculist in consultation. Lesions are always found in the cervical region, and there should be no reason why, if the case is seen and diagnosed early, osteopathic treatment cannot re-establish drainage, lessen tension and cure the disorder. Until we have more definite information and more data, probably the use of eserine or pilocarpine for mechanical effects of pupil contraction (this is opposite to the effect of atropine as noted in corneal ulcer and iritis) should be secured. It is cer-

tainly advisable that the osteopath be in consultation with an experienced specialist. **Do not assume unnecessary and needless risks.**

Cataract.

A cataract is any opacity of the lens or of its capsule. Examination with oblique illumination will show a grayish or whitish opacity, (the gray haze seen in the pupil of old persons is frequently taken to be a cataract by the inexperienced) and with the ophthalmoscope at a distance, a black opacity on a red field will be seen if the lens is not entirely cataractous, when no red reflex can be had from the pupil.

Treatment.—In olden days a cataract was treated by pressing on the eyeball and dislocating the lens back into the vitreous; but as these eyes in after years became blind (the lens acting as a foreign body) and set up sympathetic inflammation in the other eye, this method has become obsolete and is used only by fakirs. The only treatment for cataract is surgical removal of the lens through a corneal incision; or in case of people under twenty where the lens is still soft, if the capsule of the lens is opened by operation the aqueous humor will absorb it. But a number of cases have been reported cured osteopathicaly. Attention was directed in each instance to the circulation of the eyeball by work in the cervical and dorsal regions. See Ashmore and Covey, Case Reports, Series III.

INFLAMMATIONS OF THE RETINA.

Inflammations of the retina are: (1) albuminuric; (2) diabetic; (3) leukemic; (4) syphilitic; (5) hemorrhagic.

The vascular changes of the retina are: (1) anemia; (2) hyperemia; (3) hemorrhages; (4) arteriosclerosis; (5) embolism; (6) thrombosis. The retina also sometimes becomes detached. These conditions can only be diagnosed by means of the ophthalmoscope.

The **treatment** is the treatment of the underlying conditions; in cases of inflammation, absolute rest of the eyes, and protection from the light. Osteopathy has a decided effect upon circulatory disorders in the retina. The usual treatment to the vascular control should be employed.

INFLAMMATION OF THE OPTIC NERVE.

Inflammation of the optic nerve is of two kinds: **Interocular Optic Neuritis** and **Retrobulbar Neuritis.** In the interocular variety the field of vision is contracted especially for colors, there is no pain and no external signs. In the **Acute Retrobulbar Neuritis** there is pain in or about the orbit, tenderness on pressing the eye backward, and there is a central color scotoma. Diagnosis of the interocular variety is made with the ophthalmoscope. The causes of **Interocular Optic Neuritis** are: (1) diseases of the brain and its envelopes; (2) syphilis; (3) general diseases; (4) anemia, either simple or acute form, due to great loss of blood; (5) diseases of menstruation, pregnancy and lactation; (6) lead poisoning; (7) orbital and periorbital affections. Of these brain **tumor** is the most frequent cause. Inflammation of the nerve occurs in ninety per cent. of such cases. No attempt should be made at **diagnosis** of conditions causing blindness without the use of the ophthalmoscope, as is shown by a case which had been to see three different members of our school; they all held that the blindness was due to a cervical lesion, whereas had examination of the fundus of the eye been made with the aid of the other symptoms the diagnosis of brain tumor would have been easy, although the cervical lesion may have been a causative factor of the tumor.

Treatment consists of first, attention to the primary cause, and second, of the cervical and dorsal region to influence circulation of the nerve.

Chronic Retrobulbar Optic Neuritis.

The chronic affection of the orbital part of the optic nerve usually attacks both eyes, and is due in most cases to over-indulgence in tobacco or alcohol, or both combined. There is gradual diminution in the acuteness of sight, the vision is foggy and more disturbed in a bright light, there is a central color scotoma. This scotoma is detected by moving small pieces of red or green worsted or card board (from two to five millimeters in diameter) in front of the patient's eye when he is looking steadily at the observer's nose and standing about two feet away, the other eye being closed. When the test object arrives at the seat of the

scotoma it will appear dull or colorless. This disease occurs almost exclusively in middle-aged or elderly men.

The **treatment** is abstinence from tobacco and alcohol, the general health should be improved, and large quantities of water should be taken between meals, to aid in elimination of toxins.

Atrophy of the Optic Nerve.

This occurs primarily as a result of spinal diseases, (especially in locomotor ataxia, as it develops in one-third of these cases). It is also common in affections of the brain, disseminated sclerosis, general paralysis of the insane, syphilis, malaria, diabetes, acromegaly, impaired nutrition, and occasionally it is hereditary. Secondary atrophy follows papallitis, retrobulbar neuritis, retinitis, embolism of the central artery, glaucoma, fracture of the orbital canal. **Diagnosis** can only be made by means of the ophthalmoscope.

Treatment consists in attempting to control the cause of the atrophy. Circulation of the optic nerve can undoubtedly be affected by lesions of the cervical and upper dorsal vertebræ, especially the former.

Non-Paralytic Strabismus.

Strabismus is a manifest deviation of the visual line of one of the eyes, due to the absence of binocular fixation, the two eyes maintaining the same faulty relationship of the axes no matter in what direction they are turned. The power of the muscles of the two eyes are usually normal. The squinting eye follows the other eye in all its movements, the visual line always remaining at the same angle.

The varieties of squint are: periodical, constant, alternating, monocular, and, according to the deviation of the squint, are divided into convergent (internal squint), divergent (external squint) and vertical squint, which is uncommon.

The **diagnosis** can usually be made by inspection, but in slight degrees the card test is used. There is no double vision except in the early cases, as the image of one eye is suppressed and this eye soon becomes amblyopic from disuse. The **cause** of squint is

principally a defect of the fusion faculty. The exciting causes are: (1) disturbances of the relation between the accommodation and convergence produced by errors of refraction; (2) imperfect vision in one eye due to opacity of the media and interocular diseases; (3) disparity in the length and thickness of opposing muscles.

The **treatment** should be started as early as possible, as in cases treated before the fifth or sixth year the squint can usually be cured without operation and the sight in the squinting eye is saved. In the cases in which squint has come on before the fifth year and the case is not treated before the sixth year the squinting eye becomes amblyopic from disuse, and the sight in this eye can rarely if ever be brought back to normal, although the squint has been corrected in few cases by correcting lesions of the upper dorsal principally; cervical lesions are also factors. This early treatment consists of training the fusion center by means of Worth's amblyoscope and the correction of errors of refraction. In cases of far sight in which the third nerve has to send an over supply to the hard worked ciliary muscle, the internal rectus which has the same nerve supply gets an over supply, consequently over acts and turns the eyes in, hence convex glasses which relax the ciliary muscle also relax the internal rectus in the opposite way in myopia by making the ciliary muscle do a normal amount of work, the action of the internal rectus is increased and will help correct a divergent squint. (*Paralytie Strabismus*. See Texts.

Hyperopia.

Hyperopia is an error in refraction in which, when the accommodation is completely relaxed, parallel rays (or those from distant objects) are brought to a focus behind the retina, and divergent rays (or those from near objects) are focused still further back. The **cause** of this is most commonly due to the eyeball being anatomically too short in its antero-posterior diameter; less frequently it is due to diminished convexity of the refracting surfaces or absence of the lens. The far sighted eye, by using the ciliary muscles, increases the convexity of the lens and thus produces clear vision. Consequently such an eye is never in a con-

dition of rest as long as it enjoys distinct vision. As a result of the constant strain on the ciliary muscles the muscle becomes hypertrophied, and remains in a greater or lesser condition of spasm. The far sighted person has perfect vision but gets it at the expense of an over-worked third nerve.

Myopia.

Myopia is that refracted condition in which, when the accommodation is completely relaxed, parallel rays are brought to a focus in front of the retina. These rays cross in the vitreous and when they reach the retina have become divergent.

The **cause** of myopia is an anatomical lengthening of the antero-posterior diameter of the eyeball. In a myopia of 3 D., for example, the eyeball would be 24 m. m. long, and one of 10 D., would be 27 m. m. long, in place of 23 m. m., the normal length. The causes of this lengthening are excessive study with insufficient out door exercise, fine or indistinct print, poor illumination, faulty construction of desks, poor general health. The cause of the lengthening of the eyeball is attributed to pressure of the external muscles during excessive convergence, causing the posterior pole, which is place of least resistance, to bulge, congestion and inflammation, and softening of the layers of the eyeball produced by fullness of the veins of the head as a result of stooping postures; also, to the shape of the orbit in broad faces causing excessive convergence, as seen in the German. When the myopic uses his ciliary muscle, vision becomes more blurred, hence this muscle becomes atrophied from disuse.

Both hyperopia and myopia, when acquired, can be considerably benefited at least, by correction of the lesions always found to the innervation of the eye tissues. It usually requires considerable **treatment.** Still, do not expect impossible results and remove correctly fitting lenses from any and all patients that may be afflicted. Myopia may be progressive and it would be a serious thing to remove the glasses. Adjust the lesions as best you can and then have the remaining condition corrected by lenses. No doubt there are individuals wearing glasses which are not only unnecessary but actually harmful, but on the other hand there

are others who should be wearing glasses that are not so doing. It is a **serious** matter to recommend either the wearing or removal of glasses if one knows nothing of the nature of eye diseases and disorders.

Astigmatism.

Astigmatism is that refractive condition of the eye in which there is a different degree of refraction in different meridians so that each will focus parallel rays at a different point. Astigmatism is divided into irregular and regular astigmatism. The **irregular** is comparatively infrequent, and is generally due to scars of the cornea following ulceration, injuries and surgical operations. It may also be the result of partial dislocation of the lens. The vision is considerably reduced and cannot be improved by glasses. In this form the refraction of different meridians are not only different, but also different parts of the same meridian. In **regular** astigmatism the refraction of each meridian is the same throughout, but there is a difference in the degree of refraction of every meridian. One of these meridians exhibits the maximum refraction while another will exhibit the minimum; these are called the principal meridians, and are always at right angles to each other.

Astigmatism is usually due to a change in the curvature of the cornea, with or without lengthening or shortening of the eyeball in its antero-posterior diameter, and is also caused by defects in the curvature of the lens. Even the normal eye has a slight amount of regular astigmatism, due to the fact that the cornea is the segment of an elipsoid and not of a sphere.

The **symptoms** of these different refractive conditions are more or less blurring of the vision, especially of the distant vision in myopia, and in both distant and near vision in the higher grades of astigmatism. The train of symptoms which are known as asthenopic symptoms, which are symptoms that are dependent on the fatigue of the ciliary muscle or of the extraocular muscles, such as headache which is usually aggravated by the use of the eyes for close work, pain in or around the eye, fatigue and discomfort upon the use of the eyes for near work, irritable condi-

tion of the lids accompanied by itching and burning sensations; these symptoms are regularly worse at night when the patient is tired; there is some vertigo and reflex symptoms, such as nausea, twitching of the facial muscles, migraine, chorea and neurasthenia. The amount of asthenopia depends not only upon the kind and the degree of these defects, but upon the state of the patient's health, and is therefore pronounced in delicate, anemic, or neurasthenic individuals. All these symptoms are most common in hypermetropic and compound hypermetropic astigmatism, next in myopic astigmatism, then in simple hypermetropia, there being practically no asthenopic symptoms caused by nearsightedness unattended by astigmatism.

The **treatment** of these refractive conditions is the wearing of proper glasses in myopia to make distant vision clearer and to make the patient hold the book further from the eyes, and in this way prevent the myopia from being progressive. This also gives the normal amount of exercise to the unexercised myopic ciliary muscle and so makes the tone of the eyeball better. In other refractive conditions glasses give the ciliary muscle a chance to rest, as it otherwise has to constantly remain in a greater or lesser condition of spasm to obtain clear vision. In patients with asthenopic symptoms the glasses should be fitted under the influence of homatropine if the patient is under forty-five years of age, as this puts the ciliary muscle at rest and makes it possible to accurately find the refractive condition. However, in certain cases where astigmatism has been acquired, correction of the osteopathic lesion has reduced the amount of the astigmatism and in some has completely corrected the refractive error. This has been especially true in cases where the curvature of the cornea was at fault. McConnell showed in his experiments that the cornea could be affected by osteopathic lesions at least as low as the upper segments of the dorsal area, (in his cases there was edema of the cornea), by nervous involvement either by way of the cord or the sympathetics and then over the fifth nerve.

GENERAL CONDITIONS IN THEIR RELATION TO DISEASES OF THE EYE.

The centers of vision in the brain occupy the largest area of any special sense, and as the eyes are used constantly whenever a person is awake, it can easily be seen the effect the eye can exert on the nervous system. As was seen under Hypermetropia and Astigmatism the ciliary muscle has to be in constant action for the eye to have clear vision, the amount of nerve force used in a day by a defective eye is enormous. To obtain an idea of the effect of constant muscular effort one only has to try to hold the arm extended at right angles from the body for half an hour; it is, in other words, "the constant dropping of water that wears away the stone." This continued strain is not felt by a person in vigorous health who can stand nerve loss, or one who does not use his eyes; but the frail or delicate person or one using their eyes a great deal cannot stand this constant nerve leakage. The most common symptom of eye strain is headache. It has been demonstrated that fully eighty per cent of all headaches can be cured by the wearing of proper glasses, or the correction of muscular errors of balance. This does not mean to say that headache is always caused by the eyes. As has been stated before under diseases of the optic nerve and retina, these diseases are in the most cases caused by some systemic condition, and here is where osteopathic measures is the treatment par excellence (not only for the general condition but frequently for the eye disorder and headache); in the opposite way the eye can be used to great advantage in diagnosing diseased conditions of the general system, as with the ophthalmoscope the end vessels of the fundus are laid bare. This gives one an excellent opportunity to study early changes in the blood-vessel walls, and a diagnosis of Bright's disease can very often be made before an urinalysis will show the presence of albumin. Arterio-sclerosis can also be diagnosed early and the vessels studied. The study of the eye is always an advantage in making a diagnosis of locomotor ataxia; the pupil, which reacts to convergence but not to light, is nearly pathogomonic of this disease. Also the swelling of the optic nerve (choked disc) is one of the few important symptoms of brain tumor.

DISEASES OF THE EAR.

Diseases of the ear which can be treated osteopathically with any degree of success have, as a rule, their origin from catarrh of the naso-pharyngeal region with some exciting cause in acute attacks. When not of a strictly surgical nature, results from osteopathy have been rather gratifying when compared with other forms of treatment, for there is no region more difficult to reach nor the prognosis worse than in deafness and chronic affections of the middle ear.

External Ear.

Acute External Otitis Media, circumscribed or diffuse, arise from the same cause, but are differentiated by the extent of the disease. It is an inflammation of the external auditory meatus which arises from any local irritation to the canal from foreign bodies, instruments, chemicals, bacteria, etc., and is also a frequent accompaniment to a depleted physical condition.

There is pain, swelling and redness, followed by a discharge.

Treatment.—Hot applications will be most effective in stopping the pain and hastening suppuration. Give attention to general health, and see that cause of irritation is removed.

Impacted Cerumen is a common cause of deafness, accompanied by signs of local irritation and occasionally pain. Warm olive oil or fluid vaseline may be dropped into the canal, followed by a syringing with warm water. This usually brings the desired results.

Foreign bodies of all sorts and kinds have been found in the ear. They cause much discomfort and may be removed with long lipped forceps made for the purpose.

Middle Ear.

Otitis Media in its various forms, acute, acute purulent and chronic purulent are most frequently met in general practice.

It should be remembered that nearly all diseases of the mid-

dle ear and internal ear are of catarrhal origin, as it is also the cause of most forms of deafness. Beginning with a simple nasal catarrh it spreads by way of the Eustachian tube to the middle ear, predisposing to otitis media.

Acute Otitis Media.—This is caused by a congestion of the middle ear and may complicate measles, cold in the head, etc. Exposure to cold and wet, introduction of fluids through the Eustachian tube, enlarged pharyngeal tonsil, and, in infants, teething are exciting causes.

The **symptoms** vary considerably but diagnosis is generally easy. A feeling of fullness, closing of the tube, pain steadily increasing until localized to the inner ear and aggravated by lying down remove any doubt as to the trouble. The pain continues until the membrane is ruptured, which is generally from twelve to forty-eight hours. When at its height it is best controlled by hot fomentations placed continuously directly over the external ear. This hastens suppuration also. **Treatment** of the cervical region to influence circulation is of great assistance. Relax the structures well at the angle of the jaw and see that there is no mal-alignment at its articulation. It should be "sprung" to free up the structures at that point. Work the venous circulation in the neck and treat the upper dorsal spine. This, with the hot fomentations, will materially shorten the duration of most cases. After rupture the ear must be kept clean by careful syringing with warm water. At the beginning of the attack there should be thorough clearing of the bowel by enemata.

When these cases can be seen promptly at the onset, correcting of the atlas and upper cervical lesions will usually abort the attack.

Acute Purulent Otitis Media may be a sequela of the acute form when the ordinary discharge becomes purulent, but the usual cause is some acute infectious disease like scarlatina, measles or diphtheria. Injury to the membrana tympani, chronic tonsillitis and dentition are also frequent causes.

The **symptoms** are excruciating pain deep within the ear, with elevation of temperature, severe headache, constipation and marked constitutional depression. The hearing becomes rapidly

impaired and often distressing tinnitis as well as delirium. In children convulsions frequently usher in the attack. When perforation takes place there is quick relief. If this does not occur the pus may follow the Eustachian tube or go forward through the skin, or infiltrate the mastoid cells, or even through into the cranial cavity. Extensive destruction of structures in the middle ear may occur.

Treatment is the same in early stages as in acute otitis media both osteopathically and otherwise. Should this not bring about relief and the membrane bulges, perforation is immediately indicated, which will give relief and prevent extension of the purulent inflammation. Observe antiseptic precautions most thoroughly and keep the ear surgically clean.

Chronic Purulent Otitis Media.—Refer patient to a specialist and work in conjunction with him.

Chronic Otitis Media is a non-suppurative inflammation of the mucous membrane and submucous tissues of the middle ear, producing deafness and tinnitis. It is also commonly known as **catarrhal deafness.** It may follow the acute form or result from exposure to wet and cold, syphilis, carious teeth, or hereditary predisposition, but the most common cause is the extension of catarrh of the naso-pharynx through the Eustachian tube. There is a swelling of the lining membrane of the tympanum from venous congestion followed by tissue hypertrophy. The cavity contains a fluid exudate, while there is hypertrophy of the membrani tympani. The lumen of the Eustachian tube is narrowed, preventing entrance of air, thereby affecting integrity of the tympanum.

H. F. Goetz,[1] who has treated and recorded many cases, says the most important points to observe are:

(a). "Malalignment of the cervical vertebræ, either the first, second or third or alteration in the normal curve of these vertebræ, including also all of the cervical vertebræ. The effect of this osseous variation is principally noticed in the disturbance of the sympathetic nervous system, (superior cervical ganglia) branches of which supply the mucous membrane of the nose, mouth, throat, Eustachian tube and inner ear, with their vaso-

1. Journal of Osteopathy, Oct., 1902.

motors and vaso-constrictors, that is with nerves controlling the blood supply to the ear.

(b). "Malalignment of the inferior maxillary bone at its articulation with the temporal bone. The effect of this is to disturb the action of muscles superficial to the nerve and blood supply of the ear, producing a mechanical pressure, thereby causing secondary or reflex derangements in the structure of the middle ear; also causing direct pressure on the nerves of the parotid gland; branches of the same nerve which supply this gland send twigs to the middle and inner ear.

(c). "Impaired nerve supply of the tensor tympani, levator palati muscles, also the stapedius, follows the above named lesions. Contraction of the tensor tympani and stapedius muscles causes actual dislocation of the small bones of the middle ear."

Four years later he confirms the above and says further: "It is a fact that I have found in the great majority of cases examined, trouble with the jaw articulation, and when found the trouble was **always** in the ear of the same side. I know of no way to prove this, but the argument of pressure on nerves passing through the parotid gland, thus impairing nerve supply to tensor tympani, levator palati and stapedius muscles.....In addition to local treatment the best results follow when 'general treatment' is given. This is 'shot gun' but is the best way to cure catarrhal deafness." Probably this last suggestion is because of the effect on the general health, which is a great factor in these cases. Upper cervical lesions affect the sympathetic, vagus, trifacial, glosso-pharyngeal, and occipital nerves; vaso-motor nerves are involved from the fourth or fifth dorsal to occipital.

When the occluding of the Eustachian tube begins, much can be done by the patient himself in preventing a complete closing by holding the nose, closing the mouth and forcing the air through them. It also has the effect of producing motion to the ossicles of the ear and stimulating the membrane. This, done daily, is productive of good results. Externally an effect can be produced by the fingers placed on the tragus and being rather quickly

forced in and out of the external meatus. Internal treatment through the mouth upon the soft palate by means of the finger influences circulation to the Eustachian tube, also deep inward and downward treatment external to and below the angle of the jaw is very effective.

If these cases can be seen early and before there is complete ankylosis of the ossicles or filling of the chamber with hypertrophied tissue, much can be promised, while even old chronic cases have been cured or greatly benefited.

Mastoid Disease.—In speaking of this it is well to understand at once the gravity of this condition and warn the osteopath that good judgment is needed that he does not continue on the case when it has become surgical. Much can be done to abort an attack, also cure mild cases, but it is well to be prepared for surgical interference.

Mastoiditis commonly results from acute or chronic suppuration of the middle ear from continuity of structure. The cells, mucous lining becomes inflamed and they are later filled with pus and acute caries and necrosis rapidly ensue. When of a less acute nature these processes are slower and in some cases the cells merely become filled with hypertropied tissue.

The **symptoms** are increased pulse with rise in temperature, the latter often extremely high. There is usually great pain involving one side or even the whole head. The mastoid process is both painful and tender to the touch and the parts behind the ear are swollen and red. With a continuance of the inflammation and pain the patient becomes drowsy or partially unconscious or passes into a state of coma followed by death, unless relief to the brain in some form is given.

Treatment osteopathically is at the atlas and upper cervical region principally, with attention to the venous circulation. Also treat thoroughly the entire cervical region, paying special attention to the venous circulation and the lymphatics. Lesions may be found as low as the upper dorsal area involving the vaso-motor nerves, and even the clavicle and upper ribs (especially the first rib) may be found disturbed and acting as etiologic factors. Open the bowel thoroughly at the onset by warm water enemata.

These cases must have constant attention until danger of extension of the inflammation is over. Cold applications to the mastoid will be of assistance. Watch pulse and temperature carefully. Observe all antiseptic precautions and do not delay surgical interference too long.

MENTAL DISEASES.

The treatment of mental diseases osteopathically has met with as much success as the treatment of other diseases in proportion to the number of cases treated. This is one point that goes to prove that osteopathic work is not limited to a certain class of ailments; our therapeutics is applied with equal success to all classes of diseases. Osteopaths have not had as much experience with mental disorders as with other diseases, still the work accomplished has been most satisfactory.

The osteopath, practically, treats insanity as any class of diseases. The principles of osteopathy are applied here exactly in the same manner as elsewhere; if the tissues of the body were anatomically correct, insanity would not occur. A mental disease is nothing more or less than the effect of a disturbed innervation or vascular channel to the brain. From the fact that the functions of the brain are comparatively little understood and the brain being the seat of the mind, mental diseases are often looked upon in somewhat more of a mystified manner than in disorders of other organs. The brain requires nourishment to repair its tissues, the same as the tissues of any organ of the body, and it is governed by the same laws of nature. Hence there is not the slightest reason why deranged brain tissues would not interfere with its functions, after the same manner as when other parts of the body are affected by disordered tissues.

The majority of mental diseases treated at the A. T. Still Infirmary are cured, although not as a rule as quickly as many other diseases, probably on account of the brain tissues being highly organized, and thus requiring more time for repair. The cases treated successfully, represent the various forms of insanity, most of them have been of several years' standing, and were confined to asylums before receiving osteopathic treatment. From six to ten months has been the average time required in the cure of these cases, still a number were cured in a few weeks' treatment.

Nothing is known of the osteopathic pathology other than

what has been given, anatomically deranged tissues interfering with nerves and vascular channels to certain areas or to the brain as a whole. Most of the lesions are located in the cervical region, and consist of severely sub-dislocated vertebræ, usually of the upper or middle cervical region. A few cases present lesions of the dorsal region, especially of the middle dorsal vertebræ, and the vertebræ in the renal splanchnic region, and the ribs of the middle right side are usually also affected.

The treatment consists of correcting the lesions found, and paying particular attention to the kidneys and bowels. Naturally, the general health of the patient as to nourishing food given in proper quantity, regular habits and hygienic surroundings should be carefully considered. Usually secondary lesions (secondary to cervical lesions) are found, as stated, in the ribs of the right side and in the lower dorsal region. The dislocated ribs would especially interfere with the portal system, and the sub-dislocated lower dorsal vertebræ with the kidneys.

The following types of insanity may be treated with some degree of hope for benefit or a cure, but before making a prognosis certain factors must be considered, as the presence of them in whole or in part will greatly lessen the probability of recovery.

Heredity.—Authorities are in considerable accord that true insanity always has a history in the family. It greatly reduces the chances of recovery. These subjects may go through life and insanity not develop, while an exciting cause in shape of an osteopathic lesion will bring on an attack. **Stigmata,** i. e., deviations from the normal anatomically, physiologically and phsyically. **Defects** of the **cranium** are especially indicative of perverted intellect. **Syphilis.**—Where there is a history of syphilis the case many times is hopeless. And **last,** when associated with certain diseases, drugs and poisons. To get this data the history of the case must be most searchingly gone into as well as the physical examination, for these will be depended upon to find both the underlying and exciting causes.

Melancholia is a form of insanity characterized by profound and prolonged mental depressions. In considering a case of this type it is well to distinguish between melancholia and hyper-

chondria as the expression of countenance is the same in each, sad and gloomy, but one may be insane while the other is not. Heredity is found in fully half the cases and the proportion of females is fully two to one of the males.

Outside of heredity, ill health and mental stress are the chief causes. It may terminate fatally in two or more months, from exhaustion; recovery follow in six months or a year or the next stage, acute mania, develops. As yet there is no pathological anatomy and it is considered a functional nutritional disorder of the brain resting upon cerebral anemia.

Treatment should be directed with the idea of correcting any interference to the brain circulation, and the cervicals are likely to be at fault.

"As might be inferred, the tendencies of hospital practice are to place less dependence upon drugs and the greater reliance upon nutritious foods; to remove known causes of ill health and to promote the normal performance of the bodily functions."[1] Special attention to the digestion will be needed to bring this about and too much stress cannot be put upon the hygienic needs in these cases. Isolation from friends and relatives, when possible, under competent care, with cheerful surroundings, will be of great assistance. This is the feature of hospital treatment of the insane to-day—small groups in detached cottages.

Prognosis in uncomplicated cases under favorable conditions should be good.

Mania is quite the opposite of Melancholia in point of symptoms, as there is abnormal activity of the mental and physical functions. In point of pathology it is like it, for "the most careful investigation of the central nervous system has thus far discovered no pathologico-anatomical basis for mania..... We are therefore constrained to look upon the disorder as functional in its nature, as due to a morbid change in the nutrition of the cells, in the way of deficient to perverted metabolism."[2]

Treatment should, therefore, be directed toward correcting

1. Chapin, A Compendium of Insanity, p. 96.
2. Church-Peterson, Nervous and Mental Diseases, p. 724.

any interference with the cerebral blood supply, and a general upbuilding of the system by diet and general hygienic measures. Symptoms must be met as they arise, for there is no rule to follow in Acute Mania.

Prognosis is rather favorable, since a comparatively large percentage recover under other treatment. However, after six months, time the prognosis is only half as good and the ratio goes down with extended time. If it does not terminate in recovery or death a chronic form may result.

Acute Dementia is, of the three forms of dementia, the only one which offers any hope of recovery, as the senile and secondary type end only in death, for there are marked tissue changes in the brain. In the acute form there is no pathology and it is considered as purely a psychic disturbance. Young subjects are usually affected between puberty and thirty-five, with trauma, fright, over exertion mentally or physically, etc., as exciting causes. Although rare, it is in this type that osteopathic results are startling. With a history of accident there is quite sure, as experience has shown, to be cervical lesions which, by correction, will bring about sanity. Look well to the general health, as in other forms of disease. **Prognosis** is generally good.

Puerperal Insanity is as equela of childbirth, as its name would indicate. Several cases have been reported as cured by osteopathic treatment; subinvolution and uterine displacements being the exciting cause, with spinal lesions as the predisposing factor. **Prognosis** must be guarded.

In the forms of insanity here outlined, as being favorable for osteopathic treatment, none show, according to the authorities, any pathologic changes, of the brain tissue and can be classed as functional disorders. Though the microscope does not define any organic changes it is hardly possible, however, that none exist and there is doubtless a mollecular disturbance resulting from faulty cerebral circulation.

It is almost useless to treat **paresis, paranoia, epileptic** or **circular insanity,** for the reason that there has been marked changes in the brain substances, from various causes, and there is no reason

for expecting good results. It is suggested by Paton[1] "that in all cases of insanity treated outside of an asylum the practitioner should be positive of his diagnosis so that the patient may be confined, if necessary, and receive proper hygienic treatment as well as other treatment."

1. Paton—Psychiatry.

SKIN DISEASES.

Various skin diseases have been treated osteopathically with varying success. So much depends upon the cause of the disturbance and its removal, in skin diseases, that the cure does not rest so much with the mere treatment, as with thé necessary skill in locating the disturbing factor. One has to be continually on his guard to locate external irritations and disorders of the digestive and genito-urinary tracts. A great deal depends upon the avoidance of external influences; eating nutritious food and having an unobstructed circulation. The leading object of osteopathic treatment is to free the circulation and thus promote a healthy and unobstructed flow of blood; in no other class of diseases is this more essential than in skin diseases. After the removal of cutaneous irritations and the correction of internal disorders, the cure of the case depends upon the removal of constrictions to the cutaneous blood-vessels. The osteopath corrects the lesions found, relaxes the muscles thoroughly and stimulates the circulation to the parts involved, and promotes a healthy activity of all the excretory organs. When the upper part of the body is affected, lesions are generally found at the atlas and axis, and when the lower part of the body is affected, lesions at the fifth lumbar are of common occurrence, although lesions may be located at various points corresponding with the seat of disturbance. The constant use of hot baths will be found a helpful measure in many skin diseases. The treatment of skin diseases osteopathically is like the treatment of any disturbance; the cause has to be ascertained and treatment applied accordingly.

Eczema is frequently met in osteopathic practice. A differential diagnosis of its various forms is not necessary, as the same treatment is indicated for all.

In the **acute form** it is characterized by irregularly scattered red papules, accompanied by troublesome itching. The papules may subside and an exfoliation of the skin follow, or through inflammatory changes vessicles form. The hand and forearm are

the most frequent seats, although any part of the body may be affected. It may subside to a large degree and pass into the chronic stage.

The predisposing **cause** is undoubtedly vaso-motor disturbance. This involvement of the vaso-motor is recognized by European authorities, as Mracek[1] says: "Many authors look upon such as due to vaso-motor neurosis; but this itself must have a foundation."

The "foundation" is a vertebral lesion affecting the center, or the nerve between center and periphery, controlling the region involved.

Treatment is indicated by the lesions. Correct them and pay special attention to the excretory organs. Give care to diet and remove any irritant in form of clothing or occupation. If the itching is severe, antiseptics may be used; boracic solution is probably the best.

Prognosis is good, as many severe cases have been promptly and permanently cured.

Herpes Zoster, or shingles, is an acute inflammatory disease characterized by groups of small vesicles, usually along the course of the intercostal nerves on one side of the body. It may appear in any part of the body, however. Head[2] says: "That remarkable eruption is associated with disturbances of the peripheral nerves, usually an inflammation of the sensory ganglion or of the nerve." This is borne out by osteopathic experience of rib and vertebral lesion causing pressure on the nerves. Other causes which might produce the same effect are exudates, inflammations, diseases of bones or carcinomata.

Prognosis is good, although some chronic cases are very persistent.

Acne is an eruption situated principally on the face and while there are several forms the difference is small and the cause largely the same. A pustule forms in the sebaceous gland, accompanied by redness, and frequently leaves a scar. It usually appears about puberty and both sexes are affected.

1. Diseases of the Skin, p. 104.
2. Allbutt's System of Medicine.

The **cause** is not easily ascertained but frequently unhygienic living is given. Osteopathic reports give uterine disorders as a cause, for it is known that disturbed menses and the first and second month of pregnancy are often productive of an outbreak.

A constitutional treatment, when no well defined lesion can be found, is indicated, and care given to diet.

Prognosis is good, although it should be guarded and treatment must be kept up for a long time in many cases.

Urticaria, or hives, has no known etiology, but is supposed to come from an error in diet; sometimes confined to one article. Bright red blebs appear and give distress from intolerable itching which may result in exhaustion from loss of sleep.

Treatment must be constitutional with special care to diet. In many cases the hives disappear as quickly as they came.

Psoriasis, Hermatitis, Erythema and similar mild skin eruptions are usually from disturbed circulation to the skin from vasomotor involvement. Spinal treatment in the affected areas will generally bring quick relief.

Be careful that these eruptions are not associated with some systemic disease as a prodrome.

Alopecia, outside of systemic and hereditary causes, is usually due to lesions of the upper four or five cervical vertebræ. The causative lesion may be as low as the fifth or sixth dorsal, involving vaso-motor fibres.

ANIMAL PARASITES.

Tape Worms.

Varieties.—Taenia solium; taenia saginata; taenia flavo-punctata; bothriocephalus latus.

The larvae of tape worms are introduced into the intestinal canal by food and drink. The parasite reaches adult growth in the intestines. The larval forms are then found again in the muscles and solid organs.

Taenia Solium.—This is derived from the hog, and is the most common form in this country. When mature it is from two to four yards in length. The head is small, about the size of a pin, and provided with four cup-like suckers surrounded by a double row of hooklets, hence it is called the armed tape-worm. The head is fastened to the body by a thread-like neck, and following the neck, the body occurs in segments. The sexual organs, both male and female, occur in the center of the broad surface of the segment. The segments are about one millimeter in length and seven or eight millimeters in breadth. There are thousands of ova in each mature segment. The worm attains its growth in about twelve to fifteen weeks, after which time the segments are shed and passed. For further development the ova must gain entrance to the stomach of a pig or of a man, and passing from the stomach they may reach the muscles and organs and develop into larvae or cysticerci.

Taenia Saginata.—This is derived from beef, and is much longer and larger than the taenia solium. It is from five to six yards in length; the head is over two millimeters in breadth, is square shaped, and has four large sucking discs, without hooklets; hence it is called the unarmed tape-worm, in contradistinction to the hooked variety. The segments are thicker and the ova larger, and they are passed and ingested in the same manner as in the taenia solium.

Taenia Flavo-punctata.—This is a small tape worm, not exceeding twelve to fifteen inches in length. It is common in rats. The larvæ are developed in lepidoptera and beetles.

Bothriocephalus Latus.—This is found especially in Europe and is very long, measuring from eight to ten yards; it is derived from fish, is not provided with hooklets, but has two lateral grooves. The segments are short and wide, the sexual organs being on the narrow side of the segment.

Etiology.—Unhealthy condition of the stomach and intestines is the predisposing, and uncleanliness an important, factor in the occurrence of tape-worm. Those eating imperfectly cooked beef pork, fish or other meats, and those handling fresh meats, are liable to be affected with tape-worm.

When the ovum is taken into the stomach the capsule is dissolved and the embryo passes into the small intestines, fastening itself into the mucous membrane, by its hooklets and suckers and grooves.

Symptoms.—Tape-worms occur in the human being at all ages. Oftentimes symptoms are absent, the expulsion of segments being noticed and thus the worms accidentally discovered. The tape-worm is seldom dangerous, but if a worm is known to exist it is always a source of considerable anxiety on the part of the patient.

There are dyspeptic symptoms, colicky pains, nausea and occasionally diarrhea. The appetite is variable, sometimes ravenous. This condition is followed by loss of flesh and various reflex phenomena, as vertigo, headache, convulsions, palpitation, choreic movements, itching of the nose and anus, paralysis, and rarely, insanity. In addition to these symptoms there may be a wrinkled countenance, sensation of a cold stream winding itself toward the back immediately after a meal, pain in various parts of the body and ringing in the ears. The decisive diagnostic symptom is to find segments of the worm in the stools.

Diagnosis.—Discovery of the ova or segments in the passages of the bowels is the only proof of the presence of a tape-worm.

Prognosis.—Favorable in all cases.

Treatment.—Prophylactic treatment is necessary. Meats should be thoroughly cooked so that the larvae will be destroyed; and all segments of tape-worms passed in the stools should be burned—by no means should they be thrown outside or in the water-closet.

The immediate expulsion of a tape-worm is not a necessity. First of all the mode of living, and then the general state of health should be corrected. Tape-worms invariably result from a general state of unhealthiness, and with improved health and corrected digestive processes the worms cannot exist, and in a short time will be expelled. Expulsion of the head is necessary before the case will be cured, for if the head is not expelled new segments will continue to grow.

Stimulating the liver to increase the amount of bile, and increasing the activity of the digestive glands of the stomach and intestines, by a thorough treatment of the splanchnic region and direct treatment over the abdomen, will usually be sufficient for the cure of intestinal parasites. The treatment will probably have to be repeated several times, in order that the intestines may regain a healthy tone, so that the parasite will not find favorable conditions for its existence within the intestines, and that the bile may be secreted in sufficient quantities to dislodge the worm.

Hahnemann claimed, "that during a period of comparative health tape-worm s do not inhabit the intestines proper, but rather the remnants of food and fecal matter contained in the intestines, living quietly as in a world of their own without the least inconvenience to the patient and finding their sustenance in the contents of the bowels. During this state they do not come in contact with intestinal walls, and remain harmless. But when from any cause a person is attacked by an acute disease the contents of the bowels become offensive to the parasite, which in its writhing and distress touches and irritates the sensitive intestinal lining, thus increasing the complaints of the patient considerably by a peculiar kind of cramp-like colic. (In similar manner the human foetus in the womb becomes restless, twists its body and moves whenever the mother is sick, but floats quietly in the liquor amnii, without distressing her while she is well.)" This but

harmonizes with the osteopathic theory and practice with regard to tape-worm, that there is an unhealthy condition of the intestines which predisposes to the affection, and consequently the cure must be a correction of such a disordered state.

During the treatment, if a light diet of milk and broths is given, it will favor an earlier removal of the parasite, by helping to remove the mucus in which the head is embedded.

Ascaris (Round Worm) Lumbricoides.

This is the most common parasite, and is found principally in children; it is also found in cattle and hogs. It is of a yellowish brown color and in form resembles earth worms. The worm is cylindrical, pointed at both ends; the female is from seven to twelve inches in length, and the male from four to eight inches. They are probably introduced into the stomach by food and drink. They occupy the upper part of the small intestine, and are usually one or two in number, though they may be numerous. Occasionally they migrate into the stomach and are ejected by vomiting, or into the trachea and produce suffocation, or into the larynx or Eustachian tube, or they may pass downward to the anus, or into the bile ducts.

Symptoms.—Oftentimes symptoms are absent. There may be be dyspepsia, colicky pains, mucous stools, meteorismus, vertigo, fretfulness, voracious appetite, anemia, sallow complexion, headache, chorea and convulsions. Other symptoms may be present, as grinding of the teeth and itching of the nose and anus. Obstruction of the bowels has occurred. If a worm enters the bile duct obstructive jaundice occurs. A decisive diagnosis can be given only when the worm is seen.

Treatment.—Particular attention should be paid the liver, for it is here that we must seek the natural remedy in the form of bile, in order to eject and cleanse the system from nematodes.

Modes of improper living should be corrected; cleanliness is essential, and there should be attention to the general health of the patient. Thorough correction of all defects of the spinal column in the region of the splanchnics, and careful direct treatment of the bowels is indicated.

Oxyuris Vermicularis.

(Thread-worm; Pin-worm.)

This small parasite, commonly seen in children, is from three to five millimeters long in the male and about twenty millimeters in the female, is blunt at one end and sharp at the other, and occupies the colon and rectum. They are probably introduced into the intestines in the ova, by uncooked fruits and vegetables, or by the dirty hands of mothers and nurses of the infants. They vary greatly in number; migrate to the rectum where they deposit their eggs, and are often discharged in the feces, where they appear like pieces of ordinary white thread.

Symptoms.—Loss of appetite, anemia, restlessness and irritability are marked. The itching becomes intolerable and painful when the worms come down in the rectum to the anus and within the folds about the anal orifice. In the female the worms may wander into the vagina where they become particularly distressing, and thus may produce excessive sexual excitement and cause nymphomania and masturbation.

Treatment.—Cleanliness of the most scrupulous kind should be demanded in every instance. Injections of cold salt water (repeated for at least ten days) and other agents within the rectum will destroy the eggs as soon as they are deposited, besides relieving the terrible itching.

Attention to the general health of the patient and great care of the intestines and other digestive organs are absolutely necessary. The spinal treatment to the intestines and other digestive organs, as well as thorough direct treatment over the abdomen, is indicated.

Trichiniasis.

Trichiniasis is a name given to a disease produced by the embryos of the trichina spiralis. In the adult condition the trichina spiralis lives in the small intestines. The embryos migrate into the muscles where they finally become encapsulated. Man is infected by eating insufficiently cooked pork containing the encapsulated worm, which is set free during the digestive process. About the third day they attain their full growth and be-

come sexually mature. Each one discharges large numbers of embryos. As soon as born the young brood is carried away from the bowel and invade the muscles through various channels—principally by means of the blood stream and along the connective-tissue routes. The female trichina may bring forth several broods of embryos in succession. In nine or ten days after infection the first brood reaches its destination. They attain to maturity in about two weeks after entering the muscular tissue. In this process an interstitial myositis is excited and a fibrous capsule is formed in four to six weeks. The capsule gradually becomes thicker and finally calcareous infiltration may take place.

Thorough cooking destroys the parasite. The disease is most frequent among the Germans who eat raw ham and sausages.

Symptoms.—These are sometimes absent, especially when only a few are eaten. If large numbers have been ingested, gastro-intestinal symptoms develop in the course of a few days. Vomiting, diarrhea, and pain in the abdomen may be present.

In from one to two weeks muscular symptoms develop. There is fever, muscular pain, especially during motion, and the muscles are stiff, tense and sometimes swollen. When the respiratory muscles are involved dyspnea is produced, which may prove fatal. Edema, especially of the face, is an important symptom. Profuse sweats, itching and tingling of the skin have been observed.

Diagnosis.—Epidemics of this disease are more easily diagnosed than an isolated case. Among the Germans, if cases of apparent typhoid fever occur after a picnic or other feasting occasion, where raw ham or sausages have been indulged in, this disease should be suspected. Examination of the stools and of the muscles will be of aid. The worms may be discovered in the pork, a portion of which has been eaten by the patient.

Prognosis.—This depends upon the number of worms ingested. The prognosi should always be guarded. Early, marked diarrhea is favorable.

Treatment.—Prophylactic treatment is of great importance in trichiniasis. An inspection of the meat supply, as is carried out in Germany, should be employed by this government; although

the most practical way to prevent the disease is to thoroughly cook all pork and sausages. The central portions of the meat should be well cooked.

In the feeding of hogs care should be taken that they do not receive any offal, but only milk, grain, vegetables, etc.

When a person is infected with trichiniasis, thorough and prompt evacuation of the bowels should be performed at once, so that the embryo young will not have time to pass into the muscles, but will be ejected from the body. This should be followed by a thorough and persistent treatment for several days of the liver and intestines; treat both the liver and intestines directly and through the spine. The object of this treatment is to render all the digestive juices active, so that they may dislodge the animal parasite, and to prevent their passing into the muscles. Also keep the bowels active for several days.

When the larval parasites have entered the muscles, a treatment cannot be applied to affect them directly, but the health of the body should be maintained if possible, and the severer symptoms, as the muscular pains, weakness and insomnia combated. Thorough manipulation, massage and hot baths will be of special aid in relieving the stiffness and weakness of the muscles.

Filariasis.

(Filaria Sanguinis Hominis.)

Very little is known of the two varieties of *filariae*, but one is a thread-like worm with tapering, blunt ends, working at night, hence called **nocturna,** while the other is of slightly different form and appears in the blood only by day and is called **diurna.**

The mosquito is the communicating host of the parasite. During the night, or should the patient sleep during the day, the **nocturna** appears in the periphial circulation, while during the other interval they are probably in the other vessels, particularly the lungs.

After the mosquito has taken blood from an affected patient it requires from six to seven days for the metamorphosis of the minute *filaria* which are then lodged in the probosis of the mosquito and introduced into the blood of the next victim. The

adult parasite is from three to four inches long and the thickness of a coarse hair, with clear sexual distinction.

Pathologically there are no distinct lesions, as the parent worm must establish one. Lymphatic engorgement may result from plugging of the thoracic duct or of a large lymphatic with consequent engorgment which may develop symptoms in the inguinal glands, pelvic and lumbar lymphatic trunks. As these varicosities develop rupture may occur; if into the genito-urinary tract chyluria or chylocele may result, or if in the abdominal cavity chylous ascites.

Lymphangitis follows a lymph stasis, which later results in **elephantiasis.**

Symptoms.—Elephantiasis affects the legs, but the arms rarely; the labia of the female and scrotum of the male; occasionally the breasts and other parts of the body. Fever is present on account of the lymphangitis, accompanied by rigors and delirium and there is marked local inflammation. The attack terminates in a pronounced sweat. In deeper parts there is deep seated pain and signs of sepsis, while abscesses may develop over the inflamed area.

The varicose inguinal glands are doughey, soft and painless, with both sides affected alike. The scrotum is affected by the extention, and at times the testes.

Treatment is surgical, as the tumors must be removed. Unless the female worm is also removed this is, however, only palliative.

Nothing has ever been found to destroy the adult parasite. Local treatment to the parts are necessary as the needs demand. Several cases have been treated osteopathically with varying success. The treatment has at least modified the symptoms in the acute stage.

HEMORRHAGES.

Nasal Hemorrhage.

(Nose bleed; Epistaxis.)

Osteopathic Etiology and **Pathology.**—Traumatism, such as, picking the nose, blows, and surgical operations; straining when coughing; nasal tumors and ulcerations; lesions of the atlas, or any lesion of the upper cervical vertebræ, that would interfere with the vaso-motor distribution to the nose and cause local congestion or weakness of the blood vessels; obstructions to the general circulation; irregularities or suppression of the menstrual flow may result in nose bleed, as a vicarious menstruation; suppression of a habitual hemorrhoidal discharge.

Pathologically the great frequency of nasal hemorrhage is due to the great vascularity of the nasal mucous membrane. Usually in cases of spontaneous origin, bleeding is from the region of the septal artery. Spontaneous bleeding may also occur from posterior hypertrophies or adenoid vegetations. The blood flowing downward into the fauces, is expectorated in such cases, and may be mistaken for a hemorrhage from the lungs.

Treatment.—The position of the individual is important. He should assume a sitting posture, or as nearly so as possible. Holding the nostrils tightly, or plugging them with a piece of cotton, will favor the formation and retention of a clot, so that the hemorrhage may be controlled. Pressure upon the carotid artery, or upon the facial artery at the angle of the inferior maxillary, will slow the blood current and favor the formation of a clot, also pressure on the sides of the bridge of the nose may influence it. Correcting any lesions that may exist in the superior cervical region, as derangement of the vertebræ or contracted muscles, will remove obstructions or irritations to the vaso-motor system of the affected region, and thus equalize the vascular system. Holding the arms above the head, and the application of ice to the nose are of aid in some cases. Also, injection of cold

or hot water into the nostrils. In serious and obstinate cases, where other methods fail, a plugging of the anterior and posterior nares should be resorted to, using absorbent cotton or gauze.

Broncho-Pulmonary Hemorrhage.

(Hemoptysis.)

Osteopathic Etiology and **Pathology.**—Pulmonary congestion; croupous pneumonia; tuberculosis; hemorrhagic infarction; ulcers of the larynx, trachea or bronchi; gangrene of the lung; fibrinous bronchitis, carcinoma of the lung; lesions of the ribs or vertebræ from the second to the seventh dorsal inclusive, may, cause diseases of the bronchial tubes or lungs, that result in hemoptysis, or the hemorrhage may be caused directly by extreme congestion resulting from the disordered vaso-motor nerves; diseases of the heart, such as mitral disease, causing pulmonary congestion; aneurism of the branches of the pulmonary artery; vicarious hemoptysis from deranged menstrual functions; diseases of the vessel walls, or blood, as scurvy, anemia, hemophilia, etc.

Pathologically in many cases, the lesions are microscopic, consisting of ruptured capillaries. In other cases larger vessels may be ruptured, or are the seat of erosion. Many other lesions may be observed. After death the bronchial mucosa is occasionally found inflamed and the lung tissues paler than normal.

Diagnosis.—A differential diagnosis must be made between epistaxis, hemoptysis and hematemesis.

In **epistaxis** the blood may flow from the posterior nares into the pharynx; it causes coughing and a discharge of the blood may occur the same as in hemoptysis. A careful examination of the nasal region alone can determine the source of the bleeding.

In **hemoptysis** the history of the case as to pulmonary or cardiac diseases is to be considered. There is a feeling of weight and of uneasiness in the chest. A salty taste and a tickling of the throat precedes the bleeding. The blood is ejected by coughing and is bright red, frothy, very little coagula, and is alkaline in reaction.

In **hematemesis** the history would indicate disease of the

stomach, spleen, liver or heart. Uneasiness, and occasionally nausea and faintness, precedes the bleeding. The blood is ejected by vomiting, and is dark, clotted or fluid, mixed with food, and is of acid reaction. In a few instances the blood due to hemoptysis may be swallowed, and vomited.

Treatment.—In all these cases of hemoptysis the patient should be placed in bed and absolute rest demanded. An attempt should at once be made to correct any lesion that may be found influencing the cause of the bleeding. Correcting lesions to the vaso-motor nerves of the lungs and bronchial tubes, and equalizing the disturbed vascular area, may be sufficient in a number of cases. These lesions will be found principally in the upper dorsal region. In some cases, perhaps, there is an impairment of the trophic nerves by the same lesions, thus interfering with the tone of the vessel-walls and pulmonary tissues. The diet should be light, nutritious and non-stimulating. The use of hot drinks is to be avoided. The rapidity of the heart's action should be reduced. This is best performed by thorough treatment of the dorsal spinal nerves of the left side over the heart, and by inhibition in the sub-occipital region. The ice-bag to the precordia is also helpful. Iced drinks and the eating of ice is of aid. Stimulation of the systemic circulation will be of value in helping to relieve the pulmonary congestion, although the two systems are somewhat independent of each other. Also, hot foot baths and the evacuation of the bowels may be of additional value. In cases due to organic disease of the heart, the mind and body should receive absolute rest, so that the diseased areas may be strengthened as much as possible; besides a tonic treatment for the heart's action is necessary.

After the hemorrhage has subsided care should be taken that bleeding does not occur again. All irritations of the respiratory tract should be avoided. A stimulating diet, tobacco and alcohol should be avoided. Nutritious food and a moderate amount of exercise is indicated.

Hemorrhage of the Stomach.
(Hematemesis.)

Osteopathic Etiology.—Injuries to the stomach; local diseases, as congestion, ulcers and cancer; vicarious menstruation; a mechanical obstruction to the portal circulation; spinal lesions to the vaso-motor nerves of the stomach; alterations in the blood; perforation of the stomach walls, involving a blood-vessel; from disease of some neighboring organ.

Diagnosis.—A careful examination of the case and of the blood ejected will be necessary to determine the nature of the cause. The differential diagnosis as to the source of the blood, whether from the stomach or lungs, was given under hemoptysis.

Treatment.—Correction of any lesions that may influence the blood pressure in the region of the stomach, is the first requisite. Treatment of the splanchnics has the greatest influence upon the vaso-motor nerves to the stomach. Treatment of the vagi nerves and of the fourth and fifth dorsals, will quiet the violent movements of the stomach, and thus aid in controlling the hemorrhage. Stimulation of the cervical sympathetics and heat applied to the feet will tend to equalize the vascular system, and thus lessen the gastric congestion. The application of a broad flat ice-bag over the stomach will be of great value. Keep the patient quiet in bed. Surgical interference may be necessary.

Intestinal Hemorrhage.

Osteopathic Etiology.—An obstructed circulation of the blood through the vena-porta, as in diseases of the heart, lungs and liver; lesions of the vertebræ deranging spinal nerves to the intestinal blood supply; injuries caused by corroding or cutting substances; mechanical injuries to the intestines; degeneration or erosions of the blood-vessels from ulcers of the intestines, as from typhoid fever, typhus, dysentery, etc.; disordered menstrual or hemorrhoidal discharges.

Diagnosis.—The locality of the intestines affected can be approximately determined, by an examination of the discharged blood. When the blood comes from the upper part of the intestines, it is generally dark and mixed with the intestinal contents,

which gives it a tarry appearance. It is generally red and fluid when it comes from the lower protion of the bowels. If from the stomach, the blood is thoroughly mixed with fecal matter. Throwing the passage into water, the water is colored red when it contains blood, and if the contents contains bile the water is colored green or yellow. Also, noting the areas of contracted muscles, as in intestinal colic, will aid in the regional diagnosis.

Treatment.—Absolute rest in all cases is necessary, the patient remaining as quiet as possible. Food, in severe cases, should not be given for ten or twelve hours. The bed-pan should be used in caring for the evacuations. Correction of the lesions along the spinal region, chiefly of the lower dorsal and lumbar regions, that are impeding the innervation to the intestines should be attended to at once. This treatment tends to relieve any hyperemic condition of the intestinal mucosa and influences the whole vaso-motor area of the mesentery. Direct treatment of the abdomen in a few cases is of great value to relieve obstructed and contracted vessels in the mesentery, but in certain pathological conditions, e. g., typhoid fever, leave the abdomen alone. Treatment (inhibition) along the spinal column from the sixth dorsal to the coccyx is helpful in all cases to quiet the peristalsis of the intestines. In severe cases cold drinks, eating of ice and an ice pack to the abdomen are of aid. In a few instances surgical measures will be necessary.

Hematuria.

Osteopathic Etiology.—Congestion and acute inflammation of the kidneys, exacerbations of pyelitis, renal calculi, chronic nephritis, traumatism, tuberculosis, etc.; affections of the urinary tract as calculi or lacerations of the ureter; calculi, cystitis ulcerations, etc., of the bladder; calculi, gonorrhoea, parasites, etc., of the uretha; general diseases, chiefly the acute specific fevers and blood diseases; blows, wounds and traumatic influences, external to the kidneys; lesions of the renal splanchnics.

Diagnosis of the locality of the hemorrhage in the urinary tract: In hemorrhage from the **kidney** the blood is thoroughly mixed with the urine, giving a uniform color. Blood casts and eucocytes are present. In hemorrhage from the **ureters** the

blood is usually molded in clots which conform to the shape of the ureter. The clots appear like small dark worms. In hemorrhage from the **bladder** the blood is not thoroughly mixed with the urine and large clots form upon standing. In hemorrhage from the **urethra** the blood often discharges without micturition. When urine is passed the blood precedes the passage of urine.

Treatment.—Rest is essential. A correction of the lesions to the renal splanchnics is necessary to control the congestion and inflammation of the kidneys. When the ureters, bladder or urethra is involved, attention must be given to the condition of the spinal column below the renal splanchnics. In all cases the inhibitory treatment to the lower spinal column and ice to the loins are of value. If surgery is indicated do not delay operation.

Uterine Hemorrhage.

Most of the causes of uterine hemorrhage come under the subject of obstetrics; others under menorrhagia and metrorrhagia. Such will be found in obstetrical and gynecological works.

Treatment.—The patient should assume the dorsal position with the buttocks raised. If any displacement of the uterus is present and if there is any foreign material in the uterus, usually such should be corrected or removed at once. Stimulation of the clitoris is a most effectual means to control uterine hemorrhage; it contracts the circular fibres of the uterus. Stimulation of the uterus directly through the vagina, and over the abdomen, and stimulation of the upper wall of the vagina, will aid in contracting the uterus. A quick, unexpected pull of the hair on the mons veneris will have the effect of closing the capillaries by shock to the nervous control (Dr. Still). Before closing the os, however, it is well to know that there is no irritating foreign material within the body of the uterus. Correction of obstructions of the vaso-motor nerves of the uterus through the splanchnic and lumbar region is important. Compression of the abdominal aorta, and vaginal injections of hot water may be of aid, as will also a hot water bag at the lumbar region and ice water bag over symphysis. In severe cases inversion of the body, if it can be done with safety, may be performed. Packing the vagina is a method resorted to occasionally in severe cases.

VARICOSE VEINS.

In varicose veins there is a dilatation of the calibre of the veins and their valves are insufficient. The walls are irregularly thinned, lengthened and tortuous.

Osteopathic Etiology and **Pathology.**—The **internal saphenous** is the vein most frequently affected, although anv vein through out the body may become varicosed. Commonly, varicose veins occur in the lower extremities and occasionally in the arms.

The **valvular insufficiency** is caused by stretching of the wall of the vein, thus separating the thin, free edges and leaving an interspace that allows regurgitation of the blood. The valves becoming insufficient, the column of blood in the veins has no support against gravity, and being interrupted in its course does not flow normally into collateral channels. The walls of the veins become thin, as does also the adjacent skin, thus increasing the danger of a rupture, either external or subcutaneous.

Varicose veins are most frequently found in females, following uterine enlargements. The condition may be due to any obstruction or constriction that prevents the free return of blood from the veins, such as dislocations of the hip, either slight or complete, dislocations of innominata, contractions of adductor magnus muscle affecting femoral vein, prolapse of diaphragm may obstruct vena cava, tissue constrictions about the saphenous opening, garters, and, in fact, anything that might impede the free venous flow. The tendency to varicose veins increases as age advances, and many cases are found among people of middle life who have been accustomed to standing a great deal. Injuries to the pelvis, thigh or leg, lessening the nutrition to the leg, or injuries to the nerves, as vertebral dislocations in the lower dorsal or lumbar regions (the fourth lumbar especially) may be causes of varicose veins. Pregnancy or tumors in the abdomen or pelvis, causing pressure upon the iliac veins, are occasionally causes. Distention of the signoid flexure, causing pressure upon the left iliac vein, or distention of the cecum, pressing upon the right

iliac vein, are fruitful sources, as are also diseases of the heart and lungs. Varicose veins of the upper extremities are due to occupations requiring overuse of the arms.

Complications.—Varicocele, hemorrhoids, labial varix in the female, varix over pubes, ulceration and eczema due to disturbances of nutrition, edema, thrombus.

Symptoms.—Lower Extremities.—Crampy pains in the limbs upon rising. Fullness and heaviness of the limbs. Inspection may reveal superficial varicose veins near the saphenous opening, upon the external thigh, in the popliteal space, upon the external leg or behind the ankles. Edema and congestion of the foot and ankles occur in a few cases. Pain is quite a prominent symptom, due to pressure upon the nerve fibres. Eczema and itching are due to disturbed innervation and blood supply to the skin. Ulceration may occur, due to the bursting of a vein.

Upper Extremities.—Before the varicosity appears there is usually pain or a feeling as of a sprain in the involved region of the arm. The pain is usually confined to a muscle or group of muscles.

Treatment.—The majority of cases are due to disorders about the pelvis, hip or thigh, and the treatment resolves itself into the removal of these obstructions or constrictions. Occasionally cases are caused by partial dislocations of the hip joint, which can be easily overlooked during a hurried examination. The slipping of an innominate is an important factor. Quiet rest in a recumbent position, attention to the general health, and especial attention to the bowels and liver, are essential in acute attacks. Occasionally the heart and lungs are at fault. Treatment twice per week should consist of removing any of the numerous causes of the condition, and spinal treatment as well; then the leg should receive special attention. Remember, thrombi may form and that the vein must, under no circumstances, be touched in the treatment. Begin by carefully rotating the leg to stretch contracted tissue about the saphenous opening, then separate the tendons of the popliteal space and follow the course of the vein to the abdomen and relax tissue about it. Keep patient off the feet as much as possible and elevate the leg when sitting.

In rupture of varicose veins the hemorrhage can be arrested by elevating the limb and applying pressure with the fingers, above and below the wound, until a compress and bandage can be applied. The support of the varicose veins by elastic stockings will ease the pain and prevent edema in many cases, but, as a rule, it is a direct hindrance to the circulation on account of the necessity of having the stocking fit closely. Surgical operations are rarely indicated.

THE RECTUM.

To treat the rectum intelligently and thoroughly, requires special knowledge on the part of the osteopath. A speculum should be used in many cases when making an examination, and all abnormal conditions carefully examined with the eye; although much can usually be noted by the examination with the finger alone. The best position in which to give an examination and treatment is to have the patient on the side, with thighs flexed upon the abdomen. In a few cases the patient may lean over an operating table.

The **objects** of **rectal treatment** are many—to relieve hemorrhoids, etc., of the mucous membrane; to correct a dislocated coccyx; to treat an enlarged prostate gland; to replace a prolapsed rectum; to tone the lower bowel in cases of constipation; to give reflex stimuli to the heart and lungs, in cases of fainting, paroxysms, etc.; to relieve severe pains in the rectum at the time of the menstrual period, and to relieve congestion, inflammation, contracted tissues, etc., of local sources; to relax spasms in croup, and to remove tension to the nervous system in some forms of insomnia. In fact, so many diseases are affected by reflex irritations from the rectum that its examination is a necessity in many cases. The phrase "when in doubt treat the rectum" was coined by a progressive student and there is an element of truth in it. Surgical assistance to treatment will be considered under hemorrhoids.

The principal need of osteopathic internal rectal treatment, is: (1) To relax all contracted and constricted fibres about the walls of the rectum and between the sacrum and coccyx. (2) To correct a dislocated coccyx. (3) To dilate the sphincters thoroughly, in order to relieve irritations about the sphincters, and to stimulate the sympathetic nerve.

Work through the rectum to treat an enlarged prostate gland, to correct a displaced uterus, and to make a more thorough examination of the uterine tissues, the Fallopian tubes and the ovaries, is a frequent occurrence.

In giving **local treatment,** cleanse the fingers, and oil the index finger, then, after introducing it into the rectum, relax the contracted tissues by an upward sweeping motion on all sides. This treatment relieves all obstructions to vessels and nerves caused by contracted fibres, and tones the rectal walls. In prolapsed sigmoid, causing obstructive constipation, the finger can be used to separate the fold of mucous membrane and open the lumen of the bowel. Frequently there will be enough tone to the muscular coat so that the irritation will set up slight peristalsis and cause the bowel to draw up to a considerable degree. In children where there is much straining at the stool the sigmoid will often be found down and by using the little finger the same results can be accomplished and much relief given.

To **dilate** and **stretch** the sphincters thoroughly a speculum or dilator should be used under anesthesia; still, considerable can be done by one or two fingers. The sphincter should be thoroughly stretched in all directions, care being taken when an instrument is used that too much force is not applied. This treatment is of aid in cases of hemorrhoids and prolapse of the rectum, in constipation due to the loss of tonicity of the lower bowels, in tightness of the sphincters, in pain of the rectum, and in stimulating the heart and lungs. In cases of a prolapsed rectum, due to irritation about the sphincters, causing tenesmus, this treatment is of special value, as it gives the sphincter a physiological rest. Frequency of treatment per rectum must depend entirely on the patient and disease. It can be given daily in many cases and is frequently so indicated in acute hemorrhoids, prostatic troubles, etc.

According to Quain, the sensory nerves to the rectum are from the second, third and fourth sacrals. Some of the motor fibres of the circular muscles of the rectum are from the lower dorsal and upper two lumbar nerves; these pass by the aortic plexus to the inferior mesenteric ganglion. Associated with these fibres, are the inhibitory fibres of the longitudinal muscles of the rectum. The sacral nerves contain motor fibres to the longitudinal muscles, and inhibitory fibres to the circular muscles of the rectum. In all cases of rectal trouble, the lower dorsal and

upper lumbar vertebræ may be found deranged, and thus interfere with the rectal nerves. Relaxation of the sacral muscles over the sacral foramina has a marked effect in relieving **tenesmus.** In dysentery, where there is a constant desire to defecate, a thorough upward relaxation of the sacral muscles will give great relief.

Proctitis or inflammation of the rectum is not an uncommon disorder. The disease has been divided into acute, chronic, gonorrheal, dysenteric, and diphtheritic. Foreign bodies, impacted feces, cold, purgatives, prolapse of the sigmoid, and lumbar, coccygeal and innominate lesions are the most important causative factors. The **acute** form is more frequently found in older people. The **symptoms** are tenesmus, frequent evacuations of blood and mucus (possibly pus), prolapse of the mucous membrane, feeling of fullness, and radiating pains. The gonorrheal, diphtheritic and dysenteric forms are of rare occurrence, with the exception that the dysenteric may be somewhat frequent. The **treatment** is to remove all local irritations, cleanse the bowels, and put the patient in bed. All irritating foods are to be prohibited. Use milk, soups, beef-juice, soft boiled eggs and similar foods. Correct all osteopathic lesions; especially will inhibition over the sacral foramina relieve the tenesmus. Cold water in the rectum and applied to the anus will be beneficial. If abscesses occur employ surgical measures.

Prolapse of the **rectum** is another common rectal disorder. Acute cases are especially found in children, due to straining at stool. The sacrum is more straight, and thus violent straining, coughing, etc., the more readily produces prolapse. Prolapse of the mucous membrane is the most common, although all of the rectal coats may be involved. Prolapse of the upper part of the rectum into the lower or invagination is frequently met with by osteopaths. The sigmoid may prolapse and also affect the rectum. The **treatment** is to return the mass, using an anesthetic if necessary. If it is not retained, place straps across the buttocks. Then with attention to lesions that may be disturbing and weakening the rectal walls and thorough local toning treatment, the prognosis should be favorable. In high rectal prolapse local attention is necessary as well as deep treatment through the

abdominal walls to the sigmoid and upper rectum. Regularity of habits and proper food are essentials.

Hemorrhoids.

Definition.—A dilated or varicose condition of the plexus of veins lying in the sub-mucous tissue of the lower part of the rectum. The dilation of these hemorrhoidal veins may extend into the adjoining sub-cutaneous tissues and mucous membrane, and the peri-rectal plexus and adjoining venous plexuses of the bladder, uterus, vagina and sacral canal may become involved.

Osteopathic Etiology and **Pathology.**—The chief predisposing cause of piles is man's erect position and the absence of valves in the hemorrhoidal veins. Thus a retardation or stagnation of the portal vein would cause a backward movement of the entire column. It is evident that such a downward pressure of the blood in the portal system would dilate and extend the blood vessels to the very capillaries in the rectal region.

This retardation may arise from several causes: obstruction of the portal vein, from diseases of the liver; diseases of the heart; obstruction or destruction of the capillaries of the lungs; pressure from a gravid uterus, tumor, etc.; a general loss of tonicity of the abdominal walls, as in persons who take but little exercise; the excessive use of wine, tea and coffee; injuries to the spinal column, especially in the lumbar, sacral and coccygeal regions; a dislocation of an innominate bone; lifting; constipation; straining at stool; carelessness of the calls of nature, etc. Catarrh of the bowels may cause a congestion of the mucous membrane and consequently piles. Hereditary influence may be a factor in a few cases.

Hemorrhoids are divided into two classes, **external** and **internal.** An **external pile** is one that arises from the margin of the anus outside of the external sphincter muscle. It differs from the internal pile from the fact that it is always composed either of skin or hypertrophied connective tissue, forming a mere cutaneous tag, or else it is composed of a small cutaneous vein enlarged by a clot of blood. The **internal hemorrhoids** are composed mostly of enlarged veins and are connected by hypertrophied connective

tissue. They have a free arterial supply and are covered by the mucous membrane of the rectum. They are due, usually, to an affection of the middle hemorrhoidal blood supply, thereby being a part of the viceral vascular system. Internal hemorrhoids, when protruding, can be returned within the rectum, while the external ones cannot. The venous turgescence varies in size from a pea to a walnut. They may be single or may surround the entire anal opening like a bunch of grapes.

Repeated attacks of engorgement of the veins involved, will in time change the mucous membrane or the sub-mucous tissue, and cause catarrhal swelling of the mucous membrane, or hyperplasia of the connective tissue. At first the hemorrhoid is usually a blood tumor, but in chronic cases it is oftentimes made up largely of connective tissue. Owing to pressure of the varicose veins, atrophy of the mucous and sub-mucous tissue may occur. The white or slimy hemorrhoids occur when these roughened parts of the mucous membrane become inflamed and thickened, resulting in suppuration.

Symptoms.—The symptoms are quite diagnostic and need not be mistaken. Besides the appearance of tumors, there may be constipation, pain during stools, indigestion, headache and pain in the back. Hemorrhages frequently occur, and if suddenly checked, as by cold, other disturbances may occur, as congestion of the head, lungs, stomach, liver, kidneys, etc., which may result in hemorrhages from those organs. Fissures of the anus, contraction of the rectal sphincters and prolapse of the rectum may occur. Occasionally in old people there is a varicose state of the veins of the neck of the bladder, and in females, of the uterus and vagina, which causes hemorrhages of these organs. The communicating plexus of the spinal canal may be affected, causing weight, numbness and pain, so as to simulate a lesion of the cord. The patient may have a hyperchondrical disposition and be disinclined to work, especially at mental labor.

Prognosis.—Depends upon its predisposing and immediate causes, but a large majority of cases can be cured.

Treatment.—A thorough examination of the patient should be made, not only to ascertain the extent of the local trouble, but

to understand thoroughly the general health of the sufferer, especially the state of the heart, lungs and liver.

Many cases of hemorrhoids are caused by lesions in the lumbar and sacral regions, and especially dislocations of the coccyx (usually anterior) and the innominata. Correcting these lesions will oftentimes cure the hemorrhoidal disorder. Simple dilation of the rectum once a week, in addition to other treatment, is of great aid in curing hemorrhoids, not a few of the cases being cured by dilation alone. It relaxes the tissues about the tumefied vessels. Treatment is rarely necessary above the second lumbar, (unless there is more or less of a constitutional disorder) as the superior hemorrhoidal blood-vessel of the inferior mesenteric is given off about opposite the second lumbar.

In cases where the abdominal walls have become relaxed, a treatment should be given to strengthen the abdominal muscles and viscera. Treatment should be given over the abdominal muscles directly, and also to the spinal nerves of the same region. The diet should be strictly regulated and the bowels kept loose, and stimulants, indigestible food, full meals and too much meat should be avoided. Injection of cold water before stools is a good prophylactic, and applications of cold water to the protruding pile will be of some help in relieving the congestion.

Hemorrhoids in the **acute state,** within twelve or twenty-four hours from the engorgement, yield quickly to treatment. The local technique is to relax the tissues about the tumor, especially above and along the line of the vein, then with pressure at its base carefully force out the engorged blood. Follow this up by another treatment the next day and continue until normal. The vein wall, not being permanently stretched, will contract and if the irritating cause is found, there is little danger of return. Remember, in a case like this, the danger of embolism and be sure a clot has not formed. Cases of hemorrhage at stool, during or immediately following evacuation, when not from a bleeding pile, may be of considerable quantity and the source difficult to locate. It may be due to ulcerations or easily ruptured capillaries of the mucosa, but the cause will in many cases be found in the innominate and a reduction of the lesion give relief.

Rectal conditions, associated with piles, and **requiring surgery** after treatment has failed are: hemorrhoids, which are of such long standing as to become organized tissue, (these will keep up continual irritation and cannot be absorbed); **saccules** or pockets, formed by folds of mucous membrane catching and holding particles of feces, gradually enlarging and ending with considerable reflex symptoms; **fistula,** complete or incomplete, may frequently be healed by adjusting coccygeal or innominata lesions, but are apt to recur from the tract not being clean in the center or bottom; **abscesses** in or about the anus or rectum are usually traced to coccygeal, innominate, or local interference to circulation; **fissure,** complete dilatation under anesthesia to insure physiological rest of parts, is probably the best treatment; **papillæ** are small, hard black-capped papules in the lower rectum, each one involving a nerve terminal and causing much distress. All these conditions give rise to much discomfort and with surgical assistance can be cured without much trouble. It is not necessary to make them a major operation and do uncalled for things. The less surgery about the rectal sphincter the better.

Care of the **anus** and **rectum** after operation or successful treatment is a factor in preventing return. First, there should be soluble, non-irritating stools, which do not tend to bring about prolapse from straining. Diet and regularity contribute to this. Second, absolute cleanliness. This can only be obtained by following the stool with an enema of four or five ounces of cool water and immediately passing it. It will bring forth a considerable quantity of feces which would otherwise have been retained for another twenty-four hours. This procedure following, as it does, the stool does not in any way interfere with the normal function or create a habit. The anus should then be thoroughly washed in cool water and as thoroughly dried. Dusting with borated talcum powder, starch, etc., will prevent chafing.

GENITO-URINARY.

The Prostate Gland.

This gland is subject to several painful and annoying diseases, controlling, as it does, the flow of urine and exerting such a profound influence over the sexual functions. . The nerves to the prostate pass between the gland and the levator ani muscle, and the secretory branches are from the sacral nerves, while Quain gives the sensory as from the tenth, eleventh (twelfth) dorsal, first, second and third sacral and fifth lumbar. Lesions affecting the prostate are occasionally found at the tenth and eleventh dorsal and fifth lumbar, while the innominate lesions are common causes of trouble. These should be corrected, if present, and local treatment given to the gland. "Massage of the prostate," says Lydston,[1] "properly performed, is one of the most valuable advances in genito-urinary therapeutics that has been developed in many years." Osteopathic technique is to place the patient on the side, knees flexed, and standing in front insert the index finger. Care must be used not to bruise the gland and it must be touched lightly when sensitive. Relax tissue about the gland, and, then, from the median line with an outward movement, massage the surface of each lobe. This influences the blood and nerve supply, while the pressure will tend to relieve congestion. Length of treatment, as well as frequency, depends entirely upon conditions. Do not make the mistake of treating the perineum instead of the gland and do not gouge it with the finger. Remember it is sensitive tissue.

Hypertrophy is most commonly met with in practice, as twenty per cent. of men past middle life are said to be afflicted. It is probably not a sequence of old age, but due to chronic, congestive and inflammatory conditions. Anything which would produce these conditions—spinal lesions, excessive venery, mastubation, or other more innocent causes—would in time bring about enlargement. As the length of catheter life is estimated at six years it is of great importance that the condition be early recognized, for

1. Twentieth Century Practice of Medicine, Vol. XXI.

in advanced stages surgery is the last resort and its results, as yet, are not reassuring. In early stages the prognosis is good, either for a cure or to stop further enlargement, while many enlarged ones at the catheter stage have been greatly benefited or cured. Treatment of the gland once per week is usually enough, but in older cases can be given semi-weekly. Look well to nerve and blood supply.

Acute Prostatitis is a serious and painful inflammation, causing urinary retention usually. It results from trauma, horseback riding, over exertion, gonorrhea and its mal-treatment, etc. Lower dorsal and lumbar lesions are frequent. This condition must be closely watched. Inhibition of the sacral nerves will help control pain and stop any spasm of the sphincter. Cold applications to the gland externally at the perineum will aid in reducing inflammation. Local treatment should at first be given to the adjacent tissues as the gland will be very sensitive. Later direct massage will be of great benefit.

Chronic Prostatitis may follow an acute attack or it may originate as a chronic or sub-acute affection. Frequent micturition and dull pain, referred to the perineum and rectum, with the local examination, make diagnosis sure. The spinal lesions should be corrected and the gland massaged. This will induce absorption, by squeezing out the inflammatory products and do much toward preventing future hypertrophy. "Massage is done by the finger. The patient is placed in the knee-elbow position and massage employed for four minutes daily. The value of massage in chronic portatitis is very great, but should be employed with much caution and never in cases of suppuration."[1]

Prostatorrhea is often taken for spermatorrhea and any irritation of anterior sacral nerves would cause undue activity to the secretory nerves to the gland. This is easily determined.

The Seminal Vesicles can be reached just above the prostate, and if inflamed and tender or if engorged by inspissated seminal fluid, local treatment will be of benefit. Frequent massage, daily in some cases, to the gland and treatment to the sympathetic nerves above the trigone of the bladder, to the nerve fibres passing along the spermatic cord, and to the arteries directly will be of the greatest aid in impotency.

1. C. Kruger, Munch Med. Woch, June 9, 1903.

In **Chronic Gonorrhea,** where the gonococus has found lodgement in and about the gland, it can be more readily dislodged by massage than by any other form of treatment.

Retention of urine from nervous excitement or other minor causes, can often be overcome by local massage of the prostate.

Spastic stricture can usually be cured by work about the prostate and its innervation.

VARICOCELE.

A varicose enlargement of the veins of the spermatic cord, epididymis and testicle. In varicocele the pampiniform plexus is usually enlarged, but all the veins of the cord may be involved. The swelling gets smaller under compression or in a horizontal position and enlarges again on standing erect. It is almost invariably found on the left side, and the testicle on the affected side is generally smaller and softer than its fellow.

The predisposing **causes** are a longer and tortuous spermatic vein on the left side; the absence of support of the veins from surrounding muscles; the imperfect valves; the entry of the left spermatic vein into the renal vein at a right angle, instead of at an acute angle like the right vein; the more liability of compression of the left spermatic vein by accumulation of feces in the sigmoid flexure; the lack of normal exercise of the sexual functions in young, unmarried adults. Lesions in lower dorsal and upper lumbar affect the condition; the eleventh dorsal particularly. A lesion at the second lumbar may cause neuralgia of the testicle with engorgement of the vein.

The exciting causes are straining during stool, heavy lifting, excessive sexual indulgence or anything that would determine more blood to the testicles. Varicocele is similar to the varicose state of the hemorrhoidal veins and may have like causes.

The **diagnosis** is easily made. The feeling of the veins between the fingers like a convolution of earth worms; dull, aching, dragging sensation, and possibly prostration, weakness and dejectedness of spirits, are characteristic symptoms. "The condition is devoid of danger, except that it often begets morbid fears on the part of the patient, usually the result of suggestion."[1]

1. Deaver's Surgical Anatomy, Vol. II, p. 652.

The **treatment** consists of regulation of the bowels, removal of such predisposing and exciting causes as may be found, treatment of the vessels along the spermatic cord, and treatment to the lower dorsal and lumbar regions. In severe cases a suspensary bandage will give temporary relief. Surgical interference may be necessary in some cases in order to effect a cure.

Impotency.

Results from treatment in these conditions are particularly gratifying and offer a great field of activity in this day of sensational medical advertising. This condition can well be classed under four heads, Exhaustive, Traumatic, Psychic and Organic.

Exhaustive Impotency is the result of functional abuse, masturbation in early life, excessive venery, coupled with intemperate use of alcohol and improper diet without sufficient sleep. It can be symptomatic in neurasthenia. There is at first irritation of the spinal centers, which causes exaggerated sexual activity, and later this is followed by complete or partial loss of function. The first step is for a radical reform in habits; regulation of the bowels, as they will likely be constipated; direction of the mind into wholesome channels, and then skillfully directed spinal treatment. Where there has been masturbation look well for sources of irritation to the parts; a long fore skin or adherent prepuce indicates surgical aid, or there may be a lesion at the sacrals involving the nervi erigentes or, of greater importance, the pudic nerve. The innominate can be at fault in this. The lower dorsal ribs and upper lumbar are of importance. Kraft-Ebing says: "Conditions of absolute impotency are, however, rare, and are caused **only** by severe vertebral and nervous diseases." Nerve irritation undoubtedly is the cause of sexual perversion (outside of heredity and malformation,) so their relief is as necessary to bring about reform of habits as to effect a cure. Where the general health is affected constitutional treatment should follow. Motschutkovsky uses suspension in treating these cases with good results. The effect is to separate the vertebræ, freeing spinal nerve and blood channels. The prostate will probably be found in an irritated, sensitive condition, as well as the seminal vesicles.

Treat as outlined under the prostate gland. Ligation of the dorsal vein of the penis is recommended by some authorities as tending to aid turgescence of the organ. Prognosis is so dependent on how well the patient follows directions, age, environment and general condition that it is hard to give, but as a rule is rather favorable.

Traumatic Impotency is a strictly osteopathic classification, for the reason that sexual weakness is often traced to lesions resulting from remote injuries. These injuries may be to the spine, ribs or sacrum. The lower spine may be impacted from a fall or the result of long continued riding on rough streets or the railway. This inhibits the nerve supply to the extent of often seriously impairing the sexual functions. If the cord is injured to any extent the results are more serious. Treatment in these cases has given uniformly good results. It will always be due to a specific lesion, so the examination must be thorough.

Psychic Impotency is the form most frequently met with and generally the most difficult to cure, yet it should not be if the patient's confidence can be secured, for in many cases sexual power is but slightly impaired, but owing to the suggestions given by the medical advertisers the victim diagnoses his own case as hopeless. "It is not uncommon that virility returns with the peace of mind."[1] Observe all the procedure given and then inspire hope where it can be honestly given, and if the patient is progressing favorably, other things being equal, advise early marriage under strict rules of conduct. If already married, conjugal relations should be most carefully investigated and the wife taken into your confidence. Her co-operation in correcting very possible errors in sexual matters, as well as sympathetic aid in easing the patient's anxiety and chagrin, will be invaluable. Nothing but the frankest understanding between all parties is permissible and the osteopath must be in absolute control.

Organic Impotency is the result of a cortical injury or disease. The latter is the most common, as it follows tabes dorsalis, paralysis affecting the lumbar cord, some cases of diabetes, etc. Also, any congenital malformations or absence of all or part of the organs. Prognosis in these cases is bad, as cure is seldom possible.

1. Vecki, Sexual Impotence.

In no class of cases (impotency) will honesty, tact and good judgment count for so much or the rewards be greater.

GONORRHEA.

Gonorrhea is a contagious, catarrhal inflammation of the genital mucous membrane, due to a specific micro-organism. The micro-organism has great migratory powers, and is often found in remote parts of the body. Gonorrhea is a disease which should always be viewed with concern as it is far reaching in its results.

Osteopathic treatment has given gratifying results, and enough cases have been treated successfully to give definitely the treatment and prognosis. In acute cases the treatment is to thoroughly treat the dorsal, lumbar and sacral regions, give deep treatment in the iliac fossa over the iliac vessels, thorough treatment of the bowels and liver—the latter will be found somewhat enlarged, probably—careful attention to diet and hygiene, forbidding all alcohol beverages, but ordering plenty of water to be drunk. During the active stage treat daily, and if a severe case, twice daily. Danger from stricture is greatly lessened, as it is largely caused by the injection of powerful antiseptics. Prognosis is good.

Gonorrhea in the **female** is fraught with terrible results, owing to the infection traveling into the vagina, uterus and tubes. It is by far the greatest cause of pelvic inflammation woman has to contend with. The authors have had several cases of so-called gonorrheal rheumatism in the female where the toxic absorption had involved the muscles of the hip joint to the extent that it was partially dislocated. The pain was of the most excruciating character and the extreme sensitiveness of the patient made it necessary to treat under complete anesthesia. The muscles were relaxed by rotation and the subluxated hip put in position. In one case this was necessary four times. The uterus was kept clear of pus and exudate and after a long struggle recovery of general health, with only stiff knees or a slightly shortened leg instead of complete hip dislocation and deformity, resulted. Spinal treatment was given where possible, but was necessarily

slight most of the time, but always gave relief. When extreme sensitiveness had subsided, abdominal treatment was given.

Syphilis.

"The treatment has not yet been tested in full to determine its effects in all forms of this disease. We hold it to be a nutritive disorder, due to the absorption of inflammatory products. In the lesions of tertiary syphilis, osteopathy has been peculiarly successful. Especially has this been true of gummata, paralysis, rheumatism, eye affections and ulcerations. In all these conditions we depend upon increasing the blood supply to the diseased part. This enables the young granulation tissue cells to mature. It further hastens the resorption of the inflammatory, degenerated and other products present in the disease. The treatment, if properly applied, ought to relieve the various forms of tertiary syphilis readily and completely. The treatment is the surest and most powerful method of reconstructing and renovating the tissues. The poison is eliminated by the excretories while the recuperative powers are replenished by securing a good free flow of fresh and wholesome blood.[1]"

The authors have personal records of ten cases which are about as follows: two, a period of six years; two of four years; three of two years. The more recent cases should not be given as time enough has not elapsed for proper conclusions; but with one exception, none presented any symptoms after the first year; most of them apparently perfectly well after the first six months. The exception required two years and one-half, but for the past year has been well. He was in delicate health with small recuperative power. The line of treatment was: First, stimulate emunctories. Second, treat any ulcers surgically. Third, pay careful attention to circulation. Fourth, treat conditions as they arise, in connection with the foregoing, symptomatically. Special attention to the sacral, lumbar and lower dorsal regions and floating ribs. For enlarged glands, alopecia, sore throat, special treatment is needed. Here is a disease which may affect any tissue of the body, consequently circulatory disturbance in every part

1. C. E. Still—Young's Surgery, p. 84.

of the body should be corrected to obtain best results. Continue treatment until all signs and symptoms disappear, gradually extending time between treatments, but the patient should be under observation at regular intervals for four or five years, when, if there is no return of symptoms, one could feel reasonably sure of a cure. Besides the assurance that there will be no sequela which may follow a long course of mercurial treatment, there is every hope that osteopathic procedure may prevent by increased nutrition to the cord, the ever present danger of tabes dorsalis to the syphilitic victim.

HEAT STROKE.

(Heat Exhaustion: Sunstroke).

An affection produced by exposure to excessive heat. Two varieties are recognized; heat exhaustion and thermic fever.

Heat Exhaustion.—This is caused by prolonged exposure to high temperatures, combined with physical exertion. Fatigue, over-eating, alcoholic drinking, and poor sanitation predispose. This may occur without exposure to the direct rays of the sun, the heat being artificial, or in mid-summer, in close, confined rooms the same result will be produced. There is vaso-motor paralysis, the surface of the body is usually cool, the temperature may be as low as 95 degrees F., while the pulse is small and rapid.

Sunstroke or **Thermic Fever.**—This is usually caused by prolonged work under the direct rays of the sun in a humid, very hot and sultry atmosphere. This is caused by the action of the heat upon the heart centers producing a paralysis of those centers.

Pathologically, rigor mortis develops early and is marked. Putrefactive changes appear early, owing to the high temperature of the cadaver. The various organs are deeply congested, the venous engorgement is extreme in the cerebrum. There is rigid contraction of the left ventricle; while the right is dilated and filled with blood. The blood is fluid and dark. Parenchymatous changes take place in the liver and kidneys.

In heat exhaustion with lowered temperature there is a paralysis of the vaso-motor center in the medulla, and the heat is dissipated more rapidly than it is produced. In thermic fever the heat regulating centers become paralyzed by the action of the excessive temperature and more heat is produced, and less dissipated than normal.

Symptoms.—Heat Exhaustion.—This may occur gradually or suddenly with a severe attack of faintness, pallor, dizziness, headache, cold perspiration and sometimes blindness as the first symptoms. Consciousness is rarely entirely lost. In severe cases there is more permanent collapse. The pulse is rapid and

feeble and there is great restlessness and delirium. Under prompt treatment mild cases may recover in a few hours, while in extreme cases death may occur almost at once from heart failure.

Thermic Fever.—In some cases the patient is struck down, becomes quickly unconscious, and may die within an hour, or death may be almost instantaneous. In other cases there is pain in the head, oppression, dizziness, nausea, vomiting and sometimes diarrhea or frequent micturition. Soon unconsciousness sets in, the face is flushed, the eyes injected, the breathing labored and there is a temperature from 105 to 110 F. The pulse is full and rapid, the skin hot and dry and the pupils are contracted. There is usually complete relaxation of the muscles, and in some cases there is twitching and jactitation. Epileptiform convulsions are rare. In fatal cases the coma deepens, the pulse becomes feeble, rapid and irregular, the breathing hurried and shallow and death occurs in a few hours. Favorable cases are indicated by a fall in the temperature and by the return of consciousness. In these cases recovery may be complete. In some cases the patient may never be able to stand even moderate degrees of temperature, which often produce excitement, headache and pain in the cervical region. Failure of the memory, and the loss of power to concentrate the mind are sometimes sequelæ. Meningitis, epilepsy and insanity are also sequelæ.

Diagnosis.—This presents little difficulty. The history and circumstances preceding the attack are very important in making the diagnosis. The diagnosis between heat exhaustion and sunstroke fever is readily made. In heat exhaustion the temperature is **lowered,** the pulse is feeble, consciousness is rarely completely lost; in sunstroke fever the temperature is extremely **high,** there is usually complete unconsciousness, and the pulse is full and rapid.

Prognosis.—This should be guarded, depending upon the severity of the case.

Treatment.—In cases of **heat exhaustion** remove the patient to a shady place and apply water to the face, chest and spine. Thoroughly treat the upper cervical region, in order to control the impaired vaso-motor centers and nerves. If the temperature

is below normal a hot bath should be given. Keep the heart and lungs stimulated.

In **sunstroke,** place the patient in a recumbent position and loosen all constricted clothing, and stimulate the heart's action. The high fever is to be met promptly. Place the patient in a bath of water, to which add ice freely. The patient may also be rubbed with ice, and ice water enemata may be employed. The muscles of the neck will be found contracted, probably due to cerebral hyperemia. A thorough relaxation of these muscles will be of great aid in equalizing the vascular system. It is a good plan to thoroughly relax all the muscles along the spinal column for the same purpose. When the temperature nears normal the baths should be stopped. After the temperature has been reduced place the patient upon a cot with ice to the head. The cervical treatment should be repeated as often as necessary. The diet of the patient should be liquid for a few days. Plenty of water and stimulation of the kidneys and bowels will be found beneficial. The sequelæ are to be treated according to the condition. Much can be done for the sequelæ of heat exhaustion and sunstroke. Lesions will be found corresponding to the regions involved. Deep contracted muscles are common.

PART SECOND.

INFECTIOUS DISEASES.

Fever.

Fever is due to various causes, so that a definite statement cannot always be given as to the cause of fever in every disease. Each fever case, like all other disorders, is a law unto itself; different causes are found in different cases. Moreover, often only theories, and not absolute facts, can be given.

Fever may be present when a local disease assumes a constitutional character or when the constitutional character is manifested from the beginning of the disease. Fever may be a systemic disorder or a symptom of disease, and is characterized by an increase of body temperature. Other symptoms are usually present, as an accelerated pulse, disturbances of distribution of the blood, increased katabolism, and disordered secretions.

Etiology.—In infectious diseases fever is due chiefly to the action of various toxic or harmful agents, produced by the disease, upon the fluids of the body and upon the nervous system. Disturbances of the thermogenic centers and nerves of the brain or cord by harmful agents, or by lesions of the anatomical structures affecting these nerves, are sources of fever. Also disurbances of the vaso-motor centers (in the medulla and auxiliary centers along the cord) and nerves are causes of fever in many instances. A disturbed or lessened function of the nerves controlling sweating is an important factor. The multiplication of micro-organisms in the body, acting directly on the tissues or by producing toxic substances which affect the nervous system, is a fruitful source of fever. A few cases may be caused by direct affection of the nervous system, as is shown by appearance of fever in epileptic attacks, or by the passage of a catheter into the bladder. In a large number of all cases a demonstrable cause can be found upon careful examination, whether the fever be due to a necrosed mass of tissue, the introduction into the system of decomposed food, infectious diseases, a lesion of some anatomical structure affecting a thermogenic, vaso-motor or sweat center, a

lesion to the innervation to the heart (vagi and cervical sympathetic) causing a rapid heart, or a lesion to the lymphatic system.

Treatment.—The treatment of fevers in a general way consists principally of thorough inhibition to the posterior spinal nerves of the upper cervical region in order that the center of the vaso-motor system in the medulla may be effected, probably by the way of the superior cervical ganglion of the sympathetic. Thus the entire vascular system is equalized, for there is always a disturbance in the distribution of the blood in fever and if the center controlling the nerves that govern the lumen of the blood-vessels can be brought under control, there will result an equalization of the vascular system; if such occurs, health must ensue. Besides the vaso-motor nerves to the blood-vessels being effected by this treatment, the nerves governing the lymphatics and the sweat glands will also be controlled. The sweat glands as a rule are rendered active by effecting directly the innervation of the glands, also the glands are controlled indirectly by the blood supply; this aids materially in lessening the temperature of the body. Treatment for a few minutes to the upper posterior cervical region would also effect the thermogenic centers and nerves of the brain reflexly in the same manner as the vaso-motor and sweat centers and nerves are effected, thus tending to equalize the mechanism of the thermogenic system. Besides this action on the vaso-motor, sweat, and the thermogenic nerves, there is produced an increased exhalation of moisture from the lungs, on account of an increase of vascular area in the lungs through vaso-motor action. Also the large vascular area in the abdomen, under control of the splanchnic nerves, becomes constricted. Thus there is brought about a lessening temperature by evaporation, heat radiation, and perspiration; and an increased action of the general nervous system, a stronger cardiac force, an equalization of the vascular system, and a more perfect elimination of toxic properties by the skin, kidneys and lungs; consequently a reduction of the fever.

The foregoing treatment is successful to a limited extent, only in such cases where causative factors of the fever are involving the predominating centers controlling the heat production or dispersion and the vaso-motor system directly; for if the lesion

that is causing the disorder should be affecting an auxiliary center along the spinal cord instead of the predominating center, as is oftentimes the case, treatment of the predominating center would be useless as far as any permanent benefit is considered; although a temporary effect will be gained by lessening the fever at that point. Consequently, in many cases, the lesion lies within the jurisdiction of auxiliary centers which are situated at various points along the spinal cord. When such is the case, it will be of little benefit to give the cervical treatment. In such instances the lesion to the auxiliary center would have to be removed in order to cure. One cannot depend upon a set rule to reduce a fever; determine the cause, as in any other disease or symptom, and remove it.

In addition to the treatment to the cervical region and along the spinal column, as are indicated upon an examination, attention should be given to the heart's action. The equilibrium between the accelerator and inhibitory nerves (cervical sympathetic and vagi) should be maintained. The interchange of gases in the lungs should be rendered as nearly normal as possible; this is best accomplished by raising and spreading of the ribs from the second to the seventh dorsals, particularly in the region of the fifth and sixth. Also stimulation of the vagi will aid by increasing the motor power of the lungs. The kidneys and bowels should be kept active so as to favor a rapid elimination of various toxic properties; besides they have control over large vascular areas. Treatment over the ureters will prevent any clogging that might occur in them from a condensation of the urine. Attention, also, should be given the tissues at the fifth lumbar and over the iliac vessels to influence the circulation in the pelvis.

The **food** of the patient should be liquid—milk, soup, broths, etc., and most any quantity of water allowed if called for, given little at a time and at frequent intervals. The room should be well lighted, ventilated, clean and kept at an even temperature.

Two points should always be remembered relative to fever:

First—That there are many causes of fever; and in order to reduce the fever the cause must be determined and removed, the same as in any disorder. A definite fever treatment cannot be

given any more than a definite constipation treatment; the case must be seen in order to determine the cause.

Second—The reduction of fever is not necessary; the fever should be treated only as a symptom of disease when it exists as such. In fact, fever is beneficial, for it is one of nature's methods to relieve an over-burdened system from harmful agents, unless the temperature is excessive and continuous and is likely to cause more harm than the primary trouble.

Hydrótherapy is of immense value in reducing a fever. It is an agent that has been greatly used, and if applied intelligently cannot but be of aid. There is much ignorance in regard to the principles and practice of hydrotherapy, not only among all classes of people, but among other well informed practitioners in medicine. The most important function of the skin is as a heat regulator. Knowing this fact, the osteopath treats the vaso-motor nerves that control the cutaneous circulation and the nerves that control the excretion of the skin; the nerve supply being from the cerebro-spinal and sympathetic nerves. In many difficult and obstinate cases hydrotherapeutic measures should be used to aid the skin in regulating the temperature, as well as to enhance system functions for the same reason that osteopathic manipulations are given. Maintaining an equilibrium in heat production and heat dispersion is necessary in order that the standard of the body temperature may be kept; and the amount of the arterial blood circulating within a tissue determines its temperature.

The principal effect of water as a thermic agent when applied externally is due to the influence of the action of the water upon the cutaneous circulation. Lesser effects would be the mere extraction of heat from the body by evaporation and the equalization of temperatures of two bodies coming into contact. As the body is endowed with compensatory powers, this latter means would apply only to a limited extent. The temperature of the water used is important, as the colder the bath the less effective would its power be in reducing internal temperature. When a cold bath is used there is a driving of the blood away from the surface on account of the contraction of the peripheral vessels; consequently increasing the cutaneous circulation and cooling

by radiation is prevented and less heat is lost. A collateral hyperemia occurs in the underlying parts which acts as a protection to the deeper tissues. The cold also inhibits the vaso-motor nerves controlling the abdominal splanchnics, and thus a larger amount of blood passes to this immense vascular area. On the other hand, when a warmer bath is used the effect is opposite, and a lowering of the temperature is the result. The cutaneous vessels being dilated, the superficial blood is rapidly replaced by blood from the deeper vessels, thus allowing a cooling of the body to a large degree.

In the various fevers where hydrotherapeutic measures are employed, the object to be gained by such methods is not primarily an anti-thermic one but an anti-febrile reaction; consequently the use of cold water is employed. In mere heat reduction the warmer water would be more effective; but by the aid of the colder water the cause of the increased temperature, as in infectious fevers, is lessened; besides a refreshing and stimulating effect upon the entire system is gained. Thus the aim of the cold bath and friction, is not primarily to subdue the temperature by heat radiation or evaporation, but to correct disturbances governing the formation and the dissipation of heat caused by infectious fevers, and, moreover, to stimulate the nervous system, prevent heart failure, increase the eliminating power of the skin, kidneys and lungs, and to influence the corpuscular and chemical constituents of the blood to a more normal condition.

The full cold bath and friction (Brand Method) is commonly employed in infectious fevers. The half bath, wet pack, or sponging may be used. The modus operandi of each is given under the hydrotherapeutic treatment of typhoid fever.

Typhoid Fever.

In writing of these acute diseases which are self-limiting, it is understood that osteopathy aborts, overcomes symptoms and otherwise changes conditions frequently. When this occurs the case is not typical and it is a typical case which is here described.

Definition.—An acute, infectious disease due to a special poison; characterized anatomically by hyperplasia and by definite

lesions in Peyer's patches, mesenteric glands and spleen and parenchymatous changes in other organs; and clinically by its slow onset, early diarrhea, abdominal tenderness, tympanites, fever, headache, and rose colored spots on the abdomen.

Osteopathic Etiology and **Pathology.**—Lesions to the lower dorsal and lumbar regions are always found, which impair the innervation and vascular supply of the intestines and cause defective nutrition. This is the most important predisposing cause, although general lowered vitality from over-work, improper food, unhygienic environment, and insanitary surroundings, are also of great importance. It is possible that one's vitality may be so lowered that the bacillus of Eberth, if of sufficient numbers or virulency, will find a suitable medium wherein to multiply and grow, and thus the spinal lesions found in these cases are the result of reflex irritation. But the most probable underlying cause is the spinal lesion, and given two individuals with equal likelihood to infection, one with the spinal lesions and the other not, the former within all probability will be the more likely to suffer an attack. The severity and extent of the osteopathic lesion undoubtedly bears a direct ratio to the probability of attack from an infectious disease. Typhoid fever usually occurs between the ages of fifteen and thirty years. Some families are more susceptible than others. The autumn months, especially after a dry, hot summer, favor the disease. One may be reasonably certain that whenever there is a case of typhoid the individual has not been careful as to diet, or drinking water, or some rule of health, and wherever there is an epidemic it can always be traced to insanitary surroundings, the water supply, contaminated garden truck or other food, sewerage, etc.; although this does not preclude the probability that the osteopathic lesion or lowered vitality of Peyer's patches and mesenteric glands from other causes are important and many times primal etiological factors. The specific poison may be so virulent that practically no one escapes and again those of lowered vitality only will succumb to an attack.

The **exciting cause** is a special micro-organism, the bacillus of Eberth. The contagion may be carried through the air from

one person to another, but this is rarely the case. Though the water is the most common mode of conveyance, the bacillus has been found during epidemics in both water and milk. The water may be comtaminated by the intestinal discharges which have not been properly disinfected. Extreme cold does not destroy the typhoid germs. Milk may be infected from the milk-can being washed with the comtaminated water or the unclean hands of the milker. In fresh milk the germs multiply rapidly. Salads, celery, ice and fruits may be comtaminated. Oysters have become infected while being fattened or freshened. It is thought by some that the poison is not eliminated from the sick in a condition capable of transferring disease to a healthy person, but must undergo changes in the soil before it is able to cause the disease in another. Typhoid fever may be caused, however, by direct contact with the stools. Filth, sewers, or cesspools do not directly cause the disease, but they form a suitable medium for the preservation of the typhoid germs.

Pathologically, the characteristic lesions in typhoid fever consist of changes in the lymphoid elements of the bowels. These changes are most striking in the solitary glands and Peyer's patches. The alterations which occur may be divided into four well defined stages: (1) **Infiltration**—the glands are enlarged from infiltration and there is marked cell proliferation, particularly Peyer's glands in the jejunum and ileum and to a lesser extent those in the large intestine. The glands become pale and prominent. Occasionally the solitary glands, which are usually deeply imbedded in the sub-mucosa, become prominent also.

Microscopically, the capillary blood-vessels are at first considerably dilated, but later become more or less contracted, giving an anemic appearance to the follicles. The adjacent mucosa and muscularis may become infiltrated. The cells have the character of lymph corpuscles, some of which are larger, epitheloid in character, containing several nuclei. From the eighth to the tenth day this medullary infiltration reaches its height and then undergoes either resolution or necrosis.

(1) **Resolution** takes place by a granular or fatty degeneration of the cells, which are destroyed and absorbed. This produces

pitting of the swollen follicles, which may cause small hemorrhages.

(2) **Necrosis.**—With all the severe cases of cell infiltration, hyperplasia of lymph follicles reaches a stage where resolution is impossible and necrosis occurs. The necrosis is partly due to the choking of the blood-vessels and partly to the direct action of the bacilli. The necrosis may involve only the superficial layers of the mucosa or it may extend deep into the muscular coat and even perforate the outer or serous coat. Usually, however, this does not extend below the submucosa, mucosa, or muscularis. Not all of the patches necessarily slough, but as a rule it is always more intense toward the ilio-cecal valve.

(3) **Ulceration.**—The extent and depth of the ulcers are directly proportionate to the amount of the necrosis. Large ulcers are sometimes formed, especially in the lower end of the bowel, by the union of several. The edges are swollen and undermined. The base is usually clean and smooth and formed of submucosa or of the muscularis. Perforation of the bowels occurs in a small percentage of cases; more commonly the ulcers heal. The perforations may be multiple, but rarely exceed two in number.

(4) **Healing.**—Cicatrization begins about the fourth week. This granulation tissue covers the floor. It is sometimes formed with connective tissue and a new growth of epithelium results. The gland is ultimately replaced by a depressed scar with a smooth, pigmented surface. The majority of deaths occur before this stage is reached. The gland structure is never regenerated.

The **mesenteric glands** show intense hyperemia and later become enlarged and softened, but rarely ruptured. The glands at the lower end of the ileum are especially involved.

The **spleen** is invariably enlarged and softened, even diffluent. Occasionally rupture occurs spontaneously, or as the result of injury. Infarction is not a rare occurrence.

The **liver** shows parenchymatous and granular degeneration and the cells are found to be loaded with fat upon microscopic examination. Infarction abscesses and acute yellow atrophy occur in rare instances. Diphtheritic inflammation of the gall-bladder sometimes occurs and the bile is thinner and paler than normal.

The **kidneys** also show parenchymatous degeneration. They are pale in appearance, with slight cloudy swelling. Microscopically, there are seen granular and fatty degeneration of the cells of the convoluted tubules. Rarely, there is acute nephritis which may be hemorrhagic. There may be miliary abscesses in which typhoid bacilli have been found by some observers. Diphtheritic, but more frequently catarrhal, inflammation of the pelvis of the kidney may occur. Catarrh of the **bladder** is not infrequent and even sometimes diphtheritic inflammation is present. Rarely orchitis is encountered.

Hypostatic congestion of the **lungs** is not uncommon. Gangrene and hemorrhagic infarction are sometimes present. Lobar pneumonia may be found early in the disease.

Pleurisy is not often met with. Fibrinous pleurisy and empyema are rare events.

In the **larynx** ulceration is sometimes met with; bacilli, however, have not yet been found in these ulcers. Diphtheritis of the pharynx and laryxn is not uncommon. Catarrhal or croupous pharyngitis may occur; while swelling of the follicles of the pharynx and base of the tongue is frequently noticed.

Peritonitis is always present in fatal cases in which perforation of the bowel has taken place. The perforation may occur in ulcers from which the sloughs have already separated, or it may be caused by a necrosis of all the coats. Extensive peritonitis may occur without perforation, and is probably due to extension of the inflammation to the peritoneum.

The **heart** may be affected. Endocarditis is rare, while pericarditis is much more frequent. Myocarditis is frequently met with, the cardiac muscles presenting parenchymatous and rarely hyaline degeneration. It is noticeable that the cell fibres present little or no change, even in cases of death from heart failure. The **arteries** are frequently found to be involved. These conditions (obliterating arteritis and partial arteritis) may affect the smaller vessels, especially those of the heart, but more commonly affect the arteries of the lower extremities. Thrombosis of the veins, especially of the femoral, and more rarely of the cerebral veins and sinuses, occurs.

Granular and hyaline changes in the voluntary **muscles** may occur. This degeneration does not affect the whole muscle but involves only certain fibres. Regeneration takes place during convalescence.

With the nervous system meningitis is exceedingly rare. The peripheral **nerves** are frequently the seat of parenchymatous changes, even when there have been no symptoms of neuritis. The ganglia of the trunks of the vagi present an inflammatory change.

The **blood** presents little change. During the first two weeks the red corpuscles gradually decrease in number until the first week of convalescence, after which they gradually increase in number. There is often a marked decrease in the number of leucocytes. Leucocytosis is absent. The hemoglobin is always reduced.

Symptoms and Course.—The incubation period varies from a few days to two weeks or longer. During this time the patient may feel in his usual health, but more often there is a feeling of langour and indisposition to exertion, loss of appetite, slight coating of the tongue, nausea, headache, chilliness, but seldom a decided rigor, pains in the back or legs and nose-bleeding. Any of these symptoms may be present and last usually from a few days to a week or more. These symptoms increase in severity and the patient takes to his bed. The invasion as a rule is gradual.

The **first week** dates from the onset of the fever which generally (but by no means in all cases) rises steadily during the first week a degree or a degree and one-half each day, reaching 103 or 104 degrees F. The pulse is quickened to 90 to 110 per minute and is full, of low tension and sometimes dicrotic. There is great thirst also a coated tongue. The skin is hot and dry and there is rather intense headache. Unless the fever is high there is no delirium. The sleep is disturbed and there may be mental confusion and wandering. Cough with some thoracic oppression is not uncommon at the onset. The abdomen is slightly distended and tender. The bowels may be constipated or there may be three or four loose movements a day. The spleen is somewhat

swollen and a rose colored rash appears on the skin of the abdomen and chest.

During the **second week** the fever remains high and exhibits the continued type, the morning remission being slight. The pulse is accelerated and loses its dicrotic character. The headache disappears, but there is marked mental dullness and slowness and there may be a mild delirium at night. The tongue is coated and may be dry; the lips are also dry. The abdomen is tympanitic and tender. Diarrhea replaces constipation. The case may prove fatal during this week from the result of pronounced nervous or pulmonary symptoms, hemorrhage, or perforation.

The fever changes in the **third week** from a continuous to a remittent type. The pulse ranges from 110 to 130. Loss of flesh is now more marked and weakness is pronounced. Unfavorable complications may arise during this stage, as pulmonary symptoms, increased feebleness of the heart, intestinal hemorrhage, perforation, and peritonitis.

In favorable cases during the **fourth week** the fever begins to decline and the general and local symptoms gradually disappear. The diarrhea stops, the tongue clears and the patient wants food. In protracted cases the **fourth** and **fifth** weeks may present the symptoms of the third week. Frequently the following aggravated symptoms being added: stupor, low muttering delirium, subsultus, increased weakness, rapid, feeble pulse, dry tongue, distended abdomen, and urine and feces are passed involuntarily. Heart failure and inflammatory complications increase the danger.

During the **fifth** and **sixth weeks** a few cases will show irregular fever. About this time relapses or slight recrudescences of the fever may occur.

Special Features and Symptoms.—The fever is the most important and characteristic symptom and from the temperature alone a diagnosis may be made. During these stages of development, which is the first four or five days, the temperature rises steadily; the evening temperature being about a degree or a degree and one-half higher than the morning remissions, reaching 104 or 105 degrees F. at the end of the first week. When the **fastigium** is reached the fever persists with slight morning remissions.

At the end of the second and throughout the third week the temperature becomes more remittent and there may be a difference of three or four degrees between the morning and evening temperature. During the last stage the fever falls by **lysis,** forming a more or less regular step-like line of descent. The stage lasts from one week to ten days.

When the disease sets in with a severe rigor the fever frequently rises at once to 103 or 104 degrees F. The first stage of the gradual step-like ascent is rarely seen by the osteopath, as the cases do not come under his care at this early stage. In the lightest forms the fastigium may be almost absent; defervescence setting in upon the first day of the fastigium and in many cases defervescence occurs at the end of the second week and the temperature may fall rapidly, becoming normal in ten or twenty hours. This fall in the temperature may take place without any apparent cause or it may follow an intestinal hemorrhage. The temperature often falls many hours before the blood appears in the evacuations. The occurrence of peritonitis is also marked by a sudden fall in the temperature. **Hyperpyrexia** in typhoid fever is not very common except just before death.

After the temperature has been normal for several days there may be a sudden rise of the temperature to 102 or 103 degrees F. This may persist for a couple of days and then return rapidly to the normal. These **recrudescences**, as they are called, are quite common and are caused most frequently by errors in the diet, constipation, excitement or mental emotion. These elevations in the temperature are found most frequently in children and persons of a nervous temperament.

Afebrile Typhoid is of very rare occurrence. The patient has all the characteristic symptoms of typhoid fever with the exception of a fever.

The **rash** is highly characteristic. It appears about the eighth or tenth day, usually upon the skin of the abdomen or chest, rarely found elsewhere on the body. It consists of a variable number of rose colored spots distinctly elevated, and disappear on pressure. These spots last three or four days and appear in successive crops. Vivid red erythematous eruptions upon

the chest and abdomen are commonly seen during the first week of typhoid fever. Urticaria is rarely seen.

Sweating characterizes some cases of typhoid fever, but generally the skin is dry. This may occur with or without chilly sensations or actual rigors. In some cases there may be recurring paroxysms of chills, fever, and sweats and they may be mistaken for intermittent fever. Edema of the skin may occur and is usually due to anemia or cachexia and sometimes to nephritis. Local edema may occur as the result of vascular obstruction, particularly thrombosis of the femoral vein. There is a peculiar musty odor exhaled from the skin in typhoid fever, particularly if the skin has been neglected. In all protracted cases **bed-sores** are likely to develop. The **hair** is apt to fall out but is generally renewed. The nails also suffer and ridges can usually be observed upon them.

Intestinal symptoms are very inconstant. Usually there is constipation at the onset and this may persist throughout the disease although a moderate diarrhea may occur throughout the disease. The severity of the diarrhea is due most probably to the degree of the catarrh rather than to the extent of the ulcers. It is probable that the discharges are more frequent when the catarrh involves the large intestine. The number of discharges average, as a rule, from two to four or more daily. The stools are either fluid or of the consistency of jelly, of a grayish-yellow color, alkaline in reaction and are very offensive.

Hemorrhage from the bowels is a serious symptom, but by no means always fatal. This usually occurs in cases of considerable severity and it generally occurs at the time of the separation of the sloughs during the third week. When it occurs quite early in the disease it is generally the result of intense hyperemia. It may be so slight as not to be noticed by the eye or it may be from one to three pints. Intestinal hemorrhage, however slight, is alalways a grave symptom and it usually comes on without warning; or the patient may experience a sensation of sinking or collapse and the temperature falls.

Meteorism is an almost constant symptom, and when excessive adds to the seriousness of the case and corresponds generally

with the extent of local lesions. It pushes up the diaphragm and interferes with the action of the heart and lungs. It also favors perforation. Abdominal tenderness and gurgling upon pressure in the right iliac fossa may be present; pain is generally absent, and when present is usually slight.

Perforation almost invariably causes fatal diffuse peritonitis and is the most serious complication. It may occur at any time but is most common between the second and fourth weeks. It is usually indicated by sudden acute pains in the abdomen and symptoms of collapse. As a rule symptoms of **peritonitis** appear at once; distension of the abdomen, great tenderness, and rigid abdominal walls. Vomiting, pinched features, and rapid, small pulse show general collapse of the circulatory system. Recovery is rare but is possible. Peritonitis may occur without perforation by extension of inflammation from the ulcers.

The **spleen** is invariably enlarged and generally goes on increasing in size up to commencement of the third week. The edge is felt just below the costal cartilages. Rupture of the organ may occur spontaneously or as the result of a slight blow, but this is of rare occurrence. Infarcts and abscesses are sometimes found.

The **liver** can sometimes be felt to be enlarged. Jaundice and abscess of the liver are rare complications.

Gastric symptoms, as nausea and vomiting, may occur at any stage of the disease but is most common at the onset. Persistent vomiting is a serious symptom and death may occur from exhaustion.

The **pharynx** is frequently the seat of catarrhal irritation. There may be merely a dry, burning sensation. The **tongue** at first is moist, swollen, and coated with a thin white fur; later the edges clear off, while the center becomes very dry and covered with a brown or brownish-black fur. It is sometimes fissured. The lips become dry and the lips and teeth may be covered with dry, black sores. Ulcerative stomatitis often occurs if the mouth is not kept clean. Parotitis is not infrequent and the sub-maxillary gland may also be involved.

Epistaxis occurs early in most cases and is the most common

febrile affection. When it occurs during the fastigium it is a grave symptom.

Laryngitis is an occasional complication. Laryngeal ulcers and parichondritis may occur.

Bronchitis is almost invariably present as an initial symptom. It is indicated by the existence of sibilant rales. The cough is generally slight.

Hypostatic congestion of the **lungs** and edema, due to enfeeblement of the cardio-pulmonary circulation, in the latter part of the disease are not infrequent. The physical signs are defective resonance or dullness at the bases, broncho-vesicular breathing, and moist rales.

Lobar pneumonia in a few cases develops early. There may be a marked rigor at the onset, sudden rise in temperature, pain in the side, and all the symptoms of lobar pneumonia; characteristic typhoid symptoms, however, soon follow and the pulmonary symptoms soon leave. Lobar pneumonia frequently develops during the second or third week, when it forms a serious complication. The symptoms are not marked; there may be no rusty expectoration, chill, or pain in the side and hence the condition is easily overlooked. Pulmonary infarction, abscess or gangrene of lungs are occasional complications.

The **heart** sounds are at first natural, but in severe cases the first sound may grow quite feeble or be gradually annihilated. Sometimes a soft systolic murmur is heard at the apex. Pericarditis and endocarditis are rare complications, while myocarditis is more common.

The **pulse** as a rule is not very frequent and is generally not in proportion to the fever until late in the disease; 90 to 120 is the usual range. During the first week it is about 100, full, and frequently dicrotic; later it becomes more rapid, feeble and small. In severe cases during the extreme debility of the third week the pulse may reach 150 or more (the so-called running pulse). During convalescence the pulse occasionally becomes subnormal and bradycardia is met with more frequently than after any other acute fever.

Venous thrombosis occurs most frequently in the left femoral

vein. This complication is not a very unfavorable one, but occasionally the thrombosis may extend into the pelvic veins or even into the vena cava, which makes it more serious. Sudden death has been caused by detachment of a thrombus. Thrombosis of the femoral vein causes swelling and edema of the affected limb. Gangrene, however, never results from obstruction of the vein above.

Obliterations of the large or small arteries is a rare complication and may be due either to embolism or to thrombosis. As a general rule it is the femoral artery that is involved, and gangrene of the foot and leg is the result. It is not known whether the thrombosis is caused by a peculiar condition of the blood which favors clotting or to a local arteritis; possibly it is a combination of these two factors.

The **blood** presents definite changes, some of which are important. In cases where there is profuse sweating or copious diarrhea, the red corpuscles may be relatively increased; this is due to the loss of water. In most cases there is little change until the end of the second week. During the third week there is generally a decrease in the number of corpuscles and of the hemoglobin, which is always reduced. **Leucocytosis** is always absent. The white corpuscles are slightly diminished especially toward the end of convalescence.

During the first week there is generally persistent headache, sometimes neuralgia. There are a few cases in which the effects of the typhoid bacilli or their poison is manifested in the **nervous system** from the very onset. There are violent headaches, retraction of the head, rigidity, photophobia, twitching of the muscles, rarely convulsions, all indicating meningitis for which it is invariably diagnosed. It must be remembered however that all nervous symptoms may occur independently of a lesion of the nervous system.

Delirium may exist from the onset, but it usually is not present until the second or third week and only in the severer cases. As a rule it is most marked at night. It is generally of the low. muttering type, very seldom maniacal. When the patient picks at the bed clothes or grasps at imaginary objects there is indica-

tion of danger, as it is a serious symptom. Convulsions are rare.

Of the **nervous complications** and **sequelæ,** paralysis is the most common and is due to neuritis. Extreme sensitiveness of the skin and muscles is common during convalescence. Mental weakness and even insanity may follow and is more common after typhoid than after any other disease. This is probably due to impaired nutrition and weakening of the nervous centers. Neuralgia affecting the occipital and cranial nerves is frequent both during and after the disease.

The **urine** is diminished in quantity, high specific gravity, and of dark hue. Both urea and uric acid are increased and the chlorids are diminished during the first stages. About the stage of decline the urine becomes light in color and greater in quantity than normal. The specific gravity is lowered, urea and uric acid are diminished, and the chlorids are increased. Febrile albuminuria is very common but of no special significance. Acute nephritis may develop as a complication. Diabetes mellitus, in rare cases, may develop after typhoid. Pyuria is not an uncommon complication and post-typhoid pyelitis may also develop. Simple catarrh of the bladder is rare. Orchitis is sometimes met with during convalescence.

A multiple **arthritis** occasionally occurs. Mono-articular arthritis is more common and often precedes suppuration. Necrosis of the bones may occur during the fever, but usually it is during convalescence, the favorite seat being the ribs and tibia.

The **muscles** may be the seat of hyaline degeneration, and abscesses may form in the muscles.

Associated Diseases.—Erysipelas is a rare complication, coming on most frequently during convalescence, although it may appear during the height of the affection.

Malarial fever may be associated with typhoid, especially in malarial districts. Persons with tuberculosis, epilepsy, chorea, and other forms of chronic nervous diseases are liable to typhoid fever. In epilepsy and chorea the movements and fits usually cease during the attack of typhoid fever.

Pseudo-membranous inflammation may affect the larynx,

pharynx, and genitals. Measles, chicken-pox, and scarlatina may also arise.

Varieties of Typhoid.—These are numerous and are named with reference to the degree of severity which varies from extreme mildness to extreme severity.

The **mild** or **abortive** form is of frequent occurrence. The onset is usually sudden. The symptoms are similar to those of a typical case but much milder and appear earlier than in the usual type. This form runs its course in about two weeks. The fever usually reaches 104 degrees F.

In the **severe** or **grave** form there is high fever and the nervous symptoms show a profound intoxication of the system. The grave types are those associated with serious complications or those cases which set in with pneumonia, Bright's disease, or cerebro-spinal symptoms.

In the **latent** or **ambulatory** form (walking typhoid) the symptoms are very slight, the patient being hardly sick enough to go to bed. The symptoms may be of this character throughout the attack, and the patient may be able to be up and about. In other cases the first symptoms are very mild, but later they may develop symptoms of the severest type.

The **Afebrile** form is exceedingly rare. **Hemorrhagic** typhoid is a very fatal but rare form. In this type there are cutaneous and mucous hemorrhages.

Diagnosis.—As a general rule typhoid fever is easily recognized. The Widal test should be made. At times the diagnosis may have to be delayed until the distinctive signs appear, especially in those cases which come on with severe headache, delirium, twitching of the muscles, and retraction of the head. In these cases the diagnosis of cerebro-spinal meningitis is invariably made, until the appearance of the colored spots on the abdomen, which must decide the diagnosis; cerebro-spinal meningitis being a rare disease and typhoid fever with severe nervous symptoms quite frequent, it is more probable that it is typhoid. At least one-half of the cases termed brain fever belong to this class of nervous typhoid.

Prognosis.—A positive prognosis can not be made, as even

the mildest cases are liable to have severe complications develop at any stage of the disease. Under osteopathic treatment the prognosis is undoubtedly more favorable than with the treatment of the older schools. If the osteopath can see the case early, the first week, there is always a chance to abort the attack. In all cases there is the probability that the attack will be shortened; this is a common experience. Price of Mississippi, has treated over one hundred cases, and invariably when the patient is seen early the attack has been shortened to thirteen or fourteen days, whereas under other treatment the disease runs the usual course. Adsit of Kentucky, White of New York, and the staff of both the A. T. Still Infirmary (Kirksville) and Sanitarium, (St. Louis), as well as many others, have had the same experience. And if the attack cannot be aborted or shortened there is the further probability that the severity will be lessened and complications prevented. The prognosis is always more favorable in winter than in summer, and especially favorable in children. More women die than men, and fat persons stand the disease badly.

Treatment.—Typhoid fever is one of the diseases that practitioners of all the schools are agreed that drug therapeutics avail but little in its treatment. The treatment of the older schools consists of prophylaxis, good nursing, attention to hygienic principles, dieting, and hydrotherapy. All of these have their places and are recognized by the osteopathic school. But the above methods are of the defensive only—allowing the disease to run its usual course and reducing the likelihood of complications. On the other hand the above treatment coupled with osteopathy, not only attacks the ravages of the disease defensively, but of more importance, the disorder is attacked offensively. Herein is where attacks are aborted, or shortened, or severity lessened, or complications prevented. The efficacy of osteopathy is due to the ability of the osteopath to treat disease, not only prophylactically and palliatively, but of more consequence, aggressively.

The correction of the spinal lesions in typhoid fever is of first importance. This treatment effects a tendency toward equalized circulation of the intestines. The vaso-motor nerves are disturbed by the above lesions which in turn produces stasis

in Peyer's patches and the mesenteric glands. Reversely some of the spinal lesions may be due to reflex stimuli, for "Kirk..... states that muscular contractions produced by reflex activity are often more sustained than those produced by direct stimulation of the motor nerves themselves."[1]

Prophylactic treatment is very essential, for typhoid fever as a rule is a preventable affection. Modern hygienic resources enable a community to reduce the number of cases to a minimum. The number of cases in a locality depends almost directly upon the condition of the water supply and drainage. Care should always be taken in regard to the source of drinking water and milk. During an epidemic the water should be boiled for half an hour before being used. The patient should be isolated. In hospitals they should have special wards; in families a special apartment should be given them. Hygienic principles should be followed as in other infectious diseases.

The methods of disinfection must be rigid to prevent the spread of an infection. The excreta (stools, urine, vomitus, and sputum) are to be received into a bed-pan or any appropriate receptacle containing half a pint of carbolic acid (one to twenty). Three or four pints of the carbolic acid (one to twenty) should then be added to the bed-pan and the contents mixed carefully before emptying. All utensils used in handling the excreta are to be carefully disinfected by the same material, and dried. After every stool the nates of the patient should be cleansed by a cloth compress, wet with a solution of carbolic acid (one to forty) and the cloth burned. The sick room should be thoroughly ventilated each day. All utensils used about the patient in feeding should be boiled in water immediately after using. The bed and body linen is to be changed as soon as soiled and these, with all changed bath towels, blankets and rubber sheets, should be received in a sheet rinsed in carbolic acid (one to forty) and placed where they may be soaked in the solution for four or five hours. The clothes are to be boiled for half an hour. The rubber blanket is to be washed in the solution, dried and aired.

The **General Management,** careful nursing and a regulated

1. Hinckle—The Scientific Basis of Osteopathy.

diet, is of paramount importance in the treatment of typhoid fever. The patient should be placed in bed as soon as the disease is determined and there remain until the end of the attack. The room should be well ventilated and have a sunny exposure if possible. The single woven wire bed with soft hair mattress and two folds of blankets is best. A rubber cloth should be placed smoothly under the sheet. When a good nurse cannot be had, the attending osteopath should write out directions regarding diet, bed linen, and utensils, and the disinfection of the excreta.

A liquid **diet** should be administered. Milk is most commonly used; care being taken that it is thoroughly digested. If milk is not borne well by the patient, other foods, as whey, sour milk, buttermilk, and broths may be substituted. Give food that is easily digested and which leaves but little residue. When milk is used alone, three pints at least may be given to an adult in the course of twenty-four hours; and it should always be diluted, preferably with plain water. Beef juice, mutton or chicken broth may also be used when milk is not agreeable. Albumin water, prepared by straining the white of eggs through a cloth and adding an equal amount of water, is an excellent food. Well strained, thin barley gruel is considered by many an excellent food for typhoid fever patients. Cases not able to take nourishment into the stomach, on account of vomiting and other causes, should be fed rectally to support life. Do not force feeding to an unwarranted degree.

The best drink for fever patients is pure, cold water and they should be encouraged to drink freely of it. Barley water, ice tea, lemonade, or even moderate quantities of coffee or cocoa, may be given.

By **Osteopathic Treatment** many cases of typhoid fever may be aborted, if treated correctly, during the first week. If the stage of necrosis of Peyer's patches has set in, one can either lessen the severity of the attack or, at least, shorten the usual course. During the stage of infiltration, treatment to the intestinal splanchnics (chiefly from the ninth to twelfth dorsal, the innervation to the jejunum and ileum) and careful treatment over the abdomen

is indicated. This treatment will tend to lessen the intestinal catarrh and diminish the infiltration and cell proliferation of the lymphoid elements of the intestines, and thus render unfavorable the conditions that are necessary for the bacillus of Eberth. In other words, increase the tone and activity of the intestines so that the micro-organisms of typhoid fever will not find the proper tissue-soil in order to grow and multiply.

All cases of typhoid fever present lesions in the dorsal or lumbar spine and this is really the great predisposing cause of typhoid fever. Correcting these lesions is absolutely necessary in order to abort the disease. Some patients may have such a lowered vitality to begin with that the recuperative powers of the body cannot be rendered forceful enough in a short time to combat the effects of the micro-organism. Carefully raising the cecum is very effective (A. T. Still), but this must be done with the greatest of caution and judgment. Dr. Still considers a posterior condition of the third, fourth and fifth lumbars as typical in typhoid and that it inhibits the lymphatics to the intestines.

R. L. Price has had excellent success in shortening the usual typhoid course. His first treatment is to thoroughly empty the bowels by enemata. This is followed by spinal, liver and splenic treatment, and a liquid diet.

E. C. White has also treated a large number of typhoid cases with marked success. He prefers to employ the Brand method (and it must be properly used) from the start. He is, also, a thorough advocate of the spinal treatment. In cases of constipation give a very light treatment over the left iliac fossa. With all patients observe careful dieting. White believes that many lesions of the spine arise from reflex irritations during acute attacks. Careful, frequent attention to the spine is demanded.

Hildreth, relative to abdominal and spinal treatment, writes as follows: "In the abdominal treatment of typhoid fever, too much care cannot be exercised; or in the spinal treatment, too much judgment used in giving just the right kind of manipulation. There can be no question relative to the seat of the disease, and consequently there should be no trouble in knowing where or how to effect the nerves to control the same. That

Peyer's patches or the right iliac region is always involved, we all know. The spinal treatment should be applied from the eighth dorsal to the first lumbar inclusive; this effects all the lesser splanchnics and thus controls the circulation of the entire bowel. And this treatment should be given, according to the symptoms indicated, in each and every case. If the patient is constipated, then the treatment should be more of a stimulative character, but if diarrhea is present, as is commonly the case, the treatment should be an inhibitory one. In the above I always finish with a very careful treatment of the floating ribs on the left side; this effects the lesser splanchnics nerves. In all cases I always carefully treat the lower two or three lumbar vertebræ, which directly effects the hypogastric plexus of nerves, and thus controls the circulation to the lower bowel.

"In all cases I always treat the bowels directly, more or less, but this treatment **must** be given with the very greatest **care** and the best judgment, always governed by the condition of the bowel. By no means manipulate the bowel, but just lay your hands flatly on the abdomen, and with the most gentle pressure inhibit the peripheral nerves, thus either quieting an excited peristalsis or equalizing a disturbed circulation. And with this treatment remember that the two specific points in typhoid fever are the lower dorsal and lower lumbar nerves.

"The above treatment is used, of course, in connection with all the other necessary treatments, such as dieting, nursing, sponging, relieving the headaches, etc. I am unalterably opposed to ice-packs for the bowels in typhoid, for the reason it is too much of a shock. Cold cloths are good and much better than ice, and should always be used instead of ice."

After the disease has become thoroughly established always make it a point during each visit to examine the entire length of the spinal column carefully and readjust any tissue, whether it be vertebra, rib, or muscle, that may be found disordered. The bowels are to be watched carefully and if constipated, they should be moved with a light enema. Great care must be taken not to treat the abdomen roughly, if at all, after the first week. The treatment might be very injurious to the structures diseased.

A light treatment over the liver and kidneys each time is a wise precaution. The heart's action should be watched carefully. In addition to the hydro-therapeutic treatment, the general fever treatment should be employed. The patient should usually be seen twice a day.

Abdominal pain is best relieved by light treatment over the abdomen and by thorough treatment of the lower dorsal or lumbar region. Applications of hot water will be helpful.

Meteorism can be relieved by raising the lower ribs and by direct treatment to the abdomen. A change of diet may be beneficial. When gas is in the large bowel an enema may be given to remove it.

Diarrhea and **constipation** are best controlled by the usual treatment given the spine in such cases, and over the abdomen and the liver. Light enemata may be given for constipation. The stools should be examined when diarrhea occurs, as the presence of curds may cause the aggravation.

Hemorrhage from the bowels demands absolute rest and a careful use of the bed-pan. It is probably better to have the patient use the draw sheet for the evacuation. Immediate and thorough treatment must be given to the spinal column in the region of the intestinal nerves to the diseased area, so that existing lesions may be corrected and the vascular area of the mesentery equalized. Ice should be given freely and an ice-pack placed over the abdomen. Food should be restricted for ten or twelve hours. If the peristalsis of the intestines is increased, an effort should be made to control it through the vagi and splanchnic nerves.

When **peritonitis** occurs from **perforation**, the case is usually hopeless, although recovery has taken place. The indications are to lessen the inflammation. Hot applications, rest and thorough treatment of the innervation to the peritoneum is necessary.

Insomnia is best relieved by attention to the cervical region. Relaxation of the muscles in this region and a quieting treatment to the posterior occipital nerves, coupled with cold sponge baths, will usually induce sleep.

In **delirium** attention to the circulation of the brain, by care-

ful treatment of the vaso-motor system, and the Brand method of baths will relieve this distressing symptom.

During **convalescence** the patient should be restricted from any mental or physical exercise for a week or ten days and then should move about with care. Solid food should not be given for ten days or two weeks. The question of food is a troublesome one, for the patient has a ravenous appetite and is extremely anxious for a fuller diet. If the temperature has been normal for ten days, it is then safe to allow such food as eggs, milk puddings, and milk toast. If diarrhea should persist, being due to ulceration, the diet should be restricted and the patient confined to the bed. If constipation is troublesome relieve it by enemata.

There are several beneficial effects obtained by **hydrotherapeutic measures** that should receive careful consideration. Probably it is of the least significance to lower the temperature; other beneficial effects being of greater importance. When the baths are systematically carried out, there is obtained: (1) a general improvement of the nervous system, the mind is rendered clear, muscular twitchings are lessened, sleep is induced and the heart's action strengthened; (2) the respiration is stimulated, thus diminishing the liability of lung complications; (3) the activity of the renal function is increased, consequently allowing more rapid elimination of toxic matter; (4) reduction of the temperature, and overcoming ill effects of high fever.

A cold water bath, or what is generally termed the Brand method, is commonly employed. The following plan is usually followed. When the temperature is above 102.5 degrees F., rectally, a bath of 70 degrees F. is wheeled to the patient's bedside and he is placed into it for ten or fifteen minutes. The patient should be lowered into the bath by means of a sheet. Enough water is used to cover the body and neck of the patient. The head is sponged and the limbs and trunk are rubbed **thoroughly** during the entire procedure. When the patient is taken out he is wrapped in a dry sheet and covered with a blanket. This procedure is gone through with every three hours if the case is severe, otherwise once every seven or eight hours will be sufficient.

The luke-warm bath is occasionally used in private practice when one is unable to use the Brand method. A bath of 90 degrees F. is employed, which is gradually cooled ten or twelve degrees, after the patient has been placed in it, by pouring cold water on the patient. This bath is found very helpful. Also in private practice the cold pack is found satisfactory. The patient is wrapped in a sheet wrung out of water at 65 degrees F. and cold water is sprinkled over him. Whenever there is objection to any of these methods the body may be sponged off with tepid or cold water when the temperature rises above 102.5 degrees F., rectally. One limb should be taken at a time and then the trunk, occupying altogether some twenty or thirty minutes.

See reports of typhoid fever in A. O. A. Case Reports as follows: C. M. T. Hulett, Series I, p. 7, J. H. Wilson, Series III, p. 3, F. E. and H. P. Moore, and F. A. and E. S. Cave, Series IV, pp. 4 and 5.

Mountain Fever.

Definition.—A form of fever which develops in high altitudes; characterized by moderate fever and a group of symptoms due to the effects of a rarefied air upon the respiration and circulation.

There is no definite etiology or morbid anatomy.

Symptoms.—The pulse is quickened, severe headache, gasping for breath, vertigo, sometimes nausea and vomiting, debility, and as a rule constipation, or diarrhea may occur. Epistaxis sometimes occurs.

The duration is from two to four weeks. Some authorities consider this a form of typhoid fever accompanied by the varied symptoms, due to the effect of high altitudes upon the organic functions. It must be borne in mind that high altitudes alter the characteristic symptoms of the acute infectious diseases.

Treatment.—The treatment of mountain fever is largely symptomatic. For special indications see treatment of typhoid fever.

Typhus Fever.

Definition.—An acute, infectious disease; characterized by sudden invasion, high fever, marked nervous symptoms, a pecu-

liar maculated and petechial eruption and a termination by crisis about the fourteenth day.

Etiology and **Pathology.**—Typhus fever is becoming less frequent than formerly and is rarely seen in this country. Filth, over-crowding, famine, intemperance and bad food are the predisposing causes. Although it is an infectious disease, no special micro-organism has yet been found. Typhus fever is highly contagious, but it is not yet known in what manner the contagion is transmitted. It is more probable that the poison is inhaled and enters the system through the respiratory tract.

Pathologically, there are no constant lesions. There is a general hyperplasia of the lymph follicles, but no ulceration. The blood is dark, thin and lessened in fibrin. Hypostatic congestion of the lungs and bronchial catarrh are frequently met with. The liver, kidneys and spleen are found to be somewhat enlarged and softened. The petechial rash remains after death.

Symptoms.—The **incubation period** lasts about twelve days, sometimes less. The invasion is usually sudden, ushered in by either a series of chills or a single rigor. The temperature quickly rises to 104 or 105 degrees F. There is headache, pains in the muscles, especially of the back, and early, profound prostration. The pulse is at first full and strong, but soon becomes weak and frequent. There may be distressing vomiting. The face is flushed, the eyes injected, the expression stupid, and there is generally low, muttering delirium. The tongue is furred and white, soon becoming dry. The bowels are constipated and the urine is usually scanty and of high specific gravity. There is great thirst.

The **eruption** appears about the third or fifth day. It first makes its appearance upon the abdomen and chest. It rapidly extends all over the body with the exception of the face. The eruption is of two kinds—rose spots, which disappear upon pressure, and those which become hemorrhagic (petechial); pressure has no effect upon them. During the second week the symptoms become more aggravated. The tongue is dry, brown and fissured, and sordes appear on the teeth. Retention of the urine, due to paralysis of the bladder, is common. The breathing becomes

more rapid and the heart's action more feeble; the patient may die from exhaustion. In favorable cases the crisis occurs at the end of the second week.

Convalescence is usually rapid, relapses rarely occur. The urine is scanty, high colored and frequently albuminous. Bed sores are common. The temperature continues high, reaching 106 degrees F., or more, with slight nocturnal remissions. In fatal cases the fever often rises to 108 or 109 degrees F. just before death.

Diagnosis.—The sudden onset, frequent chills, early profound prostration, character of the rash, history of exposure to the poison and unhygienic surroundings decide the diagnosis. During an epidemic there is usually no doubt, but in sporadic cases the diagnosis is sometimes extremely difficult.

Prognosis.—This is usually grave, but the mortality rate is being greatly reduced in consequence of the better sanitary arrange ments.

Treatment.—Typhus fever is highly contagious and great care should be taken in controlling the disease. So far as known none of the osteopaths have had experience in the treating of typhus fever osteopathically, but there is no reason why the disease should not be treated with the same success as met with by osteopathic treatment in other diseases. It is claimed that the disease should be treated in the open air, in tents, as the recovery of the patient and the safety of the attendants are greatly favored.

The osteopath would here, as in all cases of diseases, examine the patient for anatomical disorders and wherever they are found would proceed to readjust them. There are no lesions that are characteristic of typhus and consequently the treatment of the disease would of necessity be largely a symptomatic one. Isolation is necessary and the patient's excreta should be removed and disinfected at once.

For high temperature, besides the treatment given to remove any disorder that may be found, the general fever treatment is indicated, and hydrotherapy would also be of aid—sponging the surface of the body or the use of the bath. Asthenia is wherein the greatest danger lies, and a stimulating treatment along the

spine and to the heart should be given; although correction of the primary trouble may be sufficient. Hydrotherapeutic measures, the systematic use of the cold bath, would be of service the same as in typhoid fever.

Headache and delirium which are apt to arise, caused by too much blood in the head, may be relieved by treatment of the cervical spine. Also cold applied to the head will aid. The bowels should be watched carefully; treat the splanchnics thoroughly and the intestines and liver directly. Nourish the patient as in typhoid fever by nutritious liquids—milk, broths, etc.

Although typhus is now a comparatively rare disease, an outline has been given to emphasize what correction of unhygienic conditions and insanitary surroundings will accomplish.

Malarial Fever.

(Ague).

Definition.—An infectious disease caused by the hematozoa of Laveran. "It is characterized by paroxysms of intermittent fever of the quotidian, tertian or quartan type, a continued fever with marked remissions, a pernicious or rapidly fatal form, and a chronic cachexia with anemia and enlarged spleen." (Halbert). The varieties of malarial fever are: intermittent fever; pernicious intermittent; remittent fever; malarial cachexia; masked intermittent; malarial hematuria.

Osteopathic Etiology and **Pathology.**—Malarial fevers are believed to be caused by a parasite known as the hemotozoa of Laveran. Three varieties of the parasite have been separated, corresponding with the three leading forms of the affection. The parasite of tertian fever is about as large as a normal red blood-corpuscle, beginning as a small hyaline ameba in the red blood-corpuscles. The parasite of quartan fever is very similar in its appearance to the tertian parasite but smaller; its ameboid movements are slower and the red blood-corpuscle embracing it shrinks about the parasite, assuming a deeper greenish color. The parasite of the estivo-autumnal fevers is still smaller. "If only one group of parasites exists the paroxysms—quartan intermittent—will occur every fourth day. Double quartan infection will re-

sult in paroxysms on two successive days with an intermission of one day. Infection by three groups of parasites will create daily paroxysms—the quotidian intermittent. Infection by more than three groups is rare." (Anders). Only in the earlier stages of development, small hyaline bodies are to be found in the peripheral circulation; being, in the later stages, in the blood of certain internal viscera, spleen, and bone marrow, particularly.

It is an accepted fact among medical observers that to the mosquito, *anapheles*, is due the spread of malaria and it has been the subject of much investigation in all parts of the world. The mosquito becomes infected from biting an individual whose blood contains the malarial parasite, this is then developed in the mosquito to maturity and later is transmitted to the next subject bitten. This explanation would show why certain localities favorable for the breeding of mosquitoes are particularly given to malarial outbreaks. Low, marshy grounds, banks of rivers, small ponds, etc., as well as warm weather, are needed to produce the conditions for the development of the *anapheles*. As the country has developed the intensity and extent of malaria has diminished until it is now confined largely to the southern states. It is practically unknown in the northwest and in the St. Lawrence basin. Regions which have never had cases, however, have developed them when the *anapheles* has appeared. Whiting notes cases in Southern California, the result of the insect being brought in by ships from Mexican or Central American ports. In certain regions the *anapheles* is present but has not apparently come in contact with a malarial victim, so is incapable of spreading the disease. Also in colder climates this species is harmless.

By draining the lands and preventing the breeding places, the number of the pests is reduced, while the screening of houses and care against exposure to the bites make it possible to live in malarial sections and not become infected. Naturally the resisting power of a patient is called into account when bitten by the mosquito. Where it is epidemic the inhabitants will be found, generally, poorly nourished or debilitated from climatic or other conditions. This renders infection easy, for immunity

must come from the ability of the phagocytes to combat with the invading parasite.

The **osteopathic predisposing causes** for malaria are usually interference with the vaso-motor nerves to the spleen and liver, as these two organs are so concerned in maintaining the stability of the blood tissue. Ligon, of Alabama, notes that most cases have lesions between the ninth and twelfth dorsal on the right side.

The chief **morbid changes** are due to the direct effect of the malarial parasite upon the blood. There are also changes in the liver, kidneys, and spleen, which changes usually vary with the duration and intensity of the disease. The disintegration of the red blood-corpuscles, accumulation of the pigment thus formed, and the toxin engendered by the malarial parasite are responsible for the morbid lesions of the disease.

In **pernicious malaria** the **blood** is more or less hydremic and the serum may be tinged with hemoglobin. The blood discs are seen in all stages of destruction. The spleen is enlarged, soft and the pulp dark from the accumulation of the pigment, and spontaneous rupture has occurred in a number of cases. The liver is swollen and turbid; pigmentation occurs, but is generally only visible by means of the microscope. By the aid of the microscope all the tissues of the body, even the brain, may be found to be pigmented.

The **spleen** in **chronic malaria** is greatly enlarged, firm, pigmented and the capsule thickened. The **liver** is enlarged, the color varying from a slight gray to a deep slate gray, according to the amount of pigment. The **kidneys** may be enlarged and deeply pigmented, as is also the mucous membrane of the **stomach** and **intestines.**

R. W. Connor observes that the kidneys and liver are most noticably involved, vaso-motor obstructions the rule, the spleen in the majority of cases shows engorgement and that special attention to these centers will give the best results. He invariably finds spinal lesions from the seventh dorsal to the first and second lumbar, most frequently the eighth, ninth and tenth dorsals. A

lowered vitality predisposes to infection from the bite of the mosquito.

Symptoms.—Intermittent Fever.—This form is what is known as fever and ague, in which chills, fever and sweat follow each other. The period of incubation varies from six to fifteen days, but it may be months after exposure before the first paroxysms set in. The paroxysm is usually preceded by a feeling of uneasiness and discomfort, sometimes by nausea or headache. The paroxysm consists of three stages, cold, heat and sweating.

In the **cold stage** the chill usually begins gradually; it is generally intense, the teeth chatter and the body shakes violently. The skin is cool and pale, the lips are blue, the face is pinched and the patient looks very cold. During the chill the temperature rises rapidly. Nausea, vomiting and headache are common. The pulse is frequent, small and hard. The urine is increased in quantity and of low specific gravity. The chill lasts from a few minutes to a couple of hours.

The **hot stage** succeeds the chill. The skin gradually loses its coldness and becomes intensely hot. The face is flushed, there is great thirst, the mouth is dry, and the tongue is coated. Usually at the termination of the chill the temperature has reached its maximum level, from 104 to 106 degrees F. The pulse is full and bounding and there may be a throbbing headache. The duration of this stage is from half an hour to three or four hours.

During the **sweating stage** drops of perspiration appear upon the face; the perspiration soon becomes profuse, extending all over the body. The temperature soon falls, the headache disappears and in a couple of hours the paroxysm is over and the patient falls asleep. The sweating varies greatly; it may be a very light moisture or it may be drenching.

The entire duration of the paroxysm is from eight to twelve hours; the patient usually feeling perfectly well between the paroxysms. The spleen is enlarged. Herpes labialis appears. If the paroxysms of fever occur daily at the same hour they are called **quotidian** intermittent fever; if every other day they are known as **tertian** intermittent; and if every third day they are called **quartan** intermittent. If there are two paroxysms in the

same day the term **double quotidian** is used; if the paroxysms occur a couple of hours later each successive day they are called "**retarding;**" if a couple of hours earlier they are named "**anticipating.**"

Remittent Fever.—(Estivo-Autumnal Fever).—This is characterized by a continued fever with paroxysmal exacerbations and remissions. It occurs especially in warm and tropical climates and chiefly in the late summer and fall. It is also termed bilious remittent fever on account of the intensity of the gastro-intestinal manifestation. The estivo-autumnal parasite is the exciting cause.

It is very often preceded by malaise, headache, nausea and vomiting. The onset is usually gradual and the chill may be wholly absent. As a rule, however, a chill generally occurs at the onset, but it is less severe than that of intermittent fever. After the chill the temperature rises rapidly to 104 or 106 degrees F. The pulse is full, rising to 100 or 120. There is violent headache, flushed face, pains in the limbs and loins, nausea and vomiting, and delirium when the temperature is very high. The urine is scanty or even suppressed, slightly albuminous, sometimes bloody, high colored, and deposits a sediment of urates. Jaundice is not infrequent; the spleen is enlarged and herpes labialis is quite common. After six to twenty-four hours the symptoms abate and slight sweating occurs. The temperature usually drops to 100 degrees F., the headache disappears and vomiting ceases; this is followed by a new exacerbation of fever at the end of about twelve hours, generally without the chill; and this hot stage is in turn again followed by the remission. These attacks often last three or four weeks.

Pernicious Malarial Fever.—This is rare in temperate climates and is always associated with the estivo-autumnal parasite. The principal types are the comatose and algid.

The **comatose type** usually begins with a severe chill, sometimes, however, the chill is absent. The patient is violently seized with grave cerebral symptoms, as acute delirium or sudden coma. The fever is usually high and the skin is hot and dry. The comatose condition lasts from twelve to twenty-four hours

when consciousness usually returns, the primary paroxysm rarely proving fatal; but is, however, often followed in a short time by fatal relapse.

The **Algid** variety is characterized by intense prostration and extreme coolness of the surface with the internal temperature high. The gastric symptoms are extreme nausea and vomiting. The pulse is feeble and small; the breathing frequent and shallow. There is intense thirst. The voice is feeble and indistinct. The mind is clear. The urine is suppressed. In this affection the parasites invade the gastro-intestinal mucosa especially; sometimes forming distinct thrombosis of the smaller vessels. This form may be confused with yellow fever.

Malarial Cachexia.—This is a chronic condition which often occurs in cases that have not been properly treated or in persons that live in malarial districts and are constantly exposed to the infection. The two most striking symptoms of this condition are anemia and an enlarged spleen or "ague cake." There is fever at intervals, but chills rarely occur. The skin is of a dirty yellow color. The spleen is greatly enlarged and the blood is profoundly anemic. There is debility, frequent sweating, and the hands and feet are cold. The digestion may be deranged and there may be slight jaundice. Sometimes there is edema of the feet and even dropsy occurs. Hemorrhages of the various mucous surfaces are common. Paraplegia and orchitis are rare symptoms. These cases usually do well under proper treatment, and if the patient can be moved from the malarial district.

Masked Intermittent.—Malarial neuralgia most frequently involves the supraorbital branch of the trigeminus; also the occipital, the intercostals, sciatic and brachial nerves may be affected. Such forms of malaria are called "masked malaria." In this form there is no fever and as a rule it is very hard to diagnose. A blood analysis should be made to confirm the diagnosis. In some cases one or more stages in the paroxysm of intermittent fever is omitted; this is especially true with the chill, in which case it is termed "dumb ague." Malarial cachexia is also sometimes called "dumb ague" and both are found among the older inhabitants of malarial districts. Persons living in malarial

districts are sometimes affected with constipation, headache, loss of appetite, nausea, vomiting and a languid feeling; this is called "latent intermittent fever." Frequently "bilious attacks" are of a malarial origin.

Malarial Hematuria.—Hemorrhages may occur from the mucous membrane in all severe and persistent types of malarial infection. It is a frequent symptom of the pernicious variety. Malarial hematuria is an important form. A chill may not be present, but there is usually a chilly feeling, the nose and fingers being cold and the lips blue. Prostration is marked and nervous symptoms are severe. Hemoglobinuria has been noted in malarial regions. Malarial parasites in the blood and the presence of hemoglobin in the urine will clear the diagnosis.

Diagnosis.—This is usually easy. The characteristic stages of the paroxysms, the periodicity, residence in malarial districts and the alterations in the blood will usually remove every doubt as to the diagnosis.

Typhoid Fever may simulate malarial fever, but a careful analysis of symptoms and blood examination will differentiate.

Prognosis.—This is almost always favorable under early and persistent treatment. The unfavorable symptoms are uremia, hemorrhage and marked jaundice.

Treatment.—Attention should first be given to **prophylactic measures.** Environment, isolation of the patient, and destruction of the mosquito are important considerations. Cases of malarial fever present distinct lesions in the vertebræ and ribs corresponding to the vaso-motor nerve supply of the spleen and liver. The most common lesion found is a marked lateral deviation between the ninth and tenth dorsal vertebræ and a consequent downward displacement of the tenth ribs. A disturbance will always be found in the region of the eighth to the eleventh dorsal vertebra, inclusive, or in the corresponding ribs on either side. These lesions undoubtedly derange the vaso-motor nerves to the spleen and liver; thus permitting a weakness of the system, especially of the blood, in resisting malarial infection. The blood resisting powers are lessened, probably on account of the spleen being affected, as it is an elaborating gland of the blood; and the

liver's action is somewhat dependent upon the action of the spleen; besides, the liver is a secretory and excretory organ.

The principal **osteopathic treatment** given in cases of malarial fever is correction of these subdislocations, and thorough treatment to the liver and spleen directly. Ligon observes that when the case does not respond quickly to treatment it is very liable to be of considerable duration, although in the majority of cases the disease is controlled from the third to seventh day; the most constant lesions found are from the eighth to tenth dorsal and also the fourth lumbar.

During the **chilly stage** thorough treatment of the vasomotor nerves in the upper cervical, the upper dorsal, the lower dorsal and the lumbar regions is indicated; this treatment is given to equalize the vascular system.

During the **hot stage** the same treatment as in the chilly stage should be given to control the vascular system; besides a thorough treatment of the spleen and liver is necessary. Sponging the body with water will be of some aid in reducing the temperature.

During the **sweat stage** thorough inhibition at the superior cervical ganglion to control the sweat center of the medulla, and treatment at the upper dorsal and first lumbar to control auxiliary sweat centers are indicated.

The bowels should be kept active. When in a comatose form and when internal temperature is high, place the patient in a bath.

Tete[1], of Lousiana, makes the following interesting statement, after observing about one hundred cases, that "a specific osteopathic treatment given within an hour before the expected chill is a specific cure for malaria." He follows this up by treating on the third, fifth, seventh, fourteenth, and twenty-first days, on account of the tendency of the return of an attack on those days. His observation of the value of treatment just before the attack is borne out by a report by Teall[2] where the case was cured in one treatment, but the lesion was as high as the fourth dorsal. N.

1. Journal of Osteopathy—Prize Article July, 1906.
2. A. O.A. Case Reports—Series I.

Chapman confirms this as being her experience in many cases. The spleen has been observed by Bandel to become engorged and upon emptying there would follow a rise of temperature of one fourth to half a degree. This has also been spoken of by Tucker as the "splenic wave." Price finds cases of hematuria exceedingly difficult to cure. Ligon makes the statement thatwhere the osteopathic lesion (the predisposing cause) has been of long standing prior to the attack, and as a consequence hard to correct, it is difficult to shorten the malarial attack.

This would emphasize the point that the essential treatment must be a thoroughly readjustive one, and that stimulatory and inhibitory work can only palliate.

Quinine has been accepted by medical authorities as a specific for malaria. It is supposed to act directly upon the intracorpuscular hematozoa. That it is not infallible is shown by the numerous cases which come to the osteopath, suffering from both the disease and the quinine. And even drug authorities state that other treatment is also required. It has remained for Dr. Still to demonstrate that excellent results follow osteopathic treatment in malaria. Frequently a single treatment has been sufficient to free and regulate the body fluids and forces so that the hematozoa of Laveran was rendered inert, and this treatment was directed chiefly to the fourth and twelfth dorsals. Whereas the osteopath recognizes and appreciates the importance of micro-organisms as exciting and determining factors in many diseases, still he values them as secondary factors only and relies primarily upon removing the predisposing and true etiologic factors, so that nature's forces may not be obstructed and thus predominate. Osteopathic etiology and pathology has shown so conclusively, in a large number of cases, that the existence of micro-organisms is dependent upon devitalized tissue, whether the tissue is a local one or a circulating one, as theb lood; and just so soon as the anatomical is adjusted the physiological will potentiate and antitoxic and antimicrobic substances are secreted.

Septicemia.

This term is applied to any toxic condition caused by the invasion of the blood by pathogenic micro-organisms, with or without any visible site of infection.

Etiologically, the micrococci, streptococci or staphlycocci seem to be the cause. The infection is usually introduced by a wound, of any degree of severity. The uterus is a frequent seat following miscarriage, partuition or operation. The virus may be absorbed by the mucous membrane. It may also arise from infection of the deeper tissues. **Pathologically**, the changes are not marked, but consist in brownish color of the muscles, ecchymotic spots in the pia mater and dark appearance of the blood, which is also less coagulable. Spleen, liver and lympatics are enlarged with some changes in the other organns.

Symptoms.—The incubation period is from four to six days and the onset is gradual, though often announced by a distinctive chill, followed by a profuse sweat. The most common type is the continuous form of fever, which may,in morning remissions, become subnormal. Pulse is rapid at the beginning, but as cardiac failure comes on, it becomes weaker. In the earlier stages there may be vomiting with diarrhea later. There are punctiform hemorrhages of the skin and possibly other eruptions. Blood examination will settle any doubt as to diagnosis.

Prognosis is difficult as so much depends upon the general health of the patient. There is a progressive tendency in all the symptoms and fatal termination or recovery may be the gradual sequence.

Treatment.—Remove the cause of the infection, which may be surgical. Normal salt solution is of value in the depressions following toxemia. Diet should be nourishing and consist of broths, soups, eggs, milk, etc. Osteopathic treatment, according to indications, will aid very materially in stimulating and strengthening the patient. Keep the bowels, kidneys and skin active.

Pyemia.

A febrile disease arising from an invasion of the blood by pathogenic bacteria, wherein sepsis and multiple abscesses occur from the absorption and metastasis.

Etiologically, the cause may be traced to various specific organisms which enter the blood stream and produce thrombophlebitis. From these points and from other bacteria, new foci are established. Occasionally the lymphatics carry the germs. The disease may also start from ulcerative endocarditis or when the appendix is infected.

Pathologically, thrombosis of the veins may take place in any region. Abscesses may form in the lungs, liver, kidneys, spleen or other internal organs. The small abscesses may unite and form a larger one. The skin presents eruptions and hemorrhagic extravasations, while there may be ulcers of the mucous membrane, as may also the serous surfaces be purulently inflamed. The muscles, subcutaneous and osseous tissue occasionally have abscesses. Ulcerative and suppurative heart lesions occur.

Symptoms.—The incubation period is short. There may first be a slight fever, but commonly a chill is the first symptom, which may reoccur for some time. The fever is characterized by its being intermittent or remittent. When the temperature is low, sweating is a feature. The pulse becomes rapid and weak, when the disease is severe; breathing becomes difficult. Skin symptoms, as eruptions and pustules, generally occur. In a word, there is a general intoxication. There is a lessened number of red blood-corpuscles and leucocytosis is a characteristic. There is delirium, and coma is present in grave cases. Abscesses are likely to occur in various regions and organs.

Diagnosis.—The history of the case and the symptoms will commonly render diagnosis easy, although care is necessary to determine from septicemia. Malaria, typhoid and acute tuberculosis must be excluded.

Prognosis.—Much depends upon asepsis and surgery. On the whole prognosis is unfavorable.

Treatment.—Surgical interference is the first treatment. Then the treatment as given under septicemia.

Smallpox.

(Variola).

Definition.—An acute, contagious disease, characterized by a fever and eruption which passes through the stages of papule, vesicle, pustule and crust.

Osteopathic Etiology and **Pathology.**—The nature of the specific poison is not definitely known. It is probably the most virulent of all the contagia in its effect upon exposed persons not protected by vaccination. Physical debility, unhygienic surroundings, and poor nourishment predispose. A number of cases have been treated by various osteopaths and each case presented varying lesions that had lowered physical vitality. The disease is contagious throughout the entire attack, but especially during the suppurative and desquamative stages. The poison is conveyed in the secretions, excretions and in the exhalations from the lungs and skin, but mainly in the pustules and dry crusts. The poison probably enters the system by way of the respiratory tract. No age, sex or race are exempt from this disease. Among the uncivilized people smallpox spreads with frightful rapidity and is terribly fatal.

The essential **pathology** is that of the eruption, which consists of an inflammatory, cellular infiltration starting in the rete mucosum close to the true skin. The eruption has four stages—papular, vesicular, pustular and the crust. The center of the papule represents a focus of coagulation necrosis, due to the presence of micrococci (Weigert). The vesicle appears at the apex of the papule. During this stage the rete mucosum presents reticuli which contain serum leucocytes and fibrin filaments. If the process does not extend deeper, usually, healing takes place without a scar; if, however, suppuration extends into the true skin, scarring results. The reticuli become filled with leucocytes, producing the pustules. The pustules usually rupture, sometimes they dry up; in either case a crust results. The pustules are found in the larynx, trachea, bronchial tubes and sometimes, though rarely, in the esophagus and rectum. The liver is sometimes fatty, and cloudy swelling of the secreting cells of

the kidney may occur. The spleen may be hard and firm.

In the **hemorrhagic form** extravasations occur in the serous and mucous membranes, the connective tissues, the parenchyma of the viscera and sometimes about the nerve sheaths, bone marrow, walls of the blood-vessels and into the muscles.

Symptoms.—The incubation period varies from seven to twelve or more days. The onset is sudden, with a severe chill or chills, high fever, intense headache, violent muscular pains, particularly in the back, rapid, hard pulse and delirium, which is sometimes violent. The temperature rises rapidly to 103 or 104 degrees F., the first day. During the third, the characteristic eruption appears in red spots, first upon the forehead and lips. Each pock passes through the four stages already described. The papules feel like shot under the skin and there is much itching and burning. On the third or fourth day from the onset, when the eruption makes its appearance, the fever falls and the patient feels comfortable. The serum appears about the fifth or sixth day, when a depression is seen in the middle of each vesicle; this umbilication is very characteristic of the disease. When the suppurative stage arrives the fever again returns; this is about the eighth day. On the ninth or tenth day, the pustule becomes dry and crusts are formed, being thrown off in two or three days. During this time the fever and the constitutional symptoms subside and convalescence sets in.

In the **discrete form** the pustules are separate and distinct, while in the **confluent form** the eruption appears about the second day, and the pustules are so close to each other that they coalesce into large patches. The symptoms are of greater severity and there is marked prostration.

The **hemorrhagic form** is still more severe and occurs in two varieties, the purpura variolosa or black small pox, and variola hemorrhagica pustulosa. In the former the hemorrhagic symptoms appear early. Hemorrhagic rash and hemorrhages from the mucous surfaces occur and death follows in from two to six days, sometimes before the appearance of the eruption. In the latter variety the case progresses like that of ordinary small pox,

the blood making its appearance in the pox during the vesicular and pustular stage.

Varioloid is a modified form of smallpox, in which the patient has been previously vaccinated or has had one attack of smallpox. Each symptom is milder and its course shorter. There is no secondary fever and the rash appears a day later than in the discrete variety.

The **complications** that may be associated with smallpox are laryngitis, which may produce a fatal edema of the glottis; bronchial pneumonia, lobar pneumonia (rarely), pleurisy, parotitis, vomiting, diarrhea, albuminuria and true nephritis (rarely). Endocarditis, pericarditis, and myocarditis are rarely met with. Boils and abscesses on the skin are frequent during convalescence. Prolonged delirium and sometimes insanity may occur. Neuritis, arthritis, hemiplegia, aphasia, conjunctivitis, iritis, and otitis media may also become complications.

Diagnosis.—A knowledge of a prevailing epidemic will be a helpful measure. As soon as a perfect papule makes its appearance, a positive diagnosis can be very readily made. The rashes of measles and scarlatina have sometimes been mistaken for the initial rash of smallpox. In **scarlatina** the rash resembles that of smallpox in the early stages only. In **measles** care has to be taken, for many errors have arisen in making the differentiation. There are early cough and coryza, while the pain in the back and legs is not nearly so severe as in smallpox, and there is absence of the shot-like feeling of the eruption. **Chicken-pox** is very apt to be confused with mild epidemics of smallpox. The rash is more abundant upon the trunk than upon the face. The constitutional disturbances are slight and all of the symptoms are milder. **Secondary syphilis** will be distinguished by the history, the pustule base is indurate, and there is absence of fever and itching. **Cerebro-spinal fever** and the **hemorrhagic form** of smallpox may be confounded. If the patient has been exposed to smallpox or if he has not been vaccinated, even if the initial symptoms are those of cerebro-spinal fever, the patient more than likely has smallpox. The diagnosis can be made more positive by the ankles and other joints not being involved, the irregular temperature curve,

the herpes, the marked hyperthesia, and muscular rigidity of cerebro-spinal fever.

Prognosis.—This depends upon the severity of the epidemic, hygienic measures, the protection by recent vaccination and the appearance of the eruption. The hemorrhagic form invariably is very dangerous. The discrete form is the most favorable. Sevére pneumonia and laryngitis are fatal complications. A number of cases have been successfully treated by osteopathy.

Treatment.—Prophylaxis has done much to lessen the frequency and severity of this disease. Cleanliness, sanitary measures, isolation, and according to medical authorities, vaccination, have reduced the seriousness markedly. Notify the proper authorities and have the patient isolated. The usual fever treatment, hygienic measures, liquid diet, avoidance of extreme light, plenty of fresh air, and good general care are the immediate indications. Osteopaths have been able to promptly meet and successfully treat this disease. The room should be stripped of all unnecessary furnishings, an up-stairs room being best. All communication of the nurses with members of the family should be prohibited. All utensils and clothing of the patient must be carefully disinfected and the room thoroughly ventilated. The nurse should be provided with suitable clothing, which is to be removed upon leaving the room. The doorways may be protected by hanging a sheet dampened in a solution of carbolic acid, 1:60.

The treatment consists of meeting the symptoms as they arise. Remove all lesions found and pay strict attention to the excretory organs. The pains in the back and limbs are to be controlled by careful treatment of these regions, especially by relaxing the muscles thoroughly. For the fever, besides the ordinary treatment, cold sponging or the cold bath will be helpful. When the temperature reaches 103 degrees F., with presence of considerable twitchings and delirium, the patient should be placed in a bath of 70 degrees F.; this may be repeated every three hours if necessary. Let the patient have plenty of cool drinks.

Treatment of the **eruptions** should receive careful consideration, especially in the prevention of disfigurement. Constant applications of cold water, with carbolic acid as an antiseptic, is con-

sidered good. When the crusts are forming a thorough application of vaseline will allay the burning and itching and prevent the diffusion of the particles of epidermis, which aids in keeping the contagion from spreading through the air. Frequent bathing helps to keep the crusts softened. The adding of the carbolic acid, ten grains to the ounce, to the vaseline also aids in subduing the odor.

The eyes, nose, mouth and throat should be carefully watched and the parts kept clean of all crusts. Tracheotomy may be necessary if the obstruction of the larynx becomes extensive. The diarrhea is best controlled by thorough treatment of the splanchnics. During convalescence the patient should be bathed daily. When a patient's skin is perfectly smooth, the danger from spreading the disease is over.

VACCINATION.

Vaccina is an eruptive disease of the cow and when the contents of the vesicle of cow-pox is introduced into the blood of man, it produces a local manifestation, the vaccine vesicle, with constitutional disturbance, and the majority of persons, thus successfully vaccinated, are protected from smallpox.

The vaccine is usually taken directly from the cow (animal lymph), although it is obtained from persons vaccinated (humanized lymph) as well, but this is not as successfully used as there is danger of communicating other affections, particularly syphilis.

The vaccination should be made about the third month, but if smallpox is not prevalent it is best to wait until the end of the second year. The second vaccination should be made about the seventh year and a third at puberty. After puberty vaccinate every few years and always when smallpox is prevalent.

The favorite situation for inoculation is on the arm over the insertion of the deltoid muscle. In girls it is sometimes preferred on the leg, the point usually chosen is over the junction of the two heads of the gastrocnemius muscle. The part chosen should be rendered aseptic and the skin scratched with a lancet or with the ivory point, until serum begins to exude. If blood is drawn it should be carefully dried before the lymph is applied,

as it interferes with absorption. The moistened virus should then be carefully rubbed over the abraded surface. The spot must be carefully protected until thoroughly dry.

About the third day a small red papule appears. On the fifth or sixth day a definite vesicle, and by the eighth day it has attained its full size. It is filled with a limpid fluid, is umbilicated and the surrounding tissues are red, tender, swollen, and infiltrated. About the twelfth day the pustule dries up and forms a crust which separates during the third or fourth week, leaving a permanent cicatrix. If the vaccination is made on the arm the axillary glands are often swollen and tender; if on the leg, the inguinal glands are affected.

Sometimes additional vesicles are formed near the point of inoculation. Occasionally vesicular eruptions occur. Erysipelas, various cutaneous eruptions and in a few instances tetanus are complications which may arise. Syphilis has occasionally been transmitted as, before stated, through humanized lymph. As the result of uncleanliness or owing to injury, the vesicles inflame and ulcers form. Complications should not arise if the vaccine is pure and aseptic precautions taken. If infection occurs treat with wet boracic dressing.

Scarlet Fever.

Definition.—An acute, contagious fever, characterized by sore throat, angina, rapid pulse and a diffuse scarlet eruption, followed by a membranous desquamation. There is a tendency to nephritis.

Osteopathic Etiology and **Pathology.**—The specific poison that causes scarlet fever has not yet been discovered. In no disease is the contagion so tenacious; it may be conveyed by infected bedding, clothes, etc., for a year or more after the case has occurred. It is most frequent in children before the age of ten; adults are not exempt. One attack does not always give immunity; a second and third have occurred. Both sexes are alike susceptible. Epidemics occur at all seasons of the year; they are, however, of greater intensity during the autumn than in winter. The disease is not supposed to be communicable until a desquamation

takes place, although it has been conveyed by naso-pharyngeal secretions after the desquamation period; hence persons kept away from the disease at this period generally escape. It is very hard to disinfect an apartment after a case of scarlet fever. The disease has been communicated to new occupants even after the room has been thoroughly cleansed. The contagion has been carried in milk. The streptococcus pyogenes has been found in the blood, the skin, and various organs after death. The infection generally gains entrance through the respiratory tract, thence to the throat and the general system. No doubt osteopathic lesions causing catarrhal affections of the respiratory tract predispose to the disease. In some instances the infection gains entrance by way of the alimentary tract, for instance, milk contamination. In all the eruptive fevers there can be no question that osteopathic lesions lowering physical vitality, unhygienic environment, insanitary surroundings and insufficient food are paramount predisposing factors.

There are no **morbid changes,** and except in the hemorrhagic form, the eruption fades after death. The throat is inflamed and sometimes ulcerated. The morbid changes found in the other organs are those of the complications which arise.

Symptoms.—The period of incubation varies from twenty-four hours to eight days; it is usually two or three days. The onset is generally sudden, with vomiting and sometimes convulsions, and the tongue is furred. The pulse is rapid and hard (120 to 150) and out of proportion to the fever. The temperature rises rapidly to 103 or 105 degrees F. The skin is dry, the face is flushed and there is sore throat. The eruption usually appears on the second day, first upon the neck, then the chest and rapidly spreads over the entire body. When examined closely, it is seen to consist of a multitude of red points corresponding to the hair follicles; at a distance this gives the entire body a bright scarlet color. It disappears upon pressure, but returns as soon as the pressure is removed. The rash may be uniform or it may occur in discrete patches. The eruption does not always appear on the face. In some cases the eruption is pale and hardly visible, or it may be papular or vesicular (scarlatina miliaris) and occasion-

ally petechial. There is itching which may be moderate or intense. The rash persists for two or three days and then gradually fades and is soon followed by a scaly desquamation. The duration of the fever is from seven to nine days, after which it falls by lysis. The respirations are hurried. There is loss of appetite and the bowels are constipated. The gastro-intestinal symptoms are not marked after the initial vomiting. The urine is scanty, thick and high colored, and it contains urates and a small amount of albumin. Sleeplessness, mild delirium, headache, insomnia, and rarely convulsions, may occur during the attack. The tongue is red at the edges and tip and furred at the center, with enlarged fungiform papillæ and known as the "strawberry tongue." In a few days the dead epithelium is cast off, leaving the tongue red and raw looking.

In an uncomplicated attack the duration is from three to fourteen days, according to the severity of the disease.

Malignant Scarlet Fever.—In the **anginose form** the throat symptoms are severe. The fauces and tonsils are swollen and are often covered with a false membrane which may extend forward into the mouth, upward into the nostrils, and may also involve the posterior pharynx, the trachea and bronchi. The throat may present all the symptoms of a severe diphtheria. The fever is high and there is great prostration. The glands of the neck are greatly enlarged. Abscesses and ulceration of the throat occur frequently. Death may result from ulceration into the carotid artery or it may occur rapidly from toxemia or exhaustion. In the **malignant form** there may be almost immediate prostration and death may occur within twenty to forty-eight hours, before the appearance of the rash. The onset is abrupt and the symptoms are of great severity. The temperature may rise to 106 or 107 degrees F., or higher, with the pulse rapid and feeble. There is delirium, which rapidly passes into coma. Convulsions may occur. In the **hemorrhagic form** hemorrhages occur into the skin, and there is epistaxis and hematuria. This form is found most frequently in enfeebled, poorly nourished children. Death may take place in two or three days. Like the preceding form this nearly always proves fatal.

Complications.—Acute nephritis, usually of a parenchymatous character, is a fairly common complication. It is found in both severe and mild cases, commonly during desquamation, which indicates that when the skin function is decreased and impaired the kidneys are required to eliminate an extra amount of poison. Osteopathic measures can do much to stimulate the kidneys and other emunctories and thus prevent this complication. Arthritis, meningitis, otitis, pneumonia, cardiac involvement, paralyses, and nervous affections are other possible complications.

Diagnosis.—This is not difficult, although for a time it may be confounded with the following diseases: **Acute exfoliating dermatitis,** the throat symptoms are usually absent. The tongue is not characteristic of scarlet fever. The onset is sudden with fever only. The desquamation begins before the rash is entirely gone. Nephritis is not a common complication and relapses are common. In **measles** the sore throat is less marked, the eruption occurs later, and is of a very different character from that of scarlet fever. The pulse is in proportion to the fever; and leucocytosis is absent. In **diphtheria** the cutaneous rash is usually absent. The false membrane is always present, containing the Klebs-Loeffler bacillus; the tongue has not the strawberry appearance. **Drug rashes** follow the use of quinine, belladonna, potassium, bromide and chloral. There is no fever, no characteristic symptoms of invasion and the rash is of short duration.

Prognosis.—This varies greatly. The prognosis should always be guarded, although osteopathic treatment has been distinctively successful.

Treatment.—The treatment of scarlet fever consists of careful nursing and disinfection, watching for complications and treatment of the symptoms as they arise. The patient should be isolated and there remain until desquamation is complete. The room given the patient should be an upper one if possible. It should be stripped of all unnecessary furnishings and a competent nurse put in charge. All unnecessary communication with members of the family must be entirely prohibited. The temperature of the room requires to be kept as uniform as possible,

with proper ventilation. The diet should consist of milk, light broths, egg albumin and fruit juices and plenty of water.

Thorough osteopathic treatment is to be given along the spinal region to keep the muscles well relaxed and give special attention to the renal splanchnics and to the cervical vertebræ. The neck should be watched most carefully for any abnormalities that may occur to the cervical vertebræ, and the cervical muscles kept as well relaxed as possible. Particular attention must be given the deep cervical muscles, especially those beneath the angles of the inferior maxillary and those between the atlas and occiput; keeping these deep cervical muscles in normal condition will help greatly in preventing complications that may arise in the ears, besides greatly relieving the severe symptoms of the naso-pharyngeal region. By attending carefully to the intestinal and renal splanchnics, any disturbance of the intestinal tract can generally be kept under control and the liability of renal complications is greatly lessened. Direct treatment to the abdomen should be practiced during each visit, to keep the bowels, kidneys and liver active. Examine the urine frequently.

In cases of heart enfeeblement, attention to the cervical sympathetic and vigorous treatment through the upper left dorsal region are indicated. The most effective fever treatment will be in keeping the emunctories active, though spinal treatment, and an inhibitory treatment of the sub-occipitals will be of great aid. The tension of the ear drum must be watched constantly; and if severe inflammation of the ear should arise that cannot be relieved by the upper cervical treatment, which consists of correcting any deviation of the atlas and relaxing the deep muscles at the angle of the inferior maxillary and relieving impingements at the upper dorsal of vaso-motor nerves to the ear, then perforation should be performed.

In the treatment of the **eruption,** which is due to a hyperemic condition of the cutaneous vessels followed by edema, using carbolized water 1-40 to sponge the surface, followed by the application of cocoa butter, will tend to reduce the fever by soothing the cutaneous burning and irritation; and later when desquamation occurs it limits the source of infection by preventing the

diffusion of what would be dry scales in the air; and finally it protects the surface from the influences of sudden changes of temperature, thus to a great extent avoiding the danger of nephritis.

Bathing the patient three or four times a day with tepid water is of great aid in relieving the fever, besides preventing complications. The gradually cooled bath will be of benefit when there is high temperature and marked nervous symptoms, besides it increases cardiac action. Cold water applications to the exterior of the throat will be gratefully received by the patient; pellets of ice in the mouth will also be of some comfort. Continued bathing, several times a day, aids the kidneys greatly by vicariously eliminating the poison generated in the system. The osteopath should take pains to disinfect himself. A linen duster after being dipped in a solution of bichlorid and dried, worn during his visit to the room of the patient, will be sufficient.

Measles.

Definition.—An acute, contagious disease, characterized by an initial coryza, nasal and bronchial catarrhal symptoms, a rapidly spreading eruption and moderate fever. Osteopathic lesions involving the vaso-motors to the mucous membrane of the respiratory tract and to the lymphatics draining the same area predispose.

Dr. Still considers this as largely a cutaneous disturbance and says the rash is a result of lymphatic congestion of the skin, resulting from muscular contractions along the spine, which interfere with vaso-motor centers. It is essentially an epidemic disease, yet, now and then, sporadic cases occur. The disease is in all probability due to a micro-organism, but as yet none has been isolated. One attack does not always protect from another. It occurs at all seasons, but epidemics occur most frequently during the fall and winter. Children are more susceptible, but unprotected adults are very liable to be attacked. The contagion is conveyed by the nasal and bronchial discharges and by fomites.

There is no essential **morbid anatomy** in uncomplicated cases, except the nasal and bronchial catarrh. Fatal cases show, as a rule, capillary bronchitis, catarrhal pneumonia, pulmonary col-

lapse and acute nephritis. The lesions of intestinal catarrh are rarely found. Measles itself very rarely kills.

Symptoms.—The period of incubation is ten days, followed by a prodromal stage of three days.

The disease generally sets in with symptoms of a cold, with some fever. There is marked coryza, watery eyes, sneezing, photophobia, fretfulness and a dry, croupy cough. The temperature rises to 102 or 104 degrees F. The tongue is usually furred. The early catarrhal symptoms are more marked than in any of the other infectious diseases. The tongue is heavily coated; a marked contrast to the strawberry tongue of scarlet fever.

The eruption appears about the fourth day, when the fever and general symptoms have reached their height. It first appears upon the face, rapidly spreading over the whole body. It is composed of small, dark red papules, at times arranged in small crescents. This lasts for two or three days, when it begins to fade and "branny" desquamation soon follows. Small bluish-white spots have been noted on the mucous membrane of the lips, cheeks and hard palate as early as the first day; they are considered diagnostic. The catarrhal symptoms gradually disappear and convalescence is rapid. If the fever continues high after the rash is out, there is apt to be some complication, as severe bronchitis, pneumonia or acute nephritis.

Malignant or hemorrhgaic measles, "black measles," occur, particularly when the hygienic surroundings are bad. The disease sets in with much greater intensity and is characterized by a petechial rash, by hemorrhages from the mucous membrane and great constitutional depression. This is a very serious form and death generally occurs early.

Complications.—Bronchitis, broncho-pneumonia, lobar- pneamonia (rarely), catarrhal or membranous meningitis, ophthalmia, cancrum oris, otitis, intestinal catarrh and nephritis (rarely).

Diagnosis.—Incubation period of ten days, eruption on the fourth day, Koplik's spots, catarrhal symptoms, cough, and mottled eruption are valuable diagnostic points. In **scarlet fever** there is longer initial stage with characteristic symptoms, sore throat, fever is high and the pulse is out of proportion to the fever,

and there is a diffuse punctiform rash. Upon reappearance of measley redness, after the removal of a finger over the rash, the redness appears from the middle towards the periphery, while scarlet fever redness reappears from the periphery to the center. **Rothel** is characterized by a short prodromal stage, slight fever and catarrh, marked sore throat; there is more uniform distribution of the rash which does not assume a crescentric arrangement.

Prognosis.—Uncomplicated measles rarely proves fatal, but the pulmonary complications that may arise make this one of the most serious diseases of children. Hygienic surroundings have a distinct bearing on prognosis.

Treatment.—Cases of measles should not be attended to carelessly, as is oftentimes done, but care should be taken that the patient is properly protected from atmospherical changes and is carefully nursed and dieted. Physicians many times are careless with cases of measles and severe complications or sequelæ arise.

It is best to have the patient isolated and placed in a darkened, thoroughly ventilated room of equal temperature, about 65 degrees F. The case can be controlled easily and safely by competent osteopathic treatment. The treatment is largely symptomatic, although thorough specific work, according to the indications presented, will do much to lessen severity and prevent complications. Carefully protect the organs most likely to be affected. The eyes, ears, nose and throat should be carefully watched. In mild cases simply regulating the diet and bowels and cool sponging, in addition to the fever treatment, is all that is necessary.

In **severe cases** thorough treatment along the spinal column in keeping the muscles relaxed is a very great aid. Especially should the cervical and upper dorsal muscles be carefully relaxed so as to reduce the catarrhal involvements of the respiratory tract, besides preventing complications of the chest and regions of the head. In all cases special attention should be paid to the bowels and kidneys, and the skin should be bathed daily with warm water until desquamation occurs. For the bronchial cough thorough treatment of the anterior and posterior thoracic region

is quite sufficient. The muscles should be relaxed well and subluxations of the upper ribs should be looked for, as they are oftentimes the cause of the cough. The clavicle may impinge on the pneumogastric and cause a cough and add to the catarrhal condition; also upper ribs contribute to this. For the irritated skin, warm baths are indicated, besides careful treatment at the atlas and axis for the upper part of the body, and at the fifth lumbar for the lower part of the body; and carbolized vaseline is a useful adjunct. In cases where the eruption is suppressed, giving the patient a thorough sweat will generally bring out the eruption.

It has frequently been noted that measles, treated osteopathically, recover much more rapidly than when treated with drugs. After convalescence has been established, the patient is practically well and able to go out doors, whereas those cases which are treated with drugs require a longer time to regain their strength after convalescence.

Rubella.

(German Measles).

Definition.—An acute, contagious disease, resembling both scarlet fever and measles, characterized by no prodromal stage, slight fever, coryza, slight sore throat, mild catarrhal symptoms (rarely), a punctiform rash, and is free from sequelæ.

Etiology.—It generally occurs in epidemic form, but sporadic cases are not uncommon. It is much less contagious than either measles or scarlet fever. It especially affects children, rarely adults, and spreads with great rapidity.

Symptoms.—These are usually mild and it is a much less serious disease than measles. The incubation stage is from two to three weeks. The disease begins with drowsiness, slight fever, sore throat, chillness and pains in different parts of the body. The rash appears the first or second day on the face, first, and rapidly extends over the entire body. It consists of red, oval, slightly raised spots. This lasts for a couple of days and terminates in a slight branny desquamation. The lymphatic glands of the neck are often swollen, especially the superficial cervical

and posterior auricular glands. The disease rarely lasts more than from three to five days.

Prognosis.—The prognosis is good. Complications are rare. If the surroundings are unhygienic, or if the child is delicate, it is more serious. Pneumonia, severe bronchitis and gastro-intestinal catarrh may occur and prove fatal. Relapses are quite common.

Treatment.—Rest in bed is the principal treatment, although the case should be watched on account of possible complications. Attention to the lesions found, careful treatment of the cervical lymphatics, and general relaxation of the muscles and stimulation will be effective and usually sufficient. See that the bowels are kept open and the diet is restricted for a few days. It would be well to have the attendant sponge the surface of the skin once a day with water, and apply vaseline locally for the itching. If the fever is high give the ordinary fever treatment.

Chicken-Pox.
(Varicella).

Definition.—An acute contagious disease, characterized by slight fever, mild constitutional symptoms and by an eruption which is papular, vesicular and pustular.

It occurs most frequently in epidemic form, although sporadic cases are met with. The disease is highly contagious; the specific organism, however, has not yet been discovered. It is a disease of childhood and is seldom seen in adults. The greater number of cases occur between the ages of two and six. Chicken-pox and smallpox are distinct and separate diseases; an attack of one does not protect from the other.

Symptoms.—The incubation is from ten to fifteen days. In many cases the eruption is the first symptom, in others there may be restlessness, slight fever and general indisposition. Still in other cases there is a slight chill, with feverishness, or there may be vomiting, with muscular pains in the back and legs. The eruption appears within twenty-four hours in the form of small reddish puncta, appearing first upon the trunk. In a few hours they become pearly pustules, rarely umbilicated, and contain a clear or

turbid fluid. By the end of the third day they begin to dry up, crusts then form which drop off and, as a rule, leave no scar. The eruption usually appears in crops, so that about the fourth day one can usually see pocks in all stages. There may be excessive irritation of the rash and if the pocks are scratched by the child, scars may be left after healing. As a general rule complications seldom arise.

Diagnosis.—This is, as a rule, easy. The eruption comes out slowly and in crops. There are slight constitutional disturbances and the abundance of the rash upon the trunk will distinguish varicella from smallpox.

Prognosis.—This is favorable.

Treatment.—The child should be isolated until the crusts fall off, for as long as the crusts are present the disease may be transmitted. Usually there is no special treatment, as the constitutional symptoms are so mild. Have the child go to bed for a few days; sponge daily with tepid water; use carbolized vaseline locally to prevent itching, and observe hygienic measures. A light general treatment should be given, as it makes the child feel more comfortable, besides it prevents complications.

Mumps.

Definition.—An acute, contagious disease, characterized by inflammation of the parotid gland, sometimes of the submaxillary and sublingual glands. The testicles in males and the mammæ and ovaries in females, are occasionally involved. Upper cervical lesions predispose to the disease.

The disease, no doubt, is of microbic origin, but the nature of the contagion is not definitely known. It occurs sporadically and epidemically. The disease is most frequently seen in children and adolescents and during the spring and fall. More boys are attacked than girls. Very young infants and adults are seldom afflicted. One attack usually gives immunity from a second.

There is an inflammatory infiltration of the parotid glands, but there is no suppuration. The salivary gland is swollen and hardened.

Symptoms.—The incubation period is from one to two weeks.

The disease is ushered in by a moderate fever, 101 to 104 degrees F., chilliness, headache, anorexia and lassitude. There is pain just below and in front of the ear, but sometimes the first pain is experienced in swallowing. A hard and sensitive tumor is then noticed, which increases rapidly until within forty-eight hours. The neck and side of the cheek are swollen. This swelling persists for nine or ten days, then gradually subsides and convalescence is rapid. Relapses rarely, if ever, occur. Ringing in the ears, earache and affected hearing commonly occur. In severe cases the nervous system may be affected, causing headache, fever, delirium, great prostration, or even a low typhoid state may be present.

The most frequent **complication** is orchitis, which usually occurs after the inflammation of the salivary glands has subsided. One or both testicles may be involved. The organs become heavy and painful, inflammation lasting for three or four hours and subsiding gradually. Atrophy has occurred, but this is extremely rare. Mastitis, ovaritis and vulvo-vaginitis sometimes occurs in the female.

Diagnosis.—This is usually easy, as the nature and position of the swelling are quite characteristic. The prognosis is favorable, uncomplicated cases never prove fatal.

Treatment.—Consists in keeping the patient warm and well protected. The patient should be confined to the bed if the case is severe. Hot or cold applications, (usually hot is preferable to the swollen glands), will be very comforting to the patient. The cervical region should be carefully treated. Relax all the contracted muscles found, particularly the deep muscles, and give attention to the correcting of any vertebræ that may be deranged. The atlas and axis are very apt to be found sub-dislocated. In a few cases the upper ribs will be found disordered, probably interfering with either the vaso-motor nerves, or the lymphatics to the region involved. A relaxing treatment around the swollen glands will usually give considerable relief, especially of the deep muscles at the angle of the inferior maxillary. Treat the fever by the usual method and keep the excretory organs active. Probably lesions to the atlas and axis are the predisposing causes of

mumps. Secretory fibres of the submaxillary gland are from the second and third dorsals. Attacks have been shortened by osteopathic treatment.

Whooping Cough.

(Pertussis).

Definition.—An infectious disease, characterized by convulsive cough, accompanied by long drawn inspiration, during which the "whoop" is produced.

Osteopathic Etiology and **Pathology.**—The disease occurs in epidemic form, occasionally, however, sporadic cases are met with. It attacks children of all ages and is directly contagious from person to person. It sometimes attacks older persons, in which case it becomes a serious affection. Usually one attack protects from another. Epidemics last for a couple of months, usually during the spring and winter, and often precede or follow those of scarlet fever and measles. Delicate children and those suffering with nasal or bronchial catarrh, are more subject to the disease than others. Thus general health and unhygienic surroundings are predisposing causes. The contagion enters the system through the respiratory tract. No special micro-organism has yet been found as the exciting cause of whooping cough. An attack of whooping cough frequently follows, in the same individual, an epidemic of measles.

Lesions are found in the pneumogastric, phrenic, sympathetic or recurrent laryngeal nerves. From examination of patients suffering from whooping cough, one is lead to believe that the disease is of neurotic origin. Just how a nervous lesion produces the disease, it is impossible to state. Possibly a disturbance of the vaso-motor nerves to the respiratory tract causes enlargement of the tracheal and bronchial glands, which produce pressure upon terminal filaments of the pneumogastric nerve; this has been suggested by Eustace Smith. Dr. Still considers the diaphragm a factor in the spasm and treats it, as well as the phrenic nerve, to give relief. Von Leube says, "that under the influence of the infection, an increased irritability of the recurrent laryngeal nerves is brought about and that irritation of certain areas of the respira-

tory mucous membrane, especially of the interarytenoid region in its lower parts, causes, by mechanical and chemical irritants, the attacks of coughing to appear." Disturbances are found in the middle and lower cervical vertebræ and first, second and third ribs. The vagi, phrenic, sympathetic or recurrent laryngeal nerves may be involved in this region.

There are no **morbid changes** characteristic of whooping cough, except catarrhal inflammation of the respiratory tract; the posterior surface of the epiglottis is much inflamed. In fatal cases complications, as bronchitis, broncho-pneumonia, collapse of the lungs, vesicular and interstitial emphysema, are usually present. The tracheal and bronchial glands are enlarged.

Symptoms.—The incubation period is from seven to ten days. At first the symptoms are slight, being those of an ordinary cold, slight cough, some fever and no expectoration. This catarrhal stage lasts about a week or ten days, and is followed by the paroxysmal stage, which begins when the cough becomes more frequent and severe, and the characteristic "whoop" is recognized. The features are swollen and dusky, the skin livid and the eyes are injected. The paroxysm begins with a succession of short expiratory coughs which increase in intensity; there is then a deep inspiration, the air is drawn into the lungs, producing the "whoop." Several coughing fits may succeed each other, until a quantity of stringy mucus is expectorated and vomiting is produced. Food is ejected and in most cases a little blood. An ulcer under the tongue often forms. Rupture of a conjunctival or nasal blood-vessel sometimes happens. The urine is of high specific gravity, pale yellow, and contains much uric acid. The duration of the paroxysmal stage, in cases of ordinary severity, is usually from four to six weeks, although this has frequently been greatly shortened by osteopathic treatment. The convalescence period usually lasts four weeks, so the entire duration of an ordinary attack is from ten to twelve weeks, unless treated in the early stage and aborted or shortened.

Complications.—These are frequently numerous in severe cases. Hemorrhages are apt to occur in the form of petchia, especially about the forehead; epistaxis, hemoptysis, ecchymosis of

the conjunctiva, bronchial pneumonia, pleurisy, pericarditis, laryngitis, bronchitis, collapse of the lungs and interstitial emphysema may occur as complications. Sudden death has been caused by subdural hemorrhage.

Sequelæ.—Acute nephritis frequently occurs. All the viscera may undergo fatty degeneration which may eventually become a secondary tuberculosis. Permanent changes in the shape of the chest frequently occur, and there may be various nervous disturbances.

Diagnosis.—This is easily made as soon as the distinctive "whoop" is heard, and a positive diagnosis cannot be made without it. Measles may be a cause of confusion.

Prognosis.—When the many complications that may arise are taken into consideration, whooping cough must be regarded as a very fatal affection; nevertheless, many cases recover. The younger the child the greater the danger. The deaths occur chiefly among the children of the poor and in delicate infants.

Treatment.—In the beginning of the disease one may be able to cut the disease short; but after it has fully established itself the disease is apt to run its course, although the severity of the attack and liability of complications can be greatly lessened. The cervical and upper dorsal regions should be carefully examined, also the upper ribs. The disease is predisposed, most probably, by deranged vaso-motor innervation to the mucosa of the respiratory tract. Special attention should be paid the vagi and phrenic nerves. Lesions to the recurrent laryngeal nerves are apt to occur from subluxation of the first or second ribs. Lesions to the vagi are usually due to a disordered atlas or axis. Irritations of branches of the vagi will produce the spasm of the glottis, and also a relaxation of the diaphragm. Lesions to the phrenic are usually found at the third, fourth and fifth cervicals.

When the cyanotic symptoms arise, owing to the impeded respiration and interference with the heart actions, stimulate the heart's action and relieve the obstructed respiration by raising the upper ribs, especially those over the heart.

On the whole, treatment of the entire respiratory tract is demanded and thorough correction of the vertebræ and ribs and

relaxation of the muscles should be given. As in a number of diseases, only an outlined region can be given wherein one will find the lesion. Attention should be paid the diet for a few days; and the child should be warmly clad. Fresh air is a necessity. Local antiseptic sprays may be found beneficial. Do not neglect a case of whooping cough, as serious complications and sequelæ are liable to occur.

Influenza.

(La grippe).

Definition.—An acute, contagious disease caused by the bacillus of Pfeiffer; characterized by great prostration, catarrh of the respiratory and digestive tracts and by muscular pains, and followed by a fever. Serious complications are liable to occur, especially pneumonia. It generally occurs in an epidemic form. Mortality is not high, but danger lies in carelessness during and after an attack.

Lowered vitality from osteopathic lesions, poor food and insanitary surroundings predispose. Old people are likely to be attacked. The disease is highly contagious. That it is of microbic origin, the bacillus of Pfeiffer, can no longer be doubted. The origin of the bacillus has not yet been settled. The disease is probably communicated by contagion, spreading rapidly along lines of travel. The contagion most probably enters the system by way of the respiratory tract. Frequently pneumococci and streptococci are found with the baccilli, and their toxins are apt to lead to secondary infections.

No special anatomical lesions have been found, as uncomplicated cases recover. The lesions, therefore, are those of the complications. The complications are greatly varied. Pneumonia (lobar and lobular), pleurisy, endocarditis, severe bronchitis and nephritis may exist. They may either be the result of the action of the toxin or the bacillus may be carried in the blood, locate in a weakened portion of the body and thus cause the secondary infection.

Symptoms.—The incubation period is from two to four days, sometimes longer. The onset is usually sudden with a chill or

continued chilliness. Sometimes there is a severe rigor; the temperature rises suddenly to 102 or 104 degrees F. Headache; pain in the back and ribs; great prostration, and cardiac weakness, out of all proportion to the intensity of the fever, occur. Mental depression, restlessness, insomnia, and frequently delirium are among the nervous symptoms. In many cases there are coryza, sneezing and watering of the eyes as the first symptoms. Cough and copious expectoration soon follow these symptoms. Gastro-intestinal symptoms may be marked. Nausea and severe vomiting may usher in the attack, adding greatly to the general weakness. The pulse is feeble, small and frequently intermittent. Dyspnea may be a marked symptom. Widely different symptoms are presented by different cases; the same is true of the different epidemics.

Sequelæ.—The sequelæ are chronic gastro-intestinal catarrh, phthisis, chronic bronchitis and rarely abscess or gangrene of the lungs. Persistent headache, neuralgia, neuritis, insomnia, melancholia, mania, meningitis and locomotor ataxia are some of the nervous sequelæ.

Diagnosis.—In epidemic form the disease is easily diagnosed. Isolated cases are often mistaken for a "bad cold." Fever of short duration, marked prostration and the muscular pain are the diagnostic symptoms. The duration is usually from four to seven days. Convalescence is protracted. One attack predisposes to a second and relapses are frequent.

Prognosis.—This is favorable if the patient goes to bed or at least keeps to the house. Fatal cases are due to complications as a general rule; especially pneumonia.

Treatment.—The osteopathic treatment in all cases is simple, but effective. Rest in bed; attention to the regions involved by appropriate treatment; careful hygienic management, including drinking hot water and a light diet, will meet the requirements. Pay special attention to the bowels and kidneys. The osteopathic treatment required varies with the nature of the attack and consequently a definite method of treatment cannot be given. The case is to be treated by the same method as when the various affected organs are involved in like manner under other circum-

stances. And whether the attack assumes the **respiratory, gastro-intestinal,** or **nervous type,** definite predisposing osteopathic lesions will be found. The fever is treated in the usual way. The pain, aching and tired feeling of the patient are best relieved by careful treatment of the entire spine and by relaxation of contracted muscles. Dr. Still considers that the condition of extreme contraction of the spinal musculature which characterizes influenza results in interruption of the nervous and vascular systems. Great relief is experienced by the patient when the muscles of the legs are stretched and the internal and external rotary movements are executed. The patient should be kept in bed until the fever subsides. The general nervous system, the heart and the functional activity of respiration should be carefully watched. During the entire course of the disease the bowels should be kept open. This is best performed by treatment to the splanchnic nerves, and to the liver, bile ducts and intestines directly. If constipated at the onset, give a hot water enema.

The patient is to be protected from changes in the weather, particularly those who are at either extreme of life and who are weakened by chronic organic disease. The various complications are to be treated as when they are simple diseases. Cooling drinks should be used. Such food as milk, vegetables, gruels, eggs, etc., are to be given, but do not force the appetite.

Insist upon disinfection of the catarrhal discharges, chiefly the bronchial, which usually contain the bacilli of Pfeiffer. Isolate the patient when convenient and obtain pleasant surroundings if possible.

Dengue.

(Break-Bone Fever).

Definition.—An acute infectious disease; characterized by a double febrile paroxysm, severe pains in the muscles and joints and sometimes a skin eruption.

Etiology.—It is a disease of tropical and subtropical regions. Unhygienic conditions predispose to an attack. During an epidemic a single attack is the rule. The disease spreads from place to place along the lines of travel, attacking both sexes, and all

ages. It occurs in epidemics, practically affecting every one. No **morbid** anatomical observations have been made, as the disease rarely proves fatal.

Symptoms.—The incubation period lasts about four days. The onset is abrupt with a slight chill, headache, and extreme pain in the joints and muscles, of a boring or breaking character. The joints become red, swollen and painful. The fever rises gradually to 103 or 106 degrees F., or over. The pulse is rapid and full and the respirations are much quickened. The face is flushed, the tongue coated, the appetite is lost, and slight nausea occurs. "Black vomit," similar to that of yellow fever, has been observed in this disease. Hemorrhages from various organs may occur and the lymphatic glands are swollen. The urine is scanty and the bowels constipated. Febrile albuminuria and delirium are rare.

At the end of three or four days the temperature falls and there is a period of remission; the patient is free from pain, but profoundly prostrated. During this time the eruption generally appears, but is never constant in character. After a remission of two or three days, the symptoms reappear and a second febrile paroxysm sets in. This is usually milder and shorter than the first, lasting two or three days, when convalescence begins. The duration is, according to medical writers, from seven to ten days, and convalescence slow. By osteopathic treatment, E. B. Ligon has been able to confine the attack to four or five days duration; this is confirmed by the experience of N. Chapman.

Diagnosis.—During an epidemic the disease attacks all classes alike, and the distinct remission renders the diagnosis comparatively easy. An isolated case might be mistaken for acute rheumatism, but the absence of any glandular swelling or eruption, while the pain is more closely limited to the joints, will aid in the diagnosis. Care has to be taken that yellow fever is not mistaken for dengue.

Treatment.—The indications of the treatment are to maintain the patient's strength and to treat the leading symptoms as they arise. The severity of an attack can probably be lessened at the start by strong and thorough treatment of the sub-occipital,

upper dorsal, lower dorsal and lower lumbar regions, respectively, so as to control the large vascular areas by means of the vasomotor nerves of the cranial region, of the lungs, of the splanchnic region, and of the lower limbs, thus equalizing the entire vascular system. Ligon has observed that the cervical and lumbar regions are especially tender on the second day and the lower dorsal region on the third day. The most severe symptoms disappeared within a few hours after treatment and the attack was markedly shortened.

The high fever may be treated by the usual methods and by the external application of cold water. The pain is to be controlled, according to the region affected, by a correction of parts impinging upon the nerve tissues and by strong inhibition. The entire spinal region should be kept constantly in a relaxed condition, as far as muscular contractions are concerned. Particularly should the treatment be extensive along the spine during prostration. N. Chapman, in addition to the osteopathic treatment, has the patient drink considerable hot water; also employs the hot bath. The treatment frequently shortened the attack. During the entire attack of the disease, the patient should be kept in bed and a carefully regulated diet administered. A suitable change of air may hasten convalescence.

Cerebro-Spinal Meningitis.

Definition.—A specific, infectious disease caused most probably by the diplococcus intracellularis meningitis, occurring sporadically and in epidemics. It is characterized by inflammation of the membranes of the brain and spinal cord and an irregular clinical course.

Osteopathic Etiology and **Pathology.**—The specific cause of the cerebro-spinal meningitis is believed to be a micro-organism, the diplococcus meningitis. Lesions are found in the vertebræ corresponding to the cervical and dorsal enlargement of the cord, as well as in corresponding deep muscles; also, as is well known, the muscles of the entire back are severely contracted, especially of the cervical, upper and lower dorsal regions. The disease is not directly contagious. More commonly it attacks the young,

although it may occur at any age. Overexertion, prolonged marching in the heat, overcrowded and illy-ventilated buildings, barracks, tenements, and depressing mental influences are predisposing causes. Many times the disease occurs among the poorer classes. Sometimes the disease prevails in the country rather than in the city.

In cases that prove speedily fatal there may be no characteristic changes; simply marked congestion. Other cases in which death occurs after the disease has been fully developed, there is found every degree of inflammation from slight hyperemia to suppurative changes. There can be no doubt that the osteopathic lesion, as vertebral and rib lesions and deep muscular contractions, affects the circulation of the meninges of the brain and cord and thus favors the invasion of the specific micro-organism. The arteries, veins and sinuses are greatly engorged. The walls of the ventricles soften and the ventricles contain serous exudate. The brain matter may be congested and softened in spots. In the spinal membranes similar changes take place and at times there is extravasation of blood. The changes are more marked on the posterior than the anterior surface of the cord. Abscesses sometimes form. The exudate may follow the lymph sheaths of the cranial nerves, especially the auditory and optic. In long standing cases the membranes become thick and adherent and areas of softening or atrophy of the cortex develop.

The spleen may be normal in size, but when the fever has been intense, it is apt to be slightly enlarged. Bronchitis, pneumonia, endocarditis and pleurisy may occur. The liver may become hyperemic and the kidneys congested.

Symptoms.—The prodromes vary, although the onset is apt to be sudden with a decided chill; headache; vomiting, and pain in the neck and back, which is usually severe, but may be so slight as not to be noticed by the patient. The temperature rises to 101 to 102 degrees F., and the pulse is full and strong. Hyperesthesia is a prominent symptom. The muscles of the neck and back become rigid, and there are pains in the limbs. Orthotonos occurs more frequently than ophisthotonos. Convulsions are common in children. There may be paralysis, especially of the

muscles of the face and eyes. Delirium usually appears early; it may be mild, but it is often maniacal. The bowels are usually confined, though there may be diarrhea. There is leucocytosis; jaundice has been met with.

The urine is sometimes albuminous, and sugar has been noted in rare cases. The urine may be increased, but more often it is lessened as in other infectious diseases.

The cutaneous symptoms are important. Herpes facialis occurs shortly after the onset in more than half the cases. The contents of the vesicles may be purulent and one or two may coalesce. The petechial eruptions are occasionally numerous and cover the entire skin; they do not disappear upon pressure and the number of spots varies greatly. Other eruptions as sudamina, ecthyma, pemphigus, urticaria, erysipelas, rose colored spots, and gangrene of the skin (rarely) have been met with.

In cases that are **rapidly fatal,** the onset is sudden, usually with violent chills, headache, depression, and in a few hours coma and collapse, which are soon followed by a fatal termination. The temperature may rise slightly, but it is often subnormal. The pulse is feeble; breathing is labored. These cases occur more frequently at the beginning of an epidemic. They occasionally occur sporadically.

The **abortive** form terminates abruptly after the development of one or more pronounced, characteristic symptoms.

The **mild** form can only be recognized during the prevalence of an epidemic. The symptoms are very mild; slight vomiting, little or no fever, headache and slight pain in the back and limbs.

The **intermittent** form is characterized by exacerbations in the fever every day or second day. The strict periodicity seen in malaria is not observed; the fever resembles that of pyemia.

Complications.—Pneumonia (lobar and lobular) is a frequent complication. Pleurisy pericarditis, parotitis, arthritis, enteritis, optic neuritis and otitis media may be other complications.

Sequelæ.—Blindness, deafness, keratitis (rarely), persistent headache, chronic hydrocephalus, abscess of the brain, mental feebleness, defective articulation, aphasia, and paralysis of certain cranial nerves or of the lower extremities have occurred.

Diagnosis.—Typhoid fever begins slowly and is unaccompanied by vomiting, muscular spasms or rigidity, or hyperesthesia. In typhoid the fever is higher and there is a characteristic temperature curve.

Tubercular meningitis is not epidemic and has no characteristic eruption. It is usually less sudden in its development and is invariably fatal. Retraction of the neck, muscular spasms of the legs and arms are not so marked as in spinal meningitis.

Pneumonia may be complicated with meningitis, especially when the meningitis is confined to the cerebrum. If the case is not seen early, it is almost impossible to say which is the primary affection, as pneumonia may have meningeal complications or cerebro-spinal meningitis may be associated with pneumonia. There will be motor spasms and tremors, but the head is rarely retracted, and there is less myalgiac pain than in cerebro-spinal meningitis.

Prognosis.—This varies according to the severity of the type. It is a grave disease; the old and young almost invariably perish. Cases have been treated successfully by several osteopaths. The duration is very variable—from two or three days to weeks or even months, but probably in all cases this time can be materially shortened by judicious osteopathic treatment. Convalescence is very slow and relapses are prone to occur.

Treatment.—The osteopathic treatment of cerebro-spinal meningitis requires most thorough work along the spinal column, especially the cervical region and the region of the dorsal enlargement of the spinal cord, in relaxing and keeping relaxed the deep muscles on either side of the spine and correcting the derangements of the vertebræ, particularly in the upper cervical spine. Such treatment has a marked effect on the circulation of the spinal cord and brain. Probably, a large amount of the work along the spine, in all cases where muscles are relaxed, has a direct effect upon the circulation of the spinal cord. This treatment constitutes the primary osteopathic work in cerebro-spinal fever and should be vigorously and continuously applied until a cure is obtained. Even in chronic cases where limbs have been greatly affected by pressure upon the nerve centers, due to a thickened membrane,

continued osteopathic treatment along the spine has had a marked effect in absorbing the pathological condition and restoring strength.

The preceding spinal treatment is also a very great safeguard in keeping the various viscera healthy and thus preventing complications. In all constitutional diseases of an acute nature, it is a wise precaution to thoroughly examine the entire length of the spinal column at each visit; and if such precaution is taken many serious complications will never occur that might otherwise have taken place.

The patient should be isolated in a somewhat darkened room, and care taken that the disease is not allowed to spread. The diet should bé a nutritious one of milk and broths. Cold to the head and spine will be of service in controlling the inflammation; it should be applied with an ice-cap and a spinal ice-bag. Sponging the body should be employed if the temperature is above 102 degrees F. The general bath, as in typhoid fever, may be employed if practicable. Direct treatment to the bowels, kidneys, liver and spleen should be given at each treatment.

DIPHTHERIA.

(Membranous Croup).

Definition.—An acute, contagious disease, caused by the Klebs-Loeffler bacillus, and characterized by a mei anous exudation on the mucous membrane of the fauces, larynx or nose, and by constitutional symptoms. The presence of the Klebs-Loeffler bacillus distinguishes true diphtheria from any other form of membranous inflammation. The term diphtheroid is applied to all such forms as are not due to the Klebs-Loeffler bacillus.

Osteopathic Etiology and **Pathology.**—The exciting cause is the Klebs-Loeffler bacillus. The predisposing cause is obstruction to the circulation of the pharynx and tonsils by sub-dislocations of upper cervical vertebræ, and even the lower cervical and upper dorsal, and severely contracted deep muscles of the neck. The stasis of blood favors the growth of the bacillus.

Link[1] says: "The cause of nasal, pharyngeal or laryngeal diphtheria is obstruction of the blood and lymph through the neck and the obstruction occurs as a result of lesions in the cervical region, affecting the cervical sympathetics, or lesions in the upper thoracic region whence the vaso-motor fibers arise. A derangement of the vertebral articulation of the first rib is usually found. (This affects the stellate ganglion and fibers of the sympathetic chain). These lesions cause a condition of lowered vitality of the mucosa of the nose and throat; the abnormal secretion favoring the rapid multiplication of the Klebs-Loeffler bacillus—the exciting cause of the disease."

Dr. Still believes that, among other lesions, contracting of tissues involving the scaleni and disturbing the relations of the first rib with the clavicle and vertebra are causative factors. The constitutional symptoms are produced by the toxins generated by the bacillus and absorbed from the diseased spots by the lymphatics and blood-vessels. The bacillus is non-motile and does not penetrate the mucosa, but remains very near the site of the local changes. The bacillus is very resistent and can maintain an existence for months outside of the body. There is great variation in the virulence of the Klebs-Loeffler bacillus; it has been found in perfectly healthy throats, and sometimes the bacillus may exist in the throat after an attack of diphtheria for months after all the membrane has disappeared. It has also been found in cases of simple catarrhal angina without membrane, and in simple lacunar tonsilitis. Of the bacteria associated with the bacillus of diphtheria, the streptococcus pyogenes is the most common and probably the most active, as cases of general infection with this organism have been found in diphtheria. The staphylococcus albus aurens, micrococcus lanceolatus and bacillus coli communis are also found.

The contagion is communicated, as a rule, through the air, by means of fomites from the membranous exudate or discharges from the diphtheritic patients, or during convalescence, from secretions of the nose and throat. Most cases occur in childhood, between the second and seventh year. The disease is most pre-

1. E. C. Link, Diphtheria—The Bulletin, 1905.

valent in the cold autumn and spring months. It is most frequently met with in temperate and cold climates. Defective drainage, catarrhal conditions of the throat, enlarged tonsils, general weakness, and feeble resisting power are predisposing factors. One attack does not confer immunity from another, but rather predisposes to a second.

The **false membrane** is usually found on the tonsils, the pillars of the fauces and the pharynx, and in fatal cases it may be very extensive and involve the uvula, the soft palate and the posterior nares, and even the trachea and bronchi. At first this membrane is yellowish white, but later may become gray; it is more or less adherent and when torn off leaves a raw surface. The diphtheritic poison coming in contact with the throat leads to, first, a necrosis or death of the epithelial cells, especially the more superficial, and the leucocytes. The second change is the hyaline transformation, and simultaneously coagulation; hence the term coagulation-necrosis. The irritation produced by the bacilli causes a migration of leucocytes and these are destroyed and undergo hyaline transformation. This process procedes from without inward and is usually superficial, and the necrosis may be extensive, involving the deeper tissues, causing ulceration and a gangrenous condition of the parts. The erosion of the tonsils may be so severe as to attack the carotid artery. The lymphatic glands are considerably swollen. The spleen is commonly enlarged. The kidneys show parenchymatous changes. The blood is dark and fluid. Fatty degeneration of the heart is not infrequent. Sometimes fibrinous coagula are found in the heart. Capillary bronchitis, catarrhal pneumonia and areas of collapse are almost constantly found on examination of the lungs in fatal cases.

Symptoms.—The incubation period varies from two to ten days. According to the location, diphtheria may be divided into pharyngeal, laryngeal and nasal forms.

In **Pharyngeal Diphtheria** there is first a slight chill or chilliness, followed by fever and sore throat, both of which increase rapidly. The throat is swollen and red and the child complains of difficult swallowing. The membrane begins on the tonsils in

the form of grayish-white patches; it then spreads from the tonsils to the soft palate, sometimes covering the uvula. The glands in the neck are swollen and tender. The temperature rises to 102 or 104 degrees F. The pulse is rapid and feeble, ranging from 120 to 140. There is loss of appetite and usually grave constitutional symptoms for a few days. The average duration is from one to two weeks.

Laryngeal Diphtheria (Membranous Croup) may be secondary to extension from the fauces or it may be primary. At first there is slight hoarseness and a harsh, metallic, ringing cough. These symptoms may persist for a day or two, when the child suddenly becomes worse; there is marked dyspnea and the lips and finger tips become livid. The child soon becomes very restless. The temperature may be slightly above normal and the pulse increased in frequency. In favorable cases the dyspnea is not very marked and the child probably will have only one or two paroxysms, when it will fall asleep and wake in the morning feeling very comfortable. The next night, however, the attack may return with greater severity. In extreme cases death may result from suffocation. In some cases the suffocation is slower and results from extension of the membrane downward into the bronchi. Dr. Still finds same conditions as in diphtheria, but also that the hyoid is involved with the superior laryngeal nerve. The sacral and lumbar nerves are also involved.

Nasal Diphtheria is generally secondary, but it may be a primary affection. In many cases no membrane is found; in others there may be a pseudo-membrane formed in the nose, but there is an entire absence of any constitutional disturbance. The Klebs-Loeffler bacillus is sometimes present in these membranes. Nasal diphtheria is apt to be a very grave type of the disease. The constitutional symptoms are grave—great prostration, high fever, marked glandular swelling, irritating and offensive discharges from the nose, and epistaxis. Inflammation occasionally extends through the tear duct to the conjunctiva.

A diphtheritic membrane may grow where the skin has been cut or bruised, but the bacillus cannot live on normal skin. It flourishes on a raw, moist surface and membranes have grown on

the lips, tongue, vulva, glans penis, and on ulcerative surfaces and wounds. Diphtheria occurs occasionally in the conjunctiva and the external auditory meatus.

Complications and **Sequelæ.**—The complications and sequelæ are hemorrhages from the nose and throat, skin rashes—especially diffused erythema urticaria and sometimes purpura; also capillary bronchitis, pulmonary collapse, catarrhal pneumonia, and gangrene of the lungs. Albuminaria, myocarditis, endocarditis, arthritis, otitis media, and paralysis have occurred.

Diagnosis.—The presence of the Klebs-Loeffler bacillus will at once decide the diagnosis of true diphtheria.

Prognosis.—The prognosis should always be guarded. The nasal and laryngeal forms are always grave. The causes of death are involvement of the larynx, septic infection, sudden heart failure, broncho-pneumonia during convalescence, and rarely, uremia.

Treatment.—Hygienic and prophylactic measures are important. A room should be selected that is ventilated and exposed to the sunlight. All unnecessary articles of furniture should be removed. Great care must be taken against the spread of the disease. Always isolate the patient and disinfect everything that has come in contact with him. The greatest danger lies in the spread of the disease during convalescence and in the ambulatory form, when patients are about and coming in contact with individuals, especially children with catarrhal conditions of the nose and throat. The physician should be careful about disinfecting himself.

In view of the facts that C. E. Still and several other osteopaths have treated successfully numerous cases of diphtheria and that the osteopathic treatment is peculiarly indicated and effective, the probable requirement of antitoxin (the use of which we do not feel called upon to discuss) would be lessened. Relative to the antitoxin Osler says: "The principle of action depends on the circumstance that the blood-serum of an animal rendered immune, when introduced into another animal, protects it from infection with the diphtheria bacilli, and has also an important curative influence upon diphtheria, whether

artifically given to animals, or spontaneously acquired by man."

The local treatment should be carefully, but vigorously, given. By proper treatment of the throat the extension of the disease may be prevented. The muscles about the throat, especially the deep ones, should be thoroughly relaxed and the cervical vertebræ corrected if displaced. The vaso-motor nerves to the blood-vessels of the affected region require careful treatment at the superior cervical ganglion, and the cervical lymphatics from the atlas to the first rib should be closely watched. The nerves to control are the vagi, glosso-pharyngeal, spinal accessory, and sympathetic nerves to the pharyngeal plexus, and in cases of nasal diphtheria the fifth nerve has to be carefully treated. An external treatment to the pharynx will have the greatest effect on these nerves. An internal treatment to the nerves of the soft palate will be of considerable service. The parts diseased should be disinfected and kept as clean as possible. Bichloride of mercury (1:4000) used as a spray will be found satisfactory, although there are several other disinfectants and germicides that may be used. Pellets of ice in the mouth will be a comfort to the patient. Cold applied externally will be found best for the adult; heat externally is better for the child.

Every possible means should be used to prevent the disease from spreading. One of the chief dangers of diphtheria is the spread of the disease to the larynx, trachea and bronchi. When the disease has extended to these parts it presents all the symptoms of **true croup.** The deep cervical muscles should be thoroughly relaxed to aid in relieving the passive hyperemia and with a view of disorganizing the exudate. Attention should be given to the upper ribs as interferences with the vaso-motor nerves of the mucous membrane of the trachea and bronchial tubes usually occur. Direct treatment over the larynx and local treatment through the mouth upon the soft palate will be of aid. A thorough relaxation of all the dorsal muscles, even as low as the tenth dorsal, should be given. Inhalations of slaked, freshly burnt lime may be useful in loosening the exudation. In desperate cases tracheotomy or intubation of the larynx should be performed.

Willard[1] says, relative to membranous croup: "It matters not whether or not the laryngeal inflammation was immediately caused by a germ; it would not, nor could not, have been produced by such had there not been an unnatural condition of the circulation of and about the larynx."

A constitutional treatment should always be given with a view of preventing the spread of the disease from one organ to another and to prevent complications. The heart's action should be carefully watched throughout the entire course of the disease. Treatment of the spinal cord will guard against paralysis that sometimes follows the venous hyperemia of the vascular linings and substance of the brain and spinal cord. Pay particular attention to the upper dorsal region to prevent possible heart involvement. (Post-diptheritic paralysis has been successfully treated osteopathically.) Attention to the splanchnics and to the abdomen directly will tend to keep the stomach, liver, kidneys, and intestines in a healthy state. The diet of the patient should consist of liquid food—milk, broths, meat juice, raw eggs and barley water. Let the patient drink freely of water. Treatment of the rectum may be employed with benefit when the pharynx is greatly disturbed.

Various **sequelæ** and **complications** are best relieved or prevented, according to Link, as follows: "First, limiting the production of toxins by a most thorough relaxation of the muscles of the neck, thereby favoring the unobstructed circulation of the blood and lymph; second, by the correction of lesions which affect the vaso-motor of the head and neck; third, by spinal treatment affecting the vaso-motor to the areas involved; fourth, by increasing the activity of the excretory organs, by treatment in the splanchnic and lumbar areas, that the toxins may be more rapidly eliminated. In cases where laryngeal stenosis is marked and suffocation is imminent, intubation should not be delayed."

1. **A. M. Willard, Membraneous Croup—Journal of Osteopathy, March, 1904.**

Dysentery.

(Bloody Flux).

Dsyentery is an infectious disease wherein the large intestine is inflamed, with ulceration of the mucous membrane; is characterized, clinically, by frequent stools containing blood and mucus; fever and exhaustion. **Osteopathic lesions** of an osseous character and deep muscular contractions of the lumbar region are always present. These involve the vaso-motor nerves to blood-vessels and lymph channels. Catarrh of the intestinal tract is an important predisposing cause. The disease usually occurs in the summer and autumn, and is more common in hot, malarial regions, although it is found in various climates. Unhygienic conditions are also important predisposing factors. In no disease more than dysentery does specific correction of the osseous lesion effect quicker and more satisfactory results.

Medical writers class dysentery, etiologically, under the bacillary and amebic varieties. Bacillary dysentery is subdivided into catarrhal and diphtheritic. Probably the bacillus dysenteriæ is the exciting cause of both.

Acute Catarrhal Dysentery.

This is the variety most frequently found in temperate climates. It occurs either sporadically or endemically. There is a catarrhal inflammation of part or the whole of the large bowel.

Osteopathic Etiology and **Pathology.**—Sudden atmospheric changes and simple irritants, such as unripe and indigestible food, are usually the immediate causes. The primary cause of acute catarrhal dysentery is always found by the osteopath to be due to spinal derangements in the lumbar region. The lesion is generally a slight lateral deviation of a vertebra, although the displaced vertebra may be posterior or anterior. It is generally found at the second or third lumbar; still, the trouble may be found at any point in the lumbar section. The lesion involves vaso-motor nerves to the intestinal mucous membrane, thus causing the inflammation. The drinking of impure water in itself may not be the cause of the disease, but is a favorable medium for

the development of the organisms which may excite it. Dyspeptic conditions and constipation seem to predispose to the disease.

The mucous membrane is injected and swollen and often covered with bloody mucus. The follicles of Lieberkuhn are enlarged from retention of their contents, the result of the swelling; the follicles are often ruptured and the mucous membrane sloughs off in patches, forming ulcers. These may extend along the whole colon and occasionally into the ileum.

Symptoms.—Diarrhea is the most common initial symptom; the stools being copious and painless. The stools soon become small and frequent, covered with mucus and streaked with blood. These are passed with straining and tenesmus, accompanied by colicky abdominal pains of a griping character. Chills are rare. The tongue is furred and moist; later it becomes dry. Nausea and vomiting may be present, but not as a rule. There is slight fever and often excessive thirst. Later the stools become green in color, due to the bile which causes a burning sensation in the rectum.

On examination there are found red blood-corpuscles and leucocytes, and large, round and oval epitheloid cells containing fat drops and vacuoles. No specific organisms are found and bacteria are scarce. In mild cases, the course is about eight days; severe cases subside within four weeks, but if the **osteopathic treatment** is careful and specific, the usual duration can generally be reduced one-half.

Prognosis.—The prognosis is generally favorable when the disease is treated properly. The condition may become chronic.

Treatment.—Invariably a lesion of the spinal column is found at the third and fourth lumbars or near by. It is generally a subluxation, of a lateral nature, between these vertebræ: rarely is the lesion above or below this point. The treatment should be applied immediately and directly to this region. Time is valuable in these cases and one should go to work at once to correct the irritation. An attempt should be made at each treatment to correct the disorder. This should not be delayed by wasting time in relaxing muscles and inhibiting, for usually this gives only temporary relief. When a slight movement has been accomplished

between disordered vertebræ, treatment should be stopped and results watched, because the movement may have released all obstructions or irritations causing the disease. In many cases, to get an anatomically correct spine is an impossibility, from the fact that the displacements may be of long standing and naturally the luxated and subluxated vertebræ have conformed themselves to some extent to their unnatural position. In other words, what has been lost in the form and size of a vertebra may have been gained by reducing the effect of the lesion to a minimum. A lesion of this nature at the third lumbar impairs the innervation to the colon and consequently produces a stasis of blood in the mesenteric circulation, followed by inflammation, bloody discharges, cramps, etc. A single treatment is usually quite sufficient in milder cases. Other cases require treatment every few hours or thereabouts, until cured.

Treatment directly over the abdomen through the mesenteric circulation and glands is an effective treatment in most cases and especially when the attack is severe. It relaxes the tissues about the mesentery, thereby relieving the stasis and freeing the circulation.

The constant desire to defecate, that is common to many cases, is a very annoying symptom. Strong, thorough treatment over the sacral region, by inhibition over the sacral foramina and by relaxing the tense muscles of the sacrum, will relieve this condition. In relaxing these muscles, place the whole hand against the muscles and push upward toward the occiput. This treatment inhibits the nerves to the rectum and lessens the **tenesmus.**

Attention should be paid to the liver to keep it active. Washing out the large bowel with tepid water produces a soothing effect, besides having a tendency to allay inflammation. The blandest of liquid foods, as peptonized or boiled milk, broths, beef juice, barley and rice, should be given. The patient should remain in bed until completely cured.

Diphtheritic Dysentery.

This is by far the most serious of all forms of dysentery.

Etiology.—As a primary disease, coming on acutely, it is

due to the bacillus dysenteriæ. In diphtheritic dysentery there is a true diphtheritic exudation. It usually occurs in armies, ships, etc. This is frequently fatal.

As a **secondary disease,** it occurs as a terminal event in many acute and chronic diseases. It is sometimes found in chronic Bright's disease and it is not infrequent in chronic heart disease, cachetic states and in acute diseases with pneumonia. This variety prevails in epidemic form, often attacking camps, hospitals and crowded cities.

Pathology.—In milder forms the tops of the folds of the colon are capped with a thin yellowish membrane. In severer forms the mucous membrane is intensely swollen. The colon is greatly enlarged and covered with a false membrane resulting from coagulation-necrosis. This membrane is thick and adherent and whenever it becomes separated there is ulceration and sloughing.

Symptoms.—Chill and high fever with prostration. Severe pains in the abdomen and tenesmus. Frequent bloody stools containing the false membrane. In a secondary form these are less severe than in the primary. They are the ordinary symptoms of the catarrhal form, intensified with the following typhoid symptoms: muttering delirium, stupor, brown furred tongue, bloody stools containing false membrane and sloughs.

Complications and **Sequelæ.**—Abscess of the liver is by far the most serious complication and is most frequently caused by foci of suppuration forming in and extending along the vessels of the portal system and passing as an embolus into the liver. A local peritonitis may arise by extension of the inflammation and perforation. This is not a very rare complication and may be followed by peritonitis which is usually fatal. Paralysis in the form of paraplegia is not an uncommon sequela. In severe, long continued cases pleurisy, pericarditis, endocarditis and occasionally pyemic manifestations and chronic Bright's disease may be sequelæ.

Diagnosis.—The diagnotic symptoms are the same as in the other forms of dysentery, but manifested to a greater degree.

The finding of the false membrane and the occurrence of the disease in epidemic form are important.

Prognosis.—This is the most unfavorable of all forms of dysentery, most cases proving fatal.

Treatment.—Isolate the patient and disinfect evacuations. Pay attention to the drinking water and all hygienic measures. Correction of the lumbar lesions is indicated, and strong stimulation of the splanchnic nerves with inhibition of the vagi to lessen peristalsis, especially when the necrotic membrane is being removed, so that the ulcerated surface will heal more quickly.

Peptonized milk, beef peptonoids and beef juice are the best foods. Foods that are non-irritating, but nourishing and leave as little residue as possible, are the ones required.

Amebic or Tropical Dysentery.

This form prevails in the tropical and subtropical countries for the most part, and is caused by an animal parasite, the ameba coli or dysenteriæ. This is constantly found in the stools, the tissue of the intestine and also in the pus of the liver abscesses, which are secondary to dysentery. Amebæ are sometimes found in the stools of healthy men, having probably entered the system through the drinking water.

Pathologically, the mucous membrane is swollen. This is due to the edema and cellular infiltration of the submucous coat. Round, oval or irregular, undermined ulcers are found. The lower part of the ileum may be invaded with these ulcers, but rarely. The ulcers may be so deep that their floor is formed of the muscular or even the serous coat. The disease progresses through infiltration of the connective tissue layer of the bowels. This causes superficial necrosis and the formation of the irregular, undermined ulcers. In some cases false membranes and sloughs are formed.

Symptoms.—The onset may be either sudden or gradual, with a very irregular diarrhea, moderate fever, and copious, liquid stools, abounding with the amebæ coli. The straining is less severe and persistent than in catarrhal dysentery and may be absent. Sometimes there is nausea and vomiting.

Complications.—Abscess of the liver is the most common, which may be single or multiple. When single it generally involves the right lobe. Multiple abscesses are small and generally superficial. The abscess walls are ragged and necrotic, the older abscesses have whitish, smooth, fibrous walls. These abscesses do not contain pure pus, but matter consisting of a fatty and granular debris containing the amebæ and a few cellular elements. Sometimes they extend into the lung. In addition to the abscesses there are found in the liver local necroses of the parenchyma scattered throughout the organ and due to the action of the amebæ.

Diagnosis.—Microscopic examination of the stools. Cases last from six to twelve weeks. The termination is most variable in the uncomplicated cases.

Prognosis.—Is generally unfavorable on account of the exhausted condition of the patient. Relapses often occur and the case may become chronic. Cases have been treated osteopathically with success.

Treatment.—In this form of dysentery the treatment is largely the same as in the acute catarrhal form. The spinal lesions affect the innervation to the intestine, thus producing a stasis in the circulation; this condition favoring, and in fact, inviting the retention of the ameba coli in the system at this point.

The diet is the same as in other forms of dysentery. Rectal injections and hot applications to the abdomen are useful. In all cases where strong treatment has been given to the spinal column, a quieting treatment to the nervous system and an inhibitory treatment to the heart will be gratefully received by the sufferer. Both of these effects can be accomplished at the same time by simple inhibition of the occipital nerves. The stools should be taken care of immediately and disinfcted.

Chronic Dysentery.

This is generally resultant from an acute attack, though the amebic form may be sub-acute from the onset.

Pathologically, the coats are generally thickened, especially the submucosa and the muscular coats being hypertrophied. Ulcers are usually present, although there are cases in which there

are no ulcers. Cicatricial contractions sometimes follow and the calibre of the bowels is reduced, strictures being rare.

Symptoms.—There is a progressive loss of flesh and strength, little or no tenesmus, slight, colicky pain and extreme anemia. The stools contain mucus, at times blood, and the bowels move from two to twelve times a day.

Diagnosis.—The history of the initial symptoms will establish the diagnosis. It is not always possible to distinguish between chronic dysentery and chronic diarrhea. The duration is from a few months to several years, although osteopathic treatment has proven very efficient in many instances.

Treatment.—Rest and a liquid diet are most essential. Foods that are easily assimilable and nourishing, with a minimum amount of residue, are required. Beef juice, beef peptonoids and peptonized milk are the types of food. Change of air, hygienic measures and environment are important.

In cases that become chronic, the spinal column oftentimes exhibits lesions above and below the lumbar region. Undoubtedly they are lesions of secondary importance in comparison to the lumbar lesions, but it is important that they be corrected. The treatment requires thorough, careful work of the disordered spinal column and lower ribs. Occasionally a slight kyphosis is present in the dorso-lumbar region that demands persistent work in order to correct it. An occasional rectal injection is beneficial, especially in cases that have slight ulceration of the sigmoid flexure or rectum causing colicky pains and a few loose stools in the morning, the patient being fairly comfortable during the rest of the day.

Erysipelas.

Definition.—An acute, infectious, specific disease, characterized by a peculiar inflammation of the skin, due to the streptococcus erysipelatis, with a tendency to spread.

Osteopathic Etiology and **Pathology.**—Osteopathically, lesions are found to the vaso-motor nerves and lymphatics of the affected area. These lead to congestion and predispose to infection. It occurs in epidemic form, especially in the spring of

the year. One attack predisposes to a second. Family predisposition exercises a slight influence. Abrasions, lacerated wounds, especially of the scalp, may be the starting point of an attack. Persons having skin diseases and wounds, and women who have been recently delivered are liable to be affected. Chronic Bright's disease, chronic alcoholism, syphilis, debility, phthisis, organic heart disease and unhyigenic surroundings are predisposing causes.

The specific virus is the streptococcus erysipelatis, which acts as a local irritant producing the dermatitis. These are found in the lymph vessels and cutaneous connective tissue. The fever and constitutional symptoms are due to toxic agents.

It is a simple inflammation of the skin, and if uncomplicated, no other structures are involved. Subcutaneous and mucous tissues may be involved, but rarely; if so, there is apt to be suppuration. Visceral complications are numerous and are of a septic character. Septic endocarditis, pericarditis, and pleuritis may occur. Infarcts have occurred in the spleen, kidneys and lungs.

Symptoms.—The incubation period varies from seven to fourteen days. The stage of invasion is often marked by a chill, followed by fever, which rapidly rises to 104 or 105 degrees F. If there is a local abrasion the spot becomes reddened; but if it is idiopathic, it begins as a small, red, burning spot, usually on the face or over the bridge of the nose. It spreads rapidly, the patch being elevated above the surrounding tissue. The swelling may be so great as to close the eyes and distort the features. The cervical lymph glands are swollen. The temperature continues high for four or five days and falls by crisis. The eruption beigns to subside and a moderate desquamation occurs. If the disease takes a fresh start the fever again rises and continues as long as the disease spreads. There is usually headache and sometimes delirium. The tongue is furred, bowels constipated, and there are headache and restlessness. As a result of intense infiltration the part may become gangrenous. Suppuration frequently occurs in facial erysipelas. The inflammation may extend to the mucous membrane of the throat and mouth.

Complications.—The complications are meningitis, edema

of the glottis, pneumonia, nephritis, ulcerative endocarditis and septicemia. Albuminuria is almost always constant.

Diagnosis.—This is not difficult. The fever, the acuteness of the disease, the rapidly spreading eruption, and the constitutional disturbances will serve to distinguish it from all others.

Prognosis.—This is usually favorable; healthy persons rarely die. Convalescence may be slow.

Treatment.—A number of cases of erysipelas have been cured by correcting disorders in the region of the second, third, fourth and fifth dorsals. The lesions are principally subluxations of the ribs and severely contracted muscles. The disorder at the points named interferes with the vaso-motor nerves to the face, thus predisposing to an attack of erysipelas by allowing the micro-organism congenial tissue for its devastations. In other cases derangements have been found higher than the upper dorsal, principally through the middle and upper cervical vertebræ. Lesions in these regions would also interfere with vaso-motor fibres, especially through the fifth nerve directly.

The treatments on the whole is to examine for lesions to the innervation of the affected region and remove them, besides giving special attention to the bowels, a nutritious diet, and absolute rest. The patient should be isolated as there is danger of the disease spreading. In cases where there is much restlessness and insomnia, treat the upper cervical region, especially the deep posterior muscles[1].

Yellow Fever.

Definition.—An acute, infectious disease, characterized by a febrile paroxysm followed by short remission and then relapse, jaundice, toxemia, suppression of the urine, and gastric hemorrhage; is probably due to the action of a specific parasite as yet unknown.

Osteopathic Etiology and **Pathology.**—While a specific germ must be the cause of yellow fever, if the theory of its spread by the mosquito is valid, it has not as yet been isolated. Extended tests by United States Army surgeons in Cuba seem to show conclusively that the infection is alone carried by the *stegomyia*

1. See Dr. Still—Philosophy and Mechanical Principles of Osteopathy.

fasciatus, but "It remains somewhat uncertain whether the mosquito is the sole means of transmission." (Anders). Season is the chief predisposing cause as the outbreak is usually in summer and a frost ends its spread. Immunity is generally conferred by one attack. Tucker[1] noted that all cases examined had liver lesions and that most of the patients were of the malarial or bilious type. Spinal lesions were not marked in some cases, but when present were in the liver and renal areas. Tete[2] believes it to be a virus secreted in the human organism under certain atmospheric and other conditions in certain types, i. e. people subject to hepatic and renal disturbances. He also says the vagus is an important factor.

Pathologically, there is more or less jaundice and hemorrhagic extravasations under the skin. The blood serum is red-tinted, owing to the destruction of the red cells. The liver is pale and presents extensive fatty degeneration, with necrotic masses in and between the cells. The gastro-intestinal mucous membrane is swollen, congested and presents numerous minute hemorrhages. The kidneys show parenchymatous inflammation. The spleen is not enlarged. The heart sometimes shows fatty degeneration. The stomach contains more or less of the "black vomit," which is a mixture of transuded serum and transformed blood pigment.

Symptoms.—The incubation period varies from one to five days. The onset is sudden, usually without preliminary symptoms. The attack generally begins with a chill, followed at once by headache and pains in the loins and legs. The fever rises rapidly to 102 or 105 degrees F. The pulse is accelerated, the face is flushed, the tongue is coated, the throat sore, the bowels constipated and the urine scanty and albuminous. Recent observers state that bile is present in most cases before the albumin is noted. Nausea and vomiting may be present at the onset, but become more severe about the second or third day when the black vomit appears. The **febrile stage,** or stage of invasion, lasts from a few hours to several days and is followed by a decline in

1. Journal of Osteopathy, October 1905.
2. Journal of Osteopathy, October 1905.

the fever when the severity of the other symptoms abates. This is called the **stage of remission** and in favorable cases convalescence sets in or the patient may pass into the second febrile paroxysm. The temperature rises again, jaundice appears rapidly, nausea and vomiting return. The tongue becomes dry and coated. The stools are black and offensive, the urine is albuminous, scanty and may be suppressed; there may also be hematuria. Death may occur from exhaustion or from uremia. Recovery may follow the gravest symptoms, even when there has been black vomit. The duration of the entire attack covers about one week. Relapses sometimes occur.

Price says there is a point in differential diagnosis in yellow fever and it is a symptom not met with in any other febrile affection. It is the progressive fall of the pulse rate during the congestive stage of the first sixty or seventy hours, i. e., a variation of from five to ten beats less each morning and evening. He adds, "As long as the kidneys are active there is but little to fear."

Diagnosis.—Remittent fever has not the deep jaundice, the clear mind, the black vomit, or the albuminuria of yellow fever. The enlarged spleen and the presence of the organism of Laveran in the blood in remittent fever will decide the diagnosis. **Dengue** is sometimes confused with yellow fever.

Prognosis.—This is always a grave disease, and in its severe forms very fatal. Recovery, however, may occur after the severest symptoms have been manifested. Black vomit is not always a fatal sign. Enough cases have been treated osteopathically to state that it is particularly effective. Improved sanitation is doing much to reduce mortality.

Treatment.—Prophylactic treatment should be carefully carried out. All patients should be quarantined and carefully screened so they cannot be bitten by the mosquito and the disease spread further. People that are not acclimated should keep away from infected districts. All pools, cisterns and other places which can breed mosquitoes should be drained or screened. A systematic warfare should be waged against them. The patient must be put to bed at once and plentifully supplied with fresh air. Everything must be scrupulously clean—body and bed

linen. Use a tube for nourishment and a bed-pan for excretions as the patient must not make the slightest exertion.

Spinal lesions may or may not be found. They have been observed in the cervical, eighth dorsal and second lumbar.

The treatment on the whole is symptomatic. The chills and fever of the first stage should be controlled by thorough work at the upper cervical, upper dorsal, lower dorsal and lower lumbar regions. Treatment at these points controls the superficial and deep vascular areas of the body through the vaso-motor nerves. The irritable stomach, delirium and severe neuralgic pains of the head, back, epigastrium and limbs are to be treated according to the conditions and severity of the symptoms. The kidneys and bowels should be watched carefully, and at the onset should be freely opened and control of the kidneys never lost. Let the patient drink freely of water, which will aid. Hydrotherapeutic measures, as a cold bath or sponging, may be employed to aid in controlling the fever, the nervous symptoms, and the eliminative power of the excretory organs. Discontinue the use of hydrotherapy when a spontaneous fall of temperature occurs.

At the beginning of the first stage and during the stage of remission are the periods that the osteopath should do very effectual work by paying particular attention to the four large vascular areas of the body, viz.: head, lungs, abdomen and legs. Treat the vaso-motor nerves to these regions, thoroughly, as given in the treatment of the first stage. During the third stage everything should be done that is possible to support the system. Ice slowly dissolved in the mouth will be of aid to an irritable stomach. Hemorrhages and the various symptoms are to be treated as they arise.

Good nursing, dieting, ventilation and keeping the skin, kidneys and bowels active are the primary points to consider. During the period of depression; the heart most be closely watched. The diet should be a light, liquid one, of the nature of peptonized milk or light broths. No food is recommended by some at the onset nor until the crisis is passed. Others feed during the stage of remission and give stimulants. During the last stage rectal feeding is suggested if gastric irritability is pronounced.

Tetanus.

(Lock-jaw).

Definition.—An infectious disease, caused by the tetanus bacillus, characterized by persistent, tonic spasms of the muscles with violent exacerbations.

Etiology and **Pathology.**—The exciting cause of tetanus is a specific bacillus which usually gains access to the system through some wound.

The disease is much more prevalent in some localities than in others. It is found in hot countries, as in India and the West Indies, far more commonly than in temperate regions. Dark skinned races are more subject to the disease than the Caucasian race. Exposure to damp cold is one of the recognized causes, also those localities where there are rapid changes from cold. Such regions produce conditions favorable to the existence and growth of the bacilli.

Earth mould, particularly where putrefaction is taking place, as in soil that has been manured, is especially favorable to the existence of the bacillus. Spores are probably carried by the air. This would be a reason why tetanus occasionally prevails in epidemics.

Wounds and abrasions of various kinds, particularly contused and punctured wounds of the hands and feet, favor the excitation of tetanus. When an open wound is present, the term **traumatic tetanus** is given to the disease; **idiopathic tetanus** when no wound is discoverable; **tetanus neonatorum** when it attacks infants—this form is usually due to insanitary conditions, especially the improper care of the umbilical cord; **lock-jaw** or trismus when the jaw alone is affected; **cephalic tetanus** when the throat and face is involved.

Characteristic lesions have not been found in the cord or the brain. The condition of the wound is not constant. The bacilli develop at the site of the wound where the toxin is manufactured. The bacilli do not invade the blood and organs. The tox-albumin is one of the most virulent poisons known.

Congestion occurs in various organs, due to obstruction of

the movement of the blood during a spasm. The brain, cord, lungs and mucsles are congested. The nerves are often found injured and swollen. Peri-vascular exudations and granular changes occasionally occur in the nerve cells.

Symptoms.—The period of incubation is from ten to fifteen days. In some cases the incubation may be shorter or longer than ten to fifteen days. A chill precedes other symptoms in a few cases. The onset is quite sudden, with stiffness in the neck, jaw and tongue. There are headache, stomach disturbance and languor. Opening the mouth is difficult, but is not painful. Deglutition is difficult. The stiffness increases and extends to the spinal muscles, abdomen and legs which are held in a firm spasm. Thus, the entire trunk and legs are inflexible; orthotonus has occurred.

These symptoms vary in degree of severity, dependent upon the extent of involvement. The jaws may be firmly locked or they may yield to forced extension—"lock-jaw." The muscles of the face may be involved, the angle of the mouth drawn out, and the eye-brows raised—"risus sardonicus." The neck and trunk muscles affected produce opisthotonos. Spasms of the pharynx and esophagus may occur, especially when there are injuries to the fifth nerve.

Associated with these tonic convulsions is intense pain. The distress of the patient is extreme when the chest muscles are affected. All symptoms are increased during the paroxysm. A foot fall, the slamming of a door, a draught of air or any slight sensory impression may excite a paroxysm. The paroxysm may relax and during the interval the patient may walk about. The spasms vary in frequency from a few minutes to one in several hours. During spontaneous or induced sleep the spasm usually ceases. The febrile reaction is generally slight and apparently of nervous origin; in many cases 102 degrees F. Perspiration is excessive. The urine is scanty and high colored. The bowels are usually constipated. The mind remains clear throughout. Death is generally caused by exhaustion. **Chronic tetanus** presents similar symptoms, but less marked, and it develops slowly.

Diagnosis.—The history of a wound followed by the charac

teristic symptoms would rarely occasion an error. **Strichnine poisoning** differs from tetanus in the history, in the more rapid development of the symptoms, no trismus at the beginning, marked involvement of the extremities, and absence of rigidity between the paroxysms. In **tetany** the extremities are chiefly affected by the spasms, the muscles are relaxed during intervals, and trismus is a late or very rare condition. In **hydrophobia** trismus does not occur and the respiratory spasm is caused by attempts at swallowing. The mental symptoms increase.

Prognosis.—The prognosis is unfavorable. Eighty per cent. of traumatic and fifty per cent. of the idiopathic cases prove fatal. The prognosis in children is more favorable than in the adult. Cases that are fatal usually die within six days. In cases where there is slight elevation of temperature, and in cases where the spasm is localized to the muscles of the face, neck and jaw, or where muscle stiffness is late in appearing, are more likely to recover.

Treatment.—Free incision and thorough disinfection and cauterization of the wound are necessary. The patient should be put in a dark room and there remain as quietly as possible. All sources of peripheral irritation should be avoided. Liquid food is to be given, and if the jaws are firmly set, rectal feeding may be employed or food may be passed through the nose with a catheter.

For the spasms, strong inhibition of the nerve centers controlling the affected muscles may be of use. Probably the most effectual treatment for the paroxysms would be strong, thorough treatment of the upper cervical region. Hot baths give relief to the spasms. All the excretory organs should be greatly stimulated, particularly the kidneys, lungs and bowels. Other symptoms are to be treated as they arise. A few cases have been treated osteopathically with fair success, following antiseptic measures.

Simple Continued Fever.

(Febricula).

Definition.—An acute, febrile disease, mild in character, of short duration, not excited by any special organism and depending on a variety of irritating causes. A true ephemeral fever lasts about twenty-four hours. If it persists from three to six or more

days without local affection, it is termed simple continued fever or febricula.

Osteopathic Etiology.—The most frequent cause of this form of fever is probably gastro-intestinal disturbance. In children it may consist of a gastro-intestinal catarrh or it may take the form of indigestion, due to exposure to cold or to the eating of decomposing substances; or, in cases of longer duration it may be due to the absorption of toxic substances. It may be caused by exposure to the sun or great heat or cold, or mental or physical fatigue. It may be the result of exposure to cold sufficient to produce a slight bronchitis, tonsillitis or other affections producing an unnoticed localized inflammation. It may follow a prolonged exposure to noxious odors or sewer gas. Lesions, osseous or muscular, are always present, corresponding to the tissues and organs disturbed. Muscular lesions, especially, are prominent.

Symptoms.—The disease usually sets in abruptly with a feeling of lassitude, weariness, chilliness, headache, loss of appetite and furred tongue. The temperature rises quickly to 102 or 103 degrees F. or over, and is usually apt to terminate suddenly by crisis on the third or fourth day. The pulse is frequent and the face is flushed. Herpes on the lips are common. Mild delirium may occur. Anorexia is present, and the bowels are constipated. The disease lasts from a few days to two weeks and may end by crisis or lysis. Convalescence is rapid.

Diagnosis.—This depends upon excluding other probable diseases. If the fever cannot be attributed to some of the causes already referred to, there may be a doubt as to its character for the first twenty-four hours, but, if after a careful examination, one finds no other cause and no symptoms develop of any of the recognized diseases, acute continued fever can hardly be mistaken for any other disease.

Prognosis.—Always favorable, recovery without sequelæ being the rule.

Treatment.—It is necessary to find out the irritative cause in order for one to be able to treat intelligently. Rest in bed with treatment of the disturbing factor of the disease, whatever that may be, is the principal treatment to be given. Careful

examination of all the organs, with due consideration of the symptoms, will generally leave no doubt as to the cause, and treatment applied accordingly will be sufficient. If there is any gastro-intestinal disorder, thorough treatment of the splanchnics, anterior treatment to the abdomen and thorough evacuation of the bowels are indicated. Use an enema if necessary. Besides the usual fever treatment, sponging the body with tepid water at the time of day when the fever is highest will aid in lessening the temperature and rendering the patient much more comfortable. In cases where nervous symptoms are prominent, care should be taken against any excitation that may occur, and if insomnia results a quieting treatment in the cervical region is usually sufficient. Use plenty of water internally, which is not only necessary for the tissues on account of the fever, but it is of great aid in keeping the skin and kidneys active, and thus a great help in the elimination of waste material. A liquid, nutritious diet is best. Milk, soups and broths will be enough. The demands on the digestive tract are not great when a light diet is administered, besides not exciting the nervous and vascular systems unduly.

Tuberculosis.

Definition.—A general or local infectious disease caused by the bacillus tuberculosis. The bacillus produces specific lesions either of the form of nodular bodies called tubercles or diffused infiltration of tuberculous tissue. The tubercles undergo caseation and sclerosis and may be followed by ulceration or in some instances calcification.

Osteopathic Etiology and **Pathology.**—Tuberculosis exists in all countries. It generally prevails more extensively in warm than in cold climates, and is of more frequent occurrence in the city than in the country. Altitude, however, exerts more influence than latitude. The disease rarely occurs in mountainous countries, owing to the purity of the atmosphere. The disease is very prevalent in the West Indies and the South Sea Islands. Tuberculosis is frequently met with in Canada among the French Canadians and the English. All races are liable to have tuberculosis, but the Indians of this continent, the South Sea Islanders

and the colored race are very susceptible to the disease. It is estimated that from seven to ten per cent. of the present death rate in the United States is due to tuberculosis.

The tubercle bacillus was discovered by Koch in 1881. It is a short, straight or slightly bent, rod. This bacillus has an exceedingly tenacious hold on life and is found in greater or less numbers in all tuberculous lesions.

It can live almost indefinitely outside the body. The bacilli are found in great numbers in the sputum, which dries and flies in the atmosphere in the form of dust. The organism is thus widely spread in regions frequented by phthisical patients. The bacillus gains entrance into the body by way of the respiratory tract in the vast majority of cases. Milk from tuberculous cows will produce the disease, especially in children, causing intestinal and mesenteric tuberculosis. The meat of tuberculous animals is not necessarily infectious, although there is a possibility of infection by this means. Tuberculosis may be transmitted by direct inoculation; this does not often occur in man, but when it does, the disease usually remains local, although general infection may occur. Persons who follow certain occupations, as butchers, dissectors of dead bodies, and handlers of hides, are more or less subject to local tubercle of the skin. The virus may enter the body through any fissure or excoriation on the skin; thus by washing the clothes or bed linen of phthisical patients, by the bite of a consumptive, or by a cut from a broken sputum glass of a consumptive, one may become infected. It is stated that there may be hereditary transmission. In some cases the virus may be transmitted and the disease may not appear for many years.

Predisposing Causes.—Hereditary predisposition, which renders the person more liable to accidental infection; delicate contitution; scrofulous tendency; previous infectious diseases, as influenza, whooping cough, measles, typhoid fever; diabetes mellitus, etc. In young children meningeal, mesenteric and lymphatic forms of tuberculosis are the most frequent. Pulmonary tuberculosis is usually met with in adults, especially between twenty and thirty years of age. The development of tuberculosis is

favored by damp localities; by improper and insufficient food; constant inhalation of impure air; injuries to the chest, with or without laceration of the lungs, and various osteopathic lesions that weaken the tissues nutritively. Corresponding to the innervation of the organ or tissue diseased will always be found anatomical derangements. "Every case has a defective spine and thorax." (Hayden[1]).

Bronchial catarrh, diseases of the stomach and intestines, especially entero-colitis, tubercular pneumonia, pleurisy (rarely), intra-thoracic tumors and congenital or acquired contraction of the orifice of the pulmonary artery increase the susceptibilty to infection. Lessened vitality of the tissues, whether inherited or acquired, is necessary before the germ can become implanted and proliferate, producing tuberculosis of the tissues and organs. In nearly every instance, when the lungs are involved, lesions are found at the second, third or fourth ribs. These lesions undoubtedly predispose to the tubercular infection, by lessening the vitality of the lung tissues through interference with the innervation or vascular supply. Possibly a lesion at the second rib or second dorsal vertebra would interfere directly with the vaso-motor nerves of the upper thoracic ganglia. The condition of the middle and lower cervical vertebræ should be carefully examined, for lesions at that point would involve the lymphatics of the lungs. The lowered vitality caused by the lesion is the predisposing cause and the tubercular bacillus is the **exciting cause** which determine the character of the affection.

Pathology.—In adults the favorite seat of tubercle is the lungs; in children it is the lymphatic glands, joints and bones. No organ is exempt; the salivary glands and pancreas are the least frequently involved. The miliary tubercle is the beginning of tubercular deposits. This may develop in any tissue where the tubercle bacillus is found and it is only distinguished by the presence of a tubercle bacillus, as identical structures are produced by other parasites, such as aspergillus glaucus and actinomyces.

In the development of a tubercle there is proliferation of the fixed tissue cells, particularly those of the connective tissue and

1. Journal of the American Osteopathic Association, March, 1906.

the endothelium of the capillaries, due to the irritation of the bacillus, producing the epitheliod cells and in some instances the giant cells, in both of which bacilli may be found. The epitheliod cells vary in shape and may be rounded, polygonal or cuboidal. The giant cells are formed by enlargements of the epitheliod cells and a repeated division of their nuclei or possibly by fusion of several cells. In lupus, joint tuberculosis, and scrofulous glands, in which the bacilli are relatively few, the giant cells are numerous; while in the miliary tubercles, in which the bacilli are numerous, the giant cells are scanty. On account of the inflammation produced by the bacillus, there is migration of leucocytes from the adjacent vessels and lymphoid cells. The leucocytes are chiefly polynuclear and are rapidly destroyed, but later mononuclear leucocytes appear, which are able to resist the action of the bacilli and they do not undergo the rapid destruction of the other variety. A reticulum of connective tissue is formed around the various cells by the infiltration of the protoplasm of the cells and the rarefaction of the connective tissue matrix. The tubercles are nonvascular and when once formed undergo caseation and sclerosis.

Caseation is a process of coagulation necrosis or destructive change, beginning at the central part of the growth, due to the action of the bacilli. The primarily transparent tubercular tissue is gradually converted into a yellowish gray body. Bacilli are still present. Most frequently the caseation is followed by softening; less frequently calcification or it may become encapsulated.

During the time the cell destruction is going on at the center of the tubercle, hyaline transformation is going on with conversion of the cellular elements into fibrous tissue, thus converting the tubercle into a hard, firm structure. In all tubercles one of these two processes occurs: **caseation** and the destruction of forces, which are dangerous to the patient, or **sclerosis,** which is a healing process. The ultimate result, in any case, depends upon the power of the body to produce an antitoxin to overcome the effects of the special toxin produced by the bacilli.

There may be a wide spread **tuberculous involvement.** This is the result of fusion of the new foci of infection or of miliary

tubercles. An entire lobe, or even the greater part of the lung, may be involved and undergo caseation; usually, however, caseation takes place in the small groups of lobules. The bacilli may cause a diffused infiltration and caseation without any special foci, producing tuberculous pneumonia.

The irritation of the bacilli is capable of producing **associated inflammatory processes** in its own neighborhood. There may be an overgrowth of interstitial tissue produced. In other instances, changes to catarrhal or croupous pneumonia may occur. Suppuration is associated with tuberculosis, especially of the lungs, and is due to a mixed infection or the presence of pus organisms. Some authorities claim that the tubercle bacilli alone are able to produce suppuration; it is, however, more probable that suppuration is due to a mixed infection. The constitutional features in tuberculosis are more dependent upon this secondary infection, especially by the streptococci, than upon the primary infection.

Tuberculosis of the Lymph Glands.
(Scrofula).

Scrofula is a true tuberculosis of the lymphatic glands. The virus is less virulent than that from other sources; which accounts for the slow development and milder course of tuberculosis of the glandular system.

Tuberculous adenitis may occur at all ages, but is most common in children and young adults. It is rarely congenital. Catarrhal inflammation of the mucous membranes weakens the resisting power of the lymph tissue, thus allowing the bacilli to develop, and is an important predisposing cause. The glands most frequently affected are those of the neck; more rarely there is involvement of all the lymphatic glands of the body. Invariably lesions of the upper and middle cervical vertebræ are found, as well as lesions to the lymphatics at various points along the spinal column and ribs. These lesions affect the innervation to the lymph glands, as well as mucous membranes, and thus predispose to the disease. In all cases anatomical derangements are found in the region of the innervation to the involved gland.

In **general tuberculous adenitis** all the lymph glands of the body are more or less involved, while the other organs and tissues are rarely affected. All the visible glands are found to be swollen, tender and painful. There is more or less protracted fever, with wasting and debility. This is a rare affection.

Local Tuberculous Adenitis—Cervical.—The glands of the neck are most frequently affected and this is especially the case with children. Negroes are more frequently affected than whites. It is seen especially among those living in badly ventilated lodgings and among the very poor classes. The submaxillary glands are usually the first involved and are affected on one side more than on the other, as a rule, although both sides are commonly involved. At first they are swollen to various degrees and are tender; later they suppurate and rupture if one is not able to cure them. The skin over the glands is usually freely movable; it may, however, be adherent.

The glands above the clavicle, those in the posterior cervical triangle, and the axillary glands may all be affected. In such cases it is likely that the bronchial glands are also involved and may become the exciting cause of tuberculous pleurisy or of pulmonary tuberculosis.

Lesions of the upper and middle cervicals and deep muscles are always found and undoubtedly are the underlying causes. Lesions of the lower cervical, upper dorsal, ribs and clavicle, are of frequent occurrence. Infection may gain entrance by way of the pharynx and tonsils.

The affection runs a very slow course, lasting often for a number of years.

Bronchial.—These glands may be affected primarily or secondarily to infection of the lungs. The primary form is seen most commonly in children and is apt to be associated with suppuration. Lesions of the upper and middle dorsals and of the cervicals will be found. Catarrh of the bronchial tubes is a predisposing cause.

Systemic infection may follow rupture into a vessel. Local infection of the lung may occur and the pericardium become infected.

Mesenteric (Tabes Mesenterico).—These cases occur among children and may be primary or secondary. The primary form is rare. The trunk and limbs are puny, wasted, and anemic, while the abdomen is enlarged and tympanitic. Diarrhea is marked and constant, with thin, offensive stools. Fever is almost constantly present and is of an intermittent type. The disease is most frequently met with among poor children in unhygienic, illy-ventilated houses. There may be tuberculosis of the peritoneum; in such instances the abdomen is hard, large and tender, and uneven nodules may be felt.

Acute Tuberculosis.

This shows best the truly infectious nature of tuberculosis. In it miliary tubercles develop in many and various parts of the body. In some cases these growths seem to be uniformly distributed throughout all the viscera. In other instances they are localized in the lungs or in the meninges of the brain.

In nearly every instance it is an auto-infection, arising from an old tuberculous focus, which may be latent and quite unsuspected. General infection, in most instances, arises from the rupture of a nodule into a vein, from tuberculous lymph glands, tuberculosis of the bones, joints, or even the skin.

Three chief clinical forms are recognized: acute general infection, without special localization; marked pulmonary symptoms; marked cerebral or cerebro-spinal symptoms.

General Miliary Tuberculosis or Typhoid Form.—This is similar to a general infection of the body and resembles, to a marked degree, the symptoms of typhoid fever. The onset is rarely rapid.

In most cases there is a period of incubation, during which the health fails, the appetite is lost, headache occurs, and the patient soon becomes feverish, with increased debility. The temperature rises and the pulse is rapid and feeble. The tongue is dry. The respirations are increased. Delirium may be present. In rare cases, there may be little or no fever. The temperature ranges from 101 to 103 or even 105 degrees F. It is irregular and marked by evening exacerbations and morning remissions. Occasionally there is an inverse type of temperature in which the

temperature rises in the morning and falls in the evening, and is held by some to be characteristic. The countenance is dusky. In some cases the pulmonary symptoms are marked, while in others the meningeal symptoms are more prominent. Tubercle bacilli are rarely found in the sputum.

The spleen is usually enlarged. Constipation is present, as a rule, but there may be diarrhea, and hemorrhage from the bowels may occur. The urine may contain traces of albumin. There may be excessive sweating, and herpes are often present. Choroid tuberculosis is frequently met with. In doubtful cases the blood should be examined for tubercle bacilli, although they are not always present. The duration is from two to four weeks, the disease usually terminating unfavorably.

Diagnosis.—It is often very hard to differentiate between this form of tuberculosis and typhoid fever. In **typhoid fever** epistaxis is a common, early symptom. The temperature curve of the continued type is quite diagnostic. The Widal test should be made. The respirations are moderately hurried and the pulse is often dicrotic. Diarrhea is frequent. Typhoid rash is diagnostic. No tubercles are found on the choroid. No tubercle bacilli are found in the blood. Hemorrhages from the bowels are common.

Pulmonary Form.—When the lungs are chiefly affected the pulmonary symptoms are marked from the onset. It may develop suddenly or there may be a long period during which the general health fails markedly. In children the disease may follow measles or whooping cough. There is dyspnea, cough and the expectoration is muco-purulent and occasionally rusty. There is broncho-vesicular breathing with sibilant and subcrepitant rales. The temperature is high, ranging from 103 to 105 degrees F., or higher. The pulse is rapid and feeble.

The disease may last from several weeks to even months, or, on the other hand, it may prove fatal within ten or twelve days. As the end draws near the signs of suffocation become intensified.

Diagnosis.—There may be history of tuberculosis in the family or of a previous cough. Occasionally tubercle bacilli are found in the sputum. The general symptoms, together with the

dyspnea and cyanosis, will generally decide the diagnosis. The blood should be examined.

Cerebral or **Meningeal Form** (Tuberculous Meningitis).—This form, which is sometimes called acute hydrocephalus, occurs quite frequently and is an acute tuberculosis of the membranes of the brain, sometimes of the cord.

It occurs most frequently between the ages of two and seven years, although it may occur at any age. A focus of an old tuberculous disease, especially in the bronchial glands, or a history of a fall, will often be found as the cause. Rarely does the disease involve the meninges primarily.

The meninges at the base of the cerebrum (basilar meningitis) are most involved. There is more or less inflammation, with fibrous purulent exudation, especially in the Sylvian fissures. The tubercles vary in size and number; in some cases they are very apparent, while in others they are very difficult to find. The lateral ventricles are dilated and filled with a turbid fluid. The convolutions are frequently flattened and the sulci obliterated on account of the undue intraventricular pressure. The meninges are not alone involved, but the cortex is more or less edematous; while tuberculous infiltration of the cranial nerves occurs.

Symptoms.—Prodromal symptoms are usually present, lasting one or more weeks. Headache, vomiting and chills, followed by a fever, are the initial symptoms. The child gets thin, pale, restless and peevish; the appetite is lost; the bowels are constipated and the urine diminished in quantity. The onset is usually gradual, but when the onset is sudden, the disease is generally ushered in with a convulsion. The fever rarely rises above 102 or 103 degrees F. At first the pulse is slightly accelerated, but soon becomes slow and irregular. The pain is often agonizing and intense, causing the child to give a short, sudden cry—the hydrocephalic cry. During sleep the child is restless and there are slight muscular twitchings. The pupils are contracted and the skin is dry and harsh.

The **irritative symptoms now abate.** There are no vomiting and headache and the child becomes quiet and is dull and apathetic. Constipation still persists. The abdomen is boat-shaped

and the head is often retracted; the child cries out only occasionally. The pupils are dilated. Convulsions may occur. The temperature ranges from 100 to 103 degrees F. The respiration is irregular and sighing. A patchy erythema may appear on the skin.

Following this, the mental faculties are lost and coma occurs. Convulsions or spasmodic contractions of the muscles of the neck, back and limbs may occur. The pupils are dilated; the eyelids partly closed and the eyeballs are rolled up. The child may drop into a typhoid state with diarrhea, great prostration, dry tongue and low delirium. The pulse is frequent, irregular and small. The temperature rises to 103 to 105 degrees F. The duration is from two to five weeks; chronic cases may last for a number of months. A more rapid form, occurring most frequently in adults, sets in with great violence and runs its course in a few days. It is a very rare, but exceedingly fatal form.

Prognosis.—Generally very unfavorable.

Acute Pneumonic Phthisis.

The infection of the lungs is rapid and may be primary or secondary. This form is met with most frequently in children and young adults, but may occur at any age.

Two forms may be recognized, the pneumonic and broncho-pneumonic.

The **Pneumonic form** is more rare than the broncho-pneumonic form and may be very rapid in its course. The attack sets in abruptly with a chill and the temperature rises rapidly. There are pain in the side; cough; dyspnea, and mucous and rusty sputum, which may contain tubercle bacilli. There are impairment of resonance, increased fremitus, and bronchial breathing. The whole or part of the lung may show signs of consolidation and dullness, all the symptoms of pneumonia being present. This attack may come on a person in good health after exposure to cold; but there may have been debilitating circumstances or a predisposition to phthisis. Death may occur in the second or third week or the case may drag on from three to four months.

Only one lobe is usually involved, though occasionally the

entire lung is affected. The lung is heavy and airless, sinking quickly in water. There is destruction of lung tissue and upon section, cavities are found. The cavities are generally small and are surrounded by tubercles in the consolidated tissue. Older caseous areas of a yllowish white color may be visible. Miliary tubercles are found upon careful examination.

The **broncho-pneumonic form** is the most common and occurs most frequently in children. It often follows the infectious diseases, especially measles and whooping cough. The child may be taken ill suddenly with what seems to be an ordinary bronchitis, the temperature rises rapidly, the cough is severe, and there may be consolidation with submucous and subcrepitant rales. The child has sweats. The fever may become hectic. There is rapid loss of flesh and in many cases the disease develops into chronic phthisis. In other instances death occurs in from three to eight weeks.

In adults the attack may occur in persons in good health or those run down with over work. In a few cases the attack is ushered in with hemorrhage. There is high fever, rapid pulse, increased respiration and rapid wasting. Elastic tissue and tubercle bacilli are found in the sputum. Death may occur in three weeks. Other cases begin to improve in six or eight weeks, but again decline, the case dragging on and becoming chronic.

The air vesicles and bronchioles are filled with a cheesy substance. The solidified areas have a grayish red appearance at first, but later they are of an opaque white. These areas are usually separated by areas of crepitant air tissue, but by fusion of contiguous smaller areas large sections are involved—sometimes the whole lobe. In other instances the masses are small and widely separated. These tissues tend to break down with the formation of irregular cavities.

Diagnosis.—In the **pneumonic form** it is impossible to make a diagnosis early in the disease. Tuberculosis may be suspected if the patient has been in bad health, has a predisposition to phthisis, or has had any pulmonary trouble. Pneumonia will present the typical symptoms, but if fever continues, tuberculosis will be suspected. Examination of the sputum will probably decide.

In the **broncho-pneumonic form** it is very difficult, in the early stages, to distinguish it from simple bronchitis and broncho-pneumonia. In this form the sputum will show elastic tissue and tubercle bacilli early in the disease and should be examined carefully if the disease lasts more than three weeks.

Chronic Pulmonary Tuberculosis.

(Chronic Ulcerative Phthisis).

This form is much more common than the acute form. The lesions ulcerate and soften. To the primary tuberculous infection is sometimes added septic infection, producing a mixed disease.

The **primary lesion** is not actually in the very apex, but a little below it and near to the posterior and external borders. From here the disease spreads downward and farther backward and for this reason examination in the supraspinous fossa will give the first manifestation of disease. In a large proportion the starting point of the process is in the smaller bronchi and the bronchioles and their alveolar territories become obstructed with inflammation products. These areas soon undergo caseation; ulceration occurs in the bronchial walls; the caseous matter softens and breaks down, resulting in the formation of a cavity. The more rapidly the caseous masses are formed, the more apt are they to soften. In other instances, fibroid transformation or calcification, with encapsulation of the cheesy matter takes place, and recovery may occur. In many instances these processes are not complete; the apparently healed lesions undergo ulceration.

Large cavities have a well defined limiting membrane. The contents is usually purulent; rarely it is gangrenous. The surface of the smooth walled cavities constantly produce pus. **New cavities** have walls made up of softened, necrotic, caseous masses; they develop near a healed focus or near a large old cavity with limiting walls, and if situated just beneath the pleura they may rupture and cause pneumothorax. **Quiescent cavities** are generally small, though they vary in size. The lining membranes of these old cavities may be smooth, resembling mucous membrane. Medium sized and large cavities do not heal completely.

The cavities are most frequently single, but they may be multiple and series of these small cavities may be surrounded by fibrous tissue.

In the neighborhood of tuberculous degeneration there is frequently **interstitial pneumonia,** There is either a simple pneumonia or that due to the tubercle bacilli. This takes place in the alveoli.

The area is hyperemic, hard and consolidated. In some instances the contents of the alveoli undergoes fatty degeneration. **Pleurisy** is constantly associated with a chronic form of phthisis. Sero-fibrinous, purulent or hemorrhagic pleural effusions are met with. The pleurisy may be simple, but in a great many cases it is tuberculous. Miliary tubercles and cheesy masses may be found in the thickened membrane.

The **bronchial glands** are swollen, edematous and contain tubercles. They may become caseous and sometimes calcareous. Not infrequently they undergo purulent disintegration. Tuberculosis of the **larynx** is common. Ulceration, especially of the vocal cords, and destruction of the epiglottis may occur. Amyloid changes of certain organs, especially the **liver, kidneys, spleen,** and mucous membrane of the **intestines,** are frequent. Enlargement of the liver, caused by fatty infiltration, may occur. Tuberculous lesions are found in the intestines, spleen, kidneys, and brain in nearly equal proportions; then come the liver and pericardium. Other groups of lymphatic glands, besides the bronchial, may be affected.

Symptoms.—The onset of the disease is either abrupt or gradual. Frequently it succeeds influenza, measles or bronchitis. There is a cough, expectoration, loss of weight, afternoon temperature and probably night sweats. The disease is likely to develop slowly. In other cases gastro-intestinal disorders are the first symptoms, especially with weakness and debility. Again, the disease may follow pleurisy. When the attack is abrupt, pneumonia is simulated. However, the apex of the lung, instead of the middle or lower lobe, is involved; expectoration is considerable and the fever is not so high and pronounced. Hemoptysis frequently occurs.

The **local symptoms** are important. **Pain** is an early, either moderate or severe, symptom, although there are cases where it is absent. When associated with pleurisy, it is severe. The pain is usually situated at the base, anteriorly or laterally, of the scapulæ, but may be between them. **Cough** is present, in the majority of cases, throughout the entire course. It usually grows worse, and is dry and hacking at the beginning, but looser and paroxysmal and accompanied by a muco-purulent expectoration later on. The **expectoration,** at first, is slight and there may be more or less blood mixed with it, or even hemorrhage may occur. With the formation of cavities, the expectoration increases and is of a greenish-gray or greenish-yellow color. In some instance the sputum is more or less fetid. The expectoration is composed of pus cells, blood, elastic tissues, fat globules and tubercle bacilli. **Hemoptysis** is present in a majority of cases. Early hemorrhages are usually slight, due to rupture of weakened vessels. When there is softening or cavity formation, erosion of vessels may be pronounced and hemorrhage considerable. Dyspnea is a variable symptom, but is characteristic of lung changes.

Fever is a characteristic of the **general symptoms.** It is probably always present at the beginning and the afternoon increase of temperature is common. Where there are softening and formation of cavities, a remittent or intermittent type is present. The pulse is frequent, regular and compressible. **Sweats** may occur at any time, but especially during sleep. They indicate fever activity, and are increased during cavity formation. **Emaciation** is a prominent symtom. This is due to gastro-intestinal disorders and prolonged fever. Loss of weight is gradual, especially if the disease is advancing. Where the lung is considerably diseased, heart disturbances are common.

Other disorders, as of the gastro-intestinal tract, genito-urinary, cutaneous, and nervous sytems, are frequent, especially in long standing cases. The **gastro-intestinal disturbances** are gastric catarrh, vomiting, loss of appetite, coated tongue, constipation, and later on, diarrhea. Among **genito-urinary symptoms,** albuminuria is frequent. The kidney involvement may be either of an acute or chronic character. Pyelitis and cystitis are present

in some cases, and amyloid degenerations are not uncommon. With the **cutaneous symptoms,** the skin is frequently dry and scaly, and the hair of the head dry. The hectic flush is common. Upon the chest and back there may be pigmentary stains. The **nervous symptoms** vary according to the involvement. Tuberculous meningitis is rare. The mind usually is clear and even in advanced stages the patient is always hopeful.

Physical Signs.—Inspection reveals that the shape of the chest is often characteristic. A phthisical thorax is flat, the intercostal spaces are wide, the costal cartilages are prominent, and the sternum is depressed. Sometimes the lower sternum forms a deep concavity (funnel breast). The scapulæ may be distinctly winged. Another type of thorax is long and narrow, the ribs are more vertical in direction, the intercostal spaces are wide, and the costal angles are very narrow. In other instances the chest is of apparently normal build. Defective expansion is observed early, especially at the apex of the affected side. The clavicle of the affected side often stands out more prominently, while the spaces above or below it are often more marked.

Palpation shows there is difficult expansion and increased vocal fremitus. Normally, the fremitus is stronger at the right than at the left apex. If the pleura is thickened, the vocal fremitus is diminished, and if there is pleural effusion, it is absent.

On **percussion,** if the diseased areas are minute, the percussion note may not be changed. Always compare the two sides of the chest. Dullness is first noted, as a rule, above, on or below the clavicle. As the disease progresses, the dull sound increases. In the early stages the percussion note is of a slightly higher pitch. The size of the cavity, its walls and the amount of secretion modify the note. Large, thin-walled cavities elicit the "cracked-pot" sound. Consolidation, thickened pleura, large amount of material in a cavity and a connecting bronchus impair resonance.

On **auscultation** the breathing is harsh and the expiration is prolonged and high-pitched (bronchial). Early in the disease crackling rales may be heard. After consolidation takes place there is bronchial breathing and crepitant rales. When softening occurs they become moist, louder and sometimes bubbling.

These may be heard upon inspiration and expiration. Pleuritic friction sounds, as in case of pleurisy, may be heard at any stage. Vocal resonance is increased.

The **signs** of **cavity** are: **Percussion.**—There is more or less defective resonance or tympany. Over large cavities a "cracked-pot" resonance is obtained. This is best obtained when the patient has his mouth open. There may be normal resonance if the cavities are covered with a considerable thickness of unaffected air cells.

Auscultation may detect cavernous or amphoric breathing, pectoriloquy and coarse, bubbling rales. Metallic tinkling may be heard over large cavities. Vocal resonance is increased.

Complications.—The larynx, trachea and bronchi frequently undergo tubercular inflammation, due to invasion from the lung tissue. Pneumonia is of common occurrence. Gangrene, pleurisy and endocarditis are other complications.

Diagnosis.—Bacilli may be found in the sputum before the phyical signs are well developed. It may be necessary to examine the sputum several times before the tubercle bacilli are detected. The presence of bacilli will set the diagnosis at rest, provided clinical symptoms are present. Fever, hemoptysis, cough, emaciation and a continuous, local induration are diagnostic.

Prognosis.—The prognosis of pulmonary tuberculosis varies greatly in different cases. Undoubtedly a number of cases have been cured; even spontaneous cures have occurred. A great deal can be done to prolong life and to make the patient comfortable. The average duration is about three years, although by modern treatment this time is probably being increased.

Fibroid Phthisis.

This term is applied to a form in which there is induration, followed by contraction of the affected lung tissue, due to an overgrowth of fibroid tissue. The greater number of cases are primarily tubercular, but have run a fibroid course. Other cases are primarily fibroid, followed by tuberculous infections. It may begin as an ordinary ulcerative phthisis, or it may begin as an inhalation bronchitis. In other instances it may follow a chronic

tuberculous bronchial pneumonia and chronic tuberculous pleurisy.

The **onset** is extremely insidious. There is persistent cough, often paroxysmal in character. Dyspnea is marked, especially on exertion, but little or no fever is present. The expectoration is purulent and if bronchiectasis is present, it may be fetid. It is a disease of long duration, lasting from ten to twenty years. The patient is often able to pursue some occupation and may have fair health.

The chest is sunken and the shoulder on the affected side is lowered. The heart is frequently dislocated, and if the left lung is involved, distinct cardiac pulsation is sometimes seen in the second, third and fourth interspaces. There is marked dullness over the affected side. There is distinct bronchial breathing at the base, while at the apex there may be cavernous sounds. There may be hypertrophy of the right ventricle; sometimes of the entire heart. The bronchi are dilated. The clinical history is identical with that of simple cirrhosis of the lung from which it is often separated with difficulty. Both lungs may become the seat of tuberculous disease. As a result of prolonged suppuration, amyloid changes in the liver, spleen, kidneys and intestines may take place. Dropsy often occurs from failure of the right heart.

Tuberculosis of Other Tissues.

The **alimentary tract** is frequently the seat of tuberculous inflammation. The intestines may be involved primarily or else secondarily from the lungs or peritoneum. The **primary form** is most common in children. There is slight fever, pains of a colicky nature, irregular and persistent diarrhea. The disorder is commonly unrecognized, being mistaken for appendicitis or other intestinal disorders, until emaciation, sweats, the continued fever or lung involvement are manifested.

The stomach, esophagus, pharynx, tonsils, palate, tongue and lips may be the seat of a tubercular lesion.

The **serous membranes** are usually secondarily involved. The peritoneum is generally invaded from contiguous organs, especially the intestines, although the pleuræ may be the starting point (and in the female the generative tract is a source). The

disease may be either acute or chronic. In the former it starts abruptly with vomiting, pain in the abdomen, fever, and possibly diarrhea. In the chronic form there are fever, pains, emaciation weakness and the abdomen is distended. The enlarged glands may be felt through the walls. There may be ascites, or the walls of the peritoneum are adherent, or the tubercles may ulcerate.

The **percardium** is occasionally the seat of acute or chronic tuberculosis. It is usually secondary. Likewise the pleuræ are sometimes involved. The chronic form is more common.

The **genito-urinary system** is subject to tuberculosis. The bladder, ureters, pelvis of the kidney are attacked, and from these the kidney, or possibly the kidney involvement is part of a general tuberculosis. The ovaries, Fallopian tubes and uterus are also subject to tubercular invasion. The **diagnosis** depends upon finding the bacilli, the symptoms indicating, oftentimes, an inflammation only. Also the prostate, testicles and seminal vesicles are attacked.

Tuberculosis of the mammary glands is rare. In miliary tuberculosis the liver is commonly affected, and it may be secondary to other tissues, especially the peritoneum, lymphatics and lungs.

The blood-vessels and heart are sometimes involved from nearby organs or from miliary tuberculosis. The brain is also at times invaded by tuberculosis. This has been described under meningeal tuberculosis. The spinal cord is rarely affected.

Diagnosis and Prognosis of Tuberculosis.—The osteopath should be familiar with the various forms of the disease. An understanding of the pathology and clinical symptoms is essential. The finding of the bacillus, provided there are symptoms of inflammation, is diagnostic. Much depends upon the patient's constitution, hygiene, sanitation, food, fresh air and general management. The osteopathic lesion is decidedly an important factor, but the treatment must be balanced from both the distinctive osteopathic view and that of general management. Then the patient's part is as necessary as the osteopath's. Under proper care and treatment, unless the disease has progressed to a marked degree, there is always a tendency toward recovery, but, to em-

phasize again, the osteopathic treatment, the environment and general hygiene should be thoroughly understood and appreciated, for at best, the disease is treacherous. Even after an apparent recovery is made, the patient should be under observation; there is always danger of recurrence. Tuberculosis can be treated successfully, provided the disease has not progressed to a late stage; although many times, in the later stages, life can be considerably prolonged by careful treatment.

Treatment of Tuberculosis.—The **prophylactic treatment** of tuberculosis should receive first consideration. The sputum should be thoroughly disinfected and care taken that the patient does not spit about carelessly. A spit-cup should be provided and the sputum collected and destroyed by burning and the cup sterilized. The patient should be well taken care of and given a separate apartment, so that the danger of conveying the disease to others is reduced to a minimum. He should occupy a single bed. All unnecessary furnishings of the room should be removed and the objects that remain in the room should be frequently aired and disinfected. The environment of the patient should be as favorable as possible to hygienic living. Many times a change of residence is of great benefit to the patient. When possible the patient should be out of doors and light exercise taken. The body should be well protected by flannels, the year around.

Another important consideration in the prophylactic treatment is the inspection of dairies and slaughter houses. The disease may be transmitted by infected milk. There is less danger of infection through meat; although all animals that present distinct lesions should be confiscated. Keene[1] would carry this point of prophylaxis to careful examination of the pregnant woman to avert a sudden development of tuberculosis after partuition; also of the child, after birth, to remove any predisposing lesions. The mother with a tubercular tendency should, under no circumstance, nurse the child and should be instructed to observe any disposition on the part of the child to acquire malpositions in sitting, standing or walking.

1. Journal of the American Osteopathic Association, Dec., 1904.

The **treatment of the disease** consists primarily in locating the cause of the devitalized condition of the cellular tissue. This is the vital point to be considered and requires a thorough examination of anatomical structures in the region involved. There is a reason why the tissues are in a depraved state and it is our work to examine thoroughly the structures that might become deranged anatomically and cause an obstructive innervation or vascular supply. The disease is not primarily due to the bacilli; the bacilli would not have infected the system had it been in a healthy state. Hence, the object of the treatment in tuberculosis is to favor a building up of normal, well-nourished tissues so that it is impossible for the bacilli to infect the region. Of course, destruction of the bacilli is important, but we cannot expect to do much by the use of a parasiticide, for we are not then influencing or effecting the real cause of the disease. If we can improve the arterial circulation to the diseased tissues, we will be striking at the root of the disease and the healthy blood will be the only parasiticide necessary. This is where the osteopathic theory of the cause of disease differs from that of other schools of medicine. At the local points of infection there is a decided malnutrition of the tissues, due to a lack of proper blood to the parts, thus favoring the lodging of micro-organisms; by re-establishing normal nutrition nature will repair the tissues if the condition is curable. Hence, it can be seen at once that if the case is curable osteopathic treatment will meet the demands scientifically.

The preceding is the key-note of osteopathic therapeutics; not only in the treatment of tuberculosis, but in all diseases where micro-organisms play an important part. In **tuberculosis of any part of the body,** it is the duty of the osteopath to carefully examine the structures that may become anatomically deranged, from any cause, affecting the nerve, blood and lymphatic supply to the tissues or organs diseased. Correction of anatomically deranged tissues and attention to the hygiene, diet and general health of the patient constitute the treatment.

In cases of **pulmonary tuberculosis** there is usually a dislocation of the second, third or fourth ribs over the diseased lung. In the majority of cases these dislocated ribs are the real cause

of pulmonary tuberculosis. Such a lesion would produce a weakened circulation in the lung, (chiefly underneath the deranged ribs) and thus favor a deterioration of the tissue No matter what part of the lungs is involved, a rib lesion or a corresponding vertebral lesion will be found. Another place that is oftentimes involved in pulmonary tuberculosis is in the locality of the second and third dorsals. Lesions of the ribs and vertebræ would interfere, not only with the intercostal nerves, but with the dorsal sympathetic ganglia and thus have a direct influence upon the vaso-motor nerves to the lung. Again, lesions are apt to occur in the middle and inferior cervical vertebræ, which would involve the lymphatics to the lungs and produce more or less clogging of the tissues with the debris. These vertebral lesions are usually lateral.

In **scrofula,** lesions will be found to the lymphatic glands, impairing their innervation and function. The treatment is not to be applied over the glands directly. First, it is necessary to locate the lesions in the bones, ligaments and muscles or such tissues that would cause disturbances to the glands, then readjust the parts. The object of the treatment is to modify the soil conditions on which the bacilli multiply, by correcting the local derangement of the tissues. The entire body is not in such a depraved state that the bacilli will grow and multiply wherever they happen to come in contact with the body; tissues of any organ favor a receptivity for the bacillus, only when these local tissues are in a morbid condition. It is then our work to aid nature in relieving obstructed forces that are causing such an effect.

There are **general measures** which influence the tubercular process. The diet of the patient should be nutritious. A diet of milk, butter-milk, egg albumin and meat juice will probably be found best, although many will be able to take ordinary food. The patient should be out of doors as much as possible. Meacham[1] says "Fresh, pure air, wherever found, is essential; elevation is an individual requirement, an even temperature is not necessary and sunshine is important only as it allows the patient to be out of doors. Exercise should not be taken when the patient

1. Journal of the American Osteopathic Association, May, 1905.

has a temperature above 99 degrees." The dry, even climate of the Southwest certainly tempts the patient to be out of doors more than one with opposite conditions. Even when the patient is greatly debilitated and weakened, insist upon his taking out-door exercises or rides. Gymnastic and methodical breathing exercises are essential in widening and strengthening the chest. Bolles[1] believes that the appetite should control the diet and forced feeding be not insisted upon. Fasting, to test the sense of food desire, has points well worth looking into, as gastric disturbances with a loss of strength follow over feeding. He also recommends deep breathing and physical culture to elevate the ribs and increase thoracic expansion. Out door sanatoria are being established over the country; in many cases by state appropriation as, "The treatment of tuberculosis itself has not been a satisfactory procedure except by climatic changes or the out door treatment persistently applied." (Halbert). The fresh air treatment may be taken at home by sleeping in the open air or by appliances fitted to the window of the room so only the head is exposed to the air. The only factor is to get the air. The skin, as well as the excretory organs, should be kept active. Always make it as comfortable for the patient as possible.

The **fever** is indicative of the activity of the disease, so that treatment to influence the process and to promote elimination is best. Sponging with either cold or tepid water will be helpful. The **cough** is a troublesome symptom. Attention to the underlying irritation is demanded, although one cannot hope to influence, to any great extent, the cough dependent on cavity formation. Catarrhal processes in the respiratory tract can be lessened. Lesions that are acting as a cause of irritation, will frequently be found in subluxated ribs or vertebræ. The seventh and eighth dorsals are frequent sources of cough. The tissues about the pharynx and larynx, and the hyoid bone, disturbing the vagus and other nerves, should be carefully watched, also possible reflex irritation from the abdomen and pelvis. **Night sweats** are due to tubercular processes weakening the system and particularly lessening nervous control. These will subside as the body

1. Journal of the American Osteopathic Association, May, 1905.

is strengthened. Sponging will be of service. Disorders of the **stomach** and **intestines,** such as nausea, vomiting and **diarrhea,** require treatment of the splanchnic area and regulation of diet. Considerable can be done to relieve **tubercular laryngitis** by careful treatment of the larynx and contiguous tissues. **Hemorrhage** is likely to be self-limiting. Attention to the upper dorsal vertebræ and ribs and muscles will tend to equalize the circulation. Rest and use of ice upon the chest, as well as internally, will be beneficial.

In the April number of the Journal of Osteopathy McIntyre, in an article on "Fat Food in Consumption," sums up the treatment for tuberculosis in the following words: "The treatment, then, for consumption should include rich, stimulating diet, proportioned to the digestive power of the patient, containing an excess of fats in most digestible form, of which sweet cream, fresh butter and well-cured bacon are the best examples, and the free use of pure drinking water, coupled with the promotion of blood flow, respiration and elimination of waste by osteopathic means."

Surgical measures may be necessary where glandular or other tissue has broken down and is a menace to recovery.

CONSTITUTIONAL DISEASES.

Rheumatic Fever.

(Inflammatory Rheumatism).

Definition.—An acute, febrile, non-contagious disease; it is probably infectious, although its exact nature is not known; characterized by a multiple arthritis and a tendency to involve the heart.

Osteopathic Etiology and **Pathology.**—No specific micro-organism has yet been found, although claimed by some to be due to a diplococcus; it is considered to be an infectious disease and it occurs in epidemic form. The disease is most prevalent in the temperate zone and is almost unknown in cold or tropical latitudes. It prevails most extensively during the spring months. Acute rheumatism results from an interference with the nerve centers by damp and cold. Lesions may occur anywhere along the spine, especially to the splanchnics, and sometimes are trophic in character. Particularly, are the lesions likely to disturb the processes of the digestion, assimilation and excretion, as well as directly the tissues specially diseased. Catching cold, heredity, occupations which require exposure to cold, wet, or sudden changes of temperature, lowered vitality from overwork, improper food, fatigue, etc., and a previous attack are predisposing causes. Individuals in early life (twenty to forty years) are the usual subjects.

Pathologically, there are few or no changes characteristic of the disease. The synovial membrane is hyperemic and swollen. The fluid is turbid, mainly serous, containing fibrin and sometimes leucocytes. In severe cases slight erosion of the cartilages is found. The blood generally contains an increased amount of fibrin. Acute rheumatism rarely proves fatal; when death does occur it is generally due to the complications which arise.

Symptoms.—The disease usually begins abruptly; although it may be preceded by slight fever, aching in joints, malaise, chilliness, and sore throat. A number of authorities believe that

rheumatism is secondary to tonsillitis; that infection gains entrance by way of the tonsils. It generally involves the larger joints and is almost always multiple; it has a tendency to move from one joint to another. The pain in the joints usually develops rapidly with slight chilliness and a rapid rise in the temperature from 102 to 104 degrees F. The pulse is frequent, often disproportionately to the fever. There are profuse acid sweats, often causing sudamina. There is loss of appetite and thirst is present. The urine is scanty, high colored, very acid, and deposits urates upon standing. The tongue is coated and the bowels are constipated. The joints are reddened, swollen, extremely painful and tender to the touch. Every movement, jarring of the bed, or the pressure of the bed clothes is agony to the patient. The blood is greatly deranged, anemia develops rapidly, and there is well marked leucocytosis. The duration varies from a few days to several weeks.

Complications.—The temperature may rise to 106 or 109 degrees F.; this is often associated with delirium, great prostration and a feeble, frequent pulse. Endocarditis, pericarditis, myocarditis, pneumonia, pleurisy, iritis, chorea, convulsions and meningitis may occur. Coma may develop without preceding delirium or convulsions; this is very serious and may prove fatal. Subcutaneous fibrous nodules attached to tendons and fascia sometimes develop. They vary in size and are most common in children and in young adults, occurring most frequently in the fingers, hands and wrists. They are also sometimes seen about the elbows, knees, scapulæ and spines of the vertebræ. They usually last a few days, sometimes for months, and generally develop during the decline of the fever. Cutaneous affections, such as urticaria, erythema, nodosis, purpura and sweat vesicles sometimes appear.

Diagnosis.—This is seldom very difficult; there are, however, several affections which closely resemble acute articular rheumatism. In **septic arthritis** its association with some other septic process and the tendency of the inflammation to end in suppuration with more or less destruction of the joints, will determine the diagnosis. Septic arthritis may develop during the course

of pyemia, puerperal fever, acute necrosis, or acute osteo-myeltis. **Gout** is rarely mistaken for acute rheumatism. Gout occurs later in life and usually affects the greater toe; history and mode of onset will render the diagnosis easy. In **gonorrheal rheumatism** the history of recent infection, its obstinate character and being generally connected with a single joint from the start are diagnostic. It especially effects the knee. Heart complications are rare. **Rheumatoid arthritis** begins in the small joints; then attacks them all, leaving permanent deformity. There is no fever or sweats and the heart is not affected. Acute arthritis of infants usually attacks one joint, the hip or knee. The effusion becomes purulent.

Prognosis.—Recovery is the rule, but the prognosis nevertheless, must be guarded. Relapses and recurrences are common.

Subacute Rheumatism.

In this form both the local and general symptoms are of a milder type and are more prolonged than in the acute form. The temperature seldom rises above 101 degrees F. The inflammation of the joints is not so severe and fewer joints are involved. It may last for weeks or months, and then it may pass into the chronic form. Usually though, when the course is prolonged, the joints return to their normal state.

Treatment.—Place the patient in a room that is well ventilated and maintain a temperature of about 70 degrees F. Avoid draughts of air. The bed should be soft and smooth and blankets should be used. The diet should consist largely of milk, and let the patient drink freely of water. Oatmeal, barley water, egg albumin and meat juices may also be used.

Treatment should be given along the entire spine, especially if the rheumatism changes from one joint to another; otherwise treat the innervation directly to the affected joint. Correct any derangements that may be found along the spinal column and carefully relax the deep back muscles. Particular attention should be given to the bowels and kidneys. Also, treat the liver most thoroughly during each treatment. The liver is many times

considerably enlarged and tender in rheumatism and a thorough treatment of it seems to favor a more rapid cure.

Carefully treat the affected tissues. If you cannot treat over the joint, then manipulate the tissues above and below the joint; and usually after a few minutes' manipulation the swelling is somewhat relieved so that direct treatment of the joint can be given. It is best to wrap the inflamed joints in flannel if the pain is severe. Besides treatment of the innervation of the joint, hot applications will be helpful. Some claim that cold compresses are of aid to the inflamed joints.

Complications are to be treated separately. Besides the ordinary fever treatment for the fever, the cold bath is very effectual. After **convalescence** has been established, the patient should be carefully protected for several days from cold and damp. For any stiffness that may persist, manipulation and hot baths will be quite sufficient.

H. M. Still[1] writes "If the fever is not over 103 degrees I do not try to reduce it.....After treatment in a majority of cases, the fever is reduced within twenty-four hours unless complications have set in. These are usually of the heart, so no matter how mild the attack, keep this in mind. If the action is irregular and weak, stimulate it two or three times a day. If it is rapid and high fever, go to the vaso-motor centers and reduce fever, then inhibit the heart action and keep the excretions active. If the joints are affected I always move them gently no matter how great the inflammation. As yet I have never had a case of rheumatism in which cardiac lesions or ankylosed joints were a sequela."

Chronic Articular Rheumatism.

Osteopathic Etiology and **Pathology.**—This usually develops slowly and follows an acute or subacute attack and is common among the poor, especially those exposed to damp and cold. Heredity, advanced years, although the disease may appear at any age, and constant exposure to cold and wet are predisposing causes. Chronic lesions to the spinal column corresponding to the affected area are found. Too much stress from an osteopathic

1. Massachusetts Journal of Osteopathy, Jan., 1906.

point of view cannot be placed upon the importance of lesions to both the digestive organs and to the joints especially involved.

Pathologically, the capsules and ligaments of the joints are thickened, also, the sheaths of the tendons around the joint, so that in long standing cases the movements are impaired. In severe cases the cartilages may be eroded. Atrophy of the muscles covering the joints sometimes occurs, especially when there is neuritis; thus producing marked deformity. This muscular atrophy is particularly marked when the shoulders or hips are involved. The atrophy is caused partly from disease; in cases where the joint is distended with effusion, the wasting may be due to pressure upon the muscles or blood-vessels.

Symptoms.—Several joints are usually affected; but it may be limited to one joint, particularly the knee, hip or shoulder. Pain and stiffness are the most common symptoms. The pain is increased upon motion, while the stiffness is often lessened by using the limbs. The joints are slightly swollen, but seldom reddened and are usually tender upon pressure. All the symptoms are aggravated on the approach of stormy weather. There is fever but the general health is not greatly impaired. There may be distortion of the joints and ankylosis may occur. Arterial degeneration and chronic endocarditis may develop as complications.

Prognosis.—This is very apt to be unfavorable so far as a complete cure is concerned; although most cases are greatly benefited.

Treatment.—The treatment of chronic articular rheumatism is largely correcting lesions of the spinal column, which affect the diseased tissues as well as the digestive organs, and local treatment of the joints. The joints and limbs should be thoroughly treated so as to restore a better circulation and relieve the inflamed tissues. Wrapping the affected joint with cold cloths and then covering the cloths with flannel and oiled silk is often helpful. Due attention should be given the general health, such as nourishing food, free elimination and out door exercise.

Athritis Deformans.

(Rheumatoid Arthritis).

Definition.—A chronic affection of the joints, characterized by progressive changes in the cartilages and synovial membranes, and by new osseous formations restricting the motion of the joint and causing deformity.

Osteopathic Etiology and **Pathology.**—It is due to lesions of the spinal column affecting the spinal and sympathetic nerves as well as disturbing the circulation to the cord. Lesions of the spinal column and ribs are found corresponding to the innervation of the diseased joints. The osteopath has been able in every case to demonstrate clinically important osteopathic lesions. In addition the symmetry of joint involvement, muscular atrophy, sweating, etc., point to nervous lesions. Falli found upon autopsy that the anterior horns had undergone atrophic changes. Malnutrition, traumatism, exposure to cold, and pelvic diseases are important causative factors. In all cases lesions will be found disturbing the organs of digestion. Females are more frequently affected than males. The disease is frequently seen in women suffering from ovarian and uterine troubles. Hereditary influence is a factor, also auto-intoxication. The disease is most common between the ages of twenty and thirty. Mental worry, anxiety, grief and injury are also predisposing factors.

Pathologically, the cells of the cartilages and of the synovial membrane proliferate. The cartilages undergo fibrillation, become soft, degenerate, and are absorbed, leaving the ends of the bone bare. The bones naturally atrophy and become smooth. The edges of the cartilages where the pressure is slight, thicken and form outgrowths which ossify and enlarge the heads of the bones, forming osteophytes which greatly impair the motion; true ankylosis is rare. The synovial membrane becomes thickened, also the capsule and ligaments, thus greatly restricting the movements of the joints. The muscles around the joints atrophy. In the spinal cord, atrophic and degenerative lesions are found.

Symptoms.—Pain and swelling of the joints and fever and enlargement of the lymphatics near the joint are characteristic.

The spleen is congested and later on there is gastro-intestinal disturbance. **Multiple arthritis deformans,** also known as Heberden's nodosites, is characterized by nodules developing at the sides of the distal phalanges. It occurs most frequently in women between the ages of thirty and forty, and gradually increases with age. At first the joints are swollen, tender and painful and then apparently become better. These attacks may appear at different intervals while the nodules at the sides of the joints gradually increase in size. The larger joints are rarely affected. The progressive form may be either acute or chronic. The acute form at the onset may resemble articular rheumatism. It is more common in women between the ages of twenty and thirty, but may occur in children. Pregnancy, recent delivery, lactation, the menopause, and rapid child bearing are common antecedents. There are swelling and tenderness of the joints and slight fever. Several joints are usually involved. The **chronic form** is most common. Symmetrical joints are usually involved. The affected joints slowly enlarge and are painful and red. Usually the hand is first affected; then the wrists, knees, toes, jaws and spine; in extreme cases every joint is affected. The vertebræ only (spondylitis deformans) may be attacked. The cervical spine may be alone involved, in which case the head cannot be moved up or down, although rotation usually remains. In some cases the entire spinal column is affected and may become perfectly rigid. In some cases there is hardly, if any, pain, while in others the pain is agonizing and is almost constant. The joints gradually become deformed, stiff and creak when moved; later they become completely ankylosed. This deformity is due partly to the thickening of the capsule, to the presence of osteophytes, and to the contraction of the muscles. These contractures flex the leg upon the thigh and the thigh upon the abdomen. Muscular atrophy increases the deformity. Numbness, tingling, pigmentation and glossiness of the skin, and local sweating may be present and are of trophic origin.

The **monoarthritic form** affects old persons chiefly, and women more frequently than men. It affects particularly the hips, the knees; the shoulders, and the vertebral articulations.

This is often caused by an injury. The muscles waste away and the knee-jerk is usually increased upon the affected side.

Diagnosis.—Care has to be taken in not confusing it with rheumatic fever or gout.

Prognosis.—If treated early there is a fair chance for curing the disease. Advanced cases usually improve under treatment. The osteopathic treatment should be persistent for at least several months.

Treatment.—Osteopathic treatment, if long continued in rheumatoid arthritis, has given satisfactory results, although owing to the extent of the deformity, a cure in advanced cases cannot be expected. The cause of the disease is probably a trophic or vaso-motor disturbance to the tissues of the joint. Osteopathically, there is never any difficulty to locate disorders in the spinal column corresponding to the innervation of the involved joints. The fact that many of the joints are affected symmetrically shows that the lesion is a spinal one involving the nerve center. During the incipiency marked improvement is the rule.

The treatment consists of attempts to correct the spinal derangement and careful manipulation of the diseased joints to restore vitality and motion in them. The preceding simple, but effective treatment, must be continued two or three times per week for months or even years in order to be of particular value. Coupled with the specific treatment should be a careful consideration of the general health. The emunctories should be kept active and the food of the patient be nutritious. The osteopath should require the patient to take considerable physical exercise at regular intervals, warm baths and plenty of fresh air. Massage and friction of the diseased joints will be of aid in absorbing effusions and in restoring the tone of atrophied muscles. Hot compresses are a help. The baths at various hot springs are sometimes of benefit, and change of climate is invigorating.

Gout.

Definition.—A nutritional disorder, possibly due to an auto-intoxication, in which there is an abnormal accumulation of uric

acid in the blood and tissues, an arthritis being the characteristic feature.

Osteopathic Etiology and **Pathology.**—Hereditary influences are the predisposing factors of about one-half of the cases of gout. Men are more frequently affected than women. It rarely develops before the age of thirty. Overeating, drinking alcohol, especially fermented drinks, and lead poisoning are predisposing factors. Gout is not confined to the rich by any means; but there is also a "poor-man's gout," due to poor food, unhygienic surroundings, and to an excessive use of malt liquors. Uric acid seems to be a causative factor, but whether there is an increased formation or a diminished excretion of the uric acid has not yet been decided. The ultimate result is the same in either case; there is an accumulation of uric acid in the blood, which is responsible for some of the effects of the disease.

Osteopathic experience with cases of gout shows that the cause is primarily an affection of the nervous system, as it is undoubtedly the important factor that controls uric acid accumulation or excretion. The nerve centers controlling the affected portions of the body are almost invariably involved, as well as the nerve control to the digestive and excretory organs. A neurosis of these nerve centers probably occurs and is thus the predisposing cause of gout. More can be accomplished in the cure of gout by careful examination of the spinal column, in the region corresponding to the innervation of the affected area, for vertebral lesions, and correcting them, than by any other method. Usually, slight dislocations of the bones of the foot are found, when that region of the body is involved. The most common subdislocations of the foot are involvements of the astragalus with its articulations and the metatarsals.

Pathological changes are those of the joints principally. There is deposit of uric acid in cartilages, synovial membranes and ligaments. The joint of the great toe is most frequently affected, then the fingers, ankles, knees, hands and wrist. The exudates become hard and are then called tophi. In severe cases the cartilages of the ears, nose, eyelids and larynx are involved. Finally the joints become stiff, deformed and ankylosed, and sometimes there is ulceration.

The kidneys are usually the seat of chronic interstitial inflammation with a deposit of urates. The heart and blood-vessels almost always present changes. Arterial sclerosis is quite a constant lesion; the left ventricle of the heart is hypertrophied. Urate of sodium has been found deposited upon the valves. Chronic bronchitis, emphysema and asthma are among the changes in the respiratory system.

Symptoms.—In **acute gout,** before the attack, the patient may complain of dyspeptic disorder, restlessness and twinges of pain in the small joints. He is apt to have irritability of temper and depression of spirits. The first symptom of the attack is great pain in the metatarso-phalangeal joint of the great toe, which usually comes on suddenly at night with swelling, heat and discoloration of the joint. The temperature rises to 102 and 103 degrees F. Towards morning the symptoms generally abate to recur again the next night. This lasts for several days, the symptoms gradually abating. The urine is scanty, high colored, of high specific gravity and acid in reaction. It deposits urates on cooling and often contains a small quantity of albumin. There may also be traces of sugar. There may be severe gastro-intestinal symptoms—pain, vomiting, diarrhea, faintness and a rapid, feeble pulse. Pharyngitis is an occasional symptom. The cardiac symptoms are pain, shortness of breath and irregular action of the heart. These attacks may appear with varying severity. In some cases there may be severe cerebral symptoms.

Chronic gout follows repeated attacks of the acute form. The articular symptoms continue for a longer time and the condition extends to other joints. The chalk deposits slowly increase until the joint becomes swollen and deformed. The morbid changes already described are characteristic. The urine is increased in quantity, is of low specific gravity and may contain a slight amount of albumin with hyaline and granular casts. Involvement of the heart and blood-vessels gradually occurs.

Irregular gout is seen in persons who have been gouty or have a hereditary predisposition. It includes a set of symptoms that are not alone distinctive, but when taken with this gouty tendency, all forms of irregular gout can be recognized. There

are various gastro-intestinal disturbances; cutaneous eruptions; heart and blood-vessel changes; pains in the various muscles and joints; nervous symptoms, as headache, neuralgia and neuritis; urinary symptoms, and pulmonary and ocular disorders.

Diagnosis.—Only the irregular form of gout should be difficult to diagnose. Differentiation is to be made from arthritis deformans and acute and chronic rheumatism.

Treatment.—The hygienic treatment of gout is very essential. The patient should live a quiet life, avoiding mental and physical strains. Plenty of fresh air, exercise and regular hours should be insisted upon. Alcoholic drinking should be avoided and the food taken in moderate quantities. Keeping the skin active by the use of cold baths, if the patient is strong, and warm baths should he be weak, is a helpful measure. The dress of the patient should be warm and suitable for the climate.

A regulated diet of nutritious food, taken at regular hours, is necessary. Each patient should receive separate instructions as to diet. The food given may be small amounts of beef, mutton and chicken, with fresh vegetables; with the exception of strawberries, tomatoes and bananas, fruits may be used; fats, milk and stale bread are also suitable. The patient should avoid tea, coffee, pastry, hot breads, highly seasoned dishes, and such articles. The free use of water is beneficial.

The **osteopathic treatment** consists of careful correction of the lesions of the spinal column in order to free the nerve force to the affected region. The spinal treatment in gout is the most essential treatment and is very effective. A most thorough examination should be made of the tissues about the diseased area; in the foot the astragalus oftentimes is subdislocated from its articulations, causing obstructions to the local vessels and nerves. The metatarsal bones should receive due attention, as occasionally one of the bones corresponding to the affected tissues is dislocated, usually downward. All the joints between the diseased tissues and the spinal nerve centers should be carefully manipulated so as to favor a better circulation. During a severe attack of gout, besides careful treatment of the blood supply to the diseased region, wrapping the joint in cotton wool and applying warmth and moisture to the joint may be helpful.

The kidneys, liver and bowels are to be kept active. A light treatment to the kidneys and liver each time is very helpful in aiding the organs to eliminate the waste material, and especially in controling any inflammation that may exist in the kidney. The essential treatment in gout is to relieve the disorder of the nerve centers, to increase the activities of the emunctories and to regulate the hygiene of the patient.

Muscular Rheumatism.

Definition.—A painful disease of the voluntary muscles and of their fascia and periosteum. It is regarded by many as a neuralgia of these muscles. The pain is greatly increased by motion and pressure.

Osteopathic Etiology and **Pathology.**—Osteopathic experience with cases of muscular rheumatism shows that the nerves, as they pass to and from the spinal muscles, are affected. The lesion is caused, principally, by subdislocations of the vertebræ, ribs or pelvis, according to the region involved. A gouty or rheumatic diathesis, heredity, exposure to cold and wet and previous attacks are predisposing causes. Men are more often affected, owing to their more frequent exposure. The disease affects persons of all ages. It occurs in acute, sub-acute and chronic forms.

Pathologically, there is swelling of the muscles of the nature of myositis. In chronic cases there is often atrophy of the muscles, due to interference of the trophic nerves.

Symptoms.—These are generally local and are never accompanied by marked constitutional disturbances. There is seldom fever, and the pulse is only slightly increased in frequency. Pain is the chief symptom; it is increased by motion or pressue. Tenderness is generally present and there may be swelling of the tissues. Rheumatic nodules have been found. The duration is from a few hours to several weeks. The disease is very apt to recur.

Lumbago is a painful affection of the muscles of the loins and their tendinous attachments. The onset is generally sudden. In severe cases it sometimes renders the patient helpless. In

torticollis, or stiff neck, the muscles of the side and back of the neck are affected. It is usually confined to one side of the head. Any attempt to turn the head causes a sharp pain. In **pleurodynia** the intercostal muscles, and sometimes the pectorals and serratus magnus, are affected. It usually affects but one side, more frequently the left; it is the most painful form of the disease, since the pain is aggravated by breathing. The respiratory movements are consequently restricted on the affected side. The absence of fever and physical signs will readily distinguish it from pleurisy. In **intercostal neuralgia** the pain follows the distribution of the nerves and there are tender spots along their courses. **Cephalodynia** affects the muscles of the scalp. **Scapulodynia, omodynia** and **dorsodynia** affect the muscles of the shoulder and upper part of the back. **Abdominal rheumatism** affects the muscles of the abdomen.

Prognosis.—The prognosis is good. Favorable results are the general rule under careful treatment.

Treatment.—Muscular rheumatism is usually an easy affection to cure. The cause of the disturbance is generally found in the region involved, and is due, in the majority of cases, to some dislocated tissue, usually osseous, that irritates the nerves to the muscles. In addition to correcting the lesions, stretching of the muscles, application of heat, ironing and rest are beneficial.

In **lumbago** there is invariably found a slight lateral deviation of some vertebræ along the lower dorsal or lumbar region. Occasionally, a floating rib or an innominate becomes displaced. Stretching the loins by placing the patient upon his side and flexing the thighs on the abdomen is very beneficial.

Torticollis, or stiff neck, is generally due to a lesion in the middle cervical vertebræ. The lesion is usually between the third, fourth and fifth vertebræ, occasionally as low as the second dorsal. A reduction of the subdislocation will often relieve the attack. Stretching of the muscles and application of heat will also be of aid. In some cases of torticollis (chronic) there is a curvature of the cervical spine, and occasionally the muscles are more or less fibrinous. In such instances a cure cannot always be accomplished.

A few cases of acute torticollis are caused by some of the deep muscular fibres becoming caught around a process of a vertebra. Severe contraction of the muscles by cold or extensive rotary flexions of the neck, may result in torticollis. Occasionally a case is found due to injury at birth. The injury may be to a nerve center, a nerve or to the muscles. The spinal accessory is the nerve generally involved. Lesions to the spinal accessory occur commonly at the third, fourth and fifth cervicals, or at the atlas and axis. The muscles involved in torticollis are the sterno-cleido-mastoid, trapezius, splenius and scaleni. Operations should not be performed until a thorough course of treatment has failed to relieve.

Pleurodynia is often really a neuralgia of the pleural nerves. It is usually caused by subdislocations of the ribs exactly over the regions involved. Occasionally, a lesion may exist to the corresponding vertebra, but rarely. The rib is at times completely dislocated. Applications of heat and rest of the part are of aid.

In **cephalodynia** the muscles of the scalp are generally involved by lesions in the upper five cervical vertebræ. In **scapulodynia, omodynia** and **dorsodynia** the muscles of the shoulder are usually affected by displacements of the second and third ribs, although the lesion may be found slightly lower in the ribs, or in the corresponding vertebræ. The lower cervical vertebræ may also be at fault. Dislocations of the shoulder occur frequently; and muscular fibres may slip out of the bicipital groove (rarely). In a few cases muscles may become contracted about the coracoid process, or the acromial end of the clavicle may become dislocated.

Abdominal rheumatism is generally caused by lesions in the lower six dorsal vertebræ, which involve the innervation to the muscles. In some cases lesions of the lower ribs are found, and in a few instances a lesion may be discerned in the upper lumbar vertebræ.

Myalgia of the **upper extremity** is caused by lesions of the cervical or upper dorsal vertebræ or upper ribs. Occasionally some trouble may be found in the shoulder or elbow joints. In the **lower extremity** lesions may be found in the lower dorsal or

lumbar vertebræ, or there may be derangements of the pelvic bones. Occasionally disorder is found at the hip and knee joints,

LITHEMIA.

Definition.—A constitutional disease closely related to gout, due to the faulty oxidation of nitrogenous matter. It is characterized by an excess of uric acid in the blood, with various digestive, circulatory and nervous symptoms. It differs from gout in there being no joint involvement.

Osteopathic Etiology.—Lesions are always found in the splanchnic region and are an important factor in preventing free elimination. Impaired digestion, inactivity of the liver, insufficient exercise, overeating, overdrinking and sometimes heredity are causes.

Symptoms.—The **gastro-intestinal symptoms** are important. The appetite varies greatly, sometimes it is lost; at other times it is inordinate or it may be perverted. The tongue is coated, the breath is heavy and there is an unpleasant taste. The bowels are generally constipated. In some cases there is fullness, oppression and sometimes nausea and vomiting after meals. The liver is enlarged and tender. **Circulatory symptoms** are high arterial tension, due to the action of the uric acid upon the vasomotor nerves; palpitation, especially after meals; sharp accentuation of the aortic second sound, and slow pulse. **Nervous symptoms,** such as vertigo, headache, depression of spirits, nervous irritability, and neuralgic pains, especially down the back and legs, are frequent. The **urinary symptoms** are scanty, high colored urine with high specific gravity.

Diagnosis.—This depends upon the general symptoms, the condition of the urine and the habits of the patient. This is apt to be confused with irregular gout.

Prognosis.—This is ordinarily favorable, provided treatment is persistent and the habits of the patient can be regulated.

Treatment.—In this disease it is evident that the food should be thoroughly masticated and overeating and overdrinking reduced. Exercise in the open air should be taken so that the fats in the body may be consumed. Attention to the diet is im-

portant. Green vegetables, fish, oysters, game and fruit will be found suitable.

Correction of the splanchnic lesions is necessary in order to cure. Thorough treatment should be given the liver and kidneys. All the secretory organs should act freely. The free use of water will be a helpful measure.

Diabetes Mellitus.

Definition.—A nutritional disorder in which there is an abnormal amount of sugar in the blood, characterized by an excessive urinary discharge, in which grape sugar is constantly present, and by a progressive loss of flesh and strength.

Osteopathic Etiology and **Pathology.**—Almost invariably there will be found a posterior dorso-lumbar curvature wherein the spinal column tissues are much contractured. This condition probably involves the sympathetics (vaso-motor and trophic) to the pancreas, liver and intestines. Important lesions may also be found as high as the occiput. Tenderness and congestion over the abdomen, especially the liver, are frequent. It affects men more frequently than women and is a disease of adult life, ranging between the ages of thirty and sixty, though cases have occurred in the very young. It is more serious in the young, the very young seldom recovering. Hereditary influences are believed to be a predisposing cause. It affects the better classes principally and especially those of a neurotic temperament. The Hebrew race are specially predisposed. The colored race are seldom affected.

Obesity, certain chronic diseases (malaria, gout, syphilis), occupations taxing the mind, and pregnancy are predisposing influences. Injury or disease of the spinal cord or brain frequently cause diabetes, especially any irritation of Bernard's diabetic center in the medulla. Injuries to the spine, chiefly in the dorso-lumbar and sacral regions, and to the abdomen, and diseases of the pancreas or liver are, as has been stated, oftentimes causes. Lesions to the spine may disturb the glycogenic function of the liver, the glycolytic ferment of the pancreas, or produce an alimentary glycosuria. Extirpation of the pancreas is immediately followed by diabetes, but if a fragment of the pancreas is left it is

not always followed by diabetes. The normal amount of sugar in the blood is 1-1000 while in diabetes the amount of sugar is 3 to 4-1000 up to 7 or 8-1000. The healthy kidney will not excrete sugar when it is at the normal ratio. Concerning the presence of acetone-bodies von Noorden[1] says: "The excretion of acetone-bodies may serve, like glycosuria, as a measure of the intensity of the diabetic disease.....it will be at once understood that in no other disease do the acetone-bodies occupy so important a position as in diabetes." Irritation of the centers of the vaso-motor nerves to the liver, or direct stimulus to the liver cells is followed by glycosuria. Interference with the pneumogastric nerve also influences diabetes.

Pathologically, the liver is enlarged, firmer and darker in color than normal. Often there is fatty degeneration of the organ. The pancreas is diseased in about one-half of the cases of diabetes, especially the islands of Langerhans. The lesions found are granular atrophy, occlusion of the pancreatic duct, atrophy from pressure, fat necrosis, and sometimes it is small, soft and anemic. The kidney changes are those of catarrhal nephritis. In the fatty degeneration hyaline changes take place. The heart is hypertrophied in a few cases. Arterial sclerosis is frequently met with. In the lungs bronchitis, pneumonia and tuberculosis occasionally develop. In the stomach and intestines catarrh is common. The bood presents an increase of sugar. In the nervous system are found many lesions, especially congestion, extravasation and sclerosis of the brain; disturbances of the posterior part of the cord, and congestion and sclerosis of the sympathetic ganglia. The bony lesions, however, (almost invariably a posterior lower dorsal and lumbar) must involve the sympathetics, via the splanchnics, to the extent of profound metabolic disturbance, for in no other way can the results of osteopathy be explained. The importance of specific treatment at this point cannot be over estimated.

Symptoms.—The **onset** is gradual; thirst and frequent micturition being the first symptoms noticed. After an injury or a sudden, severe nervous shock, diabetes may set in abruptly. As

1. Diabetes, p. 90.

the disease progresses there will be marked thirst, polyuria, a voracious appetite, progressive emaciation and debility. The tongue is dry, red and glazed or coated. Saliva is scanty, the teeth decay, the gums become swollen. The appetite may become enormous. As a rule, there is constipation and the skin is dry and harsh. Temperature is often subnormal; pulse frequent with increased tension.

In some cases the **urine** is not increased in quantity; usually, however, the amount varies from four to five pints to several quarts in twenty-four hours. It is pale color, of high specific gravity and acid reaction. Sugar is present in variable quantities from one or two per cent. to five or ten per cent. Sugar in the urine must be constant in order that the affection is a true diabetic one. The urine has a sweetish odor and there may, or may not be, a sediment. Albumin is often present; urea is increased and uric acid may be slightly increased. Acetone-bodies are often found and usually indicate a more serious condition.

Complications.—Diabetic coma is the most important and gravest symptom. There is either a sudden or gradual loss of consciousness. This may occur after some form of exhausting exercise. There may be previous headache or a feeling of intoxication. It may be preceded by nausea, vomiting, colicky pains or some local affections, such as pharyngitis or pulmonary complications. Peripheral neuritis, neuralgia, numbness, tingling and diabetic tabes characterize the pain in the legs. Impairment of hearing, cataracts, strabismus, diabetic retinitis and atrophy of the optic nerve may occur. The sexual function is lost early in the disease. Eczema, with burning and itching of the labia and vicinity, (and in men a balanitis), furuncles, boils and carbuncles are common. Gangrene and edema are not uncommon. Acute pneumonia, bronchitis and tuberculosis are complications. **Progressive loss of flesh** is a serious indication.

Diagnosis.—The diagnosis is very easy, as there is no other disease with which it can be confounded. Careful urinalysis should always be made. Examination for acetone, diacetic acid and oxybutynic acid is valuable.

Prognosis.—A number of cases have been cured by osteopath-

ic measures while nearly all treated have been benefited. If the patient is put upon a diet free from carbohydrates, in mild cases the sugar will disappear, while in severe cases it will still be present. Mild cases usually yield readily to treatment. In cases over forty years of age the outlook is quite favorable, but in cases under forty, and especially the young, the prognosis is not so favorable. In cases under puberty the results are apt to be fatal. Stout persons bear diabetes better than lean. All cases are liable to complications, which render the prognosis more serious. It is a disease of long **duration**, although death has occurred in a few weeks.

Treatment.—In nearly all cases of diabetes mellitus examined there have been found posterior conditions of the lower dorsal and lumbar regions. The posterior curve has always been fairly well marked and generally is a symmetrical curve. By that is meant a spinal curve that is not irregular and the relation of the various vertebræ, one to the other, is not seriously deranged. Correction of this condition of the spinal column has almost invariably given satisfactory results and in the majority of cases the condition of the patient has improved remarkably, and a few were entirely cured. To get the best results the patient should be laid on his side on the operating table and the knees drawn up so that the thighs are flexed upon the abdomen. The osteopath standing in front of the patient throws his weight against the flexed thighs and reaching over upon the spinal column springs the entire weakened portion of the spine toward its normal position, stretching the spinal column to separate each vertebra from its neighbor so that the impinged nerves, as they pass through the intervertebral foramina, may be released. Meeker[1] reports a case with a marked kyphosis which was treated two years before enough motion could be had between the vertebræ to produce any results, but after that they were favorable. Direct treatment to the abdominal organs to correct liver congestion, stimulate the pancreas and to increase activity of the intestines is essential.

The nerves affected by the posterior pathological curve of

1. Journal of the American Osteopathic Association, Oct., 1904.

the spine, mentioned above, and by separate lesions that may exist within the pathological curvature, are probably the vaso-motor nerves to the portal system, pancreas and the intestines. The vaso-motor nerves to the portal system branches are given off principally from the fifth to the ninth dorsal vertebra, although fibres may escape from the cord as low as the first lumbar vertebra. The nerves to the intestines are given off principally from about the ninth dorsal to the lower lumbar vertebræ. Possibly there are nerve fibres direct to the hepatic cell protoplasm.

How lesions in the dorso-lumbar region cause diabetes mellitus is an important question and is hard to answer. An unnatural acceleration of the portal circulation may cause an increased quantity of sugar to pass to the liver, resulting in part of the sugar not being changed into glycogen and thus passing into the circulation; or a paralysis of the vaso-motor nerves to the liver causes congestion and slowness of the blood stream. Thus a disturbed circulation of the liver may cause accumulation of sugar in the liver, so that the blood ferment has time to act upon the glycogen and transform it into sugar; or there may be a saccharinity of chyle or blood in the portal vein, due to an impeded conversion of sugar in the intestines into lactic acid; or there may be an accelerated absorption of sugar due to an abnormal state of the intestines; or the nervous control to the pancreatic functions may be disturbed. Hence, one or many pathological changes may occur and influence a case of diabetes, due to a disordered dorso-lumbar region.

The center for the hepatic vaso-motor nerves, "diabetic center," is in the floor of the fourth ventricle at the level of the origin of the vagi nerves. A lesion of the "diabetic center" or an obstruction to the pneumogastric anywhere along its course may cause diabetic symptoms; hence, there may be lesions of the cervical region that would affect reflexly the diabetic center, or lesions of the pneumogastric may occur, particularly at the atlas or axis, and cause diabetic symptoms, or, at least, these may influence the course of a case of diabetes mellitus.

There are nerves from the superior and inferior cervical ganglia of the sympathetic that have considerable influence upon

the liver. These nerves do not pass down the cord to the splanchnics, but pass in the sympathetic to the celiac and hepatic plexuses and then to the liver. Stimulation of these nerves causes the hepatic vessels at the periphery of the liver lobules to become contracted. Possibly in a very few cases, a stagnation of blood in other vascular regions of the body may cause the blood ferment to accumulate in the blood to such an extent that diabetic symptoms occur.

Dietetic treatment is essential, but is not so necessary as some medical authors would have us believe. A regulated diet should be insisted upon in all cases, but one should not go to extremes in dieting. A complete elimination of the carbohydrates is no longer considered the best treatment, as it withdraws too important an element from the diet, producing weakness without any corresponding return for good. A patient's appetite is often inordinate and it will be necessary to regulate the quantity and character of foods. Proctor[1] mentions a case which recovered when carbohydrates were restored, as the patient was too starved to build up. Under osteopathic treatment much more liberty can be allowed in selection of foods. Von Noorden[2] reported a number of cases in which excretions of sugar continued upon the strict anti-diabetic diet, but which were sugar free when they received a large amount of oatmeal along with some vegetable proteid or white of egg and butter, other carbohydrates being excluded. It is suggested by the editor of the Series that the oatmeal may be used alternately with diabetic diet and relieve the monotony greatly. It can also be used as a test of the patient's digestive and sugar destroying powers. The following food may be included in the dietary:

Animal Foods.—Meats of every variety, except livers; game, poultry, fish and eggs.

Vegetables.—Cabbage, cauliflower, celery, lettuce, green string beans, the green ends of asparagus, tomatoes, spinach, mushrooms, cucumbers, watercress, young onions, or any other green vegetable.

1. Journal of the American Osteopathic Association, Oct., 1904.
2. Practical Medical Series, 1905.

Bread and Cakes.—Made of gluten flour, bran flour or almond flour; griddle cakes, biscuits, porridges, etc., may be made of these flours.

Beverages.—Skimmed milk, buttermilk, sour wines, coffee and tea without sugar, and carbonated water.

Relishes.—Pickles, cream cheese and nuts of all kinds except chestnuts.

Fruits.—Oranges, lemons, cranberries, cherries, strawberries, all in moderate quantities.

Other foods may be used, but each case requires a thorough study in order to determine what is best to do. On the whole it is best to eat considerable meat and abstain from garden material and fruit. Water should be drunk freely.

Mental excitement and worry should be avoided as much as possible. Frequent bathing and regulated exercise will be of considerable value. The diabetic patient should have a well ventilated room and plenty of rest and sleep; flannels are to be worn next to the skin the year around.

Various symptoms and **complications** are liable to arise, which the competent osteopath is prepared to meet by following general rules.

Diabetes Insipidus.

(Polyuria).

Definition.—A constitutional disorder in which there is a continued excessive secretion of urine, free from albumin and sugar. There is constant thirst.

Osteopathic Etiology and **Pathology.**—This disease is more frequent in males than in females. It occurs most commonly between the ages of twenty and thirty. It is due to chronic disturbances of the nerves. The lesions usually found upon osteopathic examination are lateral derangements of the vertebræ in the renal splanchnic region, (ninth to twelfth dorsal inclusive) or a slight kyphosis in the same locality. Such lesions probaby affect the central nervous system in the region of the sympathetic

nerves to the kidneys, by a paralysis of the muscular coat of the renal vessels. The disease may be associated with other conditions, as injuries and diseases of the nervous system elsewhere; exposure to cold; prolonged debility and fatigue; cerebral diseases, as meningitis, paralysis of the sixth nerve, tumor of the brain, and blows on the head; injuries of the cervical region; sunstroke; cerebro-spinal fever; malaria; syphilis; pregnancy; hysteria; hereditary influences, and drinking too freely of cold water. There are many diseases and conditions which may be associated with diabetes insipidus; and which act as irritants, directly or reflexly, upon the center in the medulla oblongata (which is just above the diabetic center), or upon the sympathetic ganglia in the abdominal region. Thus, there is a vaso-motor neurosis, due either to central or reflex lesions.

Second in importance to lesions of the renal splanchnics are lesions of the upper cervical region. Irritations in the cervical region may act upon the center in the medulla or the lesions may affect some of the sympathetic fibres as they pass from the brain to the renal sympathetics.

Lesions of the nerve centers and of the sympathetic ganglia have been found upon post-mortem examination, but they are not constant. Nervous lesions have been found in the region of the base of the brain. The kidneys are sometimes congested and enlarged. The tubules may be dilated.

Symptoms.—Great thirst and an enormous secretion of urine of a pale, watery and slightly acid nature are the characteristic symptoms. The skin is usually dry and harsh, the bowels are constipated, and the appetite may be voracious. The health on the whole is quite perfect, although if the affection is not arrested, considerable loss of flesh and strength may result. There is a tendency for the disease to become chronic.

The nervous lesion causing polyuria may be the outcome of a debilitated condition of long standing or the symptoms may occur suddenly. Preceding the large flow of urine such symptoms as nervousness, irritability, headache, sleeplessness, failure of memory, and inability to concentrate the mind commonly occur. Other symptoms may be present in addition, as debility,

diarrhea, epigastric and lumbar pains, and impaired sexual function.

Diagnosis.—The diagnosis is not difficult. Thirst, polyuria and the absence of albumin and sugar characterize the disease. In **diabetes mellitus,** finding of grape sugar in the urine would at once exclude polyuria. In **paroxysmal diuresis,** the increased amount of urine is not permanent. In **interstitial nephritis,** there is albumin, casts, etc.

Prognosis.—Depends upon the cause. The disease yields to treatment much quicker than diabetes mellitus and is without doubt much less serious. The disease, in a large majority of cases, can be cured. Under osteopathic treatment most cases will yield good results or be cured in from a few weeks to six months.

Treatment.—The treatment of the disease causing diabetes insipidus is of first consequence, but very often such a disease is undiscoverable. There is often a tendency toward neurasthenia; consequently, habits, environment, etc., should be carefully attended to. Examine for sexual, rectal and other reflex irritations.

Correcting lesions of the renal splanchnics is important; in fact, in a fair number of cases treatment of this locality will entirely cure the disease. A very effective treatment, in addition to the ordinary methods of treatment, is to have the patient lie flat upon the back while the osteopath reaches around the patient on either side, placing the fingers firmly upon the transverse processes of the lower dorsal vertebræ and springing the spine forward by lifting upward on the patient, enough even to raise the patient from the surface he is lying on. This treatment is especially effective in lessening the increased amount of urine. Attention should be given to the false ribs on either side and to the condition of the spine below and above the renal splanchnics. The cervical vertebræ should be examined carefully for disorders, and if any are found they should be removed at once, if possible.

Hygienic treatment is of as much importance as in diabetes mellitus. The clothing should be warm, warm baths taken, and

general friction and care of the skin utilized so that the circulation may be somewhat diverted from the kidneys. Restriction of water is not necessary, except in cases where excessive drinking has become a habit, as the thirst is caused by the diuresis and not the diuresis by the large ingestion of water. Regulate the diet and see that the bowels are acting normally.

Rickets.

Definition.—A constitutional disease of children, characterized by impaired nutrition and changes in the growing bones, causing deformities. The physical growth is disturbed and the bone deformity is due to an over growth of cartilages and delayed calcification.

Etiology and **Pathology.**—Rickets may occur in the new-born, but it rarely begins before the child is six months old. It is a disease of the first and second years of life. There is no evidence that rickets is hereditary, but certain races, especially the Negro and Italian, have a tendency to be rickety. The disease is much more common in the large cities than in rural districts; also it is more common in Europe than in America. The disease is most frequently met with among the ill-fed and badly housed poor of the large cities. Lesions to the digestive organs predispose. Improper or insufficient food, bad air, want of sunlight, a starchy diet, prolonged lactation, exposure to cold and dampness, and syphilis are predisposing factors. Male and female children are affected equally.

Pathologically, the most marked changes are seen in the long bones and the ribs. The cartilage between the epiphysis and shaft is thickened and is soft and irregular in outline. Underneath the periosteum the tissue is spongy. Microscopic examination shows an increase of proliferation of the cartilage cells with scanty calcification. The bones are soft and there is a diminution in the calcareous salts. In a word ossification is delayed and the bones are not perfectly developed. In the cranium the frontal and parietal eminences are prominent, while the top of the head and the occiput are flattened, giving the head a square appearance. The fontanelles remain open until the second or third

year of life. The ribs become affected very early. At the point where the ribs join the costal cartilages, bulging occurs, forming the so-called "rachitic rosary." The normal shape of the chest walls is markedly changed. Just outside the junction of the ribs with the cartilages, the ribs fall in, producing a shallow depression, while the sternum and cartilages are pushed forward. The bones of the leg may be distorted. The normal curves of the spine are occasionally disturbed. The liver, spleen and sometimes the mesenteric glands are enlarged.

Symptoms.—The **onset** is slow. In many cases digestive disturbances, with their usual effect upon the nutrition, precede the appearance of the characteristic lesions. The child is irritable,restless, and there are usually slight fever and profuse sweats. The child is often languid, pale and feeble. The tissues are soft and flabby and skeletal changes begin to make their appearance. Among the first are changes in the ribs and head, already described under pathology. Changes sometimes occur in the bones of the face, particularly the maxillæ, which are reduced in size. Dentition is delayed. The spinal column is frequently curved antero-posteriorly or laterally. The long bones are curved and their extremities become thickened. The pelvis is distorted and twisted and in women this may seriously complicate labor. "Chicken breast" and "bow legs" are common, as well as muscular weakness. The abdomen is large and prominent, due partly to flatulency and partly to the enlargement of the liver and spleen.

Diagnosis and **Prognosis.**—By observing the symptoms, diagnosis is not difficult. Prognosis should be guarded, owing to danger from intercurrent diseases; still, on the whole, prognosis is fairly favorable.

Treatment.—Rickets being a disease of mal-nutrition due to hereditary weakness of the digestive organs, improper food, or to influences of disease, the treatment must be principally following hygienic rules and good dieting. The child under six months, if not nursed satisfactorily by the mother, should be given diluted cow's milk. Salts may be obtained from barley gruel and whole wheat. Diluting the milk with barley water is

highly recommended. If curds are found in the stools, the digestion is not perfect and is usually due to overfeeding the child. The child should be out doors as much as possible. Fresh air is a necessity. The worst air outside is better than the best air of the house as far as purity is concerned. Protect the child carefully with warm clothes, and when sitting or walking the child should be supported. Baths will be found beneficial.

In the older child, beef juice, light meats, yolks of eggs, green vegetables and fruits may be given. Careful osteopathic treatment of the various affected tissues of the child will aid a great deal in correcting deformities. Attention to the lesions found will also aid in increasing the nutrition to the involved tissues, as well as correcting digestive disturbances. Possibly treatment of the "nutritional" centers, (fourth dorsal and fourth lumbar) would be effectual. Carefully guard against complications of the nervous and respiratory systems. After ossification the deformities may be corrected by the orthopedic surgeon. All those conditions which predispose to rickets should receive attention; chief among these is the care of the nutrition of the mother during pregnancy. Nursing should be regulated, and possibly future pregnancies discouraged.

Obesity.

Definition.—Obesity is essentially a nutritional disease and is an inconvenient accumulation of adipose tissue in the body, sometimes impairing the bodily function. With some individuals obesity is a normal condition. In others it means impaired health, especially poor elimination.

Etiology and **Pathology.**—Heredity, overeating, sedentary habits, hot, moist climates are predisposing causes. Exciting causes are especially the eating of fat-making food, excessive use of alcohol and insufficient exercise. Obesity may follow the menopause or an infectious disease. Osteopathic lesions are frequently found in the upper and middle dorsal region. These probably are causes of a disturbed metabolism. An excessive diet of starches and sugars will indirectly act as a fat producer.

Pathologically, adipose tissue is deposited throughout most

of the tissues. Usually the abdomen is encumbered with a large amount. Passive congestion probably favors the deposition of fat, for in cases of pendulous abdomen, simply drawing the abdomen in and up and the patient, through voluntary effort, keeping it up, will frequently cause absorption of the fat in a few days or weeks. The fat is distributed underneath the skin, throughout the viscera and about the heart. The tissues may suffer from fatty infiltration, especially the heart, arteries and veins; also the liver, kidneys and stomach. There is an increase of specific gravity of the blood. Edema occurs from passive congestion, due to weak heart.

Symptoms.—The round, fat face, double chin, hanging cheeks, large waist, the thick, prominent, sometimes pendulous abdomen, and the bulky extremities form characteristic features. At first obesity presents no harmful symptoms. Usually the first troublesome symptom is increased frequency in the breathing, due to a weak and overworked heart, and to the fact that the motion of the lungs is hampered by the heavy chest walls and also by the interference with the descent of the diaphragm on account of the enlarged liver. Dyspnea, passive congestion, anemia, poor digestion, uterine disorders, and mental inactivity are common. There is cardiac hypertrophy; later the heart is overlaid with fat. The pulse is usually frequent, but may be irregular and slow.

Treatment.—Obesity being a nutritional disease it seems but reasonable that alterations of the anatomical structures will produce a change in the proper balance of nutrition. Along osteopathic lines, derangement of tissues affecting the nerves to the digestive and lymphatic systems will produce obesity. In the majority of cases examined have been found disturbances at the sixth and seventh cervical, fourth and fifth dorsal and from the tenth dorsal to the second lumbar. Lesions at these points could readily interfere with the thoracic duct and the receptaculum chyli, as well as with the processes of digestion, assimilation and elimination. It is claimed that stimulation of the splanchnic nerves causes dilatation of the receptaculum chyli. Direct

treatment to the abdomen and to areas of fatty deposit will aid very materially in absorption.

The **dietetic treatment** is essential, the principle being to furnish less food to oxidize. Restrict fats, sugar and starches and limit the amount of water. Alcohol should be prohibited. Another important point in the treatment is exercise, which must be carried out in a systematic way. Rules can be laid down only in individual cases and should be governed by the osteopath in charge. The principal effect of general mechanical treatment is to promote oxidation. Massage and baths are beneficial. The patient can do much for the abdomen by keeping it in and up, and walking erect.

Scurvy.

Definition.—A constitutional disease, characterized by extreme general weakness, anemia, spongy condition of the gums, disintegration of tissue and a tendency to hemorrhages.

Etiology and **Pathology.**—In comparison with former times scurvy is now a rare disease. Lack of fresh vegetables or their substitutes, overcrowding, dampness, bad hygienic surroundings, and prolonged fatigue under depressing influences are the predisposing causes.

There are extravasations of blood into the skin, muscles and mucous membranes. Hemorrhages may occur in the internal organs, especially the kidneys and liver, and in the serous membranes. The gums are swollen and spongy. The teeth decay. The spleen is soft and enlarged. Parenchymatous degeneration of the heart, liver and kidney is frequent. Ulcers occasionally occur in the skin and bowels. The blood is thin but there is no leucocytosis.

Symptoms.—The disease is usually slow in development. The general manifestations of anemia with debility are among the first symptoms. The gums are swollen, soft and spongy, they bleed easily and in severe cases there is ulceration. Petechial spots appear upon the body. Subcutaneous ecchymosis occurs, first on the legs, then on the arms and trunk. The eyes and face are swollen; the patient appears as if he had been bruised. Hemorrhages from the mucous membrane frequently occur. The

temperature is usually normal. The pulse is small, feeble and frequent; sometimes irregular and slow. The appetite is impaired and constipation is present at first, as a rule, although this may be followed by scorbutic dysentery.

Diagnosis.—The disease is readily recognized when several cases occur together. It is somewhat hard to recognize in isolated cases, and to be able to distinguish it from certain forms of **purpura.** The etiology, the gingival changes and the hemorrhages usually decide the diagnosis.

Prognosis.—Scurvy being a disease due to malnutrition, it is necessary to remedy such condition by attention and correction of the faults producing it. Hygienic surroundings and a wholesome diet will do more in curing the disease than anything else. An out-door life and good ventilation with anti-scorbutics, as fruit juices, (especially lemons) fresh vegetables, (onions, potatoes, etc.) and fresh milk, are necessary.

It is held by Garrod that scurvy is caused by an absence of potash; for a deficiency of potassium salts is found in the blood. The anti-scorbutics named above contain potash. A careful treatment along the splanchnics would help to improve the appetite and digestion. Treat the gums and ulcers according to surgical indications.

Infantile Scurvy.

This form usually follows the prolonged use of condensed milk, sterilized milk or proprietary foods for children. The disease occurs during the first two years of life, but it is most common from the seventh to the fourteenth month.

It develops rapidly. The child is pale, has a muddy complexion and may show signs of rickets. The gums may be soft and spongy. There is tenderness and pain on motion. The lower limbs are kept drawn up and are motionless. The bones become thickened from sub-periosteal hemorrhage, and there is apt to be softening between the shaft and epiphysis. The back and legs become very weak. The lesions are usually symmetrical. The temperature is variable.

Treatment.—The treatment of scurvy in children consists

in, first, omitting all proprietary foods and substituting fresh cow's milk, meat juice, strained gruel and a moderate quantity of fresh orange or lemon juice. Under this treatment, cases that have not progressed too far, will promptly recover.

Northrop says: "It is a significant fact that the country which furnishes most of the literature on scorbutus in children is the same which is posted from end to end with advertisements of proprietary foods."

Purpura.

Purpura is a symptom rather than a disease. It is characterized by extravasation of blood into the skin and bleeding from the mucous membranes, irrespective of direct injury. These extravasations do not disappear upon pressure and vary greatly in size. When small, they are called petechiæ; when large they are known as ecchymosis. At first they are bright red and gradually become darker until they fade into brownish spots. Clotting of normal blood requires three to five minutes, of purpuric blood, ten to fifteen minutes.

Symptomatic Purpura.—The purpura of **infectious diseases,** as in pyemia, septicemia, mycotic endocarditis, typhus fever, smallpox, etc. **Toxic,** as produced by venomous snake bites and by **certain medicines,** as copaiba, mercury, quinine, iodides, and others in over doses. **Cachetic purpura** may be observed in cancer, tuberculosis, Bright's disease, scurvy, etc. In **senile purpura** the spots are generally confined to the extremities. In certain **nervous diseases,** bleeding spots appear on the skin, as in tabes, myelitis and severe neuralgia. **Mechanical purpura** is seen in venous stasis; this is rare.

Primary Purpura.—The following forms are recognized by medical authorities: Purpura simplex, athritic purpura, and purpura hemorrhagica.

Purpura simplex is a mild form, seen most commonly in children. It occasionally follows attacks of infectious diseases. The spots are found upon the legs, more rarely upon the trunk and arms. Articular pains may or may not occur. Fever is seldom present. Loss of appetite, diarrhea and slight anemia

may be manifested. The patients get well in a week or ten days.

Arthritic purpura is a much more serious affection, characterized by multiple arthritis and an eruption which may be simply purpuric, or it may be associated with urticarial wheals or with erythema exudativum. The disorder is possibly due to rheumatism. It is more common in males between the ages of fourteen and thirty. The spots usually occur first upon the legs and around the affected joints. The joints are swollen and painful and the temperature rises to 101 and 103 degrees F. The amount of edema varies greatly and occasionally it is quite excessive. Endocarditis, hematuria and hemorrhagic nephritis are **complications** which may arise. Relapses may occur; recovery is the rule. **Henoch's purpura** is seen most frequently in children and is characterized by severe gastro-intestinal disturbances as pain, vomiting and diarrhea, hemorrhages from the mucous membranes and acute enlargement of the spleen, in addition to the symptoms already named under the foregoing form. There is some danger of hemorrhage into the kidneys. The prognosis is good.

The disorder of **purpura hemorrhagica** is usually associated with rheumatism, malaria and other infectious diseases. This is the most serious form of purpura. It is most commonly met with in delicate girls during early life; but it may occur at any age and in the most robust of either sex. After a couple of days of languor and weakness, purpuric spots appear upon the skin; and bleeding occurs from the mucous membranes and may cause profound anemia. Hemorrhages into the internal organs occur. There is usually light fever. Favorable cases recover in ten days or two weeks. Death may result from loss of blood or from hemorrhage into the brain. Except in the mild cases prognosis is unfavorable. Care should be taken not to confuse the disease with scurvy.

Treatment.—In the treatment of purpura the disease from which it develops should receive due attention. Occasionally there is danger of overlooking the primary disease and treating some symptoms of the disease, although it is true that sometimes an important symptom is nearly all that is manifested. Outside

of treating the conditions under which purpura arises, general measures should be considered, as a nutritious diet, fresh air, and general treatment of the patient so that normal circulation and strength may be restored. The treatment of the purpura locally should be such as to restore normal circulation of the part by removing any obstruction or irritation of the blood supply that may be found, by careful manipulation of the tissues. As stated the management of the disease under which it arises should be embraced in the treatment. In cases of hemorrhage from various organs see article under hemorrhage. Some cutaneous hemorhages are best relieved by local manipulation.

Hemophilia.

(Bleeder's Disease).

Hemophilia is a hereditary condition manifested by a tendency to uncontrollable hemorrhage with or without injury. The usual mode of transmission is through the female line, rather than by the male. The mother does not necessarily have to be a bleeder, but the daughter of one, in order to transmit the disease to her offspring. Atavism through the female alone is almost the rule. Not all the children of a bleeding family are afflicted; the male children are more subject to the condition than the female children. The tendency usually appears within the first two years of life. The families of bleeders are often large and are commonly healthy looking and have fine soft skins. It is claimed blondes are most likely to be afflicted.

Pathologically, an unusual thinness of the blood-vessels with a fatty degeneration of the intima has been noted. In many cases there is deficient coagulability of the blood and a lessened number of leucocytes. Hemorrhages have been found in and about the capsules of the joints; and in a few instances inflammation of the synovial surfaces. The arteries are situated superficially, but that does not explain anything. The real nature of the disease has not been determined. Emotional excitement is a factor, consequently vaso-motor disturbances may be important. The frailty of the blood-vessels and the peculiar constitution of

the blood preventing thrombotic formation are the two facts of importance that have been recognized.

Symptoms.—Hemorrhages occur from the most trifling injuries. Blowing the nose may cause severe epistaxis; the extraction of a tooth is a frequent cause of hemorrhage; the prick of a pin, a slight cut, a scratch, or a slight blow may result in profuse bleeding. The bleeding may occur spontaneously from the mucous membrane of the mouth, nose, lungs, intestines, etc.; or it may occur directly from the fingers, toes, back of the hands, and lobes of the ears. The hemorrhages may last several hours. As soon as checked the patients rapidly resume natural appearance providing the bleeding is not often repeated, thereby causing a permanent anemia. There may be attacks of arthritis with fever, as with acquired hemorrhagic tendency, closely resembling rheumatism.

Diagnosis.—Hereditary tendency and persistent hemorrhage from slight injury.

Prognosis.—In a few cases the tendency to bleed gradually diminishes until at last it entirely ceases. The younger the subject the more is it liable to prove fatal. In the majority of cases death occurs between the first and eighth year. After maturity the chances of an attack are much lessened.

Treatment.—Members of the bleeder's family, particularly the boys, should be guarded against traumatic influences, and operations of all kinds should be avoided. Out-door exercise, fresh air, bathing and plain nourishing food, in fact, the hygienic surroundings, and all food should be carefully watched so that the threatened subject may become strengthened and hardened. Marriage should be discouraged, especially with the daughters, as it is through them the tendency is propagated. Possibly, coupled with the foregoing prophylactic treatment, a stimulation of the glands of elaboration of the blood will be of service to build up the physical constitution of the patient. During attacks absolute rest and the required symptomatic treatment should be given. For resultant anemia the usual treatment is to be employed.

DISEASES OF THE DIGESTIVE SYSTEM.

DISEASES OF THE MOUTH.

Stomatitis.

Definition.—Inflammation of the mouth.

Etiology.—Chemical, mechanical, thermal or parasitic irritations; secondary to disorders of the gastro-intestinal tract, scarlet fever, measles and variola; cachexia, due to such diseases as cancer and phthisis; dentition; artificial feeding; hot weather and poor hygienic surroundings are the most common causes. Lesions to the innervation and vascular supply of the mouth are found, principally, in the upper cervical vertebræ, occasionally in the upper dorsal vertebræ and corresponding ribs.

Varieties.—Catarrhal, apthous, ulcerative, parasitic, gangrenous.

Catarrhal Stomatitis.

Etiology.—Most common in infants and children. Hot and irritating substances; secondary to diseases of the stomach, to measles, scarlet fever and variola; difficult dentition; alcoholic or tobacco excesses.

Hazzard says in all cases of stomatitis "there is generally lesion to the bony or other tissues in the cervical region (sometimes also in the upper dorsal), which deranges vaso-motor control of the tissues of the mouth and tongue, obstructs venous return, weakens the tissues and lays them liable to the effects of some particular irritant, local or in the system, but there is, generally, lesion affecting the gastro-intestinal tract which is the real underlying cause of the trouble."

Symptoms.—Diffuse, red swelling of the mucous membrane, heat and pain in the mouth, increased flow of saliva, fetor of breath, restlessness and languor. In children there is a disinclination to nurse and a slight fever may be present. The sense

of taste is blunted and there is commonly a bitter taste in the mouth.

Treatment.—Removal of the exciting cause is the most important point in the treatment. Good hygienic conditions must be enforced. The mouth should be kept clean. Wipe it out at frequent intervals with a soft piece of absorbent cotton and cold water. A borax solution is frequently used. Attention should be paid to the diet and secretions. Light but thorough treatment of the upper cervical region is to be given, with careful attention to the tissues about and below the angles of the jaw, so that the innervation, blood and lymphatic supply may be equalized.

Apthous Stomatitis.

(Canker).

This disease is characterized by little grayish-white spots upon the superficial layer of the mucous membrane. They consist, primarily, of an exudate of fibrin and wandered-out leucocytes. It is principally a disease of childhood. Among the common causes are difficult dentition, disorders of digestion and uncleanliness of the mouth, such as neglect to cleanse the child's mouth after nursing. It may be a symptom of measles or of local diseases.

Probably the innervation to the region of the little grayish-white spots or canker is obstructed at some point by a disordered tissue. The lesion may be mechanical or it may arise from a disordered digestion. If one is able to locate such a lesion and remove it, a cure will be hastened. The seat of the infection is the internal surface of the cheeks, gums, roof of the mouth, tongue and lips.

Symptoms.—There is redness of the mucous membrane of the mouth, followed by the appearance of the vesicles with a red areola. Pain in the mouth and an increased flow of saliva occur. Mastication, deglutition, and even speaking, may be painful. This condition is followed by sleeplessness, feverishness, diarrhea and fetor of the breath.

Treatment.—Removal of the cause, as in other varieties of

stomatitis, is paramount. Give attention to the food. The milk should be sterilized. The disordered digestion should be corrected at once. All secretions must receive prompt attention. The child should be nursed at regular intervals. Locally, keep the parts clean and carefully treat the innervation.

Ulcerative Stomatitis.

This is a disease of children, although it may not be limited to them, as it occasionally occurs in epidemics and affects all ages. It occurs chiefly in the families of the poor and in places where the hygienic surroundings are bad, the food poor and personal cleanliness lacking. It may begin as an apthous stomatitis. Often sufferers from severe, acute diseases are subjects of attack.

Symptoms.—The gums of the lower jaw are chiefly affected. They are at first congested, swollen and bleed readily. Pain is increased by mastication and deglutition, the mouth is hot, the breath fetid, the saliva dribbles and the digestion and bowels are disordered. The ulcers may appear at various points upon the cheeks, lips and tongue.

In the more severe cases the gums are spongy and the teeth are loosened. In proportion to the constitutional disturbances, fever and enlargement and tenderness of the submaxillary glands occur. Even necrosis of the bone may follow.

Mercurial stomatitis (ptyalism) is a form of stomatitis seen in artisans who work in mercury. A frequent attendant of mercurialization in all instances is found whether from handling the mercury or after its administration as a medicine. The first symptom usually observed is fetor of the breath which is followed by tenderness of the gums, a metallic taste and increase of saliva and redness of the gums near the insertion of the teeth. These premonitory symptoms are followed, in severe cases, by profuse salivation, protrusion of the tongue if that organ is affected. ulceration of the mucous membrane, loss of teeth and necrosis of the jaw.

Syphilitic Stomatitis is also ulcerative. The syphilitic ulcers exhibit the same gray color, but are found in the throat as well as at various points on the mucous membrane of the mouth. They

are much deeper than those of ulcerative stomatitis, but do not bleed as easily, nor are they as angry looking.

Diagnosis.—The disease may be confounded with gangrenous stomatitis, although the progress of the disease is slower and there are fewer constitutional symptoms. **Scurvy,** though a general disease, is characterized by ulceration of the mouth, but the general symptoms will usually make the diagnosis easy.

Prognosis.—Is favorable if the disease is promptly and properly treated.

Treatment.—The hygienic surroundings should at once be corrected; this being remedied, any tendency to an epidemic will be prevented. In all forms of stomatitis the cause of the affection must be removed before a cure can be accomplished. Pay strict attention to the diet and secretions. The mucous membrane of the mouth must be kept absolutely clean. An antiseptic wash is necessary. Carbolic acid (a teaspoonful to five ounces of water), listerine diluted with twice as much water, or any other antiseptic may be used. Treatment of the vascular supply and innervation of the mouth, as in other forms of stomatitis,. is indicated. General treatment should not be overlooked. Pay attention to the bowels. Vaso-motor nerves to the mouth are from second to fifth dorsal.

Parasitic Stomatitis.

(Thrush; Sprue).

The exciting cause is a fungus known as oidium albicans or saccharomyces albicans. It is claimed that a catarrhal stomatitis is the soil upon which the fungus develops. Parasitic stomatitis is chiefly a disease of nursing children and is promoted by unhygienic conditions. It is seldom seen after ten years of age, occurring in adults only in the last stages of consumption or cancer.

Symptoms.—Upon inspection there are seen numerous milk-white elevations. These appear first about the angles of the mouth, soon extending to all parts of the mouth, and in a few cases, even to the pharynx and to the esophagus. The general symptoms of stomatitis are present—pain upon mastication and

swallowing; fetid, hot breath; increased saliva; increased temperature; restlessness; swollen lips and disordered digestion occur.

Diagnosis.—The microscope will remove all doubt as to the nature of the affection. In apthous stomatitis the ulcers are preceded by the formation of vesicles.

Prognosis.—Is favorable in the majority of cases.

Treatment.—Hygienic measures, absolute cleanliness, correction of the disorders of the gastro-intestinal tract and local treatment, as in other forms of stomatitis, is the required treatment. A boric acid solution will be found beneficial.

Gangrenous Stomatitis.

A rare disease that attacks debilitated children, probably due to some parasitic micro-organism. It is generally seen between the ages of two and six years. It is usually a sequela to specific fevers, especially measles and whooping cough.

Symptoms.—Its approach is usually insidious, ulcerative stomatitis or a sloughing ulcer on the gums or on the inside of the cheek being first noted. Even a gangrenous odor may be the first symptom noticed. The process is essentially a rapid, progressive, moist gangrene. The cheek swells and becomes edematous until finally the whole side of the face is affected. The mild form is generally limited to perforation of the cheek. In severe cases the bones of both jaws, the eyelids and ears may be involved. High fever, 104 degrees F., may be present. The pulse is rapid and feeble and the adjacent lymphatics are swollen. The patient rarely recovers, death occurring in from five to seven days.

Treatment.—Local treatment of the cervical and upper dorsal regions, hygienic measures, nourishing food, local antiseptics and the actual cautery.

DISEASES OF THE TONGUE.

Glossitis.

Inflammation of the parenchyma of the tongue is a rare disease. It may be either acute or chronic; the result of direct injury to the tongue, boiling liquids, corrosive substances, accidental biting, poisonous stings, the sharp edges of the teeth or the use of a tobacco pipe. In a few cases the atlas will be found anterior; in others, frequently lesions to cervical vertebræ and muscles.

"Lesions to the atlas, axis, lower cervical, or upper dorsal vertebræ; sometimes of the upper few ribs; of the clavicle; of the cervical muscles, especially those of the throat; of the hyoid bone; of the lower jaw, may be present." (Hazzard).

Symptoms.—The tongue is greatly congested, reddened, swollen and painful. It may be so swollen that speech is difficult, as well as mastication and swallowing. In fact, in a few cases it may be so large that it protrudes from the mouth. Obstruction to breathing may occur, also restlessness, fever and increased flow of saliva. In a few instances suppuration takes place.

Treatment.—Ice applied constantly, internally and externally, at the angles of the jaw, or the persistent use of hot water held in the mouth and applied exetrnally; with a continued thoroughly relaxed condition of the cervical muscles about the angle of the jaw and also the deep cervical muscles will generally give prompt relief. The vaso-motor nerves are largely from the fifth cranial. Some of them make their exit from the cord as low as the fifth cervical and pass upward through the superior cervical and Gasserian ganglia. If pus has formed, the use of the lancet must be employed. If suffocation is imminent, perform tracheotomy. Pay due attention to the general health. Examine carefully for any possible reflex irritations.

Fetor Oris, or foul breath, is common. It is usually due to some digestive trouble, chronic tonsillitis, pyorrhea alveolaris, or decayed teeth.

Diseases of the Salivary Glands.

Hyper-secretion.—(Ptyalism).—This is an abnormal increase in the secretion of saliva. It is a common effect of certain drugs, as mercury, gold, copper and iodine, and vegetable substances producing the same results are jaborandi, muscarin and tobacco. Ptyalism may be the result of oral disease—noma and ulcerative stomatitis. It is sometimes seen in smallpox, during gestation, in rabies, and occasionally in mental and nervous affections.

Xerostoma (Aptyalism; "Dry Mouth").—This is a condition in which the salivary and buccal secretions are arrested. The tongue is red, dry, glazed and sometimes cracked. The mucous membrane is dry, smooth and shiny. Mastication, deglutition and articulation are difficult. This is a rare condition and the majority of cases have been observed in women in conjunction with nervous phenomena. It is probably due to an interference with the center which controls the salivary and buccal secretions.

Treatment.—The treatment of hypersecretion and xerostoma depends altogether upon the conditions producing them; although treatment over and around the salivary glands in dry mouth will tend to stimulate the glands' activity. The center or the nerves from the center that control the secretion of saliva and buccal glands may be interferred with by a subdislocated atlas—usually an anterior dislocation. Secretory fibres to the submaxillary gland are from the second and third dorsals. Dana says the fifth nerve controls salivary secretion.

Symptomatic Parotitis (Parotid Bubo).—Inflammation of the parotid glands, apart from mumps, occurs under the following conditions:

(1) During an attack of infectious fever, such as typhoid, typhus, scarlet fever, pneumonia and pyemia. It may also occur in secondary syphilis. Parotitis is seen especially in typhoid fever. It is doubtless either the result of septic infection or due to the extension of inflammation through the duct of Steno. The inflammation is often intense, going on rapidly to suppuration.

(2) From diseases or injury of the abdomen or pelvis, especially of the genito-urinary tract. Also, injury or disease of

the alimentary canal, of the abdominal walls, peritoneum or the pelvic cellular tissue may produce it. Derangements of the testes or ovaries, the use of a pessary, menstruation or pregnancy may also cause it.

(3) Peripheral neuritis with facial paralysis (Gower's).

Treatment.—When the parotid glands are involved, the deep tissues about the angle of the jaw are usually severely contracted or the atlas and axis are displaced. A reduction of such derangements is usually very effectual in obtaining relief from the involved glands. In a few instances the deep lateral cervical muscles, and even the first and second ribs on the side affected, are found deranged. There is probably, in such instances, an involvement of all the cervical lymphatics on the side affected. The glossopharyngeal supplies secretory and vaso-dilator fibers to this gland.

Applications of cold, especially ice, should be used at first. If the affection has progressed to a later stage, use hot applications. Use the lancet if suppuration has occurred.

Chronic Parotitis.—The glands are enlarged and may be tender and painful or painless. It may succeed mumps or acute inflammation of the throat. It is also met with in Bright's disease, syphilis and in mercury or lead poisoning.

Treatment.—In cases of chronic parotitis the atlas and axis are commonly subdislocated anteriorly, or else there is a rotary lesion of the atlas, the gland involved being generally on the side of the transverse process which is most anterior.

In disturbances of the salivary glands there will always be found lesions to the cervical vertebræ or muscles, or the upper dorsal vertebræ, ribs, or muscles, or the clavicle may be depressed and obstructing lymphatic drainage. These lesions are primary or else they are predisposing to the production of constitutional and reflex irritations.

DISEASES OF THE TONSILS.

Acute Tonsillitis.

(Quinsy).

Definition.—An acute, parenchymatous inflammation of the tonsil.

Osteopathic Etiology and **Pathology.**—Exposure to cold and wet are the most common exciting causes. Injuries and strains to the upper cervical vertebræ and muscles are invariably found. In a few cases infection may be the cause. Many persons have a predisposition to attacks of tonsillitis and probably all that a predisposition means, in a large percentage of cases, is that there is a weakened or strained condition of the cervical vertebræ, and whenever one is exposed to atmospherical changes the uneven contraction of the cervical muscles deranges still more the already disordered tissues and the lesions to the vaso-motor and secretory nerves of the tonsils are increased. Lesions which cause disturbances to the vaso-motor nerves and the lymphatic drainage may be found as low as the upper dorsal vertebræ and corresponding ribs and at the clavicles. The disease usually occurs between the tenth and fortieth years.

Pathologically, one or both of the tonsils, more often one, swells rapidly and may extend to the median line; in fact, if both tonsils are affected the isthmus of the fauces may become occluded. The tonsils, as well as the adjacent mucosa, become red and sensitive. The surface of the tonsils presents yellowish patches. Where distended follicles of the gland are protruding, the tonsils are painful, and if undergoing suppuration, they gradually soften.

Symptoms.—The onset is commonly somewhat sudden, with rigors and a temperature of 104 to 105 degrees F., while the pulse is full, bounding and frequent, 110 to 130 per minute. The jaws are stiff and painful on account of the swelling at the angle. There is difficulty in swallowing and in opening the mouth, the voice is greatly changed, the salivation increased, and respiration may be considerably impeded. Accompanying this condition are headache, thirst, an anxious face, earache, deafness and pain in the floor of the mouth and Eustachian tubes.

When suppuration is imminent, the pain becomes increased and throbbing, the patient more depressed, the fever higher and all the symptoms are increased. The rupture of the abscess may occur spontaneously or from an effort of vomiting. The contents of the abscess is ejected from the mouth. If the contents should go into the larynx suffocation may occur. The disease lasts from three to seven days, although by thorough osteopathic treatment this time may be materially shortened. It may terminate by suppuration or by gradual resolution.

Prognosis.—In the large majority of cases the prognosis is favorable. The danger lies in suffocation, the rupture of the abscess, when the obstruction is complete by double sided quinsy and when the giving of food is seriously interferred with.

Treatment.—At the beginning of the attack measures should be taken to subdue the inflammation as much as possible. Treatment should be given often, to free the lingual, tonsillar, pharyngeal and palatine vessels. Thorough treatment should be applied over the tonsillar, nasal and external pharyngeal plexuses. A thorough examination should be given to note any lesions of the cervical sympathetics to vaso-motor fibres of the fifth cranial and glosso-pharyngeal nerves. Pay particular attention to the condition of the upper cervical vertebræ and also to relaxing the cervical muscles, especially the antero-lateral muscles over the region of the tonsils. A downward, forward, firm treatment from the angle of the inferior maxillary over the tonsils to the anterior median line of the body is very effectual. If there is ulceration an alcohol gargle, one part to three, will be beneficial. An antiseptic spray will reach all diseased tissues.

The bowels and other excretory organs should be kept active from the beginning of the attack, and the diet should be of the nature of fluids, as thin oatmeal, gruel, peptonoids, milk, beaten eggs, meat juice, etc., so it can be most easily swallowed. Cold or hot applications about the neck and pellets of ice held in the mouth will be helpful. Examine the tonsils frequently with the finger and when suppuration occurs use the lance. If there is danger from suffocation the tonsil may be taken out and in extreme cases tracheotomy may be performed.

Chronic Enlargement of the Tonsils.

Definition.—A chronic, inflammatory enlargement of the tonsils. A chronic, inflammatory enlargement of the **adenoid tissues** of the pharynx will also be considered here.

Osteopathic Etiology and **Pathology.**—Repeated attacks of acute tonsillitis are common causes; chronic lesions of the upper cervical vertebræ, involving the innervation and blood supply to and from the naso-pharyngeal region; diseases associated with circulatory disturbances of the region of the tonsil, as scarlet fever, diphtheria and measles; rheumatism; rachitis; tuberculosis and syphilis are occasional causes. The disease may be hereditary. Skin diseases, improper food and unsuitable surroundings may favor the disease.

Adenoids are frequently associated with chronically enlarged tonsils. The disease may be congenital. Age is an important etiological factor, the disease occurring usually between the ages of three and fifteen years.

The two diseases are so intimately associated that one rarely sees enlarged tonsils without adenoids and those conditions that would cause chronically enlarged tonsils would cause adenoids of the naso-pharyngeal region The adenoids occur most frequently in boys at the ages stated above.

Pathologically, all the tissues of the tonsils are increased in size, especially the number of lymphoid cells; in fact, the enlargement is a true lymphoid overgrowth. The enlargement is usually symmetrical and firm. In children the tonsil is in a developmental stage and is not as firm as in the adult, so if it is thought best to remove the tonsils the earlier it is done the better. The crypts are deepened and widened, making the surface of the tonsil quite uneven. The opening into the throat varies according to the size of the enlarged tissues and may be almost closed.

The **adenoids** are hyperplasia of the lymphoid tissues in the naso-pharynx. In children the mass is soft and lobulated after the manner of the enlarged tonsils.

Symptoms.—In a few simple cases there may be no symptoms until the tonsils or lymphatics further enlarge, induced by an

acute attack. The first noticeable symptom is an obstructed breathing, necessitating the patient's breathing through his mouth. This especially disturbs his rest and is the cause of considerable dyspnea. The blood is poorly oxygenated as a result and the general health may be greatly impaired. The voice is thick and muffled, the breath fetid, and there may difficulty in deglutition. The hearing is usually defective and smell and taste are impaired. A constant cough is a very annoying symptom. Epistaxis is frequent.

This condition gives rise to the so-called "chicken breast" and is quite common when the lymphatics of the upper air passages are enlarged. These children usually complain of headache, a dried, parched mouth and tiredness, and are, as a rule, dull and stupid. Their countenances are expressionless. They have broad noses, thick, everted lips and their mouths are open. They do not learn easily nor readily at school and the teacher should have patience with them, as their hearing is generally impaired and their night's rest disturbed. On the whole, both mental and physical deterioration gradually occurs.

Diagnosis.—There should be very little difficulty in the diagnosis. Enlarged tonsils can be determined quite readily through the external wall; but a thorough ocular examination will be more accurate. **Malignant growths** of the tonsils are of rare occurrence, especially in children. They start on one side, are very painful, bright red in color, and grow rapidly.

Prognosis.—Depends largely upon early discovery of the disease, although persistent treatment in severe cases will usually induce the disease to yield to some extent at least. It requires several months' treatment in a large percentage of cases to accomplish much. Removal of the growth in a few cases will be best. After the disease has been cured the peculiar facial expression and deformity of the chest will be out-grown. In a majority of cases the adenoids and tonsils will atrophy at puberty, but something should be done before that late day, as both the mental and physical conditions may be greatly impaired.

Treatment.—Requires most careful and painstaking work. In many cases the work will seem discouraging on account of the

slowness of the case to yield to treatment. An attempt should be made during each treatment to correct any disordered cervical vertebra that may be found. Thorough and continuous treatment should be applied over the tonsils and glands externally. A downward, forward and sweeping motion over the tonsils and glands is best. Pay attention to the condition of the clavicle and upper ribs so that they may not interfere with the vascular drainage from the naso-pharynx. Occasionally an internal treatment through the mouth to the soft palate will be helpful. (See treatment of Nasal Catarrh).

Care should be taken of the spine, especially in the dorsal region, and of the ribs. If the chest is deformed an attempt should be made to correct the disordered condition. A nutritious diet and due attention to hygienic surroundings are certainly advisable.

Those cases that have been subject to **snoring** and retain the habit can overcome that annoyance by wearing a cloth or pad over the mouth during the night. When the voice remains altered after the case has been cured, training of the voice should be encouraged to overcome the defect. A few cases will require removal of the growth, but this should not be done until after a thorough course of treatment and then as a last resort; still, do not delay surgical interference too long.

DISEASES OF THE PHARYNX.

Acute Catarrhal Pharyngitis.

(Sore Throat).

Definition.—An acute, catarrhal inflammation of the mucous membrane of the pharynx, tonsils, soft palate and uvula.

Osteopathic Etiology.—Exposure to atmospherical changes is the most frequent cause. A strained condition of the upper cervical or lower dorsal vertebræ predisposes to an attack. Improper use and overuse of the voice may produce the disease, also, hot drinks and local irritants. Thoracic diseases, weakness and debility, rheumatism, gout, scrofula and infectious fevers are occasional causes.

Symptoms.—Chilliness, slight fever, dryness and soreness of the throat are the first symptoms. Associated with these symptoms are a painful deglutition, a hacking cough, dryness, soreness and tickling of the throat, and tenderness and stiffness of the neck muscles. The inflammation may extend into the Eustachian tubes, causing more or less deafness, or into the larynx, causing hoarseness. Upon inspection of the throat, the mucous membrane is red and swollen. The calibre of the pharynx is lessened and the uvula enlarged. Whitish spots may occur on the mucous membrane and in a few cases ulcers will be present.

Prognosis.—The prognosis is favorable in a large majority of cases. Most cases are readily cured, rarely lasting longer than a week.

Treatment.—Many cases get well without any treatment. In severe cases, if the patient would remain in bed twenty-four hours and attend carefully to himself, the inflammation would rapidly subside. The object of treatment is first to correct any slight strain or irregularity that may exist in the cervical vertebræ (chiefly the atlas) and impinge upon the innervation to the pharynx, viz.: pneumogastric, spinal accessory, glosso-pharyngeal and sympathetic nerves. These nerves from the pharyngeal plexus send fibres to the mucous membrane of the pharynx and soft palate as well as to the muscles of the same region. Following this correction, a thorough relaxation should be given to all the cervical muscles, superficial and deep, especially over the pharynx and the deep cervical muscles. By a firm, downward and inward movement from the lobe of the ear around the angle of the inferior maxillary, considerable relief may be given by mechanically freeing the pharyngeal blood-vessels. If ulceration is present, an alcohol gargle, one part to three, or some antiseptic spray, will be beneficial.

Should the inflammation extend into the Eustachian tube, a finger introduced through the mouth to the roof of the soft palate, and thoroughly relaxing the tissues and inhibiting the local nerves, will be of considerable benefit, not only in relieving the inflammation of the Eustachian tube, but also in lessening the pharyngeal swelling and in clearing the nasal passages.

In a number of cases of acute pharyngeal inflammation, slight lesions to the lower dorsal vertebræ and severely contracted muscles of the same region will be found. This evidently causes the inflammation of the pharynx (via vaso-motor nerves), for upon correction of these parts, immediate relief will be given the sufferer. There have been well marked cases of acute catarrhal pharyngitis with a temperature 102 degrees F., cured in a few hours by treatment of the lower splanchnics. The pharyngitis, in such cases, may be due to an interference in the circuit between the two great reflex brains, cervical sympathetic and solar plexus, which are connected by the spinal cord and splanchnic nerves on the one side and the vagi on the other. A few cases of pharyngeal inflammation are associated with chronic irritations of the pelvic organs. Thus, care should be taken that obstinate cases do not present some pelvic disorder. A light, nutritious diet and attention to the excretory organs should be given in all cases.

Chronic Pharyngitis.

Osteopathic Etiology.—This disease is found more often in the adult than in the child. Repeated attacks of acute pharyngitis are a common cause of the disease. Chronic lesions to the upper cervical vertebræ are frequently found. Improper use of the voice, as by public speakers and singers; continuous action of irritants, like tobacco smoke; the irritating discharges trickling down the fauces from a chronic nasal catarrh; irritating gases and dust, and alcoholic drinking may be causes.

Varieties.—Chronic pharyngitis may be either diffuse or circumscribed. It is termed **catarrhal** pharyngitis when only the mucous membrane is involved, and **follicular** pharyngitis when the follicles are disturbed. In the **hypertrophic** the mucous membrane is tickened and inflamed. The lymphatic tissues of the pharynx become granular in appearance and the veins greatly dilated. This is the so-called granular or chronic follicular pharyngitis or **clergyman's sore throat.** In the **atrophic** form the mucous membrane becomes pale, dry and atrophied, with a smooth glossy appearance.

The common form of chronic pharyngitis seldom produces

ulceration. A lowered nutrition, as found in various infectious diseases, syphilis, tuberculosis, diphtheria and cancer, may tend to **ulceration** of the pharynx. The ulcers are yellowish white. The most common symptom is pain during deglutition.

The **phlegmonous** form is a suppurating inflammation involving the pharynx, except post-pharyngeal abscess. It is due to infectious fevers, quinsy, injuries, corrosive poisons and foreign bodies.

A **retro-pharyngeal abscess** is a phlegmonous inflammation behind the pharyngeal tissues proper, caused by caries of the cervical vertebræ and inflammation of the local lymphatics and favored by a depraved nutrition. This is a rare disease.

Symptoms.—There is a constant desire to clear the throat. A fullness, tickling and various sensations in the throat are present. The secretions of the throat are increased and the voice is husky.

When ulceration occurs, pain is present during swallowing. Especially is the pain intense in phlegmonous pharyngitis, and in post-pharyngeal abscess as well. Swelling and stiffness of the neck, fever and exhaustion are also prominent symptoms.

Treatment.—To remove the cause of the disease is of first importance, whether it is due to nasal catarrh, smoking, luxated cervical vertebræ, the use of alcohol or foreign bodies. Other treatment will be of little use until the irritation producing the disease is removed and the general health carefully looked after.

The nasal pharyngeal region should be kept clear; care being taken of the use of the voice, and scraping of the throat stopped. The patient should live an out-door life. Sponging the throat, night and morning, first with warm water, then cold water, will lessen the liability of the patient to acute attacks from exposure. With thorough co-operation on the part of the patient in carefully taking care of himself, the osteopath can, in most instances, cure the case, or at least give great relief, by a persistent course of treatment. The treatment must be directed to the innervation and blood supply of the pharynx. Correcting the disordered cervical vertebræ or upper ribs or a clavicle, thoroughly relaxing the cervical muscles (chiefly the deep vertebral muscles), and a

firm, direct treatment over the pharynx, as in acute catarrhal pharyngitis, will be the necessary treatment.

In **phlegmonous pharyngitis** everything should be done locally that would be helpful in lessening the inflammation. Thorough treatment and close attention to the affected parts are necessary. Locally, ice will be of aid. When pus has formed it should be freed at once. The case cannot be watched too closely, for gangrene may occur. It is best to have the aid of a surgeon. **Post-pharyngeal abscesses** require incision and evacuation at once, besides treatment directed to its cause.

DISEASES OF THE ESOPHAGUS.

Acute Esophagitis.

Osteopathic Etiology and **Pathology.**—Lesions to the middle dorsal vertebræ may be predisposing factors; also, disturbances of the vagi. Traumatism is the most common etiological factor, the inflammation being such as is induced by the presence of foreign bodies; chemical irritations, from corrosive poisons, and thermal irritations, from the swallowing of hot liquids, occasionally cause esophagitis. Other causes are the catarrhal processes of the specific fevers, extension from catarrh of the pharynx and local diseases of the esophagus.

The **pathological** changes are those of simple catarrhal inflammation of the mucosa. Commonly the epithelium is thickened and undergoes rapid desquamation so that the surface is covered with a fine granular substance. Follicular ulcers may occur from the swelling and breaking of the mucous glands. The diphtheritic false membrane, when occurring in the esophagus, presents the same characteristics as elsewhere, and is seldom found in the lower portion. The calibre of the esophagus may be diminished by a purulent inflammation of the sub-mucosa, the pus generally passing into the esophagus.

Symptoms.—Pain beneath the sternum, increased by deglutition, is always present. In mild forms of a catarrhal nature, the pain beneath the sternum is duller and may be absent; but in some severe cases the symptoms may all be mild, so that a true

condition of the disease cannot be determined in every case from the symptoms. Mucus and blood, and occasionally pus, may be discharged from the esophagus. In severe cases, spasms of the esophagus may occur.

Treatment.—A bland diet should be given, preferably milk, and when the dysphagia is intense it will be best to feed entirely by enemata.

The treatment of the esophagus is principally executed through the innervation of that organ—the pneumogastric and sympathetic. Branches from the pneumogastric are given off above and below the pulmonary branches. A correction of any of the cervical vertebræ that might involve the pneumogastric, and thorough treatment of the spinal column from the sixth cervical to the eleventh dorsal, besides a raising and spreading of the ribs, chiefly at their sternal ends, are necessary. Fragments of ice may be given, and cold applications externally often give relief.

Spasms of the Esophagus.

Osteopathic Etiology.—Spasmodic contraction of the muscular layer of the esophagus is due to several causes. The irritation that produces the spasm is generally of reflex origin and is found in those of a nervous temperament, especially hysterical and hypochondrical patients. Occasionally the direct innervation of the esophagus is irritated at some point; generally a rib or a middle dorsal vertebra acts as the irritant. It occurs as a symptom in organic esophageal obstruction, hydrophobia, tetanus, chorea and epilepsy.

Symptoms.—Dysphagia is the chief symptom. Pain beneath the sternum, a choking feeling and inability to swallow food usually accompany dysphagia. An esophageal bougie can generally be passed without much difficulty.

Diagnosis.—Careful attention to the symptoms, the use of the sound, the age and the sex and the absence of any wasting symptoms or others that might indicate organic stricture, will usually readily determine the condition.

Prognosis.—Is always favorable, although it is impossible to prognose the duration of the condition.

Treatment.—A thorough search should be made to find the irritation or cause on which the condition depends. If found to be due to reflex irritation or to lesions of a rib or vertebra, the disorder should be corrected. Attention to the diet, hygienic surroundings and an occasional passage of the bougie—the psychic effect of which is particularly good—are usually followed by a speedy and permanent cure. S. A. Ellis[1] reports a case of complete stricture of the esophagus at the level of the clavicle with permanent recovery. The lesion was at the sixth cerivcal together with the first rib.

Organic Esophageal Obstruction.

Osteopathic Etiology.—There are several conditions that may result in organic obstruction of the esophagus: (a) Congenital narrowing. (b) A tumor external to the esophagus, such as aneurism, enlarged thyroid, enlarged lymphatics and various other tumors. (c) A tumor growing in the walls, generally a cancer. (d) Cicatricial constriction from ulceration, usually due to syphilis or corrosive poison. (e) Foreign bodies.

Symptoms.—Difficulty in swallowing, regurgitation of food, and considerable emaciation are symptomatic. A permanent obstruction is found upon the passage of a bougie.

Diagnosis.—Obstruction from a cicatrix may occur anywhere in the esophagus, but is usually found either quite high or low. Corrosive poison or history of syphilis would suggest a cicatricial obstruction. In **cancer,** the cachetic condition, the age, pain, enlargement of cervical lymph glands and enlargement of other organs indicate the nature of the obstruction. Examination should be carefully made for an aneurism before passing the bougie, as an aneurism may produce all the symptoms of organic esophageal obstruction.

Treatment.—The treatment in most instances requires surgical work, although lesions may be found to the innervation and vascular supply of the esophagus, which warrant persistent and continued treatment. In most cases, if the patient is willing, esophagotomy or gastrotomy should be performed to prolong

1. Journal of the American Osteopathic Association, Jan., 1905.

life. Rectal feeding may be necessary. In aneurism, little can be done to strengthen the walls of the affected portion of the vessel. Probably careful treatment to the innervation of the muscular coat of the vessels, rest and dieting will be of aid. Surgical works should be consulted. The prognosis is unfavorable, especially in cancerous conditions. In cicatricial contraction, a systematic dilation with graduated bougies should be performed, with thorough treatment of the innervation of the esophagus. The prognosis in such cases is generally quite favorable. An enlarged thyroid can usually be reduced by the treatment indicated for such disorder.

For other disorders of the esophagus consult surgical works.

DISEASES OF THE STOMACH.

Acute Catarrhal Gastritis.

(Acute Dyspepsia).

Definition.—An acute, catarrhal inflammation of the stomach, due to simple, non-specific irritation.

Osteopathic Etiology and **Pathology.**—This condition occurs at all ages and is usually traceable to errors of diet. It is due either to the irritation of indigestible food upon the mucous membrane of the stomach or to the decay and fermentation of undigested food. Simply overloading the stomach may produce more or less inflammation. The use of too hot or too cold food or drink may induce attacks. Alcoholic excess is oftentimes the cause. Taking cold or getting wet, also mental excitement, worry and grief frequently induce the disease. Ocasionally the use of tobacco brings on an attack. Injuries and irritations to the splanchnics and the vagi nerves will produce gastric fever. The irritation from dietetic errors always causes more or less contraction of the muscles in the upper and middle dorsal region, which, in turn, may produce constant osseous lesions and thus be the cause of the catarrh becoming chronic. McConnell showed in nis experimental work that vertebral and rib lesions readily affect both the spinal nerves at their exit and the sympathetic ganglia contiguous to the head of the ribs, which is followed by vaso-motor

and trophic disorder to the mucous and sub-mucous coats of the stomach, as revealed by ecchymosis and hemorrhage of the sub-mucosa and beginning parenchymatous degeneration of the free ends of the glands of the mucosa.

Pathologically, the mucous membrane is more or less covered with mucus. Upon removal of this mucus the membrane is found reddened and swollen. Slight hemorrhages and small erosions may occur and in some cases slight edema of the sub-mucous coat. Less gastric juice is secreted on account of the inflammation.

Symptoms.—In the outset there may be weakness and chilliness, with paleness and cold extremities. Later on the chilliness may alternate with flushes of heat, red face and febrile reaction. There is loss of appetite, nausea, fullness and soreness over the pit of the stomach. There is rarely any pain. To these symptoms may be added a belching of gas, headache, dizziness and mental depression; the stools become fetid and mushy, and the urine dark in color. Other symptoms may be present, as epigastric distention, a coated tongue, dryness of lips, vomiting and jaundice.

Diagnosis.—Usually there is no difficulty. When the disease is preceded by a chill it is sometimes difficult to diagnose between it and infectious fevers, but a few days will furnish differential symptoms. Generally the disease is preceded by dietetic faults or some other cause. Specially, splanchnic lesions will be found sufficient to produce or keep up the inflammation.

Prognosis.—Favorable in every case of simple gastritis; duration about one week unless one is called early.

Treatment.—Give the stomach as much rest as possible. Mild cases generally recover in a day or two if food is not allowed for twenty-four or thirty-six hours. In cases where food remains in the stomach and decomposes, emesis should be produced at once. Strict attention should be paid to the bowels, so that all indigestible and putrefied matter may be eliminated, besides preventing inflammation from extending downward from the stomach.

Treatment of the spinal nerves, from the fourth to the tenth dorsal vertebra, is essential to the cure. An irritation of these

spinal nerves may produce the catarrhal inflammation of the mucous membrane. As indicated above, obstruction or irritation of the vagi nerves, especially the right vagus, occasionally is an etiological factor; consequently, attention must be paid to these nerves, particularly at the atlas and axis.

Vomiting is a common and distressing symptom. Pathologically, it consists in an anti-peristalic contraction of the stomach and a spasmodic contraction of the diaphragm and the abdominal muscles. It is caused, usually, by irritation of the vagus nerve in the stomach, or in the pharynx by irritation along the spine (particularly in the cervical and upper dorsal regions), or to the sympathetic nerves or to various parts of the body, or by direct influence of the brain. Relief can usually be given by inhibition of the pneumogastric in the occipital region or by inhibition at the fourth or fifth dorsal vertebra on the right side.

In cases of **flatulency,** one may frequently cause physiological absorption of the gas by direct pressure on the pit of the stomach. The pressure must be somewhat firmly exerted. It seems to remove obstructions and irritations to the solar plexus. Sometimes one may be able, also, to absorb the gas by correcting lesions to the lower ribs, especially on the left side. The gas may be forced downward into the intestines or, by firm pressure over the stomach, belching will occur. Occasionally the gas can be passed into the intestines by careful inhibitory treatment in the region of the eighth and ninth dorsals. The inhibitory treatment causes relaxation of the pyloric orifice, also, inhibition of the left vagus relaxes the pylorus. Inhibition at the sixth and seventh dorsals relaxes the cardiac orifice, thus favoring the passing of gas from the stomach out through the esophagus.

Chronic Catarrhal Gastritis.

Definition.—A chronic, catarrhal inflammation of the stomach, associated with excessive secretion of mucus and deranged formation of gastric juice, with hypertrophy of the coats of the stomach and atrophy of the gastric glands.

Osteopathic Etiology and **Pathology.**—Repeated attacks of acute catarrhal gastritis; constant overeating, and excessive use

of alcohol are common causes; also excessive use of coffee, tea and tobacco; improper food and imperfect mastication. Chronic injuries and lesions to the vagi and splanchnic nerves are important factors, and are always found.

The disease may be secondarily produced by heart, lung, liver, pleural and kidney diseases causing a passive congestion of the stomach and ultimately the characteristic lesions of chronic catarrhal gastritis. **Pathologically,** on account of constant hyperemic swelling of the mucosa it becomes slate colored, hypertrophied and covered with a yellowish white, alkaline, tenacious mucus. The peptic glands undergo granular changes, and finally atrophy of their cells. In more chronic cases parenchymatous and interstitial inflammation may occur, leading to more or less atrophy of the glandular and mucous tissues. Upper and middle dorsal vertebral and rib lesions affect the vaso-motors by way of the spinal and sympathetic nerves and thus cause congestion and degeneration of the stomach tissues.

Symptoms.—The symptoms vary with the extent of the mucous membrane and glands involved. The mucous membrane may be considerably covered with mucus, the secretion of the gastric juice is impaired and altogether digestion is imperfect. There are considerable fermentation and decomposition of the food, and peristalsis is delayed on account of absence of its natural stimulus. Loss of appetite, fullness of the stomach, epigastric tenderness and prominence, nausea and vomiting are common symptoms. The patient is irritable, peevish and gloomy, and the skin is hard, dry and pale. The tongue is coated; there is heartburn, constipation and highly-colored urine; the circulation may be feeble, and there is more or less emaciation. Reflected symptoms may be present, as palpitation of the heart and slow, irregular pulse.

Diagnosis.—There is usually very little difficulty in diagnosing chronic gastric catarrh. A correct diagnosis is important, as this disease may accompany carcinoma and ulcer of the stomach Dilation of the stomach, diseases of the kidneys, liver and heart may give some trouble in making diagnosis.

Prognosis.—This depends largely upon the cause. If it is

secondary to other diseases, the prognosis depends upon the curability of the primary disease. In many instances one can not expect complete recovery, but with careful living the patient may survive many years. Osteopathy has cured many cases that were termed incurable by the other schools.

Treatment.—In cases depending upon other diseases, the treatment of the first disorder is most essential, and very little can be done with the stomach before the primary disease is remedied.

Of first importance in performing a cure is the removal of the errors in diet or other causes that may exist. Then come rest, not only of the stomach, but of the body and mind, and the use of light wholesome food, such as milk, eggs, oysters and green vegetables. The treatment must be persistent and thorough. In some of the cases, see the patient every day. Cases of chronic disorders of the stomach usually present to the osteopath marked lesions in the dorsal region from the fourth to the sixth dorsal vertebra. Occasionally lesions will be found lower in the dorsal splanchnics. A number of cases present lesions in the upper cervical region, undoubtedly affecting the vagi nerves. A few present lesions in the lower cervical vertebræ, possibly affecting vagi nerves, but probably a few fibres of the greater splanchnics occasionally originate as high as the lower cervical.

Treatment over the stomach is of very little use in inflammatory diseases of that organ; in fact, the treatment may be actually detrimental. This, however, does not hold true in debility or atrophy of the stomach walls. The affection is usually a nervous one if there is pain upon slight pressure over the stomach that decreases upon gradual, deeper pressure, and in such instance it is perfectly safe to manipulate the stomach directly. But if the pain increases with the pressure, the affection is probably an inflammatory one.

A lesion at the sixth and seventh dorsal vertebræ may cause pain in the pit of the stomach, by irritating the posterior spinal nerves; in these cases the pain is only superficial, not within the abdomen.

Lavage is a helpful measure in a few severe cases of chronic gastric catarrh, as it washes away the mucus which is a hindrance

to the secretion of the gastric juice and nauseous to the patient. It should be performed in the morning before eating.

Careful attention to the habits and mode of living is essential. Pay strict attention to the bowels and kidneys. A lesion occasionally exists at the cartilages of the eighth and ninth ribs in catarrh of the stomach. A correction of such a lesion may be necessary in order to cure certain cases.

GASTRALGIA.

(Stomachic Colic; Neuralgia of the Stomach).

Definition.—A painful affection of the stomach, involving the sensory nerves; paroxysmal in character; caused by various sources of irritation, and not associated with any discoverable organic lesion; feeble heart action and symptoms of collapse.

Osteopathic Etiology.—Of most importance to the osteopath are the lesions of the ribs and vertebræ found in the splanchnic region, involving the sensory nerves to the stomach. Sensory nerves to the stomach are from the sixth to the ninth dorsal inclusive, the sixth and seventh supplying the cardiac end, the eighth and ninth the pyloric end. The eighth and ninth ribs anteriorly are oftentimes involved.

It occurs mostly in women, especially those who are weak, anemic and constipated, and those who are given to worrying. It is also found in women subject to menstrual derangement, and more frequently in brunettes than in blondes; it is occasionally found in healthy and stalwart men. This disease may set in as early as puberty, but is especially frequent and severe about the menopause. General nervous depression, gastric ulcer and cancer, malaria, anemia, dietetic errors, rheumatic or gouty diathesis, excessive secretions of hydrochloric acid are all causes of gastralgia.

Symptoms.—The most characteristic is a sudden seizure by paroxysms of severe pain in the epigastrium, radiating to the back and around to the lower ribs. It is of an intermittent, paroxysmal character, and may be due to malaria, but vertebral and rib lesions are paramount. The pain is usually relieved by pressure and by taking food or warm, stimulating drinks. Rare-

ly, nausea and vomiting and nervous symptoms (globus hystericus and unnatural hunger) are found. The attack is independent of the taking of food, and varies in duration from a few minutes to an hour or more. Sometimes the pain subsides gradually and the patient is much exhausted, or the attack may cease suddenly without other symptoms. There may be vomiting, eructation of gas or watery fluid, or a discharge of a large quantity of pale or reddish urine.

Diagnosis.—This affection is to be differentiated from intercostal neuralgia, ulcer, cancer, gastric crises of locomotor ataxia, biliary and intestinal colic. In **intestinal neuralgia** the pain is not so severe, but of longer duration and follows the course of an intercostal nerve. In **gastric ulcer** the pain is more continuous; there are constant dyspeptic symptoms, made worse by eating, and often tenderness and vomiting of blood. In **cancer,** the age, history, constancy of pain, which is increased by eating (in some cases the pain is relieved by taking food), the cachexia, hematemesis, tumor and the visible effects on the general health, distinguish it from gastralgia. Examination will generally discover a different seat of pain in **gall-stone colic** and there is almost always jaundice. In **locomotor ataxia,** absence of the patellar reflex, Argyll-Robertson pupil, loss of coordination, and paroxysmal pain in other parts of the body will distinguish the gastric crises of tabes from the simple gastralgia. In **intestinal colic** the pain is usually localized about the umbilicus and radiates in various directions; besides, deep pressure over the umbilicus relieves the pain.

Prognosis.—Never proves fatal. Perfect recovery is usually accomplished.

Treatment.—Relief can be given by thorough innibition of the splanchnics on each side of the spinous processes of the vertebræ anywhere from the fourth to the tenth dorsal, generally from the sixth to the ninth. Areas of contracted muscles will indicate region for treatment. If impairment of the vertebræ or ribs can be found, the treatment indicated is correction of such displacements. Inhibition of the vagi is occasionally of some aid in relieving the pain and freeing the stomach of any irritating

material, by relaxing the pylorus and thus allowing the passage of such matter into the duodenum. In relieving pain in the stomach by inhibiting the vagi, more relief can usually be given by way of the left vagus than by the right. Stimulation of the vagi increases the peristaltic action of the stomach, while stimulation of the splanchnics lessens the peristalsis.

Pressure upon the epigastrium commonly gives relief, but in a few cases pressure is unbearable. Proper care should be given the bowels as intestinal dyspepsia may produce gastralgia. In these cases of intestinal dyspepsia that disturb the stomach, constipation is usually present and a thorough irrigation of the colon at bed time will be beneficial. Absolute rest and attention to the diet in severe cases is necessary.

Gastric Ulcer.

This is an ulcer apparently arising without an exciting cause. It undoubtedly follows impaired nutrition of a limited area of the mucous membrane of the stomach, which is destroyed by the action of the gastric juice; the latter being highly acid. These ulcers are usually single and are found in the stomach and in the duodenum as far as the papilla duodenalis. The splanchnics are invariably involved in gastric ulceration.

Osteopathic Etiology and **Pathology.**—As in various stomach disorders, lesions of the middle and lower dorsal vertebræ are found. Oftentimes there are lesions of the ribs, corresponding to the middle and lower dorsal region. The ribs may be affected at both the anterior and posterior ends. Especially the anterior ends of the eighth and ninth ribs are likely to be involved. If they are at fault, the immediate locality is sensitive to pressure. The posterior ends of the ribs in the region of the fifth to eighth are apt to be luxated. Other cases present upon examination a slight kyphosis of the dorsal vertebræ. This would probably produce stasis of the blood-vessels and a nervo-muscular atony of the walls of the stomach, consequently weakening the various coats of the stomach. Occasionally the vagi nerves are affected by the upper cervical vertebræ.

It is more common in the female sex between the ages of

fifteen and forty, but it occasionally occurs in children and in adults up to sixty years of age. It is frequent among servant girls and men who follow the trade of shoemaking, tailoring, weaving or any pursuit in which the costal cartilages are pressed against the stomach. It may be due to mechanical injury in cases where there is feeble nutrition and the over-acid gastric juice digests a limited spot of the mucous membrane, thus forming an ulcer; or to over-distention of the stomach, interfering with its nutrition, and thus allowing the gastric juice to act. It may be caused by anemia, disorders of menstruation, burns of the integument, heart disease and Bright's disease. Syphilis and tuberculosis are also predisposing causes. Thrombosis and embolism are also the causes of a number of cases. Thrombi, caused by obstinate vomiting, form in the nutrient gastric arteries and the circulation being thus impeded, favors the solvent action of the gastric juice. These ulcers often occur in connection with diseases of the heart and blood-vessels, giving rise to emboli which form in the gastric arteries that have lost their tone. **Duodenal ulcers** are not as common as the gastric, and affect males more frequently. They are associated with the same causes that produce the gastric.

Pathologically, the ulcer is round or oval, usually situated in the posterior wall of the pyloric portion, near the lesser curvature. It gives the stomach a punched out appearance, having sloping, clear cut sides, conical shape and a blunt apex. They are usually single, but a series of ulcers is not uncommon. The floor of the ulcer is usually smooth and may be formed of any of the coats of the stomach, usually the muscular. It may also be formed by an adjacent organ to which the stomach has become attached. The ulcer is usually small, but may reach an enormous size. In the majority of cases where the ulcers are deep and perforate the coats of the stomach, adhesions take place between the stomach and adjacent organs, especially with the pancreas and left lobe of the liver. When the ulcer is situated on the anterior wall of the stomach it may perforate and excite fatal peritonitis, for adhesions do not so readily take place as when the ulcer is situated in the posterior wall.

There may be erosions of the blood-vessels, causing fatal hemorrhage. Small aneurisms are sometimes found in the floor of the ulcer. The ulcers may burrow into the adjacent organs, invading the pericardium, spleen, pancreas, left lobe of the liver, gall-bladder, lungs, left ventricle, omentum or pleura. The vessels invaded are the gastric artery of the lesser curvature, the splenic artery from the posterior wall, the hepatic artery and, rarely, the portal vein. In case of a **duodenal ulcer,** the pancreatic or duodenal artery may become invaded. There may be fistulous communication with the colon or duodenum, and even a gastro-cutaneous fistula may form in the umbilical region.

Symptoms.—The general symptoms of ordinary dyspepsia occur. The most prominent and constant symptom is pain with tenderness. This varies greatly in character, from a mere burning or gnawing which is relieved upon taking food, to the characteristic or typical pain of ulcer, which comes on in paroxysms of the most intense gastralgia shortly after eating. The pain is not alone in the epigastrium, but radiates to the back and sides. The pain is usually increased by pressure, but slight pressure often brings relief. Tenderness on pressure is a very common symptom, and this requires the patient to wear the waist-band very loose. It is necessary to exercise care when examining for painful points, for too great pressure may produce perforation. The tender point is usually an inch or two below the ensiform cartilage. Old ulcers of long duration with thickened bases may be recognized by the touch, feeling like tumors that are due to inflammatory thickening of the tissues.

Hemorrhage occurs to a greater or less degree in nearly all cases. Vomiting of pure red blood, which is unaltered and profuse, is characteristic of ulcer. In cases of profuse hemorrhage, quite black blood is found in the stools. Syncope may follow, and rarely death. Intense anemia, may result from the frequent recurrence of these hemorrhages. Ulcers may remain entirely latent, or there may be symptoms of dyspepsia of various grades, and loss of weight from the prolonged dyspepsia. Perforation occurs in about six and one-half per cent. of all cases, though this is not necessarily fatal.

The acute perforating form occurs most frequently in women.

Diagnosis.—Hemorrhage with the gastralgia attack is the most characteristic symptom. This, with the other symptoms already named, make the diagnosis of ulcer conclusive. It is frequently impossible to diagnose between **gastric** and **duodenal ulcers,** as the symptoms resemble one another so closely. Gastric ulcer is sometimes confounded with gastralgia, gastric cancer, chronic gastritis, occasionally with gall-stone colic, rarely with intercostal neuralgia and the gastric crises of locomotor ataxia. In **gastralgia** the general health of the patient is less frequently impaired, there is less dysmenorrhea and chlorosis, and the pain is generally relieved upon taking food. Pressure always relieves the pain and there are longer intervals between the attacks, while in ulcer there is pain upon pressure between the attacks. **Gastric cancer** usually occurs after forty, and the history, extreme emaciation and cachexia, palpable tumor, absence of hydrochloric acid, presence of lactic acid, and coffee-ground vomit differentiate it from ulcer. In **chronic gastritis** there is absence of vomiting of blood, tenderness diffused more in the back, no constant pain, gastric acidity less than normal, and symptoms of indigestion are persistent and well marked. In **gall-stone colic** the presence of jaundice, sudden onset, sudden termination, congestion and tenderness of liver make the diagnosis clear. In **intercostal neuralgia** there may be pain in the epigastrium and slight symptoms of dyspepsia. On examination the pain will be found to follow the course of an intercostal nerve and tender points will be found along its course. In **gastric crises of locomotor ataxia** the patient has the appearance of fairly good health, the acidity of the gastric juice is wanting, and the distinctive symptoms of this disease are present.

Prognosis.—Guardedly favorable; many cases are cured; others terminate in fatal hemorrhage or perforation followed by peritonitis.

Treatment.—In gastric ulcer, rest in bed is important. Great care must be taken with the diet of the patient. The secretory and motor functions of the stomach should be rested as much as possible. Milk is probably as good food as any; let the patient

have an ounce or two every two hours. If the stomach needs complete rest, rectal alimentation is to be employed. In that case, care must be taken not to tax the power of the lower bowel too greatly; four ounces of milk every five hours will be sufficient. When the patient is convalescent, beef juice, gruels and eggs may be substituted.

The pain can be lessened by thorough inhibition of the splanchnics and the vagi. Hot applications over the stomach will be helpful. Vomiting may be an annoying symptom, in which case thorough work at the fourth and fifth dorsals (best on the right side), or inhibitory treatment of the vagi will usually relieve it. Lavage of the stomach is good in some instances.

Everything should be done to build up a healthy stomach. If the stomach disorder is secondary, it will be necessary to relieve the primary disorder first. When otherwise, primary trouble will be found with the innervation of the stomach; and as in other stomach diseases, lesions are commonly found from the fourth to the sixth dorsal vertebra, or slightly lower, or else in the atlas or axis, involving fibres to the pneumogastric.

Hemorrhage of the stomach, hematemesis, may be a troublesome symptom, and is a condition in some cases hard to overcome. Surgical assistance should be immediately considered. Rest in bed is absolutely necessary. The treatment of hemorrhage of the stomach is through the splanchnic and vagi nerves, to relieve the pressure in the affected blood-vessels. Swallowing pieces of ice, cold over the stomach, treatments of the cervical region, heat to the legs, and a bandage around an arm or leg will be of aid.

In all cases of gastric ulceration, careful attention should be given to vaso-motor control of the stomach by the splanchnics; to the condition of the anterior ends of the eighth and ninth ribs, with their cartilages, and to the careful removal of any lesions that may exist to the vagi nerves.

Gastric Cancer.

Osteopathic Etiology and **Pathology.**—Little is definitely known in regard to the cause of cancer. Senn[1] says: "A tumor never originates, de novo, but is always an integral part of the organism, the product of tissue-proliferation from a matrix of embryonic cells.....The structure and character of a tumor depend upon the stage of the arrested cell growth and the embryonic layers from which the matrix is derived."

Adami,[2] in speaking of inflammation, continues the thought that "neoplasms as a class, whether malignant or benign, not improbably develop as a consequence of some irritation having an intensity just sufficient to induce cell proliferation, and continued for a time sufficiently long to impress upon the cells of the affected tissue the habit of rapid multiplication." With this an accepted theory as to cancer formation, there is no difficulty in supplying the irritating cause for in our osteopathic experience cancers seem to be due to an irritating lesion to the various tissues, as the displacement of some tissue interfering with a nerve by irritating the whole or part of its fibres, or to obstruction of a vascular channel, as a vein or lymphatic duct. Probably vaso-motor or trophic nerves may be impaired by lesions and thus involve the tissues supplied by these nerves, no matter how remote from the lesion. These are doubtless the predisposing causes of cancers, by lowering the vitality of involved tissues. Possibly micro-organisms are important exciting factors. Gastric cancers are usually found in the male sex in adult life. Ulceration of the stomach, and possibly heredity, are predisposing causes.

After the uterus, the stomach is the organ most likely to be affected by cancer. Cancer of the stomach is usually primary. Eighty per cent. occur at the pylorus. Epithelioma and soft cancer are the most common varieties.

Dilatation of the stomach occurs, especially if the cancer is at the pylorus and causing obstruction. The stomach is usually reduced in size, and thickening and hardening of the tissues take

1. Pathology and Surgical Treatment of Tumors, p. 23.
2. Allbutts System of Medicine, Vol., I. p. 113.

place. The lymphatic glands adjacent to the stomach are infiltrated. Perforation into an adjacent organ may occur, as into the transverse colon or small intestine, or even into the peritoneum, causing peritonitis.

Symptoms.—Gastric cancer develops insidiously and progressively with all the general symptoms of dyspepsia, besides continued pain and tenderness. Pain and vomiting occur immediately after eating if the cancer is at the cardiac orifice, and a few hours after eating if at the pyloric. The vomit often contains dark, "coffee-ground" material, due to hemorrhage, the blood being altered by gastric juice. Free hydrochloric acid is absent from the gastric juice, and there are anemia, emaciation, edema of the ankles, presence of a tumor in the epigastrium not moving with inspiration, and involvement of the superficial lymph glands, especially the supra-clavicular and inguinal glands. Lactic acid is present. Jaundice may occur if the liver is large. The urine is often scanty and may contain albumin. The duration is from one to two years.

Diagnosis.—The differential diagnosis of gastric cancer from ulcer, gastralgia and chronic gastritis is made under gastric ulcer.

Prognosis.—While the prognosis is unfavorable, life may be prolonged by the use of proper food, cleansing the stomach, attention to the general health of the patient and surgical measures.

Treatment.—Try to locate the cause by a thorough examination of the dorsal vertebræ and ribs; these should be carefully examined to locate lesions that might occur in the splanchnic and vagi nerves and thus affect the blood and lymphatic supply to the stomach. In view of the fact that considerable progress has lately been made in the early diagnosis of gastric cancer (see late works on diagnosis), whenever there is the least suspicion of cancer, thorough chemical and microscopic analysis of the stomach contents should be made. In this way early and satisfactory surgical interference may be resorted to. Although in several cases osteopathic treatment has proven beneficial, still, at the present time, early and radical surgical measures should rule.

Great care should be taken in the preparation of food. Artificially digested foods should be used so that the labor of the

stomach may be diminished, and if necessary the patient should be fed rectally, that the stomach may be rested entirely. The stomach should be washed out with tepid water once a day or every other day. The best of care of the general health must be taken, and all stimulants prohibited.

Dilatation of the Stomach.

A dilated stomach is a stretched stomach having increased capacity, due to nervo-muscular atony or to pyloric obstruction. Every stomach which is not retracted when empty is a dilated stomach. A dilated stomach may occur either as an acute or as a chronic condition, but it is to be distinguished from temporary distention and a normally large stomach.

Osteopathic Etiology and **Pathology.**—The nervo-muscular atony causing dilatation may be due to obstructive lesions in the stomach splanchnics, or to a general debility of the spine in the dorsal region (usually a kyphosis), or to continued overeating and improper food causing a stasis and fermentation. It may also be due to overdrinking and various diseases, as phthisis, liver and lung diseases, anemia, chlorosis, acute fevers and kidney diseases, causing more or less of a general nervo-muscular atony. Dilatation may result from a mechanical obstruction, or narrowing of the pylorus or the doudenum by a cicatricial contraction of an ulcer; from hypertrophic thickening (simple or cancerous) and congenital and pressure strictures from without by a tumor or a floating kidney. In the latter case the kidney may fall upon the horizontal portion of the duodenum and thus mechanically obstruct the passage of food from the stomach, which consequently dilates. Tight lacing might prevent the liver, when congested, from passing in front of the kidney, thus luxating the kidney. Dilatation of the stomach occurs at all ages, although most frequently in middle aged persons.

Pathologically, the muscular coat is thinner and paler than normal, with more or less atrophy of the glandular tissues and an increase in capacity of the stomach. When obstruction exists at the pylorus, hypertrophy of the muscular coat may occur.

Symptoms.—The symptoms are those of the disease causing the dilatation plus those of persistent chronic catarrh. The patient complains of a sense of fullness in the epigastric region and there is flatulency, eructations and vomiting. The cavity of the stomach being much enlarged, great quantities which are usually considerably decomposed are vomited each day or two. There is lessened acidity of the vomited mass. Passage of the food from the stomach to the intestine is delayed and the bowels are constipated, the fecal matter being dry and hard. The urine maybe scanty and the skin dry. Anemia, debility and emaciation are always present to a greater or less extent and on account of the absorption of poisonous matter drowsiness may occur.

Physical Signs.—Inspection.—In some cases the outline of the distended stomach can be plainly seen. There is prominence of the epigastric region, the tumefaction being at the pyloric end of the stomach. **Palpation.**—The resistance upon manipulation of a dilated stomach is like that of an air cushion. If the patient is made to drink a half tumbler of water, bimanual palpation will cause a splashing sound to be heard along the circumference of the stomach at its lowest point; and by moving the water about by changing the position of the patient, the outline of the stomach can be made out. If the sound is not heard at the first manipulation, it must not be concluded that the stomach is normal for the stomach may be so dilated and flabby that it falls behind the abdominal wall like an apron. **Percussion.**—The note is tympanitic over the greater part of the stomach until the lower curvature is reached when the sound is dull (due to the liquid contents of the stomach), followed by a tympanitic sound again when the intestines are reached. When percussion is made the patient should always be in a standing position if possible.

When there is **pyloric obstruction** a tumor usually presents itself, and vomiting is more severe and peristalsis more active than when the dilatation is due to atony of the walls of the stomach from an obstructed innervation.

Diagnosis.—This is usually easy if due care is taken in making the examination. Goetz has shown by the use of his spinegrapho-

meter that in cases of visceral prolapse the spine is commonly posterior in the dorso-lumbar region.

Prognosis.—In a case of nervo-muscular atony the prognosis is favorable. If due to a malignant disease recovery is usually impossible. In hypertrophy of the pylorus or the duodenum, recovery is probable by means of surgical interference.

Treatment.—When the dilatation is due to atony of the muscular walls of the stomach from obstructed innervation at the spinal column, treatment is usually successful. Attention should be given to the condition of the spinal column in the splanchnic region (fourth dorsal to twelfth dorsal), the spine being usually posterior. A thorough and persistent course of treatment must be given, not only to restore the normal activity of the nerves to the muscular coat and glands of the stomach, but to build up and restore strength in the weakened spinal column. Lesions in the spinal column, even higher than the fourth dorsal, may affect the innervation of the stomach. There are cases where lesions have been found at the fifth, sixth and seventh cervicals that interfere considerably with the action of the stomach, causing nausea, flatulency, eructations, and even vomiting. Such an affection may be through the fibres of the splanchnic nerves or through fibres of the vagi nerves.

The vagi nerves have an important bearing upon gastric dilatation as paralysis of the gastric branches of the vagi arrests the peristalsis of the stomach and thus tends to favor retention of food within its cavity. The stomach in such cases becomes enlarged, mainly by the weight of the food and the presence of gases due to decomposition of the retained food. Thus lesions may be found higher than the lower cervicals and cause obstruction and paralysis of the fibres of the vagi to the stomach.

Direct stimulation over the stomach in the form of thorough manipulation of the stomach walls causes contraction of the muscular fibres of the stomach, mainly the circular fibres. This treatment, with additional treatment of the splanchnic and the vagi nerves, will tend to build up the weakened plexuses of the stomach. Much time can be saved by putting the patient to bed

and treating him every day for several weeks. When the stomach is dilated or dilated and prolapsed, to any extent, it usually requires three to five months treatment at least; this time can be shortened one-half by keeping the patient in bed, treating the spine three times a week, and the abdomen every day. Light food at frequent intervals, upper thoracic breathing, and frequent drawing up and in of the abdomen should be required. The patient may also manipulate his own abdomen twice a day to advantage; teach him to manipulate, draw and pull it upward. There is no danger of too frequent treatment as long as there is no bruising of the parts; this, however, does not apply to the spine. It is not an uncommon thing to correct a dilated stomach or a dilated and prolapsed stomach that is an inch and a half or two inches below the umbilicus. Care must be taken in all cases that other viscera are not prolapsed. It is a common experience to find enteroptosis, which can usually be readily corrected, with the stomach ptosis. But where the kidney, or possibly both, is much prolapsed only fair results can be secured until the kidney is replaced and kept there, and if necessary by surgical means. Also, note whether the liver is enlarged. (See special article on Prolapsed Organs).

When the disease is due to cancer and various growths of the pylorus or the duodenum, nothing can be done but palliate. Such cases require surgical attention. In all cases it is necessary that care and preoccupation of the patient should be removed. Baths, changes of air, a carefully regulated diet and caution in the use of liquids will be of great aid to the general health of the patient, and thus the weakened nervous system will be indirectly but greatly benefited. Too great care cannot be taken of the patient, as there is created in the organism a special aptitude for the tissues to become inflamed and thus weaknesses at various parts of the body may occur. Phthisis, typhoid fever and various diseases are apt to follow dilatation of the stomach, as the nutritive process of the body is impaired at its very beginning.

The meals should be taken regularly and with great care, the patient not eating too quickly nor too much. Solids should

be used but little; the artificially digested foods, such as peptonized milk and beef peptonoids, probably being the best. Beef juice and scraped beef are excellent foods, as they are easily digested. Fatty and starchy foods should be avoided.

Washing out the stomach is useful, but it should not be indiscriminately employed. Lavage will not be necessary in all cases of mechanical obstruction. It relieves the distention, by removing the weight and the fermenting and decomposing material.

Gastroptosis and Enteroptosis.[1]

(Glenard's Disease).

Definition.—A downward displacement of the stomach and intestines.

Osteopathic Etiology and **Pathology.**—A weakened, debilitated spine is the common cause. A slight posterior curvature is a frequent occurrence. A debilitated spine impairs the innervation to the abdominal viscera and to the muscles of the abdomen. Other causes are muscular strain, repeated pregnancies, tight lacing and mal-nutrition. A downward displacement of the floating ribs, and a consequent prolapse of the diaphragm, is an important cause.

Prolapses of the stomach and intestines are of frequent occurrence in both sexes, and very common in women. It is a condition oftentimes overlooked, and when recognized, little has been done in the way of a cure. It is the cause of much disturbance, not only to the stomach and intestines, but to the various abdominal viscera and to the pelvic organs, and it is the cause of a large percentage of prolapses of the uterus, (excluding lacerations from childbirth) for not only is the great suspensory ligament of the uterus (the peritoneum) prolapsed as a consequence, but all of the abdominal viscera and the parietes of the abdomen are also prolapsed and crowded down upon the pelvis. The small or large intestine or the stomach may be prolapsed singly. This is

1. See special article, Prolapsed Organs, Part I.

frequently the case with the transverse portion of the colon, which may be elongated and tortuous and prolapsed nearly to the symphysis pubis. Prolapse of the liver, spleen and kidneys may occur singly or with a general displacement of all the organs.

Symptoms.—The abdominal walls are weak, oftentimes flabby. The viscera of the abdomen do not have normal resistance upon manipulation. The spinal column presents lesions. There is dyspepsia, flatulency, constipation, abdominal pains and various neurasthenic symptoms.

Diagnosis.—Is readily made by the lack of tone to the abdominal walls and viscera and the general debility of the patient. Inflation of the stomach with air will determine between gastroptosis and dilatation.

Treatment.—To remove the cause is of primary importance, This is to be followed by treatment of the spinal column, correcting its various derangements and improving the innervation to the atonized viscera and abdominal parietes. Direct treatment over the abdomen helps to give tone to both the viscera and abdominal muscles. In many cases the treatment will have to be a prolonged one in order that the tissues may regain their normal condition. Usually a treatment from two months to a year, or possibly more, is required. The diet of the patient hould be nutritious. In a few cases a supporting bandage will give some relief.

Relative to the treatment of gastroptosis and enteroptosis, W. E. Harris writes as follows: "I first set to work trying to correct the spinal irregularities; coupled with this I give deep and careful manipulation of the gastric and intestinal walls—treating my patient two or more times per week for a period of one to three years. A lesser period is not long enough to bring the desired result in such cases. I also instruct the patient to knead his own bowels, which I prescribe as a necessary proceeding, and to be performed twice daily on retiring and before rising. Of equal importance with the osteopathic treatment, will come local, specific abdominal exercises. These are to be of the resistive type, and must also be taken for the general musculature. I have my patient retract the abdominal walls and voluntarily

draw the abdominal contents towards the diaphragm, in regular series. These exercises must be faithfully performed and continue after the treatment has ceased, in order to be of real value. I do not find our treatment, without the hearty cooperation of the patient in doing his exercises conscientiously, to be sufficient in itself. Have the patient avoid overloading the digestive tract. Use concentrated foods, in small quantities, i. e., only sufficient to sustain strength, twice daily and without taking fluids at meal times. Of course water, in small quantities and at frequent intervals, may be taken between meals. To summarize—First, corrective treatment. Second, resistive exercises. Third, attention to diet." (See Dilatation of the Stomach).

DISEASES OF THE INTESTINES.

Acute Diarrhea.

Definition.—A diffuse inflammation involving the entire intestinal tract to a greater or less degree. Usually the seat of disease is found in the small intestine and the upper part of the large bowel.

Osteopathic Etiology and **Pathology.**—Acute diarrhea may be caused by overeating, drinking impure water, unripe fruits, and toxic poisons produced in decomposed and fermented milk and other articles of food. This sometimes takes place in perfectly harmless substances in an inexplicable manner. Milk and ice-cream often produce intense intestinal catarrh. Changes in the weather, tending to weaken the system, often cause diarrhea; hot weather favors this, although a chilling of the system by a sudden fall in the temperature may produce acute diarrhea. Changes in the quantity and quality of the secretions also induce the disorder; thus the bile, if in too great a quantity, increases the peristalsis to such a degree that diarrhea is produced; if diminished, it favors the fermentation and decomposition of the food. This is a very common cause. Infectious diseases, through their specific poisons, as cholera, dysentery and typhoid fever; inflammation, extending into the bowels from adjacent parts; inflammation caused by peritonitis and intestinal obstructions, as invagina-

tion and hernia; hyperemia, secondary to diseases of the liver, heart and lungs; cachectic states met with in Addison's disease; the last stages of Bright's disease; cancer and profound anemia are all among the causes of diarrhea.

As in constipation, diarrhea is oftentimes simply a symptom of various disorders; still, it may be the only symptom manifested. Lesions are found in various regions of the body, but chiefly in the lower dorsal and lumbar vertebræ and the lower ribs at either side. Also lesions may be found to the vagi, thus increasing the peristalsis or affecting the blood supply of the intestines. The lesions to the splanchnics may involve the motor, vaso-motor or secretory fibres to the intestines. Oftentimes the innervation to the liver is disturbed, affecting the secretion of the bile. The left side of the spinal column is involved more often that the right side, by vertebral, rib and muscular lesions.

Nervous Diarrhea frequently follows fright and other causes of nervous excitement, and is often found in hysterical women. There is simply an increase in the peristalsis and secretion of the bowel, due to a vaso-motor paresis of the intestinal vessels, producing an outflow of the serum.

The intestinal condition is one of hyperemia. In decided cases the mucous membrane may be red and injected, but more often it is pale and covered with a layer of mucus. Sometimes the solitary follicles of the large and small bowels become unnaturally distinct. These enlargements may become filled with pus, forming abscesses which rupture, leaving an ulcer. Peyer's patches may be prominent also.

Symptoms.—The diarrhea is the important, and often the only, symptom of enteritis; the stools are frequent, varying from two or three to fifteen or more a day; they are thin and watery, varying in color according to the amount of bile they contain. They are usually of a yellowish or greenish color. They contain portions of undigested food, flakes of mucus, columnar epithelium and mucous cells, micro-organisms, oxalate of lime and cholesterin. The reaction of the discharge is either acid or neutral. There are colicky pains in the abdomen, rumbling noises or borborygmi, intense thirst, dry and coated tongue, with loss of ap-

petite, and, rarely, a fever. **Chronic catarrhal diarrhea** may follow the acute form. If the stools contain much undigested food the inflammation is in the upper bowel; if thin, watery and containing mucus, the lower bowel is involved. The general health is greatly disturbed, and the patient suffers from anemia, emaciation, weakness and depression of spirits.

Diagnosis.—This is ordinarily made easy by giving attention to the above symptoms. In distinguishing as to whether the large or small intestines are involved the following is important: In catarrh of the **small intestines,** diarrhea is not so well marked; there is much undigested food, but very little mucus; and there is usually pain of a colicky nature in the middle or inferior part of the abdomen. When the **large intestine** is involved there may be no pain; when present, it is intense and usually in the upper and lateral parts of the abdomen; there are borborygmi and thin, soupy stools, mixed with much mucus. If the lower portion of the bowel is involved there may be marked tenesmus.

Duodenitis is usually associated with acute gastritis, and, if the inflammation extends into the bile duct, there is jaundice; in these cases the urine may be bile-stained.

Prognosis.—Favorable if early and prompt treatment is employed.

Treatment.—Many cases of acute diarrhea will recover by restricting the diet, with rest. Where improper food and water are the causes, an entire change of diet should be considered. Withdrawal of all food and the substitution of boiled milk will be of great aid. The bowels should never be confined if there is reason to suspect that all irritating matters have not been removed; and when fermentation and irritation exist in the lower bowel, an enema will often be helpful. The spinal column should be examined, especially on the left side from the fifth dorsal down to the coccyx. The vertebræ may become displaced and cause diarrhea, by derangement of the vaso-motor nerves.

Either an increased blood supply through the intestines, or an affection of the motor nerves will produce an increased peristalsis. An active condition of Meissner's plexuses may be produced sympathetically, resulting in increased secretion of intes-

tinal juice and thus in diarrhea. The ribs may become displaced and be a source of irritation to the nerves of the intestines. The muscles of the spine are apt to become contracted by colds, injuries, strains, etc., and stimulate or inhibit the action of certain centers in the cord and produce disordered intestines. Conversely, the muscles of the back may be thrown into a contracted condition by irritating substances in the bowels acting as a stimulus to the centers in the cord, and thus reflexly to the muscles. Trouble may arise in the colon and rectum by the slipping of an innominate, a dislocated coccyx or contracted muscles over the sacrum. In a word, thorough inhibition, relaxing contracted muscles and correcting abnormal vertebræ and ribs are the essentials of treatment for diarrhea. Inhibition of the lower dorsal and lumbar is very effective; it dilates the mesenteric vessels by way of vaso-motor fibres, and thus controls secretions and lessens peristalsis. This has been clearly proven in the osteopathic experimental work of Burns and Pearce.

Direct treatment over the mesenteric circulation, i. e., through the abdomen anteriorly, will be helpful in some cases. It relaxes tissues, removes irritations and frees the circulation generally about the mesenteric vessels and intestines. The liver should be kept active, for although the bile is a natural purgative, it is also an antiseptic to the intestinal contents and thus prevents decomposition and possibly a diarrhea. Treatment of the vagi nerves is important, as they help to control the blood supply and the motor nerve force through the intestines. Daily hot baths and increased activity of the skin and kidneys are beneficial.

Chronic Diarrhea.

(Mucous Colitis).

Definition.—A chronic inflammation of the mucous membrane of more or less of the large intestines. There may be ulceration.

Osteopathic Etiology and **Pathology.**—Chronic diarrhea may be the result of repeated attacks of the acute form or may be caused by cancer, tuberculosis, Bright's disease, typhus fever, disease of the liver, organic disease of the heart and lungs, ob-

structions to portal circulation or impactions of any nature that occasion passive congestion. Frequently cases of long standing are due to slight chronic lesions of the lower ribs or lower dorsal or lumbar vertebræ. The lesions of the lower ribs usually consist of downward displacement of the ribs, affecting the innervation to the intestines directly, or possibly dragging the diaphragm downward to such an extent as to interfere with the blood and lymph vessels as they pass through it, thus causing congestion of the intestines by obstruction to the lumen of the vessels.

In many cases the **pathological changes** are simply those of the acute form. In more pronounced cases the mucous membrane becomes a brownish red, livid gray or slate color; this discoloration being due to hyperemia and blood extravasation. The mucous coat is also swollen and thickened. Atrophy of the mucous membrane, and in some cases of all the coats, with destruction of the glands, may be a result of the chronic form. Ulcerative changes occur chiefly in the lower part of the ileum and colon; these may be follicular or there may be large ulcers and considerable areas of ulceration.

Symptoms.—Constipation and diarrhea frequently alternate; the stools are thin, mixed with a large amount of slimy mucus; the small intestine is most frequently involved, and the patient complains of pain in the umbilical region; there is distention of the bowels with gas; the health gradually declines; there is great palor, and the patient becomes emaciated, gloomy and irritable.

Mucous Colitis, or **Membranous Enteritis,** is a chronic form of colitis, characterized by paroxysms of severe pain and the discharge of large masses of mucus, forming gray translucent casts, which are not fibrinous but mucoid in character. This disease occurs usually in women of nervous type, but is occasionally seen in men and children. Mental emotions and worry, sometimes errors in diet, or dyspepsia bring on the attack. The nutrition is generally well maintained, but in other cases there may be a gradual emaciation and ultimate death. This is undoubtedly one of the most persistent and troublesome diseases that one will meet, still the osteopath can do much for these cases and not in-

frequently bring about a cure. But the treatment must be consistent and persistent.

Mucous colitis is not hard to diagnose, although many cases are treated for simple indigestion. It is needless to say that a correct diagnosis is paramount. In these cases there is almost invariably some visceral prolapse, which undoubtedly is the underlying cause by favoring venous congestion of the bowels. The liver is usually congested; this alone may cause the venous stagnation, but more often is simply due to the common cause. Back of the visceral prolapse and congestion will almost invariably be found a posterior dorso-lumbar curvature, still there may be a scoliosis or single lesions only, and a downward displacement and constriction of the floating ribs.

The **treatment** requires most persistent and careful work for at least three months and probably six to nine months. Correction of the spine and floating ribs should be of first consideration; then intelligent treatment over the abdomen, by raising and toning the bowels, not only the bowels as a whole, but especially in the ileo-cecal, hepatic flexure, transverse colon, splenic flexure, sigmoid flexure, and rectal regions. The direct treatment should be cautiously given when there are indications of ulceration.

Have the patient help himself by manipulating his bowels night and morning, drawing the abdomen up and in, and by thoracic breathing. Prescribe plenty of drinking water and reduce starchy and saccharine food to a minimum. Again emphasis is placed upon the necessity of persistent treatment, two and three times per week, for several months. The mucus is hard to remove. It is tenacious and frequently causes colicky pains.

To the student Von Noorden's[1] monograph on this subject is especially instructive. He notes that almost without exception the patients suffer for some weeks or months prior to the development of colica mucosa from obstinate constipation. For acute attacks, among other things, he advises rest in bed, hot applications, and high water injections. He believes in massage of the large intestine (particularly of the sigmoid flexure), in cases

[1] Von Noorden, Colitis, 1904.

of atonic constipation and also in spastic constipation, provided the patient has a diet that leaves a large residue. "A coarse, laxative diet of Graham bread, leguminous plants, including the husks, vegetables containing much cellulose; fruit with small seeds and thick skins, like currants, gooseberries, grapes; besides, large quantities of fat, particularly butter and bacon."

Diagnosis.—Diagnosis is always easy. The presence of blood, pus, or fragments of tissue in the stool point to ulceration. Ulcers in the rectum, and as high as the sigmoid flexure, will be recognized by examination with the speculum.

Prognosis.—Osteopathy has undoubtedly changed the prognosis of other treatment. Many cases can be cured and most other cases greatly benefited. The deep seated ulcerations may cause circumscribed peritonitis, or even abscess, and the prognosis becomes grave as these complications arise.

Treatment.—As diarrhea may be caused by lesions anywhere from the sixth dorsal to the coccyx, a most thorough examination is necessary. On the one hand, diarrhea may be due to a marked lateral or posterior spinal curvature, which is plainly seen upon inspection, but on the other hand, it may be due to a slight twist or deviation from normal of a vertebra which would require considerable osteopathic ability to exactly locate. Diarrhea may result from subluxation in the lower costal region, one or more of the three lower ribs on either side being involved. Record of one case, in particular, of chronic diarrhea is of interest as it was due to a rib dislocation. It was the case of a man fifty years of age, who had suffered from chronic diarrhea, several stools a day, for over thirty years. He was completely cured in one treatment by correcting the dislocation of the vertebral end of the tenth rib on the left side. This case is cited to impress upon the student the necessity of precise diagnosis and treatment. Rarely will diseases be cured by a single treatment, but when such happens it exemplifies the potency of the osteopathic lesion. Treatment on the left side is usually more effective in diarrhea than treatment on the right side. When diarrhea is a symptom of some constitutional disturbance, correction of dorsal, lumbar and rib lesions, with thorough inhibition, careful dieting and rest, will commonly

suffice provided the primary disease is intelligently looked after.

Chronic lesions of the vagi nerves may exist and produce chronic diarrhea in the same manner as in acute diarrhea. Rest and a liquid diet, preferably boiled milk and albumin water, will be a helpful treatment; the diet requirement is to have a minimum amount of waste, so that the residue will cause the least possible irritation. Beef peptonoids with the milk will be a nutritious addition to the diet, and change of air and surroundings may be an aid to a more speedy cure. The skin and kidneys should be kept in a healthy condition and, if necessary, the bowels thoroughly emptied by injections.

Diarrhea of Children.

Three forms of diarrhea are recognized in children: Acute dyspeptic diarrhea, cholera infantum, acute entero-colitis.

Acute Dyspeptic Diarrhea.

This disease is most frequently due to errors in diet; the mother's milk may be altered in quantity or quality from taking improper food; the child may be over-nursed, or the foods given in place of the mother's milk are at fault. Too often a filthy bottle is the cause. The predisposing causes are dentition and extreme heat; and these, combined with constitutional weakness, bad hygiene and a weak spine, diminish the resisting power of the infant. Hence, in artificially fed children of the poorer classes, this disease is very prevalent.

Pathologically, there is catarrhal swelling of the mucosa of both the small and large intestines, with enlargement of the lymph follicles. In fact, the same changes take place as those described in the enteritis of adults.

Symptoms.—The child may seem to be in its usual health, with slight restlessness at night and an increased number of stools. This restlessness may be due to nausea and colicky pain. The stools are copious and offensive, containing undigested food and curds. In children over two years old these attacks may follow the eating of unripe food or drinking tainted milk. In other cases the disease may set in abruptly with vomiting, purging, griping

pains and fever which rises rapidly to 103 or 104 degrees, sometimes followed by convulsions. The stools become more numerous—there may be twenty in the twenty-four hours—gray or green in color, and sometimes containing mucus, rarely blood.

Diagnosis.—The sudden onset and the character of the stools, which never have a watery, serous character, distinguish this from cholera infantum, and the small amount of mucus which the stools contain distinguishes them from those of ileo-colitis. This form often precedes the onset of specific fevers.

Prognosis.—Among the better classes this is generally favorable, but among the weak, half-starved children of the poor it is very unfavorable, especially in hot weather.

Treatment.—The child should be clad warmly, kept absolutely clean and given a change of diet and air if possible, with frequent baths. Sterilized milk should be given at regular intervals; or if the diarrhea continues, beef juice and egg albumin instead. The bowels should be thoroughly cleansed by injections. The spine should be thoroughly treated through the lower dorsal and lumbar regions, and if the abdomen is not sensitive, a light treatment to the bowels directly will aid recovery. Frequently it will be found that the muscles of the neck and upper dorsals are considerably contracted, especially where the child has fever and is very restless.

Cholera Infantum.

Definition.—An acute, catarrhal inflammation of the mucous membrane of the stomach and intestines, with some disturbance of the sympathetic ganglia. This is a disease of childhood during the first dentition.

Etiology and **Pathology.**—Probably due to the poisonous products of decomposing and fermenting foods acting upon the system. The predisposing causes are hot weather, dentition, bad hygiene, the previous presence of some slight dyspeptic derangement, dyspeptic diarrhea and entero-colitis.

The **pathological** changes are identical with the morbid anatomy of catarrhal gastritis and enteritis. The serous discharges

and rapid collapse are due to the intense irritation of the sympathetic system.

Symptoms.—The disease is of sudden onset, setting in with incessant vomiting, which is excited by any attempt to take food or drink. The stools are copious and frequent, at first containing some offensive fecal matter, brown or yellow in color, later becoming thin, watery, serous and odorless. There is decided fever, reaching as high as 105 degrees; the temperature should be taken in the rectum, as the axillary temperature may be three or more degrees below that of the rectum. The pulse is rapid and feeble, ranging from 130 to 160. There is marked prostration from the onset, with pinched features, hollow eyes, depressed fontanelles, cold surface and ashy pallor. The tongue is coated at first, but soon becomes dry and red, and thirst is intense. Even at this time a reaction may set in, but more commonly death results with symptoms of collapse and great elevation of internal temperature. In other cases there are restlessness, convulsions and coma. As there is no cerebral lesion, this condition is, no doubt, due to toxic agents absorbed from the intestines.

Diagnosis.—This is not difficult, as the constant vomiting, the frequent watery discharge, rapid emaciation and prostration, and the hyperexia are significant.

Prognosis.—Grave, even with the most favorable surroundings, although in numerous instances osteopaths have successfully treated this disorder. Much depends upon the promptness of treatment.

Treatment.—A change of air, complete rest, removal of all foods for a short time, and absolutely cleanliness are of great importance. Thorough treatment should be given along the entire spine, particularly to the splanchnics of the stomach and the intestines, and to the vagi nerves in the cervical region. Frequent bathing with cool water, or better still, wrapping the child in cold, wet sheets, will reduce the hyperexia.

Thorough cleansing of the stomach and intestines with warm water occasionally gives excellent results. In **collapse** the use of a hot bath, is indicated, followed by wrapping the child warmly

in blankets and placing him in a horizontal position. The food of the child should consist of peptonized milk, raw beef juice, diluted egg albumin, barley water and chicken broth. Nourishment should be given gradually, and **only** after the intense symptoms have subsided.

Acute Entero-Colitis.

In this form of diarrhea the ileum and colon are chiefly affected, especially the lymphatic glands or lymph follicles.

Osteopathic Etiology and **Pathology.**—Warm weather, the artificial feeding of children, dentition and bad hygiene are predisposing causes. The disease usually occurs between the ages of six and eighteen months, but it is not infrequent in the third or fourth year. This disease is not confined to the warm weather, but may set in at any season of the year. Lesions in the spine occur from the eleventh dorsal to the fourth lumbar.

The mucous membrane is congested and swollen, the solitary follicles and Peyer's patches are swollen and often ulcerated. The changes may end here or the ulcers enlarge and extend into the muscular coat with the separation of a slough. There may be infiltration and thicking into the submucous and muscular coats, followed by induration of the tissue, producing abnormal rigidity.

Symptoms.—The disease may be a sequela of dyspeptic diarrhea or cholera infantum. The temperature increases and the stools change in character, being at first yellow, and later green. They contain traces of blood and mucus, and are passed without pain. Vomiting may be present, but is not a constant symptom. The abdomen is distended and tender along the course of the colon. The disease may abate here, recovery from the condition being slow; or the symptoms may increase in severity with persistent, small, painful stools, mainly of blood and mucus, and with scanty urine. The child grows pale and emaciated, and assumes a senile appearance. These cases last five or six weeks, death being preceded by coma and convulsions; though a few recover. Relapses are not uncommon and should be guarded against.

Diagnosis.—Entero-colitis is distinguished from dyspeptic

diarrhea by the greater severity, more fever, greater prostration, the stools containing more mucus and even blood, and by the greater pain and suffering. **Cholera infantum** may be recognized by the abrupt onset, very high fever, constant vomiting, hyperexia and an early collapse.

Prognosis.—Grave; recovery follows prompt treatment with favorable surroundings.

Treatment.—Attention should be given to the condition of the spine from the eleventh dorsal to the fifth lumbar. When the ileum and colon are involved, disorder is usually present at the third and fourth lumbar vertebræ, although the lesion may be higher. Relaxation of all muscles in this region and correction of the vertebral lesions are essential.

Irrigation of the bowels once a day with a pint of cold water is very beneficial and even pieces of ice may be introduced into the rectum. Fresh, pure air, rest and cleanliness, with a restricted diet and daily warm baths are important. In a word, hygienic and dietetic treatment similar to that for acute diarrhea should be employed.

Cholera Morbus.

Definition.—An acute, gastro-intestinal catarrh of sudden onset, characterized by violent abdominal pains, incessant vomiting and purging.

Etiology and **Pathology.**—This disease greatly resembles Asiatic cholera; so much so that one seems justified in suspecting that cholera morbus, like true cholera, is due to a specific organism. No single bacillus has yet been designated as the specific germ, although one has been recognized resembling very much the common bacillus of true cholera. Until this has been fully decided, cholera morbus must be regarded as severe inflammation of the mucous membrane of the stomach and intestines, due to some poison generated from the improper food, which seems to be the cause of the disease, such as indigestible fruits, cabbage and cumcubers. It is most prevalent in hot weather, but is also caused by exposure to cold and damp. The condition of the mucous lining of the intestines is the same as in acute diarrhea.

In fatal cases of cholera morbus there is the same shrunken, ashen appearance of the skin that characterizes cholera.

Symptoms.—The onset is sudden, with intense cramps in the epigastrium and frequently in the lower limbs; nausea; vomiting, and purging of bilious material, which later becomes almost like water, and in severe cases the discharge becomes serous, finally resembling the rice water discharges of true cholera. There are also intense thirst, moderate fever, rapid emaciation and loss of strength; the surface becomes cold and covered with clammy sweat; the pulse is frequent and feeble. The patient becomes restless and anxious.

Diagnosis.—Asiatic Cholera.—There is no way of distinguishing between Asiatic cholera and cholera morbus, except by examination of the discharges for the bacillus. Similar attacks are produced in poisoning by arsenic, corrosive sublimate and certain fungi, and are only discriminated from it by clinical history and cause.

Prognosis.—In the majority of cases the prognosis is favorable, death rarely occurring. The duration is from twenty-four to forty-eight hours.

Treatment.—A strong inhibitory treatment to the gastro-intestinal nerves is at once demanded. This relaxes the muscles of stomach and intestines, dilates the blood-vessels and lessens peristalsis. The treatment should be kept up until relief is given. In some cases, gentle treatment over the stomach and intestines quiets the distress. Inhibition at the occiput gives relief, especially to the nausea and vomiting. Hot applications should be applied to the abdomen.

The vomiting is relieved principally at the fourth and fifth dorsal vertebræ on the right side near the angle of the ribs. Cold carbonated water and pieces of ice swallowed are useful. The diet must be regulated, the further after treatment being symptomatic. Clear the bowel by warm enema if any irritating matter is still present.

Intestinal Colic.

This is a painful spasmodic contraction of the muscular layer of the intestines.

Osteopathic Etiology.—Lesions of the splanchnics, causing irritation of the sensory nerves to the intestines, are the most common causes. The splanchnics also contain inhibitory and vaso-motor nerves to the intestines. Indigestible food, flatulency and impaction of feces oftentimes produce intestinal colic. Foreign bodies, intestinal worms, abnormal amounts of bile discharged into the intestines, and reflex causes from diseases, as from the ovaries, uterus, liver, spine, etc., will produce the disorder; also lead poisoning, syphilis, rheumatism, locomotor ataxia, chronic malaria and hysteria.

Symptoms.—Severe paroxysms of pain, centering around the navel and diffused throughout the entire abdomen. The pain is of a piercing, cutting and twisting nature, relieved upon pressure. The abdomen is distended and the patient restless and continually changing his position. The attacks alternate with periods of complete quietude. In severe attacks the features may be pinched and the surface cold, with feeble pulse, vomiting and tense abdominal walls, all indicating incipient collapse. The duration of the attack is from a few minutes to several hours, eased at intervals and usually ending by a discharge of flatus.

Differential Diagnosis.—In **lead colic** the slate-colored skin, blue line on the gums, sweetish metallic taste, constipation, slow pulse, retracted abdominal walls, and lead in the urine will designate this disease. **Biliary colic** presents pain in the hepatic region, radiating to the back and right shoulder; also jaundice, calculi in the stools and bile in the urine. **Nephritic colic** is accompanied by pain radiating down one or both ureters to the inner side of the thigh, with retraction of testicle of side affected, and blood, mucus, pus or calculi in the urine. In **uterine colic** there is dysmenorrhea and pain in the pelvis. In **ovarian colic** there is extreme pain upon pressure over the ovaries, and hysteria. **Abdominal aneurism** presents tumor, pulsation, bruit. In **inflammatory** and **ulcerative** disorders of the abdomen there is tenderness upon pressure, and fever.

Prognosis.—Most favorable. Rarely a case terminates fatally.

Treatment.—Relief of pain is the first indication and is best accomplished by strong inhibition in the splanchnic region, which relaxes the spasm of the intestinal muscles. If disorders of the spinal column are located, it is of primary importance that they be corrected. In cases of irritation of the intestinal mucous membrane, a contraction of muscles of the spine will be found according to the area of the intestines involved, e. g., irritation of the mucous coat of the jejunum causes contraction of the muscles at the tenth and eleventh dorsals. It is merely a reflex sign and is one instance that goes to prove a double conductivity of nerve force, for, on the other hand, a lesion at the tenth and eleventh dorsals may produce colic or other disorders of the jejunum. The portion of the bowel affected, therefore, can be readily told by noticing the places of muscular contraction along the spinal column. Generally the jejunum and ileum are the portions of the bowel affected in intestinal colic. The pain can be controlled (sensory nerves), if in the jejunum, at the tenth and eleventh dorsals; if in the ileum, at the twelfth dorsal; if in the ileo-cecal region, including the vermiform appendix, at first to the third lumbar; if in the colon, at the third to the fifth lumbar; and if in the rectum, at the sacral and coccygeal nerves. Occasionally the duodenum and jejunum are reached by nerves as high as the fifth dorsal (usually vaso-motor nerves, not sensory) and the other portions of the bowel lower, according to their respective positions. The relief is given by way of the splanchnics and sympathetics to the mucous (sensory) coat of the intestines, although inhibition relaxes intestinal muscles (motor nerves) and dilates blood-vessels (vaso-motor nerves).

Anterior treatment to the abdomen helps to relieve the contracted fascia of the mesentery, with a consequent freeing of the circulation. It aids peristalsis of the intestines and expulsion of the irritating material. Direct treatment to the abdomen for the peristalsis relieves also constipation, impactions and the enteralgia, the latter principally by firm pressure. Peristalsis is also increased by stimulation of the vagi and inhibition of the splanchnics. The latter treatment, of course, is not given to relieve pain

directly, but to facilitate the removal of irritating substances if such are the source of trouble. If this does not produce a movement of the bowels promptly, a warm enema will assist greatly.

Flatulency can be relieved by direct pressure upon the solar plexus, which apparently removes obstructions to the abdominal nervous system (particularly the nerves of the digestive glands, as fermentation and flatulency are due to a disproportionate secretion of digestive juices) and thus the gaseous formations are absorbed. Additional treatment to the lower dorsal vertebræ and lower ribs to relieve nerve lesions may be indicated.

As stated in the etiology of intestinal colic, the splanchnic nerves contain not only sensitive fibres to the intestines, but motor and vaso-motor fibres as well. The same is true of the vagi nerves; they exert upon the intestines not alone a motor influence, but also a blood control; consequently, our work in a certain region can be for more than one purpose. Hot applications to the abdomen may be of benefit. The diet should always be regulated for a few days at least.

Constipation.[1]

Constipation is an unnatural retention of feces from any cause. The following causes are frequently met with: A deficiency of the bile or other secretions that aid peristalsis; many acute and chronic diseases which lessen the secretions and impair peristalsis, such as anemia, hysteria, chronic affections of the liver, stomach and intestines and acute fevers; certain drugs and strong purgatives; strictures; concentrated food; sedentary habits and neglect of the calls of nature. Atony of the colon may be caused by chronic disease of the mucosa and by general disease causing debility. There may be weakness of the abdominal muscles, due to obesity and the distention of frequent pregnancies, or obstructions, such as displaced uterus, pregnancy, prolapsed cecum, sigmoid or rectum, and displaced coccyx. Constipation is really a symptom, in most cases, of some disease; many times it is about the only symptom observed. One has to take into consideration the many causes that would produce constipation when the treatment of a case is undertaken. A disordered structure may be found in

1. See Philosophy and Mechanical Principles of Osteopathy, p. 190.

almost any region of a body which would bear directly or indirectly in the causation of constipation.

Irregular habits often bring on the most obstinate cases of constipation in later life. There may also be local causes, such as disturbances of the normal secretions, impairment of intestinal walls, due to inflammation, and mechanical obstructions caused by tumors, intussusception, twists, etc. Constipation in infants is usually caused by errors in diet, but may be congenital.

In the majority of cases lesions will be found in the vertebræ of the lower dorsal and lumbar regions, or in the lower ribs of either side. The lesions may affect the vascular supply and innervation of the intestines directly, or the lesion may cause the constipation by affecting some other digestive organ first. Lesions to the vagi affecting the peristalsis of the intestines are common.

The usual **symptoms** are infrequent stools, debility, lassitude, headache, loss of appetite, anemia, furred tongue and fetid breath. Serious symptoms may result in long continued cases, such as piles, ulceration of the colon, perforation, enteritis and occlusion. The fecal mass may become channeled and diarrhea may occur from the irritation. In long standing cases of constipation, if the patient suddenly develops diarrhea the rectum should be well examined to see if there are impacted feces present. Neuralgia of the sacral nerves may also be caused by impacted feces in the sigmoid flexure.

Treatment.—Naturally, owing to the numerous etiological factors, each case is a special study and the treatment is necessarily varied. Many cases will present slight impaction of the bowels, a sluggish liver, spinal lesions and so on, which simply require a specific treatment and all the symptoms will be removed. On the other hand, constipation may be due to prolonged ill health and thus require a careful, systematic treatment, not only of the bowels, but of the entire system. Of primary importance in these cases is regulation of the diet, plenty of exercise, and regularity in going to stool at a fixed hour each day. The effect of attention to the latter point, in some instances, will be sufficient to perform a cure. Too much cannot be said in regard to the beneficial effects of systematic habits.

Lesions may be found in the spinal column producing constipation from about the fifth dorsal to the coccyx, although principally the lower three dorsal and upper two lumbar vertebræ are at fault. Constipation may be caused by defects at any point in the intestines, and consequently the sections of the spinal column sending nerves through the intervertebral foramina to the several sections of the bowels should be examined. At any point from the fifth dorsal to the coccyx, certain vaso-motor, motor and secretory nerves of the intestines may be affected by various lesions. The vaso-motor nerves keep up the vascular tone of the bowels, the motor nerves the peristaltic action and the secretory nerves attend to the intestinal juices. In constipation, disorders of the spinal column are generally found on the right side. There is no good reason offered as to why this is so. In those cases where the liver is impaired, the answer might be because most of the nerves to the liver are on the right side, but the right side is just as often affected when the lesions are in the lumbar region and the nerve supply to the hepatic region intact. Dr. Still considers the fifth dorsal of importance.

The **vagi nerves** have important bearing upon the motor apparatus of the intestines. Lesions in the upper cervical, involving intestinal fibres of the vagi, occur occasionally. Stimulation of these fibres increases the peristalsis of the intestines. Mechanical stimulation of the mid and lower dorsal region, as shown by osteopathic experiments, increases peristalic action and vaso-constriction in the stomach and intestines.

The value of **direct treatment** over the intestines from the duodenum to the rectum in most cases of constipation cannot be overestimated. It aids peristaltic action, removes impactions, strengthens weakened muscles of the intestines and abdomen, and in general gives tone to all of the abdominal organs. The treatment should not be given in a hap-hazard manner, but each effort should be for a definite purpose. Care should be taken not to bruise the intestines or other organs, as by gouging or severe punching; the flat surface of the fingers and the palms of the hands should be used. This means that the part of the bowel involved should be treated intelligently, the osteopath reaching under-

neath the section and the patient drawing the bowels up and in. Obstructions and impactions of the gut, especially at the ileo-cecal and sigmoid regions, should be carefully corrected. At all angles of the gut, impactions and prolapses may occur.

J. H. Sullivan[1] makes the following observation concerning severe, deep abdominal treatment: "I have noted that this often resulted in the reverse of good effects. In constipation, naturally then, I am chary about treating abdominally, confining my work principally to the biliary regions, the ileo-cecal and left iliac regions and have attained good results when a promiscuous working of the abdomen had not so resulted." This emphasizes the point that specific treatment is as much indicated for the abdomen as it is for the spine.

Direct treatment to the liver and biliary ducts is necessary in many cases, as the bile is the natural purgative; thus a slowness or inactivity of the liver and bile ducts might cause costiveness.

Some cases result from anesthesia of the rectum, due to pressure of the fecal matter collecting in the rectum. Simple dilatation of the rectal sphincters and a stimulating treatment through the sacral nerves will bring about a healthy activity of these parts. Occasionally the coccyx becomes displaced and produces paresis of the rectal nerves; or a dispaced uterus or a tumor may produce the same result.

The use of **proper food** is essential. Coarse food leaves a great amount of residue, and on the other hand, dainty food leaves but little residue, both causing costiveness. The patient should drink considerable water, and the time is of importance. Have a glass of cool, not iced, water taken on arising and if breakfast is delayed sufficiently, another in half an hour. An enema[2] occasionally is indicated and is a great aid when used, particularly in cases of paralysis of the intestines and in impactions. Correct breathing is beneficial.

Treatment of the Constipation of **Infants.**—Repeated small enemata at a fixed hour each day are probably the best treatment, as the proper manipulation, with regard to method and

1. Journal of Osteopathy, May, 1900.
2. For points on enema, see treatment under Intestinal Obstruction.

amount of force necessary, is impossible to be judged properly. Two ounces of tepid water at a time should be injected. Massage to the abdomen will be useful, as will slight dilatation of the anus, which is usually done with the little finger, but in obstinate cases a soap stick may be used. When there has been continued straining at the stool, the sigmoid and rectum will often be found prolapsed, causing a mechanical obstruction. With the finger well lubricated this can be corrected and often is all that is needed. These directions, with care in the foods, are usually sufficient in any case not congenital.

Intestinal Obstruction.

(Ileus).

This is due to a sudden or gradual closure of the intestinal canal at any point. Closure of the gut may be caused by strangulation, intussusception, twists and knots, abnormal contents and strictures and tumors.

Strangulation.—This is the most frequent cause of acute obstruction of the bowels. There may be strictures of the bowels, due to inflammatory processes producing bands or adhesions, or due to the adhesion of a bowel to an abdominal wound; a vitelline remnant, as a blood-vessel, may remain and act as a strangulating cord, or in Meckel's diverticulum one end may be attached to the mesentery or abdominal wall and thus form a ring through which the gut may pass and become strangulated.

Strangulation may take place in the foramen of Winslow or the foramen ovale, or between the pedicle of a tumor and the abdominal wall. Peritoneal pouches, mesenteric and omental slits, adherent appendix or Fallopian tube and diaphragmatic hernia may be other causes. An external strangulation (hernia) may take place in the crural or inguinal canal, in the umbilicus, in the sacro-sciatic notch or in the opening through which the infrapubic vessels pass. In strangulation there is a constriction of a portion of the bowel causing an arrest of the circulation of blood at that point, and more or less of a stoppage of the fecal matter of the intestine. In ninety per cent. of cases the strangulated part

is in the lower abdomen and sixty-seven per cent. occur in the right iliac fossa, according to Fitz.

Intussusception or Invagination.—Intussusception is a slipping of a part of the intestine into another part immediately below it, as the slipping of a part of a finger of a glove or a coat sleeve into another part. The portion involved may be anywhere from half an inch to a foot or more in length and the middle and inner layers increase in length at the expense of the outer layer. This produces compression and inflammation and obstruction to the intestinal contents. It occurs principally in children and is more common in males.

Spasms of the intestinal muscles and perverted peristalsis are probably the most common causes. One part of the bowel may be dilated and an adjacent portion contracted, thus allowing an invagination. Diarrhea, habitual constipation and intestinal polypi are important exciting causes. Invaginations oftentimes occur just before death, probably due to irregular peristalsis.

Following engorgement and inflammation of the invaginated portion, a tumor is usually present and lymph is thrown out which may cause the layers of gut to adhere, so that the invaginated portion cannot be drawn out. Necrosis and sloughing are then likely to take place.

Intussusception varies according to location and is named according to the part of the bowel involved. There are commonly recognized (1) Ileo-colic, when the ileo-cecal valve descends into the colon. (2) Enteric, of the small intestines. (3) Colic, of the large intestine. (4) Colico-rectal, of the colon and rectum. (5) Rectal, of the rectum.

Twists and **Knots.**—These occur more frequently in males, usually between the ages of thirty and forty. In nearly all cases the twist is axial, accompanied by relaxed and lengthened mesentery. One portion of a bowel may be twisted about another, or a loop of bowel twisted upon its long axis. A bowel being impacted or overdistended by feces and gas, is quite likely to roll on its axis or knot and become dislocated by its weight and inactivity, thus producing compression and obstruction of the bowels. The volvulus commonly occurs in the large intestine, at the sig-

moid flexure and in the ileo-cecal and cecal regions. It occasionally occurs in the small intestine.

Abnormal Contents.—Obstructions may be caused by gallstones, enteroliths, lumbracoid worms, certain medicines (such as magnesia and bismuth), fruit stones, coins, needles, pins, buttons, etc., and fecal matter. Foreign bodies usually lodge in the ileo-cecal region and in the small intestine, while fecal impactions occur in the large intestine, more frequently in the lower part. Females are more subject to it than males.

Its causes are many and are similar to those of constipation. Spinal lesions are very frequent, probably causing paresis or paralysis of a segment of the bowel; or all the forces that maintain a normal activity of the intestines may become impaired. Hemmeter[1] says it is "more frequently the result of defective innervation of the intestine."

Impactions are frequently met with and are easily overlooked under any diagnosis which does not include thorough palpation of the abdominal viscera. The impaction may be so large as to produce dilatation of the bowel. The obstructive mass becomes very hard and dry and perhaps channeled, allowing some material to pass until, finally, a large piece of fecal matter will obstruct the passage completely. In **diagnosis** it must not be confused with neoplasms, tumors, etc. Impactions may occur at any point of the colon and the weight so drags the bowel out of position as to be misleading. The principal points are the ileo-cecal region, sigmoid flexure, and rectum. Tenderness is usually present, as may be diarrhea which must not be taken as evidence that the bowel is clear. Impaction gives rise to many reflex symptoms and is often the real cause of many mistaken conditions. Bandel speaks of a case diagnosed as brain fag which was accompanied by increasing prostration and weakness to the point where a fatal issue was feared. It was in reality a colon impacted throughout its entire length. Absorption was so great that the colon could be outlined by discoloration of the skin. Quick recovery followed the unloading of the bowel. The heart may be

1. Diseases of the Intestines, Vol. 1. p. 240.

affected by weight upon the vessels, gastric disturbances and signs of autointoxication from absorption may appear.

Dilatation of the sigmoid flexure, especially when congenitally long, may even be so great as to crowd up and interfere with the liver and diaphragm; in these cases the coats of the intestines are usually hypertrophied.

Strictures and Tumors.—These usually occur in adults, more frequently in women and generally involve the large intestine and lower part of the abdomen, most of them occurring in the left iliac fossa. They are of much less importance than the other causes of acute obstruction, but they are common causes of chronic obstruction. Occasionally a stricture may be spastic, due to vertebral lesions. Paralysis of a section of the intestine may take .place.

Strictures may be: (1) Congenital, commonly causing complete occlusion, as is seen in the imperforate anus, and defective union between the duodenum and pylorus. (2) Cicatricial stenosis, from ulceration produced by dysentery, typhoid fever, tuberculosis and syphilis. (3) New growths, from any of the benign tumors or from malignant tumors, chiefly cylindrical epithelioma about the sigmoid flexure. Tumors external to the bowels or in the pelvis may cause intestinal obstruction by compression.

Symptoms.—Acute Obstruction.—Constipation, nausea, vomiting, and pain are the four important symptoms. The pain is of a colicky nature and may come on abruptly. After the contents of the stomach has been vomited, the material becomes colored with bile and finally stercoraceous vomiting occurs. Observing the contents vomited (gastric, bile-stained, and fecal) will greatly aid in the diagnosis. The contents of the bowel, below the obstruction, may be emptied or complete constipation may remain. All the symptoms, as a rule, rapidly grow more pronounced. The pain is more severe; tenderness occurs over the abdomen in limited areas; there is slight tympany; the eyes are sunken; the skin is cold and clammy; the pulse is quickened and feeble; the urine highly colored; the tongue is dry and there is incessant thirst; tenesmus and tumor may be marked, and fever occasionally occurs. The above condition may continue from

three days to a week, when collapse and death may occur, or the sufferer gradually regains health.

Chronic Obstruction.—In fecal impactions constipation of long standing is commonly observed. In some cases the fecal mass has become channeled, allowing the bowels to remain open; the patient possibly not knowing that there is any trouble. In fact, diarrhea may be present, due to irritation above the impaction. Finally, however, obstruction occurs; the breath is offensive, the appetite is poor, the abdomen swells, and there is fullness and weight within the abdomen, accompanied by pain and vomiting. Upon examination before complete closure, the fecal impactions can easily be felt through the abdomen externally. The tumor is a yielding mass. It has been mistaken for an enlarged liver or gall-bladder, a kidney, or a tumor of the stomach or duodenum. Other symptoms may be present as hiccough, jaundice, tenesmus, tumultuous peristalsis, local peristalsis, local peritonitis and collapse. In stricture caused by cicatrices that may have been formed years before, complete obstruction takes place. Transient attacks often occur. Usually the general health is greatly impaired long before complete occlusion.

Diagnosis.—A diagnosis can usually be made by careful, thorough examination through the abdominal wall, in connection with the symptoms, and the physical signs. The region of intestinal trouble is manifested by contracted muscles at certain points along the spinal column, corresponding with the particular portion of the bowel involved, as indicated under intestinal colic. Intestinal obstruction may be confounded with tumors, intestinal colic, enteritis, peritonitis, hepatic colic and renal colic. **Peritonitis** may be differentiated by the history, the early fever, diffused tenderness and absence of fecal vomiting. When **invagination** occurs, besides the symptoms of obstruction, the age, tenesmus, bloody discharges and the sausage-shaped tumor in the line of the colon, will be diagnostic. In **stricture,** the history, gradual onset, and ribbon-like and bloody stools will distinguish that disorder. In **tumors** the gradual onset, age, bloody discharged and cachexia will be important symptoms.

Treatment.—Treatment of the bowels directly is required, and each case must depend for its relief upon the ingenuity of the osteopath. Rules to be followed cannot be given, as cases vary in manner of involvement and in location, consequently the correction of the disorder depends as much upon the ability of the osteopath as does the determination of the diagnosis. Taxis is the method commonly used in relieving intestinal obstructions, though other methods may be employed.

In **invagination,** raising the buttocks and lowering the chest, with thorough injection of oil or tepid soapsuds, or an inflation of the colon with air, may give relief. In addition to thorough but cautious manipulation of the bowels as in **impaction,** irrigation of the lower bowel with warm water, soapsuds, or glycerine and water, will usually be of material aid. In **strangulation,** high injections of warm water, and assuming the knee-elbow or lateral position, may straighten out the acute obstruction. **Twists** and **knots** are best relieved by direct treatment, although injections may be of aid. **Tumors** and **strictures** will require, sooner or later, surgical interference in most cases, but to treat as in impaction will be effective for a short time at least. If there is no indication of immediate **relief within three days, surgical interference should be instituted.** Besides the ordinary treatment for the nausea and vomiting, washing out the stomach will help allay such disorder, quiet the peristalsis and relieve the abdominal distention and pressure above the seat of obstruction. Strong, thorough treatment of the spinal nerves to the stomach and intestines will be of great help in lessening pain, establishing normal peristaltic action and in suppressing inflammation. The vagi also should be treated for perverted peristalsis. The nutrition of the patient is best retained by rectal injections of food.

Treatment of **impactions** and **abnormal contents** requires an additional word. The first step is to free the colon of the fecal mass. The enema is of great assistance in this, for cases of long standing present a hard, dry mass, often adherent, and the mucous membrane is sensitive from inflammation. Much abdominal treatment must not be given until the mass is softened by water. When in the sigmoid or rectum it may, if not dislodged by re-

peated enemata, have to be removed by a colon spoon, perhaps under anesthesia. Impaction of the small intestine is rare and out of reach of the enema, although if taken as hot as can be borne, it will exert considerable influence high up. In these tendencies and in constipation, when the bowel must be kept open before treatment has produced much effect, there should be an effort made to break up any cathartic habit which may be formed. The enema is a most valuable aid, but it must be given correctly. The patient should be instructed that a fountain syringe is preferable, and that it must never be taken standing. This merely fills and distends the rectum, or lower sigmoid at the best, and is passed without any or with very little effect. Lying on the right side is a very good position, as is also on the back with hips elevated, but the knee and chest is best in most cases. The water should be a little above body temperature and can be saponified or used clear. The effect will be about the same. The tube should be perfectly smooth and well lubricated and introduction must be made with care so as not to bruise or irritate. The water, having been allowed to run to expel the air, may be now started and will separate the mucous folds and allow easy penetration. The rubber tube should be held between the thumb and finger, so the flow can be stopped as soon as it meets an obstruction. When this is passed the flow can begin again and continue until the required amount (from one to two quarts for an adult), has been taken, or until the feeling of distention becomes too great. By following this method, much of the distress and colicky pains which sometimes accompany an enema, may be avoided. Water should be held for some minutes, to allow softening of the fecal mass. In most impactions it is important to get the water into the ascending colon, as that is their usual location. For that purpose nothing is better than a steel sigmoid irrigator. This is shaped somewhat like the letter S and about a foot long from tip to tip. Its introduction is not difficult, but care must be used. Place the patient on the right side and stand in front, having the bag suspended near. Introduce the tube and with slow, gentle pressure let it follow the course of the bowel. When the splenic flexure is reached, it will stop, but by letting a little water flow,

the bowel will distend and it will pass. When in the full length, the end will be near the median line and in the transverse colon. Now let the water flow slowly, stopping frequently, and with one hand gently lift and work the abdomen. This will both soften the contents and aid the water in reaching the farthest point. It is not well to give more than a quart the first time, as there is apt to be some prostration. The tube also has the mechanical effect of raising and replacing the sigmoid, descending colon and splenic flexure. When there is lack of tone to the bowel or when very little stimulus is needed, a half pint of cold water taken in the morning, will often act quickly. Appliances which force the water into the bowel when the patient is sitting, are not recommended, as they tend to stretch the muscular coat by pressure from lifting a column of water.

Hernia.—There are several methods of replacing a hernia. The first endeavor, in every instance, must be to reduce it, whether it be strangulated, incarcerated or simply protruded. One of the easiest and commonest methods is to place the patient on his back, the buttocks elevated, the legs flexed upon the thighs, the thighs flexed upon the abdomen, and the limb on the affected side slightly rotated inward, so that the columns of the ring about the hernia may be relaxed. After the hernia is protruded a little more, so that its contents may be emptied readily, a gentle pressure with the thumb and finger is made upon the upper part of the tumor, when the rest will follow. A gurgling noise is heard upon reduction. Cases that cannot be reduced and are causing acute obstruction of the intestines, should be treated surgically. Incomplete hernia, which does not show externally, may be present and cause severe reflex symptoms. Considerable attention has been given to this by some investigators. The patient is placed in the Trendelenberg position and the bowel lifted out of the fossa. If any signs of hernia are present a well fitting truss will often cause it to heal.

Appendicitis.

Appendicitis is an inflammation of the appendix vermiformis. In a number of cases the cecum and surrounding tissues are in-

volved (typhlitis, perityphlitis). The vaso-motor nerve supply comes from the lower three dorsals and the upper two lumbars. The sensory nerves make their exit from the three lower dorsals. Appendicitis is nearly always predisposed by injury to the innervation of the vermiform appendix and immediate region, by vertebral derangements or sub-dislocations from the tenth dorsal to the third lumbar. The vermiform appendix is a peculiarly constructed organ, and its function has not been determined with positiveness. It undoubtedly has a function and possibly a very useful one. Sir William Macewen[1] does not share in the general belief that the appendix is without function, but protests against its indiscriminate removal, believing it has a powerful influence over the function of the colon. This is in keeping with the ideas of Dr. Still, who has always maintained that the appendix is of importance to the human economy. Although the organ has been found in various localities of the abdomen, this fact and others do not necessarily indicate that it is a functionless relic. It is richly supplied with lymphatics and blood-vessels and has a peristaltic action peculiar to itself. When the organ is in perfect condition, foreign material probably would not find a lodging point in it, on account of its peristalsis. Dr. Still[2] suggests that the appendix has a sphincter, also the power to contract, dilate or shorten, should any foreign substance enter, and he has worked with this idea in view with uniform success. Appendicitis may also be caused by fecal impactions and foreign bodies in the bowel contiguous to the appendix. In these cases there is usually an impaired innervation from the spine, due to vertebral and lower rib lesions, resulting in a weakened muscular coat and catarrhal congestion of the mucosa. In a word, prolapse of the bowel at this point is a common cause. In various instances abrasions of the coats of the tube occur, or the innervation or vascular supply is impaired, and pathogenic bacteria, as bacilli coli communis, streptococci pyogenes, staphylococci pyogenes aurei, typhoid bacilli, tubercle bacilli and others, find a favorable lodging point and determine the nature of the disease. Injuries to the spinal

1. **The Lancet,** (London,) Oct., 1904.
2. **Philosophy of Osteopathy, p. 226.**

column and displacements of the vertebræ in the lower dorsal and lumbar regions, straining and lifting, tight lacing, torsion of the appendix, traumatism, impaction of feces, concretions and foreign bodies, acute indigestion, indigestible food, overeating, exposure to wet and cold, and infectious diseases (as typhoid fever, tuberculosis and influenza), are all in the list of causes of appendicitis.

Pathologically, in most cases the inflammation is catarrhal. This includes many of the mild attacks. The mucosa is inflamed similarly to catarrhal processes elsewhere, although the inflammation may rapidly spread to the deeper structures unless immediately cared for. The inflammation may be so severe that the lumen becomes closed. This is termed **obliterating appendicitis.** When this occurs the attack may cease and danger from subsequent attacks are at an end, but inflammation may go on to purulent involvement and even to **ulceration, gangrene** and **perforation** or **peritonitis.** An **abscess** may be within or without the appendix. **Adhesions** are likely to form about the mass.

Symptoms.—A sudden, violent pain in the abdomen, usually localized in the right iliac region, although at first this pain may be general. The point of greatest tenderness is detected over McBurney's point—a point at the intersection of a line between the umbilicus and the anterior superior iliac spine, with a second drawn along the outer edge of the right rectus muscle. The patient usually lies on the back with the right leg drawn up. The severity of pain is not indicative of the seriousness. If the pain ceases suddenly, it is commonly a serious indication. There is usually fever at the onset, the temperature being from 100 to 102 or even 104 degrees F., and very rarely preceded by a chill. In favorable cases the temperature gradually falls, reaching normal in from five to seven days. If **suppuration** takes place the temperature continues with but slight fall, although in some cases there is a rise, or it may become almost normal. Pain in the right iliac fossa, without fever, rarely points to an acute attack of appendicitis. Vomiting and nausea are more or less frequent, and more commonly present in the event of perforation or rupture of an abscess. In favorable cases vomiting rarely lasts beyond the

second day. In the majority of cases constipation is present from the beginning of the attack, due to paralysis of the bowels. There may be diarrhea, particularly in children.

On **inspection** of the abdomen at the onset of the attack, the sides look alike, but on **palpation** there is rigidity of the rectus abdominis muscle and the other muscles overlying the seat of inflammation. The whole abdomen may be slightly distended. In the majority of cases there is a progressive development of a hard swelling or tumor in the right iliac fossa. These tumors vary in size, but are usually oval and the size of a hen's egg, and generally situated a little above Poupart's ligament. **Fluctuation** of the tumor is indicative of suppuration. There is often great irritability of the bladder and frequent micturation. A sudden fall in the temperature often indicates that a perforation has taken place, or that a small abscess has ruptured into the intestines. In favorable cases the temperature falls at the end of the third or fourth day, the pain lessens, the tongue becomes clearer and the bowels are moved. If the tumor persists, the patient is very liable to have a **recurrence** of the condition.

Rapid growth of the tumor and aggravation of the several symptoms point to suppuration, especially **extreme tenderness** over the point of inflammation. If the appendicitis goes on to suppuration, there is danger of rupture into the peritoneum. In a few cases the abscess may rupture into the bowel, in which case the patient recovers. Other terminations are lumbar abscess, hepatic abscess and perinephritic abscess. Death may be caused by septicemia or pylephlebitis. These events may be delayed a variable length of time, depending upon the extent and strength of the adhesions that form about the abscess. "The gravity of the appendix disease lies in the fact that from the very outset the peritoneum may be infected; the initial symptoms with nausea and vomiting, fever, and local tenderness present in all cases. may indicate a wide-spread infection of this membrane." (Osler). He also says local signs are not so trustworthy as the general symptoms.

There is liability to **relapses in appendicitis.** The attacks may recur for years at different intervals. In some cases these inter-

vals are very short. In some cases perfect recovery may take place after repeated attacks.

Diagnosis.—In many cases the diagnosis is easy, but other cases require careful study and close observation. Sudden pain becoming localized, tenderness and rigidity in the right iliac region are three symptoms that together almost positively indicate appendicitis. A **pseudo-appendicitis,** with all symptoms of true appendicitis in the initial stage, may be caused by the downward dislocation of the twelfth rib on the right side, and occasionally the eleventh rib on the same side. The rib lies obliquely downward toward the crest of the ilium. In a few cases the obliquity of the lower rib is so great as to very nearly touch the ilium. The dislocated rib may produce severe irritation, pain, tenderness, rigidity, and even inflammation, of the abdominal muscles. The patient nearly always complains of the pain being deeply seated, thus possibly confusing one. In **typhoid** there is a gradual development of the fever, characteristic temperature curve, enlargement of the spleen, epistaxis and diarrhea. The Widal test should be made. The absence of fever and intermittent pain in the abdomen, with complete constipation, fecal vomiting, general distention of the abdomen, bloody stools and marked tenesmus would determine **intestinal obstruction.** In **tubal disease** a gradual onset, a more dull and constant pain, the history, and pelvic examination will usually differentiate this disorder from appendicitis. Kelly[1] gives these points in differential diagnosis, between acute salpingitis and appendicitis: In the former it will usually be found that there has been a yellowish vaginal discharge for some period before the attack. The local pain and tenderness, usually located deeper in the pelvis, is most intense on palpation in the region of the Poupart's ligament. On vaginal examination exquisite tenderness is felt on either side of the uterus. In **biliary colic** the pain is higher along the biliary ducts and gall-bladder, extending even as high as the shoulder, and jaundice is generally present. In **renal colic** the pain extends along the ureters down to the inner side of thigh and testicle, and back into lumbar region. There is absence of fever and rigidity. The

1. The Vermiform Appendix and Its Diseases, p. 711.

pain in **perinephritic abscess** is downward into groin, as in nephritic colic, and there is tenderness of the lumbar region. Exploratory incision may be necessary.

Prognosis.—Naturally, the prognosis depends upon the character of the appendicitis, but on the whole the prognosis is favorable. A large proportion of cases recover. Surgical operations are many times deferred until too late; undoubtedly on account of the uncertainty of the condition. Still, on the other hand, many serious cases recover under the proper treatment when an operation seemed almost absolutely necessary; all going to prove the fact that very much depends upon diagnosis of the true condition. The statement that there is "no medical treatment for appendicitis," seems rather broad in view of the report of the medical inspector[1] of the French Army in Algeria. Out of 668 patients suffering from appendicitis, 188 were operated upon and 23 died, while 408 were treated medically and only three died. He concluded that a meat diet tended to increase the number of cases.

Treatment.—Confine the patient in bed at once. Cases have undoubtedly been lost by not enforcing this point. Attempt should be made to correct the disordered condition of the dorsal and lumbar regions. Thorough and careful treatment should be given at this point, and in most instances the pain can be relieved by correction of the disordered vertebræ. If the case is seen at the beginning of the attack, thorough manipulation over the right iliac fossa and local applicationof ice are indicated. When the case is advanced, extreme care should be used in manipulating over the swollen and inflamed region. Hot applications will be helpful in such instances.

When due to fecal impactions and foreign bodies, thorough, direct, elevating treatment over the involved region, and high rectal injections are indicated. This applies to the onset, for if the disease has progressed to the point where pus may be present, the **bowel** must be **absolutely** at **rest.** Do not give nor allow to be given purgatives at any stage of the disease. When **sure** that **there is no pus,** direct, careful work over the cecum and appendix

1. **Dr. Chauvel, 1902.**

is allowed and is of value. It should be a lifting of the colon and relaxing of nearby tissues, to promote the circulation. Treatment of the spine is necessary in all cases, to relieve pain, to correct the nerve and vascular supply, and to increase peristalsis so as to remove irritating bodies from the vermiform appendix. H. Wakefield[1] says he has never had a case go to operation or fail of recovery. He lays particular stress on keeping the bowel open, non-irritation by drugs, and avoidance of easily fermenting foods as prophylaxis, and among other directions in treatment, "Well adapted massage and kneading over the visceral region are of service in hastening the return to normal."

The case should be most carefully watched, and a surgeon should be promptly called for consultation if the occasion demands it in the least; and if thought advisable, operation should be resorted to before too late. Do not assume too much responsibility in these cases. The patient should be nourished on a restricted diet of milk and animal broths. Asa Willard[2] strongly recommends no food by mouth, as it is bound to set up peristalsis and cause increased irritation.' He sustains the strength by rectal feeding. This view is held by other authorities, even to withholding water when the inflammation is at its height. Tasker confirms the advisability of restricted feeding and advises resting the bowel even to the point of discontinuance of food. The course of the attack is usually so short that there is no danger of starvation and little loss of strength results. This point is a highly important one in cases of any degree of severity.

DISEASES OF THE LIVER AND BILE DUCTS.

There are several diseases of the liver and bile ducts, such as carcinoma of the biliary tract, stenosis of the ducts, pylethrombosis, fatty liver, perihepatitis, etc., purposely left out, as they are either of rare occurrence in which there has been no osteopathic experience, or else almost wholly require surgical inter-

1. Cyclopedia of Practical Medicine, June 1906.
2. Journal of the American Osteopathic Association, Dec., 1903.

ference. The osteopath has had, on the whole, excellent results in the treatment of liver diseases; yet no one can expect to accomplish the impossible or get good results when the liver (or any other organ) is so organically changed that very little normal tissue remains. Primary diseases of the liver will invariably present osteopathic lesions from the fourth or fifth dorsals to the eleventh or twelfth. The ribs on the right side are commonly involved. These lesions probably disturb the liver by way of the vaso-motor fibres. Displacements of the hepatic flexure and transverse section of the colon and displacements of the right kidney are frequent sources of liver disorders. Care should be taken in differentiating primary from secondary diseases, for naturally the relative importance of the various factors in treatment will vary. In many secondary diseases there will be found predisposing osteopathic lesions, and these secondary disorders and degenerations can at least be palliated and occasionally the degeneration retarded or stopped by persistent osteopathic treatment, diet, and hygienic measures.

Hyperemia of the Liver.

This is an abnormal fullness of the blood-vessels of the liver, followed by an enlargement of that organ. It is active when arterial, passive when venous.

Osteopathic Etiology and **Pathology.—Active hyperemia** is usually due to indiscretions in diet. After each meal a physiological hyperemia of the liver occurs, which is greatly increased by habitually overeating and overdrinking. This condition may lead to functional disturbance and possibly to organic change. Traumatism and lesions of the vertebræ and ribs, irritating vaso-motor nerves, are important. Habitual constipation, malaria, heat and arrested menstrual epoch, and infectious fevers are also causes of the active form.

Passive hyperemia is due to obstructions of the venous circulation. Valvular heart disease is the most common cause. Lung diseases, as emphysema or cirrhosis; obstruction to the vena cava or causes interfering with the flow of blood through the liver; and diseases of the pleura, are among the causes.

Most cases of congestion of the liver present lesions to the vaso-motor nerves of the liver, fifth to ninth dorsal. Especially are the ribs over the liver apt to become displaced and affect the organ.

Pathologically, the liver is enlarged and engorged with blood. The appearance of the organ depends upon the duration of the hyperemia. In passive hyperemia the central portion of the lobule and the area of the hepatic vein are deeply colored. The periphery and the area of the portal vein are pale. This alternation of the dark and light color gives rise to the nutmeg liver, which is so noticeable upon section. In cases of long standing, atrophy of the liver cells and overgrowth of connective tissue result.

Symptoms.—Active Hyperemia.—Dull aching and a sense of fullness in the right hypochondrium, aching of the limbs, coated tongue, nausea, vomiting, constipation, highly colored urine, and slight jaundice.

In **passive hyperemia** the symptoms are the same, but less marked. The onset is gradual and the liver may attain considerable size. In severe cases following tricuspid regurgitation the liver may pulsate. In severe cases dropsy takes place.

Diagnosis.—Active hyperemia is occasionally confounded with catarrhal jaundice. Usually congestion of the liver is easily diagnosed.

Prognosis.—In active hyperemia the prognosis is good, unless repeated attacks lead to atrophic degeneration. In passive hyperemia the prognosis depends entirely upon the cause.

Treatment.—Active hyperemia.—The treatment consists of measures which tend to diminish the congestion, principally a thorough, direct manipulation over the liver by raising and spreading the ribs. Careful and thorough treatment to the dorsal splanchnics of the liver is also indicated. The substitution of a scanty for a heavy diet is essential. The foods given should be such as are easily digested, as milk and broths; fats and sugars are to be avoided.

In **passive hyperemia** the treatment consists of correcting the disorder causing it. Often heart diseases are the cause. A

thorough depletion of the bowels will aid largely in relieving ascites that may follow passive congestion. (See ascites).

Simple Catarrhal Jaundice.

Definition.—Jaundice due to inflammation of the terminal portion of the common duct, not the result of impacted gall-stone. The bile is retained and absorbed.

Osteopathic Etiology and **Pathology.**—A frequent cause is the subdislocation of the tenth rib on the right side, thus interfering with the innervation to the bile ducts, and causing congestion of the mucous membrane of the common duct; although lesions above and below this point may occur. Extension of gastro-duodenitis into the common duct may be a cause. Duodenal catarrh usually follows errors in diet, exposure, malaria, Bright's disease, portal obstruction and chronic heart disease. Infectious fevers, as pneumonia and typhoid fever, and emotional disturbances are among the causes. Catarrhal jaundice may occur in epidemic form.

Pathologically, the duodenal end of the duct is most commonly involved. The mucous membrane is swollen and the orifice fills with mucus. The inflammation may involve the common and cystic ducts and even the hepatic. The liver is enlarged and the gall-bladder distended.

Symptoms.—The only symptom present may be simply the jaundice. There is always tenderness upon pressure over the ducts. The patient many times complains of a stabbing pain when pressure is exerted over the duodenal opening. Usually the course of the bile duct can readily be felt upon deep pressure, owing to the tumefaction. Accompanying this condition may be general malaise, loss of appetite, nausea, vomiting, constipation or irregular action of the bowels, pains in the back and limbs and a slight fever.

Diagnosis.—Where jaundice is present without pain, it generally indicates catarrhal jaundice. The absence of emaciation or of evidences of cancer or cirrhosis usually makes the diagnosis easy. Good general nutrition and a negative physical examination favor simple jaundice as to the diagnosis.

Prognosis.—The prognosis of catarrhal jaundice is favorable, unless accompanied with infectious diseases or hypertrophic cirrhosis. When diseases are associated with jaundice the danger is usually from the disease. The duration of the disease is generally given from two to eight weeks, but osteopathic treatment generally lessens that time at least one-half.

Treatment.—The treatment is directed toward relieving the inflammation of the bile ducts and increasing the flow of the bile into the intestines. Great relief to the patient will be experienced from thorough treatment over the bile ducts, especially at the duodenal end. Press slowly but firmly over the region of the ducts, then execute a downward motion with firm pressure over the course. This performance should be repeated several times, until the tenderness in this region is almost or entirely relieved. The idea of this treatment is, **first,** to slowly but firmly bear down upon the abdominal muscles over the congested tissues, so as to relax the tissues and get as close to the ducts as possible, and **second,** with the downward movements to reduce the congestion of the ducts and at the same time to remove any mucus or other material from the orifice, thus allowing a freer flow of bile. Care should be taken not to gouge or dig into the tissues with the ends of the fingers, but to use the flat surface of the fingers. Any gouging or severe treatment will not allow one to accomplish his purpose, owing to the stimulus or irritation it would give the abdominal muscles and thus cause them to contract; and furthermore, it would more or less bruise the parts. An inhibitory treatment should be given along the spine on the side affected to help relax the abdominal muscles before this treatment is administered.

Direct treatment is given to the liver by more or less kneading or working the organ and also by raising and spreading the ribs. This treatment is to stimulate the activity of the liver. Reaching under the cartilages of the eighth and ninth ribs on the right side and bearing inward and downward will empty the gall-bladder and thus be of aid in relieving the tension in the biliary passages. It is probably a stimulus to these cutaneous fibres that causes a relaxation of the sphincter muscles of the gall-bladder

and thus allows it to empty. Stimulation of the tenth nerve contracts the gall-bladder. When all of the muscles of the hepatic region have been carefully relaxed and softened, a thorough examination can then be made of the vertebræ and ribs that might embarrass the innervation or vascular supply of the liver. Lesions of the vertebræ and ribs affecting the liver may occur from the sixth to the eleventh dorsal. Lesions to the vagus and phrenic nerves may occasionally involve the organ.

Irrigation of the large bowel with cold water has been practiced. The cold is supposed to excite peristalsis of the gall-bladder and ducts and thus aid in the expulsion of the mucus. Drinking freely of water will be helpful. A non-stimulating diet should be given. The stomach may not be in a condition to bear solid food; and furthermore, food on entering the duodenum will increase the local inflammation of the common bile duct. Give diluted milk, buttermilk, light meat broths, clam-broth, egg albumen and pressed beef juice. After the pain, vomiting and fever subside, the diet can be gradually increased.

JAUNDICE.

(Icterus).

Jaundice is a symptom and not a disease. It consists of the discoloration of the skin and other tissues by material derived from the bile. The discoloration may vary from a mere paleness to a yellow or brown olive hue.

Osteopathic Etiology.—There are two forms of jaundice, hepatogenous—caused by a suppression of the function of the liver cells, as found in acute yellow atrophy, malaria, pernicious anemia and certain fevers; and hematogenous—due to disintegration of the blood. The supposed cause of the latter form has recently been found to be of rare occurrence, if ever present; that is, the hematogenous form is also due to obstruction.

There are various causes of jaundice. The immediate cause is a deposit of pigment in the skin. Obstruction by foreign bodies as gall-stones and parasites are important causes. Inflammation and swelling of the biliary ducts and duodenum are common causes as well as stricture of the duct by tumors and various growths,

either internal or external, to the biliary ducts. In some instances pressure from without by the pancreas, stomach, kidneys, enlarged glands, fecal matter, a pregnant uterus, etc., has been the cause. Irritations and obstructions of the splanchnic nerves, due to lesions in the lower dorsal vertebræ and the ribs from the sixth to the eleventh, will affect the liver markedly by lowering the blood pressure in the liver, so that the tension in the smaller bile ducts is greater than in the blood-vessels. Also, lesions at these points may cause inflammation and tumefaction of the bile ducts.

Symptoms.—Hepatogenous.—This form may be found at all ages, usually though in children. Besides the discoloration of the skin, there is itching of the skin, on account of bile pigment deposits; even eruptions may occur. The mucous membranes are often colored and a constant symptom is the bright yellow discoloration of the sclerotic coat of the eye. Sweating is common and localized in the abdomen and palms of the hands. The secretions are colored with the bile pigment. It may be noticed in urine before being apparent in the skin or conjunctiva. The perspiration is colored, rarely the saliva, tears and milk are colored, and oftentimes the expectoration is tinted.

As very little bile passes into the intestine, the feces are pale gray or slate gray color and usually fetid and pasty. The bowels are generally constipated, but diarrhea may occur, owing to decomposition resulting from absence of the natural antiseptic ingredient. Other symptoms may be associated with the gastro-intestinal derangements, as nausea, fetid breath and loss of appetite. A slow pulse may occur, due probably to some stimulating effect on the inhibitory action of the vagus nerve. Lesions often occur at the atlas and axis, affecting the vagus. Pain back of the right scapula is a symptom of liver trouble; it has been suggested that it is due to a stimulus passing up the vagus to the spinal accessory, and thence to the trapezius muscle.

Various cerebral symptoms may be present, as great depression of spirits, irritability, headache and vertigo. Vision is variously affected. Owing to the ingredients of the bile gaining entrance to the blood, grave nervous symptoms occasionally are

manifested, as sudden coma, delirium and convulsions, attended by fever, rapid pulse and dry tongue—the symptoms of the so-called "typhoid state."

In the **hematogenous form** the destruction of blood is due to some toxic agent. The feces are not clay colored and the urine is less stained with bile. Among the diseases causing this form are acute yellow atrophy, yellow fever, bilious fever, typhus and typhoid fevers, pyemia and snake poison.

Diagnosis.—To mistake for jaundice the dirty yellowish discoloration of the skin commonly termed sallowness is an error often made. This condition indicates malaria, uterine disease or general ill health. Very likely it is an anemia and is readily diagnosed from the jaundice as the secretions and conjunctiva are not stained. Addison's disease somewhat resembles jaundice, but the feces are normal, the urine and sclerotic coat are not colored, but exposed portions of the body and flexures of the joints are deeply stained.

Prognosis.—Depends entirely on the cause producing it. Ordinary cases run from two to six weeks, while others may not recover for several months. Jaundice from impaction of the bile ducts may be manifest for only a few days. The hematogenous form usually terminates fatally, owing to the disease causing it.

Treatment.—The treatment for the different forms resulting secondarily will be found under the diseases causing them. A simple icterus, caused by disturbance through the innervation of the liver and bile ducts directly, can be relieved readily by thorough treatment of the liver and bile ducts as described under catarrhal jaundice. Carefully raise the intestines if they are prolapsed, especially the colon.

Abscess of the Liver.

Abscess of the **liver** is a diffused or circumscribed inflammation of the cells of the liver, resulting in suppuration.

Suppuration within the liver, in the parenchyma or blood or bile passages, may be produced by various causes. The ameba coli of dysentery is occasionally transferred from the intestines

into the liver. Traumatism is sometimes the cause. **Foreign bodies** and parasites, such as gall-stones; retained bile, which causes suppuration of the bile passages; hydatid cysts; and in rare cases, foreign bodies (as a needle or fish bone from the stomach) pass into the liver, and lodging there are the exciting causes of an abscess. **Septic emboli.**—Nearly all the abscesses of the liver may be traceable to microbic origin. They may come through the hepatic artery, but more often reach the liver through the portal vein, which brings septic emboli from ulcers of dysentery, typhoid fever, typhlitis, or from gastric ulcers. There may be an embolus which arises in the left heart, reaching the liver through the hepatic artery. Even a non-infectious embolus may be the cause of an abscess by coming in contact with pyemic organisms brought to the liver through other channels and lodged there. These emboli generally originate in the lungs and left heart or arise beyond if they are small enough to pass through the capillaries of the pulmonary artery. In fact, these embolic or pyemic abscesses may be caused by infection in the area of the systemic circulation and carried through the portal vein or hepatic artery. The emboli may even, instead of passing through the lungs, reach the liver through the inferior vena cava. Much more commonly, however, infection is brought through the portal vein from ulcerative infections of the bowels in dysentery, appendicitis, rectal affections, abscesses of the pelvis and sometimes after typhoid fever. These conditions produce a purulent inflammation of the portal vein (suppurative pylephlebitis).

Pathologically, the right lobe is the most frequent seat of abscess, more toward the convexity than toward the concave side. The abscess may be single or multiple and varies in size. It may be very small, or it may convert the whole right lobe into an abscess cavity. The liver is proportionately enlarged and rarely the abscesses communicate with one another. Although the liver is enlarged, the external appearance may be unchanged, but if the abscess is near the surface there may be a prominence and fluctuation may be recognized. Sometimes the liver adheres to the viscera or abdominal wall. The walls of the abscess cavity are usually ragged and have no definite limiting membrane;

but in chronic cases the abscess wall may be firm and thick. Septic or pyemic abscesses are always multiple. The liver is uniformly enlarged and on section there may be found what looks like solitary abscesses, but it will be found upon examination that they communicate and that probably the entire portal system in the liver is involved.

Symptoms.—Hepatic abscess is marked by fever, high in the evening and low in the morning, resembling very much intermittent or remittent fevers. There are pain, usually in the hepatic region, chills, sweats, and slight jaundice, marked jaundice being rare. Emaciation is a common symptom. The liver becomes enlarged and if the abscess is near the surface there may be bulging and fluctuation, limited tenderness and throbbing. This enlargement is usually upward into the mammary and mid-axillary regions rather than downward, and is most marked in the right lobe. It is not entirely due to the presence of pus, but also to the swelling of the cells and to hyperemia. Constipation may occur or there may be diarrhea, which is important in the diagnosis as amebæ are found in the stools. The abscess may burst into the lungs, pleura, intestines or stomach or it may perforate externally, occasionally breaking into the pericardium.

Diagnosis.—Abscess of the liver may be mistaken for intermittent fever, or typhoid fever. Then it is sometimes confounded with the intermittent hepatic fever of gall-stones or impacted calculus, but in that case there will be a history of hepatic colic, and jaundice is much more marked. It should be remembered that abscess of the liver is usually secondary to dysentery, or suppurative disease in some part of the body, as from ulceration of the rectum or stomach.

Prognosis.—Generally unfavorable, but modern surgical measures have reduced the mortality.

Treatment.—The treatment is largely surgical, but cures can at times be performed by thorough treatment of the dorsal liver splanchnics, and by treatment of the pneumogastric, as it contains a great many of the vaso-motor nerves to the liver. The phrenic and the sympathetic, by way of the inferior cervical ganglion, form part of the innervation of the liver. The case

must be watched most carefully. To determine the cause will be the most valuable aid in deciding on the treatment required. Use care in regard to diet.

Hepatic Cancer.

Hepatic cancer occurs next in frequency to that of the uterus and stomach. Severe subdislocations of the vertebræ and ribs corresponding to the liver splanchnics are usually found on examination. These lesions affect the vaso-motor nerves to the blood-vessels or lymphatics of the liver, or possibly the trophic nerves to the liver tissues are involved. Traumatism and mechanical obstructions are also important. Certain micro-organisms are possibly exciting factors. Heredity may be a cause. The disease may be secondary by extension from other organs. Carcinoma, which is comparatively common, is generally secondary in the liver. It is usually found in males between the fortieth and sixtieth years.

Pathologically, the chief forms of cancer of the liver are the nodular and massive. The nodules in the **nodulary form** vary in size from one-fifth of an inch to two inches in diameter and are found throughout the entire organ. They are opaque, of a yellowish white color, and the superficial ones may occasionally be felt through the abdominal walls. The nodules are both primary and secondary. In the **massive form** the lesion is one large cancerous mass, sometimes as much as six inches in diameter, and of a grayish white color. This form is primary.

The **primary form** of cancer starts in the liver cells and thus a stroma of independent growth is added. The **secondary form** results from emboli, usually through the portal vein, but occasionally through the hepatic artery, and thus the liver cells become affected. In time the hepatic cells undergo atrophy caused by the pressure of the new growth. The portal circulation becomes blocked, owing to compression and atrophy of the branches of the portal vein, while the branches of the hepatic artery are enlarged and permeate the new growth. Sarcoma is a secondary involvement.

Symptoms.—The enlargement of the liver, and increased nodules may be present upon examination. Other symptoms are loss of appetite, nausea, dyspepsia, flatulency, constipation, epigastric fullness and tenderness over the hepatic region. Pain is a common symptom. Fever rarely occurs. There are jaundice, a cold, dry skin, with emaciation and characteristic cachexia.

Diagnosis.—The age, history, cachexia, enlargement of the liver, with nodules, pain, tenderness and a rapid course are the points of differentiation. Diagnosis has to be made from pyloric, intestinal, and kidney tumors, gall-stone impaction, liver abscesses and echinococcus cysts.

Prognosis.—Terminates in death after a course of a few months to a few years.

Treatment.—Indications for treatment are to relieve the suffering of the patient, and if a careful study of the case is made and thorough, persistent treatment is given, life can be considerably prolonged. The suffering can be at least lessened by early symptomatic treatment.

CIRRHOSIS OF THE LIVER.

This is a chronic disease of the liver, characterized by hyperplasia of the connective tissue with destruction of the liver cells, resulting in the organ becoming hard and usually small.

Etiology.—The disease usually occurs in the male sex and in middle life. When occurring in children, it is commonly of the syphilitic form. The abuse of spirituous liquors is a common cause. It follows chronic diseases, such as syphilis, long continued malarial intoxication, gout and tuberculosis. Passive congestion, due to chronic heart and lung disease, causes some cases. A few cases are caused by inflammation of the bile ducts, due to obstructing calculi; others to a stimulating diet, while some cases are inexplicable.

Pathologically, the **first stage** is hyperplasia of the connective tissue and consequent enlargement of the organ. As this increases the connective tissue destroys immense numbers of the hepatic cells, owing to the pressure. Often the enlargement is accompanied by tenderness. In the **later stage** the overgrowth

of imperfectly developed tissue seems to contract the hepatic cells that still remain, causing atrophy and death of most of them, and thus reducing the size of the organ, which is followed by sclerosis. The portal and hepatic circulations are greatly obstructed. An occasional form is termed **hypertrophic sclerosis** in which sclerosis is found while the organ continues enlarged.

There are two common and well defined varieties, atrophic cirrhosis and hypertrophic cirrhosis; other forms (rare) are met with.

Atrophic cirrhosis is the common form, and is usually due to alcoholic excess. The surface of the liver is rough and uneven in addition to its hardness and reduction in size. It may also be greatly deformed and covered with granulations ("hob-nails"). The normal weight is four or five pounds, but it may be so reduced as to weigh no more than one pound or a pound and one-half. Sometimes there is fatty infiltration, which enlarges the liver to such an extent that the contraction is not noticed. There is an overgrowth of the connective tissue, which contracts and constricts the branches of the portal vein, causes atrophy and degeneration of the hepatic cells, and even sometimes obliterates the bile ducts. The new connective tissue is well supplied with blood-vessels from the hepatic artery, thus aiding greatly in the growth.

In the **hypertrophic form,** as well as in the atrophic cirrhosis, there is an overgrowth of connective tissue, but in the hypertrophic form the new form of tissue exhibits no disposition to contract. The enlargement of the organ is largely due to hyperemia. As the tissue does not contract there is no pressure on the portal vein and atrophy is prevented. There is jaundice (which is a characteristic symptom), owing to obstruction of the biliary channels. The surface is smooth and its color is greenish yellow.

Symptoms.—Atrophic Form.—In the most extreme cases of this form there may be practically no symptoms. As there is obstruction of the portal circulation, there may be congestion of the stomach and intestines, resulting in chronic gastric or intestinal catarrh having the following symptoms—anorexia, distress after eating, distention, constipation and coated tongue. Owing

to the anastomotic communication between the portal and caval circulations, as the portal circulation becomes more obstructed, the superficial abdominal veins become greatly distended. Hemorrhoids occur, owing to the communication of the superior hemorrhoidal, which is a branch of the portal vein through the inferior middle hemorrhoids, with the hypogastric vein and the vena cava; hence hemorrhoids are a characteristic symptom. There is enlargement of the spleen and hemorrhage from the stomach or bowels. Edema of the legs and ascites are due to engorgement of the portal system. Ascites is much more common than edema of the legs. There may be slight jaundice, although this is a rare symptom in atrophic cirrhosis. There is always decided emaciation. On examination there is a diminished area of hepatic dullness, while the splenic dullness is enlarged. It is often impossible to outline these organs, as the abdominal distention prevents it. The urine is scanty, high-colored and often loaded with urates, but seldom bile-stained.

In the **hypertrophic form** slight jaundice appears at the onset, which gradually deepens until it is intense and persistent. Occasionally there is fever. There is neither ascites, hemorrhage nor enlargement of the spleen, but there is enlargement of the liver with tenderness; there being apparently no hyperemia of the stomach or bowels. The urine is often bile-stained, but of normal quantity. It is likely to run a rapid course. On examination the liver is smooth and round and can be felt below the ribs.

Diagnosis.—In **atrophic cirrhosis.**—With ascites without dropsy elsewhere, history of alcoholism, hemorrhage from stomach or bowels and reduction in size of liver, the diagnosis is absolute. **Hypertrophic cirrhosis.**—In **cancer** of the liver the patient is advanced in years, has no splenic enlargement, and more commonly ascites is present; while in hypertrophic cirrhosis there is chronic biliary obstruction, the liver is only slightly enlarged and hard, marked jaundice, with causes leading to or evidence of hepatic obstruction. This form of cirrhosis is also to be differentiated from **amyloid liver** and **echinococcus cyst.**

Prognosis.—Unfavorable, although in some cases the disease can be arrested during the early stage, provided the habits are regulated and treatment is continuous and persistent. Death usually occurs from one to two years after appearance of dropsy. Ascites is difficult to contend with.

Treatment.—If the disease is recognized at the beginning and persistent treatment given to the liver, the chances are that atrophy of the cells and connective tissue formation will not take place. But ordinarily cases of cirrhosis are incurable. The most that can be done is to reestablish a compensatory circulation in the liver. Otherwise it would be no more unreasonable to say that one could cure a chronic valvular lesion of the heart. The patient should live a quiet out-door life. Alcoholic drinking should be stopped. The diet should be light and nutritious, preferably a milk diet. The bowels should be kept open, the skin active and the kidneys closely watched.

Amyloid Liver.

There is infiltration into the tissues of the liver, of the so-called amyloid substance. The infiltration begins in the blood-vessels, the hepatic artery first, then the central zone or periphery, and finally all structures of the liver. This disorder should be viewed as a disturbance of metabolism.

Etiology and **Pathology.**—This condition is usually found in cases of prolonged suppuration, especially associated with tubercular disease of the bones as in hipdisease, syphilis, rickets, malaria, cancer and leukemia. It is believed by some to be the result of microbic invasion, especially the tubercle bacillus and staphylococcus. Lesions are frequently found from the fifth to the tenth dorsal vertebra, which probably act as predisposing factors.

The liver is considerably enlarged and rounded. It is pale or waxy in appearance and is doughy in consistency. On section it is anemic and whitish, partly due to infiltration into the walls of the blood-vessels narrowing the lumen. The amyloid changes may be circumscribed and in some cases fatty infiltration is present.

Symptoms.—There are no characteristic symptoms except the enlargement of the liver, although the complexion may be waxy and there may be some gastro-intestinal disturbances. Pain is absent, although occasionally there is a dragging sensation, due to the weight of the organ. Jaundice is not present, but the stools may become light colored, owing to a diminished secretion of bile. The urine may be increased in amount and contain some albumin if amyloid changes occur in the kidneys. Emaciation and anemia are present and ascites seldom occurs. Amyloid changes involve the spleen, kidneys, intestines and other organs.

Diagnosis.—The organ being large, hard and smooth, with absence of jaundice and ascites, the presence of albuminuria and an enlarged spleen, and with the history of the case, mistakes are not likely to be made.

Prognosis.—Depends upon the cause. The progress may be rapid or slow.

Treatment.—Careful attention to the primary disturbing factor and direct treatment to the liver will, in some instances, reduce the size of the organ. Nitrogenous food and hygienic measures should be instituted. The vaso-motor nerves of the portal system (fifth to last dorsal) should be treated thoroughly.

Acute Yellow Atrophy of the Liver.

Definition.—A disease characterized by marked jaundice with rapid destruction and general inflammation of the hepatic cells (the size of the liver being markedly reduced), and by great disturbance of the nervous system.

Etiology and **Pathology.**—This disease is of rare occurrence and more frequently found in women than in men. It seems to be associated with pregnancy, usually during the second half. It is apparently of an infectious origin, due to the action of some virulent poison. Cases subject to alcoholic excesses, mental excitement and syphilis are apt to suffer from the disease.

This disease closely simulates phosphorous poisoning. Some writers regard the disease as being caused by the retention of bile, the hepatic cells being destroyed by this retained bile. In fact, very little is known of the real cause, but on post-mortem examination the liver is found much reduced in size and on section the

surface is yellow or yellowish red. The yellow condition is of the first stage while the red appears later. At first the organ is soft and spongy, but later it becomes quite firm. The hepatic cells are destroyed and this suggests the action of a poisonous chemical compound. The spleen is enlarged. There is granular degeneration of renal epithelium. Other organs, as well as the skin, show marked bile staining. The heart muscle is fatty and numerous hemorrhages occur. The blood is lessened in quantity.

Symptoms.—An apparently simple jaundice and gastro-intestinal disturbances are usually the first symptoms. In fact, there are no distinct symptoms of this disease at the beginning. This may last from a few days to a couple of weeks and then the symptoms become more severe. Headache, convulsions, delirium, and vomiting, sometimes mixed with blood, occur. The patient may be in a "typhoid state," with pulse rapid and tongue dry and coated. There is marked diminution in the size of the liver. The stools do not contain bile. There is a great change in the urine and it is very characteristic. It is bile-stained and often contains bile-stained, fatty casts with leucin spheres and tyrosin and renal epithelium.

Diagnosis.—The marked diminution in the size of the liver, the deep jaundice with delirium (although in the case of severe jaundice there may be cerebral symptoms) and the presence of leucin and tyrosin in the urine, will differentiate the disease.

Prognosis.—Is very unfavorable, the disease being almost always fatal.

Treatment.—So far as known osteopaths have never had any experience with acute yellow atrophy of the liver. It being of rare occurrence and but little being known of the pathology, it is impossible to do more than outline a symptomatic treatment. Probably persistent work to the vaso-motor nerves of the liver and attention to the excretory organs would be especially indicated. The application of ice over the liver is said to be helpful.

Gall-Stones.

Gall-stones are concretions which originate in the biliary ducts or gall-bladder, derived from substances which are con-

tained in a state of solution in normal bile, with the exception of epithelium and mucus, these being supplied by the mucous membrane of the biliary passages. There is undoubtedly a chemical disturbance in the function of the liver, and probably infection plays a part.

Osteopathic Etiology and **Pathology.**—This is a disease of middle life and is more frequently found in women. Sedentary habits, combined with overeating, are important factors. It is found in stout subjects who are particularly fond of starchy and saccahrine food. Tight lacing may induce gall-stones by retarding the flow of bile. Catarrhal jaundice is a predisposing factor. Also, constipation and depressing mental influences are sometimes regarded as favoring circumstances. The bulk of a gall-stone is cholesterin and the formation of the concretion is a precipitation of this substance from the bile. Other conditions which co-operate to form the stone are not definitely known. Possibly the action of micro-organisms in the bile, causing decomposition of the cholate salts of sodium which hold in solution cholesterin, may be an important factor in the precipitation of cholesterin. Conditions inducing lithic acid favor the development of gall-stones. The thicker the bile the more likely it is to deposit. Possibly the internal secretion of the spleen acts as a solvent to cholesterin. Dr. Still's theory is that lesions of the ribs on the left side from the sixth to the tenth dorsal are factors in the formation of the stones as they interfere with pancreatic secretions. No matter how it comes about, the fact is that in all cases of gall-stones the osteopath finds lesions to the eighth, ninth and tenth ribs on the left side, as well as lesions from the fifth or sixth to the tenth dorsal, deranging innervation to the liver and bile ducts. The lesions at these points over the spleen probably interfere with the activities of the spleen and thus in some manner this organ does not properly elaborate the blood before it passes to the liver. In carcinoma of the liver and stomach gall-stones are said to be frequent.

Pathologically, gall-stones are composed chiefly of cholesterin. In addition there are small amounts of calcic carbonate, bile pigment and organic matter. The stone itself is a brownish

object, nearly spherical, faceted and in some instances polygonal in shape, varying in size from a pea to a hen's egg.

The stones are found anywhere in the biliary tract from the duodenal orifice to the ramification of the bile vessels. Many times there is more or less of an accumulation in the gall-bladder At any point the stone may produce ulceration and suppuration. Perforation may occur into the peritoneal cavity or adjacent organs

Symptoms.—Gall-stones may be in the gall-bladder for years without giving rise to any symptoms. Their presence is made known only by their expulsion from the gall-bladder. If they lodge in the duct in transit from the gall-bladder to the duodenum **biliary colic** is produced, which is the characteristic symptom of an impacted gall-stone. Small stones may pass into the intestine without producing symptoms. The pain is very sudden, piercing and excruciating in the region of the gall-bladder, when a stone attempts to pass. The pain radiates through the abdomen, right chest and shoulder, and the patient writhes in agony and occasionally faints. Downing[1] emphasizes the point that when a patient comes in with a history of repeated attacks of biliary colic and no stone found in the stools one should at once suspect that one of considerable size obstructs the common duct.

There is always tenderness in the biliary region with more or less contraction of the abdominal muscles. Nausea and vomiting are usually present, followed by a weak pulse, cool skin and pale and anxious face. Fever is soon present and a chill is common. The paroxysms continue as long as the stone remains lodged, which may be from an hour to several days. There are remissions of pain, entire relief being given as soon as the stone reaches the duodenum. Jaundice usually follows a prolonged attack. The liver is sometimes enlarged. The spleen is enlarged. Should the stone become impacted, ulcerative perforation, with consequent peritonitis and shock, follows.

Diagnosis.—The diagnosis is conclusive when the gall-stones are found in the stools or when they can be felt in the gall-bladder. All the above symptoms are characteristic. If a patient complains of severe pain radiating from the hepatic region, and nausea and

1. Journal of American Osteopathic Association. March, 1905.

vomiting are present, subsiding suddenly with a slight jaundice, the disease should hardly be mistaken.

Nephritic colic should never be confounded with hepatic colic as in the former the pains start in the lumbar region and radiates downward into the groin, the testicle and the inside of the thigh. In **appendicitis,** jaundice and bile-stained urine are not found. A **pseudo-biliary colic** is occasionally found in nervous women, especially when the eleventh and twelfth ribs on the right side are displaced downward.

Prognosis.—Is usually favorable. Only in cases when perforation occurs does a fatal ending result.

Treatment.—During the attack of **biliary colic,** the osteopath should usually be able to readily locate the position of the gall-stone in its transit from the gall-bladder. He should usually proceed at once to aid the stone in its downward passage by careful manipulation over the duct. Still this treatment should be given with caution, for if there is suppuration or ulceration, perforation and resultant peritonitis may occur.

Only occasionally will one have any difficulty in dislodging the stone and relieving the sufferer in a few minutes. The recumbent position, with the thighs flexed on the abdomen, is the position assumed for treatment, and if the muscles in the hepatic region are very tense and rigid, interfering with locating the gall-stone, an inhibitory treatment to the posterior spinal nerves supplying the contracted muscles will aid one materially. An inhibitory treatment of the nerves of the biliary tract (the ninth and tenth dorsals), may be a helpful measure in dilating the duct. Also, hot application over the affected area and to the dorso-lumbar region will aid.

During remissions two or three treatments per week should be given to correct the lesions at the eighth, ninth, tenth and eleventh ribs over the spleen; especially treat the region of the tenth dorsal well. Also a thorough treatment of the liver is necessary. A lesion will be found in the ribs over the liver and in the dorsal splanchnics corresponding to the liver. Average cases should not require more than two or three months' treatment. Hildreth, who has had many cases, is much opposed to opera-

tion as his experience has been that where there is not complete obstruction the correction of lesions will prevent further formation of stones. While he finds the trouble ranges from the third to the eighth dorsal, still, as a rule, it is between the fifth and sixth that best results are obtained. Probably if the treatment is a rightly directed one the stones already formed may be disintegrated. Willard[1] reports 393 cases.

Permanently impacted gall-stones require surgical treatment. Prophylactic treatment, as a regulated diet, daily exercise and a discontinuance of excesses, should be strongly urged. The patient should not be allowed any fatty or saccharine food. Water freely taken will be of aid.

DISEASES OF THE SPLEEN.

Diseases of the spleen are usually secondary to other disorders. The following osteopathic treatment under Splenitis will, in addition to the probably primary disturbance, be applicable to active and passive splenic hyperemia and amyloid degeneration of the spleen. Surgical and other measures are to be employed when indicated.

SPLENITIS.

In **splenitis** there is generally a blocking up of the smaller splenic arteries by fibrous coagula (hemorrhagic infarct), which have formed in the left ventricle of the heart in consequence of endocarditis. Malarial infections, septicemia, typhus and acute exanthematic fevers may cause coagula formation in the splenic veins. Injuries to the vertebræ or ribs on the left side over the spleen (ninth to eleventh rib inclusive) are occasionally the cause of primary inflammation of the spleen. Following the formation of abscesses the entire organ may suppurate; it may produce pyemia, or it may burst and the pus be discharged into the peritoneal sac, causing peritonitis, or into the pleura, stomach or colon. **Chronic splenitis** is induced by passive congestion, leukocythemia and splenic anemia.

Symptoms.—Tenderness and enlargement of the spleen are the principal symptoms. The organ may be twice its normal

1. **Journal of the American Osteopathic Association, March, 1905.**

size, but in a few cases the tumefaction is so insignificant that it can hardly be found on percussion. Dull pain generally exists if the enveloping membrane or adjacent organs are involved, the pain being increased upon percussion and deep inspiration. In a few cases the pain radiates to the left shoulder and if the peritoneal covering is involved a sharp pain will be present. Fever and rigor follow if suppuration has taken place, and peritonitis follows in case of rupture or perforation. Marked hypertrophy and chronic inflammation may cause cough, nausea, vomiting and dyspnea.

Treatment.—In the treatment of both the disease producing splenitis and of primary splenitis, a thorough treatment of the spine, eighth to the eleventh dorsal, is necessary. The nerves (vaso-motor) to the spleen are from the left splanchnics, consequently treatment of the left side is more effectual. Particular attention should be given the ribs over the spleen—the ninth, tenth and eleventh—as disorders of these ribs are a common cause of splenic disturbances. Careful and fairly firm treatment is always indicated, care being taken not to add irritation to an already inflamed organ, and especially beware that force is not used where there is danger of rupture. Stimulation of the tenth nerve contracts the spleen. In cases of suppurative splenitis the direct treatment should not be given.

Stimulating treatment over the spleen, as over the liver and kidneys, gives tone to the strong elastic capsule surrounding it, so that direct manipulation over these organs, coupled with the power of the strong elastic capsule and highly elastic tissue of the inner organ, will greatly aid in lessening the engorgement and hyperemia. In a few cases where the spleen is involved, lesions are found in the upper cervical which affect the right pneumogastric nerve and thus impair the normal activity of the gland.

DISEASES OF THE PERITONEUM.

Acute Peritonitis.

Primary inflammation of the peritoneum may be caused by exposure to cold and wet; also by blows over the abdomen and

penetrating wounds of the abdomen, by severe injuries to the dorsal and lumbar spines and by injuries to the lower three or four ribs on either side.

Secondary peritonitis is the more common and follows inflammatory diseases of the digestive tract and genito-urinary system. The inflammation may extend to the peritoneum in gastritis; inflammation of the intestines, particularly appendicitis; in acute, suppurative inflammation of the liver, spleen, pancreas and various pelvic viscera. It always follows perforation of any organ, as the intestines and gall-bladder, and often arises from ulcers and cancer of the stomach and intestines. It is secondary to general morbid processes, as rheumatism, Bright's disease, tuberculosis, Pott's disease, scarlatina, typhoid fever and septicemia. It may follow rupture of the various abdominal vessels, and it may even follow pleurisy on account of the communication between the pleural and peritoneal cavities by the lymphatics. The micro-organisms producing the infection are streptococcus pyogenes, staphylococcus pyogenes aureus, or albus, bacillus coli communis and tubercle bacillus.

The peritonitis may be **local** or **general** and the exudate **plastic fibrinous, sero-fibrinous** or **purulent.** In the **first stage** the peritoneum is red, sticky and uneven on account of the desquamation of the epithelium. In the **last stages** the exudate becomes sero-fibrinous, fibrinous or purulent, and adhesions often result between the coats of the intestines and adjacent organs.

In **general peritonitis** the peritoneum covering the intestinal coils is congested and fibrin and leucocytes, which go to make up the yellow lymph, cover the surface of the peritoneum to a greater or less extent. In **localized peritonitis** the formation of lymph occurs and the adhesions are more pronounced. The inflammatory portion becomes encapsulated and if absorption does not occur, pus may form and the abscess ruptures into the peritoneal cavity, causing general peritonitis, collapse and death.

In all cases of peritonitis the normal secretion of the peritoneum is lessened and, if adhesions do not occur by an arrest of the inflammatory processes, exudation of a greater or less amount of fluid takes place within the peritoneal cavity. When recov-

ery follows, the fluid is absorbed, which results in deformity and irregularity of the abdominal organs.

Symptoms.—Acute General Peritonitis.—This sets in with chilly feelings or actual chill, followed by a moderate fever, intense pain and extreme tenderness in the abdomen. The chills are not necessarily the initial symptom, pain sometimes being the first noticeable one. The abdomen is usually so painful that the patient lies upon the back with the thighs flexed and shoulders elevated so as to lessen the strain upon the abdominal parietes. The acts of breathing and emptying the bladder may cause pain. The greatest pain is usually below the umbilicus, but it may radiate to the lumbar and dorsal regions and to the shoulder and chest. Distention of the abdomen gradually takes place and it becomes tense, supposed to be due to a paralysis of the muscular coat of the intestines. There is a rapid, wiry pulse. The tongue is coated white, oftentimes becomes red and fissured. The features are pinched, vomiting is persistent and the bowels are usually constipated. The urine gradually becomes scanty and high-colored. Other symptoms may follow the preceding, as an anxious expression, sunken eyes, cold, clammy skin, feeble pulse and collapse. Tympany is excessive. When ascites is present the flanks are dull upon percussion and the dullness may be movable, depending upon the amount of adhesion. Cases may terminate in death within forty-eight hours, but usually the course is from four to eight days.

In **acute, localized peritonitis** the symptoms of acute general peritonitis occur in a milder form; the fever is more constant and the disease runs a longer course. The symptoms are those of circumscribed abscess; particularly fluctuation is present. There are symptoms of the disease producing the circumscribed peritonitis.

Diagnosis.—A typical case gives little difficulty in the diagnosis; severe pain at the onset, distention of the abdomen, the tenderness, chills and fever, vomiting, effusion and collapse, are characteristic of this condition. In **acute enteritis** the pain and tenderness are not so marked nor localized. There is more frequent diarrhea, absence of wiry pulse and the collapse is more

extreme. **Intestinal obstruction** may simulate peritonitis at first. The history, the fecal vomiting, the absence of wiry pulse, of fever and of any marked tenderness will distinguish it from peritonitis. In **hysterical peritonitis** every symptom of peritonitis may be present, even the collapse; but time will tell. If the attention is distracted, the pain may vanish. **Rheumatism of the abdominal muscles** presents a rheumatic history, and the abdominal distention and characteristic features of peritonitis are lacking. Tenderness of the abdomen is not aggravated by deep pressure; the affection is sub-acute. **Tubal pregnancy** with rupture may be hard to differentiate. Typhoid fever, renal and biliary colic, should present no difficulty after careful examination.

Prognosis.—Not favorable in acute general peritonitis. Mild cases may recover. Death usually occurs in a few days from exhaustion. Localized peritonitis is more favorable, especially when not septic. Much may depend upon surgical measures.

Treatment.—Absolute rest, careful nursing and dieting, attention to the primary disease, and surgery, if indicated, are the outline for treatment. The abdominal splanchnics should be treated thoroughly, but as carefully as possible. At times an inhibitory treatment to the spinal nerves of the dorsal and lumbar region and relaxing the spinal muscles will relieve pain. But it is of more importance to give a thorough treatment to the splanchnics, correcting lesions, if any, and relaxing muscles by manipulating the spinal column and lower ribs, so as to tone up and contract the dilated intestinal musculature that is producing the distention, and to lessen the peristalsis of the intestine. Naturally when the patient is exhausted to some degree the treatment must be made accordingly lighter. The ultimate result will be the same for all we can do is to aid nature by correcting anatomical disorder and by stimulating or inhibiting nerve force. On the whole, in these cases, contractions and relaxations of soft tissues are only gross manifestations of internal disorders and are to be used as a clue to the disorder or as a symptom in making a diagnosis.

An inhibitory treatment of the vagi nerves will lessen peristalsis to a slight extent, and particularly so if the peristalsis is

abnormally increased. The principle of cure is not through mere inhibition of the vagi, but in removing the stimulus producing an increased nerve action. The bowels should not be allowed to become clogged, but be kept active. This tends to drain the peritoneal cavity of the products of inflammation and lessens the congested condition of that region by depleting the vessels of the intestinal walls. It also aids in lessening the pain and improving the general state of the patient. Either cold or hot applications, the one most agreeable to the patient, may be placed over the abdomen to aid in relieving pain. The diet should be a regulated and nutritious one of peptonized milk, beef juice, egg albumin or light gruels of pearl barley or arrow root, given in very small amounts in order to avoid vomiting, if possible, and to lessen irritation to the digestive organs. In severe cases rectal feeding should be employed. Good nursing and dieting will accompilsh much. A number of practitioners believe in the starvation method and it should be thought of in certain intestinal involvements. The nausea and vomiting can usually be lessened by a thorough treatment of the fourth, fifth and sixth dorsals and of the vagi. In cases of perforation the local use of ice is indicated, with stimulation of the system by careful attention to the vagi, sympathetic, phrenic and splanchnic nerves, and then absolute rest.

Chronic Peritonitis.

The majority of cases are due to tuberculosis. Some are caused by cancer and various growths in the abdomen. Many present old lesions of the lower ribs on either side, and of the vertebræ of the mid-and lower dorsal, and lumbar regions, and occasionally lesions of the pelvis. Other causes may be sclerosis of the liver, Bright's disease, scrofula, chronic alcoholism and syphilis. It rarely follows the acute form. Chronic peritonitis may be circumscribed or diffused. In **circumscribed peritonitis** adhesions occur between the spleen and diaphragm, liver and diaphragm, or stomach and liver or between various adjacent organs. The union usually consists of fibrous strands of variable length. A coil of intestine may become snared and produce intestinal obstruction.

Diffused peritonitis.—The intestines become matted together by the fibrous links, as well as the peritoneal walls (adhesive peritonitis). The peritoneum is thickened and the omentum may become thickened and contracted; the spleen and liver are sometimes covered by thick, tough capsules. The effusion varies in amount and may be bloody in tubercular (tubercular peritonitis) and cancerous cases.

Symptoms.—In the **localized form** symptoms of intestinal obstruction may be the first noticeable, due to fibrous bands. In others there are colicky pain, constipation and a feeling of restriction of the organs involved, whenever motion occurs. There also may be some tenderness upon manipulation over the abdomen and a hectic fever.

In the **diffused form** there may be symptoms of acute peritonitis in a moderate degree, although the disease is likely to be insidious. They consist of paroxysmal pain, diffused tenderness, tumor-like swellings over the abdomen, possibly a slight fever, edema, irregularity in the movements of the bowels, albuminuria, anemia and emaciation. The effusions may be sacculated, the coils of the intestines dilated, and friction fremitus and fluctuations may be observed.

Prognosis.—Is usually unfavorable; still, modern treatment has considerably lessened the mortality rate.

Treatment.—The treatment is of necessity, chiefly that of the disease producing it and one must be governed by circumstances. Rest, with a nutritious diet of chicken, fish, eggs and milk, is indicated; starches and sugars should be avoided, from their tendency to ferment and dilate the bowels. When the effusion is great, paracentesis will be necessary. Operative interference will be required in many instances where there are simple adhesions, and occasionally in the tubercular form.

The nerve supply of the peritoneum is from the vagi, splanchnics and sympathetic. By paying due attention to the correction of lesions of these nerves, and by very careful treatment over the abdomen a number of cases may be greatly benefited or even cured.

Ascites.

Ascites is a collection of fluid of a serous nature in the peritoneal cavity. It may form a part of general dropsy, as from cardiac or nephritic disorders. The most common cause is obstruction of the portal system from diseases of the liver. Lesions of the ribs and vertebræ from the fifth to the ninth dorsal on the right side involving the vaso-motor nerves to the portal circulation are predisposing factors. Growths or inflammatory processes in the gastro-hepatic omentum and hepatic fissure, producing pressure upon the portal vein, may cause ascites. Also tumors elsewhere in the abdomen, even of the ovary, and enlarged spleen and uterus, if of sufficient pressure, would have the same effect. Chronic lung diseases, chronic peritonitis, anemia and pressure upon the thoracic duct are important causes; or a downward displacement of the lower ribs of either side may cause a prolapsed diaphragm and interfere with the various blood-vessels from the abdomen as well as the thoracic duct.

Symptoms.—Whenever there is venous engorgement of the vessels draining the peritoneum, ascites is more or less of a prominent symptom. When the effusion is large, there is sensation of weight, the abdomen is pendent when the patient stands, widened when lying on the back and the fluid flows from one side to the other when the patient turns over. A gradual uniform enlargement of the abdomen is quite characteristic. There are also dyspnea, edema of the feet, scanty urine and constipation. A peculiar wave-like impulse is obtained by placing the fingers of one hand on one side of the abdomen and by giving a sharp tap on the opposite side with the other hand. There is a sense of resistance in the flanks when the succussion wave is elicited. When the patient takes the dorsal position, a dull sound is heard on percussion at the flanks, while a tympanitic sound is heard at the umbilical and epigastric regions. When the patient turns over on the side, the upper flank is tympanitic and the lower dull upon percussion. If the amount of fluid is too small to detect in this manner, then place the patient in the knee-elbow position, when a dull sound will be determined at the most dependent

portion. The fluid when withdrawn is clear, yellow and albuminous serum. The amount varies; there may be several gallons. Specific gravity is from 1011 to 1015. The fluid of ovarian cysts is albuminous and coagulates spontaneously. Specific gravity is about 1020.

Diagnosis.—History, fluctuation and movable dullness are important points. **Ovarian Tumor.**—This will be distinguished by the history of the case, enlargement being limited to the iliac fossa, dullness quite immovable on change of position, and by examination through vagina and rectum. If the examination is carefully followed up in this manner one will rarely err in the diagnosis. **Distention** of the **bladder** is differentiated by the history, tenderness over the bladder, location of the dullness and rounded outline, and by careful catheterization. The history, nature of the enlargement, changes of the uterus, lack of menses, growth of mammæ, sounds of fetal heart and absence of fluctuation will distinguish **pregnancy.** In chronic **peritonitis** there is a different history; pain, tenderness and irregular enlargement of abdomen, and vomiting; the fluid is more albuminous and of a higher specific gravity.

Treatment.—Attention to the cause is of first importance and removing the fluid of secondary consideration, unless the cardiac and respiratory actions are too greatly embarrassed by a large amount of fluid, in which case removal of the fluid at once is necessary. Osteopathic work in the lumbar and lower dorsals has resulted successfully in a few cases. By keeping the bowels active, the congested blood-vessels of the abdomen are more or less depleted, with a consequent lessening of ascitic fluid. Also, by keeping the kidneys and skin active aid will be given the other emunctories, particularly the bowels. In ascites the ingestion of much fluid is contraindicated, a diet of bread and meat being the best. A few cases will yield by adhering to this diet, stimulating the heart and increasing the action of the kidneys. On the whole, it is absolutely necessary to determine carefully the cause and act accordingly. It should be remembered ascites is a symptom only and the prognosis depends upon the cause, although it is generally an unfavorable symptom.

DISEASES OF THE PANCREAS.

Acute and chronic pancreatitis, pancreatic cysts and calculi, and carcinoma of the pancreas are largely amenable only to surgical measures.

Pancreatitis.

Acute pancreatitis is usually divided into hemorrhagic, suppurative and gangrenous. These divisions are different stages of the one disease.

This is a rare disease and little is known about it. Traumatism producing hemorrhage, inflammatory derangements of the stomach and intestines, and inflammation extending from the duodenum to the pancreas by way of the pancreatic duct, are among the etiologic factors. Alcoholism may be a predisposing factor. It has followed specific fevers, pyemia, and acute tuberculosis. Probably injuries to the lower dorsal and upper lumbar may affect the innervation. Most cases occur after the thirtieth year of age.

In **hemorrhagic** pancreatitis there is enlargement of the pancreas, especially of its head. The entire organ is very much infiltrated with blood and many hemorrhagic foci occur, alternating with points of fat necrosis. The tissues surrounding the pancreas, the mesentery and omentum may be invaded by the hemorrhage. **Suppurative** pancreatitis follows the hemorrhagic form, when recovery does not occur, or when gangrene does not supervene. The entire organ is congested. Small abscesses or diffused suppuration take place, with more or less peritonitis about the adjacent organs. **Gangrenous** pancreatitis follows the hemorrhagic form. The two forms, hemorrhagic and gangrenous, may be associated, or about the fourth day gangrene of part or of the whole of the organ occurs. The organ is of a dark softened shreddy consistency.

Symptoms.—Indigestion followed by abdominal pain are the common initial symptoms. The pain may be localized over the pancreas or diffused through the abdomen, followed by tenderness, swelling and tympany of the upper abdomen. Vomiting and constipation may be present. The temperature is usually

subnormal, but may be elevated. Fatty stools, mellituria, and a palpable tumor may be found. Rarely a recovery occurs, death usually taking place within three or four days, or if not, the organ becomes suppurative. With this form occur abdominal tenderness and swelling, jaundice, chills and fever, probably collapse and death. In the gangrenous form the symptoms are similar, the gland being entirely destroyed.

Diagnosis.—This disease is to be distinguished from acute intestinal obstruction, perforation of the stomach and bile ducts and from irritating poison. Prognosis is unfavorable.

Treatment.—Osteopathic indications would be to give attention to the splanchnic nerves of the dorsal and first lumbar and the right vagus. Direct treatment of the abdomen anteriorly about three inches above the umbilicus to affect the gland and to stimulate the celiac and left semi-lunar ganglia might be effective; still, this could be given in certain instances only.

Besides the preceding, the treatment of peritonitis is indicated in hemorrhagic pancreatitis. Surgical and palliative treatment of the other forms is indicated. The present treatment of pancreatic diseases is largely surgical.

The pancreatic juice is the most important of all digestive fluids, as it has a most vigorous action on all foods. Consequently, the dietetic treatment should consist in administering milk, beef peptonoids, egg albumin and pancreatized meats.

DISEASES OF THE RESPIRATORY SYSTEM.

DISEASES OF THE NOSE.

Acute Nasal Catarrh.

Definition.—An acute, catarrhal inflammation of the mucous membrane of the upper air passages. This is usually an independent affection, but sometimes it precedes the development of another disease, such as measles and influenza.

Osteopathic Etiology and **Pathology.**—In acute nasal catarrh the primary lesion is usually muscular, involving superficial and deep muscles of the cervical region. These contractions are induced by atmospherical changes and drafts. In some instances inhalation of irritating vapors or dust will cause congestion and inflammation of the mucous membrane; in such cases the contracted muscles are the result of reflex stimuli, but, nevertheless, treatment of the muscular lesions will prove very beneficial in allaying the inflammation.

In severe cases, particularly, lesions of the upper cervical vertebræ will be found; chiefly first to fifth cervicals, although the vaso-motor nerves to the upper air passages may be disturbed by osteopathic lesions as low as the fifth or sixth dorsal. The cervical vertebral lesions noted upon examination may be the result of an old standing injury or simply the result of muscular contractions.

Very likely in many cases a micro-organism is a factor, especially when the disease occurs in epidemic form, but this does not preclude the fact that the osteopathic treatment is clearly indicated. Probably in the large majority of cases where the disease occurs epidemically, there exists a previously congested membrane.

The **pathological** status of the nasal mucous membrane is one of hyperemia. Redness and congestion are marked. There is no discharge from the nose at first, but later a copious, watery secretion occurs, which may become muco-purulent in character.

Symptoms.—The disease is ushered in by a feeling of indisposition, slight headache, fullness in the head, frequent sneezing, and perhaps chilliness. In severe cases there are pains in the back and limbs, slight feverishness, quick pulse and the skin is dry. The fullness is due to the inflammation of the mucous membrane so that the patient has to breathe through the mouth. This is soon followed by a thin, clear, irritating discharge, which may become muco-purulent. The mucous membrane of the tear duct is swollen, the eyes are injected and suffused with tears and the conjunctivæ are injected. The inflammation may extend to the Eustachian tube and middle ear, resulting in temporary deafness. The sense of smell and sometimes the sense of taste are lost on account of the inflammation of the nasal mucosa. There may be slight soreness of the throat, the pharynx becomes red and swollen, and the act of swallowing is painful. If the larynx is involved, the voice is husky and sometimes lost, and in severe cases there may be bronchial irritation and cough.

Diagnosis.—This is always easy, but care must be taken to ascertain whether it is the initial catarrh of severe influenza, measles, or simple coryza.

Prognosis.—The prognosis is favorable. There should be early and proper treatment or the catarrh may become chronic. The duration in mild cases is usually about one week, frequently this time may be shortened; severe cases may continue for a couple of weeks. In patients who have a scrofulous taint or a tendency to rheumatism, the mucous membrane seems susceptible to frequent attacks.

Treatment.—In severe cases the patient should remain in the house and the room be kept at an even temperature. Most cases are easily aborted by a few treatments, providing the patient takes proper care of himself in the meantime. The muscles of the cervical region are usually found in a contracted state, especially is this true of the muscles immediately beneath the angle of the inferior maxillary bone. Such contractures tend to obstruct, mechanically, the internal jugular and carotid veins, thereby causing a stasis of the blood in the spheno-palatine and facial veins which drain the region of the nasal fossa, and thus a hyper-

emia of the Schneiderian membrane is the result. In other cases the contracted muscles (muscular contraction being due chiefly, in the case of acute coryza, to atmospherical changes) of the deep upper cervical region, especially the rectus capitus anticus major and adjacent muscles, may produce lesions of the fifth cranial nerve and thus involve the innervation of the nasal mucous membrane. The lesions affecting the innervation of the nasal mucous membrane may be either obstructive or irritative to fibres of the fifth nerve (chiefly vaso-motor fibres, possibly secretory and trophic; the sensory and motor fibres are also involved, but these are not so important). The lesions may also affect the superior cervical ganglion of the sympathetic, in part or as a whole, by the effect of mere mechanical pressure from muscles.

The anatomical situation of the superior cervical ganglion of the sympathetic is very important from an osteopathic standpoint. The ganglion is commonly anterior to the upper three cervical vertebræ, occasionally the fourth and fifth cervical vertebræ, resting upon the sheath of the rectus capitus anticus major, while directly anterior to the ganglion is the sheath of the internal carotid and internal jugular blood-vessels. From this ganglion arise the carotid and cavernous plexuses which connect with the fifth nerve, and fibres of the fifth nerve may extend all the way to the cervical ganglion, as disorders of the fifth nerve are so universally caused by lesions of the atlas. Consequently, it is at once seen that the primary treatment of acute nasal catarrh is to relax thoroughly all muscles of the cervical region that are found contracted, and to correct any disorder of the upper cervical vertebræ that may occur and thus equalize the blood and nerve supply to the nasal mucous membrane.

Additional treatment to the fifth nerve should be given at the several points on the face where its fibres come near the cutaneous surface, and also the jaw should be sprung open. To accomplish the latter, place the thumbs over the bridge of the nose and the fingers of both hands about the inferior maxillary just in front of the angles of the lower jaw and while the patient opens the mouth, moderately resist the act by the fingers and thumbs. This releases and gives greater freedom to the nerve

force of the fifth nerve, as fibres of the fifth nerve are in close relation to the articulation of the inferior maxillary; in fact, it is a frequent occurrence that disorder of the fifth nerve is occasioned by a slight subluxation of the bone at either articulation of the inferior maxillary. The points upon the face of importance in treating nasal catarrh are the nasal branch upon the nose, the one at the supra-orbital foramen, the two at the inner angle of the eye (the inferior trochlear and ethmoidal nerves), and the one at the infra-orbintal foramen. Hot drinks, a regulated diet, and attention to the bowels will be of additional benefit in severe cases.

Chronic Nasal Catarrh.

Definition.—A chronic inflammation of the mucous membrane lining the nasal passages. There is an increased secretion and impairment of the sense of smell.

Osteopathic Etiology and **Pathology.**—Chronic nasal catarrh, in many localities, is one of the most common affections of the body. And not only is it a very common disorder, but an extremely persistent one. Its chief significance rests on the fact that nearly nine-tenths of deafness is due to an extension of the nasal catarrh to the middle ear by way of the Eustachian tube.

Repeated attacks of acute catarrh are a common cause; these being due to atmospherical changes, overheating of buildings (particularly dry heat), climatic conditions, and unhygienic habits and surroundings.

Special causes, as irritating vapors and dust, syphilis and tuberculosis of the nasal passages, or any prolonged irritation or chronic disease that produces lowered vitality, are important.

Deeply seated muscular lesions of the upper cervical vertebræ are always found. These lesions are contractures and may be either primary or else secondary to vertebral strains and maladjustments. Almost invariably vertebral deviations are noted; in fact, these permanent deviations are most likely the principal predisposing causes to the disorder becoming chronic. It should be remembered that repeated muscular contraction is an important source of bony derangements, especially when the muscular strain causes a one-sided tension.

Involvement of the same blood-vessels, lymphatics and nerves as in the acute type takes place. Two points of interest to be noted are, first, deep underneath the tonsils will always be found a small, severely contracted area (and thorough treatment of this is very effective), and, second, the soft palate will be found chronically engorged. Both of the above points are important from a therapeutic consideration, for the venous and lymphatic congestion is marked in these regions.

Pathologically, there are two recognized varieties of chronic nasal catarrh, hypertrophic and atrophic. In the **hypertrophic** the mucous membrane is red, thickened, and spongy. The nasal passages are obstructed by the swelling of the membrane of the septum and the enlargement of the lower turbinated bones.

The **atrophic** may follow the hypertrophic, but not necessarily so. In this form the mucous membrane is thinned, pale, and dry, so that the cavities are enlarged. A thick, purulent secretion is present, and crusts are numerous. In some cases the discharge is very offensive, which has given rise to the term **ozena.** The sense of smell is lost, due to the atrophic process involving all of the tissues, including the bone. The purulent inflammation may extend into the accessory sinuses.

Symptoms of the **hypertrophic** form may be local or general. There is obstruction of one or both of the nasal passages, causing **mouth breathing.** This is especially distressing during the night and disturbs the sleep. A nasal intonation of the voice may occur, and in advanced cases there may be deafness, due to obstruction of the Eustachian tube. In fact, a very large proportion of **deafness** is caused by chronic nasal pharyngeal catarrh. There is impairment of the sense of smell, and usually disturbance of the secretion in the nasal pharynx takes place. Hypertrophy of the **adenoid tissue** in the vault of the pharynx often occurs, also of the mucous membrane around the orifices of the Eustachian tubes. There may be watering of the eyes from catarrhal occlusion of the lachrymal canal. There is no odor in this form of nasal catarrh.

In the **atrophic form** there is some obstruction in breathing, due to the crusts. The sense of smell is lost. The odor is very obnoxious.

Prognosis.—Treatment may result in great improvement, but a perfect cure is rare. The prognosis of the hypertrophic form is more favorable than that of the atrophic.

Treatment.—The treatment should be both constitutional and local. In the first place thorough cleanliness of the nasal pharyngeal region is demanded. The diet should be very nutritious, especially in children, where loss of strength and flesh occurs. In cases associated with general diseases or constitutional disorders, care of the health of the patient in every particular should be taken.

The local treatment of chronic nasal catarrh is the same as in the acute form—correcting the blood and nerve supply to the nasal mucous membrane. Thorough, deep treatment over the tonsillar region and through the mouth over the soft palate is very effective. The treatment must be most persistent, as it usually takes several months to perform a cure. It is a disease that greatly taxes the patience of both the physician and the patient, owing to the fact that there is extreme liability of the patient catching a fresh cold immediately after treatment, as then all the tissues of the cervical region are relaxed and the pores of the skin are open; besides, a chronically altered structure of any mucous membrane is slow to yield to treatment.

Hay Fever.

Definition.—An acute, catarrhal inflammation of the upper air passages, usually occurring periodically every spring and autumn; often associated with asthmatic dyspnea, due to the action of some atmospheric irritant upon a hypersensitive mucous membrane.

Osteopathic Etiology and Pathology.—Hay fever patients are generally of a nervous temperament, and this, combined with a sensitive nasal mucous membrane, renders the upper air passages extremely vulnerable to the irritating effects of the pollen of plants, dust, and other irritants that may be inhaled. The primary nervous lesions which predispose to the disease and cause a hypersensitive mucous membrane are in the region from the fifth cervical to the third dorsal vertebra or corresponding ribs,

although the lesion may occasionally occur in the upper cervicals and even as low as the fourth and fifth dorsals. The vaso-motor nerves are principally at fault, although there may be disturbances to other nerves, especially the sensory fibres of the fifth cranial. In a large number of cases the nasal mucous membrane is not only sensitive and irritated, but there may be hypertrophy of tissue and polypoid growths. The exciting cause is generally pollen or dust, and changes in temperature frequently excite attacks.

It should be taken into consideration that heredity may be a predisposing cause, particularly in families with a neurotic taint. The disease is more common in the United States than in Europe, and certain localities favor it. It is more common in men than in women.

The **pathological** condition is a hypersensitiveness of the mucous membrane, which is often associated with **hypertrophic rhinitis.** The hypertrophy affects the inferior and middle turbinated bones, and the soft tissues. The septum is frequently deflected.

Symptoms.—Redness of the conjunctivæ and swelling of the eye-lids. Severe cough with considerable headache and distress. Sneezing is a troublesome symptom. At times there are asthmatic attacks resembling ordinary bronchial asthma. There is great depression of spirits. The rose cold begins in May or June and lasts until the latter part of July. The autumnal begins the latter part of August and continues until the first frost.

Diagnosis.—Hay fever is easily recognized. The season of the year and the periodical recurrence of the cough and asthma make the diagnosis easy.

Prognosis.—The disease rarely, if ever, proves fatal. Continued attacks may be followed by asthma, chronic bronchitis, or the sense of hearing or smell may be lost. The paroxysms are apt to grow more severe each year unless checked by judicious treatment.

Treatment.—Under osteopathic treatment the prognosis is fairly favorable if treatment is commenced early in the season. In most instances hay fever is a chronic neurosis of the innervation of the upper air passages. Probably, all things being equal

in given cases of asthma and hay fever, a certain stimulus applied to the innervation of the bronchial tubes causing an attack of asthma, would if the same stimulus be applied to the innervation of the upper passages, cause an attack of hay asthma. The primary lesion causing hay fever is found from the fifth cervical to the third dorsal, either in the vertebræ or in the ribs. Many cases are caused by a disordered first, second or third, although a lesion to the innervation of the nasal pharyngeal region as high as the atlas or as low as the fourth dorsal vertebræ or rib may be found.

The treatment should be strong, thorough and frequent and applied to the motor, vaso-motor and sensory nerves of the affected region. It is always important to treat the fifth nerve in all cases, not only on account of the various fibres it conveys to the nasal region, but it aids in relieving the hyperesthesia of the mucous membrane. A firm, thorough treatment to the palatine nerves of the palate will be of benefit in many instances in relieving the hyperesthesia and itching of the affected parts; it also aids in preventing sneezing. A few cases will present distinct irritating factors in the nasal fossæ, as **polypi,** hypertrophy, etc., which perhaps in some instances had better be removed at once.

Cases moving to a favorable climate, as the Adirondack or White Mountains in the east and the Rocky Mountains in the west, are greatly improved. Unfortunately this does not cure them, relief being experienced only while they remain in the locality; besides, a majority of hay fever patients are unable, financially, to travel. Osteopathic treatment has cured a number of hay fever cases, and most cases will at least be relieved under the proper treatment. It has been a common experience in treating these cases that they yield much quicker where the climate is favorable, as for instance in the Rocky Mountain resorts.

DISEASES OF THE LARYNX.

Acute Catarrhal Laryngitis.

Definition.—An acute, catarrhal inflammation of the mucous membrane of the larynx. This may be ushered in as an inde-

pendent disease or it may be associated with general catarrh of the upper respiratory passages.

Osteopathic Etiology and **Pathology.**—One of the principal causes of acute catarrhal laryngitis is exposure to cold and dampness, which contracts the muscles of the neck region, especially about the larynx. Lesions in the upper and middle cervical vertebræ are important predisposing causes. Occasionally the first rib becomes luxated, causing a greater or less congestion of the laryngeal mucous membrane by contracting the lower antero-lateral muscles of the neck. Improper placing of tone, as well as too constant use of the voice in speaking and singing, are common causes. Inhalation of irritating gases or dust, and mechanical injuries to the larynx are occasional causes. The disease may be associated with certain infectious diseases, as measles, diphtheria, influenza and whooping cough.

Pathologically, the mucous membrane is intensely reddened and inflamed; this inflammation involves both the true and false vocal cords and may extend into the trachea and about the epiglottis. The membrane is covered slightly with mucous secretion. In rare instances edema of the glottis may occur. The muscular contraction about the larynx impedes blood and lymphatic drainage and thus induces congestion. The contraction may be so severe as to slightly prolapse the organ. The vertebral lesions impinge upon or affect vaso-motor fibres and thus bring about congestion.

Symptoms.—There is hoarseness and cough with a sensation of tickling in the larynx; these are the most constant symptoms. The cough is dry and the voice altered. At first the voice is husky, but some attempts at speaking are attended with more or less pain and finally the voice may be entirely lost. Deglutition is painful. At first the expectoration is scanty, but later it becomes muco-purulent. There is rarely much fever. When there is considerable edema, dyspnea and asphyxia are prominent features.

Prognosis.—Simple catarrhal laryngitis never terminates fatally. When there is dyspnea or asphyxia indicating edema of the larynx, the prognosis is grave. The attack usually lasts from

one week to ten days, but this can be materially shortened by careful osteopathic treatment. In severe cases it may be two or three weeks before the larynx returns to its former condition; these cases are usually infective.

Treatment.—In a few cases confinement of the patient to his room, and possibly the bed, will be necessary; especially should the larynx have rest from phonation, and the taking of food of an irritating character should be avoided. Smoking is to be prohibited. The room should be at an even temperature, from 70 to 75 degrees F., and the atmosphere saturated with moisture by the generation of steam.

The tissues in the cervical region about the cervical sympathetic and vagi nerves should be carefully adjusted. The deep posterior muscles of the cervical spine are to be relaxed and direct treatment given over and about the larynx. Relaxing tissues and raising the larynx will be very effectual in relieving the **huskiness** of the voice and in controlling the congestion and inflammation of the laryngeal mucosa. Besides the treatment of the vagi nerves at the atlas and their course down the lateral and anterior portion of the neck, the superior laryngeal may be treated at the upper portion of the great cornu of the hyoid bone and the inferior laryngeal at the inner side of the cleido muscle near its sternal attachment. Adjust the tissues along the course of the external carotid and subclavian arteries, chiefly the first rib for the latter. Give careful treatment to the internal jugular and innominate veins. Correct any tissues that may impinge upon the lymphatics of the mucous and sub-mucous coats of the larynx where they are drained into the deep cervical glands.

Prompt action of the skin, freedom of the bowels, placing the feet in a hot bath and continued local hot packs, or even an ice-bag in severe cases, will be of special value at the onset; but due attention should be given these throughout the entire course. The fever is easily aborted by the cervical treatment and proper attention to the bowels and sweat glands.

Chronic Catarrhal Laryngitis.

Definition.—A chronic, catarrhal inflammation of the mucous membrane of the larynx.

Osteopathic Etiology and **Pathology.**—The causes of chronic laryngitis may be numerous, but lesions of the cervical vertebræ are the most common. The contractured cervical muscles, especially the deep vertebral ones, are usually the result of corresponding osseous deviations.

Other causes given under the acute form, as overuse and abuse of the voice, inhalation of irritating substances, excessive use of tobacco and alcoholic drinks, tumors, etc., are important etiological factors. Thus irritations inducing acute attacks, if repeated, will result in chronic catarrh.

The **pathological** changes as revealed by the laryngoscope are swelling of the mucous membrane, osccaional superficial erosions, and rarely ulceration.

Symptoms.—The voice is usually hoarse and rough, being due to a thickening of the vocal organs. In severe cases the voice may be lost. There is fatigue and pain after slight use of the voice, a sense of tickling in the larynx which produces a desire to cough, and expectorations of viscid mucus and muco-pus.

Prognosis.—The prognosis is sometimes unfavorable, although many cases are cured.

Treatment.—The patient must learn to take care of himself properly. He should avoid overheated rooms, the use of tobacco and alcohol, and the throat should not be protected too much. It is a good plan to bathe the neck every morning and night with cold water. He should avoid loud speaking; the sound should be expelled by the abdominal muscles and diaphragm and not by the muscles of the throat. Examine the upper air passages carefully for any obstructions that might exist which are a source of irritation to the larynx.

Special attention should be given to the atlas, axis and third cervical. Lesions lower down the spine may be found, for other laryngeal nerve fibers, other than those from the superior cervical ganglion, may be at fault.

Aphonia is commonly caused by a dislocated atlas. The aphonia may also be caused by swelling of the vocal cords and tissues about them and by serous effusions of the laryngeal muscles. Difficult breathing and hoarseness are occasionally very troublesome symptoms. The former is due to an inability of the glottis to dilate, on account of swelling of the mucous membrane of the diseased parts and from drying of the secretions on them, thus increasing the obstruction (this is sometimes termed pseudo-croup), but expiration is easy, the stridor is from the inspiration; the latter is due to a collection of mucus on the vocal cords or the cords may become relaxed, swollen or roughened.

Another annoying symptom sometimes presented is pain on deglutition, which is due to swelling of the mucous membrane of the upper laryngeal passages and the epiglottis. In all of these annoying symptoms, persistent, thorough, direct treatment of the larynx is of value. On the whole, careful, continued treatment of the cervical innervation and vascular supply of the larynx, as in the acute form, is indicated.

Laryngismus Stridulus.

(Spasm of the Glottis).

Definition.—A spasm of the muscles of the larynx that are supplied by the inferior or recurrent laryngeal nerves. This is not excited by an inflammatory condition, but it is usually a purely nervous condition.

Osteopathic Etiology and **Pathology.**—Spasm of the glottis is usually found in children with **enlarged tonsils and adenoids.** It has been observed that rickets and syphilis are probably frequent underlying causes. The spasm is occasionally associated with tetany. The nervous factor is the immediate and important consideration. Cervical lesions, both vertebral and muscular, are invariably found. Then naso-pharyngeal and tracheal disorders and reflex digestive disturbance are exciting causes. An elongated uvula or a deranged hyoid bone will occasionally be exciting factors. Subluxation of the upper two or three ribs and of the clavicle may also be exciting factors.

The affection is usually found in children under five years of age. All cases are not of a distinct nervous type, for slight acute catarrhal laryngitis may be present.

Symptoms.—There is a sudden onset and the spasm may occur on waking from sleep, but it may come on either in the night or day. The disease starts with a sudden arrest of breathing, the child struggles for breath; there are tonic muscular spasms and the face becomes congested in a few seconds. This is followed by sudden relaxation of the spasm and the air is drawn through the glottis with a shrill, crowing sound. Several spasms may occur in a day or they may be weeks apart. Death rarely occurs.

Diagnosis.—The absence of fever, cough and hoarseness and its distinctly intermittent nature will differentiate it from croup. Should there be any question of diagnosis a bacteriological examination is advisable.

Prognosis.—The prognosis is almost always favorable. In very young children death from suffocation may occur, but rarely.

Treatment.—The treatment should be applied either centrally or peripherally, depending altogether upon the location of the irritation. If the irritation is of central origin, that is, through the innervation from the brain and spine, a correction of the superior and inferior laryngeal nerves is necessary; if the stridor is due to peripherial irritations, a correction of the end-plates (muscles) over and about the larynx is required in order that the spasms be relieved.

Thorough treatment should be applied to the upper part of the chest and diaphragm, chiefly the phrenic nerves at the third, fourth and fifth cervicals and over the eighth, ninth and tenth ribs anteriorly, in order that the spasms may be prevented from extending to the intercostal muscles and the diaphragm.

Placing the patient in a hot bath will be of service in some cases when the spasms are severe. Alternating hot and cold packs about the throat are of service. The air of the room should always be kept moist. Care should be taken that the trouble is not due to gastro-intestinal disorders or to dentition. Keep the child upon a fluid diet of milk, meat broths and egg albumin.

Spasmodic Laryngitis.

(False Croup).

Definition.—A catarrhal inflammation of the mucous membrane of the larynx with spasm of the glottis.

Osteopathic Etiology and **Pathology.**—This affection is practically the same as laryngismus stridulus associated with catarrhal inflammation of the mucous membrane. It is a disease of young children. Derangements of the innervation and blood supply to the laryngeal mucous membrane and muscles of the larynx are found in the same locality as noted under acute catarrhal laryngitis and laryngismus stridulus. There is acute catarrh causing a croupy cough, and difficult breathing due to spasm of the glottis.

Symptoms.—These attacks generally occur during the night, the child being suddenly awakened by severe paroxysms of suffocation and a dry, hard cough, associated with evidences of dyspnea. In half an hour or an hour or two the coughing ceases, perspiration follows and the child falls asleep. If proper treatment is not given, these attacks may occur for several successive nights, the child appearing almost or quite well during the day.

Diagnosis.—The symptoms are so characteristic that the diagnosis is easy. In all instances the prognosis is favorable.

Treatment.—The catarrhal inflammation of the mucous membrane of the larynx should be treated in the same manner as simple inflammation of the laryngeal mucosa, i. e., thorough treatment of the cervical spine and direct treatment over the larynx.

During the paroxysm, if the patient cannot be relieved very shortly by the cervical treatment, he should be placed in a hot bath of a temperature from 98 to 110 degrees F. This will, in the majority of cases, relieve the attack. In addition a hot compress may be placed about the throat. Producing emesis by irritating the fauces with the finger is necessary in a number of cases in order that the secretions in the laryngeal region may be ejected, thus relieving suffocation and labored breathing. Also, an overloaded stomach which is causing an irritation, should be emptied at once by vomiting. The bowels should be kept well open in

all cases. Occasionally the epiglottis becomes wedged in the chink of the glottis. Such a condition requires an introduction of a finger into the fauces to release the disorder.

Care should be taken, especially following an attack, that the child is not exposed to cold or rapid changes of temperature, so as to avoid repetition of the spasms.

Coughing.—Coughing, not only in spasmodic laryngitis, but also in various diseases where coughing is a prominent symptom, is a most irritating and annoying feature. The osteopath is many times called upon to relieve the cough, whether it is due to slight irritation of a nerve fibre alone or is a symptom of a serious chronic disease. The coughing center is located in the medulla oblongata; the afferent nerves are sensory branches of the vagus; the efferent nerve fibres are found in the nerves of expiration and in those that close the glottis. Consequently, coughing may be caused by stimuli to various sensory nerves, various cutaneous areas (chiefly the upper part of the body), mucous membrane of the respiratory and digestive tracts, the mammæ, liver, spleen, ovaries, uterus, kidneys, etc. Perhaps the most common cause of cough is contraction of some of the muscles of the neck, irritating sensory fibres. Contraction of the omo-hyoid muscle may produce an irritating cough by causing traction on the hyoid bone. In a few cases the larynx may prolapse to some extent and thus be a source of irritation. Lesions of the spinal cord between the seventh and eighth dorsal, also at various points above in the dorsal vertebræ and in the ribs (especially at the second and third ribs), are very apt to produce a cough. Impaction of the sigmoid flexure is oftentimes accompanied by coughing. Enlargement of the heart may cause pressure upon the respiratory tract directly and cause a deep, dull cough. Foreign bodies in the external meatus of the ear are occasionally a source of irritation which is accompanied by coughing. Thus there are innumerable sources of stimuli that may produce coughing. In all cases it is necessary to make a careful diagnosis as to whether it is an irritation to some fibre that can be corrected at once or whether it is a symptom of a disease that can only be relieved by the cure of the disease.

Tuberculous Laryngitis.

Definition.—An inflammation of the laryngeal tissues of tuberculous origin.

Osteopathic Etiology and Pathology.—Tuberculosis of the larynx is commonly secondary to pulmonary tuberculosis. In a few cases the laryngeal invasion may be of primary origin. In either instance there will be found a disturbed innervation or altered blood supply of the larynx that predisposes to the favorable multiplication and growth of the bacilli. The osteopathic lesions are similar to those found in other nutritive involvements of the larynx.

Pathologically, the mucous membrane is inflamed and swollen, and exhibits scattered tubercles, which are usually about the blood-vessels. The tubercles cluster, caseate and leave shallow, irregular ulcers. There is thickening of the mucosa about the ulcer, and the ulcer is generally covered by a grayish exudate. They may erode the true vocal cords, often destroying them completely. The ulcers slowly involve the tissues in all directions, causing perichondritis with necrosis of the cartilages. The mucous membrane of the pharynx, esophagus, fauces, and tonsils may be involved, and the epiglottis may be completely destroyed.

This disorder, strictly, should be discussed under pulmonary tuberculosis for, as heretofore stated, it is generally a secondary affection; the larynx being invaded by the tubercular bacilli in the sputum arising from the bronchial tubes and lungs. The bacilli in inspired air may primarily invade the laryngeal mucosa. However, in either case the circulation of the mucosa is not normal and osteopathic correction of the same is effective.

Symptoms.—Huskiness of the voice, followed by hoarseness, and in advanced stages aphonia, are prominent symptoms. A hacking cough is usually present and the patient complains of pain in the throat, particularly on coughing, swallowing or speaking. The loss of voice, painful speaking or whispering are quite characteristic. When the ulceration of the tissues of the larynx has progressed to a later stage, dysphagia, suffocation and distressing paroxysms of cough occur.

Diagnosis.—Is not difficult, as pulmonary phthisis is usually associated with it. Examination of the sputum for the specific bacilli will be conclusive.

Prognosis.—The prognosis is not of the best at any time. On the whole, it is unfavorable.

Treatment.—In this disease osteopathic treatment has been quite effectual. Cases of primary origin are more successfully treated than when of secondary cause, although one will be surprised many times at the results obtained when the disorder is not primary. The treatment must necessarily be both constitutional and local. Care of the general health as to hygiene and diet is absolutely necessary. The food must be nutritious and non-irritating. Scraped beef, raw oysters, raw eggs, soups and gruel are required. In cases where difficulty of deglutition occurs, it may be largely overcome if the patient hangs his head over the side of the bed and sucks through a tube liquid nourishment placed in a dish upon the floor.

The local treatment required is thorough, persistent work over the larynx and adjacent tissues. This treatment is given to increase the blood supply to the diseased tissues so that the involved parts may become absorbed or thrown off, and that the bacteria may be deprived of the conditions favorable to their activity. Treatment along the cervical spine and upper dorsal will aid in correcting the vaso-motor disorders that exist. Local application of hot water will assist in relieving the pain. When pulmonary phthisis exists, attention and correction of it is important; in fact, is of primary consideration in laryngeal affection.

Syphilitic Laryngitis.

Etiology.—This disease is of frequent occurrence. It results from the virus of syphilis of the inherited disease, or the secondary or tertitary stages of the acquired form.

Symptoms.—There is a hoarseness of the voice, a hacking cough, difficulty in swallowing and the various symptoms of catarrhal laryngitis. The secondary form may present superficial, whitish ulcers on the cords or ventricular bands, while in a tertiary stage the lesions are extensive and serious. Deep ulcers

with raised edges are present, gummata develop on the submucous coat of the epiglottis and there may be necrosis and exfoliation of the cartilages. Deformity is produced by the cicatrices following the healing of the ulcers and sclerosis of the gummata. Edema of the larynx may suddenly prove fatal.

Diagnosis.—The history of the case, the presence of other symptoms of the disease, the deep, symmetrical ulcers, the absence of tuberculosis elsewhere and the absence of marked pain, will usually make a diagnosis easy.

Prognosis.—Is somewhat favorable, more so at least than the tubercular form of laryngitis. There is great danger of deformity and permanent impairment of the voice.

Treatment.—The treatment should be both constitutional and local. Active measures must be taken to rid the system of the virus of syphilis, and thorough, direct treatment should be applied to the larynx and to its innervation. If the cicatricial stenosis has progressed so far that there is little hope from manipulative treatment, tracheotomy or gradual dilatation should be performed. The ulcerated portion is always to be kept clean.

Edematous Laryngitis.

Definition.—An acute inflammation of the mucous membrane of the larynx with infiltration of serous fluid into the submucous tissue.

Etiology.—This is a very serious affection. It may occur in connection with acute laryngitis, though rarely, and occasionally with chronic diseases of the larynx, as tuberculosis and syphilis. It may be a complication of some acute infectious disease like diphtheria, scarlet fever, or erysipelas of the face. It sometimes occurs suddenly in the course of Bright's disease. Lesions as in acute laryngitis are predisposing factors.

Pathologically, the laryngoscope shows enormous swelling of the epiglottis. This swelling can very easily be felt with the fingers. The mucous membrane is tense and changed in color. There is infiltration of a serous or sero-purulent fluid into the loose connective tissue of the larynx. The aryteno-epiglotic folds are greatly involved, and they may be swollen to such a degree that they almost meet.

Symptoms.—Extreme dyspnea and stridulous respiration. Hoarseness of the voice and later aphonia. There is a feeling of intense oppression or suffocation. Evidence of dyspnea, anxious face, blue lips, protruding eyes and retraction of the base of the chest occur. The sterno-cleido-mastoid muscle is very prominent.

Diagnosis.—This is not difficult. The history of the case, laryngoscopic examination, and the swollen epiglottis which can be easily felt with the fingers make diagnosis easy.

Prognosis.—Generally unfavorable. At any time it is extremely grave, but with prompt and vigorous treatment recovery is possible. The duration varies from a few hours to several days.

Treatment.—One must attend strictly and carefully to the laryngeal innervation, as in acute catarrhal laryngitis. Obstruction to the superior or inferior thyroid, facial, internal jugular or innominata will cause tumefaction and edema of the larynx and adjacent tissues. Also, enlargement of the lymphatics about the larynx and salivary glands may produce edema of the laryngeal region; consequently, particular care should be taken of the various tissues about these vessels and of the innervation from the cervical spine, so the veins are not obstructed or the lymphatic channels disordered, so that infiltration of the tissues may be further prevented.

The most prominent symptom is laryngeal dyspnea and this depends altogether upon the swelling of the soft parts. If the swelling is great and the disorder cannot be removed, suffocation will follow. In such cases, besides giving direct treatment over the larynx, introducing a finger into the mouth, and reaching clear back under the roof of the soft palate, with a firm, downward, outward and sweeping movement on either side, relax the soft tissues. The persistent use of small pellets of ice, held far back in the mouth, will be found very beneficial; also, application of the ice-bag, provided the edema is of inflammatory origin.

If one is not able to control the rapid infiltration of the larynx and glottis when such cases arise, trachetomy or intubation should be performed at once. When edematis laryngitis is due to diseases of the heart, lungs and kidneys, treatment of the primary disease should be given in addition to the local treatment.

DISEASES OF THE BRONCHI.

Acute Bronchitis.

Definition.—A catarrhal inflammation of part or whole of the mucous membrane of the larynx, trachea and bronchial tubes, or it may extend into the capillary tubes. This is bilateral, affecting more or less the bronchial tree in both lungs.

Osteopathic Etiology and **Pathology.**—The most common cause of acute bronchitis is "catching cold." It is more prevalent in the winter, and it often succeeds an ordinary cold in the head, coryza or laryngitis, the inflammation extending downward from the upper air passages. A case of acute bronchitis always presents a contracted condition of the muscles on either side of the spine in the upper dorsal region. The contracted muscles may extend as far down as the middle dorsal or as high as the entire cervical. Occasionally, the ribs posteriorly are drawn downward by the extreme contraction of the muscles, and the upper anterior part of the chest may be somewhat constricted and limited in its movements by the tensed muscles. Thus, in a few cases the ribs and upper dorsal vertebræ are actually sub-dislocated by the extreme contraction of the muscles. The principal points affected are the second, third, fourth and fifth dorsal regions. In a few instances cervical lesions disturbing the vagus and resulting in motor weakness of the tubes, will be noted. The osteopathic control of the bronchial vaso-motor nerves is in this region (dorsal).

The disease is also associated with measles and it is usually a symptom of influenza. One attack predisposes to another. It affects either sex and especially children and the old, in whom it most frequently involves the smaller bronchi. In adult life it involves the larger bronchi. Micro-organisms may act as an exciting cause.

Pathologically, the mucous membrane of the portion of the trachea and bronchi that are implicated become reddened, congested and more or less covered with a tough mucus mingled with epithelial cells. The hyperemia is most marked about the mucous glands. Some of the smaller bronchial tubes are dilated. In severe cases there is desquamation of the ciliated epithelium,

swelling and edema of the sub-mucosa, and infiltration of the tissues with leucocytes. The affection involves chiefly the vaso-motor nerves. In cases on the verge of chronicity, look well to the diet; especially lessen in amount the starchy and saccharine foods.

Symptoms.—The onset of acute bronchitis is accompanied by the symptoms of a common "cold." At the beginning the cough is hard and dry without expectoration; but later it is looser, the secretion becoming muco-purulent and abundant and finally purulent. The scanty sputum is at first glairy and mucoid, while later it becomes more abundant and muco-purulent and contains pus-cells and desquamated epithelium. When the bronchial inflammation becomes fully established, there is a feeling of tightness and rawness beneath the sternum and a sensation of oppression in the chest, due to swelling of the mucous membrane and the presence of secretion which cause stenosis of the bronchial lumina. There is a slight fever, rarely exceeding 101 degrees F. The disease lasts from four or five days to three weeks. There is either a complete recovery or chronic bronchitis is developed.

Physical Signs.—There may be no physical signs in slight attacks of acute bronchitis of the larger tubes. In severer cases the physical signs are well marked. **Inspection** may recognize increased frequency of breathing, and when the smaller tubes are involved these is dyspnea. **Palpation.**—The bronchial fremitus may often be felt, providing there is sufficient narrowing of the breathing tubes. **Percussion.**—Sounds are normal as long as the bronchitis is uncomplicated. **Auscultation.**—In the early stage piping, sibilant rales may be heard on both sides. These rales are inconstant and appear and disappear with coughing. There may be harshness of breathing added to these. When resolution sets in, the rales change and become mucous and bubbling in quality. Vocal resonance in bronchitis is normal, unless complications occur.

Diagnosis.—This is generally easy. The absence of dullness and blowing breathing and the bronchial character of the cough and expectoration are usually sufficient to distinguish it from

pneumonia and pleurisy. If the physical signs are noticed carefully, the diagnosis is rendered easy and positive in all cases.

Prognosis.—In the very young and the very old, the prognosis is unfavorable, but in a previously healthy adult the most that can happen to a case of acute bronchitis is to become chronic. Recovery is the rule; even in the aged and feeble death is rare. If osteopathic treatment can be instituted from the inception, the disease will probably be aborted. The treatment almost invariably lessens the severity and duration of an attack.

Treatment.—Complete rest in a warm bed, and a hot foot bath would cure a large majority of cases in a day or two if the patient would only submit to such treatment. Most of them wish to be around and out doors and very likely attending to their usual work, so that a cure in some cases is hard to perform. They are very liable to take more "cold" and in a few cases it will take great effort to prevent the bronchitis from becoming chronic. One thorough treatment per day will usually be sufficient.

The hyperemic condition of the bronchial tubes is due to a vaso-motor disturbance, generally caused by a severe contraction of the muscles of the back in the region of the first to fourth dorsal; although the vaso-motor nerves to the mucous membrane of the bronchial tubes may be affected anywhere from the first to the seventh dorsal inclusive. Contraction of the muscles over the anterior part of the chest corresponding to these regions and caused by the same influences (chiefly atmospherical changes), is of quite common occurrence. In the majority of cases the contraction of the chest and back muscles is so severe that the ribs are partly displaced by the tension and thus is added a complication to the disorder, and from this complication chronic bronchitis is liable to occur. The rib or ribs or even vertebræ to the corresponding region oftentimes remain partly dislocated and are a source of continued and permanent irritation to the innervation of the bronchial tubes. So it is always necessary in treating any form of bronchitis to see at each treatment that the ribs and vertebræ from the first dorsal to the seventh dorsal, inclusive, are anatomically correct.

As has been stated, the disordered muscles or ribs may be

affected anteriorly as well as posteriorly; consequently, the treatment applied is a thorough relaxation of the chest and back muscles and the correction of the ribs and vertebræ in order that the vaso-motor disturbance of the bronchial mucosa may be corrected and the inflammation relieved. In addition to the dorsal spinal nerves, and the sympathetic, the vagi are to be considered in the treatment of bronchitis, as all of these nerves, sympathetic, spinal, and vagi, go to make up the anterior and posterior pulmonary plexuses from which the bronchial mucosa receives its innervation. The veins particularly involved in passive hyperemia of the bronchial tubes are the superior intercostal and azygos major; so raise and spread the ribs to give greater freedom to these blood-vessels.

"The blood flow may be diverted from the bronchi to the abdomen by a slow, deep, inhibitive treatment over it, including pressure over the solar and hypogastric plexuses." (Hazzard).

The excretory organs and the diet of the patient should be attended to. Especially in children, the diet had best be a fluid one, as milk, egg albumin, meat broths and meat juice.

Chronic Bronchitis.

Definition.—A chronic inflammation of the mucous membrane of the large and middle sized bronchial tubes.

Osteopathic Etiology and **Pathology.**—Chronic bronchitis may be either primary or secondary. The primary form is the result of exposure to wet and cold or to the daily inhalation of irritating vapors or dust. This form is rare, the affection being almost always a secondary one, and is most commonly met with in chronic lung affections, heart disease, gout or renal disease. It may be caused by any disease which favors congestion of the air tubes by obstruction of the circulation; especially mitral disease and Bright's disease. It is also caused by chronic alcoholism and may be the result of repeated attacks of the acute form. Chronic vertebral and rib lesions are found from the first to the seventh dorsal, inclusive.

Pathologically, the lesions of chronic bronchitis present great variation, as to both their nature and extent. In some cases

the mucous membrane is very thin, so that the longitudinal elastic fibres stand out prominently. The epithelial layer is in great part missing. The muscular coat and mucous glands are atrophied.

In other cases the mucous membrane of the bronchi is thickened, granular and infiltrated. Ulceration is occasionally noted, particularly of the mucous follicles. In long standing bronchitis, there is dilatation of the tubes (bronchiectasis) and emphysema may be a constant accompaniment.

Symptoms.—Pain is rarely present; there is merely a feeling of constriction beneath the sternum. The cough varies with the weather and season and there is often an absence of the cough during the summer. It is apt to be worse at night than in the morning, and is frequently paroxysmal. There is rarely any fever. As a rule, there is free expectoration of muco-purulent or distinctly purulent matter. Sometimes it is abundant, seromucous in character, and again there are severe cases of dry cough in which there is almost no expectoration. Unless associated with other diseases, the general health suffers but little, if at all. The appetite, as a rule, is good and the body weight is well maintained.

Physical Signs—Inspection.—The chest is usually distended and the movements limited; the condition often being the same as found in emphysema. **Percussion** yields a clear and hyperresonant note. **Auscultation.**—The expiration is prolonged and wheezy. This is associated with sonorous and sibilant rales and moist rales of all sizes.

Special Varieties.—Bronchorrhea, dry catarrh, putrid bronchitis or fetid bronchitis.

Bronchorrhea.—In this form there may be an excessive bronchial secretion. This may be very liquid and watery, but more frequently it is purulent, though thin and containing greenish masses; or again it may be thick and uniform. Dilatation of the tubes and ultimately fetid bronchitis may be developed.

Fetid Bronchitis.—Fetid expectoration is met with in gangrene of the lungs, abscesses, bronchiestasis, decomposition of matter within phthisical cavities, or empyema with perforation of the lungs; or it may occur independently. The sputum is

abundant, thin and grayish-white in color and on standing separates into three layers; the uppermost of frothy mucus, a middle layer of dirty green muco-serous fluid, and the lower of thick, greasy purulent matter in which are found small yellow masses, the so-called Dittrich's plugs. This condition may lead to abscess, gangrene, ulceration of the bronchial tubes with dilatation, pneumonia and rarely metastatic brain abscess. When **putrefactive changes** take place during the course of chronic bronchitis, as a rule, the following symptoms immediately appear: fever, which may be septic; increase of cough; pain in the side, and sometimes a chill. There is increased prostration. The symptoms may abate followed by the usual course of bronchitis.

Dry Catarrh.—The cough is of great intensity and paroxysmal in character with little expectoration. It is usually associated with emphysema and is a very troublesome form.

Diagnosis.—This is not usually difficult. Phthisis—the absence of fever, of hemorrhage, of tubercle bacillus and the signs of localized consolidation (usually at one or other apex) will serve to distinguish between the two.

Prognosis.—Recovery is not always accomplished. The disease being generally a secondary affection, the prognosis must depend upon the primary condition. The danger from development of emphysema, bronchiectasis and dilatation of the right ventricle must be thought of. Frequently cures will be obtained, even in old persons. Care must be taken that there are no serious organic lesions. Deep treatment to readjust the upper and middle dorsals is most essential.

Treatment.—In the first place there must be a careful regulation of the hygiene of the patient. The diet should be a nutritious one, care being taken to give food that is easily digested. A liberal diet can easily be selected from the various meats, vegetables, cereals, fruits, soups, broths, eggs and milk. The clothing should be carefully selected. Flannel should be worn next the skin the year around, care being taken that the sufferer is not too warmly clad. Due attention should be given to bathing, exercising, etc. The patient should be out in the open air a great deal, but be careful that it is not too stormy. The air of the room

should be kept at an even temperature and not subject to abrupt changes. Two or three treatments per week will be required, and when the condition is considerably aggravated, do not hesitate to treat oftener, but be careful not to unduly irritate the lesions.

Lesions will be found to the ribs and vertebræ from the first to the seventh dorsal inclusive. Many cases present lesions in the vertebræ from the second to fourth, usually of a lateral nature. Other lesions of frequent occurrence are displacements of both vertebræ and ribs. Correcting these deviations relieves the chronic inflammation of the tubes. Also in those cases where dilatation of the bronchial tubes occurs, the obstruction to the motor fibres is to be removed by the correction of the vertebræ and by removing obstruction to fibres of the pneumogastric; the fibres of the latter supplying the transverse muscles of the bronchial tubes.

It generally requires a considerable course of treatment for the cure of chronic bronchitis, and one of the hardest things to contend with in the treatment is the likelihood of the patient "catching cold." When a fresh cold gets thoroughly started, it is almost impossible to prevent the disease from extending down the bronchial tubes, as the innervation is less rich in the smaller tubes.

Hazzard says: "The obese should be taught the habit of deep respiration, as should all persons subject to the attacks of the disease. This measure, together with the daily cold sponge or shower bath, is a great aid in overcoming the chronic tendency."

Those cases that are due to cardiac or nephritic diseases require the treatment of the primary disease in addition to a light bronchial treatment.

A lesion between the gladiolus and manubrium of the sternum may be found, but it is of rare occurrence in these cases. The upper portion of the sternum may be locked underneath the middle portion of the sternum; or at the point of articulation of the two portions a distinct ridge may be found, caused by the articular ends being pushed anteriorly. Probably such lesions directly affect the innervation to the bronchial tubes and lung tissues.

Fibrinous Bronchitis.

Definition.—A rare, acute or chronic inflammatory disease of the bronchi, in which a fibrinous mould of the bronchus and its branches is formed. These are expelled in paroxysms of cough and dyspnea. The casts block the bronchial tubes. When these moulds are large or medium sized, they are generally hollow, while those of the smaller bronchi are solid.

Etiology and **Pathology.**—The causes are unknown. Young men, between the twentieth and fortieth years, are the usual subjects; but the disease may occur at any period of life. Lesions occur as in other forms of bronchitis. The attack occurs most frequently in the spring months. In some cases there seems to be some hereditary influence. Chronic pulmonary diseases, like phthisis, emphysema and pleurisy, are occasionally predisposing causes. It is sometimes associated with skin diseases, such as herpes, impetigo and pemphigus.

The **pathology** of the disease is obscure. The masses that are expelled are usually round and mixed with blood and mucus. The casts are more dense, but the membrane is identical with that of croupous exudates. This affection, however, is limited to certain bronchial tubes and recurs at stated or irregular intervals, sometimes for a period of several years. There is loss of epithelium in the affected bronchi and the sub-mucous tissue is often swollen and infiltrated with serum.

Symptoms.—Acute cases are rare. The attacks may set in with rigors, high fever, pain in the side, soreness, severe paroxysms of cough and sometimes a slight hemoptysis. The symptoms are those of an ordinary acute bronchitis, but of severer character; aggravated cough and dyspnea and fatal termination are not uncommon. Death occasionally results from suffocation. There may be but one attack without any recurrence, but in the chronic form the paroxysms recur at irregular intervals, though they are less severe than in the acute form.

The disease may last for ten or even twenty years, the attacks recurring weekly, or a period of a year or more may intervene. The onset is marked by bronchial symptoms with or without fever.

The cough soon becomes distressing and paroxysmal in character. The sputum may be blood-stained and occasionally there is profuse hemorrhage. The expectoration is in the form of ball-like masses which, when unraveled are found to be moulds of the bronchi. They may be hollow and laminated or quite solid. When examined under the microscope they are seen to consist of a fibrillated membrane in which are imbedded leucocytes, mucus, corpuscles, fat drops and epithelial cells. Leyden's crystals are sometimes seen and occasionally Curschmann's spirals are found.

Physical signs are usually those of bronchitis. The weakened or suppressed breath sounds in the affected territory may occasionally be determined. There is sometimes a diminished expansion or even retraction of the chest wall over the affected area. There is no dullness or percussion, unless the portions of the lung supplied by the affected tubes collapse. After dislodgement of the casts, the normal respiratory murmur returns.

Diagnosis.—The fibrinous casts alone are sufficient for a positive diagnosis.

Prognosis.—Generally favorable. In uncomplicated cases there is rarely any danger, even though there may be severe paroxysms of cough and dyspnea. In fatal cases the lesions of associated or preceding affections have been found, such as chronic pleurisy, pneumonia and phthisis. Although this is a rare disease, cases have been treated with success by osteopathic means. If uncomplicated there should be a fair chance for a cure, depending, of course, upon the constitutional condition and the permanency of the lesions.

Treatment.—The treatment is largely that of acute bronchitis. The disorder is more extensive than in acute bronchitis, consequently severe subluxations of the ribs and vertebræ of the upper and middle dorsals occur, besides extensive muscular contractions of the chest and neck. The fibrinous casts are somewhat of the same nature of membranous exudates elsewhere, therefore the treatment should be directed to a correction of the hyperemia of the mucous membrane of the bronchial tubes, thus loosening and disorganizing the exudate. The vagi nerves sup-

ply a part of the innervation to the bronchial tubes and lungs. Any disorder to them should be corrected when diseases of the bronchial tubes and lungs exist. They contain motor fibres to these organs, and to the bronchial tubes they supply, principally the transverse fibres. In bronchitis of various forms, marked effect can be secured by close attention and treatment to the inferior laryngeal nerve. This is best treated at the inner side of the lower portion of the sterno-cleido muscle.

The different forms of bronchitis illustrate the point so often noted in osteopathic etiology and pathology, that the various affections of the same region should not be studied so much as types of several diseases or disease entities as different degrees of involvement, depending on the severity of the causative lesion, the function of the nerves disturbed, and the character of the tissues. It is straining a point to diagnose and classify many diseases according to signs and symptoms instead of studying the process from central causes, for, at best, peripheral manifestations, micro-organisms, etc., are really incidental to the importance of the primary source of disturbed nutrition. Consequently, the same treatment, if scientific, is frequently indicated for all of the disorders that may affect a given locality. After all has been said and done, the therapy as well as the pathology, must hinge upon the fundamental—uninterrupted blood channels and nerve courses are essential to health. Whether a disease is of primary or secondary origin, or whether or not it presents different symptoms in various types, the above basic principle is invariably applicable. This simplifies etiology, pathology and treatment and furnishes a backbone to theory and practice, and some day rational medicine will adopt it.

Bronchiectasis.

Bronchiectasis is a dilatation of a part or the whole of the bronchial tube. As a rule this affection is a secondary one, the most common cause being chronic bronchitis. The inflammation weakens the bronchial walls so that they are unable to resist the strain that is put upon them during violent paroxysms of coughing. After dilatation has once commenced, the weight of the

secretion which accumulates tends to further distend the weakened walls and the elasticity, becoming impaired, is finally lost. Dilatation of the bronchi is also associated with emphysema, compression of a bronchus, aneurism or mediastinal tumor, broncho-pneumonia, measles and whooping cough in children, and also traction associated with fibroid induration. Hence the bronchial dilatation is especially associated with bronchitis, interstitial pneumonia, and sometimes chronic pleurisy. It is rarely a congenital effect in such cases. It is commonly unilateral. The lesions presented to the osteopath are largely like those found in chronic bronchitis, i. e., derangement of the upper four or five dorsal vertebræ and ribs, and lesions of the cervical vertebræ involving the vagi. These lesions obstruct the nerve force to the bronchial tubes and thus cause the dilatation.

Pathologically, two forms are recognized—the cylindrical and the saccular. Both forms may occur in the same lung. The condition may be general or partial. When general it is always unilateral.

In **universal bronchiectasis** the entire bronchial tree is converted into a series of sacs opening into each other. These have smooth, shining walls in the most dependent parts which are sometimes ulcerated. In extreme conditions the dilatations may form large cysts immediately beneath the pleura; as a rule, the lung tissue lying between the sacculi becomes cirrhotic.

The **partial dilatation** is much more common than the universal. The bronchial mucous membrane is involved with an occasional narrowing of the lumen. Here the narrowings are most commonly cylindrical, sometimes saccular, but rarely fusiform.

In all forms there is decided change in the bronchial wall. In the large dilatations, the cylindrical epithelium is replaced by pavement epithelium. The elastic and muscular layers are thin and atrophied and the fibres are generally separated. These dilatations frequently contain fetid secretions and when these secretions are retained, the lining membrane becomes ulcerated.

Symptoms.—There is always cough, which occurs in severe paroxysms. In some cases a change of position will cause a par-

oxysm of coughing—very likely due to the emptying of the contents of a dilated tube into a normal one. The sputum is mucopurulent and is greenish brown in color, is fluid, and has a sour, or more frequently, a fetid odor. On standing, it separates into three layers; the upper is frothy and thin, the middle mucoid, and the lower is a thick sediment of cells and granular debris. Microscopically, the sediment consists of pus corpuscles, fatty acid crystals which are arranged in the form of bundles, and sometimes red blood discs and hematoidin crystals. Elastic fibres may be found if ulcers are present.

Physical Signs.—When distinctly present, they are those of a cavity in the lungs. When chronic pleurisy and interstitial pneumonia are associated, there may be retraction of the chest wall. The percussion resonance is impaired. On auscultation bronchial, or even amphoric, breathing is heard occasionally with metallic rales.

Diagnosis.—In a large number of cases this is impossible. History, paroxysmal cough, characteristic copious sputum and an absence of tubercle bacilli with little impairment of the general health will serve to distinguish bronchiectasis from pulmonary tuberculosis. Circumscribed empyema which has ruptured into the lung may simulate bronchiectasis. This is of a much more sudden onset, has a history of previous pleurisy, the health is gradually impaired, and there is thoracic oppression and dyspnea on the slightest exertion.

Prognosis.—Is generally favorable, although many times it requires an extended course of treatment in order to perform a cure.

Treatment.—Largely the same as in chronic bronchitis. Severe lesions are found in the dorsal vertebræ about the region of the third, fourth and fifth, and many times lesions of the pneumogastric at the upper cervical vertebræ are also found. The lesions are much of the same nature as those of bronchitis, but, as a rule, there is a much deeper or more extensive lesion. These lesions weaken the motor innervation to the muscular coats of the bronchial tubes, and in many instances the extensive lesions involve the vaso-motor nerves controlling the blood supply to the bronchial tubes. In most cases marked lesions of the ribs on

either side will be found, usually in the region corresponding to the affected vertebræ.

Care should be taken as to the hygienic surroundings of the patient. The diet should be carefully regulated and nutritious, as in chronic bronchitis.

Bronchial Asthma.

Bronchial or **spasmodic asthma** is a chronic affection, characterized by a paroxysmal dyspnea due to a spasmodic contraction of the muscles of the bronchial tubes or to swelling of their mucous membrane.

Osteopathic Etiology and Pathology.—The majority of lesions causing bronchial asthma are from the second to the seventh dorsal region, inclusive, either in the ribs posteriorly or anteriorly, or in the vertebræ. These lesions involve vaso-motor nerves to the bronchioles which produce the narrowing of the tubes and thus cause the dyspnea. Usually the lesion is at the third, fourth or fifth rib on the right side, although, as stated, a lesion may be found above or below this point at the anterior or posterior ends of the ribs or in the vertebræ corresponding to the same region. Probably lesions are found more on the right side, because most people are right handed; these muscles being better developed would tend, when contracted, to draw the ribs from their articulation. The third, fourth and fifth ribs are usually found involved because it is the region of greatest vaso-motor innervation to the bronchial tubes.

In a number of cases there will be found a posterior curvature of the dorso-lumbar region; and accompanying this condition will be catarrh and dilatation of the stomach, congestion of the liver, and, perhaps, intestinal indigestion and constipation. Careful attention should be given to the digestive organs.

Occasionally a lesion is found involving the pneumogastric at the atlas and axis. Such a lesion also irritates fibres of the pneumogastric to the muscles of the bronchioles and thus produces narrowing of the tubes and consequently the paroxysms. Other points to note are the costal cartilages and hyoid bone, and probably, in a few instances, lesions to the phrenic.

Attacks may be induced reflexly by various excitants, as dust, diseases of the upper respiratory tract, etc., but the lesions to the vaso-motor and motor nerves are the predisposing causes. Laughlin[1] says: "It is questionable whether reflex causes alone are sufficient to produce genuine asthma without the existence of specific lesions affecting the direct nerve connections of the part involved."

Pathologically, true asthma is a pure neurosis. There is more or less chronic inflammation of the bronchial tubes, shown by injection and thickening of the bronchial mucosa in the majority of cases. There may be found the morbid states peculiar to chronic bronchitis and emphysema. Whether the constriction of the tubes is due to spasms of the bronchial muscles or to swelling of the mucosa, or to both, the primary, predisposing and irritating influences are common to both. These are vertebral and rib lesions affecting the spinal nerves at their exit and the sympathetic chain along the head of the ribs; irritating lesions to the vagi, constricting pulmonary vessels, and to the cervical sympathetics, causing disturbance of the same, would be factors in the pathological chain. Reflex irritations may be found in various regions, but the principal osseous lesions, according to Dr. Still, are on the right side from the second to the sixth dorsal.

Symptoms.—The attack may come on at any time, but usually it comes on in the night during sleep. The onset may be sudden or the attack may be preceded by premonitory sensations, such as tightness in the chest, flatulence, sneezing, chilliness and a copious discharge of pale urine. Nervous symptoms, headache, vertigo, neuralgia, and an anxious, nervous, restless feeling may precede the attack. There is a sense of oppression and anxiety, followed by dyspnea. Soon the respiratory efforts become violent, the patient is obliged to sit up or runs to the window for air. The shoulders are raised, the hands are placed upon something firm to keep the shoulders fixed so that the accessory muscles of respiration can be brought into play. The contracted tubes resist the entrance of air. Expiration is prolonged and wheezy.

1. Laughlin—Asthma—Journal of the American Osteopathic Association, Oct., 1904.

In severe cases the face becomes pale, the skin is covered with perspiration, the extremities are cold, the lips, finger-tips and eyelids are livid, owing to defective oxygenation of the blood. The pulse is small and quick and the temperature is normal or subnormal. The attack may terminate suddenly, some times with a spell of coughing; this is especially so of severe cases, as the cough is generally absent in brief paroxysms.

The **cough** is at first very tight and dry and accompanied by a tough, scanty expectoration which is expelled with great difficulty. The **sputum** contains rounded masses of matter, the so-called "perles" of Lænnec. Microscopically, they are found to be of a spiral structure, containing cells derived from the bronchial mucous membrane and fatty degenerated pus cells. A second form is contained in the inside of the coiled spiral of mucin, a filament of great clearness and translucency, that is most probably composed of transformed mucin. Curschmann's spirals are found in the early stages of the attack and for a time these were supposed, by their irritation, to excite the paroxysms. Their spiral form is unexplained. Curschmann believes that these spirals are found in the finer bronchioles and to be a product of bronchiolitis.

Physical Signs.—Inspection shows enlargement of the chest which is fixed and barrel-shaped. The breathing is labored and the chest moves but slightly. The diaphragm is lowered. **Percusion** yields hyper-resonance, especially in cases which have had repeated attacks or when the asthma is associated with emphysema. **Auscultation.**—With inspiration and expiration are heard sonorous sibilant rales which are more marked on expiration. As the secretion increases, which is later in the attack, the rale becomes moist. The attack lasts for a variable period, rarely less than an hour. In severe attacks the paroxysms recur for three or four nights or more with spontaneous remissions during the day. In some cases the relief seems to be absolute, but in the majority of cases there is more or less oppression and cough for a day or two, sometimes for many days.

Diagnosis.—The physical signs, examination of the sputum and the history of the case makes the diagnosis easy.

Prognosis.—It is not a fatal disease and only dangerous when complications arise. Under osteopathic treatment the prognosis is usually favorable, unless there are serious complications, as this is a disease that osteopathy has treated with signal success. In long standing cases emphysema invariably develops.

Treatment.—Asthma, unless complicated with bronchial and lung diseases, is readily relieved during the paroxysms. Cases of many years' standing have been cured in a few treatments. It should be borne in mind that asthma is a respiratory neurosis.

To relieve an attack the osteopath should locate the lesion, if possible, and correct it. If the muscles are so severely contracted that it is impossible to make out the nature of the lesion, then strong inhibition, with an upward, outward movement over the angles of the ribs involved, will be quite sufficient. The object to be gained in every case is to relieve pressure or irritation to the vaso-motor or motor nerves, so that the narrowed tubes may be relaxed. Strong inhibition, such as placing the knee in the patient's back, at the same time pulling on the shoulders, will have temporary effect, but it is always best to reduce the lesion if possible. In severe cases dilatation of the rectum may relieve the paroxysm, and in a few instances it will be necessary to treat the uterus locally.

During the interval between the attacks is the time to remedy the disease. Then one is able to locate exactly the position of the disturbed tissues that are causing the paroxysms and apply treatment in the regions given under etiology. Many cases of asthma are cured in from one to three months' treatment. One treatment a week is sufficient, provided one is able each time to accomplish something toward a correction of the lesion and that the patient does not suffer during the meantime. Too frequent treatments may simply act as an irritant to the nervous lesions.

Attention should always be given to the diet and hygiene. Gastric digestion should be complete before retiring or it may induce an attack. Complications are treated according to the disease. Examine the upper respiratory tract, the digestive tract, and the pelvic organs when there is reason to believe the paroxysm may be induced reflexly. Laughlin sums up the treat-

ment as follows: (1) Removal of specific lesion; (2) removal of exciting causes; (3) removal of reflex causes; and, (4) treatment of the patient to improve the condition of the general nervous system.

DISEASES OF THE LUNGS.

Emphysema.

Used in a general way, emphysema is a term which implies the presence of air in the interstitial tissue, but when applied to the lungs there are two applications of the term, having widely different significations, viz.: Interlobular or interstitial emphysema and vesicular emphysema.

Interlobular Emphysema.—This is caused by rupture of air vesicles, deep in the lung structure, the air escaping into the interlobular connective tissue. It is not a very serious condition, rarely produces symptoms and affords no physical signs. It usually results from violent acts of coughing in which the expiratory strain is very great, as in whooping cough and in bronchial asthma; also, from wounds of the lung.

The air bubbles escape into the interlobular septa and are sometimes seen like little rows of beads outlining the lobules. The pleura may become detached and larger vesicles may form. In rare cases the rupture may take place at the root of the lung and the air passes along the trachea into the subcutaneous tissue of the neck and chest wall, which gives rise to a very peculiar and distinctive crepitation upon palpation. Rarely there is rupture of the superficial vesicles, producing pneumo-thorax.

Vesicular Emphysema.—Dilatation of the infundibular passages and alveoli or an increase in their size either symmetrical, involving both lungs, or localized. Vesicular emphysema is divided into compensatory, hypertrophic and atrophic forms.

Compensatory.—This occurs when a region of the lung has been disabled from any cause and does not expand fully during inspiration; the healthy portion of the lung must then distend and do vicarious work or the chest wall will sink in to occupy the space. This happens with portions of healthy lungs in the neighborhood of tubercular areas and cicatrices, areas of collapsed

lung or parts prevented from expansion by pleuritic adhesions (in this case the compensatory emphysema is chiefly at the anterior-margins of the lungs). As a rule this distention is physiologic and beneficial, the alveolar walls being stretched but not atrophied; only rarely do they atrophy, then the air cells may fuse, producing true emphysema.

Hypertrophic Emphysema.—This is enlargement of the lung, due to dilatation of the air vesicles and atrophy of the walls.

Osteopathic Etiology and **Pathology.**—The predisposing cause of emphysema is generally found to be due to derangements of the tissues, usually vertebræ and ribs, which affect the innervation to the lung tissues. Such lesions are found in the vagi and spinal dorsal nerves. The atlas may be involved, but it is generally the ribs and dorsal vertebræ. Congenital weakness of the lung tissues, probably due to non-development of the elastic tissue, is a predisposing factor. This disease has a markedly hereditary character and frequently starts early in life. The heightened pressure within the air cells upon an already weakened lung tissue produces emphysema. Hence, the obstinate cough of chronic bronchitis and expiratory straining of asthma are sometimes the immediate cause. In all attacks of severe coughing or straining efforts, the glottis is closed and the air is forced into the upper part of the lungs, forcibly expanding them, and here is where emphysema is found to be most advanced. This disease is also found in players of wind instruments, in glass blowers and in those whose occupation necessitates heavy lifting or straining.

Pathologically, the thorax is barrel-shaped. The lungs are enlarged and do not collapse when the thorax is opened, as they have lost their elasticity. The organs are pale, soft and downy to the feeling and pit on pressure. Enlarged air vesicles may readily be seen beneath the pleura. Microscopically, there are seen atrophy of the vesicular walls and a diminished amount of elastic tissue. There is more or less obliteration of the capillaries, and the epithelium of the air cells undergoes a fatty change. There is usually chronic inflammation of the bronchial tubes, which may be roughened and thickened, and the longitudinal lines of the submucous elastic tissue stand out prominently.

The diaphragm is lowered and the subjacent viscera are displaced. The most important morbid changes are found in the heart, the right chamber being dilated and hypertrophied. This is caused by the increased tension in the pulmonary artery, which is enlarged and the seat of atheromatous degeneration. In long standing cases the hypertrophy is general. Changes in the liver, kidneys and other viscera are those associated with prolonged venous engorgement.

Symptoms.—The onset of the disease is usually gradual. The first symptom to be noticed is the shortness of breath. In rare cases it may exhibit a more acute development, as after whooping cough, and then the first symptom will be dyspnea. In some cases this persists all the time, while in moderate emphysema the dyspnea is noticed only on slight exertion, such as going up-stairs, running or walking rapidly. The lungs are always filled with air which is charged with carbonic acid and does not change, as the patient is constantly making ineffectual efforts to draw in air. The inspiration is shortened and the expiration is greatly prolonged and is often harsh and wheezy. The pulse-rate is accelerated; the temperature is usually normal. Cyanosis is a characteristic symptom in well established cases and is of an extreme grade not seen in any other affection. Bronchitis is frequently found in combination, especially in winter. In this case there will be the symptoms of the associated bronchitis, cough, expectoration and sometimes oppression. As the patient advances in age and there are successive attacks of bronchitis, the condition gets worse. In advanced cases, the result of cardiac failures, there may be venous engorgement, dropsy and effusions into the serous sacs.

Physical Signs.—Inspection.—There is a marked change in the shape of the thorax. The chest is rounded with increased circumference, giving it the characteristic barrel-shaped chest. The sternum bulges, as do also the costal cartilages. The intercostal spaces are wide, especially in the hypochondriac region, and narrow above. The clavicles and muscles of the neck stand out with great prominence and the neck itself seems to be shortened on account of the elevation of the thorax and sternum. The

curve of the spine is increased and there is a winged condition of the scapulæ. These changes give the patient a stooping posture. The chest does not expand, but is raised up by the scaleni and sterno-cleido-mastoid muscles which stand out prominently and are hypertrophied. The heart's apex beat is invisible and there is usually marked epigastric pulsation. On **palpation** vocal fremitus is found diminished, but not absent; the apex beat is rarely felt. There is distinct shock over the ensiform cartilage. This is due to the displacement of the heart and engorgement of the right ventricle. There is marked pulsation in the epigastrium. On **percussion** there is sometimes increased resonance, almost amounting to tympany. The upper level of hepatic dullness is depressed. The heart dullness may be obliterated and the upper limit of splenic dullness may also be lowered. The **percussion** note is greatly extended. **Auscultation** reveals that the inspiration is short and feeble while there is prolonged expiration, the normal ratio being reversed. In associated bronchitis rales are frequently heard. The pulmonary second sound is accentuated.

Diagnosis.—Unless complicated the diagnosis is generally easily made. The enlargement of the thorax, with dyspnea and hyper-resonance and a prolonged expiration will differentiate emphysema from **chronic bronchitis.**—**Pneumothorax** is of sudden development while emphysema is of slow development. **Pneumothorax** is almost always unilateral, and it gives a tympanitic percussion note. In auscultation there is amphoric breathing and metallic tinkling and absence of any vesicular murmur.

Prognosis.—The disease is rarely fatal, although death may result from heart failure, dropsy or pneumonia. Thorough and persistent treatment will generally relieve the primary condition. The disease, as a rule, runs a long course but does not necessarily shorten life.

Atrophic emphysema is a senile change.

Treatment.—In cases of recent occurrence one may be able to build up the altered lung tissue by treatment of the innervation to the lung structure, viz.: the vaso-motor nerves from the second to the seventh dorsal, the vagi, and the cervical and dorsal sympathetics. When a number of air vesicles have been converted

into one sac, it is impossible to restore the altered lung structure and a treatment to relieve the symptoms and to prevent the further progress of the disease is indicated. In all cases treatment should be applied to correct any vertebræ or ribs of the upper dorsal region that may be displaced, and to raise and spread the ribs so that the lung structure may be better nourished and strengthened and that the aeration of the blood will be more perfect. Treatment of the vagi nerves is important, as their physiological action on the lungs is to increase their movement.

The general health of the patient is an important consideration and everything should be done to promote as healthy a condition as possible. The digestion should be carefully looked after and everything done to restore a normal state of the blood.

Strengthening the cardiac action will be of service in relieving any dropsical tendency that might occur on account of obstruction to the pulmonary circulation. If bronchitis or asthma occurs, their respective treatments are indicated. A general treatment of the splanchnic and lung vascular areas should be given to prevent any disturbance in the circulation which might cause congestion of the liver, congestion of the hemorrhoidal veins, or catarrh of the stomach and bowels.

"Free evacuation of the bowels and measures to relieve any flatulent distention are very needful in cases of emphysema to take off from the diaphragm any pressure from below, and to allow it to descend as freely as possible. With this view also the food should be concentrated, nourishing, and not bulky."[1]

It is a good plan to instruct the nurse or attendant to aid inspiration by raising the arms strongly above the head during inspiration and to compress the chest during expiration so as to coincide with natural breathing, which will render the aeration of the blood greater and increase the elasticity of the vesicles.

Acute Lobar Pneumonia.

(Croupous Pneumonia).

This is an acute, infectious disease wherein various vertebral, rib and muscular lesions predispose to a lowered nutritive state

1. Yeo—A Manual of Medical Treatment or Clinical Therapeutics, Vol. 1, p. 597.

of the parenchyma of the lung, permitting the invasion of the micrococcus lanceolatus of Frankel, with consequent local inflammation and pronounced constitutional disturbances, chill, extreme prostration and fever, which terminates abruptly by crises. Secondary infective processes are frequent.

In describing a typical case of pneumonia it is considered as a self-limiting disease. By osteopathic treatment it is usually aborted or, at least, its course much shortened. In such a case it is not typical pneumonia and could not be described as such.

Osteopathic Etiology and **Pathology.**—Age, sex and climate exert little predisposing influence. Males are, on the whole, more frequently attacked. Pneumonia frequently follows injuries of the chest. Various derangements of the ribs and vertebræ are always found in pneumonia; such derangements correspond with the regions of vaso-motor, motor and trophic fibres of the lungs, viz., second to seventh dorsal, inclusive, and the upper cervical vertebræ, the latter region affecting the vagi. The muscles of the chest region are always severely contracted. These various disorders produce a lowered vitality of the bronchial and lung tissues, thus favoring the existence of the micrococcus lanceolatus. Unhygienic surroundings, alcoholism, any or all habits that tend to depress the nervous system, or lowered vitality from some pre existent disease, like diabetes, Bright's disease, organic heart affection or one of the infectious fevers, favor its development. One attack undoubtedly predisposes to another and repeated attacks may occur in the same individual. The exciting cause is the invasion of the lung by pathogenic bacteria, especially by Frankel's diplococcus pneumoniæ.

Pathologically, the lung in croupous pneumonia exhibits three distinct stages—congestion, red hepatization and gray hepatization. In the **stage** of **engorgement** the tissue is red in color, firm and solid and less crepitant than the healthy lung. The cut surface is bathed in blood and stained serum. Microscopic examination shows the capillaries to be dilated and tortuous. The alveolar epithelium is swollen and the air cells filled with a variable number of red corpuscles, detached alveolar cells and a few leucocytes. During the **stage** of **red hepatization** the tissue

is solid and airless. It is reddish brown in color and of a dry, mottled appearance. It is very friable and does not crepitate, as the affected portion is airless. Its weight and specific gravity are increased so that it sinks in water. The torn surface presents a granular appearance, which is due to the minute fibrinous plugs which fill the air cells. On microscopic examination the air spaces are found filled with coagulated fibrin. The tissue contains red blood corpuscles and pus cells and the walls of the air cells are infiltrated. In sections properly treated the diplococcus is detected, and in some cases also the streptococcus and staphylococcus. In the **stage** of **gray hepatization,** the lung is still dense and heavy, but the surface is moister and softer, while the lung tissue is even more friable and the red color gives place to a mottled gray. The exudate loses its granular character and a yellowish white purulent liquid flows from a cut surface. Microscopically, the air cells are densely filled with leucocytes, while the red corpuscles and fibrin filaments have disappeared. The stage of gray hepatization is the stage of beginning **resolution.** The exudate is softened. The cell elements are disintegrated and absorbed by the lymphatics. In unfavorable cases the consolidated lung may become infiltrated with pus, and abscesses occur. In some instances the tissue is gangrenous, or it may become the seat of fibroid induration. These, however, are rare.

Symptoms.—The disease begins abruptly, usually with a severe chill, lasting from half an hour to an hour, the fever rising rapidly. There is a sharp pain in the side, the skin becomes harsh and dry, the face is flushed, the eyes are bright and the expression anxious. A short, dry, painful cough soon develops. The expectoration presents a characteristic, rusty or blood tinged appearance and is extremely tenacious. The temperature rises rapidly to 104 or 105 degrees F., and continues high for from five to ten days and generally terminates by crisis. The pulse is full and bounding, but the pulse-respiration ratio is not maintained. There is marked dyspnea, the respirations ranging from forty to fifty per minute. Examination of the lung shows the physical signs of consolidation—blowing breathing and fine rales. Head-

ache, gastro-intestinal disturbances, sleeplessness, epistaxis, rarely delirium except in drunkards, may also be present.

The symptoms given are those of a typical case of pneumonia, but all are subject to modification. The onset may be gradual and the chill absent. In all cases, and especially drunkards, the temperature may not be high, while the pulse is often feeble and rapid instead of full and strong, and the physical signs may not make their appearance until the second or third day.

Special Symptoms.—The **fever** rises abruptly in the initial chill, the temperature reaching 104 or 105 degrees F., and is continuous with a variation of a degree or two. The fever terminates by crisis after having continued from five to nine days. The temperature commonly falls during the night and is accompanied by a profuse perspiration. The temperature may fall from five to eight degrees in eight to twelve hours.

The **sputum** at first is mucoid and frothy. About the second day it becomes of a characteristic color, quite copious and consisting of a frothy, fluid mucus, containing small viscid masses. It is very viscid and glutinous, in some cases almost from the onset. In old and previously weak persons, there may be no expectoration. Under the microscope the sputum is seen to contain red blood-corpuscles, leucocytes, alveolar epithelium, the micrococcus lanceolatus as well as other micro-organisms, pus corpuscles and small fibrinous casts. A stabbing **pain** is a common early symptom, as well as a dry, short **cough.** The **urine** is febrile, scanty and high-colored. Urea and uric acid are increased. A trace of albumin is often present, and there may be symptoms of acute nephritis. **Herpes** is common. The naso-labial herpes appear from the second to the fifth day, and they may occur upon the cheek, genitals and also upon mucosa of the tongue. It is supposed to indicate a favorable prognosis. There is redness of the cheek, usually on the affected side. The mucous membrane of the mouth is dry. The tongue is white and furred. Anorexia and thirst are present. The patient is usually constipated, but diarrhea may occur. Vomiting is common. The spleen is usually enlarged, but the liver is not perceptibly increased in size, unless there is extreme engorgement of the right heart. The **pulse** is

full and bounding. The average pulse-rate is from 100 to 108 per minute. In consolidation the left ventricle receives a lessened amount of blood and the pulse may become small. In the aged and debilitated, a small, weak and rapid pulse may be present. The **heart sounds** are usually loud and clear and in favorable cases the pulmonary second sound is accentuated, owing to the increased tension in the pulmonary vessels. Upon distension of the right chambers and failure of the right ventricle, the second sound becomes less distinct which is a very unfavaroble symptom, for very much depends upon the strength of the right ventricle in pneumonia. The **blood** usually exhibits leucocytosis which disappears with the crisis. In malignant pneumonia this is absent and its continued absence is an unfavorable sign. The proportion of fibrin is also greatly increased. The diplococci can rarely be seen. Headache is common as an initial symptom and may be persistent. The disease is often ushered in by convulsions, especially in children; consciousness is usually retained throughout the whole attack, even in severe cases, though in some cases there is delirium. In drunkards delirium tremens may be present from the onset. In these cases the patient often wanders about until the preliminary excitement gives way to coma.

Physical Signs.—Stage of **Congestion.**—Diminished expansion, the movements of the affected side are defective, the face is flushed and the patient lies on the affected side. Tactile fremitus is slightly increased. There may be tympany over the involved area from diminished intrapulmonary tension. In the latter part of this stage there is impairment of resonance. Fine crepitant rales are heard at the end of forced inspiration.

Stage of **Red Hepatization.**—The breathing is markedly abnormal. Very little or no expansive motion of the chest over the affected region. Vocal fremitus is markedly exaggerated. The skin is hot and dry and the pulse frequent. Dullness over the affected parts with an increased sense of resistance is present. There is high-pitched, prolonged, bronchial breathing when the lung becomes solidified. When the larger bronchi are completely filled with exudate, tubular breathing is absent. Crepitant rales may also be heard.

Stage of Gray Hepatization.—Largely the same physical signs are repeated in this stage as in the second. The normal manner of breathing returns, as does also the normal expansive movement of the affected side. Crepitant rales reappear. The temperature of the skin is lessened, breathing changes from bronchial to vesicular and bronchial resonance continues for some time.

Complications.—**Pleurisy** is the most frequent complication. Pneumonia on one side and pleurisy on the other is possible. The pain is more acute and localized. The respiration is greatly affected and the usual signs of effusion are present. **Pericarditis** is more common in the pneumonia of children. Though usually plastic it may be sero-fibrinous, but rarely the fluid is purulent. There is increased dyspnea, the pulse becomes weaker, and the heart sounds are gradually suppressed. **Endocarditis** is a comparatively frequent complication. It is more liable to attack persons with old valvular disease and to affect the left heart. The physical signs are sometimes absent and even when present are liable to be very deceptive. It may, however, be suspected in cases where the fever is protracted; when septic manifestations, such as chills, sweats or irregular temperature, develop; when embolic symptoms appear, or when a rough, diastolic murmur develops. **Meningitis** is the most important complication and usually comes on at the height of the fever. This complication is rarely recognized unless the basilar meninges are involved. It is frequently associated with ulcerated endocarditis. Cerebral embolism causing hemiplegia has been observed.

Diagnosis.—A typical case of pneumonia is easily recognized. The abrupt onset with rigor, the rapidly developed fever, the sputum, physical signs and abnormal pulse-respiration ratio, as a rule make the diagnosis easy. Frequent examination of the lungs should be made in Bright's disease, diabetes, organic affections of the heart, cancer and alcoholism, as all these affections are liable to become complicated with acute pneumonia. **Pleurisy** is often confounded with pneumonia. The resemblance between friction sounds and creptiant rales is often very close. In pleurisy vocal resonance and vocal fremitus are diminished; there is no "rusty" sputum; the percussion dullness may change with the

posture of the patient, and the breathing is distant and weak. **Typhoid pneumonia** may be mistaken for typhoid fever with pneumonia. Hypostasis occurs late in typhoid fever while dullness sets in early in pneumonia. The history of the onset will be of aid, as pneumonia as a complication sets in late in the disease. The Widal test will be of value. **Acute phthisis** may begin with a chill and may resemble pneumonia very closely, especially the physical signs. Examination of the sputum will show the bacilli of tuberculosis.

Prognosis.—This largely depends upon the previous health of the patient. At the extremes of life the prognosis is much more unfavorable. It is especially fatal in drunkards. The mortality of the "old schools" is from twenty to forty per cent., but there is no doubt that great blunders have been made in the treatment of pneumonia to render such a high death rate. By competent osteopathic treatment this rate may be materially lessened and this disease, dreaded by both physician and patient, need not seem so fearful. The death rate from pneumonia during the past few years has been appalling. In New York and Chicago nearly one-eighth of the deaths the year around are due to pneumonia, and during certain months of the year twenty-seven or eight per cent. of all deaths are due to this disease. So great were its ravages that a special commission was appointed in New York, recently, to determine, if possible, its cause and cure. Drug medication is notoriously unreliable, the most competent physicians freely admitting that they are practically powerless to stay the ravages. Given a patient with a fair constitution, osteopathic treatment will offer reasonable hope to the sufferer. There is no question that osteopathy merits much commendation in the treatment of pneumonia. Many severe cases have been cured and many more have undoubtedly been aborted. The treatment is directly applicable and specifically indicated, and coupled with good nursing and hygiene, the mortality rate of the old schools is being markedly lessened.

Treatment.—The treatment of pneumonia must be both constitutional and local. By this is meant that the systemic

strength and vigor must be maintained in addition to treatment of the chief lesion of the disease, which is located in the lungs.

During the various stages of the disease, the treatment should be directed to the nerves of direct innervation that control the capillaries, and to the vaso-motor nerves of the pulmonary circulation, in order that the hyperemic and inflamed state of the pulmonary capillaries and adjacent tissues may be lessened and the circulatory system equalized. The disordered tissues that should be corrected in order that the centers of the spinal cord and the nerves that influence the function and structure of the lungs may be relieved, are: contraction of the thoracic and dorsal muscles, subluxations of the ribs and dorsal vertebræ from the second to the seventh, inclusive, and the upper cerivcal vertebræ that may become disordered and impinge upon the vagi nerves. Also, carefully treat the middle and inferior cervical regions for the lymphatics of the lungs. Each of these regions should be carefully examined and thoroughly treated whenever found involved. The specific micro-organism that influences the course of pneumonia is naturally a very important factor; but observing and improving the general health, and establishing an unobstructed circulation through the diseased lung tissues will hasten the crisis by favoring a rapid formation of anidotal substances to neutralize the poisonous substance produced by the micrococcus lanceolatus of Frankel. Healthy tissues, which occur only where there is uninterrupted freedom of vascular supply and nerve force, are obtained by correction of any and all anatomical disorders. This will rapidly decrease any lethal tendency in the patient and at once abort the cause of the disease so that all that is needed is sufficient time for nature to heal the diseased tissues. Thus the principal predisposing cause of specific diseases, as in all diseases, is some disorder of the anatomical tissues so that normal physiological functions are interferred with, and the determination of the different kinds of disease is from a difference in location of the lesion and a difference in the nature of the micro-organism involved in each disease. What is necessary in many cases is a correction of the mechanical predisposing condition and the exciting and determining influences will be rendered inactive.

The importance of close attention to both vagi can not be overestimated. Any obstruction above or below the origin of the superior laryngeal nerve is followed by loss of motor power of the lungs, thus causing difficult and labored breathing. The lungs become surcharged with blood, because the air pressure in the lungs is low and the thorax is distended. This condition is followed by serous exudation. Thus obstruction of the vagi may be one factor in the cause of pneumonia. Obstruction of the vagi below the origin of the recurrent laryngeal nerves affects the lower and middle lobes of the lungs, and produces also a catarrhal inflammation of the upper lobes. The recurrent laryngeal nerves may be obstructed by dilatation of the aorta or subclavian artery as they wind about them; also by dislocations of the first and second ribs, which may affect the nerves not only directly, but by causing an obstruction to the subclavian vessels with a consequent disturbance of the aorta and the heart. The recurrent laryngeal nerves may be treated directly at the inner lower part of the sterno-mastoid.

One of the chief objects of the treatment should be to prevent **heart failure** and to lessen the pulse-respiration ratio. The average pulse-rate in typical cases is from 100 to 110 per minute and when it exceeds this to any extent, say 120, there is cause for alarm. At first the pulse is full and bounding, later it is small on account of a lessened amount of blood reaching the left ventricle and systemic circulation, owing to the extensive consolidation. In treating heart failure particular attention should be paid to the condition of the ribs on the left side over the region of the heart, the second to the fifth, inclusive. A correction of any disturbance to the inhibitory nerves of the heart, (the vagi) and the accelerator fibres of the heart (the cervical sympathetic) should be made. General treatment of the entire system will relieve the heart of some work and favor an equalization of the vascular system. Also by the use of hydrotherapy the maintenance of the heart's action may be accomplished. Cold compresses, and not warm ones, should be used, as the latter relax the vessel walls, producing more or less paresis of the vessels, while the former stimulate the vaso-dilators, producing dilatation and tone of the

vessels, thereby causing a vigorous increase in the flow of blood. This relieves the heart by increasing the cutaneous circulation, besides increasing arterial tension. The right heart is indirectly aided by the increase of the tension in the general vascular system, and the vessels of the pulmonary circulation have more force expended upon them and a greater contraction of their vessels occurs on account of the dilatation of the cutaneous vessels. The temperature of the water used should be 60 degrees F., and the compress applied for thirty minutes or as long as necessary.

In addition to the fever treatment in the cervical region, the gradually cooled tub-bath will be of aid. The temperature at first should be ninety degrees F. and then gradually cooled to eighty degrees F. The duration should not be over ten or fifteen minutes. Care should be taken that the patient does not exert himself. He should be lifted in and out of the baths. These baths also have a marked effect upon the respiratory and nervous centers. The ice-bag over the chest and spine has a beneficial influence; still, with feeble children be exceedingly careful when applying or using cold methods.

During all stages of the disease, the best possible care should be taken of the patient. See the patient frequently, probably twice a day or oftener. Each time thoroughly relax the dorsal muscles and re-adjust the ribs, for as every osteopath of experience will note (and Dr. Still particularly emphasizes) the contracted muscles frequently and continually displace the ribs.

Experience has shown that the first treatment is of the greatest importance and if the osteopath will control the predominant symptoms at that time the rest will be much simplified. For that reason it is best not to leave the patient until the chest pain, fever, high pulse or whatever may be present, are well in hand, although it may mean a long visit. Treat the conditions existing and wait; then treat again and the result will more than repay. There is always more than a chance of aborting the disease, but the first treatment is often the crucial test. F. E. Moore reports numerous cases treated without a fatality and the average duration of the disease not exceeding five days. Many other instances can be cited equally favorable. The apartment should be

well aired and a temperature of 65 degrees F. maintained. In the very young the temperature should be higher. The diet is exceedingly important. Give a liquid, light and nutritious one, a milk diet being preferable. Otherwise give meat juice, broths, egg albumin and whey. Avoid starchy and saccharine foods, and give plenty of water. Good nursing and complete rest of body and mind, with careful attention to the activity of the bowels, kidneys and skin, will indirectly aid the clogged up lung fascia to perform its function and hasten an early recovery from the disease. In epidemic forms be particularly vigilant in the employment of antiseptics. (See pages 538–9.)

Broncho-Pneumonia.

(Catarrhal Pneumonia).

Definition.—An inflammation of the minute bronchi and air vesicles. The affection begins with an inflammation of the capillary bronchi, which extends to the air vesicles.

Osteopathic Etiology and **Pathology.**—The disease is most prevalent among the very young and the old. It may occur as a sequence or in association with measles, diphtheria, whooping cough and scarlet fever. Broncho-pneumonia seldom occurs as a primary disease. Exposure to cold, impure air, rickets and diarrhea are marked predisposing causes in children. In the old, debilitating affections and chronic diseases are predisposing causes. Broncho-pneumonia occurs sometimes as a complication in small-pox, erysipelas, typhoid fever and influenza. The principal lesions found upon examination are subdislocated ribs affecting the pulmonary vaso-motor nerves. The third, fourth and fifth ribs are especially apt to be subdislocated. The muscles throughout the thoracic region are generally severely contracted. Another group of cases, the so-called **aspiration or deglutition pneumonia,** are caused by the inhalation of food particles or other substances. Whenever the sensitiveness of the larynx is benumbed (as in comatose states) from any cause, small particles of food are allowed to pass the rima, reaching the smaller bronchi and producing intense inflammation which may even cause suppuration and sometimes gangrene. Cases are liable to occur after opera-

tions about the nose and mouth. It is often secondary to carcinoma of the larynx and esophagus and after tracheotomy and glosso-pharyngeal palsy. A very frequent and fatal form of broncho-pneumonia is caused by the **tubercle bacillus.**

Pathologically, both lungs are usually involved and become heavy. On the pleural surfaces, especially at the base, sunken purplish or slaty patches are noticed, representing collapsed lung tissue. On section small, projecting portions of consolidation are seen, separated from each other by uninflamed and collapsed tissue. The section of lung tissue is of a dark reddish color. The terminal bronchi are filled with tenacious, purulent material. Microscopically, the terminal bronchi and air cells are filled with a plug of exudation composed of leucocytes and desquamated epithelium. The walls of the bronchi are swollen and infiltrated with leucocytes.

Symptoms.—The symptoms are frequently marked by those of the primary affection. The onset is usually gradual. The child becomes feverish; there is increased frequency in respiration and there is an aggravated cough. The temperature rises to 102 or 104 degrees F., the respiration may rise as high as 60 or even 80 per minute. The cough is hard, distressing, frequently painful and accompanied by a muco-purulent expectoration. The pulse is greatly accelerated—120 to 180 per minute. As the disease advances, signs of deficient aeration of the blood are noticed. At first there is a pale and anxious expression of the face, the lips are blue and the child makes strenuous efforts to breathe. The blood soon becomes highly charged with carbon dioxide and, by its benumbing influence upon the nerve centers, sensibility is reduced and the cough and suffering subside. The face becomes livid and death may occur within twenty-four hours from paralysis of the heart.

At the beginning of the attack dullness is absent and subcrepitant and sibilant rales are present. Areas of consolidation soon become manifested. There is slight impairment of resonance and the breathing is harsh. Upon inspection there is, in grave cases, retraction of the base of the sternum and of the lower cartilages, pointing to defective expansion of the lung.

Diagnosis.—This is usually easy, developing as it generally does in the course or at the conclusion of another disease, with a gradual onset as a rule, and irregular fever and a long duration, besides usually occurring in children under five. If the areas of consolidation are large, involving the greater part of a lobe, it is sometimes very difficult to distinguish bronchial pneumonia from lobar pneumonia. **Lobar pneumonia,** when occurring in children, is usually between the ages of five and fifteen. The onset is abrupt in a child of good health; it resolves rapidly; there is rusty colored sputum and continued fever falling by crisis. **Tuberculous broncho-pneumonia** is very hard to differentiate from simple broncho-pneumonia. A great many cases can be correctly diagnosed only after the lapse of considerable time. The presence of signs of softening, considerable disease of the apices, and examination of the sputum, or in the case of a child, of the vomited matter, would diagnose this form. If elastic fibres and tubercle bacilli are found in the sputum or vomited matter, the diagnosis is at once decided in favor of tuberculous broncho-pneumonia.

Prognosis.—The prognosis depends on the cause. In children that are previously weak and debilitated the disease is very fatal. When the disease follows measles and whooping cough, the fatality is not so great. In adults the prognosis is about the same as in the coupous form. The deglutition variety is apt to be fatal.

Treatment.—A great deal can be done to prevent the disease by careful attention to debilitated children in keeping them warm and protected at all times. There is usually a preexisting bronchitis. In measles and whooping cough and during convalescence, the child should be well taken care of.

A thorough, persistent treatment of the dorsal vaso-motor nerves posteriorly should be given. Derangements to the third, fourth and fifth dorsal nerves are most likely to be found; the principal vaso-motor innervation to the bronchials and air vesicles is from this region. Treatment over the chest anteriorly is of great aid, especially an upward and outward manipulation of the ribs should be given. Attention should be given the vagi nerves to increase the activity of the lungs as well as for the effect gained upon the circular fibres of the bronchi. Care should be

taken that the fifst rib is not impinging upon the first thoracic ganglion.

Ice-bags over the chest are helpful. The chest should be protected from changes in temperature by a jacket of cotton batting. The diet should consist of milk, egg albumin and broths. Keep the temperature at about 70 degrees F. and the air of the room moist and free from draughts. When the fever is high, sponging or the wet pack is helpful. The bowels from the beginning of the attack should be carefully watched.

There is danger of a **failing heart;** this is generally associated with mucous rales and cyanosis. Douching alternately with hot and cold water will usually excite coughing and overcome the difficulty. The gradually cooled bath will have a marked effect in reducing the temperature, quieting the nervous symptoms, increasing the respiratory power and promoting sleep.

In the first stage of pneumonia, Hazzard[1] says, "There is better opportunity to correct the specific lesion, as the patient's strength will allow of such treatment. The work is also aided by the fact that the alveoli are still open, and lung action, stimulated by treatment, may become a valuable aid in dispelling the engorgement." This is a most valuable suggestion, but be exceedingly careful in subsequent treatments not to treat too hard and thus lame and bruise the patient.

Series I, II, III, and V of the American Osteopathic Association Case Reports present several interesting cases of pneumonia which typify the importance of immediate and direct correction of the osteopathic lesions.

Herman[2] cites an interesting case of delayed resolution, due to a depressed condition of all the ribs on the affected side with marked luxation of the eighth. The lesion at the eighth was the cause of a prolonged attack of hiccoughs which prevented resolution. It is pointed out that there is an abundant intercostal nerve supply to the diaphragm from the eighth and ninth intercostals. C. E. Achorn instances an autopsy of patient dying of pneumonia, where a bony ankylosis was found at the second dorsal; this lesion was probably an important predisposing factor.

1. Hazzard—Practice of Osteopathy p. 91.
2. Herman—An Unusual Feature in a Case of Pneumonia—Journal of the American Osteopathic Association, July 1906. (This refers to lobar pueumonia.)

Broadly speaking, one should keep in mind the following: First, early treatment will frequently abort what would ultimately be pneumonia—still, in the preceding it is not these cases that are especially referred to, but those following the course of a typical pneumonic process; second, both specific and general treatment prior to the crisis will materially lessen the severity of the disease; third, the crisis corresponds to beginning resolution (during resolution expectoration and liquefaction and absorption of the exudate are paramount features) and must be met promptly and vigorously, special attention being paid to the heart; and, fourth, during convalescence good, general attention and care of patient as to treatment, hygiene, diet, and climate, are important. (This refers especially to lobar pneumonia.)

Chronic Interstitial Pneumonia.

(Fibroid Induration).

Definition.—A chronic, inflammatory disease of the lungs, characterized by an overgrowth of fibrous or connective tissue.

Etiology.—With few exceptions chronic affections of the lungs cause more or less fibroid overgrowth. This is especially frequent after bronchial pneumonia and pulmonary tuberculosis. It is also excited by abscesses, hydatids, syphilis, emphysema, sarcoma and old fibrinous pleurisy. It may also be caused by compression, by aneurism or neoplasms. It may arise as a primary affection, due to the inhalation of irritating dusts (stone dust, coal dust and metal dust). There will be found deeply seated osseous lesions of the upper and middle dorsal region and corresponding ribs, and frequently of the cervical vertebræ.

Pathologically, as it involves limited or extensive areas, it is recognized as **local** or **diffuse.** It is a unilateral affection. The involved portion is shrunken and on section it is found to be tough, firm, of a greenish color and containing an overgrowth of fibrous tissue. If it affects the left side the heart may be displaced. The unaffected lung is usually enlarged (compensatory emphysema). There is hypertrophy of the right ventricle of the heart.

Symptoms.—There is a chronic cough, which varies greatly in its severity; moderate dyspnea, and a variable expectoration. There is no fever and the general health of the patient may be preserved for a number of years. The expectoration is generally copious, muco or sero-purulent, rarely fetid. There is retraction of the affected side, displacement of the apex beat and lateral curvature of the spinal column. The unaffected side is enlarged. The intercostal spaces disappear, the ribs sometimes even overlapping. The tactile fremitus is generally increased, but if the pleuro-membrane is thickened the fremitus may be decreased. There is generally impairment of resonance. A tympanitic or amphoric note may be heard over a dilated bronchus. On the sound side the percussion note is generally hyper-resonant. The breathing sounds may be feeble. They may be bronchial or cavernous, but rather amphoric. Late in the disease cardiac murmurs are not uncommon.

Diagnosis.—This is never difficult. It is mainly to be distinguished from **fibroid phthisis.** In the latter both lungs are involved and there is fever and bacilli are found in the sputum.

Prognosis.—The disease is exceedingly chronic and may last for many years. Death may result from gradual failure of the right heart, hemorrhage or from intercurrent attacks of acute pneumonia involving the other lung.

Treatment.—Little can be done for this condition. Intercurrent bronchitis may be somewhat relieved by the treatment for chronic bronchitis. The patient should dwell in a mild climate. Hygienic surroundings and nutritious food are indicated. Something can be done by attempting to correct the condition of the ribs and vertebræ, but this measure, from the nature of the disease, is generally palliative at best.

Congestion of the Lungs.

Congestion of the lungs may be active, passive or hypostatic. The two former have particular osteopathic significance, owing to the lesions involved.

Active congestion may result from violent physical exertion, excessive alcoholic indulgence, inhalation of hot air or as a symp-

tom in pneumonia and other pulmonary affections. There is dyspnea and cough with rusty expectoration of a frothy nature. On percussion, the note is dull with increased tactile fremitus and bilateral involvement. Absence of fever is a distinctive feature.

Prognosis is good under osteopathic treatment, but it must be promptly met as it is usually a symptom of another disease.

Treatment is the same as in the beginning of pneumonia.

Passive congestion, when not hypostatic, is mechanical and due to an impeded return of blood to the left heart from mitral stenosis, or regurgitation, dilatation of the right ventricle and cerebral disease. The lungs are large with distended pulmonary vessels with venous blood in the air spaces. There is dyspnea and cough, with blood-streaked, frothy expectorations.

The **treatment** is primarily of the condition causing the congestion, but in addition the upper ribs should be raised and thorough treatment given the dorsal region as outlined under pneumonia.

Hypostatic congestion results from a weakened heart in exhaustion, infection or old age; also from continued dorsal decubitus. Rheumatic fever, tuberculosis and other constitutional diseases, as well as organic growths, may predispose. The condition gives rise to a mild form of lobar pneumonia. **Symptoms** are not well defined and often are not recognized. There may be slight dullness, increased fremitus, liquid rales and other signs of a venous engorgement.

In **treatment** the first move is to change position of the patient and then look after any underlying cause. Osteopathically, follow treatment of pneumonia. In all cases of circulatory involvement of the lungs, treatment to relax muscles or to adjust vertebræ and rib lesions to the vaso-motor nerves of the lungs is very efficacious. Landois (1904) says: "Irritation of sensory nerves, particularly if intense and long continued, causes a dilitation of the vessels in the areas innervated by them."

Edema of the Lungs.

There are two forms of **edema,** collateral and general, which follow an intense congestion with transudation of serum into the air vesicles and interstitial tissue. The **collateral form** is localized and usually appears in connection with pneumonia, pulmonary infarcation or abscess. In **general edema** the base of the lung is involved to a greater extent, but the whole structure is affected and hydrothorax is generally present. The **cause** of edema is not well understood, but may result from a long line of constitutional diseases. The **symptoms** are dyspnea, cough with copious, blood-streaked sputum which is expelled with difficulty. There may be fever in the inflammatory type with weak, increased pulse. Dullness over the affected area, broncho-vesicular breathing and small liquid rales are audible. The **diagnosis** must largely be made upon the bilateral dullness at the base of each lung and physical signs noted above. **Prognosis** depends on the condition causing the edema and treatment should be directed to correcting it. This should be followed by osteopathic treatment to free the lungs of the effusion as outlined under pneumonia, especially relaxation of the upper dorsal and cervical muscles, seperation of the upper ribs and stimulation of the heart.

DISEASES OF THE PLEURA.

Pleurisy.

Definition.—An inflammation of one or both pleural membranes.

Varities.—Etiologically, it may be divided into primary and secondary pleurisy; also, into acute and chronic pleurisy. Anatomically, the cases may be divided into dry pleurisy and pleurisy with effusion (sero-fibrinous, purulent, hemorrhagic).

Acute Pleurisy.

(Fibrinous or Plastic Pleurisy).

The affection may be be primary or secondary. As an independent affection it is rare. It may follow exposure to wet and cold or it may be due to mechanical injury. The disease may set

in with pain in the side, slight fever and the friction sound of pleurisy may be present. These symptoms last a few days and then disappear and no exudation occurs. The pleural surfaces become more or less united.

As a secondary process, dry **plastic pleurisy** arises from extension of the inflammation in acute or chronic diseases of the lung, especially pneumonia. Abscesses, gangrene and cancers also cause plastic pleurisy. It sometimes occurs in acute articular rheumatism, and in a large number of cases is associated with **tuberculosis.** This condition may be a complication in chronic Bright's disease and in chronic alcoholism.

In the **fibrinous form of pleurisy** the serum is scant and the membrane is covered with a sheathing of lymph, which finally organizes and adhesion takes place between the opposing surfaces.

Sero-Fibrinous Pleurisy.

This form is known as pleurisy with effusion. There is little lymph, the exudate being mainly composed of serum.

Osteopathic Etiology and Pathology.—Many cases rapidly follow exposure to cold, wet or an injury to the thorax. Exposure to cold is considered a mere predisposing agent, permitting the action of various micro-organisms. The large majority of cases are due to **tuberculous** infection of the pleura.

The osteopath finds that the predisposing causes of pleurisy in every instance are injury to the chest wall, ribs and vertebræ, and exposure to cold, causing contraction of the thoracic muscles. These injuries and strains throughout the chest result in an interference with the intercostal and phrenic nerves, and also with the intercostal and internal mammary arteries; consequently, there is produced a lowered vitality of the pleural tissues, which permits the attack of the micro-organisms. It may be secondary to rheumatism, Bright's disease, cancer and cirrhosis of the liver.

Pathologically, there is an abundant exudation of serum. Fibrin is found on the pleura, and is rarely abundant in the serous fluid in the form of floculi. The fluid is straw colored as a rule. It varies greatly in quantity from one-half to four litres. Mi-

croscopically, there are found leucocytes, a variable number of red corpuscles, shreds of fibrin and occasionally cholesterin, uric acid and sugar. The composition of the fluid resembles blood serum. On boiling it is found to be rich in albumin.

Various displacements of the adjacent organs are caused by the effusion. The lung is more or less compressed into the back part of the pleural sac. The heart is displaced. The diaphragm may be crowded downward. On the right side this lowers the liver; on the left it displaces the stomach, transverse colon and sometimes the spleen.

Symptoms.—The onset may be abrupt with a chill, severe pain in the side and fever. With few exceptions the disease comes on insidiously, pain in the side being the first symptom. The pain is sharp and cutting and is aggravated by breathing or coughing. There is moderate fever, the temperature ranging from 102 to 103 degrees F. Dyspnea may be present at the onset and is due partly to the fever and partly to the pleuritic pain. When the fluid is effused slowly, dyspnea may be absent except on exertion. It is most marked when the effusion has developed rapidly. As the effusion accumulates and the inflamed surfaces separate, the pain diminishes and, as a rule, soon disappears.

Physical Signs.—Immobility and bulging of the affected side, depending on the amount of exudation. The intercostal spaces are obliterated. The apex beat of the heart is displaced. Upon **palpation** the limited movement of the chest is more accurately determined. Tactile fremitus is greatly diminished and soon abolished. The position of the heart's impulse can be readily located by palpation. Displacements of the liver and spleen can be felt through the abdominal walls. At first the **percussion** notes are impaired and later there is dullness which gradually rises as the fluid increases. The upper line of dullness is not horizontal when the patient is in the erect posture, but is higher behind than in front. Above the effusion in the sub-clavicular region, percussion gives a tympanitic note, the so-called Skoda's resonance. In moderate effusions the level of dullness often changes with the position of the patient. Early in the disease a friction rub can usually be heard. As the fluid accumulates, the

breath sounds become weak, distant and may have a tubular or bronchial quality. Vocal resonance is usually diminished or absent. There may, however, be bronchophony or it may manifest a nasal or metallic quality, resembling somewhat the bleating of a goat (Lænnec's egophony).

Duration.—The course of acute sero-fibrinous pleurisy is extremely variable. The fever is due to inflammation and may last for two or three weeks, when it may subside. The cough and pain disappear and the effusion, which is usually slight in these cases, may be absorbed quickly. In cases where the effusion is poured out rapidly it may be absorbed just as quickly. In cases where the effusion is poured out slowly or where the effusion reaches as high as the fourth rib, recovery is usually slower. Large effusions may persist without change for months and finally the case may become subacute or chronic. This is particularly true of tuberculous cases.

Prognosis.—This depends largely upon the cause; on the whole, prognosis is favorable. Death is a rare termination of sero-fibrinous effusion; death may, however, occur suddenly without sufficient lesions to explain the cause. The exudate may become purulent.

Purulent Pleurisy.

(Empyema).

Empyema is a suppurative inflammation of the pleura. It is often secondary to a sero-fibrinous pleurisy. It frequently follows the infectious fevers, especially scarlet fever, less frequently, typhoid fever, measles and whooping cough. In children the effusion in many cases becomes purulent early, and many are probably purulent from the beginning. Fracture of the ribs, penetrating wounds, malignant affections of the lungs or esophagus, and especially perforation of the pleura by **tuberculous** cavities, frequently are followed by empyema.

There are four points in particular relative to the underlying causes: **first,** vertebral lesions exert a strain, and consequently irritation and obstruction, upon the spinal nerve at its exit; **second,** the rib lesions irritate and obstruct the sympathetic

ganglion resting against the head of the rib and anchored there by the parietal layer of the pleura; **third,** the rib lesions disturb and obstruct the intercostal blood-vessels; **fourth,** the rib lesions disturb and obstruct the internal mammary blood-vessels. Then in addition there may be cervical lesions that disturb the function of the lymphatics. Thus is the field prepared (a lowered local nutritive state, frequently coupled with general ill health) for infective processes. "Catching cold" will, also, so contract the muscles (with possible resultant osseous lesions) that congestion, followed by inflammation, may take place.

Upon bacteriological investigations, the streptococcus, staphylococcus, micrococcus lanceolatus and tubercle bacillus are the organisms most commonly found. In many cases the pneumococci are present, and as a rule these cases pursue a favorable course.

Pathologically, on opening the pleural sac after death it is generally found that the fluid has separated into two layers—an upper layer of a clear greenish yellow serum, and a thick, purulent lower layer. In a few cases the exudate is fibrino-purulent. It usually has a heavy, sweetish odor. When due to wounds it is generally fetid. It is horribly offensive when associated with gangrene of the lung or pleura. On microscopic examination it has the character of ordinary pus. The pleural membranes are greatly thickened.

Symptoms.—It may begin abruptly with acute symptoms such as rigor, high temperature, prostration and severe pain in the side. More frequently it develops gradually in the course of other diseases or it may follow sero-fibrinous pleurisy. The general symptoms are those of septic infections—chills, profuse sweating and irregular fever; in such cases there is a gradual loss of flesh with palor and weakness. In some cases the characteristic symptoms (pain in the side, cough and dyspnea) may be entirely absent. Examination of the blood invariably shows leucocytosis. Empyema may perforate the neighboring organs, as the esophagus, pericardium, stomach or peritoneum. In rare cases the pus passes down the spine, and along the psoas muscle into the iliac fossa and simulates a psoas or lumbar ab-

scess. It may also perforate externally or rupture into the lungs.

Physical Signs.—Practically they are identical with those of pleurisy with effusion. There are one or two signs, however, which are more or less distinctive of the affection. In children edema of the chest walls is frequently present and the affected side is greatly enlarged. There is obliteration or even bulging of the intercostal spaces. The displacement of the heart and adjacent organs is marked.

Pulsating Pleurisy.—This is a strange phenomenon associated, usually, with empyema. It is of rare occurrence and is met with in sero-fibrinous pleurisy. The heart impulse is forcibly communicated through the effusion. There is an external pulsating tumor which manifests no tendency to point externally. Its etiology is not definitely known.

Prognosis.—A purulent effusion, if left alone, may kill by sepsis or it may become inspissated or rarely encysted. Empyema is a chronic affection and in the majority of cases, if unrelieved, will end in death; a few cases recover.

Special Varieties of Pleurisy.

Tuberculous Pleurisy.—It occurs as: (1) An acute affection with an abundant sero-fibrinous exudate. (2) Sub-acute pleurisy with insidious course; frequently preceding the development of pulmonary pleurisy. (3) Chronic adhesive pleurisy, in which the pleural membranes are greatly thickened and present tubercles and caseous masses.

Diaphragmatic Pleurisy.—In these instances the diaphragmatic portion of the pleura is involved either partly or chiefly. This is generally a dry pleurisy, but there may be either sero-fibrinous or purulent effusion, though rarely large in amount. The symptoms are acute and the pain is situated in the epigastric region. The pain is usually intensified by pressure upon the tenth rib at the point of the insertion of the diaphragm. It is also increased by deep inspiration. Severe dyspnea is a marked symptom in most cases.

Encysted Pleurisy.—This occurs most frequently in purulent pleurisy, and is a form in which adhesions occur so as to form

loculi or spaces which are filled with pus. They are quite difficult to recognize during life.

Interlobular Pleurisy.—The opposed surfaces of two lobes of the lung may become closely agglutinated and sometimes pus is encysted between them. These collections may perforate the bronchi.

Hemorrhagic Pleurisy.—This is characterized by bloody effusion and is met with in asthenic states, however induced, as by cancer, Bright's disease, and occasionally the malignant fevers. Also it is noted in tuberculous pleurisy in which event the hemorrhage occurs from the rupture of newly formed vessels. Occasionally it is met with in perfectly healthy individuals. It must not be confounded with blood that has become mixed with the sero-fibrinous exudate, caused by wounding a blood vessel during tapping, or with hemothorax, due to the rupture of an aneurism, or the pressure of a tumor on the thoracic veins.

Treatment of Acute Pleurisy.

An early treatment and rest in bed with a liquid diet are the measures to be employed at the beginning of the attack. Pay particular attention to any primary disease and to the general health. Rarely is there any difficulty in locating the cause of the disturbance; generally a rib or corresponding vertebra is badly subdislocated over the seat of the disease. The sympathetic and phrenic nerves are involved through the intercostal and phrenic nerves. A careful examination of the side of the chest affected should be made, as there may be more or less obstruction of the intercostals and the internal mammary arteries from their branching of the aorta and subclavian vessels. A dislocation of the first or second ribs may affect the subclavian vessels and its branches markedly; although all the upper ribs and the thoracic muscles should be examined carefully for derangements which would affect these blood-vessels and produce an exudation. Ice-bags upon the chest, as in pneumonia, may be used. Limiting the movements of the chest with a bandage or adhesive strips will give considerable relief.

When the effusion has taken place, carefully raising and spreading the ribs with attention to special points of involvement, will many times cause absorption of the fluid. The daily amount of liquid food should be greatly lessened with a view of depleting the blood serum from various tissues; thus the serum collecting in the pleura, which is a lymph space, will also be absorbed. Treatment of the bowels, kidneys and skin, so that they may be rendered active, will aid in the depletion of the blood serum.

It may be necessary in some cases to aspirate, especially if other methods fail and if the effusion is large. The points of operation are in the mid-axillary line at the seventh interspace or at the angle of the scapula at the eighth interspace. In puncturing the needle should be held close to the margin of the upper rib so as to avoid the intercostal artery. Withdraw the fluid slowly and if faintness is produced, desist. If the exudate reaches as high as the clavicle a litre may be safely withdrawn.

Empyema should be treated surgically. Simply tapping is rarely sufficient. A free incision, as in abscess, and thorough drainage should be made. Care must be taken that the drainage tube is large enough.

"In cases of pleurisy the axilla and the inner arm may be tender and painful; this is due to the pleuritic inflammation being carried by the way of the 'nerve of Wrisburg.'

"The pleuritic pain in the costal muscles compels restricted movement of the ribs and also limits the respiratory function of the diaphragm. These painful cramps and stitches are independent of the pain arising alone from the inflamed pleural surface, and the diminution of the respiratory movements is due to a particularly contractured state of the muscles of the chest as is demonstrated by the fact that the patient can not draw a long breath; hence one may reasonably conclude that nature has so distributed nerves to the pleura as to enable that serous membrane to control the muscles which create movements of the adjacent costal surfaces and thus insure its quietude during the stages of inflammation or repair." (Ranney).

Chronic Pleurisy.

Definition.—Chronic inflammation of the pleural layers. Exudative and dry or plastic pleurisies are the two forms in which this affection occurs.

Chronic Pleurisy with Effusion.—This may follow an acute sero-fibrinous pleurisy and less frequently the disease sets in insidiously. In most cases in children, the fluid changes to pus early in the disease. There are cases in which the fluid persists for months without becoming purulent or undergoing any special change. In such cases the character and physical signs do not differ from those in acute sero-fibrinous pleurisy.

Chronic Dry Pleurisy.—These cases originate in two ways:

First, this may succeed ordinary pleural effusion when the fluid portion of the exudate is absorbed and the layers of pleura come together; they are separated only by fibrinous elements that become organized into a layer of firm connective tissue. This process goes on at the base, principally, which, if it follows the acute form, produces but slight flattening, but if it succeeds the chronic form or empyema, the extent of retraction and flattening will be marked. Calcification may occur in these firm, fibrous membranes and occasionally little pouches of fluid are found between the false bands.

Second, a large number of cases are dry from the onset. This condition may follow directly **acute plastic pleurisy.** It may be of **tuberculous** origin or it may set in without any acute symptoms. No matter how slight the plastic exudate may be, it invariably tends to become organized, thus producing adhesion of the layers. This is undoubtedly the result when the pleurisy is primary or secondary. The adhesions are generally circumscribed. When the adhesions are of tuberculous origin they may be locally confined to one pleura or they may be bilateral. In these cases both the parietal and costal layers are thickened, and embodied in the thickened pleura are found firm fibrin masses and small tubercles.

Occasionally vaso-motor symptoms arise in chronic pleurisy, especially in cases of tuberculous origin, and are probably due

to the involvement of the first thoracic ganglion at the top of the pleural cavity. These almost invariably mean that there is a displacement of the first, second, or third rib. Unilateral flushing or sweating of the face or dilatation of the pupil are common manifestations.

Symptoms.—Definite symptoms are rarely present. In some cases the physical signs are quite pronounced, while, on the other hand, they may be entirely negative. In mild cases there may be slight immobility of the affected side with feeble breath sounds. In other cases there may be very full chest expansion while the breath sounds are extremely feeble. In a large number of instances the physical signs are quite distinct. There is displacement of the viscera, retraction of the chest walls, curvature of the spinal column and dropping of the shoulders. There are feeble breathing and creaking, leathery friction sounds. Dullness is found at the base.

Treatment.—The treatment of chronic pleurisy is largely that of acute pleurisy. Gymnastic and methodical breathing exercises should be employed in helping to correct the thoracic walls. Care must be taken not to injure the chest and pleura if adhesions have formed. Surgical work may be necessary in some cases.

The vaso-motor symptoms that are sometimes manifested in chronic pleurisy and are claimed to be due to involvement of the first thoracic ganglion, are an interesting feature to the osteopath. Such cases would probably present to the osteopath a marked lesion of the upper dorsal vertebræ or the second or third rib. These vaso-motor symptoms are also found in pleurisy associated with tuberculosis of the apex of the lung. This but goes to substantiate the osteopathic theory of pulmonary tuberculosis.

The osteopath frequently treats these cases and he should be cautious about over treating or straining the chest wall. The adhesions are persistent and often there is more or less pain, so care must be exercised when attempting to structurally readjust. Do not expect to completely relieve every case, but never-

theless there are few cases but that can be benefited. Occasionally the pain alone is due simply to pleurodynia.

Hydrothorax.

Hydrothorax is an accumulation of transuded serum into the pleural sacs. It occurs as a secondary process in various diseases, but Bright's disease and valvular heart disease are common causes. It is frequently met with in connection with general dropsy, however caused, but it may occur alone. In **renal diseases** hydrothorax is usually bilateral; unilateral in heart affections. The fluid is clear, has an alkaline reaction, low specific gravity, is non-inflammatory, without any flocculi or fibrin. The pleural surfaces are smooth. **Compression** of the thoracic duct, thoracic veins or the superior vena cava, by tumor or aneurism are sometimes the causes of hydrothorax. Probably a downward displacement of the **diaphragm** would interfere with the thoracic duct, as would lesions in the vertebræ along the dorsal spine.

Symptoms.—Dyspnea, cyanosis, asthmatic seizures and feeble circulation; while the physical signs are those of the pleural effusion.

Treatment.—The treatment largely depends upon the affection producing the disease. If the serum cannot be absorbed as in pleuritic treatment, aspiration should be undertaken. Do not delay aspiration long when the functions of the lungs and heart are interferred with. Keeping the bowels and kidneys active, as in general dropsy, will, in a few instances, give relief.

Pneumothorax.

(Hydro-pneumothorax; pyo-pneumothorax).

Strictly speaking, the term pneumothorax means air alone in the thoracic cavity, which is an extremely rare condition. It is almost always accompanied by a liquid inflammatory exudate of serum or pus, hence the terms hydro-pneumothorax and pyo-pneumothorax are used.

It may result from: (1) The rupture of the lung in health by a violent strain, or perforation of the pleura, or a phthisical cavity, or a hemorrhagic infarct, or in gangrene and septic broncho-

pneumonia. Perforation of the lung from the pleura may occur in empyema. (2) Perforation of the pleura through the diaphragm, due to malignant disease in the abdomen, especially of the stomach or colon, or of the esophagus. (3) Traumatism, as in perforated wounds of the chest or fracture of the ribs.

Pathologically, the heart is dislocated toward the opposite side, and sometimes there is displacement of the liver and spleen. The lung is compressed. Even when air alone has escaped into the pleural sac, a serous or purulent effusion usually soon develops and the membranes are inflamed. It is seldom difficult to find the cause of pneumothorax.

Symptoms.—The onset is usually sudden and ushered in by severe pain, urgent dyspnea and cyanosis. There may be symptoms of incipient collapse—faintness; weak, frequent pulse; lowered temperature; cold extremities, and pinched features—in severe cases. The onset, however, may be gradual and there may be no urgent symptoms. Post-mortem examinations have revealed pneumothorax when unsuspected before death.

Physical Signs.—Inspection shows marked bulging of the intercostal spaces of the affected side with immobility. The apex beat is usually displaced. The breathing is frequent and short. Diminished or abolished vocal fremitus is observed. The resonance may be tympanitic or even amphoric. Extreme variation depends upon the degree of intrapleural tension. The **percussion** note may be ringing and amphoric over the upper part of the lung that contains air, while there is usually dullness at the base from effused fluid. The extent of these areas can readily be altered by changing the position of the patient. In the upright position the space containing the air is enlarged as contrasted with the recumbent position as the fluid sinks to the base and yields dullness. The breath sounds are suppressed. Amphoric breathing or bronchial breathing of a metallic character may be present. The voice has a metallic sound. A characteristic sign is what is called the "coin clinking" sound which is conveyed to the auscultator listening at the back of the chest, while a coin placed on the front of the chest is being struck with another, thus producing a clear metallic sound. Shaking the patient produces

a splashing sound when fluid is present (Hippocratic succussion).

Diagnosis.—Usually the history of one or other of the causal factors, together with the characteristic physical signs, coin-sound and succussion splash render the diagnosis not difficult. Almost the only affections that pneumothorax could be mistaken for are diaphragmatic hernia, following a crush or other force; very large phthisical cavities, and dilated stomach. Over the surface of large cavities vocal fremitus is increased or at least remains distinct, the heart is not displaced and the cavities are circumscribed.

Treatment.—Practically, most cases should be treated as in ordinary pleurisy with effusion. The various urgent symptoms that may arise are to be treated symptomatically. When necessary, withdraw the fluid with an aspirator. In purulent cases permanent drainage is required.

DISEASES OF THE URINARY SYSTEM.

DISEASES OF THE KIDNEYS.

Renal Hyperemia.

Definition.—An increase in the amount of blood to the vessels of the kidney. It is active hyperemia when there is arterial congestion, passive hyperemia when there is venous congestion.

Osteopathic Etiology and Pathology.—Active hyperemia may be caused by injuries to the renal splanchnics; injuries over and to the kidneys; exposure to cold when the body is very warm; poison given, as diuretics; eruptive fevers and pregnancy, or follow genito-urinary operations. Passive hyperemia may be caused by obstructive diseases of the general circulation, as chronic heart, lung and liver diseases, or by pressure on the renal veins by tumors, growths and the pregnant uterus. Thrombosis of the renal veins may produce passive hyperemia, but rarely.

Pathologically, in active hyperemia the kidney is swollen and slightly enlarged. Upon removal of the capsule, the kidney is found to be brown and mottled. On section the parts bleed freely, the Malpighian bodies are distended, and microscopical examination shows a cloudy swelling of the renal epithelium. In passive hyperemia the kidney is swollen, hard, firm and of a bluish red color. Later there is an overgrowth of connective tissue and some infiltration between the tubules. The Malpighian bodies occasionally become shriveled and the renal epithelium fatty.

Symptoms.—In **active hyperemia** the urine is scanty, of high specific gravity and of high color, containing some albumin and casts. Pain is experienced over the loins, following the course of the ureters, and the bladder is irritable. There are head-headache, nausea and vomiting. When from infection, fever may be present.

In **passive hyperemia** the symptoms are primarily those caused by the disease producing the disorder. There is weight over the loins and dropsy. The urine is diminished, of high specific gravity, highly colored, albuminous and occasionally shows a few hyaline casts.

Prognosis.—Active Hyperemia.—Usually favorable if it can be treated in time. If prolonged, acute nephritis may develop. **Passive Hyperemia.**—Depends on the cause. If the disease is prolonged, it terminates in interstitial nephritis.

Treatment.—Active Hyperemia.—Absolute rest and thorough treatment to the renal splanchnics and treatment over the abdomen to the kidneys directly. Water should be drunk liberally and the patient encouraged to use vapor baths. Favorable hygienic surroundings, warmth and good food are indispensable. Warm applications over the loins are helpful.

Passive Hyperemia.—The treatment largely depends upon the cause, but too much importance cannot be given to the treating of the vaso-motor fibres of the kidneys from the eighth dorsal to the first lumbar. Text-books state that the vaso-motor fibres to the kidneys are from the ninth to the twelfth dorsal vertebra, inclusive, but osteopathic experience shows we can affect vaso-motor fibres slightly higher. Treatment here has a marked effect on the blood pressure within the glomeruli. The renal eipthelium is extremely sensitive to circulatory changes. Even the compression of a renal artery for only a few minutes causes marked disturbances. Hence any irritation or obstruction to the vaso-motor innervation of the renal blood-vessels may result in serious conditions. The superior cervical ganglion of the sympathetic and the sciatic center have important bearing on the secretions of the kidney, through vaso-motor fibres. Due attention should be paid to the bowels, and the patient required to take plenty of rest and a light diet.

Acute Parenchymatous Nephritis.

(Acute Bright's Disease).

Definition.—An acute, inflammatory process affecting the epithelium of the uriniferous tubules and due to the action of cold or toxic agents upon the kidneys, as well as to injuries to the renal splanchnics; is characterized by certain nervous symptoms with fever, dropsy, and scanty and highly colored urine. This inflammation involves more or less the whole kidney.

Osteopathic Etiology and Pathology.—This disease is caused by exposure to cold and wet while the body is warm and perspiring. Excessive use of alcohol is a factor. May be caused also by infectious diseases, such as scarlet fever, diphtheria, measles, smallpox and others; also by certain specific poisons which are eliminated by the kidneys, as turpentine, chlorate of potash, carbolic acid, phosphorus, ginger, cantharides and oil of mustard; also by pregnancy, as this is supposed to compress the renal veins. Blows and injuries to the back at the tenth, eleventh and twelfth dorsals are frequently the cause. Lesions are found from the sixth dorsal to the fourth lumbar. The lower three ribs may be at fault, while the innominate and muscular contractions have been found to be pathological factors. Loudon places considerable importance on cervical lesions and McConnell believes vasomotor disturbance plays an important causative role in the disease.

Pathologically, at times the kidney alteration may be so slight as not to be recognizable by the naked eye, the appearance varying according to the stage and severity of the disease. The kidneys become enlarged, engorged and of a bright red color, and later have a mottled appearance; and when the capsule, which is non-adherent, is stripped off, the kidney is found to be soft and inelastic. In most of the cases in which the disease is due to toxic agents brought to the kidney through the blood-vessels, the glomeruli suffer first. The epithelium of the glomeruli and tubules is the seat of cloudy swelling and, in the later stages, of fatty change and hyaline degeneration. The tubules are clogged by altered cells, leucocytes and blood-corpuscles. In mild cases the

interstitial tissue is simply inflamed, but in all cases it becomes more or less mixed with leucocytes and red blood-corpuscles. Osteopathic lesions produced upon animals in the region of the ninth to the twelfth dorsal, resulted in acute nephritis. The autopsy findings were distinctly typical.

Symptoms.—The onset is usually sudden, with moderate fever, pain in the back in the lumbar region and over the kidneys and following the ureters. Nausea and vomiting may be present. Dropsy soon appears, beginning with slight swelling or puffiness in the face below the eyes, later showing itself in edema of the abdominal walls and extremities. Uremic symptoms may develop. The urine is characteristic; is diminished in quantity and of high specific gravity; at first the sediment is copious and reddish brown in color, becoming less in amount and of high color. This sediment contains casts of the uriniferous tubules, free blood, epithelial cells, uric acid and urates. There are large quantities of albumin in the urine.

The presence of albuminous matter in the urine, even in large quantities, is not sufficient evidence to warrant a diagnosis of Bright's disease nor is the amount a guide as to the severity of the case, for grave conditions often show a slight amount (Loudon).[1]

Diagnosis.—The general symptoms may be very slight, for the most severe cases may manifest slight edema of the feet, or there may be only the puffiness under the eyes and of the eyelids. In such cases the diagnosis must depend upon examination of the urine. With previous history, suddenness of the attack and character of the urine, ordinarily the diagnosis will be quite easy.

Prognosis.—Although this disease is generally grave, the prognosis is favorable and the majority of cases recover under judicious treatment.

Treatment.—Cases of acute nephritis require rest, quiet and warmth. Many cases recover under these conditions alone. It is absolutely necessary, however, that these conditions exist no matter what other treatment is used. A thorough treatment to the renal splanchnics cannot be overestimated for it is here (tenth to twelfth dorsal, inclusive) that a majority of the lesions

1. Journal of the American Osteopathic Association, July, 1904.

producing acute nephritis occur. Besides correcting the vertebral and rib displacements in this region, a very effective treatment is to have the patient lie flat upon the back and then the osteopath, reaching around the patient with the fingers of each hand on either side near the spines of the lower dorsal vertebræ, raise the patient so that the entire body, except the shoulders and the feet, are lifted clear of the bed. Thus the treatment springs the spine anteriorly and produces a marked effect upon the kidneys through the renal vaso-motor nerves. Occasionally lesions in the upper cervical region interfere with the normal activity of the renal nerve fibres passing to the kidneys by way of the superior cervical ganglion of the sympathetics.

Another very effectual treatment for the kidneys is treating them through the abdomen by a careful pressure upon the kidneys through the abdomen on either side of the umbilicus, thus lightly working each kidney outward and upward. This treatment relaxes any tissues about the blood-vessels, nerves and lymphatics to and from the kidneys that may be contracted and thus aids in establishing a normal activity of the involved organs. It also helps in relaxing tissues about the ureters and prevents the clogging up of the latter with debris. Bandel and Stearns report cases in which an impacted colon was an important factor in this particular.

The above means have for their object the direct relief of the congestion of the kidney. This is further aided by keeping the bowels active, which supplements the action of the kidneys, and by increasing the activity of the skin. This also aids in relieving dropsical effusions. The hot pack, in which the patient is wrapped in a wet sheet and then covered by a number of blankets, is an exceedingly good method to relieve the kidneys of some of the work and lessen their congestion, besides arresting uremic intoxication. This can be repeated daily if necessary. Where there is dropsy and scanty urine, the indications are to increase the secreting action of the kidney; besides treatment through the renal splanchnics, which contain the vaso-motor nerves of the kidneys, stimulating treatment to the vagi will help to increase the urinary secretion. Hot fomentations, placed directly over the

region of the renal splanchnics, is a valuable aid in cases which do not respond quickly to osteopathic stimulation. Treatment of the liver is important. Injections of cold water into the intestines will tend to stimulate the secretion of the kidneys, but this should be used with the greatest caution; in some cases tepid water would be better (see uremia).

The diet of the patient with acute nephritis is important. Give food that is easy of digestion and which contains a minimum amount of nitrogen. The stomach is quite likely to be irritable, consequently food that is adapted to it should be selected. Milk and weak animal broths are undoubtedly the best foods. The return to a solid diet, especially of meat, should be very slow. Suitable adjuvants to the milk diet are rice and farinaceous preparations. Loudon[1] recommends complete withdrawal of all foods for twenty-four to forty-eight hours and the reducing of nitrogenous foods to a minimum; a diet of milk and cream after the fast, followed by cereals and broths, then eggs and fish until albumin disappears from the urine. Alkaline mineral waters are useful to help maintain an alkaline urine, thus tending to withdraw exudates. The patient should be treated daily at first and later on every other day, for case reports show frequent treatments hasten recovery.

For treatment of acute uremia in Bright's disease, see uremia. Treatment of complications should be treated as affections independent of the renal disorder.

Chronic Parenchymatous Nephritis.

Definition.—A chronic inflammation of the kidney, involving the epithelium, glomeruli and interstitial tissue, characterized by dropsy, increasing anemia, albuminous urine and acute uremia.

Osteopathic Etiology and Pathology.—It may be the result of acute nephritis, but rarely so; for in the vast majority of cases it is primarily chronic, and the etiology cannot always be traced. It may follow the same diseases as already mentioned in the acute form, scarlatina and pregnancy contributing the greater number. It is more common in the male sex and in early adult life, although

2. Journal of the American Osteopathic Association, Dec., 1904.

it is not infrequent in children, following scarlatinal nephritis. Habitual exposure to cold and dampness; chronic lesions of the spine, chiefly in the lower dorsal region; alcoholic excesses; tubercular disease of the lungs, and frequently malarial poisoning, are causal factors.

Pathologically, the **large white or a yellowish white kidney** is the most common kidney lesion. In this form the kidney is enlarged, often to twice its normal size, is smooth, and the capsule very thin. The tubes, on microscopic examination, are found to be choked with broken-down granulated epithelium and fibrinous casts. The capillaries show hyaline changes. The interstitial tissue is increased everywhere, but not to an extreme degree. Catarrhal swelling and hyperemia (to a slight degree) are found in the pelvis of the kidney.

In the **second stage**—that of the **small white kidney**—there is a reduction in the size of the organ, due to the destruction of the renal epithelium and the contraction of the overgrown connective tissue. Some hold that this is a primary, independent form and not always preceded by the large white kidney. The organ is pale in color, rough and granular, the capsule being thickened and somewhat adherent. There is an accumulation of fatty epithelium in the convoluted tubules, constituting marked areas of fatty degeneration and giving the organ a white or whitish yellow appearance. It is this which gives the name of small granular fatty kidney to this form. There are great interstitial changes, degeneration of tubules and destruction of great numbers of the glomeruli.

Chronic hemorrhagic nephritis is a variety associated with this stage. The organ is enlarged, and scattered throughout the cortex are found brown hemorrhagic foci due to hemorrhages into and about the tubes. Otherwise the changes are similar to those found in the large white kidney.

Symptoms.—It usually begins as a chronic affection and the symptoms slowly become apparent. Failing health and loss of strength, dyspepsia and anemia, waxy appearance with puffiness of the face, dropsy and increased arterial tension with hypertrophy of the left ventricle, gradually make their appearance.

Uremic symptoms are common, while dropsy is marked and persistent. Vomiting and sometimes profuse diarrhea occur; in fatal cases there is sometimes found to be ulceration of the colon. The urine, as a rule, is diminished in quantity, is often very scanty, although it is frequently normal in color and appearance. There is an abundance of albumin, heavy sediment, hyaline and granular tube casts, epithelium from the kidneys and pelvis, leucocytes and often red blood-corpuscles. If fatty degeneration takes place, there will be fatty casts and oil globules.

Diagnosis.—In the inflammatory stage, where there is enlargement of the kidney, extreme pallor, scanty urine, history of scarlatina, pregnancy, or exposure to cold and wet, and lesions in the lower dorsal region, the diagnosis is clear.

Prognosis.—Always give a guarded prognosis; relapses are frequent, but cases have been cured. There is always a tendency for the sub-chronic forms to become chronic.

Treatment.—The treatment requires persistent work, especially over the renal splanchnics, and strict attention on the part of the patient to hygienic principles. Care should be taken as to exposure to cold and overexertion. The quality of the blood should be improved, as it is anemic and mixed with urea and various effete matters. Strict attention should be paid to the diet. Iron is largely used for the anemic condition, by the old practitioners, but this principle we hold to be wrong. It is not more iron that is wanted, but an ability of the system to assimilate the iron which it has. Relative to diuretics von Noorden says: "It would be the greatest paradox to economize the renal work to the utmost in one direction (diet, sweating, etc.) and on the other hand excite them to increased activity by means of the strongest stimulants we possess, (drugs). I regard such prescribing as radically wrong." The diet should be carefully selected and of minimum amount. The pure milk diet is undoubtedly the best. The use of meat seems to favor uremic convulsions.

The digestive organs should be kept in as good a condition as possible, particular attention being paid to the liver and bowels. The use of suitable clothing is important; wool should be worn

next to the body. The skin is a powerful adjuvant to kidney elimination, and the suppression of the action of the skin throws extra work on the kidneys. Possibly stimulation of the lung function would aid in the elimination. Rest, with a proper amount of fresh air and out-door exercise, is essential.

In conditions calling for attention to the skin and bowels the treatment will be the same as in acute parenchymatous nephritis. There is a ganglion on each side of the umbilicus within a radius of an inch that sends fibres to the kidneys (Dr. Still). Just what is the function of these ganglia is unknown. The treatment of the complications is independent of that for the renal trouble. For direct treatment to the kidneys see acute Bright's disease.

Interstitial Nephritis.

Definition.—A chronic inflammation of the kidney in which there is reduction in its size due to an extensive destruction of the tubular substance, with an overgrowth, and later a contraction, of the connective tissue elements. There is a strong tendency to cardiac hypertrophy with general arterial sclerosis.

Osteopathic Etiology and Pathology.—This condition generally arises, primarily, through lesions to the renal splanchnics, although it may follow parenchymatous nephritis; or it may be caused by a continued passive congestion due to valvular heart disease. Gout; cystitis (often following gonorrhea), the inflammation extending up the ureters to the kidney; heredity; long continued worry, anxiety or grief; chronic alcoholism; syphilis; chronic mineral poisoning (as from lead), and alterations in the renal ganglionic centers are causes. It chiefly occurs in males during middle life.

Pathologically, both kidneys are involved (although one may be more affected than the other), and reduced in size, often to less than half their normal size. After removing the capsule, which is thickened and adherent, the surface is found to be uneven, or granular and containing small cysts. The kidney is hard, tough and resistent, the color varying from a darkish brown to a yellowish gray. The cortical portion is especially reduced in size. On microscopic examination, the connective tissue appears greatly

increased; this contracts, compressing the tubules and blood-vessels, causing their destruction. There is general arterial sclerosis, and the left side of the heart is hypertrophied. There are frequent nasal and retinal hemorrhages, due to the brittleness of the arterial walls which predispose them to rupture; hence, apoplexy is a frequent termination. The ganglionic centers, being interferred with, undergo fatty degeneration and atrophy. There are marked retinal changes—retinitis, fatty degeneration of the retinal tissues and sclerosis of the nerve fibre layers.

Symptoms.—The onset is insidious. In most cases the symptoms are latent. The general health is disturbed; there are frequent micturition, gastric disturbances, tense and bounding pulse, hypertrophy of the left ventricle, disorders of vision, sleeplessness, headache, furred tongue, slight swelling of the feet, dry skin, scurvy and shortness of breath. The urine is increased in quantity, of acid reaction, light in color, low specific gravity, with a small amount of albumin, a few narrow hyaline casts, and some epithelial cells. There is increased thirst and the patient may have to urinate two or three times during the night. There is well marked mucous cloud, slight sediment, and as the disease advances the urine is diminished, the albumin is increased and the casts become more numerous, while occasionally blood-cells will be found.

Diagnosis.—The early stages are not always recognizable. Later, while there is high arterial tension, thickening of the arterial walls and marked hypertrophy of the heart, the urine should be examined very carefully both night and morning, as the diagnosis will greatly depend upon the condition of the urine, which is increased in quantity, of low specific gravity, with a trace of albumin, narrow hyaline and pale granular casts, making the diagnosis usually easy.

Prognosis.—It is generally incurable, but favorable so far as the power to prolong life is concerned, provided the diagnosis be made early in the case. The case usually terminates with convulsions, coma and death.

Treatment.—The dietic and hygienic treatment is the same as in chronic parenchymatous nephritis. The nerve and vascular

supply to the kidneys should be treated as in acute parenchymatous nephritis. Frequent bathing, with friction of the skin, should be insisted upon and the bowels kept regular by a treatment of alkaline water. The alkaline water is a good diuretic, besides it flushes the kidneys and helps to remove the debris.

The accidents and complications which so often endanger the patient, must be treated as they arise.

Amyloid Kidney.

(Chronic Bright's Disease).

Definition.—A pathological state of the kidney in which there is a peculiar infiltration into the kidney structure of an albuminoid material of a waxy appearance.

Etiology and Pathology.—This is simply an event in the process of Bright's disease, and not to be regarded as one of the varieties of Bright's disease. It is most frequently caused by profuse and long continued suppuration, especially of the bones, by syphilis, tuberculosis, cancer, phthisis, lead poisoning and gout.

Pathologically, the kidney is large and pale, but it may be normal in size or even small, pale and granular. The capsule is not adherent, the surface of the kidney, after removing the capsule, is pale and anemic. On section the cortex is seen to be enlarged. It is homogenous, anemic, pale, waxy and resisting. On microscopic examination there is found to be an infiltration of a homogeneous or wax-like material. This progresses until all parts of the organ are infiltrated. As the result of this pressure the structures of the kidney undergo an atrophic degeneration, the kidney becoming contracted, smaller, rough and even distorted in shape. The cortex becomes narrowed and the capsule adherent. If a section of an amyloid kidney be stained with a solution of iodine, numerous mahogany red points appear.

Symptoms.—This disease almost never occurs alone. There are similar changes in the liver, spleen and often the intestinal canal. There is a profuse, watery diarrhea, due to amyloid changes in the intestinal canal, with loss of flesh and strength, edema of the lower extremities, and ascites. There is an in-

creased flow of pale, watery urine, of low specific gravity; albumin is abundant and usually hyaline, often fatty or finally granular tube casts occur.

Diagnosis.—The history being associated with a suppurative disease and enlargement of liver and spleen, the character of the urine—polyuria with a large amount of albumin—will determine the condition.

Prognosis.—As a rule the prognosis is decidedly unfavorable and it must be controlled by the suppurating disease with which it is associated.

Treatment.—The primary disease demands attention, otherwise the measures of treatment indicated are exactly those of chronic parenchymatous nephritis, with special attention to the general health and surroundings of the patient. Give a generous diet and be persistent with the treatment.

Pyelitis.

Pyelitis is an acute, catarrhal inflammation of the pelvis of the kidney. When a suppurative inflammation extends into the interstitial tissue of the organ, it produces a condition called pyelo-nephritis. The inflammation usually starts in the pelvis of the kidney, the infection being carried there either by the circulation or the urinary tract, but it soon involves the rest of the kidney. Pyelitis is usually secondary to some other conditions such as urethritis, cystitis, or ureteritis. "Infection of the kidney rarely takes place through the blood and only when the vital membrane of the kidney is impaired." It may start from within the organ in the interstitial tissue, caused by infectious embolism or traumatism, or the tubules may become obstructed by concretions.

Osteopathic Etiology and Pathology.—Retained decomposed urine due to pressure upon the ureters by tumors or bladder disease; calculus concretion in the substance of the kidney, following pregnancy or infectious fever; traumatic agencies, as falls, blows, kicks or penetrating wounds, and lesions at the tenth, eleventh, and twelfth dorsals and first lumbar vertebræ, or slightly lower, will cause pyelitis. By far the most frequent form of pyelitis is

that which follows cystitis, the inflammation extending up the ureters to the pelvis of the kidney and thence to the substance of the organ, inducing pyeloneph-ritis. This disease is rarely idiopathic from exposure to cold and wet.

Pathologically, the mucous membrane of the pelvis is usually the first affected, the inflammation generally extending from below upward. It is swollen and sometimes visibly congested and of a gray color. The pelvis and calyces are more or less dilated, while the papillæ are flattened. There is a gradual dilatation of the calyces and atrophy of the kidney substance, until the whole organ is converted into a pus sac with or without a thin shell of renal tissue. If complete obstruction occurs, the fluid portion may be absorbed and the pus become inspissated and cheesy. The ureter is often dilated. In tuberculous pyelitis the apices of the pyramids are also invaded, the kidney substance is broken down and the result is the same. In the pyelitis caused by cystitis, the infection passes up the tubules or is carried by the lymphatics. The abscesses extend along the pyramids, burst through the papillæ and calyx into the pelvis of the kidney, and thus also the kidney becomes a purulent sac.

Symptoms.—Pain and tenderness over the region of the kidney first appear. In a few cases cystitis will be the only symptom. The suppurative stage is marked by high fever and a chill or a succession of chills. The general condition of the patient denotes prolonged suppuration. There is failure of health and more or less wasting and anemia. The urine is characteristic, contains pus, which varies in quantity greatly, and where only one kidney is affected, may be suppressed for a time and there will be a sudden outflow of the pus, due to the breaking of the sac. Blood is also very constant, but hardly ever of sufficient quantity to be seen by the naked eye. The urine is usually diminished in quantity and the color pale; the specific gravity is low on account of the small amount of urea present. The reaction of the urine is acid. Pus and blood render the urine slightly albuminous. Casts from the kidney, and even portions of the kidney, may be present.

Diagnosis.—From **nephritis** by the absence of much albumin, tube casts and dropsy. From **cystitis,** by the history, lumbar pains and acid urine. **In cystitis the urine is always alkaline.** From **perinephritic abscess,** by the absence of edema over the lumbar region. The urine may be normal and there are lumbar pains and hectic fever. In **tuberculous pyelitis** there is a history of tuberculosis in other organs and there are tubercles in the urine. **Malaria** or **typhoid** fever may be suspected.

Prognosis.—Depends altogether on the cause and extent of kidney involvement. In simple cases recovery in a few is usual, although there is a tendency in all cases for the disease to become chronic. If there is obstruction to the ureter, the recovery is doubtful. The tuberculous and suppurative varieties are grave.

Treatment.—Depends upon the cause, but thorough treatment along the lower dorsal, the lumbar and sacral regions will be of considerable benefit in controlling the catarrhal process in the kidney, its pelvis the ureter and the bladder. Fresh spring waters for dilutants and restricting the diet to light food, preferably milk, are indicated. Rest is important and warm applications locally are sometimes helpful. The general health must be carefully watched as there is always considerable drain upon the system. A timely operation may materially lengthen the life in many cases. Attention to the bladder, urethra and prostate is necessary.

Uremia.

The name applied to a series of manifestations resulting from the retention of poisonous materials in the blood, which should have been removed by the kidneys. Uremic symptoms may occur any time during an attack of nephritis. They may also occur when the circulation of the blood in the kidneys is interferred with or the ureters are obstructed. They are not due alone to the urea (which is found to be increased in the blood), but more probably several toxic poisons that are retained in the blood. Traube's theory is that acute cerebral edema with anemia accounts for the symptoms. Halbert says: "A more recent and more plausible claim is to the effect that a poison is developed

in the body as the result of nephritis," for retention of effete matter or ligation of renal arteries and ureters or impaired renal activity does not fully explain the cause of the stupor, coma, convulsions, sometimes paralysis, and gastro-intestinal disorders.

Symptoms.—Loss of appetite, nausea, vomiting, headache and drowsiness are the initial symptoms. Headache is usually at the back of the head and may extend down the neck. The next symptom is coma, alternating with convulsions which may range from only a slight twitching to violent epileptiform spasms. These spasms may occur without the slightest warning and are often followed by blindness which may last for several days. These attacks of coma and convulsions are sometimes ascribed to localized edema of the brain.

Transient paralysis is also due to congestion or edema of the brain and it may be of the cord. There may be mania which comes on abruptly, although the delirium is not at all violent, while profound melancholia may be found. There may be nervous symptoms develop, such as numbness in the hands and fingers, itching of the skin and cramps in the muscles—especially those of calves of the legs. Pulmonary symptoms are sometimes continuous—dyspnea, paroxysmal dyspnea and Cheyne-Stokes' breathing. These attacks of dyspnea may be as distressing as true asthma. Cheyne-Stokes' breathing may be present without coma.

Uncontrollable vomiting may set in with great abruptness, followed by hiccough and purging. There may be a catarrhal or diphtheritic inflammation of the colon with diarrhea. The breath has a urinous odor and the tongue is often very foul. The pulse is slow and full, with a temperature below the normal, although during convulsions the pulse may become rapid and the temperature rise. Occasionally there are atypical forms of urenia which may be very confusing and obscure.

Diagnosis.—The history, subnormal temperature, the urinous odor of the breath, high arterial tension and increased second sound of the heart will distinguish the condition.

Prognosis.—Extremely grave, but one should always be very careful in his prognosis, for there is a possibility of recovery, even after the most serious symptoms have been manifested.

Treatment.—As impermeability of the kidneys produces uremia, by not allowing the various poisons to be eliminated by the renal path as they should be, the treatment must be applied directly to the kidneys. Elimination is demanded and if treatment through the abdomen to the kidneys directly and to the renal splanchnics does not bring about prompt and thorough elimination of the intoxicating properties, the bowels and skin must be made active. The vapor or hot-air bath or hot pack should at once be used. An ice-bag to the head will be beneficial. An increase in the quantity of urine may be brought about by the displacement of a part of the mass of blood, which is in relative stagnation in certain parts of the vascular system, and forcing it into the main circulation in order to increase the pressure within the vessels of the kidney, is the treatment indicated. This great stagnant mass of blood is found in the arterial capillaries of the portal system in the liver and splenic tissues and should be manipulated into the general circulation in order to increase the arterial tension of the kidneys and thus favor elimination. The treatment should mainly be applied to the vaso-motor nerves of the portal system, from the fifth to the ninth dorsal, and to direct treatment over the abdomen, liver and spleen.

The introduction of water, from 110 degrees to 120 degrees F., into the colon by means of injections, is useful; warm irrigations increase renal secretion, bowel action and sweating with a decrease of tension. Cold drinks will stimulate the abdominal vessels and induce absorption of a certain quantity of water to still further increase diuresis. Cold irrigation increases blood pressure temporarily, but later it lessens the pressure; it should be used only with great caution. Milk is one of the best drinks to be used. Secretions of the liver must not accumulate. The bile must be expelled so that its toxicity will not be added to the other poisons.

The food of the patient is an important matter. A milk diet is best; avoid meat and nitrogenous foods and any food that leaves much residue. In this way the nutrition of the patient is kept up with a minimum of urea formation and, besides, there will be very little intestinal putrefaction. Emergency measures not men-

tioned above are repeated; high normal salt enemata (two to three pints), the alcohol sweat and venesection. When the attack is broken the condition resolves itself into the renal disorder, generally acute Bright's disease.

This disease illustrates nicely one phase of the uselessness of drugs; for when the impermeability of the kidney has become such that it ceases to have the power of eliminating toxic substances formed by the organism, there is then retained the medicinal substances. The kidney is as impermeable for therapeutic poisons as for the natural poisons and the employment of toxic medicines in such cases has no other effect than to bring an association of medicinal intoxication with an uremic.

Renal Calculus.

Renal calculi are concretions formed by precipitation of solids derived from the urine, and are found in the kidney or its pelvis. If large, they are called stones; the smaller masses are known as gravel or sand, according to their size. When they (stones) attempt to pass through the ureters, it brings on an attack of renal colic; rarely are they voided without this symptom.

Osteopathic Etiology and Pathology.—The affection occurs at all ages. The male sex is more liable than the female. Sedentary habits, gout and excessive meat eating are predisposing causes. Heredity seems to be a predisposing cause in some families. Inflammation of the pelvis of the kidney, caused by derangement of the ribs and vertebræ of the tenth, eleventh and twelfth dorsals or first lumbar, is an important etiological factor.

Pathologically, the chemical varieties are:

(1) **Uric acid,** which is the most common. The stones are usually smooth or lobulated; are hard and of a reddish color. Usually in these stones, both uric acid and urates are to be found. This material may be passed in the form of sand or large stones. The sediment in the urine may be the nuclei of the stones; as may foreign matters, such as the mucus or desquamated epithelium caused by the inflammation of the pelvis of the kidney, blood clots, or, in fact, any foreign matter that may reach the urinary passages. Individuals passing a small amount of urine and old

people are the principal subjects. "As a consequence of concentration and high activity of the urine, the uric acid and urates are readily separated in solid form and held together by the albuminous matrix."

(2) **Phosphatic Calculi** are white in color, soft and mortar-like. They are not very common and are composed of phosphate of lime, ammonia and magnesium phosphate. These are found more often in the bladder than the kidney. Disease of the bladder is the cause.

(3) **Oxalate of Lime** are a mixture of oxalate of lime and uric acid. They are dark in color, very hard and uneven, with hard, pointed projections. On account of their uneven shape they have been named mulberry calculi. These stones produce great pain as they pass through the ureters. They are of rare occurrence.

There are other concretions of rare occurrence.

Symptoms.—There is pain in the back in the region of the kidneys with more or less tenderness. The pain may be severe and paroxysmal. There may be bleeding, which is seldom profuse; this will give the urine a smoky hue, but may be present to such a small degree as to be only apparent by the use of the microscope. Pus is almost always present. The stone may obstruct the ureter and cause pyo-nephrosis or hydro-nephrosis. Pyelitis of a catarrhal character is common.

Renal Colic is caused when the calculus attempts to pass through the ureter so that ureterial spasms result. The stone, however, may become lodged at the entrance to the ureter. There is a sudden onset and great pain which starts in the back, radiating downward into the groin, down the side of the thigh and into the testicle and glans-penis. The testicle is often retracted, the face pale, the features pinched, and there is frequently vomiting. There are cold sweats and the pulse is weak. The paroxysm may last only a few minutes or extend over several hours. After an attack the urine is characteristic; blood and pus are always present and sometimes mucous casts. If uric acid is found, it points to uric acid or oxalate of lime calculi and the urine is acid in reaction. If alkaline phosphatic stones may be sus-

pected, examination of the urine directly after the attack aids greatly in diagnosis, for at other times the urine is usually negative.

Diagnosis.—Biliary Colic.—The jaundice in biliary colic comes on very soon after the obstruction begins. The stools are without bile and the pain extends from the right hypochondriac region to the upper abdomen and the right shoulder. The urine is negative and a stone may be passed in the stools. **Renal colic** is often **simulated** when the ureter is obstructed from any cause whatever. It may be compressed from a floating kidney or tumor, or obstructed by a clot of blood, fragments of hyatid cysts or plugs of mucus. **Lumbo-abdominal neuralgia and renal tuberculosis may simulate** renal colic.

Prognosis.—As complications may arise, it is best to give a guarded prognosis, but the prognosis is generally favorable. It is a disease that is very apt to recur when strains or falls affect the innervation to the kidney, but many cases have been permanently cured. If the stone is large, its passage along the ureter may prove fatal unless surgical interference is instituted at once, but if it is renal sand it may be easily voided in the urine and thus the prognosis will be favorable.

Treatment.—A treatment should be given to try and overcome the cause producing the calculi, which will often be found at the tenth rib. Treat the kidneys thoroughly, both through the renal splanchnics and directly through the abdomen, anteriorly. But direct abdominal treatment should be given very cautiously. Treatment here corrects disorders and seems to release some solvent that acts upon the various forms of calculi and disintegrates the ones already formed and prevents the formation of others. Possibly this solvent is an internal secretion of some gland; possibly like the splenic secretion is to biliary calculi. Dr. Still holds that one of the functions of the supra renal capsule is to prevent the formation of these concretions.

In the **uric acid tendency,** the free use of alkaline mineral waters for the solution of uric acid may be helpful in many cases. Much may be done by dieting. The amount of nitrogenous food should be limited, eating a minimum amount of meat and using

plenty of milk and vegetables. In the **phosphatic tendency,** diluted drinks freely used are helpful. Meats are indicated. Milk and vegetables should not be used freely as they tend to make the urine alkaline. In all instances care of the general health and avoidance of beer drinking and excessive meat eating are demanded.

During an attack of **renal colic,** when a stone has lodged in a ureter, one may be able, by very careful manipulation, to aid the stone in its progress downward, (somewhat after the manner of manipulating gall-stones), but do not delay surgical measures too long. By inhibiting the nerve force of the spinal nerves along the lumbar and sacral regions (chiefly tenth dorsal and first lumbar), relief may be given. The nerves of the ureters are derived from the inferior mesenteric, spermatic and pelvic plexuses. Great relief is experienced from the hot bath, and it is sometimes sufficient to relax the spastic condition. Clothes wrung out of hot water and applied locally are of aid. Occasionally a change of posture will give relief. Even inversion of the patient is sometimes followed by immediate cessation of the pain. The patient may drink freely of hot lemonade or water. An anesthetic may be of aid in the manipulation of a renal calculus in the ureter, as the anesthetic will relax the tissues over the abdomen, making it much easier for one to get near the impacted calculus, but **be cautious.** During the intervals the patient should lead a quiet life and avoid sudden exertions of any kind. It is important to keep the urine abundant, consequently have the patient drink a large quantity of distilled water. "Renal calculus is brought about by lesions affecting the suprarenal capsule of the kidney, or spinal lesions from the tenth dorsal to the first lumbar, affecting the lower ribs."[1]

Movable Kidney.

This means a distinctly mobile condition of the kidney (almost always acquired, but may be congenital), due to the lax condition of the tissues which support it and to the elongation of the renal vessels which allow the kidney to move in certain direc-

1. Young—Osteopathic Surgery, 1904.

tions. There are almost invariably lesions in the dorso-lumbar region that predispose to an abnormal mobility of the kidney. These lesions undoubtedly weaken the innervation to the surrounding and supporting kidney structures. A posterior spine, with consequent downward and constricting displacement of the floating ribs, is common, although lateral and anterior spines (dorso-lumbar region) may be found. Strains, heavy lifting, and various violent exertions are important exciting factors. Tight lacing, pregnancies, an enlarged liver and gastro- and entero-ptosis are also important factors. This condition is found more commonly in women, and undoubtedly is a frequent cause of direct, gastro-intestinal, reflex, and obscure disturbances. There are very different degrees of mobility in different cases. It may be so slight as hardly to be recognized or so great that it can easily be felt by the hand through the abdominal walls, resembling a movable tumor in the abdomen.

Symptoms.—Often there are no noticeable symptoms. Sometimes when the displacement and mobility of the kidney are most marked, the reflex symptoms are not noticeable. The right kidney is the one usually affected, on account of its relation to the liver which moves during the respiratory act. Usually there is pain in the lumbar region and the patient experiences a heavy, dragging pain in the abdomen, which especially manifests itself while standing and walking. There may be intercostal meuralgia. Various colicky and other gastro-intestinal pains, and nervous symptoms as neurasthenia, melancholia, hysteria and headache are common. There may be obstinate indigestion, palpitation of the heart, flatulence and cardialgia; also, an irritable bladder, due to pressure. At times the kidney becomes tender and swollen as a result of twisting of the renal vessels, causing engorgement of the organ; this may be associated with agonizing pain and symptoms of collapse.

Diagnosis.—The shape of the tumor, marked mobility, and lessened resistance on percussion of the renal region will make the diagnosis. The disorder very rarely proves fatal.

Treatment.—Many cases rarely give trouble directly, but may be a source of reflex and obscure symptoms. Attention to

the general health of the patient and persistent treatment of the dorso-lumbar region greatly strengthen the relaxed tissues about the kidney and cure a number of cases. Having the patient attempt to replace the organ after he goes to bed will be of value. Treatment of the abdomen to strengthen the walls and lessen any liver congestion and to keep the bowels active is very beneficial. Teach the patient how to stand and walk correctly, especially holding the abdomen in and up. A liberal diet to the point of increasing the weight is worthy of trial. The use of supports is not always satisfactory. Surgical treatment for fixing the kidney is of permanent value, but do not advise operation unless absolutely indicated. (See Prolapsed Organs, Part I).

To **determine the presence of a movable kidney,** it is best to have the patient in the dorsal position, the head slightly lowered and the abdominal walls relaxed by flexing the thighs moderately upon the abdomen. Then with the left hand in the lumbar region behind the eleventh and twelfth ribs, and the right hand in the hypochondriac region, the kidney can usually be detected after full inspiration followed by complete expiration; or, have the patient in a standing posture with the body bent slightly forward and the hands placed upon a table, then perform bimanual palpation; or, perform the manipulation in the knee-elbow position. When in this position (knee-elbow,) if the kidney has become dislodged, a resonant note will be obtained by percussion over the normal location of the kidney.

DISEASES OF THE BLADDER.

Cystitis.

Cystitis is an inflammation of the mucous membrane of the bladder. Retention of the urine; foreign bodies, such as stones, in the bladder; the use of dirty catheters; exposure to wet and cold; injuries to the bladder and over the pubes; irritations to the sacral nerves; spinal lesions in the dorsal enlargement of the cord; innominate lesions; irritating drugs; enlarged prostate and urethral strictures are the principal causes of cystitis. The disease may be secondary to fevers, infectious diseases and inflammation of

adjacent organs. A displaced uterus may produce a chronic irritation of the bladder.

Pathologically, there is hyperemia of the mucous membrane of part or of the whole of the bladder, with redness, congestion and edema. The secretion of mucus that covers the mucous membrane is of a dirty gray color. If the congestion is very extensive, a bursting of the capillaries may take place. In a few cases the neck of the bladder and the urethra, where it passes through the prostate, is involved. In chronic cases the mucous membrane becomes thickened and covered with patches of false membrane. The muscular coat of the bladder becomes hypertrophied and the veins tortuous.

Symptoms.—The onset may be sudden with rigors and fever, but in many cases a frequent desire to micturate will be the first symptom. This is followed by tenderness and pain over the bladder and contiguous parts, loss of appetite, depression and sleeplessness. Tenesmus of the bladder, caused by a spastic condition of its muscles, and a burning along the urethra are usually present. The urine is alkaline in reaction and contains pus, epithelium and blood.

Diagnosis.—The diagnosis is usually easy. **Pyelitis** has pains in the lumbar region and along the ureters and there is a frequent desire to urinate. The bladder is not subject to spasms and the urine is of an acid or neutral reaction.

Prognosis.—In many cases the prognosis is usually favorable, but in cases of long standing and in hypertrophy of the bladder prognosis must be guarded.

Treatment.—Rest in bed with strict attention to diet is necessary. Milk is the best food and avoid highly seasoned articles and acid foods. The use of plenty of pure water is helpful to dilute the urine, and if necessary the bladder should be washed out carefully. If the case is severe, emptying the bladder several times a day with a catheter will be necessary. Always be careful about the cleansing of the instruments. Warm applications over the pelvic region will be comforting to the patient. Lifting the abdominal viscera from the bladder is of assist-

ance. The patient may be placed in the knee and chest position for this or the usual method employed.

Treatment to the second, third and fourth sacral nerves controls the neck of the bladder, and strong inhibition will generally control the spasms of the sphincter. The fundus of the organ is supplied by sympathetic fibres from the pelvic plexus. Direct treatment over the bladder, if applied carefully, will act on the terminal fibres of the sympathetic. Lesions to the nerves of the sphincter of the bladder oftentimes occur between the fifth lumbar and sacrum, also from a displaced innominate. Such lesions are apt to be found in cases of incontinence of urine. The lesion to the vertebræ is usually a lateral one.

Thorough treatment to the genital urinary center (lower dorsal and upper lumbar) will also be of aid. In males direct treatment of the prostate glands is occasionally important as is also the plexus of nerves at the trigone of the bladder. In **treating** the **prostate gland** introduce a finger into the rectum and work about the base of the gland to relax the tissues, and thus remove obstructions of the vascular, lymphatic and nervous structures to the gland. Do not work too much upon the gland itself, it may irritate. Also treat the innervation at the eleventh and twelfth dorsals, fifth lumbar, and first, second and third sacrals.

It is important in **young boys** to examine the condition of the penis in bladder diseases. The prepuce may become adherent or other irritations may be found that are a source of disturbance to the bladder, or even to the kidneys, on account of the intimate connection of the sympathetic system in this region and the relation of one organ to another.

An **irritable bladder** is usually due to disorders of near-by tissues, especially the urethra, vagina, uterus and rectum.

Enuresis, exclusive of paralysis, is frequently due to some local mechanical disturbance. **Nocturnal enuresis** or **bed wetting** is very frequently caused by lower dorsal and lumbar lesions (especially the fifth lumbar), displacements of the innominate, or phimosis, hooded clitoris, contracted meatus, etc. The patient is usually neurotic. Care of the general health and habits is important. Constipation may be present.

DISEASES OF THE CIRCULATORY SYSTEM.

DISEASES OF THE PERICARDIUM.

Pericarditis.

Pericarditis is an inflammation of the serous membrane covering the heart and its reflection in front over the chest. Primary inflammation of the pericardium is rare. Such cases usually result from cold and exposure or injury and are most commonly met with in children.

Secondary pericarditis occurs in connection with rheumatism, Bright's disease, tuberculosis, gout, diabetes, eruptive fevers, various septic conditions and dyscrasia. Pericarditis may result by extension of inflammation from contiguous organs, as the disease may occur in penumonia, pleuro-pneumonia, chronic valvular diseases, and ulcerative diseases of the esophagus, bronchi, vertebræ, ribs, stomach, etc. Displacement of the ribs over the heart and involvement of the corresponding vertebræ predispose to pericarditis, by weakening the innervation of the pericardium and thus disturbing the circulation. The disease may occur at any age. Males are more frequently attacked than females.

The morbid conditions vary with the stage. The stages are (1) acute, plastic or dry pericarditis; (2) pericarditis with effusion, sero-fibrinous, hemorrhagic or purulent; (3) absorption or adhesive pericarditis. These different stages or varieties commonly succeed one another, although medical writers place so much importance in them that each is described separately. **Acute pericarditis** is by far the most common and often the inflammation subsides at this point instead of going on to more serious involvement. There is a possibility that in some cases the forms are independent of each other.

The changes are the same as in various sero-membranes. Hyperemia and alteration of the epithelium is most marked on

the visceral layer. This is followed by an exudation from the hyperemic vessels. There is roughening and loosening of the epithelium and the fibrin is precipitated upon the walls of the pericardium. More or less lymph is exuded and sometimes injected capillaries burst and cause a bloody exudation. From this stage the morbid appearances vary according to the progress of the disease. The disease may undergo resolution and fatty degeneration and absorption of the products in point take place. As the stage of effusion occurs, the parietal and visceral layers of the pericardium are separated by a sero-fibrinous exudate. This condition may increase until the quantity of the exudation is considerable, or the effusion may become absorbed. Rarely does the exudate become purulent.

Adhesions may be formed between the layers of the pericardium, during the last stage, by bands of various lengths or the layers are more or less separable.

Symptoms.—Simple cases may not present any symptoms. Usually a chill or cold feeling at the heart, followed by pains in the cardiac region, ushers in the attack. Fever is generally present, rarely exceeding 102.5 degrees F. Tenderness over the heart is noticeable. There is dyspnea and the patient is restless.

In the **effusive stage** the symptoms depend largely upon the amount of diffusion. The pain is sharp and stitch-like. Nausea, vomiting and hiccough sometimes occur. The pulse is irregular and feeble. Insomnia, headache and even delirium may occur. Distention of the veins of the neck may cause dysphagia and a cough may be present, owing to the irritation of the trachea. The recurrent laryngeal nerve may be compressed as it winds about the aorta and thus cause aphonia.

The friction sound is a characteristic physical sign of the first stage. In the effusive stage there may be precordial bulging. The area of dullness is enlarged, the diaphragm and liver may be crowded downward, causing an epigastric bulging. As the effusion increases, the heart sounds become less distinct; the friction is not heard. In the **third stage** there is a return to normal, although **adhesions** may form and cause precordial retraction and permanently embarrass the heart's movements.

Diagnosis.—Pericarditis is frequently overlooked by the practitioner. It is a serious disease and one should be especially careful. In cases of rheumatism the osteopath must always be on his guard. The greatest difficulty lies in distinguishing between dilatation and cardiac hypertrophy and pericardial effusion. Hydro-pericardium may be mistaken for pericardial effusion.

To distinguish between endocarditis and pericarditis should not be a difficult task if one understands thoroughly the nature of each disease. A large pericardial effusions may be confounded with a pleural effusion.

Prognosis.—In mild cases of pericarditis the large majority rapidly recover in two to three weeks. In cachectic subjects and where adhesions have formed, the duration is longer. Relapses may occur. The purulent effusions are the most dangerous. Septic cases are usually fatal.

Treatment.—Demands prompt and effective measures. Absolute rest mentally and physically, is necessary. Too much stress cannot be laid upon this point, as death has occurred from neglect of this. To quiet the heart's action is the first necessary requisite, and then give treatment to limit the inflammation. In the second stage prevention of cardiac failure and promotion of absorption are the indications to be met. Too much importance cannot be placed upon the point that general strength, good nursing, dieting and free elimination are essential, not only in securing a rapid subsidence of the inflammation, but to prevent further complications.

Raising and separating the ribs over the heart will be of great aid in lessening the inflammation and promoting absorption. In many cases lesions to the ribs on the left side and subdislocations of the vertebræ affecting the vaso-motor nerves, the lymphatics and nerves to the heart will be found. The first five ribs and corresponding vertebræ is the region where one may expect to find the lesions. In addition to absolute rest, an inhibiting treatment in the dorsal region between the scapulæ will aid in slowing the heart's action. Correcting any lesion that may be found to the vagi nerves will also be a help in controlling the heart's action; besides, most of the vaso-motor fibres to the heart

are in the vagi. These lesions are usually found at the atlas. One should also examine carefully all the cervical vertebræ for derangements that might affect the cervical sympathetic, especially the superior and middle cervical ganglia. These ganglia are primarily affected from the fifth cervical to the first dorsal. Inhibition for a few minutes between the transverse process of the atlas and the occipital bone to the posterior occipital nerves will be of great aid in controlling the tumultuous action of the heart; also, inhibit in the upper dorsal. The warm bath will quiet the heart, but care should be taken not to weaken the patient. The general treatment has the effect of lessening nervousness and quieting the heart.

The function of the phrenic nerve must be borne in mind when regarding the pericardium. The phrenic is usually primarily affected at the third, fourth and fifth cervicals, and occasionally there are connecting fibres as low as the fourth and fifth dorsals. Ice-bags may be found of value in retarding the progress of the effusion and in lessening the heart's action. Liquid food, as milk and broths, should be given throughout the disease. If the effusion is very large the services of a surgeon should be secured and tapping performed. If the effusion is of a purulent nature, a free incision should be made with antiseptic precautions.

Endocarditis.

Endocarditis is an inflammation of the lining membrane of the heart. The process is usually confined to the valves; the lining of the cavity of the heart may also be affected, especially in severe cases. Three forms are recognized: simple acute endocarditis, ulcerative endocarditis, and chronic endocarditis.

Simple Acute Endocarditis.—This form usually results from acute articular rheumatism. It may also be caused by the infectious diseases, especially scarlet fever, but rarely, by typhoid fever, measles, chicken-pox, diphtheria, smallpox and erysipelas. Acute endocarditis is frequently found in chorea. It is also met with in diseases attended with emaciation and general weakness, as cancer, gout, Bright's disease and diabetes. It is not un-

common in phthisis. Probably in many cases, micro-organisms play an exciting part, but back of this the osteopath finds lesions of the heart innervation important causative features. Prophylactic osteopathic treatment is a potent factor in preventing endocardial changes in the above diseases. Keeping the muscles relaxed and the osseous tissues intact is of great value.

Pathologically, the left side of the heart is most commonly involved. The disease is characterized by the presence of small vegetations on the segments or on the lining membrane of the chambers, although in mild cases there is simply swelling of the valves. The mitral valves are more often affected than the aortic. The vegetations appear, usually, on the auricular surface of the mitral and the ventricular surface of the aortic valves, a little back of the valve edge. Their seat corresponds to the point of maximum contact (Sibson). These growths are liable to be broken off at any time and carried as emboli by the blood current to distant organs, particularly the brain, spleen and kidneys. This is not uncommon in acute endocarditis or chronic valvulitis. In favorable cases the vegetation is ultimately absorbed and the valve is but slightly altered beyond a simple sclerotic thickening. This is often the starting point of sclerotic valvulitis. Osteopathic measures undoubtedly lessen the liability of cardiac involvement, prevent extensive changes and promote absorption of disease products, by lowering heart tension and improving the cardiac nutrition.

During the fetal life, the right side of the heart is most commonly involved. The chorda tendinæ are sometimes affected, but rarely alone.

The vegetations are composed of proliferated connective tissue cells. The superficial elements undergo a coagulation-necrosis and fibrin is deposited from the blood. Micro-organisms are found and are probably the specific agent in causing acute endocarditis.

Symptoms.—A large number of cases are latent, the autopsy first disclosing the lesion. In many cases there are slight fever, a frequent, sometimes irregular, pulse, palpitation and dyspnea. There is seldom any pain.

Physical signs are very uncertain. They may not be present in mild cases and in those in which the valves are not affected. Usually auscultation furnishes the only indication of endocarditis—a soft, blowing, systolic murmur which is heard most frequently at the apex, as the mitral valves are the ones generally involved. When the aortic valves are affected, the murmur is heard at the second interspace at the right edge of the sternum.

Diagnosis.—This depends entirely upon the etiology and physical signs. The greatest danger is in the disease becoming chronic.

Treatment.—The patient should be kept as quiet as possible, so that the work required of the heart may be reduced to a minimum. The disturbed circulation can be controlled by careful attention to the vaso-motor nerves at the various centers along the spine. Attention should be given the disease that is causing the endocarditis. Keep the patient well protected by flannels and beware of damp rooms and sudden changes of temperature.

Treatment should be given to correct any lesion found in the upper five dorsal vertebræ or ribs and to raise and spread all of these ribs so that the heart's action will not be unduly disturbed by interferences with its innervation. The vaso-motor nerves to the heart's vessels are found in the vagi nerves, consequently care should be taken that lesions to these nerves do not exist. An inhibitory treatment to the sub-occipital nerves acts reflexly on the vaso-motor nerves and tends to equalize the general vascular system. This treatment quiets the heart's action. Ice applied locally is advocated by many practitioners. Flannels should be placed next to the skin and the ice-bag placed over the flannel. This reduces the fever, lessens the pulse-rate and quiets the heart action. The same points are obtained by the inhibitory treatment at the sub-occipital region. The ice-bag also relieves pain and oppression. Be very careful in the use of ice when there is much cardiac dilatation. Treatment of the middle and inferior cervical regions may have some effect in controlling the heart's action. A general treatment to quiet the patient is effective. Do not allow any overexertion. The patient should have nourishing liquid food.

Emery[1] says: "Many of us have been in the habit of saying, just because we hear a decided murmur in the heart region, that the patient has valvular heart trouble; that the patient has organic heart trouble. This is a common error.....When there is an anemic condition of the body, apparently the cusps of the valve will be so weakened, and the attachment will be so weakened that the blood will force its way between the valves and back into the heart, causing regurgitation murmur, when as an actual fact there is no deformity and no real disease of the valves, and as soon as the general condition of the anemia is improved, the valve will do its work fully and the murmur entirely cease. So if you have the murmur without the hypertrophied condition, which at once follows such a valvular lesion, you must be guarded in your statements, for if an actual valvular lesion existed, compensation would take place, and it would be the means of corroborating such a valvular condition; if no hypertrophy is found, then we are not justified in definitely stating that a valvular or organic lesion exists, for such a weakened condition as has been mentioned might be the only pathology present, and be the cause of the murmur."

Ulcerative or malignant endocarditis.—This is an acute, infectious or septic disease, characterized locally by necrosis or ulceration of the valve. It may very rarely be a primary disease. It is generally a secondary affection to septicemia, pneumonia, erysipelas, scarlet fever and acute rheumatism. Acute endocarditis often precedes the ulcerative variety, the latter being simply an increase in severity of the former.

Etiology and Pathology.—It is doubtful if there can be a primary form of ulcerative endocarditis. Chronic valvular defects are the most important predisposing causes. Pneumonia is most frequently, of all the acute diseases, associated with severe endocarditis. It is rare in tuberculosis, diphtheria, typhoid fever and chorea. It occurs in association with erysipelas, gonorrhea and rheumatism. Septicemia (from whatever cause), pleurisy, meningitis and puerperal fever are causes of ulcerative endocarditis.

1. Journal of the American Osteopathic Association, April, 1906.

Pathologically, the lesions are either vegetative, ulcerative or suppurative. The vegetations are composed of granulation tissue, granular and fibrillated fibrin, and colonies of micro-organisms. They become necrotic and break down into ulcers. The ulcerative changes may lead to perforations or produce valvular aneurisms. Of the valves the mitral is the most frequently affected; then the aortic; then the mitral and the aortic together; then the heart walls; then the tricuspid; then the pulmonary. In a few cases the right heart alone is involved. The lesion is not always confined to the valves, but may involve the mural endocardium. The most common organisms found are the streptococci and staphylococci. The bacillus diphtheriæ, bacillus coli, gonococcus, pneumococcus, bacillus anthracis and other organisms have been found. Associated pathological changes include the lesions of the primary disease and the changes due to embolism. The spleen, kidneys, brain, intestines and skin may be the seat of embolism. When found in the lungs, they originate in the right heart.

Symptoms.—If in the course of any of the diseases previously named under etiology, chills followed by fever and sweats occur, ulcerative endocarditis should at once be suspected and a thorough examination be made. The general symptoms are high, ir egular fever, delirium, sweating, great prostration, rapid pulse, hurried breathing and sometimes jaundice and diarrhea occur.

The occurrence of delirium, coma or hemiplegia points to involvement of the brain; pain in the region of the spleen, with increased dullness on percussion, point to trouble in that organ; hematuria may occur from involvement of the kidneys. More rarely there will be impaired vision from retinal hemorrhage; and there may be suppuration and sometimes gangrene in various locations, depending upon the position of the embolism.

The **septic type** is seen in connection with external wounds, the puerperal process or acute necrosis. The symptoms presented are rigors, irregular fever, sweats and exhaustion—the signs of septic infection. The symptoms may resemble a quotidian or a tertian ague. The **typhoid type** is the most common. The characteristic symptoms are irregular temperature, sweating,

prostration, delirium, drowsiness, diarrhea, petechial and other rashes, distention of the abdomen and pain in the right iliac region. The heart symptoms may be overlooked, as in the septic type. Under the **cardiac type** are considered those cases in which there have been chronic valvular diseases which are attacked with fever, rigors and sweats, and the symptoms of embolism may develop. In the **cerebral group** of cases the symptoms may simulate meningitis—basilar or cerebro-spinal. Acute delirium may be the distinctive symptom. Heart symptoms may be overlooked.

Physical Signs.—The heart symptoms may be entirely latent Even after a careful examination, there may be no murmur present. When murmurs are present it is often difficult to locate them.

Diagnosis.—The previous history should be considered and this, together with the symptoms, makes a correct diagnosis possible, even though physical signs are absent. The duration is from a few days to several weeks. The termination is usually fatal.

Treatment.—The treatment of this form of endocarditis is likely to be of little avail. About the same treatment as in simple endocarditis should be followed. Absolute rest is essential and this, coupled with the local treatment of simple endocarditis and a nourishing liquid diet, constitutes the principal treatment.

Chronic Endocarditis.

This condition may begin as a chronic inflammation or follow the acute form, which is more often the case. There is a **sclerosis** of the valves which causes deformity, owing to the contractions. The onset is usually insidious.

It is well known that the larger percentage of valvular lesions are the result of either acute or chronic endocarditis. Thus rheumatism stands foremost as a cause of valvular defects. Alcoholism and overeating (through introducing irritating influences into the blood, or by causing rheumatism, gout and allied diseases) are important etiological considerations. Nephritis and syphilis are considered among the causative factors.

Chronic endarteritis extending from the aorta to the valves, resulting in thickening and degeneration of the tissue, may be an insidious source of valve disease.

A potent cause of special interest to the osteopath (for the reason that his treatment is so effective), is continued **muscular strain** as seen in athletes and laborers. The heart muscle itself may be strained, particularly the valve leaflets and the tissues about the valve, which effect often terminates in valvular leakage. In addition, the orifice of the valve openings may become stretched and distorted through strain superinduced by prolonged exertion, by flabbiness of heart tissue, and by dilatation of the ventricles. In these latter cases it is seen that the leaflets of the valves may remain intact, but still they are unable to stretch completely across the opening.

With the above condition it is readily noted that thickening, curling and adhesions will take place when inflammation attacks the valves and contiguous tissues, and following these, limy infiltration and fatty degeneration may be a consequence.

Thickening and hyperplasia are immediate consequents of connective tissue overgrowth; and especially is chronic endarteritis accompanied with atheromatous and calcareous degeneration. Thickening, at times, is only slight and the function of valves is not impaired.

In curling or **retraction,** there occurs a shrinkage of the hypertrophic or hyperplastic tissues. This condition is very apt to become permanent.

Adhesions of the valve leaflets is a self-evident condition. It is well to note here that in acute and chronic endocarditis some part of the fibrous valve ruptures or is lacerated or eroded from strong and rapid heart action; the **laceration** or rupture or erosion always occurs at the point of maximum contact. Thus the eroded surface allows an opportunity for the rheumatic or septic micro-organisms to lodge, multiply and grow, and adhesions result. Carefully applied osteopathic methods are very efficacious in impending acute heart disturbances, and this without doubt is the reason why so many of our rheumatic cases get well without any heart affections. Keeping the heart quieted and

slowed prevents the strong and rapid action and thus lessens the probability of lacerations, ruptures and erosions of the valve tissues.

Calcification and atheroma, as has been mentioned, may follow the above diseased processes. The calcification is sometimes so marked as to be of the character of a bony ring.

The question arises here, What effect have osteopathic lesions as direct causative factors in valvulitis? It appears reasonable that the heart is not exempt from the influences of the vertebral and rib mal-adjustments. Furthermore, clinical experience has abundantly proven that the heart tissues are affected by these lesions in the same manner as any tissue or organ is affected. Again, osteopathic dissection reveals direct nervous connection from the upper dorsal spinal ganglia to the heart ganglia.

No one will question that the integrity of heart function and life are dependent upon normal coronary artery supply, upon vaso-motor equilibrium, and upon motor control. All of these functions are influenced by the status of cervical vertebræ, upper dorsal vertebræ, and rib relations. Just what the pathological affection is when these anatomical parts are disturbed is beyond us until more careful dissection and experimentation have taken place. How cervical and dorsal sympathetics, vaso-motor and motor nerves with their spinal connections, vagi and phrenic, are so disturbed as to involve valvular parts and induce inflammation, is a problem for us to investigate. Through analagous reasoning from other organic ailments and through the fact that osteopathic therapeutics corrects heart lesions, we know in a general way that the correction of osteopathic lesions decidedly influences the heart.

Two well known **physiological facts** relative to the heart are: first, the heart increases in size up to adult life, and, second, the heart muscle can actually be increased in size. This latter fact occurs in physical development and training. A heart that is weak and flabby can be increased in strength, tone and size. This helps us to understand how certain strains and distortions of the heart, with consequent valvular lesions, may be corrected through rest, exercise and treatment; somewhat analagous to the

correction of an atonic, prolapsed and dilated stomach. Then it also seems probable that disturbed innervation and blood supply to heart areas or to the heart as a whole would predispose to congestions, inflammations and degenerations whereby rheumatism, septic states, etc., and muscular strains would act only as exciting causes, not true causes.

No one is going to expect that thickened, retracted, adhered, or ruptures valves are to be made anatomically correct; but the right treatment will certainly reduce the morbid state to the minimum. Then there are cases where osteopaths have eliminated all murmurs when specialists stated the disease was incurable; showing that it is impossible by signs and symptoms to always diagnose the morbid tissue state. Only the resulting effects of size and of leakage are definitely revealed by auscultation and percussion. Hence there is a class of valvular diseases that can be successfully treated by osteopathic measures, which, if left to terminate under drug medication, will reveal (at post-mortem) the pathological signs of valvular heart disease.

Downward displacement of the **first rib** may interfere directly with the subclavian artery and thus cause constriction of that vessel and a consequent regurgitation; also, cardiac fibres of the recurrent laryngeal nerves may be impinged by a dislocation of this rib. Many lesions which interfere with the right side of the heart occur at the **second** and **third ribs** and lesions of the **third, fourth** and **fifth ribs** may interfere with the valves. Lesions of the **corresponding vertebræ** produce the same results as the ribs. These lesions are probably to the sympathetic nerves along the dorsal region. Lesions may be found anywhere along the cervical vertebræ which may involve inhibitory (vagi) fibres or accellerator (sympathetic) fibres to the heart. Also, in some cases the **floating ribs** are dislocated downward and cause a prolapse of the diaphragm, and thus a constriction of the aorta, which may result in regurgitation and valvular disorder.

Mitral Regurgitation.—Mitral regurgitation is a leakage of blood from the left ventrical, through the mitral valves, into the left auricle. The opening of the valve may be distorted, or the valve leaflets thickened, rigid, or retracted, thus allowing an

escape or reflux of blood from ventricle into auricle. The tendinous cords may also be thickened and adhered, with consequent prevention of free action.

By a forcing back of a portion of the blood from ventricle to auricle at the same time the pulmonic veins are emptying into the auricle, an overdistention of the auricle takes place. The auricle, then, from the extra amount of work required, becomes hypertrophied and dilated. There may be no noticeable symptoms at first. Later on shortness of breath, cough, irregularity of heart's action, indigestion, liver congestion, and so on, occur.

The **apex beat** is forcible and downward to the left. Of course the area of dullness is to the right and left. There is a **systolic murmur** in the mitral area, which is transmitted to the left axilla.

Every osteopath should understand the mechanism of this most frequent valvular lesion. Following hypertrophy and dilatation of the left auricle, the reflux may be so excessive that a residue remains. The auricle not being able to handle all the blood, **stasis** of the pulmonary vessels takes place, and pulmonary edema and hydrothorax are sequelæ. Then comes dilatation of the right ventricle and back pressure on tricuspid valves and right auricle. The **veins** throughout the body become turgescent, and the liver is apt to be indurated.

Before the breaking down of the left heart compensation, osteopathic methods, as all know, are effective in maintaining balance. Even after the lungs begin to be affected, careful and thorough treatment will result in good, and in cases of general venous sluggishness treatment, particularly to liver, bowels and limbs, will generally materially help in slowing the downward course of the disease.

Mitral Stenosis.—In stenosis there is narrowing or constriction of the valve opening. Thus in mitral stenosis the free flow of the blood from left auricle to ventricle is hindered.

The **cusps** are usually thickened, rigid and adhered. The valve opening may be so stenosed as to be but a narrow slit. In all cases stenosis is a **structural defect.** It cannot occur by strains, as regurgitative effects sometimes result.

The **symptoms** of mitral stenosis are practically the same as those of mitral regurgitation, owing to similar effects upon the circulation.

Under **physical signs** we find the apex-beat is only slightly displaced. Palpation will reveal, near the apex, a rough presystolic thrill. The increased area of dullness is to the right. There is an abruptly terminating, rough, presystolic murmur.

Aortic Regurgitation.—Aortic regurgitation is a reflux of blood from aorta to left ventricle, following ventricular systole. This is considered the **most serious** of the valvular diseases. The valve opening is either too large, so the valve leaflets do not fit tightly, or the segments themselves are thickened and retracted. Structural defects of the aortic valves are largely of the same character as in diseases of the mitral valves.

The **regurgitation** first causes dilatation of the left ventricle. This is followed by hypertrophy. If the mitral valve holds intact, no further effects result. But if the mitral valve is diseased or becomes incompetent from the dilated ventricle, the same morbid states follow as was noted under mitral regurgitation.

There is a forcible apex-beat, displaced downward to the left. The increased dullness is to the left. There is a long, loud **diastolic murmur.** The well known "water-hammer" pulse is felt.

Aortic Stenosis.—Aortic stenosis indicates a narrowing of the aortic orifice. It is a structural defect. The free flow of blood is obstructed from the left ventricle into the aorta.

Aortic stenosis is much less frequent than regurgitation. Aortic stenosis and regurgitation are very apt to be associated. The beat is commonly forcible, and the increased area of dullness is to the left. There is a systolic murmur, heard best at the right second interspace, which is conducted into both carotid arteries.

Tricuspid Regurgitation.—Tricuspid regurgitation is the most common valvular lesion affecting the right heart. It is rare as a primary lesion. The affection may be of a structural character, or functional.

Hypertrophy of the right ventricle occurs after the manner of left ventricle hypertrophy in mitral regurgitation. The se-

quelæ of venous turgescence follow, also, in the same way as was given under the mitral lesions. Tricuspid regurgitation rarely exists independent of some other cardiac or pulmonary ailments.

The apex-beat is diffused toward the epigastrium. Increased cardiac dullness is toward the right. There is a systolic murmur, which is heard best just above the xiphoid cartilage. The jugular vein pulsates; in severe cases there is pulsation of the liver.

Osteopathic treatment is usually effective in relieving the engorgement of the veins, and particularly in reducing liver congestion.

Tricuspid Stenosis.—This affection is said to be the **most rare** of valvular lesions. Thickening, obstruction and adhesions from endocarditis cause the stenosis. As in other lesions of the heart, there is a congenital form. There is pre-systolic murmur, heard best at the xiphoid cartilage. The pulse is small and weak.

Pulmonary Regurgitation.—This is another rare lesion, and is seldom met with in a simple form.

There is forcible pulsation in the epigastrium. Increased cardiac dullness is downward. There is a diastolic murmur, heard most distinctly at the left second intercostal space.

Pulmonary Stenosis.—Another rare lesion. The effect of this lesion on the right ventricle is the same as that of aortic stenosis on the left. The congenital lesion is apt to occur with a patulous foramen ovale.

There is a systolic murmur, heard best at the second intercostal space on the left. **Many systolic murmurs** heard over the pulmonary opening **are functional.**

Combined Valvular Lesions.—When two or more lesions occur at the same time the terms, combined or associated, are employed. This is a very common occurrence. Two, three or all of the valves may be affected at the same time. **Stenosis** and **regurgitation** at the same orifice is the most common association of any two valvular lesions. When there is a joint affection of two or more valves, the **aortic** and **mitral** are most commonly associated; then mitral and tricuspid; then aortic, mitral and tricuspid.

Prognosis and Treatment of Valvular Diseases.—It is impossible to outline with exactness either prognosis or treatment of heart lesions. All will agree that the character of the lesion is the first consideration, and before records of these cases can be of any scientific benefit, we must look well to the nature of the valvular leakage or obstruction and note precisely what effect our therapeutics has. Perhaps of greatest consideration in the matter of prognosis is, to what extent **compensation** has been maintained. We know that compensation may be perfect; that hypertrophy and dilatation may balance the valvular defect so thoroughly that even the patient is not aware of a heart lesion. As soon as compensation begins to fail, when palpitation, irregularity of pulse, dyspnea, edema, etc., appear, we know that our treatment should pass from the realm of the defensive to that of the offensive. Then when compensation fails still more, prognosis and treatment must necessarily be changed according to the increasing gravity.

In our osteopathic work we should never forget that the condition of the lesion may be greatly influenced by environment. Habits, occupation and general daily life may effect the heart ailment for good or bad. Thus in **prognosis** we have **three features** in particular to note: character of heart lesion, extent of systemic involvement, and environment. In the immediate prognosis, the extent of general venous stasis, if any, is of great importance. In other words, the gravity of the complications is of first consideration.

Aortic regurgitation is ranked by heart specialists as the most serious lesion. Aortic stenosis is a grave lesion, but not so serious as aortic regurgitation. It is often stated that the character of the lesion is not of so much consequence as the extent of involvement the lesion has engendered. Mitral stenosis is more grave than mitral regurgitation. Right side heart lesions are usually relative, and, naturally, when the right heart is diseased from extension of the ailment from the left side, the situation is serious.

In our **treatment** the first point indicated is to improve, if possible, the **integrity** of **heart muscle** and **lessen** the **valvular**

defects, if such can be done. Owing to a dearth of statistics, it is impossible to state to what extent improvement in organic lesions has been accomplished. Very likely if we had statistics and no post-mortem findings, we would still be in the dark as to much of our work. This much is positive: osteopaths have time and again apparently cured grave valvular lesions; cases that eminent specialists diagnosed as absolutely organic lesions. Our practitioners have eliminated the murmurs, reduced the size of the heart, and removed any and all systemic symptoms. These patients are well, have been well for years, and are leading active lives. But were these cases suffering from organic lesions? No doubt there was valvular leakage, hypertrophy and dilatation, but was the valve defect a functional one? In other words, was it due to strain and distortion? In all probability the patients' days were numbered and post-mortems would have shown grave lesions and quite likely more or less organic changes.

Does it not seem likely that some functional lesions may terminate in organic lesions? Through continued stretching of the valves and their immediate tissues, fatty degeneration may take place; the same as fatty degeneration of the heart muscle, occurring in dilatation of the chambers. If we can remedy functional lesions through specific work upon nerve centers and fibres, why cannot we influence organic lesions and at least reduce the gravity to a minimum? We know functional diseases of the heart, as palpitation, rapid heart, slow heart, etc., can be corrected, and from all indications, functional valvular leakages are generally easily and quickly remedied; it is only a step farther to affect truly organic lesions. The same valves, the same nerves, and the same osteopathic lesions are noted. Then it is only a continuation of the same process from functional disease to organic disease. Indeed, no one is able to draw a line between the two. Probably, as was intimated before, careful osteopathic treatment in rheumatism and other diseases that are apt to predispose to heart affections, will keep the heart so strong functionally and organically that resulting valvular lesions are not nearly so likely to develop. The heart can be treated and controlled as can any tissue or organ. It certainly stands to reason

that osteopathic therapeutics is rational in both preventing and curing valvular lesions. The M. D. gives his drugs with the hope of maintaining heart muscle integrity, of lessening a too forceful beat, of increasing waning power, of promoting general circulation, of preventing and lessening complications. We can do the same thing with our methods, even more effectually, and with no probability of harmful effects.

It would appear there are at least two ways in which organic lesions may develop. **First,** as stated above, through **functional distortion,** the normal heart muscle being strained from severe exercise, or a weak, flabby, or disused heart muscle being overtaxed by ordinary exercise. Here it will be seen that in the first instance immediate rest would probably correct the weakness; in the second, rest and general building up of the body if the atonic heart muscle resulted from some debilitating disease. If from local causes correction of the specific osteopathic lesion should be effective.

Secondly, through strong and rapid heart action the **valves are ruptured** or **lacerated,** always at the point of **maximum contact,** and thus present a favorable surface to micro-organisms.

Owing to the valves being a reduplication of the endocardium, they have no muscles or blood-vessels, so that in **functional leakages,** inflammation does not play a part, hence, a possibility of degeneration occurring from excessive stretching.

The large majority of **osteopathic lesions** are unquestionably found in the upper five dorsal vertebræ and the first five or six ribs on the left side, although cervical lesions, in many instances, play an important secondary, if not the primary, role. These mal-adjustments affect vaso-motor nerves to the heart, that is, to coronary vessels, the dorsal and cervical sympathetics, the vagi, and the phrenic. We are unable to state just how these lesions disturb nerve conductivity; what present anatomy and physiology teach us does not fully explain. Osteopathic dissection must be the means to the end of the explanation. We have many clinical results, but not the physiological knowledge, as yet, to support it.

The dropping down of the first rib, as well as the clavicle,

interferes with the large blood-vessels, especially the subclavian, and causes increased resistance of the heart's action and probably a certain regurgitative effect. This regurgitative effect would also occur in cases of obstruction to the aorta by constriction of the diaphragm from a dropping of the floating ribs. To what extent this latter feature has been demonstrated is not known. In valvular diseases it is practical to divide them for treatment into, **first,** where the **lesion** is **compensated; second,** where **compensation** is **incomplete; third,** where **compensation** is **lost.** With all cases we should give consideration to environment, temperament, habits, food, clothing, exercise, etc. Often these secondary matters are of vital importance, especially when compensation is failing. The Schott method of treatment may be of some avail; this treatment, which is composed of a series of resistant exercises, tends to lessen peripheral resistance, develop heart muscle, and remove heart stasis.

Speaking in general, **hypertrophy** and **dilatation** follow valvular leakage, as a **secondary effect.** It is a compensatory condition, and whenever compensation is failing, there is naturally a breaking down of the structural tissues of the heart; that is, the muscular hypertrophy is losing in integrity. Our primary aim, then, should be to keep up the compensation, which is represented in the hypertrophy, although there are cases that fail rapidly, especially in emphysema and cirrhosis of the lungs. Generally, in hypertrophy and dilatation, there is a **disproportion between** the **amount** of **work** the **heart has to do** and its **ability** to do it. One of two things has occurred; there is an increase in peripheral resistance or the volume of blood through the heart is abnormal in quantity.[1] Loudon[2] says: "The treatment of chronic disease of the heart requires a longer time, as a rule, than the same disorder in the acute stage. Some cases cannot be materially helped; a vast majority may be greatly benefited after a thorough trial; while more than we might at first suppose, can be entirely cured. I desire to quote at length from Hare relating to this point. He says: 'A chronic structural change in the

1. Valvular Heart Diseases, A. O. A. Journal, March, 1905.
2. Journal of Osteopathy, February, 1904.

heart resulting from an acute process is not always synonymous with chronic heart disease. Thus, acute endocarditis occasions a variety of changes of the mitral and aortic valves which long may indicate their presence by their characteristic murmurs, and yet in time these may wholly disappear. That many such cases outgrow the valvular trouble, especially mitral lesions, there can now be no doubt. The majority, even of those in whom valvular murmurs permanently continue do not have their health unfavorably affected for years, and in many of these, the duration of life is not appreciably shortened.' This statement, from such an author, gives the osteopath great encouragement; for add to those above referred to, which recover in time from all valvular trouble, the many cases of valvular insufficiency due to dilation, owing to osteopathic lesions to the trophic nerve, and which may be cured by removing such lesions, we find that quite a percentage of cases are thus disposed of.

"It is doubtless true, also, that the cases above mentioned having valvular thickening and vegetations, could have been cured in quicker time and greater number had osteopathic treatment been given to tone the heart, upbuild the general circulation and increase the activities of the excretory organs. The importance of the lungs is often overlooked in the treatment of cardiac diseases. The osteopath's ability to expand the chest and increase the capacity of the thorax should be demonstrated in both cardiac and pulmonary troubles. It is said to be a universal law throughout the animal kingdom 'that muscular power is directly proportional to the amount of oxygen consumed.' Hence give the power, and have your patient live as much out of doors as practicable. **Exercise** should be **moderate** and always **stopped** short of **fatigue.**"

Hypertrophy of the Heart.

Hypertrophy of the heart is an enlargement of the heart, due to an increase in the muscular tissue. It is usually associated with dilatation. The ventricles are more often involved than the auricles, and the left ventricle is more likely to be affected.

Etiology.—Valvular disease of the heart causing an ob-

struction to the outflow of blood, as mitral insufficiency, diseases of the aortic valve; increased intra-vascular pressure, caused by sclerotic changes in the walls of the vessels; contraction of smaller arteries, due to irritation of toxic substances in the blood, as in Bright's disease. Overeating or drinking and excessive physical exercise would also induce hypertrophy of the left ventricle. Hypertrophy of the right ventricle is caused by valvular lesions on the right side. Lesions of the mitral valve causing an increased resistance in the pulmonary vessels are etiologic factors; also diseases of the pulmonary vessels in the lungs, as in cirrhosis and emphysema. There are conditions affecting the heart, as the use of tea, alcohol and tobacco. Disturbed innervation, as in exophthalmic goitre; derangements of the vertebræ, and ribs corresponding to the upper five dorsals; downward displacements of the floating ribs, causing a prolapse of the diaphragm and a consequent retardation of blood through it to and from the heart, will effect the heart's action. Simple hypertrophy never occurs in the auricles; it is always accompanied with dilatation. The condition develops in the left auricle in mitral lesions; in the right auricle when there are disturbances of the pulmonary circulation. The tricuspid is rarely affected primarily.

Pathologically, the left side of the heart is more commonly enlarged than the right; the ventricles than the auricles. The shape of the heart varies when the left ventricle is hypertrophied, the concial shape being more or less lost; it lies more horizontally and is elongated. When both ventricles are enlarged the heart is round. When the right ventricle is affected, it occupies the largest part of the apex. The increase in the size of the heart is probably due to a numerical increase in the muscle cells. The muscle is firm, of deep red color and cuts with considerable resistance. Normally, the heart weighs from eight to nine ounces. In general hypertrophy it may weigh from fifteen to thirty ounces.

Symptoms.—Hypertrophy, being a conservative process or an act of **compensation,** does not necessarily present any symptoms at first. At the beginning there is rarely any pain, but a sense of fullness and discomfort is present. As the hypertrophy increases, the arteries become fuller, the veins less full and the

circulation accelerated. Epistaxis may be of frequent occurrence and the face congested. Pains occur in the precordial region. There are nervousness, headache, hot flushes, palpitation, cough and vertigo. In hypertrophy of the **left ventricle,** the apex is lower and to the left. The carotids pulsate visibly and the radial pulse is strong and tense. Percussion reveals enlargement to the left and downward. The first sound is louder and prolonged. The aortic second sound is intensified. In hypertrophy of the **right ventricle** the enlargement is to the right edge of the sternum. The second sound in the pulmonary area is increased. The apex-beat is displaced outward. The pulse at the wrist is usually small. Hypertrophy of the **auricles** always occurs with dilatation, which is most common in the left auricle. The physical signs are characteristic. They are caused by diseases of the mitral and tricuspid valves and diseases of the lungs, as emphysema and cirrhosis.

Diagnosis.—If a careful examination is made, hypertrophy can hardly be mistaken for any other condition. There may be a resemblance to pericardial effusion, pleuritic effusion, aneurism or mediastinal tumor, when near the heart.

Prognosis.—Depends largely upon the cause producing the hypertrophy. Remember that hypertrophy is a compensatory act. The prognosis is more or less unfavorable if resulting from emphysema, Bright's disease or in old age; also in degeneration of the vessels. In most cases of functional overaction, persistent treatment can usually accomplish considerable.

Treatment.—The treatment must be according to the cause of the hypertrophy. There are many etiological factors, consequently the treatment depends upon the influence of these factors. The principal treatment will be found under endocarditis, as valvular diseases are usually caused by endocarditis, and hypertrophy of the heart is a conservative process of nature—an act of compensation secondary to valvular and arterial lesions. The indications are to lessen the force and number of pulsations of the heart and remove the cause if possible.

Dilatation of the Heart.

There may be **dilatation** with thickening of the walls, and dilatation with thinning of the walls, or they are normal. It may be produced by impaired nutrition of the cardiac muscle or increased endocardial tension. More frequently the two conditions act jointly, although they may act singly. Impaired nutrition of the cardiac muscle may diminish the resisting power and thus cause dilatation. Weakening of the cardiac walls may occur in scarlatina, typhoid, typhus, rheumatic fever, etc. It is met with in chlorosis, anemia and leukemia. Increased endocardial tension occurs in sudden, extreme exertions and in valvular diseases. The important causes are considered under hypertrophy. Both impaired nutrition and increased endocardial tension are influenced directly by the extent and severity of the osteopathic lesion. This point has been considered under chronic endocarditis.

Pathologically, the right side is more commonly affected than the left. In advanced aortic incompetency, all the divisions may be dilated. When one ventricle alone is dilated the septum may be seen to bulge. In extensive dilatation, the auriculo-ventricular rings are often dilated. Other orifices may also be dilated. The condition is often associated with **hypertrophy** and **fatty degeneration.** The muscle may be normal in appearance. The endocardium is often opaque, and roughened in patches. There is degeneration of the ganglia of the heart.

Symptoms.—Dilatation causes weakness of the walls of the heart, but as long as the hypertrophied walls can compensate, no symptoms result. When the hypertrophy weakens, greater dilatation occurs and symptoms of venous stasis appears, as dropsy, feeble irregular pulse, dyspnea, cough and scanty urine. In some instances there may be brief precordial distress, faintness or palpitation.

Physical Signs.—On **inspection** the apex-beat is diffuse and feeble, or it may not exist. As observed by Walsh, the impulse may be visible and yet not palpable. **Palpation**—the impulse is diffuse, feeble and fluttering. The pulse is small, rapid and irregular, rarely is it slow. **Percussion**—the area of lateral dullness is

increased to the right. There is increase in the dullness downward to the sixth interspace and upward to the second rib in many cases. **Auscultation**—the sounds are weak and sharp. The first sound is shorter, lacks its muscular element and becomes more like the second. The sounds are obscured, the cardiac murmurs are present. In many cases the characteristic gallop rhythm is present. When the right heart is chiefly dilated, the true apex-beat cannot be felt, while an impulse may be felt below the xiphoid cartilage, and a wavy impulse is seen in the fourth, fifth and sixth interspaces to the left of the sternum.

Diagnosis.—When a clear history can be obtained, together with the characteristic features, the diagnosis can be readily made. **Prognosis** depends upon the cause.

Treatment.—The treatment of dilatation is that of valvular heart disease. It is important that the patient should have plenty of rest, suitable food and regulated exercises.

Myocarditis.

Myocarditis is an acute or chronic inflammation of the muscular tissue. In many cases where the muscle substance of the heart is diseased, there is no doubt that **osteopathic lesions** are potent underlying factors. The lesions lessen nervous integrity and thus have a direct bearing upon the muscular strength and the likelihood of inflammatory invasion.

Acute Myocarditis.—This affection is met with in fevers, in connection with endocarditis and pericarditis. Septic emboli may block the coronary arteries in pyemia, septicemia and malignant endocarditis and cause infarcts in the myocardium with abscess formation. Males are affected more often than females.

Pathologically, in **acute interstitial myocarditis** the changes take place in the intermuscular connective tissue. This becomes swollen and round-cell infiltration takes place. The muscle substance is pale and soft. **Acute parenchymatous degeneration** is characterized by degeneration of the muscle fibres, which are infiltrated with granules. The cardiac muscle throughout is pale and soft. **Acute suppurative myocarditis** is a rare condition. In this form abscesses occur, which vary in size from a pin's head to

a pea. They vary greatly in number and are usually multiple. They may not cause any disturbance and may not be recognized before death. On the other hand the abscess may rupture into the heart cavities or the pericardium, or they may perforate the intra-ventricular septum, thus allowing the venous and arterial blood to intermingle. It may cause a cardiac aneurism.

Symptoms.—These are very uncertain. If during the course of any of the causal diseases, the pulse suddenly becomes rapid, small, and irregular and compressible and palpitation and syncope develop, all of which point to cardiac weakness, myocarditis may be suspected. Signs of venous stasis develop later in the affection. The physical signs are those of dilatation. This is extremely grave. Cases do, however, recover.

Treatment.—The treatment is the same as that given under endocarditis and pericarditis. Rest in bed is absolutely necessary. Pay particular attention to the nourishment and to the hygienic surroundings of the patient.

Chronic Myocarditis.—Among the causes of this form of myocarditis are the excessive use of tobacco or alcohol; gout, rheumatism, malaria, diabetes, chronic nephritis, syphilis and lead poisoning. Acute interstitial myocarditis may lead to the chronic form. This form is "commonly caused by the narrowing of a coronary branch in a process of obliterative endarteritis" (Osler). It may be due to injuries of the anterior and lateral portions of the chest. Unquestionably **osteopathic lesions** of the upper dorsal vertebræ and ribs and cervical region affect the integrity of the heart muscle and predispose to congestion, inflammation and debility of the tissue. Males of middle life are more predisposed to chronic myocarditis.

The **pathological changes** occur most frequently in the left ventricle and the septum, but they may occur in any portion. The patches and streaks that are in the walls are sometimes only seen upon very careful examination. They are of a gray or grayish white color and, when fibres that have undergone fatty degeneration are intermingled, they have a grayish yellow tint. The condition may be associated with hypertrophy and dilatation. A part of one of the heart cavities may become dilated, producing

what is known as cardiac aneurism. There is destruction of the muscular fasciculi with subsequent development of new fibrous tissue. Fatty degeneration is also seen.

Symptoms.—Advanced fibroid myocarditis may be present without any symptoms. Slight degrees present no symptoms. The symptoms when present are: a feeble, irregular, slow pulse; attacks of angina pectoris and sometimes arhythmia. If fatty degeneration is also present the pulse will be quickened and irregular.

Diagnosis.—This is often very difficult and is requires careful and persistent study of a case to be able to make a correct diagnosis.

Prognosis.—This is grave. Sudden death is liable to occur at any time from complete obstruction to the coronary arteries, as this condition is associated with sclerosis and narrowing of these arteries or their branches.

Treatment.—The treatment of chronic myocarditis is largely included in chronic endocarditis. The cause of the disease should be determined, if possible. Careful treatment to the ribs of the left side, from the first to the sixth, and the corresponding vertebræ, will be of great aid in controlling the disease. Attention should be given to the diet and hygiene of the patient. Outdoor life, bathing of the skin, and careful treatment of the vasomotor nerves will be of great help.

Degeneration of the Heart Muscle.

Under the term fatty heart are embraced two affections. Fatty degeneration, in which the sarcous substance of the fasciculi is converted into fat; and fatty outgrowths, in which there is an excess of fat in and about the heart.

Fatty degeneration is very common and is due to an interference with the nutrition of the cardiac muscles. It is found in the impaired nutrition of old age, of cachectic states, of grave infectious diseases and of wasting diseases. In poisoning by arsenic and phosphorus, intense fatty degeneration is produced. Pericarditis may be associated with changes in the superficial layers of the cardiac muscle. Lesions of the coronary arteries will

produce this condition; also impairment of the oxygen carrying power of the blood. It occurs most frequently in men after forty years of age. Anatomically, the affection may be either general or local. It is most commonly seen in the left ventricle. When the condition is general the heart is dilated, flabby and relaxed. Microscopically, the muscular fasciculi exhibit a loss of nuclei, and oil drops and granules appear in the fibres. The affection may be present without any noticeable symptoms. Slight degrees and localized fatty degeneration are unrecognizable. **Dilatation** must be present to produce **symptoms.** This is apt to occur early. Dyspnea; asthma; cough; angina pectoris; dropsy; slow, weak pulse; palpitation, and toward the end, Cheyne-Stokes breathing may appear. Mental symptoms, such as maniacal delusions, may come on and last for weeks. **Prognosis** depends upon the cause and extent of involvement.

The **treatment** is largely that of dilatation of the heart. An effort must be made to determine the cause, and treatment should be applied accordingly. Considerable can be done in improving the nutrition of the tissues of the heart by hygienic and dietetic measures. Light exercises will often be of aid, but care has to be taken that the exercises do not tax the patient too severely. A general treatment of the body will be a helpful measure in invigorating the system as a whole and toning the cardiac tissues. The diet should be nutritious; largely nitrogenous.

Raising the ribs over the heart and increasing the chest expansion will be of help in cases where there are attacks of dyspnea and angina. Many cases present deep seated lesions in the upper dorsal region. When there are attacks simulating apoplexy, lay the patient flat upon the back with the head slightly elevated.

Fatty overgrowth forms a part of general **obesity** and sooner or later this infiltration impairs the nutrition of the cardiac muscle and true fatty degeneration results. This form occurs more frequently in men and between the ages of forty and seventy years. The characteristic changes consist of an increase in the normal fat. The heart may be enclosed in a thick covering of fat. The fat may also be deposited between the fasciculi, sometimes reaching the endocardium. Fatty overgrowth is certain

to exist in extreme obesity. No **symptoms** are produced until the muscular fibres weaken so that **dilatation** occurs. The presence of extreme obesity, combined with signs of cardiac weakness, point to fatty overgrowth. The **treatment** of fatty overgrowth of the heart is largely the same as that of obesity. Oertel's method of lessening the amount of liquids, proteid diet and graduated exercises is effective in cases where heart compensation is intact.

Amyloid degeneration is rare. It attacks the blood-vessels and intermuscular connective tissue. This is of the same nature as amyloid degeneration elsewhere.

Hyaline degeneration sometimes occurs in prolonged fevers. It attacks the muscular fasciculi.

Calcareous degeneration is a rare condition. The muscular fibres of the myocardium are infiltrated with lime and salts.

Brown atrophy is commonly seen in the hearts of the aged and in chronic valvular diseases. In pronounced cases the heart muscle is of a dark red brown and firmer in consistence than the normal heart. There is an accumulation of yellowish brown pigment granules in the muscular fibres, especially about the nuclei.

Neuroses of the Heart.

Palpitation is a more or less rapid action of the heart of which the patient is conscious. There is usually an irregular or forcible action of the heart, as well as a frequency of the heart-beat. There is usually some local irritation to the cardiac nerves; especially are **lesions** found to the third and fourth ribs, although a lesion may be higher or lower in the dorsals or it may be the cervical area. Muscular lesions are frequent. These lesions predispose to the effects of reflex stimuli, still the general health may be so weakened or the reflex irritation so pronounced that palpitation results independently of predisposing osteopathic lesions. Females are more liable to be affected than males. It often occurs at puberty, during menstruation and at the climacteric period. Anemia, the acute infectious diseases, dyspepsia, disturbances of the ovaries and other pelvic organs are com-

mon causes. The abuse of coffee, tea, alcohol, tobacco; diseases of the stomach, overwork, fright, grief, anxiety and sexual excesses are causal factors. Palpitation may be associated with organic diseases of the heart, but as a rule it is a purely nervous affection.

The patient's perception of the increased action and force of the heart is the **essential element** in palpitation. The action of the heart varies greatly and at times it may be a mere fluttering which lasts but a few minutes. In severe cases the heart beats violently and the pulse may be rapidly increased and reach 160 or more. The face is usually pale, but may be flushed. The heart's action is not increased in some cases. The attack generally lasts only a few minutes.

The first consideration in **treatment** is to locate the disturbing factor. Raising the ribs over the heart and lowering the first rib; correcting the clavicle in a few instances, or inhibiting along the upper dorsal region will usually quiet the heart's action. Stimulation of the vagi nerves, as they pass along the side of the neck, may be all that is necessary; in some cases inhibition of the superior cervical sympathetic or of the middle cervical region, acting on the depressor nerve of the heart, will lessen the tumultuous action of the heart. It will be recalled that there is either irritation of the accelerator nerves of the heart or the vagus is inhibited.

All **reflex disturbances,** as a displaced uterus, etc., must be removed before the palpitation can be stopped. Rest and confidence in the treatment are of great importance. A very few cases will require a hot bath and a general treatment and possibly an ice-bag over the heart to quiet the increased activity. In **anemic cases** hygienic measures and a proper diet, coupled with the treatment for anemia, are indicated. If the attack is severe, the patient should rest in a recumbent posture and drink something warm, besides receiving the indicated treatment.

Tachycardia is rapid action of the heart and commonly occurs in paroxysms. There are no heart sensations, as in palpitation. Either the sympathetics are stimulated or the vagus inhibited. It is not related to lesions of the heart, but is in reality a **disorder** of the **nervous system.** In some instances the condi-

tion is physiologic. Nervous strain, in the form of **osteopathic lesions** to the upper dorsal or cervicals irritating the sympathetic, is the most common cause. Emotion, fright and severe exercise are other causes. It is found in neurasthenia, anemia, hysteria and in those using an excessive amount of tobacco, tea and coffee. **Reflex stimuli** from abdominal or pelvic disorder may induce tachycardia. In exophthalmic goitre the sympathetics are over-stimulated, and in some instances the vagus inhibited, leading to "heart hurry." Tumors, hemorrhages, enlarged glands, etc., obstructing the action of the vagus, are a source of rapid heart.

Sudden onset with rapid action of heart, small weak pulse, headache, flushed face and faintness are common **symptoms.**

The **treatment** is somewhat similar to that outlined under palpitation. Locating the cause is the first essential. Besides removing local osteopathic lesions, inhibition to the cervical and dorsal sympathetics is effective. Raising the ribs over the heart will lessen the pulse-rate.

Rest, diet and general care of the patient may be necessary. Out-door exercise and cold bathing are beneficial. In a few cases springing the dorsal spine forward, raising the floating ribs, and slight traction of the cervical spine are effective in slowing the heart's activity.

Brachycardia, or slow action of the heart, is the opposite of tachycardia. In a few cases it is physiologic. It usually occurs secondarily, following infectious diseases; accompanying nervous disorders, as hysteria, melancholia and neurasthenia, and is associated with diseases of the digestive organs, pulmonary disorders and toxic effects of coffee, tea, tobacco, and drugs and the toxins of jaundice, diabetes, uremia, etc. Obstructions to the cervical sympathetics and irritations of the vagus, from osteopathic lesions, may be either direct causes in themselves or predisposing factors in the above diseases.

A **slow, weak pulse** is the characteristic symptom. The heart sounds are feeble. When the pulse beat is below sixty per minute it is diagnostic.

In the **treatment** of slow heart, as in the other neuroses of the heart, the cause should be first determined. A stimulating

treatment to the cervical sympathetics and inhibition to the pneumogastric will readily relieve many cases, at least temporarily. The lesion may be directly to these nerves and of course removal of the same is essential. Inhibition of the pneumogastric probably affects the activity of the depressor nerve, and stimulation of the cervical sympathetics, besides acting on the accelerator fibres of the heart directly, influences the blood supply of the body and thus increases arterial tension. Stimulation to the upper chest anteriorly and posteriorly, over the cardiac region, will increase the rapidity of the slow heart. Rest and care of the general health is necessary.

Arhythmia, or an irregularity of the heart's action and pulse beat, is due to lesions in the cervical region interfering with the vagi, sympathetic or vaso-motor nerves to the heart. In a number of cases the first, second or third rib on the left side is at fault and a correction of it will relieve the irregularity immediately. It is claimed that there are nerves at the fourth and fifth dorsals that tend to control the rhythm of the heart-beat. Other causes are organic diseases, reflex disturbances, excessive use of tobacco, coffee and tea, valvular diseases, and degeneration of the heart tissues and ganglia.

The **treatment** naturally requires attention to the primary disease, although many times local lesions to the heart innervation will be found, removal of which relieves the cardiac irregularity. Rest and general, stimulating treatment are beneficial. **Lesions** of the **ribs** are the most frequent. The lesion is usually found in the second, third and fourth ribs, but may be as low as the sixth or as high as the first; these are in addition to dorsal and cervical vertebral lesions.

A symptom that may accompany a rib lesion is **shortness** of **breath,** due to the irritation to respiratory movements. Frequently these lesions are to the anterior ends or to the costal cartilages.

Angina pectoris is characterized by a paroxysm of violent pain in the region of the heart, extending into the neck, back and arms; and in violent attacks, there is a sense of impending death. It is a symptom rather than a disease, associated with a number of morbid conditions of the heart and vessels. It occurs most

frequently in males after the fortieth year. It is found in connection with arterio-sclerosis, simple hypertrophy of the heart, aortic stenosis, aortic insufficiency and increased arterial tension. The **exciting causes** of an attack are undue exertion and mental emotion. **Lesions** are invariably found to the **ribs** over the heart and to the **corresponding vertebræ.**

The condition usually found is **disease** of the **coronary arteries.** Advanced sclerosis of the coronary arteries may occur, however, without angina. The **osteopathic lesions** undoubtedly affect the cardiac innervation, particularly vaso-motor and sensory, thus leading to the neurosis with consequent disturbances of cardiac circulation and resulting irritation to the ganglia; following this is sclerosis of the coronaries and heart muscle ischemia.

The **paroxysm** begins suddenly, usually during exertion or intense mental emotion. The pain is agonizing and of a grip-like character, and there is a feeling of impending death. The pains radiate up the neck and down the arms, and there may be numbness or tingling in the fingers and over the cardiac region. There is usually extreme pallor, the skin is ashen gray and frequently a profuse sweat breaks out over the surface. Dyspnea may be present. The duration of the paroxysm varies from a few seconds to a minute or two. At the end of this time the patient passes out of the attack or dies. The attacks occur at intervals, varying from a few days to many years. After the paroxysms there is instant relief.

In the **diagnosis** the only condition with which true angina pectoris is liable to be confounded is pseudo-angina pectoris. **Pseudo-angina** or hysterical angina occurs chiefly in women or in neurasthenic men. The attack usually occurs at night and is unassociated with organic heart disease. There is a feeling of cardiac **distension instead** of **constriction** as in true angina. There is emotional excitement and the attack lasts one or two hours, which is much longer than that of true angina. The **prognosis** is unfavorable, although many cases live for a number of years. A few cases have recovered under a thorough course of treatment.

The **treatment** of angina pectoris consists in correcting the

disordered upper dorsal vertebræ and the upper left ribs over the heart. Invariably lesions are found in this region and if the treatment is applied to correct these disorders, the attack can be relieved. By following up the treatment during the intervals, a number of cases can be practically cured. A common lesion found is a slight lateral curvature in the upper dorsal region. This curvature is oftentimes great enough to cause a subdislocation of several of the ribs, which certainly complicates the derangement, at least as far as a quick cure is concerned.

During the **attack** raise the ribs over the heart at the point of constriction so as to relieve the impinged nerve fibres. The vagi and phrenic nerves may also be at fault in some cases. The sensory nerves to the heart are from the first, second and third dorsals.

Ice-bags or heat applied locally will be a helpful measure. In cases where there is high arterial tension, an inhibitory treatment to the upper and middle cervical regions will be of special aid, as it relieves this tension by affecting the vaso-motor nerves. This treatment will at least overcome the **vaso-motor form** of angina pectoris. Hot foot-baths and friction will also be found of value.

The patient should at all times avoid any excitement and live a very quiet life. He should take the best of care of himself and his food should be nutritious. In pseudo-angina the treatment is to relieve the irritation to the nerves affected.

DISEASES OF THE ARTERIES.

Arterio-Sclerosis.

(Atheroma).

This is a thickening of the intima of the arteries, due to an inflammatory increase of the connective tissue, associated with more or less fatty degeneration and calcification.

Old age, alcohol, lead, gout, syphilis, rehumatism, laborious work, overeating, nephritis, and calcareous water tend to produce the condition. **Excessive eating** and **drinking** are common causes of both atheroma and chronic renal diseases and should

always be regulated. Physical overwork, chronic intoxications, etc., produce hyper-tension of the vascular system and thus lead to changes of the vessel walls. All of the above list of causes are important.

Pathologically, the arteries are thickened, tortuous and rigid. The intima may be occupied by rough, calcareous plates. In extreme cases the sub-endothelial tissue undergoes degeneration and breaks down in spots, forming "atheromatous abscesses." The disease may be **circumscribed** or **diffuse;** in the latter there is a wide spread distribution of the affection. Owing to the general effect, the heart, liver and kidneys receive less blood and tend to atrophy. Microscopically, there is found more or less fatty degeneration of the different coats, and an overgrowth of connective tissue in the intima. The arteries most frequently affected are the aorta and coronary.

Symptoms.—Circulatory.—There is a sluggish, high tension pulse and accentuation of the second aortic sound. There is also dyspnea, severe pain in the left side, palpitation, and the left ventricle is hypertrophied. **Cerebral.**—Such symptoms as headache, tinnitis, vertigo, syncopal or epileptiform attacks may be present. **Renal.**—There is an increase in the quantity of urine, which is of a pale color and low specific gravity; at times it is albuminous. The disturbance leads to atrophic nephritis. In some cases the peripheral arteries become obliterated.

Sequelæ are cardiac dilatation, heart failure, paralysis, apoplexy, fatty heart, aneurism, contracted or senile kidney, angina pectoris, and in extreme cases, gangrene of the extremities.

Diagnosis.—The characteristic symptoms are hardened arteries, high tension of the pulse, hypertrophy of the left ventricle, and accentuation of the aortic second sound.

Prognosis.—Many cases can be greatly benefited by osteopathic treatment, and at the incipiency the improvement is generally marked. It usually runs a very chronic course.

Treatment.—The treatment must necessarily consist, principally, in the removal of such conditions as are producing the degeneration. Alcoholism, gout, rheumatism, syphilis, etc., must be remedied before there can be much change in the arteries.

Freeliving and all excitement must be stopped. Besides treatment of the primary disease, a general treatment will be of much avail in equalizing and reducing arterial tension. Brunton[1] speaks of cases of atheroma being cured by exercise and manual treatment to the rheumatic joints themselves. One, apparently suffering from senile dementia, was much improved after two years of this treatment applied to the joints, and resulted in benefiting the cerebral circulation. The bowels and kidneys should be kept active, and the general health of the patient carefully watched. Keeping the skin active by daily baths is an essential factor in the treatment. Very frequently the disease is not only retarded, but improved.

Aneurism.

Aneurism is a cricumscribed dilatation of an artery. A **true aneurism** is one in which the sac is formed of one or more coats of the artery, and may be fusiform, saccular or cylindrical. A **false aneurism** is one in which the internal coat of the artery alone gives way, and if the blood dissects between the layers of the vessel walls, it is called a **dissecting aneurism.** An **arteriovenous aneurism** results when a direct communication is established between an artery and a vein (this is also termed an aneurismal varix), or a sac may intervene (varicose aneurism). **Miliary aneurisms** are of very small size.

Sudden strain and the conditions that lead to arterial degeneration, like syphilis, rheumatism, gout and alcoholism, are predisposing causes. The male sex at middle life suffers most. Increased arterial tension upon a weakened vessel, usually arteriosclerosis, is the immediate cause. Non-septic embolism and malignant endocarditis are other causes.

Aneurisms may occur in various arteries but the aorta (thoracic and abdominal) is most frequently involved.

Aneurism of the Thoracic Aorta.—The arch of the aorta is the most common seat. It may occur in the ascending, transverse and descending portions and in the thoracic aorta below the arch. They vary greatly in size and shape.

1. Lectures on the Action of Medicine, p. 343.

Symptoms.—Aneurisms may exist without any symptoms or apparent physical signs, especially if they are small. The most important symptoms are the result of direct pressure. Dyspnea arises most frequently as a result of pressure upon the trachea, the left bronchus, or upon the recurrent laryngeal nerve. Paralysis or spasm of the vocal cords may be due to pressure upon the left recurrent laryngeal nerve. This causes alterations in the voice, as hoarseness, stridor and aphonia. A cough is usually present and it is of a metallic, barking character when due to spasm of the vocal cord. Dysphagia results from pressure on the esophagus. Pain may result from pressure upon the intercostal nerves. Compression of the vagus will produce vomiting. Dilatation or contraction of the pupils and unilateral sweating may result from compression and irritation of the sympathetic nervous system. The pulse in the vessels beyond the aneurism is slow; hence, the pulse in one radial may be delayed and diminished in volume. This may be due to the narrowing or distorting of the arterial orifice by the aneurism, or the diffusion or spending of the current within the sac.

Hemorrhage may result from rupture of the sac into the lung, bronchus or trachea. The bleeding may be profuse, often producing sudden death. If the aneurism presses upon the deep seated veins, there may be venous engorgement, cyanosis and local edema.

Physical Signs.—Inspection.—In many instances this is negative, but usually sooner or later an abnormal prominence and pulsation in the upper sternal region is observed. **Palpation.**—An **expansile pulsation** and a distinct systolic shock can be felt over the aneurismal sac. **Percussion.**—Dullness and increased resistance may be present. **Auscultation.**—A murmur or **bruit** is generally heard over the aneurism, corresponding with the first sound of the heart, but more intense. An important sign is a much intensified ringing **second sound,** which is almost always heard in large aneurisms of the arch of the aorta.

Diagnosis.—Care has to be taken to differentiate thoracic aneurism from solid tumors, pulsating empyema and pulmonary tuberculosis.

Prognosis.—The prognosis is always grave. Death may result from exhaustion; rupture of the aneurism into the pericardium, trachea, bronchi, esophagus, lungs, heart or pleura; heart failure and direct pressure.

Aneurism of the Abdominal Aorta.—An abdominal aneurism commonly occurs near the celiac axis. The tumor may be fusiform or saccular and it is sometimes multiple.

Symptoms.—Pain in the back or passing around the sides; numbness of the legs; delay in the femoral pulse; gastro-intestinal symptoms, especially vomiting, are the chief symptoms.

Physical Signs.—Inspection.—Marked **pulsation** in the epigastric region and sometimes a tumor may be visible. **Palpation.**—A **tumor** can be felt. The pulse is forcible and **expansile. Percussion.**—Dullness may be elicited if the growth is large. **Auscultation.**—A systolic murmur is generally audible. A diastolic murmur is sometimes present.

Diagnosis.—A positive diagnosis demands the presence of a **tumor** which can be grasped and has a **heaving expansile pulsation.** The presence of pulsation, a thrill, or a systolic murmur, does not justify the diagnosis of abdominal aneurism, as this may be simulated by other conditions. The pulsating aorta of nervous women may simulate aneurism. There is no distinct tumor that can be grasped and the beating is not expansile. In solid growths located over the abdominal aorta, there may be pulsation, thrill and systolic murmur, causing them to be mistaken for an aneurism. In this the pulsation is not expansile, and is frequently lost when the patient is placed in the knee-elbow position.

Prognosis.—The prognosis is unfavorable. Death usually results from rupture. After development of the aneurism, the duration of life is from one to four years.

Treatment ot Aneurisms.—The object to be obtained in the treatment of aneurisms is to lessen intravascular pressure and to restore a more normal tonicity of the vessel wall. By diminishing intravascular pressure, coagulation of the blood within the aneurism will be favored. Restoring contraction of the sac is important; possibly lesions to the vaso-motor nerves of the involved blood-vessels would favor a lessened tonicity of the walls

of the vessel; also a prolapsed diaphragm might predispose to aneurism in the thoracic aorta.

In most cases the **treatment** can only be **palliative.** Various measures have been employed to produce clotting and consolidation within the sac of the aneurism. **Tufnell's method** has been commonly employed in early cases. It consists of absolute rest in bed for two or three months. The mind should also be quiet. A dry diet is given: for breakfast, two ounces of bread and butter and two ounces of milk; for dinner two or three ounces of meat and three or four ounces of milk or claret; for supper, two ounces of bread and two ounces of milk. The object of the diet is to lessen the blood volume and reduce the blood pressure within the sac. Also, to render the blood more fibrinous and, on the whole, to favor coagulation.

Ligation of distal arteries has been employed in aneurisms; also, acupuncture and electrolysis with varying success. Ice-bags applied locally give great relief when pain is severe.

In aneurism of the abdominal aorta, pressure may be employed. Steady pressure for twenty-four hours under an anesthetic, on the proximal portion of the vessel, is necessary. The object to be gained is coagulation.

In all cases of aneurism the patient should live a quiet life and avoid all sudden exertions. Absolute rest in a recumbent position is necessary in severe cases; it lessens the number of heart-beats and reduces blood pressure.

DISEASES OF THE BLOOD AND DUCTLESS GLANDS.

ANEMIA.

Anemia is a condition in which there is a diminution in the amount of blood as a whole, its red corpuscles, its albumin or its hemoglobin, i. e., a deficiency in one or more of its constituents. Peckham[1] suggests that luxated ribs, as a whole, may be a very potent factor in anemia. The usual lesions are in the splanchnic area, involving metabolism. However the whole spine is apt to be involved. The condition may be general or local. Anemias are divided into, (1) primary or essential anemia; (2) secondary or symptomatic anemia.

The Primary or Essential Anemias.

Chlorosis.—A pronounced anemia, most frequently met with in girls about the age of puberty, and characterized by great reduction in the hemoglobin. Those in whom the pubis and breasts are undeveloped are especially apt to be affected. Young women considerably past puberty and girls before puberty, may become chlorotic, but such cases are somewhat rare. Blondes suffer more frequently than brunettes; the weak more often than the strong. Overwork, especially in badly lighted, closely confined and illy ventilated rooms, is a predisposing cause. A lack of nutritious food and out-door exercise and too much stair climbing are also predisposing causes. Menstrual disturbances are a cause, as well as a sequence, of chlorosis. According to Sir Andrew Clark, constipation plays an important role, and he suggests that the condition might really be a copremia, due to the absorption of the toxic ptomaines and leucomaines from the colon.

It is very seldom that the disease proves fatal. Hypoplasia of the vascular system and of the uterus, and imperfect development of the genitalia have been noticed. The heart is dilated and the left ventricle usually hypertrophied.

Symptoms.—The blood examination shows a very marked

1. Journal of Osteopathy, June, 1902.

reduction in the hemoglobin, while the number of red corpuscles is not greatly reduced and may even be normal. The red cells are found to be paler than normal in severe cases; the corpuscles may be extremely irregular in size and shape. There is pallor and weakness without loss of flesh. The skin has a peculiar greenish tint. A capricious appetite, breathlessness, palpitation, constipation and sometimes epigastric pain are common symptoms. There is a tendency to hysterical outbreak and menstrual disturbances.

Physical examination shows the heart to be slightly dilated. A systolic murmur is heard at the base and in severe cases it may be also heard at the apex. A soft, continuous murmur is heard over the jugular vein on the right side of the neck. The pulse is full and easily compressible. Thrombosis of the large veins, or of the femoral, or of the cranial sinus may occur.

Diagnosis.—In cases in which the greenish palor of the face is marked, the disease can be recognized at a glance. Chlorosis may be confounded with anemia in the early stage of **pulmonary tuberculosis.** Organic **heart disease** is simulated by the breathlessness and palpitation. **Bright's disease** may be mistaken for chlorosis on account of the edema of the feet, and general pallor present in the latter affection.

Prognosis.—This is always favorable. Appropriate treatment is generally followed by speedy recovery. Relapses are common.

Treatment.—Gerdine[1] says: "Among the specifics iron takes high rank in connection with the anemias, especially that form called chlorosis. In such diseases the trouble lies in a lack of the iron containing element—hemoglobin of the red blood-corpuscle.....Admitting the lack of iron in the red corpuscle, will the administering of more iron necessarily effect a cure? May it not be that the trouble lies, not so much in the lack of iron, as in the ability of the body to utilize." Halbert[2] says the idea is gaining ground that chlorosis is due to imperfect blood forming organs, or increased growth of special organs at puberty.

1. Bulletin, March, 1905.
2. Practice of Medicine.

Bunge[1] proves by exhaustive experiments that the giving of inorganic iron in anemia is irrational. That it is not assimulated has been shown conclusively, for no matter in what form it is administered, the iron can be recovered from the feces without loss. It also acts as an astringent to the intestinal secretions and produces many uncomfortable symptoms.

The object of osteopathic treatment is to correct the inability to assimilate the iron in the food, by paying attention to the nervous and lymphatic systems, to the blood elaborating organs, and to hygienic measures. The osteopath corrects various derangements that may be found along the spinal column to the nervous and vascular channels, and manipulates all muscles that are contracted or flabby, with a view of creating a greater demand for nourishment to the tissues and a consequent better digestion. The splanchnics should receive particular attention, as they are usually at fault.

Treat the liver directly and raise the ribs over the spleen. Treatment of the cervical, solar and hypogastric plexuses will tone up the nervous system and increase the circulation, so that digestion is aided and dyspnea is relieved by the proper oxygenation of the blood. It is not external chemical properties that the system needs, for it contains within its tissues (or at least in the food introduced) all the properties and forces necessary for health; but the system needs help to relieve it from its embarrassed and overburdened condition, so that the forces may act unobstructedly. Consequently all that anyone can hope to do is to relieve these obstructions by correcting any abnormalities and by having the patient observe hygienic rules. Coupled with the osteopathic treatment is the use of food that is easily digested (eggs, milk, green vegetables, meats, etc.), plenty of pure air, rest and sleep, with a change of occupation, if possible.

Progressive Pernicious Anemia.—A grave form of anemia in which the red corpuscles have been destroyed and reduced in number, according to medical writers; often unassociated with any definite causal lesion.

Etiology and Pathology.—Osteopathic lesions of the splanch-

1. Physiologic and Pathologic Chemistry, p. 379.

nic region are common and deeply seated, and may result in degeneration of the posterior column of the cord and changes of the sympathetic nerves. Males are more frequently affected than females. Those past middle age are most commonly affected, but children also suffer. The disease is widely distributed. The etiology is very obscure. Unfavorable hygienic surroundings and insufficient nourishment favor its development. Pregnancy, parturition, advanced atrophy of the stomach, profound and long continued gastro-intestinal disease, and intestinal parasites predispose. Severe or prolonged hemorrhages are other causes. In many cases no adequate cause is apparent. Addison characterized a group of cases by a "general anemia, occuring without any discoverable cause, whatever; cases in which there had been no previous loss of blood, no exhausting diarrhea, no chlorosis, no purpura, and no renal, splenic, miasmatic, glandular, strumous or malignant disease." According to one theory, these cases are due to increased hemolysis, excited by absorption of poisons from the intestines and elsewhere; on the other hand, other authorities believe it is due to defective hemogenesis.

Pathologically, the skin has a lemon tint in most cases, the body is rarely emaciated, the fat is a light yellow and the muscles are usually intensely red in color. Extreme fatty degeneration occurs in this disease. The heart is large and the heart cavity contains very little blood. The heart muscle is flabby and of a pale light yellow color. There are changes in the ganglion cells of the sympathetic, and sclerosis of the posterior column of the cord. Ecchymoses sometimes occur in the skin and mucous membranes. The lymph glands are enlarged, swollen and of a deep red color. The bone marrow is dark red; the lymphoid cells are increased; numerous nucleated red corpuscles are present, and the fat vessicles are absent.

Symptoms.—The approach of the symptoms is slow and insidious. Languor slowly develops into extreme debility which prostrates the patient so that he can not rise from bed. The pallor is marked. There is shortness of breath and palpitation of the heart on the slightest exertion. There is very little loss of flesh. The skin soon becomes of a lemon yellow tint. The

appetite fails, while nausea, vomiting and diarrhea may be present at first, and gradually grow worse. The pulse is large, but soft and jerky. The mucous membranes—lips, gums and conjunctivæ—seem bloodless. Hemic murmurs are constantly present. The capillary pulse and pulsating veins are frequently seen. Cutaneous and retinal hemorrhages are frequent. Moderate irregular fever is commonly present. Numbness and tingling, and sometimes tabetic symptoms, appear.

The **blood** is pale and watery. The number of red corpuscles is greatly reduced. The leucocytes are usually not increased; they may be even somewhat reduced. The hemoglobin may be reduced, but not proportionately. Nucleated red blood-corpuscles are invariably present. The red corpuscles are irregular in size and shape.

Diagnosis.—At first the diagnosis may be uncertain, but the distinctive symptoms soon decide. The relative increase, or at least no proportionate decrease, in the hemoglobin and the large forms of nucleated red blood-corpuscles found on examination of the blood, together with a marked anemia, digestive disturbances, and profound prostration, are important symptoms.

Prognosis.—As a rule the disease proves fatal, although the disease may be retarded and cases have recovered.

Treatment.—The treatment of this form of anemia is largely the same as the treatment of chlorosis. Careful attention to the derangements of the spinal column, good food, rest and suitable hygienic surroundings, constitute the necessary treatment; a change of climate will many times be of great value. In this disease a general treatment would be indicated; by that is meant attention should be given the entire system to get it in as healthy condition as possible, by correcting the various lesions in the spinal column and ribs, relaxing the spinal muscles thoroughly and stimulating the various glands and excretory organs of the body. Everything should be done that is possible to prevent the destruction of the red corpuscles. The blood forming organs of the body should be thoroughly treated. Stimulation of these glands, with careful attention to the entire circulation, will tend

to restore the blood to the normal. Toast, meat juice, and bone marrow will be found to be the most suitable food.

Leukemia.—A blood disease, characterized by persistent increase in the colorless corpuscles of the blood, with lesions of the spleen, lymphatic glands or bone marrow—either of one or of the whole.

Etiology and Pathology.—Nothing definite is known of the causes. It is most commonly seen in the middle period of life and in the male sex. An injury or blow in the splenic region often precedes the development of leukemia. Very likely lesions of the ribs over the spleen and the corresponding vertebræ, affecting vaso-motor nerves to the spleen, would predispose to the disease. Hereditary influences, anxiety, worry, pregnancy, malaria and syphilis seem to favor its development. It is often associated with autointoxication.

Pathologically, emaciation and pallor may be extreme. Dropsy may be present. The heart and vessels are commonly found gorged with coagulated blood, and on account of the great increase in the leucocytes, it is of a whitish or yellow color. The spleen is almost always enlarged. The spleen is firm and cuts with resistance, and the blood-vessels are enlarged. The capsule is thickened. The Malpighian bodies are usually invisible. Adhesions between the spleen and the abdominal walls, diaphragm, stomach or other viscera may be found. The bone marrow is involved in association with the spleen in the majority of cases. The fatty tissue disappears and is replaced by rich lymphoid and blood cells in all stages of development. The lymphatic glands may be enlarged; this may occur alone or in association with the splenic enlargement. The cervical, axillary, inguinal and peroneal glands are usually involved. They are generally distinct, soft and movable. The liver is often enlarged, generally due to diffused leukemic infiltration. The capillaries and interlobular tissues are filled with leucocytes. Changes occasionally occur in the kidneys. Leukemic nodules may be found in various parts of the body also.

Symptoms.—At first the symptoms are those of intense anemia, although usually developing slowly. The first symp-

toms noticed may be the swelling of the abdomen from enlargement of the spleen, or the enlarged lymphatic glands may first attract attention. Hemorrhages from the mucous membranes may occur early. There is moderate, irregular fever which may rise to 102 or 103 degrees F. The pulse is usually rapid, soft and compressible. Dropsy generally occurs in advanced cases. Headache, dizziness and faint spells may occur, and sudden coma may follow cerebral hemorrhage. The diagnosis must depend upon the examination of the blood. It is paler than normal. In the **spleno-medullary form** of leukemia[1] there is an enormous increase in the number of leucocytes. Nucleated red corpuscles, usually normoblasts, are present in considerable numbers. A characteristic feature is the presence of myelocytes which are large, mononuclear forms, containing neutrophilic granules not found in normal blood. The red corpuscles are only moderately reduced. The hemoglobin may be reduced relatively or in a somewhat greater proportion.

In **lymphatic leukemia** the increase in the colorless cells is not so great as in the spleno-medullary form. The lmyphocytes are increased, all other leucocytes being relatively lessened. Nucleated red corpuscles are rare. Lymphatic leukemia is rare, while it is more fatal and rapid in its course. It is more frequently met with in the young.

Diagnosis.—The diagnosis can only be determined by examination of the blood.

Prognosis.—This is unfavorable and in advanced cases, hopeless. A few cases have recovered. The course is usually from four to eight weeks in lymphatic leukemia; in other forms, from two to five years, or even longer.

Treatment.—The treatment is mainly a general one, although special attention should be given to the spleen and lymphatics and care taken that the patient receives plenty of fresh air and good food.

An out-door life in a dry climate, with attention to hygienic living, will be of great help to the spinal treatment. The bowels should be kept regulated and the diet be a full one, with careful

1. See Whiting—A Case of Spleno-Medullary Leukemia, A. O. A. Journal, July, 1906.

avoidance of anything that would lead to irritation of the stomach. All exposure and excesses are to be avoided.

Secondary Anemia.

This division includes a large proportion of anemic cases. It is very necessary to determine the primary disorder. The most important groups are:

(1) **Anemia from hemorrhage**—If the hemorrhage is copious, acute secondary anemia results. The watery and saline constituents of the blood are rapidly made up by absorption from the gastro-intestinal tract. The corpuscles and hemoglobin take a long time for regeneration; sometimes it is weeks or months before they reach normal. The albuminous constituents are more rapidly restored.

(2) **Long continued drain** of the **albuminous materials** of the blood may produce marked anemia, as in chronic Bright's disease, suppurative processes, prolonged lactation, chronic dysentery, cancer, etc.

(3) **Toxic anemia** is the result of the absorption of lead, mercury, arsenic or phosphorous. Certain diseases, poisons, chronic malaria and syphilis also produce anemia. They act directly on the red corpuscles, producing considerable destruction or increase the rate of ordinary consumption.

(4) **Anemia from inanition** results from starvation which may be due to conditions which interfere with the proper reception and assimilation of the food, such as obstruction of the esophagus by cancer, and in chronic dyspepsia. It may also be due to insufficient food supply, either in quality, quantity or both. The reduction of the blood plasma may be great, while the corpuscles are but slightly affected.

Symptoms.—Paleness, exhaustion and faintness are usually the first symptoms. Paleness is not always a positive sign. Examination of the blood shows reduction of corpuscles and hemoglobin. Care should be taken to diagnose from the primary anemias. Prognosis is usually favorable, although dependent upon the cause.

Treatment.—Rest and nourishing food is the principal treat-

ment in secondary anemia. The cause of the affection should be removed if possible. All that the system needs is an opportunity to overcome the defect and the percentage of red blood-corpuscles will increase with great rapidity. The patient should be out in the open air when possible. All toxic substances are to to thoroughly eliminated and their recurrence prevented. A careful treatment along the spine will aid in increasing the tissue activity.

Hodgkin's Disease.

(Pseudo-Leukemia).

Definition.—A disease characterized by progressive hyperplasia of the lymphatic glands, with anemia and secondary lymphoid growths of the liver, spleen and other organs, and without a marked increase in the white corpuscles.

Etiology.—The causes are unknown. Lesions of the spinal column are found corresponding to the innervation of the lymphatic and digestive systems. Such lesions may affect vaso-motor or trophic fibres of the lymphatics. Depressing influences of all kinds seem to favor the disease. A large majority of the cases occur in males, between the ages of twenty and forty years. In a large number of cases the disease develops insidiously and without any apparent cause. Chronic skin diseases, various irritative conditions, chronic nasal catarrh, syphilis, tuberculosis, and malaria, giving rise to local glandular swelling, may precede a general development of the disease. Heredity may be the cause, but this is doubtful.

Pathologically, the enlarged glands are soft and elastic, though sometimes they are hard and dense. In the early stages they are small, isolated and readily movable, while in the more advanced stages the glands are larger, fuse together and are surrounded by hard, dense capsular tissue. The lymphatic growth may perforate the capsule and extend into the surrounding tissues. On section the tumors are smooth, either soft or firm, and of a grayish white appearance. Suppuration may occur in the superficial glands. Necrosis, and sometimes caseation, may occur in the harder tumors. The more superficial glands are usually

first affected, then those of the submaxillary region, neck, axilla and groin, but the entire lymphatic system may be involved. Of the deep seated glands, those of the thorax and the abdomen (the retro-peritoneal) are most often affected. The abdominal vessels, the sacral and lumbar nerves, and the nerve plexuses may be compressed by groups of the enlarged glands.

The spleen is generally enlarged, but only slightly. The marrow of the bones may be converted into lymphoid tissue. The tonsils, lingual follicles, intestines, liver, kidneys, lungs, skin, retina and heart may have lymphoid tumors scattered throughout their substance. The nervous system may be involved and invasion of the brain and spinal cord may occur.

Symptoms.—Usually the first symptom to be noticed is enlargement of the glands of the neck, axilla or groin. Later signs of anemia appear—pallor, weakness, dyspnea, headache, giddiness, palpitation, and edema of the legs. Epistaxis occasionally occurs. Hemic murmurs are often heard over the heart. There may be fever, very irregular and variable in degree.

The symptoms due to the **mechanical pressure** of the enlarged glands upon different structures vary greatly with the number, size and distribution of the tumors. Dyspnea may arise from pressure upon the trachea. Pleuritic and abdominal effusion may occur from pressure producing venous obstructions. Pressure upon the pneumogastric nerve will interfere with the heart's action; inequality of the pupils and unilateral sweating of the face may be present as the result of pressure upon the cervical sympathetic. Entanglement of the nerves in the growth may cause pain. Bronzing of the skin may occur in connection with affections of the abdominal glands and is probably due to pressure upon the suprarenal capsules. Jaundice may occur from pressure upon the bile ducts. The blood is thin and pale and the red corpuscles are generally diminished in number. Leucocytes may be slightly increased.

Diagnosis.—The differential diagnosis between Hodgkin's disease and tuberculous adenitis may be difficult in the early stages. Blood analysis will usually decide the diagnosis.

Prognosis.—Recovery is rare; it is almost invariably fatal. Duration is from a few months to three or four years.

Treatment.—A definite treatment cannot be outlined. Usually various spinal lesions are found which correspond directly with the lymphatic and digestive systems. Possibly the nerves controlling the lymphatic system, being obstructed, have some influence in the cause of the disease. The special points of treatment are the cervical region, to control the upper parts of the lymphatic system, and the splanchnics, to control the region of the receptaculum chyli, thoracic duct, spleen and liver.

Local treatment of the glands does not amount to much; in fact, if one is not careful, treatment to the gland does positive injury by bruising them. Treatment of the digestive organs; attention to the diet and hygienic surroundings are demanded.

Addison's Disease.

Definition.—A constitutional affection, characterized by chronic inflammation and degeneration of the suprarenal capsules, a pigmentation or bronzing of the skin, depressed circulation and prostration. "It is believed to depend upon degeneration of the adrenals or changes in the sympathetic semilunar ganglia, or both." There will probably be found lesions to the splanchnic spinal region corresponding to the adrenal innervation.

Etiology.—Male sex between the ages of twenty and forty, laborious work, injury (a blow upon the abdomen or back), displacement of the dorsal vertebræ from the eighth to twelfth, or of the upper lumbar, and caries of the spine are the predisposing causes. An important cause is tuberculosis. Atrophy, tumors, degeneration of the suprarenal capsules, pressure, inflammation or degeneration of the abdominal symphaetic ganglia are sometimes the cause. The blood contains less fibrin and is deficient in red corpuscles, while a slight increase of white corpuscles is found. Two theories have been advanced to explain the cause of the "bronzing" that is present in Addison's disease. **First,** the disease, according to Addison, depends upon the loss of function of the adrenals; the internal secretion is probably perverted

or suppressed. Experimental evidence goes to show that these glands furnish an internal secretion essential to normal metabolism. In cases where this bronzing is found with the adrenals healthy, it is ascribed to disease of the semilunar ganglia, which interferes with the vessels and lymphatics of the glands. In cases where the adrenals are diseased and yet there are no symptoms of Addison's disease, it is suggested that accessory glands may be present. **Second,** it is held that it is a disease of the abdominal sympathetic system, which is generally involved in diseases of the adrenals, but which can also become diseased by other chronic disorders which invade the solar plexus and ganglia. According to this it becomes an affection of the nervous system and in that case the pigmentation becomes an atrophic phenomenon (vaso-motor). The extreme debility is caused by the disturbed tissue metabolism. As the pneumogastric is also involved, the heart, lungs and stomach will be affected. Other degenerations take place in the spleen, kidneys and thymus gland.

Symptoms.—Onset insidious; languor, moderate anemia, great weakness, gastric irritability and pigmentation, which ranges in color from a light yellow to deep brown. With the gastric disturbances, there is anorexia, nausea, vomiting and there may be diarrhea. The heart's action is weak and the pulse is small and rapid. There is profound asthenia and dizziness and ringing in the ears, upon the least exertion. As the disease advances there is marked prostration and the patient dies by syncope or from sheer exhaustion. There may be convulsions, due to anemia of the brain. The urine is usually normal. There is sometimes polyuria, and the urinary pigments have been found to be increased.

Diagnosis.—The diagnosis cannot be based upon the pigmentation alone, as other diseases, such as pregnancy, uterine disease, cancer, tuberculosis of the peritoneum, lymphoma, and hepatic disease produce the same symptoms. Abnormal pigmentation occurs in some cases of exophthalmic goitre and continued filthiness. The deep discoloration of the skin is associated with melanotic cancer (in rare cases), and is also sometimes the result of prolonged use of arsenic. Other symptoms must be

considered before making a diagnosis. In many cases it is difficult to diagnose Addison's disease in its early stages. Later, asthenia, gastric irritability, nausea and tendency to fainting, will aid in the diagnosis.

Prognosis.—The disease is generally incurable. Duration one to two years, although a few cases are rapid and prove fatal in a few weeks.

Treatment.—The general treatment indicated is rest and nutritious diet. Many patients enjoy a milk diet best. Special attention should be paid the lower splanchnics, to control the slow inflammation of the glands. The vagi and phrenic nerves are to be considered, as they influence the disease to a greater or less extent. The phrenic nerve is primarily controlled at the third, fourth and fifth cervicals and has certain fibres connected with it as low as the fourth dorsal. The vagi may be influenced at the jugular foramen. Dissection shows that the suprarenal capsules are of the nature of a nerve-depot, besides having connection with the solar and renal plexuses. Injuries to the renal splanchnics may affect the suprarenal capsules. In some cases of Addison's disease, the inflammation has been traced to the spinal cord. This would affect, in particular, the vaso-motor nerves to the glands; and as the glands are normally richly supplied with blood, it would be likely to interfere with the internal secretion of the glands, which, as in all glands, is emptied into the venous or lymphatic system, and is so essential to the metabolism of the body. J. B. Bemis reports a case due to tenth dorsal lesion.

Treatment should be applied to the cervical and dorsal enlargements of the cord to affect the trophic centers in the cord, as the trophic nerves control the normal metabolism of the body. However, if the obstruction to the vaso-motor nerves of the gland has caused a degeneration of the gland, the blood will not be able to carry the vital secretion to its distributing point, and in consequence the stimulus to the trophic nerves of the gland will be lacking, the glands function overcome, and, in turn, those parts of the body which depend upon the internal secretion are effected. If the disease has developed to a considerable extent, no help can be expected.

DISEASES OF THE THYROID GLAND.

Goitre.

A **goitre** is practically any enlargement of the thyroid gland not due to inflammation, exophthalmic goitre, malignant diseases or to parasites. The gland may be enlarged as a whole or in part. The gland is a very vascular body. Lesions producing goitre are almost invariably found in the region of the middle and inferior cervical ganglia. Commonly, lesions of the cervical vertebræ, involving the innervation of the gland, are lateral or anterior, from the fourth to the seventh inclusive. The first rib or clavicle may be deranged and obstruct the innervation or the circulation directly. In a few cases the causative lesions will be as low as the fourth or fifth dorsal (affecting vaso-motors) or as high as the atlas and occiput. Although reflex disturbances, particularly menstruation, may be factors, still the underlying cause will invariably be found in the locality of the nerve, blood and lymph distribution and drainage of the gland. Dr. Still emphasizes the point that the vertebral ends of the first ribs are frequently displaced upward and outward.

In certain localities goitre is very prevalent, in some instances "as many as eighty per cent. of the population being afflicted." It has been suggested that considerable lime in the water favored the thyroid gland enlargement and that boiling the water lessened the tendency. Very likely, however, in some localities, e. g., Italy, the custom of carrying loads upon their head and shoulders may produce predisposing osteopathic lesions. Likewise, pregnancy is said to favor goitre, and frequently the patient is able to trace the enlargement to this period, but in a number of instances the goitre did not appear until after the confinement, which undoubtedly strained the neck and shoulders and predisposed to the disease. It is not a rare experience to find, upon carefully questioning the patient, that a fall, a strain or some violent physical exertion, wherein the upper chest and neck were affected, preceded the thyroid enlargement. Women are more affected than men. Heredity is a possible factor, and congenital cases have been noted.

Pathologically, there are several varieties of simple goitre. The **parenchymatous form** is a smooth enlargement of a part or of the whole of the gland and is a true hyperplasia of the tissues. The **fibrous goitre** may be of large size and often is hard to remove as it presents hard, irregular nodules which are due to an increase in connective tissue. In the **adenomata** there are well defined masses. The **follicular form** is due to enlargement of the follicles. The **cystic** variety is caused by distension of the follicles with liquid, and usually presents a small, round swelling. There are still several **other varieties** of more or less rarity. The **vascular goitre;** due to dilatation of the blood-vessels, is occasionally met with and is readily cured.

Symptoms.—It is not usually a difficult matter to diagnose a goitre. Enlargement of the gland and its movement upward on swallowing are characteristic and will enable one to distinguish it from other neck enlargements. The entire gland, or one lobe, or the isthmus alone may be affected. Often the goitre is of no inconvenience; the deformity being the objectionable feature. When the growth is large it may press upon the trachea causing dyspnea, or upon the esophagus causing difficult swallowing, or it may be beneath the sternum compressing the veins and causing swelling of the face and head. In some instances the growth may compress the vagi. Pain is an occasional symptom, and nervousness, rapid heart action, indigestion, and congestion of the head are common.

Treatment.—The treatment of goitres, osteopathically, has been highly successful. Many cases will be cured in a few treatments; still, on the other hand, some cases will require several months' treatment and then possibly the growth will not be lessened much in size. Probably those cases in which there are enlarged and dilated vessels are the ones that yield to one or two treatments. Simply removing the pressure from the veins may be all that is necessary. Besides correcting the clavicle, upper ribs and cervical and upper dorsal vertebræ, treatment over the gland itself is a very helpful measure, but be very careful not to bruise it. This treatment is principally to relax the tissues about the enlargement. Hygienic measures, diet and attention to

reflex irritation are essential. Keeping the parts exposed to sunlight is beneficial, as metabolism is increased by a sun bath. Neal[1] observes that in eight cases (six of which were cured and the other two were still improving under treatment), there were lesions at the fifth lumbar vertebra. Inquiry developed the fact that there are twenty-six cases recorded with that lesion as a factor. Her theory is that there is first a disturbance of the pelvic plexus, then the hypogastric and lastly the solar plexus. From here it is carried to the middle and inferior cervical ganglia which, when already disturbed by cervical and rib lesions, are rendered less able to send their rhythmic impulse to the thyroid gland. Also see Case Reports, Series III for report of fifty-two cases of goitre.

Exophthalmic Goitre.

Exophthalmic goitre is a disease characterized by palpitation with accelerated pulse, a fine tremor, enlargement of the thyroid gland and protrusion of the eyeballs. In some cases the last two symptoms may not be present. In reality the disorder is a tropho-neurosis.

Etiology.—Usually found in women from the twentieth to the thirtieth year. Several members of the family may be afflicted with this disease. Preceding the development of the disease may be fright, worry, shock, anemia and depressing emotions. Neurasthenia frequently precedes the disease.

Some authors classify exophthalmic goitre, primarily a disease of the thyroid gland (hyperthyrea) in antithesis to myxedema (anthyrea); others claim it is essentially a heart disease; and some a morbid crisis. Our knowledge of the disease would term it a neurosis of either the cervical sympathetic, possibly, or the cervical medulla spinalis and the medulla oblongata. Injuries to the cervical vertebræ are generally found from the fourth cervical to the first dorsal, affecting the middle and inferior ganglia of the cervical sympathetic. These ganglia contain nerve fibres to the blood-vessels of the eyeballs and also nerve fibres to the thyroid gland and to the heart. Many diseases of

1. Journal of the American Osteopathic Association, May, 1905.

the eyes resulting from disturbed innervation to the blood-vessels of the eyeball and orbit are due to lesions affecting the cervical sympathetic ganglia. The thyroid gland may become enlarged from lesions in the region of the lower cervical vertebræ and first rib; such lesions involve the middle and inferior cervical ganglia. Also, the heart's action, and in fact the entire vascular system, may be functionally disturbed by lesions irritating the accelerator fibres of the cervical sympathetic.

Structural changes are usually found in the fibres of the sympathetic nerves of the middle and inferior cervical ganglia. The protrusion of the eyeballs is due to development of fat in the posterior orbit which crowds the eyeball forward. In some cases there are atheromatous changes of the ophthalmic artery. Fatty degeneration of the eye muscles takes place, owing to the disease and stretching of the muscles. The colloid material of the thyroid gland is replaced by mucinous fluid; there is an increase in proliferation of its tubular spaces. These changes indicate an active evoluting process. The gland is enlarged by the dilatation of the blood-vessels, due to vaso-motor paralysis, and in cases of long standing, there is a serous infiltration. The thymus gland is sometimes enlarged.

Symptoms.—The development of the disease may occur suddenly, but usually it is of slow origin. The first symptom usually noticed is **cardiac palpitation,** coupled with an accelerated pulse. The acceleration of the pulse may become so marked that it is noticed in the carotids, the epigastric region, the retina and in some few cases in the liver. Within a few weeks or months struma is developed. The **goitre** is soft and elastic, involving the entire thyroid gland, although varying in size and subject to frequent changes. The blood-vessels of the gland are greatly dilated and upon auscultation, a thrill is heard.

Exophthalmos is the next prominent symptom. In a few cases the protrusion of the eyeballs appears before the enlargement of the thyroid gland. The degree of exophthalmos varies greatly, from a mere prominence to a dislocation of the eyeball. Both eyes are always affected, although sometimes more noticeable in one eye than in the other. **Incoordination** of the move-

ments of the eyelids and the eyeballs is present. Von Graefe observed "that the upper lid looses its power to move in harmony with the eyeball in the act of looking up or down." Owing to the eyeballs not being properly protected, conjunctivitis may be present. Vision is unimpaired. Lachrymal secretion may be increased. In connection with the above pathognomonic symptoms are headache, **nervousness,** insomnia, vertigo, despondency, indigestion, increase of temperature, emaciation, anemia and cough. There is overactivity of the gland. The excessive and deranged secretion probably alters and weakens the blood and thus causes the marked changes in metabolism.

Diagnosis.—The diagnostic signs of exophthalmic goitre are enlarged thyroid, exophthalmos and a rapid action of the heart. It is in the incipient stage that one is liable to confound it with heart disease, phthisis, malaria or neurasthenia.

Prognosis.—The prognosis depends upon the progress the diseases has made. Taken at the beginning (in the first few months) one can expect good results. Recovery has been made in severe cases of long standing. The progress is necessarily slow. The length of treatment varies according to the case. In cases of a few months' standing, three months' treatment will usually suffice; others take from six to eighteen months. Relapses may occur. Death occurs in some cases from disorders of circulation leading to a dilated heart.

Treatment.—The treatment is given primarily to correct the disorders of the cervical vertebræ. .The upper dorsal vertebræ and upper ribs should be examined carefully for derangements. Lesions are usually found involving the middle and inferior ganglia of the cervical sympathetic, especially the inferior ganglion. A lesion obstructing or irritating these ganglia would disturb the normal activity of the thyroid gland, interfere with the action of the heart and affect the vaso-motor fibres of the head and arms. Involvement of the middle cervical ganglion would dilate the blood-vessels back of the eyeballs and produce exophthalmos.

There may be an irritation at the first, second or third ribs, causing an interference with the nerves of the heart. Also, an affection of the vagi would have some influence upon the heart's

action, either inhibitory or involving the vaso-motor fibres to the coronary arteries; besides, a disorder of the vagi would affect the blood and nerve supply of the thyroid gland.

We should consider that the disease might be excited by reflex origin in a few cases, thus producing a simultaneous stimulation of the vaso-dilators of the thyroid gland, a stimulation of the motor fibres of Muller's muscles of the orbit and eyelid, as well as of the accelerans cordis; the same as a direct stimulation to the sympathetic fibres or of their spinal origins. The increased cardiac action or palpitation that is present may be caused by a diminished or arrested inhibitory action of the vagus. The phrenic nerve has some action upon the secretion of the thyroid gland. Have the patient drink distilled water.

Mental and physical rest is very necessary. Administer an easily digested and nutritious diet, especially in anemic cases. Lesions are oftentimes found in the medulla oblongata. These, doubtless, are simply a sequence, in most instances, of the primary affection to the cervical spine and cervical sympathetic. Treatment to effect the generally disturbed circulation is indicated. Agee reports several cases cured (Journal of Osteopathy, Feb., 1903), also see Case Reports, Series I and II.

Myxedema.

"Myxedema is an affection characterized by widespread changes in nutrition, as shown by the appearance of a solid, edematous swelling of the subcutaneous tissues, dryness of the skin and arrest of development of its appendages, subnormal temperature, slowness in mental processes and in execution of voluntary movements."

It is a disease due to atrophy or destruction of the thyroid gland and in many ways it presents symptoms diametrically opposite to exophthalmic goitre. In exophthalmic goitre there is hypertrophy of the thyroid gland and increased function; in myxedema, atrophy of the gland and decreased function; in exophthalmic goitre there is increased pulse, nervousness, excitability, and a thin moist skin, while in myxedema there is a

low pulse, subnormal temperature, dullness, apathy, dry, harsh, scaly skin.

The disease is a nutritive one, caused by the inactivity of the secreting cells of the gland and the patient can be benefited or cured only by stimulation and increased blood supply to the thyroid body. The disease is apt to lead to extreme mental dullness and insanity.

It has been caused by surgical operations of the thyroid gland, which destroyed its tissues, causing a consequent loss of function. In a few cases the gland may be enlarged, but if such is the case the secreting cells are destroyed. The disease may occur at any age, usually, however, in adults during middle life. More women than men are affected. As heretofore stated, the disease is caused by a lessened amount of thyroid gland secretion entering the blood—just the opposite of the cause of exophthalmic goitre.

Practically the same lesions are found as in exophthalmic goitre—nerve and vascular involvement of the thyroid body. Cervical lesions are the primal ones. Posterior upper dorsal vertebræ and fullness of the supra-clavicular regions are characteristic. In the congenital form, lesions at the atlas and third cervical are also found in nearly every case. **Cretinoid idiocy,** or cretinism, is a congenital or infantile form of myxedema.

In the **treatment** special attention should be given to hygienic measures, diet, warmth, massage and general good care. A few cases have been cured in the early stage of the acquired form by osteopaths. Correction of the cervical and upper dorsal vertebræ and ribs and direct treatment to the gland constitute the osteopathic treatment. Various nervous symptoms require more or less general treatment. The dorsal area is apt to be found posterior and thus a source of nervous impairment to the digestive organs. (Relative to the importance of the internal secretions and the relation of the thyroid to the adrenals, pituitary body, etc., the student is referred to Sajous work on The Internal Secretions and the Principles of Medicine).

DISEASES OF THE NERVOUS SYSTEM.

DISEASES OF THE NERVES.

Neuritis.

Neuritis is an inflammation of the nerve fibres. It may be confined to a single nerve, localized; or general, involving a large number of nerves, when it is known as multiple neuritis. Osteopathically, there are **invariably lesions** of the osseous or muscular tissues, that correspond to the nerve fibres involved. The lesion either irritates the nerve directly or disturbs the circulation to the nerve. In those cases where the osteopathic lesion is not the immediate exciting cause, there will be found anatomical irregularities that predispose to the affection.

Localized neuritis.—This may be due to: Exposure to cold, affecting most frequently the facial nerve. (This is the so-called rheumatic neuritis). Extension of inflammation from neighboring parts. Traumatism—blows, wounds; compression, muscular contraction, excessive stretching such as occur in fractures or dislocations.

Multiple Neuritis.—This may be due to: Organic poisons; carbon bisulphide; ether; and the metallic bodies, lead, mercury and arsenic; poisons resulting from the infectious fevers—diphtheria, typhoid fever, smallpox, scarlet fever, syphilis, malaria, etc.; cachectic conditions; anemia; carcinona, and exposure to cold or overexertion.

The inflammation may chiefly involve the connective tissue surrounding the nerve—peri-neuritis—or it may involve the deeper structure—interstitial neuritis. **Parenchymatous neuritis** is really a degeneration, due to excessive or prolonged irritation or pressure which cuts the nerves off from their centers. This is found in deeply seated osteopathic lesions. An acutely inflamed nerve is red and swollen. In **peri-neuritis** there is an infiltration of the nerve sheath with leucocytes. In the **interstitial form,** lymphoid cells accumulate between the nerve bundles. In the

parenchymatous form, inflammatory signs are wanting. There is an increase in the nuclei of the sheath of Schwann. The white substance of Schwann becomes segmented, breaks up into drops and the axis cylinders break up into granules and both disappear, while the interstitial connective tissue is but little altered. The muscles connected with the degenerated nerves also atrophy. In all these forms the **osteopathic lesion** plays either an exciting or predisposing role, by disturbing nutriton to the tissue and thus setting up inflammation, which may lead to Wallerian degeneration[1].

Symptoms.—Localized Neuritis.—There is not much constitutional disturbance in this form of neuritis. In the case of a sensory nerve, there is severe pain, of a boring or stabbing character, following the course of the affected nerve, with tenderness upon pressure. Weir Mitchell believes this (tenderness) is due to the irritation to the nervi nervorum. Trophic symptoms, such as glossiness of the skin and brittle nails, arise in more chronic cases, while in advanced cases, there is wasting of the muscles. Sweating, herpes, and occasionally effusion into the joints, occur. When a motor nerve is principally affected, muscular power is impaired, motion is painful and muscular twitchings will occur. Ultimately contractions, wasting of the muscles, and even reactions of degeneration, take place. A rare form is the so-called **ascending neuritis,** in which the inflammation extends upward from the peripheral nerves to the larger nerve trunks, or even the spinal cord, resulting in **myelitis.** This occurs most commonly in traumatic neuritis. The duration is variable. Many acute cases get well in a few days. Other cases may persist for months and even years.

Multiple Neuritis.—Inflammation involving several nerves which are affected simultaneously or in rapid succession. **Acute Form.**—The attack usually follows overexertion or exposure to cold and wet. This form is characterized by a chill, followed by a rapid rise in temperature which may reach 103 or 104 degrees F.; headache; pains in the back and limbs. Loss of appetite,

1. See Osteopathic Lesion,—Journal of American Osteopathic Association. May, 1906.

is loss of power, especially in the legs and extensor muscles. The muscles atrophy. There is more or less anesthesia, and wrist drop and foot drop occur. The intercostal muscles may become paralyzed in such cases, when the diaphragm carries on respiration.

Alcoholic Neuritis.—This is the most common form, and occurs more frequently in women. It results from a moderate amount of alcoholic drinking, continued over a long time. The onset is slow and may be preceded for some time by numbness and tingling in the fingers and toes. It is rarely febrile. Loss of power soon becomes marked, first in the lower, and then in the upper, extremities. The extensor muscles are most affected, causing wrist and foot drop. Occasionally there is paraplegia, while in rare cases the face and sphincters are involved. There are hyperesthesia, tenderness and pain, especially in the legs. The cutaneous reflexes are commonly intact and the deep reflexes, as a rule, are lost. Delirium is common and hallucinations or illusions occur.

In the **Infectious Diseases.**—Neuritis, due to an attack of some infectious disease, may be local or multiple. It is due to toxic materials absorbed into the blood. It is most common after diphtheria. The symptoms presented are those of neuritis due to any other cause.

There are other forms of neuritis as endemic, recurring, arsenical, etc.

Diagnosis.—As a rule, the diagnosis is not difficult. In the alcoholic form in some instances, there may be difficulty, and in cases with paralysis, care should be taken. The **prognosis** of neuritis is generally favorable.

Treatment.—It is very evident that the successful treatment of neuritis depends upon being able to ascertain the cause. Rest is important in all cases. Rarely has one any difficulty in locating the deranged structures that are predisposing to the attack; and usually correction of these disturbances, which are in the region involved, will give immediate relief. All worrying should be constipation, and sometimes intense pain in the nerves, also occur. Numbness and tingling are felt in the fingers and toes. There

stopped and in alcoholic cases, the alcohol should be stopped as soon as possible. Hot applications will be of service in relieving the pain, but usually, as stated, correcting the disturbance to the nerve fibres will be successful. Passive movements and massage are helpful, but of course bear no comparison to specific osteopathic treatment. Relaxation of muscles along the spinal column and along the course of the nerve will at least give temporary relief.

Sciatica.

Sciatica is usually a neuritis of the sciatic nerve, although all painful affections of the nerve are termed sciatica. In some cases it is a functional neurosis. The nerve is swollen and presents an interstitial neuritis.

Osteopathic Etiology.—This affection occurs more frequently in males than in females. The usual period for sciatica is from the twentieth to the fiftieth year and the principal causes are **vertebral lesions** of the lower dorsal and lumbar vertebræ, especially lesions to the fourth and fifth lumbar. Occasionally the lesion is a subdislocated innominatum, a downward displacement of a floating rib or a partial dislocation of the femur. Other causes are exposure to cold, contraction of muscles, gout, rheumatism and syphilis. In a few cases intra-plevic causes are found, such as uterine and ovarian tumors, rectal accumulations and the fetal head during labor.

Symptoms.—Pain in the nerve along its course is the most constant symptom. The pain is most intense back of the thigh and above the hip-joint. The pain radiates downward through the entire distribution of the nerve; it is of an annoying character and walking is especially painful. In rare cases there is wasting of the muscles, cramps, herpes and edema. In a few cases the neuritis may involve the spinal cord.

Diagnosis.—The diagnosis of sciatica is usually easy. Care has to be taken in the examination to determine whether or not the affection is primary or secondary. It is difficult, in some cases, to locate the origin of the disturbance, especially if it is in the lumbar vertebræ, as frequently a very slight deviation of a

vertebra will cause the disease, as may fecal accumulations in the rectum, and pelvic tumors. **Hip-joint disease** and **sacro-iliac disease** can generally be easily distinguished from this affection. The lightning pains of **tabes** may simulate sciatica, but then there are other well defined symptoms of the disease.

Treatment.—Sciatica rarely runs a very long course, though there are cases that last for years. The treatment almost wholly depends upon the cause. If the cause can be determined at once, the probabilities are that severe cases may be relieved by a few treatments. Correction of the vertebræ, to relieve impingements to the nerve fibres as they pass through the intervertebral foramina, usually constitutes the primary treatment. Carefully examine the pelvic organs for disturbances. Occasionally deep treatment over the iliac vessels will be of great help. The innominata, if deranged, should be corrected and all troubles of the hip-joint that are found must be corrected.

Cases of rheumatism and gout should receive their separate treatments, besides careful manipulations of the affected leg. Rest in bed should be insisted upon. Adjustment of the special points found deranged and a thorough treatment of the entire leg will be beneficial. Cold applied along the course of the nerve and an inhibitory treatment back of the trochanter will at least give temporary relief. Extension of the leg is effective. Placing a patient upon his back and flexing the leg and thigh upon the abdomen, at the same time keeping the leg straight and the foot flexed, is an effectual method of stretching the sciatic nerve. As a rule, sciatica readily responds to osteopathy.

NEURALGIA.

Neuralgia means simply "nerve pain." The term neuralgia should be restricted to such nerve pains as are not caused by structural changes in the nerves. In cases where the pain is due to organic change in the nerves, the disease should not be classed as a neuralgia, although it is practically impossible to draw an absolute line between functional and organic disturbances for the one may gradually progress (pathologically) into the other. In neuralgia there is always **disturbance** of the **blood**

supply to nervous tissue, which may be of the character of congestive irritation, ischemia or altered states of the blood wherein it contains toxic substances or is below normal quality. It is well known that osteopathic lesions are very common etiological factors.

Osteopathic Etiology.—Neuralgia is essentially a disease of adults. It rarely occurs before puberty or late in life. Women are more prone to neuralgia than men and the tendency may sometimes be hereditary. Sufferers from neuralgia often present a peculiar "nervous temperament."

The exciting causes of neuralgia are impairment of general health; irritations of the nerve fibre or trunk by a displaced bone, ligament or muscle, which may affect the nervous tissue directly by mechanical irritation, or indirectly, by the disturbance of its blood supply or chemical irritations, due to the disturbed circulation; exposure to cold or damp; overwork and worry; toxic influences of various diseases, as malaria, lead poisoning and alcoholism; simple irritation from carious teeth.

Symptoms.—Pain, which is spontaneous and paroxysmal, is the most prominent symptom. It may be described as "darting," "shooting," "burning," "stabbing," "boring," etc. The pain is usually unilateral, following the course of the sensory nerves, and there are generally tender points along the course of the nerve. Especially are there points of tenderness near the central end of the nerve, where the displaced structures are irritating it. After the pain has continued for some time the skin becomes tender, reddened and swollen. The redness and edema are supposed to be due to vaso-motor changes. Muscular spasms, trophic disturbances, skin eruptions, herpes and grayness of the hair are of rare occurrence. The duration of an attack varies from a number of minutes to a few hours.

Neuralgia of the Fifth Nerve.—This is by far the most frequent variety of neuralgia, and it is generally due to a displaced **atlas** or inferior maxillary. All the branches of the fifth nerve are rarely involved. The **ophthalmic division** is most often affected; pain and tenderness being present about the supraorbital notch or foramen, the palpebral branch at the outer part of the eyelid,

the nasal branch, and occasionally an ocular pain will be felt within the eyeball. When the **infraorbital branch** is involved, pain and tenderness are principally present at the infraorbital, nasal and malar points. When the **third division** is affected, the chief tender places are the inferior dental, temporal and parietal points. In nearly all cases of neuralgia of the fifth nerve, there is extreme tenderness in the region of the articulation of the atlas and the occipital, particularly the side on which the fifth nerve is involved. This tenderness in a few cases may be found as low as the second or third cervical vertebra. The pain may be so severe as to cause edema along the course of the affected nerve fibres, grayness of the eyebrows and locks of hair chiefly in the temporal region, and convulsive twitching of muscles.

Cervico-Occipital Neuralgia.—This variety involves the **posterior branches** of the **first four cervical** nerves, affecting the region of the posterior part of the neck and head. The pain may extend as far forward as the parietal eminence and the ear. The chief tender points are about midway between the mastoid process and the spine, between the sterno-mastoid and trapezius (branches of the cervical plexus), and a point just above the parietal eminence. This form of neuralgia is chiefly due to **subluxations** of the **upper four** or **five cervical** vertebræ irritating the posterior branches of the spinal nerves. A draught of air or exposure to cold are common exciting causes. The pain is of a sharp lancinating nature or else it is heavy and tense.

Cervico-Brachial and Brachial Neuralgia.—In these forms of neuralgia the pain is referred to the area supplied by the **four lower cervical** and the **first dorsal** nerves. The tender points are in the axilla along the course of the ulnar, the circumflex at the posterior part of the deltoid and points at the lower and posterior part of the neck. The **lesions** exciting this form of neuralgia are usually found in the upper dorsal and upper cervical spines, but they may be as low as the sixth dorsal or as high as the atlas. As far as neuralgia of the ulnar nerve alone is concerned, the lesion is generally found at the fifth vertebra or rib. How a lesion as low as the fifth dorsal affects the ulnar nerve, it is hard to say definitely. There may be fibres directly to the ulnar nerve

as low as this region, the nerve may be reflexly affected, the vasomotor supply to the ulnar nerve may be disturbed, or possibly the lesion interferes with fibres of the deep layers of the back muscles and thus contraction of muscles for some distance above the lesion would affect the ulnar and other nerves.

Trunk Neuralgia.—This includes dorso-intercostal and lumbo-abdominal neuralgia. The former, **dorso-intercostal** neuralgia, affects the intercostal nerves from the **third** to **ninth dorsal,** and is characterized by pain along the intercostal spaces, or in a few of them. The pain may be bilateral and symmetrical, which usually shows a vertebral lesion. Three points of tenderness are usually noted, viz., near the vertebra, near the median line in front, and midway between these two points in the mid-axillary line. The pain is usually dull with acute exacerbations. **Lesions** of the **vertebræ** and **ribs** in the locality affected are by far the principal causes. Cold, exposure, strains, etc., are exciting causes of every-day occurrence. When the pain is bilateral and symmetrical the lesion is usually in the vertebra; when unilateral generally the rib alone is involved. The most common lesion is a crowding together of the ribs anteriorly at the fifth and sixth interspaces.

The pain of **herpes zoster** is not neuralgic, but neuritic, involving the posterior spinal ganglion. **Pleurodynia,** strictly speaking, is neuralgia of the pleural nerves, and not of the intercostals, but a deranged rib over the region of the pain is commonly the cause of the pleurodynia.

Lumbo-abdominal neuralgia involves the posterior branches of the **lumbar nerves.** Tender points are found near the vertebra, middle of the iliac crest, lower part of the rectus, and in the male occasionally in the scrotum, in the female in the labia. These are often bilateral and are usually of a constricting nature. The ilio-scrotal branch is the one most commonly affected.

Subluxations of the **vertebræ,** and other lesions, as contracted muscles, are found along the lumbar vertebræ, and even as high as the lower dorsal vertebræ. Also lesions are found at the lumbo-sacral articulation. Pelvic disease is also a cause.

A downward displacement of the **lower ribs,** eleventh and

twelfth, is a common disorder and may be the cause of severe neuralgiac pains in the region of the iliac fossæ. It may simulate ovarian inflammation, renal colic, or even appendicitis if on the right side. In fact it may be a cause of inflammation of the deeper structures, such as the ovary and Fallopian tube.

A subluxation of the vertebræ at the fourth and fifth dorsals may cause severe neuralgiac pains in the epigastrium.

Neuralgia of the Spinal Column.—According to medical writers this is especially found in weakly women and after concussion of the spine; that it is a troublesome symptom in hysteria, and in many cases it is due to a reflex stimulus from diseased viscera. Most of this is undoubtedly true, but they have not found out the real significance of these neuralgiac pains. The various **tender points** along the spinal column are of paramount importance to the osteopath as a **guide** to his **diagnosis;** not only in certain cases, but in nearly every case. The tender points are not due, in nearly every instance, to reflex stimuli from diseased organs, but these tender points are the result of a local lesion and are many times the cause of the disorder to the diseased viscus. The neuralgiac pains are simply a symptom that a lesion exists in the immediate locality.

Neuralgia of the Sacral Region and Coccygodynia.—This form involves the nerves in the sacral and coccygeal regions. The nerves between the bone and the skin are affected. The cause of the pain is generally due to derangement of the articulation of the **lumbar** and **sacrum,** and to severely contracted muscles over the sacral foramina; also to lower lumbar lesions. In coccygeal neuralgia the **coccyx** is commonly displaced in any one of the various displacements that are liable to occur.

Neuralgia of the Legs and Feet.—This includes the **crural form,** in which the front of the thigh is the seat of the pain; also the form in which tender points are found along the course of the **sciatic** nerve. The latter form is quite a common one, although sciatica is rarely a neuralgia. It is a neuritis and will be found classed under that heading. The tender points presented are the lumbar, sacro-iliac, gluteal, peroneal, maleolar and external plantar. The various neuralgiac pains of the legs and feet are

generally due to **lesions** of the **lumbar, pelvic** and **thigh** regions. **Metatarsalgia** occurs when the fourth metatarso-phalanageal articulation is partially dislocated. Neuralgia in the heel, ball of the foot and toes may be due to local causes or to lesions higher up.

Visceral Neuralgia.—This is a term applied to neuralgia of the gastro-intestinal tract, the kidneys, and the various pelvic organs.

Neuralgias are also classified, according to their character and cause, as epileptiform, reflex or sympathetic, traumatic, herpetic, hysterical, rheumatic, gouty, diabetic, anemic, malarial, syphilitic and degenerative neuralgia.

Diagnosis and Prognosis of Neuralgia.—Neuralgia is to be diagnosed chiefly from neuritis, rheumatism, and the effects of severe pressure upon the nerves. In **neuritis** there is oftentimes a symmetrical affection, while in **neuralgia** there is a unilateral distribution and there are many remissions and intermissions and a varying of the pain from one place to another. In severe forms of neuritis, anesthesia succeeds the hyperesthesia of the sensory nerves. In cases of severe pressure upon nerves, the pain is continuous and neuritis will soon be manifested. In **rheumatism** the pain is localized in muscles or groups of muscles and does not follow the course of the nerve. The pain is increased by motion.

The **prognosis** is generally favorable, no matter how severe the attack. The prognosis is influenced only by the age of the patient and the cause.

Treatment of Neuralgia.—Consists, first, in the control of the paroxysm and, second, in the removal of its cause. In controlling the paroxysm, frequently one will be able to remove the cause. In a large majority of neuralgias the cause is directly due to a **displaced tissue,** generally a bone or muscle in the locality affected; all that is necessary in order to perform a cure is to correct the disordered tissue and the pain will cease. This usually can be done immediately, although there are cases which require several treatments before a correction of the parts can be accomplished; besides, in acute cases the involved region will be so tender that an attempt to correct the tissues sufficiently to re-

lieve the paroxysm will be unbearable to the patient. In such instances when the cause cannot be removed at once, firm pressure or inhibition over the involved nerves for a few minutes and local application of hot water will generally disperse the pain for the time being. The rules of hygiene should be observed in all cases.

The best time to **remove** the **cause** of neuralgia is between the attacks when the tissues are not as tender or contracted to such an extent as during the paroxysm. A diagnosis can then be made much more easily, and the tissues corrected with less pain to the patient.

The details (as to the locality treated) for each form of neuralgia will be found under the discussion of each variety. The general health and diet should be considered. Peterson[1] says: "Morphine is, among the alkaloids, the most frequent cause of insanity. It is a sad commentary on the heedlessness of some medical men, but the family physician is responsible, in almost every case, for the development of the morphine habit and its far reaching consequences. It should be looked upon as a sin to give a dose of morphine for insomnia or for any pain (such as neuralgia, dysmenorrhea, rheumatism) which is other than extremely severe and transient."

Diseases of the Cranial Nerves.

Olfactory Nerve.—This nerve may be affected at various points from its origin to distribution. The disturbances may produce hyperosmia, parosmia or anosmia. The lesions may be tumors, injuries to the head and various diseases of the brain, or diseases of the nasal mucous membrane.

The **treatment** of the nerve (beside treating the disease causing the disturbance) is to the cervical region with a view to controlling the blood supply.

Optic Nerve and Tract.[2]—The retina, optic nerve, chiasm and optic tract may be affected by various lesions.

The affections of the **retina** are organic or functional. Under

1. Nervous and Mental Diseases, p. 622.
2. See Diseases of the Eye, Part I.

organic there is hemorrhage and retinitis, retinitis may be due to several diseases, as syphilis, Bright's disease, anemia, etc., Functional includes toxic and hysterical amaurosis, tobacco amblyopai, nyctalopia, hemeralopia and retinal hyperesthesia.

Included in the lesions of the **optic nerve,** are optic neuritis and optic atrophy.

Under lesions of the **chiasm** and **tract** are diseases of the chiasma and unilateral regions of the tract. Lesions of the tract and centers may be found in the tract itself, in the optic thalamus and the tubercula quadrigemina, in the fibres of the optic radiation, in the cuneus, and in the angular gyrus.

A brief summary, only, has been given of the lesions found, it being the idea not to dwell upon symptoms, morbid conditions, etc., but to bring out essential osteopathic features in regard to the cranial nerves. For the various effects of these lesions and points of diagnosis, the reader is referred to the various works on nervous diseases.

Lesions peculiar to **osteopathic** practice, that affect the optic nerve and tract, are found chiefly in the upper and middle cervical vertebræ. The disorders to these vertebræ may involve fibres of the optic nerve directly—those that are supposed to originate in the cervical spine; they involve the retina and optic nerve by way of the fifth, as claimed by some; and the above lesions especially affect the blood supply to the optic nerve and tract, either interfering mechanically with the blood-vessels or obstructing and irritating vaso-motor nerves. The most common lesions are sub-dislocations of one or all of the three upper cervical vertebræ. Still, lesions may be located as low as the third or fourth dorsal vertebra, which may influence vaso-motor and sympathetic nerves, or the lymphatics. The three or four upper ribs should also receive due consideration.

Motor Oculi.—Lesions of the third nerve may affect its center or the course of the nerve. These lesions produce spasms or paralysis.

The only way that we can control the motor oculi is by way of the superior cervical sympathetic; also, it has a connection with the fourth, fifth and sixth nerves, and we can influence it to

some extent by direct treatment to the eyeball and orbital muscles. It should be remembered by the osteopath that many of the lesions affecting the cranial nerves, are found upon post mortem examination, to be the effect of lesions in the spinal region; that the **real lesions** are the disordered anatomical spinal tissues; as for instance in the third nerve, derangements of the atlas or axis may affect the nerve sympathetically (reflexly), or possibly by direct fibres, and produce the secondary effect—the so-called primary lesions of other schools—at the center or in course of the nerve.

Patheticus.—This nerve may be involved by tumors at its nucleus, or as it passes around the outer surface of the crus into the orbit. Aneurisms or the exudation of meningitis may also compress its fibres. This nerve is purely motor, although it receives a few recurrent sensory fibres from the fifth nerve.

This nerve is controlled osteopathically, principally at the superior cervical sympathetic. It has connections with the sympathetic by way of the cavernous plexus.

Trigeminus.—Lesions of this nerve are found in its nucleus and in the pons, and include sclerosis, hemorrhage, disease and injury at the base of the skull, tumors, aneurisms, inflammation of the nerve, and sub-dislocations of the **upper three cervical** vertebræ, or the inferior maxillary.

This nerve is an extremely important one from an osteopathic point of view, as it has a vaso-motor influence over various vessels of the head and face, and secretory fibres to the lachrymal, parotid and submaxillary glands; also, it controls mastication, and to some extent deglutition, and influences hearing (tensor tympanum muscle). Diseases of the nasal mucous membrane and disease of the anterior portion of the eyeballs are largely due to the **vertebral sub-dislocations** and to derangements to the inferior maxillary. Our principal work upon this nerve is at the upper cervical vertebræ, the inferior maxillary, and the deeply contracted muscles in the upper cervical region. For the facial points of treatment see neuralgia of the fifth nerve. This nerve is closely related to the sixth, seventh, eighth, ninth, tenth, eleventh and twelfth nerves. Particular emphasis is given to the

importance of treating this nerve in nasal catarrh and in eye diseases of the anterior portion of the eyeball. It contains trophic fibres to the eye, sensory fibres to the sclerotic coat and iris, and vaso-motor fibres to the choroid plexus.

Abducens.—This nerve is especially liable to be affected by tumors and meningitis. It is controlled osteopathically at the superior cervical sympathetic, being connected with the sympathetic at the cavernous plexus.

Facial.—Lesions may occur in the cortical centers of the nerve, the nucleus and the nerve trunk. Paralysis of the facial nerve, occasionally occurs (Bell's paralysis); also facial spasm may occur. This nerve is controlled at the the stylo-mastoid foramen. **Lesions** to the **atlas,** anteriorly or laterally, are commonly found. In the region of the stylo-mastoid foramen, the nerve communicates with the great auricular of the cervical plexus, the trifacial, the vagi, the glosso-pharyngeal and the carotid plexus of the sympathetic. The facial nerve may be affected directly as it passes above the angle of the jaw.

A number of cases of **Bell's paralysis** have been cured by osteopathic treatment. There are usually lesions to the upper two or three cervicals. Correction of the cervical vertebræ and massage of the paralyzed muscles, with care of the general health, will suffice, provided there is not an extensive central lesion. Although the disease may be due to syphilis, meningitis, tumors, etc., the most frequent causes are lesions of the **atlas, axis,** and **third cervical** and **exposure** to **cold.** The cold produces a neuritis in the Eustachian tube, and deep treatment beneath the angle of the jaw is effective. The **prognosis** of Bell's paralysis is generally favorable.

Auditory.—Lesions affecting this nerve may occur anywhere from its cortical center to its distribution in the cochlea and vestibule. Disorders resulting from lesions to this nerve are nervous deafness, auditory hyperesthesia, tinnitis aurium, and Meniere's [1]disease.

1. R. D. Emery reports a case of Meniere's disease as cured. A. O. A. Case Reports, Series IV.

The control of the nerve and the treatment of lesions affecting it, are effected principally at the **first** and **second cervical** vertebræ. The atlas is especially apt to be subdislocated anteriorly or in a rotary manner. The condition of the **upper dorsal** region should also be carefully examined, as vaso-motor nerves to the ear may be impinged at this point. The auditory connects with the fifth, sixth and seventh nerves.

Glosso-Pharyngeal.—This nerve may be affected by tumors, degenerations, meningitis and various lesions. It is often very hard to determine exactly the pathology, on account of its various connections with other nerves, the vagi, facial, spinal accessory, olfactory and optic nerves.

This nerve is chiefly controlled at its exit at the jugular foramen. Osteopathically, **lesions** of the **cervical** vertebræ and **upper dorsal** vertebræ affect it. The deep muscles of the anterior and lateral regions of the neck and subdislocations of the atlas especially affect the nerve.

Pneumogastric.—On account of its extensive distribution, and the importance of its functions this is one of the most important nerves in the body. It distributes fibres to five vital organs—heart, lungs, stomach, liver and intestines—and to other organs of secondary importance. This nerve is associated with deglutition, phonation, respiration, circulation and digestion.

Hemorrhages, softening, etc., may involve the nucleus of the nerve, while the trunk may be impinged by tumors, thickened meninges, aneurism of the vertebral artery and **subdislocations** of the **upper five** or **six cervical** vertebræ, chiefly the atlas.

The nerve is most easily controlled at its exit from the foramen. Inhibition of the suboccipital region, between the mastoid process and transverse process of the atlas, will influence the nerve markedly, probably reflexly; also direct treatment may be given the nerve as it passes along the anterior part of the neck near the trachea. The superior laryngeal branch may be treated below the great cornu of the hyoid bone; the inferior laryngeal, at the inner side of the lower part of the sterno-cleido-mastoid muscle. The inferior laryngeal nerve may be affected

by dislocation of the first and second ribs, producing pressure upon the nerve as it winds about the subclavian vessel. Fibres of the nerve have been traced to the spinal accessory nerve, as low as the sixth and seventh cervical vertebræ; consequently, lesions to the vagi nerves may occur anywhere in the cervical region.

Spinal Accessory.—Lesions of this nerve may cause paralysis or spasm of its branches. The lesions consist of **subdislocations** of **cervical** vertebræ, chiefly the upper three or four. The nucleus may be involved by wounds, abscesses, caries of the vertebræ, tumors and meningitis. These lesions may also involve fibres of the trunk.

The special points of control of the nerve are at the jugular foramen, the sixth and seventh cervicals and the second, third and fourth cervicals.

Torticollis or **Wry-neck** is spasm of the muscles of the neck supplied principally by this nerve. There will be found either derangements of the **middle** or **lower cervical** vertebæ or the muscles are swollen from exposure to cold or from a blow. Sometimes the lesion is in the upper dorsal. The disorder is mainly a neurosis and, unless it has become chronic, the **prognosis** is favorable, and even in chronic cases, often considerable benefit can be obtained.

Hypoglossal.—This nerve may be affected by cortical, nuclear and infra-nuclear diseases, as well as by subdislocations of the upper cervical vertebræ. It communicates with the superior cervical ganglion, the vagi, the upper cervical nerves and the gustatory branch of the fifth nerve. We control the nerve at the anterior condyloid foramen and at the superior cervical ganglion.

Diseases of the Spinal Nerves.

Cervical Nerves.—The **great occipital** nerve may be controlled at a point on the occiput between the mastoid process and the first cervical vertebra. The **small occipital** and the **great auricular** nerves may be controlled at a point just behind the mastoid process. The great auricular nerve and the frontal branch of the trigeminus nerve meet over the parietal protuber-

ance. The preceding points are the places where one may inhibit the nerves and control a headache or neuralgiac attack, although subdislocations of the upper cervical vertebræ, or contracted muscles between the atlas and occiput are usually the cause of such disturbances. A correction of the lesion will usually cure the disturbance.

Treatment of the upper cervical region, by relaxing muscles and correcting deranged vertebræ, constitutes the principal treatment of an ordinary **headache.** It is best to have the patient flat upon his back and the osteopath stand at the head of the patient, and, first, thoroughly relax these contracted muscles or correct the disturbance of the vertebræ; then after the foregoing has been accomplished, give an inhibitory treatment of the suboccipital region. In inhibiting, place the fingers over the contracted and tender tissue; hold tightly for several minutes, or at least until the tissues have thoroughly relaxed. Many times one will be able to detect a slight twitching underneath the fingers, and when such is felt, he knows at once that the headache is relieved. In inhibiting at any point along the spine, seek the contracted fibres and tender points and inhibit exactly over the area. Headaches that are due to a disturbed circulation of the brain, may be relieved by this inhibitory treatment in the suboccipital region. The treatment reestablishes a normal circulation to the brain. Headaches may also be due to lesions at various points along the spine and ribs, and a correction of such points is necessary in order to cure the affection. A place often found involved is the upper dorsal region. **Reflex headaches** can be cured only by relieving the irritation. The treatment to the head would only be temporary.

Lesions to the **phrenic nerve** usually occur in the region of the third, fourth and fifth cervical vertebræ. The lesion may be due to a deranged vertebra, or to disease of the membrane of the cord, or of the anterior horn of the gray matter.

The **treatment** of **hiccoughs** is inhibition, or better still, if possible, a correction of the deranged tissues, when such exist, at the third, fourth and fifth cervicals; or, pressure of the nerve at the supra-clavicular fossa; at the inferior insertion of the

diaphragm, between the seventh and tenth ribs; at the cartilage of the third rib; and in some cases, at a point just above the back of the mastoid process; and at the second lumbar. In a few cases hiccoughs may be stopped by forced protusion of the tongue; this probably inhibits the nerve connection between the hypoglossal and phrenic when such exists. Firm pressure with the flat of the hand over the solar plexus and inhibition anterior to the sterno-mastoid, opposite the third cervical, may also be used.

Various diseases of the phrenic nerve are principally treated in the area of the origin of the phrenic nerve.

Lesions to the **brachial plexus** are usually derangements of the cervical or upper dorsal vertebræ. Direct injuries, contraction of muscles, a deranged clavicle, a cervical rib, or a dislocated shoulder are to be thought of.

In obstructions to the **musculo-cutaneous** nerve, the power to flex the fore-arm upon the arm is greatly impaired. The lesion is most likely to be found between the fifth and sixth cervical vertebræ.

Clinically, the **median nerve** is of special interest from the fact that atrophy of the muscles of the ball of the thumb, which is pathognomonic of progressive muscular atrophy, may be caused by an affection of this nerve. The lesion is usually from the third to the seventh cervical vertebræ.

Lesions of the **ulnar nerve** may arise between the sixth and seventh cervical vertebræ, but are oftentimes found as low as the the fifth dorsal, especially at the fifth rib on the side affected.

Lesions of the **circumflex nerve** may be found in the lower cervical vertebræ, but are commonly caused by dislocations of the humerus and clavicle.

Lesions of the **suprarscapular nerve** occur most frequently from the fifth to sixth cervical vertebra, inclusive.

Dorsal Nerves.—The essential osteopathic points of the dorsal nerves have been considered under intercostal neuralgia. It might be stated that the posterior fibres of the sixth and seventh dorsal nerves supply the skin of the pit of the stomach. This is of value, clinically, as severe pains in the epigastric region which

are due to impingement of these nerves, are supposed by the patient to be due to some stomach disorder.

Diseases of the **liver** may be manifested by **pains** in the region of the right scapula. It has been suggested that the stimulus passes from the liver up the pneumogastric to the spinal accessory and down the spinal accessory to the trapezius muscle and thus causes the "liver pain."

Intercostal neuralgia is more common on the left side of the body. The intercostal veins of the left side empty into the left superior intercostal vein or the left vena azygos. Thus the blood, to reach the vena cava, is obliged to take a circuitous route and stagnation is more likely to occur than on the other side.

The glandular structure of the **mammary glands** is supplied by intercostal nerves from the third to the sixth interspace.

Lumbar Nerves.—The lumbar nerves may not only be deranged by various growths, inflammatory processes and abscesses in the abdomen, but by lesions of the lumbar vertebræ.

Lesions in the region of the **first lumbar** may affect the **ilio-hypo-gastric** and **ilio inguinal** nerves and cause various irritations of the penis, scrotum, labium and thigh. Also, the perineal region may be involved, as well as connecting branches of these nerves to various visceral nerves underneath.

The **genital organs** may be affected by lesions to the **genito-crural** and **external cutaneous** nerves, caused by vertebral lesions of the second and third lumbar vertebræ.

Lesions at the third and fourth lumbar vertebræ and sacro-iliac articulation may affect the **obturator nerve.**

Sacral Nerves.—Lesions to the sacral nerves are especially liable to occur when an innominatum is subdislocated, as that changes the relative position of the femur with the body and causes impingement to the sacral nerves. Contraction of the pelvic and thigh muscles also affects sacral nerves. Other lesions to the sacral nerves may be located at the fifth lumbar and sacrum. It should be remembered that the centers of the sacral nerves are in the lower dorsal and upper lumbar region. Various lesions to the sacral nerves may be caused by pelvic inflammation, compression by growths, and injuries and contractions of muscles within the pelvis. Sciatica has been described under neuritis.

DISEASES OF THE SPINAL CORD.

Spinal Hyperemia.

This disease may be acute or chronic. When **acute** it is really a symptom of acute inflammation and follows violent physical exertions, sexual excesses, toxemia, as well as any vasomotor disturbance of sufficient intensity. The **chronic** form may follow injury or meningitis, but is not well defined.

The **pathological** changes are not well marked.

Symptoms are mild in character. They are twitching of muscles, involvement of the sphincters in some cases, shooting pains, numbness, and a feeling of heaviness and weight in the back and limbs.

Treatment.—Keep the patient quiet and in bed. The ice-bag is of assistance. Relax the contracted muscles and correct any lesions. If pain is present to a great degree, inhibition at the point will usually control it.

Spinal Anemia.

The spinal cord is very liable to be affected by any disturbance of the circulation. Diseases affecting the heart, the aortic valve particularly; hemorrhages and wasting diseases generally affect the circulation to the cord. This results in diminishing its functions. Weakness of the legs is experienced, with periodic pains in the back upon fatigue. At times the symptoms may be those of neurasthenia.

Treatment.—There should be rest and all sources of worry and excitement eliminated. Spinal irritation is often a result of previous disease and this should be carefully sought out. Treat symptoms as they arise. The condition found on examination of the spine will be the guide for the osteopath. The results obtained are good.

Spinal Hemorrhage.

This may be considered under one head when affecting either the cord or the meninges, as the cause and treatment are practically the same.

The most common form is the **meningeal,** which may be primary or associated with hemorrhages of the brain or cord. It is either subdural or extradural.

Etiology is similar in both cortical and meningeal hemorrhage. Injuries to the spinal column, fractures, wrenches, concussion and exposure are most frequent causes, but it may be associated with syphilis, arterio-sclerosis, tumor and degeneration of the arteries in the aged.

Pathologically, in the **subdural** form the central arteries are involved. Inflammation of the meninges and cord compression usually occur in proportion to the extent of the hemorrhage. The **extradural** form is usually located in the cervical region. The clot may extend through the intervertebral foramina and from its source to the vertebral plexus of veins. In the **cord** the hemorrhage is usually in the gray matter, from the central arteries. A zone of softening follows in a few days, which may cause an extension of the inflammation.

Symptoms of meningeal hemorrhage are sudden, severe pains and numbness in the back near the seat of the trouble and along the nerves involved. Rigidity of muscles of greater or less degree, even to convulsion, is followed by paralytic symptoms, as well as anesthesia and visceral disturbance. In the cord numbness of the limbs is followed by sudden paraplegia with loss of reflex and anesthesia. Both of the diseases soon become chronic.

Prognosis is not good, but if the patient survives a few days the osteopath can promise more than any other form of treatment. Hemorrhage in the cervical region is the most fatal.

Treatment.—In any form the patient must have absolute rest in bed. Local application of the ice-bag may give relief. Osteopathic treatment must depend upon the results of the examination. Careful manipulation along the spine will reduce the local congestion, after which the lesions must be corrected and this will depend upon the extent of the injury to the bony structures.

Acute Myelitis.

Acute myelitis is an acute inflammation, with softening of the substance of the cord, giving rise to marked disturbances of motion, sensation and nutrition. When the whole thickness of a section of the cord is involved, the condition is termed **transverse myelitis.** When an extensive area is involved, it is termed **diffuse myelitis.** When the gray matter around the central canal is especially affected, it is termed **central myelitis.**

Etiology.—There can be no doubt that osteopathic lesions are very potent factors in producing this disease. It may follow repeated exposure to wet, cold or exertion; or be a sequel to the infectious diseases, as smallpox, typhoid fever, typhus, puerperal fever or measles. Osteopathic lesions of the spine, even of a muscular nature, readily disturb the cord circulation. It may be due to traumatism or disease of the vertebræ, as caries or cancer. Syphilis and tumors are also said to cause it. Sometimes there is a hereditary tendency to the disease. It is most common in males between fifteen and thirty years of age.

Pathology.—To the untrained, naked eye, the cord may present little or no change. The nervous tissues are in various stages of degeneration. On section the substance of the cord is red and soft, the line of demarcation between the gray and white matter is lost or extremely indistinct, and minute hemorrhages are sometimes seen. In very acute cases, affecting the white and gray matter, after injury, when the membranes are cut the substance of the cord may flow out as a reddish creamy fluid.

The nerve fibres are much swollen and the axis cylinders broken up. Blood discs, leucocytes, and numerous granular fatty cells may also be present. The blood-vessels are distended, and dilated. There may be thickening and hyaline degeneration of the vessel walls and hemorrhagic extravasation.

Symptoms.—Acute Transverse Myelitis.—This is the type most frequently met with. The symptoms differ with the situation of the lesion, which is generally in the dorsal cord. At the onset there may be pain; numbness and tingling in the back, radiating into the limbs. There is usually moderate fever, mal-

aise, chills, muscular pains, a coated tongue and constipation. Symptoms of **motor paralysis** soon develop, which may become more or less complete. The reflexes are lost at first. They may soon return and are exaggerated below the lesion. Following this the muscles often become rigid and contracted. Unless the lesion is in the lumbar or cervical cord, reaction of degeneration or wasting of the muscles, as a rule, does not occur. A girdle sensation frequently occurs at the level of the disease. At first there is retention of the urine and feces, later incontinence. Bed-sores soon develop; also drying and hardening of the skin. The nails become thick and brittle. Death may occur from exhaustion, or heart or respiratory failure, but it is rare; segments of the cord may be completely and permanently destroyed, causing persistent paraplegia. H. A. Greene[1] reports a case, due to injury, which was greatly benefited by treatment.

Acute Diffuse Myelitis.—In the acute forms the course of the disease is rapid. The trophic disturbances are more marked than in the former type. This form is likely to follow exposure to cold, injuries, tumors, syphilis or one of the infectious diseases. There may be chills, fever, malaise, pain in the back and limbs, and occasionally convulsions. The reflexes are generally lost. The motor functions are rapidly lost. There is incontinence of urine and feces, rapid wasting of the muscles and bed-sores develop. The disease may prove fatal in from six to ten days.

Diagnosis.—Landry's Disease.—In this the bladder and rectum are not affected. Trophic disturbances are absent. There is but slight loss of sensation, no reactions of degeneration and no girdle pains. **Multiple Neuritis.**—There are never trophic changes. The bladder and rectum are rarely involved; the girdle pain is absent. **Acute Poliomyelitis.**—There are no sensory symptoms and the rectum and bladder are not affected.

Prognosis.—In very acute cases death occurs in from three to ten days. Milder cases generally recover with some loss of motor power, although in a few cases treated by osteopathy recovery was complete, due probably to the case being seen early and thus degeneration prevented.

1. A. O. A. Case Reports, Series V.

Treatment.—Lesions of the vertebræ are usually readily found in cases of myelitis. Generally, deranged vertebræ are found in the upper dorsal region, and occasionally lesions are located in the lumbar and cervical vertebræ. The treatment of myelitis is chiefly to correct these lesions, so that the normal circulation of the cord may be reestablished. One has to be very **careful** when treating the lesions not to cause additional injury to the cord. An inhibitory treatment to the muscles about the lesion may be all the treatment that can be given at first; nevertheless, it aids nature just so much in overcoming the excessive irritation of the cord tissues. Nature has the curative means, provided they may operate unobstructedly. In a few cases the ribs in the region of the spinal lesion will be found deranged and interfering with trophic fibres, blood-vessels and lymph vessels of the cord.

Warm baths and massage will be found of additional value. Enemata should be used in emptying the bowels and if a catheter is necessary to empty the bladder it may be found preferable to keep a soft one permanently in the bladder. An ice-bag to the spine may be beneficial. If there is any danger of bed-sores, use alcohol to stimulate and harden the skin. Rest, liquid diet and good nursing are necessary.

Chronic Myelitis.—This defines the conditions when the inflamation is subacute with the paraplegia and other symptoms which then naturally appear are present, with also the signs of both degeneration and repair. The symptoms develop slowly as compared with the acute form. It should not be confused with atrophy, pachymeningitis nor tumors of the cord. **Treatment** is practically the same as in acute form. Loudon[1] reports a case due to injury which was greatly benefited.

Anterior Poliomyelitis.

(Infantile Paralysis.)

Definition.—An acute disease occuring most commonly in young children, characterized by paralysis, rapid wasting of cer-

1. A. O. A. Case Reports, Series II.

tain muscles, and fever. It is an acute myelitis that affects the anterior horns of the cord. There are no sensory symptoms.

Etiology.—It usually occurs in children under three years of age and is more common in summer than in winter. The cause of the disease is unknown. Traumatism, exposure to cold and overexertion, are probably predisposing causes. It has occurred in epidemic form and is most probably of infectious origin. "In order that a child can develop this disease, it is necessary that the motor cells in the anterior horns of the spinal cord be affected to the extent of atrophy, degeneration or death, by an inflammation or a profound alteration in their blood supply."—(Ivie)

Morbid Anatomy.—The disease is most frequently seen in either the lumbar or cervical enlargement and is usually unilateral. In very early cases, the condition of acute hemorrhagic myelitis, with degeneration and rapid destruction of the large ganglion cells, has been found. The anterior cornu in the affected region is atrophied and there is destruction of the multipolar ganglion cells. The anterior nerve roots are atrophied, the muscles are wasted and undergo a fatty and sclerotic change.

Symptoms.—The child may have a slight fever, malaise, muscular twitching, headache and sometimes vomiting. This may last a day or two or only a few hours, when paralysis sets in abruptly. The **paralysis** is rarely complete and groups of muscles only may be affected. As a rule, the paralysis comes on abruptly, but it may come on slowly, taking from three to five days to develop. In a few weeks, atrophy sets in and the limb becomes flaccid, soft and wasted. The paralysis remains stationary for a time when improvement takes place, but complete recovery is rare. Sometimes the growth of the bone of the affected limb is impaired. There are no sensory disturbances and the bladder and rectum are not affected.

Diagnosis. This is not difficult. Careful study of the case is all that is necessary.

Prognosis.—Complete recovery is rare. Improvement is the rule. Ivie[1] tabulates sixteen cases, all showing good re-

1. A. O. A. Case Reports, Series V.

sults. W. B. Davis[1] reports a case cured by six months treatment and still well after three years. T. M. King[1] one case cured and one greatly benefited and A. S. Craig[1] one much helped.

Treatment.—In all cases of spinal disease a thorough treatment should be given. One is not justified, at any stage of the disease, in stopping the treatment. It should be remembered that osteopathic treatment has been successful in diseases that are oftentimes considered hopeless and incurable by practitioners of other schools. It is impossible to tell how much can be done for a case until an attempt is made. In the various diseases of the spinal cord, careful and thorough treatment should always be given with a view to correcting abnormal deviations of the vertabræ and ribs, and to seperate each vertebra and relax the muscles thoroughly, to relieve impingements of nerve centers and nerves and to influence the circulation of the cord. Of course it is impossible to regenerate nerve centers that have been destroyed, still, one cannot always tell when the nerve tissues have been entirely destroyed, for the symptoms may simulate central degenerative changes.

In the regions of the cervical and lumbar enlargements of the cord, special care should be taken that the spinal column is thoroughly treated. Rest in bed is necessary and the ordinary fever and bowel treatments should be given. Massage and baths will also be found a helpful measure in maintaining the nutrition of the muscles.

Ivie,[2] among other good ideas on treatment, gives the following: "May I suggest that when such severe results (the acute stage) follow a slight infection, that we may expect to find a lesion located at such a point as will interfere with one or more of the anterior root arteries which join and supply the anterior spinal plexuses. As there are only five or ten of the anterior root arteries (Dana), the lesions affecting them can be located throughout a wide range of the spine. In a great many cases we find that the correction of lesions well up in the dorsal and even in the cervical region have increased the amount of the improvement

1. A. O. A. Case Reports, Series I.
2. Journal of the American Osteopathic Association, February, 1906.

well beyond that received in the correction of the lumbar lesions alone. To **promote resolution**, correct the lesions, both muscular and bony, and relax the muscles of the spine daily; move every vertebra to the limit of all its possible motions; use flexion, extension, rotation, and lateral flexion at least once every day for at least a week; and help to overcome stasis by keeping the child off its back, turning it from side to side and letting it lie on its stomach as much as possible. The limb, to be kept in its best condition, should be kept warm; treated gently; held in a natural position by the use of sand bags and clothes cradle, thus beginning early the **prevention** of deformity; the paralyzed muscles should not be kept on a stretch, as that will retard any possible improvement; stimulating rubs and baths should be given frequently." In the **chronic stage** he advocates: "Now that the nerve cells have been given a chance to regenerate (removal of lesions), the best thing to do is to force them to work if possible. To do this, the so-called resistance exercises or educational movements are to be strongly recommended; the idea being to take and place the limb in a given position and then ask the child to fix all its attention on the limb and to earnestly attempt to hold it there while you move it, or to keep making the attempt while you move the limb through its whole range of motion in that direction. These movements should be so calculated that the resistance of the child will exercise the group of muscles affected. The mother or nurse can give these exercises every night on going to bed."

Acute Ascending Paralysis.

(Landry's Paralysis.)

Definition.—An acute disease, characterized by an advancing paralysis, beginning in the legs, passing upward to the trunk and arms and finally it may involve the centers in the medulla. It has been thought to be a myelitis, but of late the opinion that it is a neuritis is gaining ground. **Toxic** influences that congest the nerve courses and ultimately destroy the cells seem to be the important factor. The spleen is congested and in some instances the lymphatics.

Etiology.—A definite cause has not been found, although osteopathic lesions are important predisposing factors. A toxic cause seems probable. The disease is most common in males between twenty and forty years of age. It may follow traumatism, exposure, cold or the infectious fevers.

Symptoms.—Weakness of the lower extremities is generally the first symptom. This is shortly followed by paralysis. The paralysis then extends to the trunk and within a few days the arms are also affected. The muscles of the neck are next involved and finally those of respiration, deglutition and articulation. The reflexes are abolished. The muscles are relaxed, but do not waste or show electrical changes. Sensation is usually not affected, but there may be tingling, numbness, hyperesthesia and muscular tenderness. The sphincters are not involved as a rule. The spleen is usually enlarged. The **course** is variable. Death often occurs in from two days to a few weeks. When the improvement takes place, the part last affected recovers first.

Diagnosis.—This is not always easy. It is sometimes impossible to differentiate between this disease and **multiple neuritis**, especially in cases in which sensation is involved as in Landry's disease. The rapidly advancing motor paralysis, the absence of wasting and of electrical changes, as well as the absence of involvement of the sphincters, will serve to distinguish it from other affections.

Prognosis.—The prognosis is unfavorable. A large majority of cases prove fatal. In a few cases treated osteopathically, results were favorable if the patient was seen early. The muscles of the spinal column were markedly contracted.

Treatment.—The treatment of Landry's disease consists principally of thorough treatment of the spine, especially of the lower dorsal and lumbar regions. The treatment should be most thorough; the vertebræ and ribs found disordered should be corrected and each vertebra should be seperated from its neighbor. When the paralysis has extended to the trunk and neck, a thorough treatment all along the spinal column should be given with a view of relaxing the contracted muscles and to render flexible the entire spinal column, so that the cord may be properly nourished

and the progress of the disease checked. Thorough relaxation of the contracted spinal muscles unquestionably has a potent effect upon the cord circulation, which tends to check and retard degenerative processes. Treatment of the limbs directly will be found a help, as well as direct treatment of all tissues paralyzed. If swallowing is impossible, the patient should be fed through the rectum. See that the patient is carefully nursed. Massage is beneficial.

Locomotor Ataxia.

(Tabes Dorsalis.)

Locomotor Ataxia is frequently met with. It is a disease of the spinal cord wherein the ultimate effect is a sclerosis of a progressive character of the nerve courses of the posterior column. It is claimed that the origin is in the protoplasmic processes of the posterior spinal ganglion. The characteristic symptoms are incoordination, Argyll-Robertson pupil, lightning pains and loss of knee-jerk.

Osteopathic Etiology and **Pathology.**—Most cases develop between the ages of thirty and forty, although it is occasionally seen in young men, and rarely in children from hereditary syphilis. Males are much more frequently affected than females (10 to 1, Osler), and the disease is much more frequent in cities. Predisposing causes are given as syphilis, prolonged exposure to wet and cold, and sexual excesses, although there is a disposition on the part of neurologists to confine the cause of true tabes to syphilis, some records showing as high as 90 per cent. of the cases from that cause. Tabetic symptoms develop in from five to fifteen years after syphilitic infection. There are no data to show the probable proportion of syphilitic cases which later develop tabes, but it is undoubtedly small. As all cases of tabes examined by osteopaths show spinal lesions, it is reasonable to suppose that by interfering with the nutrition to the spinal cord, they allow consequent degeneration. It is also quite probable that osteopathic treatment for syphilis would, for the same reason, prevent sclerosis and resultant tabes. That syphilis is not the only cause, is also held by some authorities. Starr cites a true case from a se-

vere blow in the dorsal region. Osteopathic observation would lead to a differentiation of tabes, according to the cause. Cases have been recorded, which simulated true tabes in most symptoms, which did not have a history of syphilis. J. Knowles makes the point that probably certain cases simulating tabes have reached what might be called an irritation stage (pathologically) of the nerves and their centers, sclerotic changes not having taken place; and he believes these cases would naturally yield to osteopathic treatment. Teall confirms this view by being of the opinion that these cases are the ones largely due to traumatism, exhaustion or exposure, and the probabilities are that in time sclerotic changes would take place, resulting in true tabes. In such cases there can be no question as to the osteopathic lesion, which would be sufficient to materially interfere with the peripheral sensory nerves and disturb the protoplasmic processes to the spinal ganglia and sensory tract. As a rule they are in the lower dorsal and lumbar regions. Cases are reported which had marked sacral and coccygeal lesions.

Pathologically, Dana speaks of locomotor ataxia "as a post-infective degeneration, which first attacks the posterior spinal ganglia or corresponding cells of the special senses, due to a prolonged poisoning of these parts by the toxins of the infection." Thc first ehange is in the posterior roots. Without doubt osteopathic lesions can readily affect the nutrition of these roots. This is shown upon experimentation in cases where the vertebral lesions impinge the tissues surrounding the spinal nerve at its exit, and also where the displaced head of the rib crowds upwards against the spinal nerve and again where the rib impinges the corresponding sympathetic ganglion which lies anterior to the head of the rib. Very likely in many cases the syphilitic infection is an exciting factor, but it seems plausible that osteopathic lesions, traumatism, cold, exposure and excesses predispose by disturbing the circulation to involved areas. The changes are at first inflammatory, followed by degenerative changes in the nerve courses which cause connective and neuroglia overgrowths to take the place of fibres in the sensory tract, and finally in the motor tract. Thus from the posterior ganglia, a section between the columns

of Goll and Burdach is involved, and the progress of the sclerotic change is upward in the cord. The pia mater and coats of the vessels are thickened. The principal changes in the cord are in the lower dorsal and upper lumbar segments and the cord may be changed in shape. In long standing cases there is degeneration of the ascending antero-lateral tract, of the direct cerebellar tract, and of the pyramidal tract. The cerebral changes in some cases, consist of sclerosis in the restiform bodies in the inferior peduncles of the cerebellum, and of certain cranial nerves, especially the third, optic, vagus and auditory nerves, and also cortical changes may occur.

Symptoms.—Authorities divide the symptoms into three stages—the pre-ataxic, ataxic and paralyitic. This division is largely an arbitrary one., **Motor symptoms** are usually the earliest and most prominent. There is inability to coordinate the muscles. The patient first notices that he cannot walk steadily when in the dark or when he has his eyes closed. Later he finds that he cannot maintain his equilibrium even in daylight; this is ascertained when the patient places his feet together and also when the eyes are closed. As a rule this is unaccompanied by muscular wasting, so there is no loss of motor power. Soon the gait becomes characteristic; in walking the feet are lifted high and are brought down heavily on the heel; the ball of the foot comes down last, producing what is called the "double step;" the walk is straddling; the limbs are thrown about, and there is staggering, due to **incoordination.** Incoordination also develops in the hands, but usually later in the disease. Paralysis and muscular atrophy do not develop until after a few years.

Pain is almost always present; it is of a darting, shooting or stabbing character and appears in paroxysms. It is most common in the legs, lasting but a second or two, and often accompanied by a hot, burning feeling. Herpes may appear along the course of the nerve. Anesthesia and hyperesthesia of certain areas may occur. The **muscular sense** is more or less impaired; there is a feeling as if there were cotton between the patient's feet and the floor. Retardation of tactile sensation is a common symptom. The power of localizing pain is often lost. The **knee-**

jerk is lost early in the disease. Occasionally, however, cases are met where it is retained. The skin reflexes are also impaired; in some cases they may be increased at first, but later are sure to be involved with the deep reflexes. The **pupil** does not respond to the light, but still accommodates for distance, constituting the **Argyll-Robertson** pupil. Ptosis may develop with or without strabismus. Optic atrophy, which may lead to blindness, paresis of the ocular muscle, and contracted pupils, may occur. The ocular symptoms may appear early in the disease.

The **visceral pains** of **crises** are chiefly gastric and are sometimes accompanied by obstinate vomiting. Laryngeal, rectal, urethral and nephritic crises may occur, and at times are exceedingly severe. Laryngeal crises may be manifested by intense dyspnea and noisy breathing. Constipation is common. There may be retention of the urine resulting in cystitis. Sexual power is generally lost early.

Trophic changes occur later in the disease. The so-called arthropathies, or joint lesions, may occur at any period of the disease. It consists of an enlargement of the joints, associated with serous exudations, which rarely become purulent; atrophy of the heads of the bones; destruction of the bones and cartilages; or spontaneous fracture or dislocation may occur, owing to the brittleness of the bones. There is no pain and the large joints are most frequently affected; these may be excited by an injury. Herpes, skin ecchymoses, edema, local sweating, alterations in the nails, perforating ulcer of the foot, onychia, decay of the teeth and atrophy of the muscles may occur. The auditory nerve is rarely affected, but in some cases there may be deafness. There may be attacks of vertigo. Olfactory symptoms are rarely met with. Cerebral symptoms are rare. **Paralysis** may develop and the patient becomes bed-ridden. The disease itself does not prove fatal; the patient may live for years until some intercurrent disease causes death.

Diagnosis.—This is usually easy when the characteristic symptoms are developed. The presence of lightning pains, absence of the knee-jerk, early ocular palsies, a squint, ptosis and Argyll-Robertson pupil make the diagnosis conclusive. Care

has to be taken in making diagnosis from peripheral neuritis, paresis, ataxic paraplegia, cerebellar disease and some diseases in which the posterior columns are disturbed.

Prognosis will depend largely on the exciting cause, as it is least hopeful from syphilis, but the earlier the case is treated the better the chance. The progress of the disease can sometimes be arrested and occasionally cases presenting symptoms of the first and second stage are entirely cured with persistent treatment.

Treatment.—Experience in the treatment of locomotor ataxia has been that often the disease can be checked and the symptoms relieved; but curing a case of locomotor ataxia, except in the early stages, is seldom possible. When there is degeneration of nerve centers, there is no hope for a cure. Those with a syphilitic history are by far the hardest to relieve. Cases with a syphilitic history presenting preataxic symptoms, Argyll-Robertson pupil, lightning pains and loss of patellar reflex have been cured; unfortunately these cases are rarely diagnosed.

The treatment consists of thorough correction of the spinal derangements found, especially through the lumbar and lower dorsal regions. If the disease has involved the arms or brain, thorough treatment should be given the entire length of the spine with a view of increasing the circulation in the spinal cord and brain, and thus checking or preventing the tissue degeneration. "In the early stage, deep massage to the muscles of the back promotes the flow of venous blood through the spinal vessels and their anastomotic branches, and is the best means of relieving the congestion which is supposed to exist." (Starr) The lower spine will be found to be rigid and should be well sprung to get mobility.

Careful treatment of the limbs should be given, but be exceedingly **cautious** in the treatment of the limbs of **advanced cases,** as there is considerable danger of producing fractures. Stretching the thigh muscles and internal and external rotation treatment of the legs should be given. See that the bowels are moved daily and be positive that there is no retention of the urine in the bladder. A catheter has to be used in some cases. The patient

should be careful about taking too much food, and especially beware of indigestible food, as it irritates or excites gastric crises.

During **painful attacks** the patient should rest in bed, and with careful treatment the attack can generally be relieved. Hot applications are of considerable aid.

At all times excesses should be avoided. Occupation of some character should be given the sufferer. Do not promise to cure the patient, and make it plain at the start that it will probably require a long time to show much improvement.

Hereditary Ataxia.

(Friedreich's ataxia)

This is a rare hereditary disease, due to sclerosis of the columns of Goll and Burdach and the pyramidal tracts. There are ataxia, muscular weakness, nystagmus, speech disorders and loss of knee reflex. Almost invariably there will be found a neuropathic history. Alcoholism, syphilis and insanity in the parents are predisposing causes. Tubercolosis may be a factor. Acute diseases, especially infectious fevers, dentition and injuries to the spine may be exciting causes. It occurs most frequently in males about the seventh or eighth year and very seldom after puberty. Several members of the same family are apt to be affected. The disorder is transmitted by the female. "The degeneration of the posterior and pyramidal columns seems to occur at the time of cord development, when mal-nutrition or hereditary dyscrasia would disturb it most."

Pathologically, "the spinal cord is smaller throughout than normal; we have also a combined disease of the posterior and lateral tracts (Schultze), a degeneration of Goll's tract in toto, of Burdach's almost entirely, and of the direct cerebellar, the crossed pyramidal (?), and of Clarke's columns, in which we find not only atrophy of fibres, but also a degeneration of the ganglion cells. Gower's tract may likewise be involved." (Oppenheim.)

Symptoms.—Impaired coordination, beginning in the legs and later extending to the arms, is the first marked symptom. The gait is peculiar, it is swaying and irregular and it lacks the pronounced stamping gait of locomotor ataxia. There is a loss

of reflexes, while no sensory symptoms are present as a rule. The sphincters are normal. Nystagmus is present and is a characteristic symptom. The speech is scanning. Talipes and lateral curvature of the spine are common. There is no mental change. The course is always very slow.

Diagnosis.—This is not difficult as a rule, especially when several cases occur in one family. The age, spinal curvature, nystagmus, incoordination, scanning speech, irregular gait, and deformity of the feet are symptomatic. In **locomotor ataxia** the gait, sharp pains, anesthesia and Argyll-Robertson pupil will differentiate between the two. Differentiation will also have to be made from chorea, ataxic paraplegia and multiple sclerosis.

Treatment.—The same treatment as in locomotor ataxia is followed. Lesions presented have been found at the tenth and eleventh dorsals, and at the second and third cervicals, although, as a rule, the entire spinal column is quite debilitated. Some improvement will be noted in these cases, but not much can be expected from treatment; contractures may be prevented.

Spastic Paraplegia.

Spastic paraplegia begins as a stiffness in the legs, with no sensory symptoms, but finally the muscles become rigid and slowly paralyzed. The reflexes are exaggerated.

It may occur, in a few instances, as a primary disease, "being a degeneration of the motor neurone, whose body lies in the brain cortex and whose axone lies in the lateral pyramidal tract." Usually it is secondary to tumors, inflammation and softening of the brain. Multiple sclerosis, hemorrhage, transverse myelitis, syringomyelia and other diseases of the cord, injury, exposure and overexertion are exciting causes. Syphilis may be a cause. It generally develops between the ages of twenty and forty.

Pathologically, the degeneration involves the lateral pyramidal columns of the cord. It begins at the periphery and extends upward until finally the axones atrophy and neuroglia overgrowth takes place and sclerosis of the motor tracts results.

Symptoms.—Muscular stiffness in one leg is usually the first symptom, which gradually disturbs both sides. The muscular stiffness increases to a rigidity, and even cramps, so that it is

with considerable difficulty the patient moves about. The reflexes are exaggerated. The joints, as well as the muscles are stiff, so that the toes are dragged upon the ground and the legs are kept close together, abduction of the limbs being difficult. On the whole, there is much tiredness, stiffness, rigidity and hardness of the leg muscles, so that all motions with them are performed with great effort. Sensory and trophic symptoms are lacking; control of the bladder and rectum is normal. The progress of the disease is slow. The upper extremities may be involved in after years, but the common extensive disturbance is with the legs, so that they may be entirely useless and the muscles atrophy from disuse, although rigidity and contractures remain.

Treatment.—The prognosis is usually unfavorable, though frequently the patient may be considerably benefited. A few cases that have been **caused** by **traumatism**, cold or exposure have yielded to osteopathic treatment and all symptoms disappeared. The treatment is largely that of locomotor ataxia. The lesions are readily located in the spinal column. In a few cases a slight posterior curvature of the dorso-lumbar region is found, but the majority of the lesions are in the lower dorsal region. Special care should be given to the bladder and bowels. Prolonged warm baths are beneficial. Treatment of the legs is always secondary to that of the spine. The diet should be nutritious and one easily digested. Give the patient plenty of fresh air and sunlight with cheerful surroundings. E. C. Link[1] reports two cases, one of over one year's standing, completely recovered, and another much improved.

Ataxic Paraplegia.

In **ataxic paraplegia** there are ataxic and spastic symptoms, due to both posterior and lateral sclerosis. Traumatism, cold and exposure are etiologic factors. It is found in diffuse myelitis, general paresis and leptomeningitis. The posterior and lateral columns are degenerated, so that in the former there is an ascending degeneration and in the latter a descending.

1. Journal of Osteopathy, Oct. 1904.

Symptoms.—These comprise those of **tabes** and **spastic paraplegia.** Incoordination, ataxia, lightning pains, anesthesia, rigidity of muscles and exaggerated reflexes are the principal symptoms. The muscles easily fatigue; sensory symptoms are not so troublesome as in tabes; there may be visceral crises, sometimes Argyll-Robertson pupil; and possibly spasms of the upper extremities and jaw. The course of the disease is slow.

Diagnosis.—This is not difficult as a rule. First, there is ataxia; then increased reflexes, fatigue of the muscles and paraplegia. **Tumor** of the **cerebellum** may confuse the diagnosis.

Treatment.—There is frequently a chance to greatly benefit these cases, and even in some instances a cure may be performed, provided the case is seen early. Thorough treatment of the spine to relax the muscles and to adjust the ribs and vertebræ is the indication. Stretching the spine, if carefully done, is beneficial. Muscular manipulation improves the spinal cord circulation, and osseous correction removes probable impingements to nutrient channels and nervous influences induced by cold, exposure, traumatism and secondary disturbances. Care of the general health, hygiene, diet, etc., are important.

SYRINGOMYELIA.

Definition.—A chronic affection of the spinal cord in which there is an embryonal neurogliar overgrowth about the central canal, with cavity formation. It is characterized, clinically, by progressive muscular atrophy, peculiar disturbances of sensation and various trophic and vaso-motor disorders. The onset generally takes place before the thirtieth year. Males are much more commonly affected than females. It is claimed by some that the disease is infectious. It frequently follows trauma.

Pathologically, the condition begins with an overgrowth of embryonal neurogliar tissue. This is followed by degeneration of the gliomatous tissue with a formation of cavities, or this cavity formation may be the result of hemorrhage. The disease, in most cases, involves only the cervical or dorsal regions, and is usually in the posterior or posterio-lateral tracts. The cavity may prevail throughout the entire cord, but usually only the

cervical and dorsal regions are involved. The cavities lie in the gray matter outside of the canal.

Symptoms.—The onset is slow. The symptoms depend upon the situation and extent of the cavity. As the disease most frequently involves the cervical region, the neck and arms are usually affected. At first neuralgic pains may develop in the muscles. Later there is progressive muscular atrophy and loss of painful and thermic sensations. Tactile and muscular senses are usually intact. The reflexes are increased and a spastic condition is present. The lower limbs usually escape, but when they are involved the clinical picture may be that of **amyotrophic lateral sclerosis.** The special senses and the sphincters are usually involved. A lateral curvature is present. When the disease extends into the medulla, there will be various bulbar symptoms. Trophic changes and vaso-motor disorders are common.

A form of syringomyelia, known as **Morvan's disease**, is characteristized by neuralgiac pains, cutaneous anesthesia and painless felons.

Diagnosis.—The progressive muscular atrophy, the retention of muscular and tactile senses, and the loss of thermic and painful sensations are typical symptoms. The diseases with which it may be confounded are: **Cervical Pachymeningitis.** The pain is usually greater, the tactile sense is lost and it runs a more rapid course. **Anesthetic Leprosy.** The trophic changes are more marked, tactile sensation is lost and the phalanges often drop off. **Progressive Muscular Atrophy** and **Amyotrophic Lateral Sclerosis.** Sensory symptoms are wanting.

Prognosis.—The prognosis is unfavorable. Duration is from five to twenty years.

Treatment.—Little can be done except attending to the diet and hygiene of the patient and meeting urgent symptoms. Probably, continued treatment along the spinal column would influence to some extent the circulation of the cord in the region of the involvement.

Amyotrophic Lateral Sclerosis.

"This is a chronic, progressive form of spinal paralysis, characterized by the symptoms of progressive muscular atrophy in the arms and by lateral sclerosis or spastic paraplegia in the legs." (Starr). It is similar to progressive muscular atrophy, except, in addition, there is sclerosis of the pyramidal tract. Osler classes progressive muscular atrophy of spinal origin, amyotrophic lateral sclerosis and progressive bulbar paralysis as diseases of the whole efferent or motor tract, wherein these disorders may simply be various stages in the same case. He says, "A slow atrophic change in the motor neurones is the anatomical basis, and the disease is one of the whole motor path, involving, in many cases, the cortical, bulbar, and spinal centers." There can be no question that for the student, a classification of spinal cord diseases according to the whole motor tract, the upper motor segment, the lower motor segment, etc., is a scientific classification from our present knowledge of the histology and physiology of the neurone, but for clinical purposes the usual classification is given. Osteopathically, we are greatly in need of a new nosology, either according to the cause of the disorder or to the physiological disturbance.

Amyotrophic lateral sclerosis does not occur so frequently as progressive muscular atrophy. Heredity plays a part and it affects older people. **Injury** to the **spinal column** is undoubtedly an important factor. Exposure and cold may be exciting causes. It is said infectious diseases and syhilis are rarely the cause.

Pathologically, there are atrophy in the anterior cornu and sclerosis of the crossed and direct pyramidal tracts. There is sclerosis of centers in the medulla.

Symptoms.—There are defects in speech and swallowing is difficult. The reflexes are exaggerated; the arm and leg muscles become weak and finally rigid and atrophied. This results in deformity. Disturbances of sensation are not pronounced. The sphincters may be slightly affected.

Diagnosis.—The disease is not so prolonged as progressive muscular atrophy. Differentiation has to be made from multiple sclerosis and transverse myelitis.

Treatment.—The same treatment as outlined for progressive muscular atrophy is indicated. The disease may be retarded and life prolonged.

Progressive Muscular Atrophy.

A disease characterized by a slow, but progressive, loss of power and by muscular atrophy. Anatomically, it is characterized by degeneration of the ganglion cells of the gray matter in the cord. This atrophic affection develops just opposite to that of chronic anterior poliomyelitis. It is commonly a disease of males in middle life. Syphilis, rheumatism and lead poisoning predispose. It sometimes follows cold, wet, exposure, traumatism, mental worries, overuse of certain muscles, or prolonged emotional excitement. Hereditary influences are present in some cases. In all cases **lesions** are detected in the **vertebræ** and **ribs**, corresponding to the innervation of the diseased areas. Very likely these lesions are the starting point of the disease, by impairing nutrition to the motor cells of the anterior cornu, and thus resulting in atrophy.

Pathologically, the muscles are wasted, the fibres undergo fatty degeneration and there is an overgrowth of connective tissue. The peripheral motor fibres are degenerated. The anterior nerve roots leading to the horns are atrophied. The large ganglion cells of the anterior horns are atrophied, or even entirely removed. The neurogliar tissue is increased. There is sclerosis of the anterior and lateral pyramidal tracts of the cord in the majority of cases. (See Amyotrophic Lateral Sclerosis). The pyramidal tracts have been found degenerated through the pons and internal capsule, even up to the motor cortex. When bulbar symptoms are present, there is degeneration of the motor nuclei of the medulla. The posterior columns are not involved.

Symptoms.—Irregular pains, numbness or exhaustion are usually felt in the region that is soon to become wasted. The upper extremities are first affected. The muscles of the ball of the thumb waste first, then the interossei. From atrophy of the interossei and lumbricales and contraction of the long extensor and flexor muscles, the deformity known as "claw hand" results. The

wasting creeps up from the forearm, arm and shoulder. The muscles of the trunk are gradually affected. The muscles of the lower extremity may escape entirely. The platysma myoides does not waste and is often hypertrophied. The face muscles are attacked late or not at all. The affected muscles often twitch. Deformities and contractures develop, notably lordosis. Sensation is not impaired although the patient may complain of numbness and coldness. The bladder and rectum are not affected, but sexual power may be lost. The paralysis is flaccid and the reflexes absent in the so-called **atonic cases.** In **tonic** atrophy there is more or less spasm, the reflexes are greatly increased, there are often contractures and the wasting is usually trifling.

Diagnosis.—Differential diagnosis has to be made from syringomyelia, chronic anterior poliomyelitis, lead palsy and muscular dystrophies.

Prognosis.—The prognosis of progressive muscular atrophy is not favorable, although a number of cases have been greatly helped by an extended course of treatment.

Treatment.—The treatment consists of a thorough, stimulating treatment of the innervation of the affected regions, with manipulation of the muscles and parts diseased. **Correction** of the **lesions** to the **vertebræ** and **ribs**, which are involving the innervation to the diseased tissues, is of primary importance. A cure cannot be expected when degeneration of the nerve centers has occurred; still, the progress of the disease may be checked in many cases, and the patient occasionally gains considerable strength. When atrophy starts in the muscles of the ball of the thumb, the lesion is to the median nerve, and derangements of the cervical vertebræ, from the fifth to the seventh, may be found. Attention to the general health is important. Out door life is preferable and gymnastic exercises are of value, but do not overtax the strength.

Bulbar Paralysis.

(Glosso-Labio-Laryngeal Paralysis)

A progressive atrophy and paralysis, invading the lips, tongue, pharynx and larynx, due to involvement (sclerosis) of the motor

nuclei of the medulla oblongata that supply these tissues. It is rarely primary, more **frequently secondary** to tabes, amyotrophic lateral sclerosis and diseases involving the motor nuclei of the medulla. Diphtheria, syphilis and lead poisoning are said to predispose. **Osteopathic lesions** of the upper cervical are also important factors in many cases. Halbert says: "The nuclei of the hypoglossal, the spinal accessory, the facial and the motor part of the trifacial nerves suffer most decidedly from the sclerotic degeneration. The nerve trunks and the muscles which they supply gradually show the effects of a similar degeneration."

The **acute form** results from hemorrhage, embolism or inflammatory softening. The onset is usually sudden. The speech is difficult or entirely lost. There are dribbling of saliva, difficult swallowing, the lips flabby and flaccid, and frequent choking spells occur. These cases may prove rapidly fatal.

The **chronic form** may result from progressive muscular atrophy, insular sclerosis, amytrophic lateral sclerosis, acute ascending paralysis or chronic poliomyelitis. The paralysis starts in the tongue, the first symptom being a slight defect in the speech. When the lips become involved, the patient cannot whistle and speech is rendered still more difficult. The lips are prominent and the lower one drops. The saliva is increased in amount and there is drooling. Mastication of the food becomes difficult. The tongue becomes atrophied and the mucous membrane wrinkled. Fibrillary tremors of the lips and tongue are present. Sensory symptoms are not present. Taste is normal. Paralysis of the larynx is not so pronounced as of the other parts.

Diagnosis.—This is generally easy as the symptoms are well marked. The **prognosis** is unfavorable.

Treatment.—Little can be done in the majority of cases. Only in those cases where the paralysis is caused by **cervical lesions** can much hope be given. Derangements of the cervical vertebræ, especially the atlas and axis, occasionally influence the circulation in the medulla to such an extent that the motor nuclei are greatly involved. The subluxated vertebræ may interfere with the blood-vessels directly or through the vaso-motor and trophic nerves. When the onset is not abrupt, the prognosis

is more favorable. When deglutition is impaired, the stomach tube should be used in feeding the patient to prevent the food passing into the trachea.

DISEASES OF THE BRAIN.

Tumors of the Spinal Cord and Brain.

While these conditions are comparatively rare, especially in the cord, and are, so far as known, amenable only to surgical treatment, they should always be considered in cases which present symptoms that do not lead to satisfactory diagnosis. Injuries, syphilis and tuberculosis are the usual predisposing causes. **Symptoms** of **tumor** of the **cord** affect a definite area, and shooting neuralgiac pains are the earliest effects. These gradually increase until later they become paroxysmal and at last become dull and continuous. There may be hyperesthesia and later anesthesia. As the tumor develops, the areas affected may increase upward or downward. Symptoms of paralysis are at first unilateral, although there is an increase in the reflexes in both legs. Later a paraplegia ensues. The bladder and rectum are often affected early.

Symptoms of **tumor** of the **brain** are such that it is usually not difficult to diagnose. Occipital headache and pain in the back of the neck and often in the upper end of the cord, with occasionally a frontal headache, are present. **Papillitis** is an early and pronounced symptom. Vertigo is almost always a constant symptom, as well as vomiting. Incoordination is usually present. If there is constant neuralgia, and paralysis of the facial nerves, the tumor is in the cerebellar area.

Pachymeningitis.

Pachymeningitis is an inflammation of the dura mater, either external or internal, and at times it involves both surfaces. Pachymeningitis **externa** results from trauma; fracture of the skull; caries, following disease of the ear; tumors and syphilis. In the syphilitic cases, the inner table of the skull is roughened and thickened, and in septic conditions there may be pus. There

may be a thickening of the membrane, which is permanent. The only symptoms are those of the causative disease and local pain. Pachymeningitis **interna** may result from the same causes or as a continuation of the external inflammation. It is impossible to differentiate between the two in life. The post mortem has shown it in chronic insanity and alcoholism. The tissue, from inflammation, forms a hematoma which causes pressure symptoms.

The **symptoms** may be present for years, with a dull headache and some confusion of ideas. When hemorrhages occur, there are symptoms of apoplexy and the true condition may be suspected. The course of the disease is usually slow. There is intense headache, lasting several days, followed by cerebral disturbance and vertigo and a difficulty in concentration. Later there may be sudden unconscious spells, followed by restlessness and irritability. These attacks return after six months or so, and the headache becomes continuous and the patient lapses into semi-stupor. This is characterized by heavy sleep, frequently with delirium. The gait is ataxic and movements feeble. Complications, as cystitis, bed-sores and emaciation may follow, the patient dying after several weeks.

Treatment is palliative except where surgery is resorted to. Ice-packs may relieve the headache. The bowels must be kept thoroughly open and any other means which will relieve blood pressure should be used. This can be done by spinal treatment to draw the blood to the viscera. Inhibition of the occipitals may help.

Leptomeningitis.

Leptomeningitis is an inflammation of the pia and arachnoid membranes and occurs in different forms, defined according to the cause or distribution.

Etiology.—It is infectious and due to many different micro-organisms. The method of access is by the blood and lymph from some infected part of the body or by direct extension from some contiguous pus formation. Trauma may also be the cause.

Pathologically, it has a great variety of distribution and may be limited or general.

Symptoms depend upon the area affected and the extent of the inflammation. There are always headache and some fever, occasionally delirium, and coma; also gastric symptoms, such as vomiting, constipation and coated tongue. A rapid pulse is usual. When the base of the brain is involved, the cranial nerves may be affected and strabismus and ptosis occur. There is facial spasm or palsy if the facial nerve is affected, and sensory and trophic changes occur if it is the fifth nerve. There are retraction of the head and tensity of the muscles in the cervical region and along the spine, the legs are flexed, and there is an exaggeration of the tendon-reflex, and increased cutaneous irritability. It must not be confused with pneumonia, typhoid fever or influenza.

Prognosis is unfavorable.

Treatment is largely the same as under pachymeningitis.

Congestion of the Brain.

Congestion of the **brain** is an abnormal increase in the amount of blood in the blood-vessels of the brain. The congestion may be either active or passive. Osler says: "Less and less stress is now laid on active hyperemia as a cause of symptoms. As Leube suggests, the symptoms usually referred to active hyperemia in the infectious diseases, or in association with hypertrophy of the heart accompanying disease of the kidney, are due to the action of toxic agents rather than to changes in the circulation. On the other hand, **venous stasis** and **anemia** of the brain must be very potent causes of head symptoms. The uncertainty which exists is largely due to the fact that the condition of the blood-vessels, as seen within the skull after death, may bear no relation to that which held sway during life."

Active hyperemia results from prolonged mental activity, the use of certain drugs, sunstroke, plethora, functional irritation and heart disturbances.

Passive hyperemia results from some local obstruction to the return of blood from the brain, such as tumors in the neck, straining, emphysema and mitral disease; also lesions in the vertebræ, interfering with the blood supply from the brain, are very important.

Pathologically, active congestion often leaves no signs at the autopsy. In **passive** congestion the vessels are found engorged.

Symptoms.—This disorder should be regarded more as a symptom than a clinical entity. These are not very characteristic or constant. In **active hyperemia** there may be headache, vertigo, a sense of fullness or pressure, irritability, rapid pulse, insomnia, restlessness, confusion of ideas, and in some cases, delirium and hallucinations.

In **passive hyperemia** the symptoms are less pronounced, slower in their development, and in severe cases there may be torpor and dullness of the intellect.

Treatment.—The treatment of hyperemia of the brain consists largely of rest and an inhibitory treatment in the cervical region. Attention to primary disorders is always necessary. The treatment should be applied to the **upper** and **middle cervical** regions. This influences the nerves (if such exist) that control the cerebral vessels. At least it has a marked influence upon the vessels, as such a treatment always lessens the amount of blood in the brain, to a greater or less extent. Probably, the treatment dilates the various vessels of the body, and thus there is a tendency to equalize the vascular system.

If lesions are found in the cervical region, exclusive of contracted muscles, they should also be corrected. The head should be kept raised. Heat applied to the feet and cold to the head will be found helpful. Also, increasing the activity of the bowels and kidneys will tend to lessen the blood pressure in the brain. The diet should be a liquid one.

In a few cases lesions may be found in the cervical region, affecting directly the blood-vessels to and from the brain, but, as stated, the most common lesions are contracted cervical muscles. The **first** or **second rib** on the left side may be found dislocated and interfering with the subclavian vessels. There may be lesions in the **upper** and **middle dorsal,** disturbing vaso-motor nerves to the head. Pressure on the carotids will temporarily aid in lessening the amount of blood going to the brain. In all cases the clothes about the neck should be loose, and the shoulders and neck kept raised to avoid any flexion of the neck. Treatment

of the spine through the **splanchnics** will tend to lessen the amount of blood to the head by dilating vessels elsewhere.

Anemia of the Brain.

A condition in which the quantity of blood in the brain is diminished, or the bulk of the blood may be normal, but there is alteration in the quality. It may be due to hemorrhages, diarrhea or to dilatation of the intestinal vessels from sudden withdrawal of ascitic fluid. Feeble action of the heart, ligature of one carotid and obstructive endarteritis of the vessels carrying the blood to the brain are also causes. Subdislocations of the **cervical** and **upper dorsal** vertebræ, and deeply contracted muscles in the same region, causing disturbances to the blood supply of the brain, are often located.

Pathologically, the gray and white matter and membranes are pale. The puncta vasculosa are less distinct and few are seen. The large vessels are full of blood. The cerebo-spinal fluid is usually increased.

Symptoms.—There may be dizziness, noises in the ears, confusion of ideas, drowsiness, inability to stand, and flashes of light. The skin is cold, the respiration hurried, the pupils dilated, and finally there may be loss of consciousness and even death may succeed. In the chronic form there are mental apathy, extreme lassitude and sleeplessness or sometimes there may be insomnia. In other cases there are headache, vertigo, tinnitus, hallucinations or delirium. **Hydrocephaloid** symptoms have been described by Marshall Hall. They occur in young children after excessive diarrhea. The child is in a semi-stupor, with eyes open, pupils contracted and depressed fontanelles. The coma may become profound and death result.

Treatment.—The principal treatment of anemia of the brain is given with the patient flat upon the back with the head low. Give a stimulating treatment of the cervical region, to increase the blood supply to the vessels of the brain. The cause of the anemia, especially in hemorrhage, requires prompt attention. If lesions are found in the cervical region interfering with the vessels passing through the neck, such lesions should at once be

removed. The heart's action should be stimulated and nutritious food administered. In severe cases absolute physical **rest** is demanded. Most of the cases are due to **mechanical pressure,** as heart and lung diseases, tight clothing, and lesions of the cervical and upper dorsal regions, interfering directly with the blood from the brain.

In cases of **fainting,** place the patient in a recumbent position and stimulate with cold water. Also give a stimulating treatment to the cervical region, and raise the ribs, especially the fourth and fifth over the heart. All tight clothing about the neck and chest should be loosened. A thorough dilatation of the rectal sphincters will oftentimes cause return of consciousness when other methods fail.

Edema of the Brain.

This is an abnormal accumulation of cerebro-spinal fluid in the subarachnoid space and in the meshes of the pia. In some cases there is moistness of the brain itself.

It is **caused** by mitral stenosis, Bright's disease and atrophy of the convolutions. Any disease that causes a marked degree of passive congestion of the brain may produce edema. It is also the result of either active or passive congestion. Lesions to the cervical vertebræ may be found causing the hyperemia. Uremic symptoms, according to Traube, are due to edema of the brain.

Pathologically, the sub-arachnoid space is filled with clear fluid. The brain substance is anemic and moist. The fluid in the ventricles is generally increased; in some cases the brain tissue is infiltrated.

The **symptoms** are those of anemia and are not clearly defined. The affection is always secondary.

Treatment.—The treatment of edema of the brain depends upon the cause. The heart should be stimulated, when due to heart disease; and when the edema is due to kidney diseases, the kidneys should be treated so thorough elimination is forthcoming. Careful treatment of the cervical region will always be of aid, and in a few cases lesions will be located in the neck, interfering with the flow of blood from the brain. In some instances lumbar puncture may be suggested.

Cerebral Hemorrhage.

(Cerebral Apoplexy)

In **cerebral hemorrhage** there may be **premonitory symptoms,** as headache, fullness of the head, heart disturbances, dizziness, numbness in the hand or foot, but the **onset** is apt to be **sudden** so that consciousness is lost and **hemiplegia** develops.

Etiology.—The affection is most frequently met with in the old, as there is a natural tendency to degeneration of the vessels, and in the very young, in whom they are naturally weak. More men are affected than women. Any cause which tends to **degenerate** the arteries predisposes to apoplexy. Arterio-sclerosis, gout, alcoholism, syphilis, Bright's disease, embolism, and aneurism of the vessels of the brain are predisposing causes. Heredity predisposes, as there are families in which the arteries degenerate early. Probably **lesions** in the **cervical** region, especially the atlas and axis, predispose to apoplexy, by weakening the circulation in the brain and lessening the resistance of the walls of the blood-vessels. Usually lesions are found at the atlas and axis. Of considerable importance are lesions to the **upper** and **middle dorsals**, (commonly a posterior condition) which probably disturb the vaso-motor control to the head. The lesions may affect the blood-vessels directly, or the vaso-motor nerves may be involved. **Exciting causes** are violent exertion, particularly straining efforts, mental or physical excitement and alcoholic excesses, and in children, convulsions or whooping cough.

Pathologically, the general disease leading to cerebral hemorrhage should be noted. The bleeding is usually from the central branches of the circle of Willis and involves the vessels of the basal ganglia, internal capsule and white matter. Anders says the cerebrum is involved about twenty times as frequently as the cerebellum. The hemorrhage may also occur in the pons, medulla and meninges. **Miliary aneurisms** are a very frequent source of bleeding. The blood penetrates the brain tissue, and if only to a slight extent, the clot shrinks and is absorbed, leaving a connective tissue proliferation. If the **hemorrhage** is **severe,** reactive inflammation takes place and marked paralysis and degeneration of the motor tract occurs.

Symptoms.—The patient is commonly attacked without any warning, though there may be a feeling of fullness in the head, headache, depression or sensations of numbness, tingling or pains in the limbs. In many cases there is sudden loss of consciousness, while in others the onset is more gradual and loss of consciousness may not occur for a few minutes after the patient falls, or after motor weakness is manifested, or it may not take place. The patient cannot be aroused; the face is usually congested, but sometimes it is pale and breathing is stertorous. The pulse is usually slow and full. The pupils may either be contracted or dilated. The temperature is often subnormal, or in basal hemorrhage it may be high. The urine and feces may be passed involuntarily. Convulsive seizures are not uncommon. Even while the patient is comatose, the **paralysis** can be detected. The head and eyes may be turned strongly to one side (conjugate deviation). If the arm or leg is lifted it drops lifelessly, or unnatural rigidity is manifested. The reflexes are lost. In grave cases, the patient does not awake from the coma; the symptoms deepen and the patient dies. In other cases consciousness returns partially or completely, and in about forty-eight hours from the onset, there may be a febrile reaction, due to cerebral inflammation, during which the patient may die, or if consciousness has been regained, there may be delirium or recurrence of the coma. When the attack does not prove fatal, consciousness is finally restored, while the signs of paralysis gradually grow less, but almost never disappear completely.

When **hemiplegia** is complete, it involves the face, arm and leg. The facial paralysis is partial, involving only the lower portions of the facial nerve, so that the frontalis and orbicularis oculi escape. If the tongue is paralyzed, when protruded it deviates toward the paralyzed side. The arm is, as a rule, more commonly paralyzed than the leg, and in some cases the face and arm alone are paralyzed. The trunk muscles almost always escape. Sensation is impaired. The deep reflexes are increased on the affected side, and the skin reflexes are diminished or lost. As a rule, there is no wasting of the paralyzed limbs. Later in the history of the case, secondary contraction or late rigidity comes

on. This is most marked in the upper extremity, the arm and hand being flexed.

Crossed hemiplegia is when a lesion takes place in the lower part of the pons, the crus or medulla. The facial nerve is involved, causing facial paralysis on the same side as the lesion and hemiplegia on the opposite side.

Conjugate deviation is when, in right hemiplegia, the eyes and head may look toward the left side. This is often an early symptom and generally passes away, but it may continue for weeks. If convulsions or spasms or early rigidity develop, the eyes and head are rotated toward the paralyzed side or away from the side of the lesion. These symptoms are associated with lesions of the cortex. The conjugate deviation may also occur in lesions of the internal capsule or the pons, but the phenomena are reversed.

Diagnosis.—The coma of apoplexy may simulate the coma from uremia, opium poisoning, alcoholism or epilepsy. Mistakes in diagnosis frequently occur. To tell whether the attack is due to **embolism, thrombosis** or **hemorrhage** is often impossible.

Prognosis.—Always doubtful. When the attack does not prove fatal, there is always a probability of a subsequent attack.

Treatment.—The patient should be placed at once in a horizontal position, with the head somewhat raised and the clothing loosened about the neck and chest. Relax well all the soft tissues of the cervical region, and take particular note of the **first rib,** especially the left. This rib is oftentimes found elevated and thus interferes with the large blood-vessels beneath it. Attention should be given the **superior cervical ganglion,** to control as much as possible the vaso-motor nerves to the head, and to equalize the entire circulation. **Compression** of the **carotid** artery is effectual in lessening the blood pressure in the brain. Horsley and Spencer endorse the statement that compression of the carotid artery lessens bleeding from the lenticulo-striate artery. An ice-bag should be placed on the head and heat applied to the feet. A rectal injection of warm water should be given to cleanse the colon thoroughly. When dyspnea is marked, change the posi

tion of the patient and raise the ribs well on both sides. Keep the bowels and kidneys as active as possible.

Following the immediate **treatment after** the **attack,** the patient's general health must be carefully watched. The paralayzed muscles should be manipulated and massaged often, and the patient carefully protected against the effects of decubitus. There have been cases where correction of **deeply seated rib** lesions or marked **vertebral lesions** have given almost instant relief to the paralyzed tissues. All secretions should be well attended to. Warm salt baths every other day will be found a useful measure In many cases of apoplexy, and especially where there is hemiplegia, the cervical region presents marked lesions (chiefly lateral or anterior dislocation of the atlas), as well as a **posterior upper dorsal** area including lateral deviations. Careful manipulation of the spinal centers and nerves, corresponding to the paralyzed region, is often helpful. It is a good plan to relax the muscles all along the spinal column, with a view to keeping the organs in a healthy tone.

Operative treatment may be useful in cases to relieve clots in the meninges; but to attempt an operation for a deeper hemorrhage would be useless. Osteopathic treatment for several months, at least, will almost invariably gradually improve the paralyzed parts.

Occasionally, cases of **hemiplegia** are entirely relieved by osteopathic treatment. In these cases lesions are presented at the atlas and axis or in the upper dorsal region. It is doubtful if these are cases of cerebral hemorrhage, as they are invariably diagnosed by the physicians who had the cases prior to osteopathic treatment; although usually a few cerebral symptoms are presented. Probably, the lesions in the cord are primary and the effect upon the brain tissue is a secondary one, either due to the nerves directly, or to the blood-vessels, causing spasticity of the vessel walls. When the lesion in the brain is very severe, little hope can be given the patient. The treatment, in such instances, would be to improve the quality of the blood and to relieve any nervous obstructions to the brain, with a view to absorping the clot. Probably, an important predisposing cause of apoplexy

is a lesion in the cervical region, which would influence, more or less, the blood pressure in the brain, as well as nutrient nerves to the blood-vessels.

Something can usually be done to **prevent apoplexy.** Many of these cases present a thick, short neck with muscular contractions, a slight stoop and posterior upper dorsal. Treatment of the heart and kidneys, with attention to the diet and digestive system, will be of some aid, at least in preventing an attack. The spinal column, especially the cervical and dorsal regions, should be carefully examined and treated. In these cases arterio-sclerosis is usually a complication and it is well to keep this in mind when giving treatment, especially in the cervical region. The patient should lead as quiet a life as possible and everything be done to build up the general health. G. L. Gates[1] reports a case of hemiplegia, following convulsions after confinement, as cured, and G. Degan[1] and A. S. Craig[1] each a successful case of crossed hemiplegia.

Embolism and Thrombosis of the Cerebral Vessels. (Cerebral Softening).

An **embolus** is, in the majority of cases, a vegetation from a diseased valve of the left ventricle. Less frequently it is from the auricular tissues or an aneurism, or it may be calcareous particles from an atheromatous vessel. It is most frequently due to heart disease, while pregnancy, with or without heart disease, and the infectious fevers are predisposing causes. Embolism is most frequent in women and in young adults. The embolus enters the left carotid oftener than the right, which is the most direct course, and passes to the left middle cerebral artery. The posterior cerebral and vertebral arteries are more rarely affected. The basilar artery may be obstructed.

A **Thrombus** is a clot formed in one of the vessels. This may be primary at the point involved, or secondary about a previous embolism. Arterial degeneration, traumatism, and a weak heart are predisposing causes. It occasionally follows ligation of a carotid artery. Thrombi are usually found in the middle cerebral

1. A. O. A. Case Reports, Series I and V.

and basilar, but the vertebral arteries and the posterior cerebral may be plugged.

Pathologically, the parts supplied by the vessels which are obstructed degenerate and become soft. Sometimes the surrounding tissue presents the appearance of an infarction, and is infiltrated with blood. At other times the area is only a little paler than normal and slightly softer. As the process of softening advances, the tissue is gradually infiltrated with serum and there is degeneration of the nervous elements. Suppuration may result if an embolus has been detached from an infectious focus.

Symptoms.—In **embolism** the onset is sudden, without premonitory symptoms. There is usually a history of heart trouble. If the left middle cerebral is blocked, aphasia is associated with the hemiplegia. This is quite a characteristic symptom. A great deal depends upon the artery affected and upon the size of the clot. In **thrombosis** the onset is usually gradual and there are often premonitory symptoms, such as headache, vertigo, disturbed sleep, tingling in the fingers, and failure of memory; while the paralysis may begin in one hand or foot and extend slowly and hemiplegia may be partial. Symptoms and location and extent of paralysis vary according to the arteries blocked.

Diagnosis.—It is often difficult to differentiate embolism, thrombosis and hemorrhage. In **hemorrhage** there is previous arterial degeneration, sudden onset, high blood pressure follows excitement or effort and there is early rigidity. In **embolism** and **thrombosis** there are syphilitic or alcoholic history, gradual onset (not in embolism), weak heart and usually transitory coma. Thrombosis generally occurs late in life. In embolism there is often history of valvular disease. Embolism is more favorable than thrombosis and hemorrhage.

Treatment.—The patient should rest in bed with the head elevated and attention paid to the heart, bowels and kidneys. Usually the heart is feeble, and a stimulating treatment should be applied. Keeping the bowels and the kidneys active renders the circulation more active, besides the urine is scanty and high colored. Stimulation of the body in general is demanded, and

close care of the patient is necessary. The nutrition of the patient is maintained as in cerebral hemorrhage.

Treatment of the cervical region, to cause reflex contraction of the arteries, will increase the cerebral circulation and lessen the tendency of the blood to clot. On the other hand, in hemorrhage, the blood pressure should be lowered to favor coagulation.

In the after treatment of the body and limbs, care should be taken about too strong stimulation of the sensory nerves, as they have an influence on the brain, and might cause another attack.

Aphasia.

Aphasia is a defect in speech, as a result of diseases of the brain. The speech impairment varies according to involvement of the cortical speech centers. Most of the defects are found in cases of hemiplegia, and as the patient improves the speech defects disappear. There is a close association between the speech centers so there is usually a **combined aphasia.** Mental discipline and capacity help very materially in correcting the impairment. **Auditory aphasia** is a word deafness. The patient's hearing is intact although he is unable to understand what is said to him. The lesion is located in the first and second temporal convolutions of the left hemisphere. In writing the patient frequently repeats and uses wrong words. In **motor aphasia** or aphemia the patient has no voluntary speech, neither can he repeat words when heard or read, but he understands them. This type of aphasia is the most common one. The lesion is in the third left frontal convolution and may be more extensive. In **visual aphasia** or word blindness, the patient is unable to read words understandingly, but is able to see them. Spoken words are understood and repeated. The lesion is in the angular gyrus and may be more extensive. **Agraphia** is usually a symptom of all the types, especially of motor asphasia. It has not been proven that there is a graphic center.

Inflammation of the Brain.

(Abscess of the Brain).

Encephalitis is an inflammation of the tissue of the brain.

In many cases the meninges are also inflamed. It is divided into two forms, **focal** and **diffuse.**

Etiology.—It may be traumatic, due to falls upon the head, or blows; more frequently, it follows fracture or punctured wounds. Meningitis is usually associated with an abscess. Extension from some inflammatory focus, as caries of the temporal bone, due to disease of the middle ear or labyrinth, is an important cause. It may be secondary to some distant focus of suppuration, as in malignant endocarditis, hepatic abscess, chronic bronchitis with bronchiectasis, bone disease, and occasionally gangrene of the lung. It may also follow one of the infectious fevers.

Pathologically, the abscesses vary considerably in size. They may be solitary or multiple. In very acute, cases, the abscess is not limited; when of long duration, it is inclosed in a capsule. The surrounding tissues are edematous and more or less infiltrated. The cerebrum is most frequently involved, and the temporo-sphenoidal lobe more than any other part. In ear disease, the cerebellum is most often affected. In the diffuse form, the front part of the cerebrum is usually involved. The vessels are distended and the brain tissue is softened.

Symptoms.—Abscesses from injury may run an **acute course,** and fever, headache, delirium, vomiting, rigors, convulsions and coma may be present, being the symptoms of acute infection. In more **chronic** cases, the general symptoms are severe headache, vomiting, fever, twitching ,drowsiness, vertigo and mental impairment. **Focal symptoms** vary according to the region involved. In the "silent regions," when the abscess becomes encapsulated, no symptoms may be present. An abscess may be "latent" for from a week to two months or a year or more, in almost any region. When in the parieto-occipital region, there may be hemianopsia; in the cerebellum, vomiting and loss of coordination occur; in or near the motor area, there may be convulsions or paralysis; in the temporo-sphenoidal lobe, deafness and aphasia. In abscess of the temporo-sphenoidal lobe and parieto-occipital region, there may be no focal phenomena. In the **diffuse form** positive symptoms may be lacking.

Diagnosis.—In **acute** cases there is rarely any difficulty. In **chronic** cases difficulty may arise. **Tumor** of the **brain** may produce identical symptoms, but is slower in development and a choked disc is common. In abscess, however, the presence of fever is a distinctive symptom. **Prognosis** is grave.

Treatment.—The only treatment that would be successful, when abscesses have formed, is surgical measures. For the operation in brain abscesses, see surgical works. Preventive measures, such as proper treatment of ear diseases, are of great importance as abscesses may follow such a disease.

In **inflammation** of the brain, without abscess formation, the principal treatment would be a cervical one to equalize the vascular supply of the brain, and to correct lesions, as deeply contracted muscles and vertebral lesions, to the veins from the brain. **Lesions** may occur in the upper dorsal vertebræ, upper ribs and clavicle and influence the blood supply to the brain. Rest and an ice-cap are of importance.

Hydrocephalus.

This is a condition in which there is an excessive accumulation of fluid in the ventricles (internal hydrocephalus) or arachnoid cavity (external hydrocephalus). The cases may be divided into congenital and acquired.

Congenital Hydrocephalus.—This is present before birth and the head may obstruct labor. More commonly it is not noticed until some time after birth. It is probably due, in some cases, to inflammation of the ependyma of the ventricles. The head is large and round and the eyeballs protrude. The frontal suture is widened and numerous Wormian bones develop. The bones of the cranium are thin and the veins are marked beneath the skin. The lateral ventricles, as well as the third, are greatly enlarged, while the aqueduct of sylvius, and sometimes the fourth ventricle, may be dilated. They contain a variable quantity of fluid which may reach four or five liters. The ependyma is sometimes smooth, but more often it is thickened. The cerebral cortex is thinned, the convolutions of the brain are flattened and the sulci more or less obliterated.

Symptoms.—There is slowness in mental and physical development. Reflexes are exaggerated. The child is feeble and learns to walk late. Usually these cases do not live more than four or five years; the disease, however, may be arrested.

Acquired Hydrocephalus.—There is usually a tumor compressing the veins of Galen. Tuberculosis may be a cause, as are other inflammations affecting the ependyma. The ventricles are dilated the convolutions flattened, the brain tissue softened and there is a moderate amount of fluid.

Symptoms.—The symptoms of hydrocephalus in the adult are never distinctive. In some cases there are headache and gradual blindness, while signs of imbecility appear sooner or later, even though at first the child is able to pursue his studies and seems bright. There may be convulsive attacks, the gait becomes ataxic, while paresis may occur. The symptoms may be those of brain tumor, without focal symptoms.

Diagnosis.—This is not difficult. It must not be mistaken for **rachitis. Prognosis** is not favorable.

Treatment.—The treatment of hydrocephalus is not satisfactory. The cases treated have presented lesions in the middle cervical vertebræ. Probably lesions in this region have some effect in exciting the disease. In one instance the enlargement of the head was considerably relieved by correcting the cervical vertebræ.

The primary treatment is, of course, to correct the disease causing the hydrocephalus. Pressure upon the head by means of adhesive plaster has been used. Keeping the bowels and kidneys active has some influence in lessening the fluid. The lumbar puncture recommended by Quincke may be employed when pressure symptoms are marked. The puncture should be between the third and fourth lumbar vertebræ, into the arachnoid sac. By puncture at this point there is no danger of injuring the cord, besides the fluid is removed slower and there is less danger of collapse. There have been some favorable results in puncturing the ventricles and removing the fluid.

Multiple Sclerosis.

(Insular Sclerosis).

Definition.—A chronic disease of the brain and cord, characterized by numerous sclerotic patches throughout the nerve elements.

Etiology.—The cause is not definitely known, but probably derangements of the tissues, affecting the blood-vessels to degenerated areas, are the common cause. Thus osteopathic lesions, corresponding to the involved area, are found. The **lesions** are deeply seated **osseous** ones. It is claimed that the infectious diseases, especially scarlet fever, are important causes. Cold, wet, exposure, traumatism, syphilis and mental emotion are supposed causes. In some cases heredity has been a causal factor. The disease occurs most frequently in young persons.

Pathologically, the localized areas of sclerosis are widely distributed in the brain and cord. Very seldom is the brain or cord alone affected. The sclerosis is found, principally, in the pons, cerebellum, basal ganglia, medulla, and in the walls of the lateral ventricle. The cord is involved at different points in various regions. The sclerosed patches appear, upon section, as grayish red areas and are firm. Histologically, they consist of connective tissue, in which are a few normal fibres. The axis cylinder remains intact for quite a long time after the medulla of the nerve has been destroyed. There is a thickening of the walls of the vessels.

Symptoms.—The disease is always a chronic one. Loss of power in one, and then the other, lower extremity is the first symptom. Finally the disease extends to the upper extremities. Tremors, increased reflexes, scanning speech and nystagmus occur. There may be atrophy of the optic nerve. Numbness, tingling and vertigo are also among the general symptoms. Mental debility, coma, and epileptiform or apoplectiform attacks may be found in severe cases. The course of the disease may extend over a period from five to fifteen years. Death commonly results from some intercurrent disease.

Diagnosis.—The diagnosis, as a rule, is not difficult. Three

characteristic symptoms are, **volitional tremor, scanning speech** and **nystagmus.** The diagnosis may be confounded with paralysis agitans, locomotor ataxia and hereditary ataxia. **Prognosis** is not favorable, except in the very early stages.

Treatment.—The treatment should be a most thorough and persistent one, of the entire spinal column, especially the cervical spine, to correct any derangements found, to relax muscles and to stimulate the spine as a whole. Rest and food that is easily assimilated, are of value. Tepid bathing is a helpful measure. In a few cases osteopathic treatment has improved the condition.

Cerebral Palsies of Children.

Infantile hemiplegia, diplegia and spastic cerebral paraplegia (Little's disease) include the palsies of childhood. "In these palsies, as in the same troubles of adult life, the loss of motor power is always accompanied by a rigidity and by some contractures and exaggeration of reflexes, in this respect distinguishing these paralyses from those of spinal origin." (Dana).

It appears that injury to the fetus is an important cause, as are premature birth and difficult delivery. Many cases present a history of instrumental delivery. **Hemorrhage** of the **meninges** is given as the principal lesion. This is in the motor cortex and involves the motor tract down to the anterior horns of the cord, although other areas may be disturbed as well, e. g., the central ganglia. There may be considerable brain inflammation and sclerosis of nerve tissues follows. In some cases there is lack of brain development.

Other causes are injuries, infectious diseases, embolism, syphilis, and hemorrhages occurring after birth.

Many of these cases, especially those with a history of difficult delivery, present distinct **osteopathic lesions** in the upper and middle cervical vertebræ. The atlas and axis are the most frequent points of involvement. In a few, lesions to the upper dorsal are found.

In **hemiplegia** there may be slow or rapid development. There are convulsions, fever, hemiplegia (usually the right side), increased reflexes and spasticity, with a history similar to adult hemiplegia.

The child is not bright, speech is defective, tremors, athetosis and frequently epilepsy develop if the condition does not clear up early.

In **diplegia** or birth palsy, the affection is usually congenital and there is double hemiplegia or diplegia. Injury at birth or before is the usual cause. Convulsions may follow birth or defect in the arms or legs may not be noticed before several months have elapsed. There is mental dullness and epilepsy frequently follows. The reflexes are exaggerated, incoordination is common and in severe cases athetosis.

In **congenital spastic paraplegia** (Little's disease), the involvement is usually to the lower limbs. The reflexes are increased, the muscles are rigid and contracted and the legs may be crossed, due to spasms of the flexors and adductors. It is claimed by von Gehuchten that this disease occurs frequently in children prematurely born, and that the pyramidal tracts do not functionate properly, owing to their being non-medullated. Mentality is good and epilepsy does not occur. George Laughlin believes an anterior condition of the **atlas** and **axis** is a **common lesion.** E. C. Link[1] cites a case where there was "a greatly exaggerated anterior curve of the cervical region, atlas and axis anterior, and a general posterior condition of the dorsal and lumbar regions, also a lateral swerve of the spine between the second and sixth dorsal." He says the treatment was especially directed to the cervical region, "for we believe this lesion to be the **cause** of the **non-development** of the **pyramidal tracts** of the spinal cord."

Oppenheim asks if congenital spastic paraplegia may not be of purely spinal origin, and says there is some evidence to that effect. This would place considerable importance upon spinal lesions as etiologic factors.

The **prognosis** of cerebral palsies of children, according to Oppenheim, is, on the whole, unfavorable, although a number of cases practically recover. "Contracture, athetosis and chorea, when once completely developed, rarely recede entirely." If epilepsy does not develop in two or three years, it probably will not. "The **prognosis** of **Little's disease** is relatively favorable." In those

1. Journal of Osteopathy, May, 1904, p. 204.

cases due to injuries at birth, or after, where spinal lesions are a factor and brain changes are are not severe, osteopathy certainly offers a more favorable prognosis than any other treatment. Do not expect to do much in cases where brain changes are marked or where there is non-development.

Treatment of cerebral palsies depends upon the cause. The correction of osteopathic lesions is always indicated. During **convulsions,** the hot bath and rectal injections are beneficial. Manipulation and massage of contracted muscles is helpful and any general treatment that builds up the system and promotes nervous integrity is indicated. Mental training may gradually overcome some of the mental defects. Surgical measures have rarely been successful. Harroder[1] reports a case of cerebral palsy practically cured.

General Paresis.

Paresis is a disease of the cerebral cortex, of a progressive character, in which there is degeneration followed by motor, sensory and mental disturbance, usually ending in paralysis and death. The term has been much misused, as any condition of general mental or nervous breakdown is frequently classed as paresis.

Etiology.—Men are much more frequently affected, doubtless because of a combination of mental strain and irregular habits, for alcohol and sexual excesses are the most frequent causes. Syphilis is also often a factor, and with paresis in the young it is almost always the cause, being hereditary in these cases. As exciting causes, injuries, exposure and infections have some bearing.

Pathologically, vaso-motor disturbance brings about congestion of the pia and cortical capillaries, changes in the vessel walls, stasis and exudation of serum in the lymph spaces. This is followed by a production of connective tissue and a rapid degeneration of nerve cells in the medulla as well as the cortex. The brain atrophies, especially the left side. In a small proportion of cases, there is sclerosis of the posterior and lateral columns of the cord.

1. A. O. A. Case Reports, Series V.

The **symptoms** may be divided into two stages. The **first,** with gradual onset, symptomatic of neurasthenia, with increasing excitement and irritability. There are mental perversion, fretfulness, lapses of memory, and fatigue is pronounced, alternating with periods of mental exaltation. This leads to most extravagant actions on the patient's part. Motor symptoms are marked at these times. As muscular weakness increases, the bladder and sexual functions are involved, while insomnia may be an unpleasant feature.

There is likely to be a period of calm, the **second stage,** which has the appearance of improvement, but really is the beginning of dementia. There is loss of memory, inclination to sleep and general lack of interest and loss of voluntary control. An impairment of motor power and rapid increase of various mental perversions continue until there may be hemiplegia, often permanent, followed by complications ending in delirium. The patient now takes to his bed from general weakness and paralysis, waiting the end, which may come within a year or be delayed for many years.

Diagnosis must determine between this disease and **neurasthenia,** which is much like it at the onset. Absence of mental and motor impairment, and exaggerated knee reflex will be sufficient to differentiate. In **multiple sclerosis**, nystagmus and marked intention tremor are absent. The withdrawal of alcohol will be sufficient to distinguish **chronic alcoholism. Prognosis** is bad. If the symptoms are particularly marked, the patient should be turned over to an asylum.

Treatment is palliative and is of little avail, unless at its incipiency. When not of syphilitic origin, owing to the vascular changes in the brain, osteopathic treatment can do much to retard the progress of degeneration. The patient must immediately be removed from all exciting causes and his habits carefully regulated. All constitutional disorders should be observed and particular attention given to the cervicals and to vaso-motor control of the brain.

GENERAL AND FUNCTIONAL DISEASES.

Paralysis Agitans.

(Shaking Palsy.)

Definition.—A chronic, nervous disease, characterized by tremors, muscular weakness, muscular rigidity and alterations in the gait.

Etiology.—The disease usually commences after forty years of age, but occasionally it occurs from the thirtieth to fortieth years. It is more frequent in males than in females. Heredity seems to have but little influence in the cause of the disease. Among the principal causes are physical injuries, exposure to cold and wet, emotion, business worry, alcoholism, sexual excesses and acute diseases. Physical injury, in conjunction with exposure to cold, is the best determined cause. Disorder of the vertebræ of the cervical or dorsal regions, or of the upper and middle ribs, can generally be found. Traumatic influences probably affect the nerve centers, causing a disturbed innervation, either by the direct effect of the deranged structures upon the nervous tissues or obstructing nutritive channels to the nervous tissues.

In most cases no changes have been observed in the central nervous system or in the sympathetic ganglia. Some observers have noted induration of the pons, medulla and cord, but these changes may be due to senility or to the indirect consequences of the long disturbance of function. In a few cases, interstitial sclerosis of the peripheral nerves is observed; these are probably secondary changes. Osteopathic experience regards paralysis agitans as an affection of the central nervous system, due to a disordered structure in the locality affected.

Symptoms.—The onset is usually gradual, but may come on quite suddenly after exertion. The **initial** symptoms are usually tremor, stiffness or weakness in one hand. In rare cases, at first there may be neuralgic pains, dizziness and symptoms of a rheumatoid nature. The tremor can be controlled by the will at the onset of the disease. The affection gradually extends until an entire side or the upper or lower limbs are involved. At this

advanced stage of the disease, a peculiar muscular rigidity of the involved region takes place. Muscular weakness comes on at about the same time as the rigidity, and the loss of power varies much in degree. The condition is most marked in the fingers and hands, whence it extends to the arms and legs. It commonly passes from the right arm to the right leg, then to the left arm, and then to the left leg. At this stage the movement between the thumb and fingers is like that of crumbling bread. The writing is greatly affected and in time it is impossible to write. The trembling may be so violent as to prevent sleeping. There is occasionally an intermission of days in the tremor.

On account of the rigidity of the muscles, the patient assumes a characteristic **attitude** and **gait.** The position of the body is that of a tendency to go forward, the head is bent forward, the back curved outward, the arm bent at the elbow and held away from the body, and the knees so close together that they rub in walking. The gait is a "propulsive" one, and when once started in a forward walk, the patient's gait becomes more and more rapid and he cannot stop until he comes against some object. The expression of the face is stiff and mask-like, the speech slow and monotonous and the voice shrill. The patient is generally restless and troubled with insomnia. The general health is in fairly good condition. Reflexes are usually normal. The intellect is generally retained, although the physical ailment may cause mental depression.

Diagnosis.—Is usually easy and can oftentimes be made at a glance. **Disseminated sclerosis** has a tremor, but is shown particularly in voluntary movements. The speech is scanning and the gait ataxic. The disease begins in the lower extremities, the attitude is different from that of paralysis agitans, and there is nystagmus. In **chorea** the movements are general, irregular and more intermittent, and it particularly involves muscles of the face. Also chorea is a disease of children and young adults.

Prognosis.—The disease does not necessarily shorten life; the patient oftentimes dies with some intercurrent disease. Improvement usually result from careful, prolonged treatment.

Early treatment, of course, will give the most satisfactory results, and occasionally, if taken very early, the case can be cured.

Treatment.—A most careful examination of the physical structures of the patient should be made, particular attention being paid to the **cervical** and **dorsal vertebræ,** the upper and middle **ribs** and the **muscles** along the spinal column. All irregularities found should be corrected if possible, and strong, thorough treatment given to the region of innervation of the affected parts. Treatment of the arms and legs will also be of aid. All mental strain and physical exhaustion should be prevented if possible. General **hygienic measures** are to be employed. The life of the patient should be quiet and regular. Bathing, fresh air, massage and out-door life will aid in improving the general health. **Persistent** treatment will retard the progress and frequently improve the general condition. Simple and hysterical tremor must not be confounded with that of paralysis agitans. E. Ashmore[1] reports an interesting case which shows about what may be expected under treatment.

Acute Chorea.

(St. Vitus Dance)

Definition.—A functional disorder of the nervous system, chiefly affecting children, more than twice as frequent in females as males; characterized by irregular, involuntary muscular contractions, usually slight psychical disturbance, and there is liability to endocarditis.

Osteopathic Etiology.—The disease affects children of all stations, but is more common among the lower classes. The greater number of cases occur before the age of twenty. It sometimes develops during the early months of pregnancy, when it often assumes the maniacal type. Chorea is frequently associated with endocarditis and rheumatism and delayed menstruation. Fright, mental worry, sudden grief and overstudy may bring on an attack. Children of neurotic stock are more susceptible. Heredity plays some part as a predisposing cause. Reflex irritation from worms or from genital irritation has a slight influence

1. A. O. A. Case Reports, Series IV.

upon the disease. Overwork in school is an important factor. **Derangement** of the **anatomical structures,** involving the nervous system along the spinal column, is the most common cause. Most of the anatomical displacements are found in the cervical vertebræ, although the upper dorsal may be involved.

Pathologically, as yet, no constant anatomical lesions have been found. Emboli occur in some cases, but this might be expected, as endocarditis so frequently occurs as an effect and not the cause of chorea. "In cases not rheumatic, the most probable explanation of the symptoms is to be found in vascular changes, having their origin in disturbed nutrition." (Holt) According to osteopathic theories and investigations, the disease is due to various irritations to the spinal centers and nerves of the affected region. The disordered nerve cells may be the result of direct pressure, hyperemia, anemia, etc., and the action upon the brain centers is possibly a reflex act. Of late acute chorea is regarded by some as an infectious disease.

Symptoms.—In the majority of cases the affection of the muscles is slight, the speech is hardly involved and the general health but slightly impaired. Marked restlessness, disturbed rest at night, crying spells, pain in the limbs, headache and irritability, are some of the premonitory symptoms. In **mild cases** one hand, or the hand and face, are involved. The irregular, jerky movements are characteristic of this disease. In **severe cases** the movements are general, the power of speech is lost, and the patient is unable to get about. The condition usually occurs after one or more mild attacks, although it may occur primarily. During an attack of chorea, the child's disposition changes, he becomes irritable, cannot concentrate his mind, memory is affected and hallucinations may occur. The reflexes do not differ from the normal. **Maniacal chorea** is most serious, and often proves fatal, although recovery may occur. This form occurs most frequently in pregnant women. Speech is greatly affected and insomnia, fever and maniacal delirium develop. The **duration** is from six to ten weeks, in the average case. Mild cases may recover in a month or less, others last six or more months. There

is a tendency of chorea to recur; rheumatism seems to favor this tendency. In children recovery is the rule.

Diagnosis.—In the majority of cases chorea is easily diagnosed. The symptoms are generally very characteristic. In **hereditary ataxia** the slow, irregular movements, the scolioses, scanning speech, talipes and the existence of other cases in the family, will differentiate this from chorea. **Cerebral sclerosis** usually occurs in infancy, impaired mentality, exaggerated reflexes, rigidity and chronic course of the disease, are points which render the diagnosis easy.

Treatment.—Nearly all cases can be cured.[1] The causes of chorea, osteopathically, are usually found to be subluxations of the vertebræ or ribs at any point, but particularly in the cervical vertebræ. Chorea is one of the diseases of the nervous system, in which constant morbid changes are not always found upon the post-mortem examination. Possibly the reason is because the lesions causing the diseased state are not deeply seated enough to primarily affect motor centers; but are lesions of the spinal column and ribs, affecting simply the nerve fibres, as they pass through the intervertebral foramina. That such is the case in many of the "but little understood" diseases of the nervous system is very reasonable. The osteopath certainly finds well marked lesions, and upon their correction a cure results. What better proof could be given that such lesions are the real cause of the disease?

The muscle, or group of muscles involved, will give the osteopath a **direct clue** as to where the lesion will probably be found. In nearly all cases, it is in the spinal region of innervation to the affected muscles. Other cases may be due to cerebral lesions, as well as to intestinal and uterine disturbances. Careful search should be made for **reflex** irritation, such as intestinal parasites, adherent prepuce, eye strain, etc.

All cases should be taken from school, carefully guarded from excitement, and placed under the most favorable **hygienic** conditions, with a certain amount of discipline as to self control. The

1. See A. O. A. Case Reports, Series II., III., IV., V.

more serious cases should be placed in bed, so that rest will be secured as well as diminished liability to heart complications.

The **diet** must be carefully watched and the bowels attended to regularly. Mild gymnastics, in most cases, will be found of service. Amusement should be given the child, in the open air if possible. In severe cases where the skin is harsh and dry, the hot air bath, providing the strength is good, will give considerable relief from the intensity of the disease. A few cases of acute chorea run into a **chronic form,** but the latter, as a rule, yield to osteopathic treatment.

Huntington's Chorea.

Chorea, in its chronic form, is a hereditary disease and is progressive, characterized by choreic movements and a tendency to mental involvement.

Etiologically, it seldom appears before the thirtieth year and has often been observed in four or five generations and is associated with idiocy, epilepsy and other degenerative conditions.

Pathology.—The changes observed are those of dementia. Various diseased conditions of the brain and its coverings have been observed.

Symptoms.—Mental debility usually is first observed, impairment of speech, involuntary contraction of facial muscles also those of the hands, and other exaggerated muscular action, while the gait is erratic. The patient is irritable and often shows maniacal violence. The course of the disease is slow and may continue for years.

Diagnosis can easily be made by obtaining family history.

Treatment must be to relieve conditions and not much can be expected.

Choreiform Affections.

Myoclonia is a sudden contraction of a few muscle fibres, a single muscle or of a group of muscles. Occasionally epilepsy may be associated with it. The **etiology** and **pathology** are not known, but osteopathically there can be but little doubt that the innervation to the muscles involved is interfered with.

Symptoms.—The lower extremities are usually first affected and it may be sudden or gradual in appearance. It is progressive and slowly involves the arms and, rarely, the face. Usually the spasms cease during sleep.

Prognosis is rather favorable. Examination should show the cause of the nerve interference and its correction bring relief.

Dubini's disease is probably associated with certain diseases of the cord and brain and is characterized by sudden, sharp pains in the head, neck and lumbar muscles, extending to the lower extremities in the form of a short, sharp spasm, usually at regular intervals. Later there may be symptoms of hemiplegia. The disease is apt to progress and death may occur during a convulsion. There is no record of a case being treated osteopathically.

Habit spasm usually results from overstudy and nerve exhaustion with impairment of general health, and is incident to early life. The symptoms are twitching of the mouth and eyelids, grimaces and jerking of the shoulders. **Treatment** for the general condition, with correction of any spinal lesions, will generally give relief.

General tic resembles habit spasm closely, but is supposed to be psychic in character. There are coordinate spasmodic movements of the head, face and upper trunk, swallowing and abnormal vocal sounds. The movements are rapid and frequently repeated. **Prognosis** is uncertain and will depend largely on general conditions.

Infantile Convulsions.

(Eclampsia)

Infantile convulsions may be due to many causes. They may precede the development of many diseases of the nervous system, and also occur as the result of peripheral irritation. Dentition in association with rickets, and intestinal parasites are common causes. They may be the early symptoms of acute, infectious diseases. Scarlet fever, measles, pneumonia and smallpox are very frequently preceded by convulsions. They may be due to debility, resulting from gastro-intestinal disorders. Malnutrition is a predisposing cause. Disease of the bones, especi-

ally rickets, may be associated with covulsions. Lesions of the brain are other causes.

Symptoms.—In severe cases the fit may be identical with epilepsy. It is more often not so complete as true epilepsy. It may come on suddenly, without warning, or be preceded by restlessness, twitching, sometimes grinding of the teeth and fever. The attack may be single, but the fits may follow each other with great rapidity and terminate fatally. It is rare for the child to die during a convulsion. As in epilepsy the temperature often rises during the fit. A transient paresis sometimes follows, if the convulsions have been chiefly limited to one side.

Diagnosis.—The diagnosis is generally easy. The attack is usually due to the ingestion of some indigestible food or to some peripheral irritation, or an acute disease. Convulsions, appearing immediately after birth or injury, are probably due to meningeal hemorrhages or serious injuries to the cortex; although a few of these cases will present grave lesions of the cervical vertebræ. Infantile convulsions usually occur between the fifth and twentieth months. Convulsions occurring after the second year are more likely to be true epilepsy. The **prognosis** depends almost wholly upon the cause, severity and duration.

Treatment.—The **first step** in the treatment is to determine the cause if possible. Treatment in the region of the sixth and seventh dorsals will often give relief; thorough work along the lumbar region and the sacrum will many times be sufficient, if the convulsion is due to intestinal disorder. C. M. Proctor reports that in male infants he has relieved convulsions quicky, in several cases, by pushing back the foreskin and has always found, in such cases, either a phimosis or an adherent prepuce. In female infants it might be well to examine the clitoris. It may be necessary to vomit the patient, when it is due to undigested food in the stomach; and in some cases an enema should be used, when the irritation is in the intestines. In a few cases, when the convulsions are due to dentition, a lancet applied to the gums will be all that is required. A thorough treatment to the cervical region, to control the circulation, should always be given; at the same time apply ice to the head. The patient should be put in a bath of

95 to 98 degrees F., should the preceding treatment not have the desired effect, or, better still, use the bath at once and treat at the same time.

Epilepsy.

Definition.—A chronic affection of the nervous system, characterized by attacks of unconsciousness, which are usually accompanied by general convulsions. When there is merely a momentary loss of consciousness it is called **petit mal.** Loss of consciousness with convulsions is called **grand mal.** When the convulsion is localized, with or without loss of consciousness, it is called **Jacksonian epilepsy.**

Etiology.—Epilepsy usually begins before puberty, and very rarely after the twenty-fifth year. Males suffer somewhat more frequently than females. Heredity predisposes to the disease to some extent, but probably not so greatly as many writers would claim. Neuroses, as insanity and hysteria, and intermarriage of relatives, are important elements to consider. When epilepsy is inherited, it is almost always due to some morbid state of the nervous sysem. Other predispositions to the disease may be caused from defective general development of the brain, from impairment of the general health, and from an exhausted nervous system.

Many **exciting causes** may be found: mental emotion, fright, excitement and anxiety; blows and injuries to the head; infectious diseases; syphilis; alcoholism; masturbation; ocular and aural irritation; disturbed and delayed menstruation. Epilepsy may be excited by reflex convulsions from intestinal worms, gastric irritation, etc. Also thickening of the membranes of the brain, pressure from a tumor at the periphery, uterine diseases and many other sources of irritation may be found, that are the exciting causes of epilepsy.

The true exciting causes of epilepsy are, undoubtedly in many cases, due to **lesions** of the **vertebræ** and **ribs** espeially the vertebræ of the cervical region, although in some cases the lesion is in the lower splanchnic region or in the ribs (chiefly from the fourth to the eighth). These lesions to the spinal tissues disturb the nutri-

tion to the vaso-motor nerves. If the real seat of the disease is in the cerebro-cortex and the medulla, the cervical lesion, and in fact other lesions, could readily affect the nerve force to and from these regions; or the vertebral artery circulation, where a cervical lesion exists, may be involved and affect the brain. In cases where lesions of the vertebræ and ribs exist in the upper and middle dorsal region, the vaso-motor innervation to the brain may be involved, for in this region the vaso-motor nerves to the cranium, etc., pass from the cord into the sympathetics.

To illustrate a specific lesion, the following is interesting. The case was one of epilepsy that was evidently caused by a dislocated right fifth rib. By producing an irritation in the region of this rib, so that the lesion was increased, the patient could be made to immediately suffer from an attack of epilepsy. By resetting the rib, at once the sufferer would be entirely relieved. The case was cured after three months' treatment, the chief work being to keep the rib in place. Rarely a subdislocated innominate bone, or some lesion remote from the brain, is located and found to be causing epilepsy. A large majority, however, of all lesions causing this disease will be readily located in the cervical region. Booth reports: "I have records of seven fairly defined cases of epilepsy—such as have been so pronounced by M. D.'s. I find in all of them **marked lesions** in the **upper cervical** and in most of the cases the occiput is posterior upon the atlas or twisted. In all cases there was a thickening of the soft tissues, especially in the upper cervical. The lower cervical was also much involved but not so noticeably. All of the cases also presented marked disturbances in the upper dorsal; most were decidedly anterior, and one very posterior. One was almost a confirmed drunkard; notwithstanding the fact, he recovered to such an extent that he went to work, and I understand has been holding his position for more than three years. He had had to give up his work entirely. One was a hopeless case in every particular and did not seem to receive any benefit from the treatment. I think it was entirely beyond help from any source. The others responded very well and the results were definite and decided. The length of treatment in successful cases ranges from about five weeks to a little

over a year. But those that were treated the greater length of time were not treated continuously."

After one convulsion has occurred, others readily occur, owing to the proneness to changes in the nerve centers. Very little is known as to the pathology of this disease. Convulsions may be caused from irritation of both the cortex cerebri and the medulla oblongata. From a study of the character of the auræ, one is led to believe, that there is a disturbance, in most cases, in the centers of the cerebral cortex; and that the lesions so generally found along the spinal column are the true exciting causes of the disease. Perhaps in a few cases the irritation may be to the medulla reflexly. The lesions found on osteopathic examination may act reflexly, as has been stated, upon the centers in the brain and excite them; or the circulation is deranged, and consequently the nutrition to the brain and meninges, by vaso-motor control and the vertebral vessels, is impaired.

As a rule, **pathological** lesions are not found. To the naked eye the appearance of the nerve centers is largely that of healthy organs. The changes revealed by the microscope are most probably those of secondary origin. Recent experiments seem to show that the motor zone of the cortex is affected.

Symptoms.—These will be considered under the three varieties, known as grand mal, petit mal and Jacksonian. **Grand Mal.**—In most cases the seizure is preceded by a pronounced sensation known as the **aura.** This differs greatly in various individuals. It may begin in a finger or toe and rise until it involves the head, when the patient screams and falls to the floor unconscious. In other cases the sensation may start from other parts of the body, as the epigastric region, where it may simply be a slight discomfort; or other sensations may be felt, as that of a ball rising from the stomach. The aura may start from any part of the body as a numbness, tingling, chilliness, etc., and may, also, be manifested through the optic, olfactory, auditory and gustatory nerves, by flashes, smells, sounds and tastes. "Intellectual auræ" may also be manifested. Some form of auræ is met with in nearly one-half the cases of epilepsy. Others lose consciousness so early that the patient is not aware of the onset.

In cases not attacked suddenly and not preceded by an aura, a prolonged prodrome may be present for several hours or a day. The patient may feel irritable, dizzy or dispirited. Or he may be quiet and calmly await the attack. In a few cases certain movements may precede an attack, as running rapidly forward in a circle, or standing on the toes and rotating rapidly. The attack proper is sudden. The patient falls with a peculiar cry. The **convulsion** or fit may be divided into **three stages,** that of **tonic** spasm, of **clonic** spasm and of **coma.**

The **tonic spasm** succeeds the epileptic cry; there are loss of consciousness, pallor of the face and the pupils are contracted. The body assumes a position of tetanic rigidity, the head is retracted and rotated, and the spine curved, owing to an unequal affection of the muscles of the two sides. The jaws are fixed, the arms are flexed at the elbow, the hands at the wrist, and the fingers are clinched. The legs and feet are extended. The muscles of the chest are involved and respiration is suspended. This stage lasts a few seconds. The **clonic spasm** follows the tonic spasm. The muscular contractions become intermittent. From slight vibratory motions, the intermittent muscular contraction becomes general. The arms and legs are thrown about violently, the muscles of the face are distorted, the eyes rolled, and the lips open and close. The muscles of the jaw contract violently and the tongue is apt to be bitten. The pupils are dilated, the face cyanosed and blood streaked, frothy saliva pours from the mouth. The feces and urine may be discharged involuntarily. The temperature rises about one degree F. This stage lasts about one or two minutes. The period of **coma** may last from a few minutes to several hours. Usually if left alone, the patient will awaken after a few hours. In a few cases mental confusion follows the waking. During the stage of coma, the face is congested but not cyanotic. The muscles are relaxed and the breathing is noisy.

Petit Mal.—In this variety of epilepsy, convulsions are absent. The seizure consists of momentary unconsciousness with fixed, staring eyes, dilated pupils and rarely any twitching of the muscles. After the attack the patient resumes his work. There may

be attacks of vertigo, without unconsciousness, and the patient may fall. In a few instances there may be auræ of various kinds. Petit mal may be a forè-runner of grand mal or the two may alternate.

Jacksonian Epilepsy.—The affection is always symptomatic of lesion in the motor area of the cortex. The lesion is quite apt to be a tumor, though various injuries, inflammation, sclerosis, softening, hemorrhage or an abscess may be the cause. Consciousness is retained and the convulsions are limited in extent. Tonic and clonic spasms of the same character as in general epilepsy occur. A slight numbness, tingling, or twitching may precede the attack.

The **severity** of epilepsy **varies** extremely. The seizure may occur but once a year or it may occur several times in a day. In many cases a marked periodicity is observed. The mental functions are not, as a rule, injured, but when the seizures are frequent, the health fails and the mental capacity is reduced. Many sufferers from epilepsy are subjects of chronic gastric catarrh, and have at the same time an inordinate appetite. Occasionally a fit may follow inordinate eating.

When there is a **series** of **convulsions,** which follow one another in rapid succession and which are associated with high fever, the term "status epilepticus" is applied. The most **common form** of epilepsy is the **major** form. About two-thirds of all attacks occur between eight a. m. and eight p. m. When attacks occur in the night the name **nocturnal epilepsy** is given.

Diagnosis.—Uremic convulsion closely resembles an epileptic convulsion. When the history of the case, analysis of the urine, increased temperature and the general health of the patient are all closely observed, error should be avoided. In **reflex convulsions** of **children,** a careful search, and if necessary waiting a short time, will readily determine the source of the attack. When **nocturnal convulsions** take place without the knowledge of the patient, the attack is epileptic. In **hysterical convulsions** the patient rarely loses consciousness. They rarely hurt themselves, never bite the tongue, the temperature is normal, opisthotonos does not occur, and the duration is usually longer. In **Jack-**

sonian epilepsy, the attack is limited to some portion of the body, or it may gradually extend into a general convulsion. In a large majority of cases, it is due to syphilis. Care should be taken to recognize petit mal.

Prognosis.[1]—Records show that many cases have been cured and a much larger number have been benefited.

Treatment.—Osteopathic treatment has been especially successful in epilepsy, as compared with other treatment. Although the osteopaths do not claim a cure in every case, by any means, still about four out of every ten have been cured, while one-half of the remaining have been greatly helped in regard to the lessening of the severity of the attack, and in rendering the attacks less frequent.

The **primary lesion** is usually found in the cervical region, from the third to the seventh vertebra, though it may be as high as the atlas. These lesions may affect the brain in various ways; probably in the manner described under the etiology. Ossasionally lesions are found in the dorsal vertebræ or in the ribs. When occurring below the cervical region, the lesions are generally found in the upper and middle dorsal regions. Lesions may be found at any point along the spinal column.

The treatment is according to the rule that applies to all osteopathic work: an individual correction of the lesions presented in the case at hand. If any general movement or treatment might be given, it would be strong traction of the head to stretch the cervical vertebræ, or rather to separate them, so that the circulation to the brain may be equalized.

If the lesions in such cases are in the cervical vertebræ, probably they affect the cervical sympathetics. A **careful search** for a source of excitation must be made throughout the entire body. An irritation of the intestinal tract may be the exciting cause; or some irritation of the genito-urinary tract may be found, as phimosis, masturbation, etc., so that it is very necessary that great care be taken in the examination. Subjects of masturbation usually present lesions along the genito-urinary center in the spine.

1. See A. O. A. Case Reports, Series I., III., V.

Proper **hygienic measures** should be added. Pay particular attention to the bowels. Baths are important, and plenty of fresh air, and out-door exercise are of much significance. The patient's mind should be occupied. The question of food is an important one; general diet—carefully regulated as to the amount given—should be prescribed. The patient must not be allowed to eat too much at a time, nor too often. If the bromides are being used, they should be withdrawn gradually.

In most cases of true epilepsy a continued treatment of several months is necessary. Unless the patient can follow out the treatment for several months, or even years, in a number of cases it will be entirely useless to take the treatment; although if the lesion present is very apparent, and the patient is enjoying fair health otherwise, and has not been affected long, a treatment for a few months, or even weeks, might be all that is necessary.

Surgical interference is often indicated in Jacksonian epilepsy. Trephining has been practiced successfully in a number of cases and the risk from operation with modern surgery is so reduced that one is frequently justified in advising an operation.

During an **attack,** a special treatment cannot be given to lessen the severity of the fit in all cases; in fact, most patients prefer not to have the seizure shortened as the after effects are more disagreeable. In some cases, at the beginning of the seizure, exerting a firm pressure upon the sub-occipital will quiet the patient. This treatment probably controls the circulation of the brain, by way of the superior cervical ganglion. In cases where the exciting factor seems to be in the intestines, and the peristaltic action of the bowels is reversed, causing a reversion of the nerve current of the vagi, a rapid, firm kneading over the abdomen, so as to establish normal peristalsis, will suffice to prevent an attack, if one is notified of its approach. In some cases a rapid, thorough stimulation of the solar plexus will lessen an attack. Possibly it reduces the blood pressure in the brain, by bringing blood to the splanchnic region.

In all cases during the convulsion the patient should be carefully protected from injuring himself. A towel should be twisted and placed in the mouth, so that the tongue cannot be bitten.

Do not place small articles as corks, etc., between the teeth, as they are liable to enter the pharynx and cause suffocation. The patient should be watched to protect him from any injury; otherwise the attack should be allowed to spend itself.

MIGRAINE.

(Sick Headache).

Migraine or sick headache is a neurosis, characterized by a paroxysmal pain in the head, usually unilateral and periodical, with nausea, frequently vomiting, and disorders of vision.

Osteopathic Etiology.—The disease usually begins in the first half of life, rarely earlier than puberty and is slightly more frequent in females. Some weakened or depressed condition of the nervous system, due to lesions of the upper cervical vertebræ, lesions of the inferior maxillary, anxiety, overfatigue, anemia, digestive derangements, eye-strain and menstrual disorders, is generally the cause.

It is supposed by some to be a **vaso-motor** disturbance, because there are symptoms, as pallor and flushing of the skin, which show an involvement of the sympathetic system. It is possible a spasm of cerebral arteries, followed by vascular dilatation, takes place. The seat of the pain is believed to be in the meninges of the brain. Possibly in many cases where the atlas is found involved and causing the affection, some meningeal fibre of the fifth nerve is impinged by the lesion. Caries of the teeth and nasal troubles are causes of the disease in children.

Symptoms.—A **paroxysmal** headache is the principal feature of migraine. The attack may occur without warning, although there are usually malaise, restlessness and a disturbed vision preceding the headache. The **prodromal** symptoms vary to a great extent. Other prodromal symptoms besides those given, may be vertigo, spots before the eyes, tinnitus, chilliness, etc. The pain is of a sharp and stabbing nature and is oftentimes limited to the temporal region of one side. Others describe the pain as of a binding or of a boring nature. It is continuous. It may be in the occiput instead of in the side of the head.

Hyperesthesia of the surface is noticed, but the tender points

of neuralgia of the fifth nerve are absent. The patient is sensitive to light and noise. Flashes of light occasionally attend the pain in the head. Hemianopia is not infrequent. The temporal artery may be contracted, the face pale and the pupil large. In others the eye is dilated, the face flushed and the pupil small. Nausea and vomiting are frequent with loss of appetite. In some cases where the stomach is full, vomiting the contents will relieve the attack. Should the stomach be empty, vomiting of mucus may occur, and is later followed by vomiting of bile. Tenderness is commonly found about the region of the occipital and upper cervical muscles. Attacks rarely occur oftener than once in ten or fifteen days. During the intervals the patient may be quite well. The **duration** is anywhere from a few hours to several days.

Diagnosis.—The sensory symptoms, the paroxysmal character, the severity and definite course, usually readily distinguish migraine. **Growths** of the **brain** may be the cause of symptoms closely simulating migraine. In such cases an ophthalmoscopic examination may reveal a choked disc.

Prognosis.—Is usually favorable when the attacks are light and of short duration. Cases of long standing and of great severity are not so easily cured, although in most instances great relief can be given the patient. There are very few cases in which the severity and frequency of attacks cannot at least be lessened. Oftentimes attacks of migraine cease after middle life.

Treatment.—The **atlas** or one of the **upper cervical** vertebræ is almost invariably subluxated. This is not always the direct cause of migraine, but it is an important factor in the causation. **During** the **attack** many cases can be completely, or at least partially relieved, by a careful treatment in the upper cervical region. But there are some cases where treatment of the cervical region is entirely unsuccessful, and, in fact, aggravates the attack. The details of treatment vary in every case. If any defects in general health or any error in the mode of living can be found, these of course must receive first attention. Rest, diet and regularity of meals are usually to be specially considered. Anything that is known to induce an attack must be carefully avoided. In

some patients the attacks cease so long as they remain free from mental work, but as soon as they return to their studies the paroxysms occur.

Every case should be thoroughly examined before a course of treatment is laid down. Causal conditions can generally be found, and the correction of such usually results in a cure, or at least in great relief. Errors in diet; digestive disturbances, as a disordered biliary tract; disorders of the pelvic organs; eye-strain; a spinal lesion, particularly in the upper or middle dorsal region; mental and physical fatigue, and affections of the nose may induce attacks.

The earlier the treatment, the more likelihood of a cure. Cases of long standing are generally harder to cure. Preceding a paroxysm, relief can usually be given, but after the paroxysm has reached its height it is harder to give relief. The patient should rest in a quiet room which is darkened and well ventilated. Besides the indicated osteopathic treatment (generally a cervical one), hot applications to the nape of the neck and keeping the extremities warm are helpful. The nerves involved are the vasomotor, occipital, frontal and temporal. A free evacuation of the bowels will relieve a few cases. During the intervals, valuable adjuncts will be found in the use of systematic exercises and frequent bathing. Do not fail to have the eyes examined.

Occupation Neurosis.

These are a group of maladies of the nervous system, due to excessive use of certain muscles in some oft repeated act, and characterized by spasm of the muscles concerned. There are several varieties, as writers' cramp, telegraphers' cramp, piano players' cramp, violin players' cramp, typewriters' cramp, etc.

Osteopathic Etiology.—A nervous temperament predisposes to the development of the affection. Previous injuries and strains of the involved parts are important factors. Faulty methods in writing, and in the other disorders, strained or cramped positions of the affected tissues, predispose to attacks. Slight **lesions** of the bones, joints, ligaments and muscles are commonly found, involving the motor and sensory nerves of the

immediate locality. The majority of all cases occur between twenty and fifty years of age.

Distinctive **pathological** changes have not been found. Each case has particular lesions of its own. The details of the case are characteristic of the one case only. The affection is most probably primarily a spinal one, due to deranged action in the spinal centers concerned in the various acts. Such derangements are caused by impingements of the anatomical structures upon the spinal vessels and fibres controlling the affected region.

Symptoms.—Symptoms of the various varieties of professional neuroses develop slowly and gradually. A cramp or spasm affecting the used member is an early symptom. In writers' paralysis, there may be a combined movement of flexion and abduction of the thumb so that the pen may be twisted from the grasp. Tremor, stiffness, fatigue and heaviness of the affected member are present most of the time. Weakness and debility of the muscles develop until **paresis** and paralysis may occur, with a spasm or alone. Abnormal sensations are generally present upon using the affected muscles, and frequently the pain seems to be in the bone or joint. The abnormal sensations consist of a tired feeling, tingling, numbness and tenderness or even pain. In some cases the pain is neuralgic, or a sub-acute neuritis may develop. **Vaso-motor** disturbances are present in severe cases. Hyperesthesia, a local asphyxia giving the tissues a chilblain-like appearance, and a glossy skin are manifested. The arm and hand may become blue and hot when using it. Associated with the inability to perform the usual work, may be mental worry and depression.

Diagnosis.—The history of the case and the limitation of the disease to one member, usually make the diagnosis easy: **Cerebro-spinal** diseases, as hemiplegia; early **tabes,** affecting the arms; and progressive **muscular atrophy** have to be carefully excluded. Occasionally nervous persons imagine they have the disease, and complain of weakness or stiffness, without showing any characteristic disturbances.

Prognosis.—As a rule is favorable. Osteopathic treatment, in the majority of cases treated, has performed a cure.

Treatment.—Rest of the part, mental quiet and attention to the nutrition of the patient, are the first necessary considerations to be attended to . The treatment consists of a correction of the parts irritating or disturbing the spinal centers or nerves affected. The ulnar, radial and median nerves all innervate muscles employed in writing. Lesions of the cord affecting these nerves may be found from the fifth cervical to the sixth dorsal. In a few cases lesions occur as high as the atlas. When the **radial** and **median** nerves are involved the lesions are principally found in the upper dorsal vertebræ. When the **ulnar** nerve is involved the lesions are usually slightly lower. The lesions may affect the fibres of these nerves directly (mechanically), but more probably the vaso-motor nerves are involved, as in this region the vaso-motor fibres to the arm pass from the cord to the sympathetic fibres. The brachial plexus originates higher than the upper middle dorsal region, still some of its nerves are frequently affected in the dorsal region by osteopathic lesions, for removal of the same relieves the disorder.

Other lesions affecting the arms are oftentimes found in the ribs on the side involved. Any of the first five ribs may become deranged and affect the innervation of the arm. The clavicle in a few cases may be abnormally low. Occasionally slight subdislocations of the shoulder joint (especially anterior) and elbow joint are found. Gymnastic exercises of the arm and hand, coupled with a general treatment of the shoulder, arm and hand, are beneficial. Hydrotherapy, massage and friction of the involved member are useful.

HYSTERIA.

Oppenheim defines hysteria as "a psychosis, which does not express itself by disorders of the intellect, but in defects of character and emotional disturbances, whose real nature is hidden under an almost unlimited and varied number of physical symptoms of disease."

The affection is found chiefly in women and generally in those of a nervous type. It is probably often due to strain of child bearing and lactation, where there is deficient means of support.

A large majority of cases are between the ages of thirty and fifty and about twenty women to one man have hysteria. Old maids, widows and childless married women are, however, frequently affected with the disease. In male subjects the disease is more of a **hypochondriasis.** The character of the nervous system in the female is probably why the disease occurs oftener in women than in men, and not on account of the possession of certain sexual organs, although there is no doubt pelvic disease is a prominent factor. Heredity is an important factor in the cause of hysteria. Oftentimes the disease is transmitted through hysterical, epileptical or insane parentage. Simply a general neurotic tendency may be an unquestionable cause of hysteria. Anders points out that lack of proper mental development, improper hygienic surroundings and chronic toxemias are causes.

The **direct causes** of hysteria may be many, and include physical and mental influence, or both. Traumatism of various regions of the body, but especially of the spinal column, may excite hysteria. Some slight lesion of the vertebra or rib may be all that is discoverable. A correction of the same is occasionally all that is necessary to remove the direct cause, still there is usually considerable disturbance of the spinal tissues, especially slight curvatures and muscular contractions. Prolonged emotional excitement, defective education and many moral and mental influences are potent and frequent causes. Masturbation or an adherent prepuce occasionally is the cause of the affection in boys, or any excitation that produces exhaustion. Disturbances of the sexual system in both sexes are responsible for many cases. The mentsrual period and the menopause are frequent periods for the manifestation of the disease. The disease often affects prostitutes. Disturbances of the digestive, nervous and circulatory systems, and general diseases of an exhaustive kind are exciting causes of hysteria. Dr. Still says that occasionally the colon is prolapsed and crowded down upon the pelvic organs. Hazzard[1] is of the opinion that "a majority of the cases show a depression of all the ribs, narrowing the thorax and often causing enteroptosis."

1. Practice of Osteopathy.

Symptoms.—The symptoms may be extremely varied, including any symptom of the many nervous diseases. The **sensory symptoms** are numerous. The most common is anesthesia, which may be found in certain parts of the body, usually one side of the body. The patient may not know of the sensory derangements until discovered by the physician. When there is **anesthesia** without other nervous symptoms, the case is commonly hysterical. The most marked symptom is analgesia, where the patient is insensible to painful impressions. A pin may be placed deeply into the flesh, and not be felt by the patient. The anesthesia may extend to the mucous surfaces, and even deeply down to the tissues of the joints. There may be other symptoms of disturbed sensation; as an absence of pressure, temperature and muscular sensation.

Hyperesthesia may be present nearly as often as anesthesia. Hyperesthetic areas may be found in various regions of the body, but especially along the spinal column and in the ovarian region. The "hysterical spinal irritability" is of special interest to the osteopath. The spinal column may be affected as a whole, or in segments, or confined to a single vertebra. Especially when a spinal irritability is in segments, or confined to a single vertebra, are local derangements of the spinal column apt to be found. Correction or even **pressure** upon these areas will often relieve the patient. Severe pain over the heart may simulate angina pectoris. **Globus hystericus** is of quite common occurrence.

Charcot refers to the ovarian hyperesthesia as follows: "It is indicated by pain in the lower part of the abdomen, usually felt on one side, especially the left, but sometimes on both, and occupying the extreme limits of the hyperesthetic region. It may be extremely acute, the patient not tolerating the slightest touch; but in other cases pressure is necessary to bring it out. The ovary may be felt to be tumefied and enlarged. When the condition is unilateral, it may be accompanied with hemianesthesia, paresis, or contracture on the same side as the ovarialgia; if it is bilateral, these phenomena also become bilateral. Pressure upon the ovary brings out certain sensations which constitute the aura hysteria, but firm and systematic compression has frequently

a decisive effect upon the hysterical convulsive attack, the intensity of which it can diminish, and even the cessation of which it may sometimes determine, though it has no effect upon the permanent symptoms of hysteria."

The **special senses** may be disturbed, although these symptoms are usually transient. There may be blindness; narrowing of the field of vision, due to anesthesia of the periphery of the retina; loss of hearing; loss of smell or loss of taste.

Motor disorders may be of different forms of paralysis, as hemiplegia, paraplegia or monoplegia. In fact all forms of **paralysis** may be found in hysterical patients. Osler says: "There is no type or form of organic paralysis which may not be simulated in hysteria." The affected muscles do not atrophy. The paralysis is usually general, and contractures are common. Local paralysis, as of the bladder, vocal cords and other parts of the body, commonly occur.

Contractures and **spasms** may also occur. True epilepsy may even be simulated by hysterical spasms, but on careful observation the characteristic attack of epilepsy is found wanting. Firm pressure may increase the severity of an attack as well as bring it on. The spasms are of various parts of the body, as the diaphragm, bronchi, abdominal muscles, bladder, etc.

Various **disturbances** of the **viscera** may occur. Of the digestive tracts, the appetite may be disturbed or depraved. Diarrhea or constipation may be present. Flatulency is a common symptom. The respiratory tract may be another point of considerable disturbance in many cases. Dyspnea, aphonia, hiccough, cough, and exaggerated breathing, as when cold water is poured on one, are common manifestations. Various **cardiac** vascular symptoms may be manifested, especially a rapid heart. Various **vasomotor** derangements are common.

Psychical manifestations, as lack of will power and an excitable nature—easily moved to laughter or tears—are frequent. The moral tone may be lowered. Even delirium, catalepsy, ecstasy and trance, may be mentioned among the psychical phenomena.

The **hysterogenous zones** are of more than passing interest to the osteopath. Tyson writes as follows, in regard to the hys-

terogenous zones: "These are hyperesthetic areas especially studied by Richet, on which persistent pressure will sometimes excite a hysterical attack. While the ovaries are favorite hysterogenous zones, the zones may be in any part of the body; as for example, the sides of the trunk. Such pressure may also cause an existing attack to subside. Hysterical spasms may also be localized or limited to groups of muscles." Especially when zones along the spine and side of the trunk are located, the attack of hysteria may be completely relieved by correcting the localized deranged tissues.

Convulsive seizures are not uncommon and may follow various prodromal symptoms. Some authors divide the symptoms of hysteria into convulsive and non-convulsive forms.

These are part of the many manifestations, that are presented by various hysterical patients, and it is readily seen, an osteopath has to be continually on his guard.

Diagnosis.—The diagnosis is generally quite easy. The characteristic emotional symptoms, associated with any of the many other symptoms which have no organic lesion, are characteristic of the disease. Care has to be taken, though, in some cases where symptoms are presented which have organic lesions. The history, the attack and neurotic temperament, will largely decide the nature of the affection.

Prognosis.—Death may occur from exhaustion, but such a termination is rare. Recovery is the rule, although the duration may be long. Recovery usually takes place rapidly, after the exciting cause has been determined and removed.

Treatment.—First of all, the osteopath should have due appreciation of the nature of the disease. It is not always necessary to be harsh and severe with the patient; but one should be firm and unyielding. He can do a great deal by having complete mental control of the hysterical patient. A most careful examination should be made for an exciting cause, and when found it should be removed. This naturally constitutes a very important part of the treatment. A light general treatment is commonly indicated. The general health, especially the bowels, should be carefully attended to. The hygiene, exer-

cise and amusement of the patient should receive due consideration. One has to gain the confidence of the patient, and then be firm but kind to them. Relative to diet Yeo[1] says: "The diet should be simple, abundant, and supplied regularly, and at not too long intervals as is frequently the case in boarding schools. All strong stimulants are best avoided, and the hysterical should not indulge in strong tea or coffee, or exciting wines and liquors."

The "rest cure" as introduced by Weir Mitchell, is applicable in some cases. This method consists of plenty of food, especially milk, absolute rest of the body and mind, massage and electricity with isolation of the patient from friends and sympathetic relatives. Doubtless a general osteopathic treatment would be much better than massage. Yeo says that to the application of hypnotism and suggestion "we look with little sympathy and less confidence."

During the hysterical **convulsions,** the patient should be watched, but extreme measures should not be practiced. There is little danger of patients hurting themselves. Throwing cold water in the face, or a cold bath may produce the necessary mental shock. Pressure over the ovary as stated in hysterogenous zones, or some other zone of the body, or pressure upon a large blood-vessel, as a carotid, will oftentimes stop an attack.

NEURASTHENIA.

"Closely allied to, and in some cases almost inseperable from, hysterical states are those morbid conditions to which, in modern times, has been applied the term neurasthenia." (Yeo).

The affection is usually found in that class of people who are predisposed to hysteria. The disease is more common among men than women. The predisposition may be inherited or acquired. Many of the exciting causes that produce hysteria will cause neurasthenia. Various **lesions** along the spinal column, chiefly in the cervical and upper dorsal regions, include the predisposing causes of a large majority of cases. This spinal irritation, taken in conjunction with overstrain of mind and body or probably in most cases the spinal irritation as the predisposing cause of the over strain, results in the nervous exhaustion. Par-

1. Manual of Medical Treatment.

ticularly overwork, associated with care and anxiety, is an exciting cause of great significance.

The neurasthenic patient is generally of a **neurotic temperament.** The affection may result from various chronic diseases, sexual excesses, alcohol and tobacco. Thompson[1] believes that improper sexual hygiene and perversion or abuse of the marital relation are most important factors in the development of neurasthenia in both sexes, and a regulation of this is imperative for a cure. The symptoms are dependent, to a greater or less extent, upon **spinal, cerebral, cardiac** and **gastric disturbances,** but all of these conditions are usually dependent upon **vertebral** and **rib lesions** of the upper dorsal and cervical regions. The lesions in the vertebræ are generally slight lateral deviations, in the ribs upward displacements of the vertebral ends, followed by contraction of the deep muscles in the neighborhood of the lesions. A posterior condition of the atlas and a lateral lesion between the third and fourth dorsal are especially apt to be found. As to spinal areas most affected Stearns[2] says the predisposing irritations are located particularly in the first two cervical, the first two dorsal and the last two lumbar vertebræ.

These various lesions probably cause an impairment of nutrition, in the nerve-centers of the cord and brain, or both. Definite **morbid anatomical changes** have not been found resulting from nervous debility or irritability. Still, it seems probable that certain changes in the nerve-cells may result from excessive functional activity. **Traumatism** is a prominent causative factor in both **neurasthenia** and **hysteria. Railway** and other **injuries** frequently produce osteopathic lesions that result in nervous disorders. That there is a demonstrable pathological basis resting in sympathetics and spinal nerves, there can be no doubt.

Symptoms.—To enumerate the many symptoms of neurasthenia in detail is hardly necessary. The nervous debility may affect any organ of the body, owing to the exhaustion of the nervous energy, thus lessening the functional activity of that organ.

The most noticeable symptoms are various **sensory disturb-**

1. Cosmopolitan Osteopath, October, 1903.
2. Journal of Osteopathy, January, 1904.

ances and **muscular weakness,** dependent upon the spinal lesions. The patient generally feels weak and tired. Headache, pains in the back and sacrum, tender points along the spine, and various sensations of numbness, tingling, etc., are felt.

The **mental faculties** are oftentimes irritable and weak. An inability to concentrate the thoughts with depression, fear, vertigo and many other mental symptoms, may be manifested.

Palpitation, irregular action of the heart and pain over the precordia may be present. **Ocular** disturbances, **visceral** symptoms of many kinds, and **vaso-motor** phenomena, as chilliness, flashes of heat and sweating, are among the many symptoms of which the patient complains.

Genito-urinary disorders in the male, and ovarian and uterine irritation and painful menstruation in the female, are occasionally symptoms dreaded by the sufferer. Polyuria is frequent.

The symptoms or signs of great importance to the osteopath in neurasthenia, as in many other diseases, are the tender points along the spinal column. They give direct clues as to where the lesion may be found.

Diagnosis.—Error in diagnosis can usually be prevented by a study of the history of the case and symptoms. Care must be taken in determining between symptoms of organic diseases and the symptoms of a true nervous exhaustion.

Prognosis.—Is almost invariably good. Only in cases where there is a tendency to mental disorder should the prognosis be guarded. It usually takes some time to perform a cure among the poorer class, as the requirements demanded for a cure are oftentimes expensive. Fortunately, however, most cases of neurasthenia are among the rich who can well afford to meet the requirements.

Treatment.—Naturally the treatment, exclusive of the manipulation to correct the various lesions found, is extremely varied, owing to the many exciting causes and symptoms to contend with.

As has been stated the lesions are usually found in the upper spinal region, still lesions are occasionally located in the lower spinal region, especially in female sufferers, when the pelvic organs

are disturbed. The many mental symptoms, as inability to concentrate the mind, insomnia, vertigo, headache, etc., are best treated through the cervical region, with attention to the heart's action and the excretory organs. Careful attention should be paid to the deep posterior muscles between the atlas and occipital bones.

Rest is very necessary. Changes of scene and occupation, attention to the surroundings, careful dieting, hydrotherapeutic measures, pleasant companions, relief from responsibility, bathing, etc., should receive careful attention and consideration by the osteopath. Set rules cannot be given. The details of treatment that should be adopted are dependent upon the individual case. Every well trained osteopath will be familiar with such measures.

Careful attention must be given to the secretions, excretory organs and the circulation. A study of each case will bring out the various irregularities that may exist.

When the nervous involvement is extensive, a" general treatment" may be given. Such a treatment would effect the entire nervous and muscular system, and tend to equalize disturbed nerve force. Bringing the muscular system into play and relaxing contracted muscles calls for more blood and nerve force, and consequently a nutritious diet.

The "rest cure," as introduced by Weir Mitchell, may be employed to considerable advantage in many cases. Yeo says: "It is in certain cases of this disease that the "rest cure," devised by Weir Mitchell, has proved so remarkably successful. But there can be no sort of doubt that it has been applied far too indiscriminately, and that for this, as indeed for any special method of treatment, a careful selection of suitable cases is needful." The diet should consist principally of milk at first, followed in a few days by soft boiled eggs, boiled rice, lamb chops, graham bread, stewed fruits and butter, and a little later by roast beef, vegetables and light puddings. Tea, coffee and alcohol should be avoided.

During the entire course of the treatment, care should be taken to correct any lesion that may bear directly upon the cervical sympathetic, the solar plexus and the hypogastric plexus, as they are the great reflex centers of the body.

VASO-MOTOR AND TROPHIC DISORDERS.

Raynaud's Disease.

(Symmetrical Gangrene)

Raynaud's disease is probably due to vaso-motor disturbances and is characterized by local syncope, local asphyxia and local gangrene.

Osteopathic Etiology.—Females between the ages of twenty and forty are most frequently affected and are generally of the anemic or neuropathic type. Three cases have been observed by Adams of the Pacific College of Osteopathy, who found in each the same lesions to the **vaso-motor** area of the cord (from the first to sixth dorsal); two being in the form of a scoliosis while the third had in addition to a curvature, a rotated second dorsal with much muscular contraction and extreme sensitiveness. Two were in the third stage while the other had well marked symptoms of the second stage. Judged from the pathology and result he has little doubt that the disease is one of exaggerated vaso-motor activity. Improvement began immediately on treatment, which was toward the correction of the lesion.

Exposure to cold, or severe emotional disturbances may bring on an attack of **local syncope.** It is most frequently seen in the extremities, producing what has been called dead fingers and toes. One or more of the fingers are usually affected, although the whole hand may be affected with the fingers. The part affected becomes white and cold, with loss of sensation. This is gradually followed by a reaction and the fingers get red, hot, and tingle. The change does not occur at the same time in all the fingers; one finger may be white, and the one next to it red.

Local asphyxia usually follows local syncope. It affects the fingers and toes most frequently but the tip of the nose and helices of the ears may also be affected. The affected part is swollen, dark red and painful and sometimes there is marked anesthesia. These attacks may recur for years without further effect. The attack may be brought on by slight exposure to cold.

If local asphyxia persists long enough, **gangrenous** changes

take place. This is reached in only a few cases. The affected part becomes dry, black and cold, and superficial gangrenous blebs appear. A line of demarcation shows itself and the dead part sloughs away much less extensively than the appearance would indicate. The attacks are generally very painful. Hemoglobinuria may be present. The gangrene is usually superficial and rarely causes an extended loss of substance.

Treatment.—In the three cases of Adams it consisted in thoroughly relaxing the contracted muscles, which immediately controlled the pain. This was followed by corrective treatment, with local manipulation along the vascular channels. The patient should be kept warm and when at rest the affected parts elevated and wraped well in wool. Regulate the diet and habits. Under this treatment recovery should result.

Many **vaso-motor** and **trophic disorders** undoubtedly arise from vertebral and rib lesions impinging the spinal nerve at its exit and the sympathetic ganglion at the head of the rib.

DISEASES OF THE MUSCLES.

Thompson's Disease.

(Myotonia Congenita).

Thompson's disease is an hereditary affection, characterized by tonic spasms of the muscles, induced by voluntary movements. The disease is congenital and in family groups. The men are more frequently affected than the women. Isolated cases presenting the same features have been described, but they are rare. The disease is rare in this country and in England, but quite common in Scandinavia, Germany, France and Italy. Thompson himself was a sufferer from the disease. Osteopathically, **lesions** are found in the spinal column.

There is an increase in the muscular fasciculi, and a multiplication of the nuclei of the muscles. The heart is not affected, but the diaphragm may be involved. The spinal cord and the nerves are not organically affected.

Symptoms.—The disease appears in early childhood. The first symptom noticed is a stiffness during voluntary movements. Voluntary contraction takes place slowly, and the relaxation which follows is also slow. This is more marked after periods of inactivity. Upon a repetition of the movements the rigidity wears away. In moving about, the start is difficult, but after a few steps have been taken the patient can walk without difficulty. The condition is aggravated by emotion and cold. The muscles of the arms and legs are most frequently affected. The reflexes are normal, and there are no sensory symptoms. There is usually more or less irritability and morbidness.

Treatment.—It has always been thought by the medical practitioners that this disease was incurable. Muscular gymnastics, massage and friction, and avoidance of cold or emotional disturbances, chiefly constitute the treatment.

Doneghy, of Wheeling, W. Va., reports the cure of a case of myotonia congenita, in 1898, that had consulted some of the most

eminent physicians of this country to no avail. In a personal letter from Dr. Doneghy he refers to the treatment of the case as follows: "I found the lesions in the sixth, eleventh and twelfth dorsal vertebræ, and first, second, third and fifth lumbar vertebræ. While correcting these lesions I gave rectal treatment to stimulate the sympathetic plexuses in front of the sacrum, to restore sexual power, as he had lost all erectile power and nocturnal emissions occurred from one to three times per week. He had been thus afflicted for about four years. The patient has been well for the last ten months, i. e., ever since I discharged him, cured." Some years later this patient is reported well. G. E. Hodges[1] reports a serious case which was considerably benefited.

The **osteopathic treatment** of various **diseases** of **muscles** is usually a local one to the innervation. Disturbances of nutrition to the muscles are caused by locally deranged osseous and muscular tissues. Treatment of the muscle itself by manipulation is always indicated.

Interstitial myositis occurs in the **contractured vertebral muscles** accompanying osteopathic lesions. This has been found by experimentation.

Pseudo-Muscular Hypertrophy.

This is one of the muscular dystrophies of the progressive type, tending toward paralysis, while in the beginning it is an apparent hypertrophy.

Etiology.—It has a tendency to run in families and appears early in life. It sometimes follows some of the acute diseases of childhood and manifests itself at puberty.

Pathologically, it seems to be a degenerative atrophy. There is increase in the nuclei, swollen fibres and increase in the muscle size. This is followed by atrophy with fatty deposit in the muscle tissue.

Symptoms are weakness in the legs, stumbling and a waddling gait. There is an increase in the size of the calves of the legs, followed by the same symptoms in other muscle groups higher in the legs. This produces a marked lordosis. Atrophy follows,

with increased loss of strength, so the patient, when lying, has to turn on the face and then raise himself first on the hands, then the knees and finally on the feet. The reflexes are lost and there is mental apathy of a progressive type.

Prognosis.—No cases have been cured, but there is a possibility of arresting the progress of the disease.

THE HIP-JOINT.

GEORGE M. LAUGHLIN, D. O.

All of the various diseases and disorders of the hip are more or less amenable to osteopathic treatment when a careful and correct diagnosis is made before the case is undertaken for treatment. A large number of such cases are constantly going to the osteopath for treatment on account of his reputation for "hip setting," or rather the reputation that his school of practice has established for that line of work. The possible mistake of the practitioner is that he may proceed to uphold that reputation by attempting to set hips that are not dislocated, but where some other form of hip trouble is present, instead of studying his cases from the standpoint of their clinical history and using his anatomical knowledge to determine what is wrong. Of the many cases that come to us with some form of hip limp or lameness in the leg, not one in a hundred, outside of congenital dislocation, will prove to have a completely dislocated hip, but upon careful physical examination and by getting a clear history of each case it will be determined that the patient, if a child, in all probability has either hip-joint disease or infantile paralysis or perhaps some other form of spinal paralysis; if an adult, sciatica, misplaced or the so called slipped innominate, spinal trouble, ununited fracture of the neck of the femur or vicious union with shortening, or monoarthritis following injury. There are other conditions, not dislocations, that produce temporary or permanent lameness, such as rheumatism and other forms of arthitis, that impair or destroy the hip-joint, but the conditions first mentioned are the most common. Partial dislocations are frequent and will be taken up for explanation under a separate heading as will all the other conditions heretofore mentioned.

Mistakes in diagnosis, showing a lack of knowledge of the pathology of the various hip diseases on the part of the practitioner may be followed by such treatment that great harm may

result. This is especially true in hip-joint disease or in any other disease when there is inflammation of bone or other articular structures.

No attempt is here made to describe all the pathological conditions of the hip-joint, but special attention will be given to the diagnosis and treatment of the more common conditions met with in daily practice. In discussing treatment, that part which has been developed by the osteopathic system will be given special prominence, although we must not overlook many useful procedures established by other systems.

DISLOCATIONS.

TRAUMATIC,	PATHOLOGICAL,
PARTIAL,	CONGENITAL.

TRAUMATIC DISLOCATIONS.

Traumatic dislocations of the hip are rare. Out of a series of three hundred radiographs taken of cases that have come to us for treatment for some form of hip trouble, in only two cases was there a dislocation as the result of trauma or violence. We here refer to the complete dislocation in which the articular surfaces of the bones are completely separated from one another. Dislocations very rarely occur in children, since violence directed to a joint is more likely to result in a **separation** of the **epiphysis.** In old people or even in people past fifty, dislocations of the hip, where violence has been directed to the joint or in its neighborhood, are practically unknown, a **fracture** of the **neck** of the **femur** resulting instead. Dislocation of the hip, moreover, never occurs from direct injury, but from a force applied to the feet or knees, or, if the legs are fixed, to the back. By getting a definite history of an injury which has resulted in a deformity of the hip with lameness, this point may be of considerable diagnostic value.

In dislocations of traumatic origin, a great amount of injury is done to the articular structures; the capsular ligament and the ligamentum teres are ruptured, the muscular tissues about the joint more or less lacerated, the synovial membrane and carti-

leges bruised, and in some cases the rim of the acetabulum fractured. Fracture of the rim of the acetabelum is liable to occur when the hip is dislocated while in the position of adduction, the head of the femur being dislocated upward and backward. It is the generally accepted view, however, that practically all dislocations of the hip occur while the thigh is in the position of abduction—the capsular ligament rupturing at its weakest point, behind and below, resulting primarily in a downward displacement. The Y ligament in front, on account of its great strength, is seldom torn, but, when it is, the dislocated hip is freely movable instead of occupying a fixed position as is the case in dislocations where this structure is intact.

The four varieties of dislocations commonly described are the **dorsal,** the **sciatic,** the **obturator or thyroid,** and the **pubic.** In the two former, the head of the bone is displaced posteriorly, in the two latter, anteriorly. After an injury producing a dislocation of the hip if the patient's limb becomes flexed and inverted, the head of the bone passed backward, producing either a dorsal or sciatic dislocation. If the tendon of the obturator internus is ruptured or if the head of the bone passed in front of it, the dislocation becomes dorsal, if not the sciatic variety is produced. If the leg becomes extended and everted, the head of the bone passed forward, producing either the obdurator or pubic variety. Of course, in addition, the direction of violence producing the dislocation may determine the character of dislocation that ultimately results.

Dorsal dislocation.—In this form of dislocation the head of the bone lies on the dorsum ilii above the obturator internus tendon, behind and above the acetabulum. When the limb is flexed and adducted, the head of the bone can be readily palpated. The great trochanter is two or three inches higher than the one on the opposite side and is more prominent. The leg is short and if the Y ligament is intact, the foot turns inward; in fact, the entire leg is inverted. The leg is more or less flexed and adducted.

Sciatic dislocation.—In sciatic dislocation, the head of the bone passed first down through a rent in the capsular ligament, then backward and upward, lodging below the tendon of the

obturator internus in the upper part of the sciatic notch. The signs are somewhat similar to those found in a do·sal dislocation, the leg is flexed, adducted and inverted but there is less shortening. When the leg is extended, the shortening only amounts to from one-half of an inch to one inch, but by flexing both limbs at right angles to the body with the patient upon his back, as much as two or more inches of shortening at the knee will be noticed. In this variety of dislocation, the head of the bone cannot be readily palpated on account of the thick muscular tissues overlying it.

Obturator dislocation.—An obturator dislocation is produced by the head of the bone passing downward through the ruptured capsular ligament, then passing slightly forward into the obturator foramen. The head of the bone lies on the obturator externus muscle; it can be detected in the perineum. The leg is abducted, everted and lengthened. The great trochanter is less prominent and lower than the one on the opposite side. The leg is flexed on account of the tension of the psoas muscle. The lengthening amounts to about two inches. Great pain is frequently experienced on account of pressure on the obturator nerve.

Pubic dislocation.—In a pubic dislocation, the head of the bone lies on the horizontal ramus of the pubes, in front and slightly above the acetabulum. The great trochanter along with the head of the bone is displaced inwardly, which gives the hip a flattened appearance. The leg is slightly flexed; is shortened, abducted and greatly everted, the inner part of the leg looking forward. The head of the bone can be readily felt under the tissues when the leg is moved about. Considerable pain is sometimes experienced on account of pressure upon the anterior crural nerve.

Diagnosis.—The diagnosis is, as a rule, not difficult if the practitioner will observe closely the physical signs of dislocation which are always well marked. About the only condition which might be mistaken for a dislocation, is fracture of the neck of the femur. The age of the patient and the character of the injury will be helpful in making a diagnosis. In fracture of the neck of the femur, force is usually directed against the great trochanter, as, for example, by a fall upon it; while in a dislocation, the force

is directed against the feet or knees, as a rule. Then, too, in fracture, if it is not impacted, crepitus can be elicited and there is more or less shortening, the foot is everted, the head of the bone cannot be palpated, and neither flexion, abduction nor adduction is present. By careful, but forceful inward and downward pressure, above the great trochanter, a depression can be felt which is present only in fracture where there is much shortening. In fracture, too, the arc through which the great trochanter passes when the leg is carefully rotated while in extension, is much less than normal or where there is a dislocation. The absence of a history of injury immediately followed by complete inability to use the limb, will enable one to make a diagnosis between old dislocations and deformities due to bone disease; the former developing at the time of injury, the latter coming on slowly.

Treatment.—In treatment, it is more essential to study out the obstructions to a reduction and the manner to overcome them, than to attempt to use the set manipulations prescribed in some text-book, but there are a few rules which must be observed in every case. **Extension** and **manipulation** must always be used, the character of the manipulations depending on the form of dislocation. In order to secure a reduction, the head of the bone must travel back over the course it took when dislocated. As the capsular ligament is always ruptured, the head of the bone must return to the acetabulum through the rent made at the time of dislocation. The patient should be anesthetized, although this is not always necessary, and placed upon his back upon an ordinary treating table; if the **dislocation** is **dorsal or sciatic,** the leg should be flexed upon the abdomen or nearly so, then rotated inwardly, followed by outward circumduction and extension. The operator may stand on either side of the table. If the left leg is dislocated, for example, and the osteopath stands on the right side of the table, the right arm should be placed under the flexed leg at the knee, the left hand is then placed on the ilium and with it pressure directed downward. In this position, the leg canbe easily rotated inwardly, flexed to any degree desired and then circumducted outwardly and extended with considerable force. During these manipulations, the patient's knee is placed firmly

against the osteopath's chest which necessitates his body passing through the various movements required except at the conclusion of extension. If the osteopath stands on the left side of the table, he may place his right hand upon the patient's knee and his left hand upon the ankle, then pass the limb through the movements of flexion, inward rotation, outward circumduction and extension.

In the **anterior dislocations,** the obturator and pubic, the leg should be flexed, abducted, rotated outwardly then circumducted inwardly and extended. An **obturator dislocation** can sometimes be reduced by a method similar to the one commonly used to reduce a sub-glenoid dislocation of the shoulder. The leg is flexed at a right angle and abducted, the osteopath then places his foot on the pelvis and uses traction. When it is necessary to use traction in the direction of the long axis of the femur to reduce any dislocation of the hip, it is often advisable to pass a strong towel about the inside of the thigh close to the pelvis by means of which strong outward pressure can be exerted. This often assists in disengaging the head of the bone. After the hip has been reduced, the legs should be tied together and the patient remain quiet in bed for two weeks, after which time passive motion should be instituted to secure good movement of the joint. All of these methods apply chiefly to recent dislocations, before adhesions have formed about the joint to such an extent as to prevent reduction.

Old dislocations.—When cases are seen immediately after a dislocation has occurred, a reduction is not, as a rule, difficult, but from day to day following the injury, a reduction becomes more difficult on account of the inflammatory adhesions increasing and becoming harder to overcome. Even after three or four weeks, the adhesions may be so strong that it is impossible to rupture them and secure a reduction. A few cases are reported, however, where reductions have been made even after several months.

Probably one of the greatest obstructions to a reduction in old cases, is the capsular ligament, the rent in this structure having healed firmly about the neck, leaving the head of the bone outside of it. In cases where all other adhesions have yielded by a

long course of treatment, this obstruction has remained, preventing the head of the bone from passing back through the capsule into the acetabulum.

In old cases where a reduction cannot be secured, a great deal of benefit can be derived by a course of several months' treatment consisting chiefly of rotation, flexion and extension. This treatment will improve the usefulness of the limb by increasing the motion of the joint and nutrition to the entire limb.

Pathological Dislocations.

Pathological dislocations are those that arise from some disease of the joint in which the articular structures are more or less destroyed. These dislocations cannot be classified as those of traumatic origin. They come on slowly and are not directly due to violence. Such diseases as hip-joint disease, rheumatism, rheumatoid arthritis, or septic arthritis, following acute infections, such as pneumonia, are responsible for such deformities. This class of dislocations is the result of these diseases, although previous injury to the tissues about the hip acts as a predisposing cause for the disease producing the deformity in most all instances. In some cases a true dislocation is produced by the head of the bone being forced out of the socket by an accumulation of fluid in the joint cavity. This condition has occurred in arthritis, with effusion, following typhoid fever.

In most instances, however, where pathological dislocations occur as a result of a diseased joint, the articular surfaces are not separated sufficiently to produce a complete dislocation even where there is effusion as in the above case, but the articular surfaces are destroyed, the head of the bone breaking down and the upper part of the acetabulum giving away, producing permanent shortening with ultimate ankylosis or limited motion.

The various diseases giving rise to pathological dislocations will be discussed elsewhere, under separate headings.

Partial Dislocations.

Partial dislocations or subluxations of the hip are not of uncommon occurrence. They occur to a greater or less extent in

connection with all acute and chronic diseases of the hip at some period in their history, also directly as the result of injury. A partial dislocation may be described, in distinction from traumatic and pathological dislocations, as a slight disturbance in the position of the head of the bone in its relation to the acetabulum wherein the articular surfaces are not entirely or, in some instances, not at all separated, and in which there is no destruction of gross amount to the articular tissues. This disturbance may be due to a slipped innominate, a twisted pelvis, or the trouble may be primary in the hip-joint as a result of injury to it or a disease of it. In all instances, there is a limitation of motion of the joint, more or less pain on motion in the hip or knee, and the muscles about the hip are contracted. In a partial dislocation, we do not get the marked physical signs that occur in traumatic or pathological dislocations; some of them, however, are present, but to a much less degree. For instance, in the early stages of hip-joint disease, we find the pelvis twisted downward and forward on the affected side, the leg flexed, everted, abducted and lengthened. But the head of the bone cannot be palpated and the lengthening, if careful examination is made, will be found to be due to the twisted pelvis, and the other physical signs to contracted muscles. At this stage the articular structures are diseased, but not destroyed; if the disease advances and the joint breaks down, a pathological dislocation will ensue, but if the disease is checked in this stage the joint may be restored.

If the **innominate** is rotated backward, the leg is shortened; if forward, it is lengthened. In both instances the hip muscle may be contracted producing a slight subluxation of the hip-joint.

Treatment.—The treatment in subluxations will depend upon the cause of the trouble and the condition of the joint. If the disturbance is due to a strain of the muscles, trauma to the joint, slipped innominate, even though of long standing, attempt should be judiciously made to correct the trouble at once, except in cases where there is much inflammation, when a little rest and treatment directed to reducing it should be given first. In the acute and chronic destructive diseases of the joint, as hip-joint disease,

septic arthritis, rheumatism, rheumatoid arthritis, etc., where the partial dislocations result from some such disease as one of the above mentioned, the subluxation may be reduced and the case greatly benefited if it can be accomplished without the use of force and without pain to the patient, otherwise great injury might result from the use of undue force in attempting to reduce a subluxation of a diseased joint where the tissues may be easily broken down or a chronic inflammation increased. In these cases, the proper treatment includes very little manipulation about the hip, rest to the part in bed or on crutches, spinal manipulation to correct secondary curvatures. The pelvis may be carefully and gradually corrected, and in some cases, extension and limited fixation are absolutely necessary. The X-ray is of great value in determining the exact position of the head of the bone and its relation to the acetabulum in all complete and partial dislocations. It is of especial value in determining the pathological condition of any diseased joint, showing the extent of destruction to the head of the bone and acetabulum. It can also be determined whether the disease is active or quiescent by the character of shadow made by the bone; inflamed and rarefied bone giving a light shadow in comparison to normal bone or bone that has hardened after an inflammatory process by the deposit of the salts of lime.

In all cases, a careful diagnosis should be made before treatment is given. The diagnosis should be made by a careful physical examination; this alone, however, is not sufficient as it will also be necessary in the majority of cases, in order to get at the pathology of the condition, to learn the clinical history of each case.

Congenital Dislocation.

Congenital dislocation of the hip is of common occurrence in comparison to some other forms of hip trouble, notably traumatic dislocation, but not nearly so common as hip-joint disease. Congenital dislocation means that a dislocation exists at birth, but perhaps the term dislocation is a misnomer inasmuch as it implies that the hip was at one time normal. This condition is

really a congenital deformity of the acetabulum and head and neck of the femur, due to some error in development. It is probably not due to any defect in the nervous system as the dwarfed head and neck of the femur and the deformed acetabulum will rapidly develop after a reduction has been made and maintained for some months by the fixation method; this could not be expected if there was some defect in the central nervous system acting as a cause for the deformity. The disturbance is clearly a nutritional one due to some obstruction in fetal life. Pressure on the uterus from abnormal growths near it, a deformed uterus, or fibroid growths in the uterine wall may be responsible for the deformity. The condition is much more common in girls than in boys. The deformity is frequently bilateral, but more commonly unilateral.

Physical Signs.—The deformity is hardly perceptible at birth and may not be noticed until the child learns to walk, when a distinct **limp** is discovered, which becomes more pronounced as the child grows older. Children with this disease do not learn to walk readily and are sometimes two years of age before they are able to get around well upon their feet. The head of the bone is displaced upward in the median line, lying directly above the acetabulum. This displacement, of course, produces **shortening** of the **leg,** the amount of which varies from one-half inch in infants to two or more inches in children seven or eight years old. The shortening increases with the use of the limb in walking throughout the growing period of life. The leg is neither inverted nor everted, but as the case grows older there is more or less flexion and adduction. This is especially true in bilateral cases, where this condition produces the scissor-like, **waddling gait.** In **bilateral** cases, the buttocks are prominent and there is marked lordosis; in **unilateral** cases, there is some lateral curvature. The head of the bone is quite movable up and down. This telescopic motion amounts to an inch or more, and in younger cases before the child has walked much the head of the bone can be drawn down to the acetabulum without using great force. In older cases, although the telescopic motion remains, the head of the bone having advanced farther up the ilum from much walking, and the hamstring and adductors muscles having shortened,

the head of the bone cannot be drawn down as before without the use of great force. All the movements of the joint are normal excepting abduction which is limited. The limb is usually only slightly under developed, the child being able to run about without pain or discomfort. On flexion and adduction, the head of the bone can be plainly palpated.

Pathological Anatomy.—Some have advanced the view that these dislocations are produced during labor or during the first few months of life. This view is not tenable on account of the position of the head of the bone in the median line above the acetabulum; this practically never occurs in traumatic dislocations. In traumatic dislocations, the head of the bone is fixed on account of inflammatory adhesions, while in congenital dislocations there is no evidence that any acute inflammation has ever existed and there is telescopic motion. The head of the bone is small and often times ill-shapen, the epiphysis being especially undersized or apparently misplaced; the neck of the femur is short and more perpendicular than normal. The **acetabulum** is shallow and small, the absence of the normal rim giving it the appearence of being elongated. The hip being supported chiefly by its ligamentous attachments, the capsular ligament and ligamentum teres are greatly stretched.

The **ligamentum teres** is thickened and flattened. No doubt the obstruction to the branch of the obturator artery which passes along this ligament to supply the head of the femur is largely responsible for its great deformity in later years. The **capsular ligament** is drawn over the head of the bone and is thickened and contracted at its middle portion after the manner of an hour glass. This constriction becomes more marked with age and increased walking and is one of the principal obstructions to a reduction in cases where the child has walked for several years. In some cases where all other obstructions have apparently been removed, the osteopath has been unable to force the head of the bone through it into the acetabulum. The adductor and hamstring muscles are shortened as is also the tensor vaginæ femoris.

Diagnosis.—The diagnosis is not difficult. About the only condition which might be mistaken for it is infantile paralysis in

which a limb is left only slightly deformed. The clinical history of the case, the absence of the telescopic motion, and the loss of knee jerk, will be sufficient evidence upon which to differentiate this disease from congenital dislocation.

Treatment.—The character of treatment will depend largely upon the age of the patient. For the purpose of classification we may divide this subject into three heads, discussing each and giving the class of cases that properly come under the separate heads, viz.: (1) Those cases that require only **manipulative treatment**. (2) Those that may successfully, or at least with the hope of the most satisfactory result, be operated upon by the **Lorenz method.** (3) **Hoffa's** operative **method.**

When a case is first examined the osteopath should make known to the parents of the child the condition of the joint, and the probable outcome under the various methods of treatment. Cases that are to be treated by the Lorenz or Hoffa method should be sent to some one who has had considerable experience in such work, as a successful result will depend upon the operator knowing his technique in every detail. The general practitioner can handle those cases that come under the first division.

Manipulative Method.—It is not to be supposed that a cure can be made in any case by manipulation alone, the best that can be hoped for is a certain amount of improvement. I have thoroughly tested this method on a number of cases ranging in age from two years up to twenty-five. A part of these cases were treated continuously for over a year. The results were not satisfactory except in the older cases where great functionali mprovement was experienced, but very little anatomical change made in the joint. In very **young cases** the head of the femur can be placed in the acetabulum by traction and a little rotation, but as soon as traction is removed the head slips out of the shallow socket. The capsular ligament is large and roomy, the socket shallow, the head and neck small and almost perpendicular so that it is not possible to maintain a reduction without using fixed abduction and flexion of about 90 degrees. In **cases** that have **walked** a **year** or **two,** and even in older cases, the head can be drawn down and made to pop when an attempt is made to reduce it. This

must not be mistaken for a reduction as the popping noise and quick little jump are caused by the head passing over a thickened portion of capsular ligament, between it and the ilium. **Manipulative treatment** consists of traction, flexion and rotation of the hip with some treatment directed to the lower part of the spine. The results of this treatment may be summed up as follows: Nutrition to the leg is improved; the capsular ligament is thickening and thus made stronger by irritation in repeatedly drawing the head of the bone over it. **Cases** that have **passed** the **age limit** of seven or eight years for an operation by the bloodless method of Lorenz can be greatly benefited by taking treatment for a year or more, but it is of little value in younger cases. I have greatly benefited several bilateral cases in young women. Improvement was noted in the following respects: The leg was made stronger and bore the weight of the body with less effort, adduction was partly overcome; and where crutches were used, the patient was enabled to put them aside permanently and walk about with comparative ease.

The Lorenz Method.—This is the best and most satisfactory method to be used in cases between the ages of two and six. Some cases, however, have been successfully operated upon to the ages of eight or nine. It is the **only method,** outside of the open operation of Hoffa, that offers any hope of a radical cure. In at least one-half of the cases correctly operated upon, an anatomical cure is effected, and in a greater number there is marked functional improvement. The success of the operation depends upon: (1) A **complete reduction** of the hip. Where the hip is placed in a cast without being reduced no improvement results except that the telescopic motion may be considerably lessened on account of the fribrous tissue that forms about the hip as a result of the inflammation set up by the attempt to reduce it.

(2) The **proper application** of the **cast.** If the cast is not correctly applied the head of the bone will slip out of the socket, and therefor no improvement results.

(3) **Care after treatment.** After the final cast is removed the muscles are found to be atrophied and there is some limitation of motion in the joint. **Manipulation** must then be instituted to

restore the muscles and establish normal motion in the joint. Care must be used in treating the hip, as violent treatment may dislocate it before the muscles have strengthened and the socket deepened from moderate use.

In any case where the hip can be reduced, the chances for a complete anatomical cure are good. The operation is never contraindicated except in cases that have passed the age limit and where there is no prospect of being able to reduce the hip; in children in poor health who are not able to stand the shock of the operation and the consequent treatment; in children under three the operation should not, as a rule, be performed on account of the difficulty in keeping the cast clean. If the cast becomes urine soaked it will crumble and break and thus fail to serve its purpose.



FIG. 1.—Flexion of thigh with knee flexed.



FIG. 2.—Stretching adductor muscles.

The Technique of the Operation.—The patient is anesthetized and placed on an ordinary treating table. The operator stands on the side next to the affected hip; the assistant on the opposite side. The latter holds the pelvis firmly against the table so as to resist the movements of the operator. The thigh is then flexed to a vertical position with the knee flexed on the thigh. It is then firmly abducted so that the adductor muscles stand out prominently. These muscles are deeply massaged in this position until they give away by tearing or stretching. Next the

hamstring group is stretched. This is accomplished by flexing the thigh to a position paralel to the body, the knee is then extended till the patient's foot is placed by the side of the head. This not only stretches the muscles but overcomes the resisting



FIG. 3.—Stretching hamstring muscles.



FIG. 4.—Reduction of hip, using trochanteric block.



FIG. 5.—Position in which cast is applied



FIG. 6.—Position child assumes in walking.

tissues about the head of the bone by forcing it down toward or even into the acetabulum. If the tensor vaginæ femoris needs stretching it is accomplished by placing the patient on the side and carrying the thigh with the knee extended to the position

of extreme hyperextension. The next move is to set the hip. A small padded block is placed under the trochanter, and with the knee flexed on the thigh and the thigh to the side of the body the limb is firmly abducted. During this procedure the head of the bone can be heard and felt to jump into the socket. In some cases a reduction cannot be made by this procedure but it should always be attempted before trying traction with the leg extended. To secure a reduction by the latter method a yarn rope is fastened around the ankle by means of which an assistant can make traction. To oppose this traction a sheet is looped around the perineum which is protected by a rubber pad, and the ends tied to the corners of the table at the head. While the assistant makes firm and steady traction the operator rotates the femur in such a way as to force the head of the bone into the acetabulum. When reduced the limb must be placed in a position of about 90 degrees abduction and flexion. If the limb is extended the head of the bone will jump out of the socket, showing the necessity for continuing the position in which reduction can be maintained for some months. The hip can readily be reduced again, when it should be fixed in position by the use of the plaster of Paris cast. Usually not over ten or fifteen minutes are required to make the reduction.

The **evidences** of a **successful reduction** are: (1) The distinct jump that the hip makes in being reduced and the clicking or popping noise that accompanies it. (2) When in position the head of the bone causes a bulging of the tense tissue in front of it. (3) If the sound limb is placed in the same position as the one just reduced and which is still held in the position in which it was reduced, the great trochanter on either side will be found to bear the same relation to the turberosity of the ischium, both trochanters being about on a level with the tuberosities. If the hip is not reduced the trochanter of the dislocated hip will be an inch or more higher than the tuberosity of the ischium on the same side and about the same distance above the trochanter on the sound side. (4) In the reduced position the knee cannot be fully extended on account of the resistance offered by the hamstring muscles.

With the hip still held in the position of reduction the cast is put on. A pair of neatly fitting woolen drawers should be put on with a strip of roller bandage on each leg. The pelvis and limb down to the knee are wrapped in sheet cotton held neatly in place with gauze bandages. The plaster is then applied on crinoline bandages four or five inches wide and five yards long. The bandages are soaked in hot water containing a little powdered alum, which causes the plaster to set quickly. The cast should be three-fourths of an inch thick throughout, with the points of greatest strain made a little thicker. The cast is then trimmed and the legs of the drawers turned up and attached to the top part. The roller bandages are used for rubbing the skin by drawing them back and forth under the cast. The ends of the bandages should be tied together to prevent them from getting under the cast. The patient should be kept in bed for about a week and then encouraged to walk. After a few weeks the child gains confidence in himself and runs about without much trouble. The more the child walks the deeper the socket becomes and the better the chances for a successful outcome of the case. The cast should be worn for five or six months. It is then taken off and the parts of the body under the cast are thoroughly cleansed and rubbed with alcohol. The position of flexion and abduction is then lessened to the point of slight resistance, and a new and lighter cast applied as before. This is allowed to remain for one or two months. Sometimes a third cast is required; if so, flexion and abduction are further lessened before it is applied. When the final cast is removed the child should remain in bed for a week or ten days and then use the limb only very carefully for some weeks, as time must be given for the muscles to develop sufficiently to support the hip firmly in the new socket. At this time the lower part of the spine and the hip should be carefully manipulated to build up the muscles which have atrophied during their long period of enforced rest. The motion of the hip-joint will be found to be slightly restricted. This can be improved by careful passive motion of the joint and will get gradually better as the patient uses it. Vigorous manipulation of the hip at this time may dislocate it.

Preliminary Treatment.—It is questionable if long preliminary treatment is of any value where the Lorenz operation is to be performed. Where the general health needs improvement, treatment given for that purpose is certainly advisable, but a long course of treatment given to the hip with the view of making the operation less difficult is in many cases a detriment rather than a help. In my own experience I have found those cases that have had long preliminary treatment more difficult to reduce than those that have not.

This character of treatment, as before stated, will increase the strength of the limb and improve locomotion, but the tissues that resist a reduction of the hip are also made stronger. The muscles become larger and stronger, but not permanently lengthened; the capsular ligament thickened and more resistant; and too, as time goes on, the deformity of the acetabulum and head of the femur becomes more marked. In cases under five it may be safe to attempt a short preliminary treatment, but in older cases in good health it is not advisable for the reasons already mentioned; the loss of time also must be taken into consideration, as it is very difficult and in many cases not possible to secure a reduction after the age of six.

Possible Injuries.—In cases where extreme force is used on account of unusual resistance or in older cases where ordinary resistance is great, the operator may fracture the femur or detach the epiphysis from the head of the bone or the ischium may be fractured. In case any of these injuries occur the operation must be stopped, the fracture reduced and treated as a fracture in any other case. In careful and experienced hands it is not very likely that any of these accidents will occur. There is practically no mortality in connection with this operation.

Concluding Remarks.—So much has been said pro and con about this operation that it is evident that it is not thoroughly understood by many who discuss it. It must be admitted that the operation is not a success in all cases, even where a reduction is made in the beginning of treatment. Most of the failures arise however, from the improper application of this method on the part of the operator or from operations attempted on cases that

are too old. The cast is too often applied where a reduction is not secured and in such a manner as to fail to maintain a reduction if it had been secured. This operation is thoroughly in harmony with osteopathic principles, in that adjustment is essential to development. I have seen a shallow acetabulum and a small head of the femur develop to almost normal depth and size after six months of maintained adjustment. Inasmuch as there is absolutely no hope of a cure outside of this or the open method, it is advisable that it be given a trial in all suitable cases.

The Hoffa Method.—This method will not be described here inasmuch as it has been practically superceded by the Lorenz method in all cases that have not passed the age limit. The cases selected for this operation are usually between the ages of six and ten. In this operation all structures that resist a reduction are divided, the joint laid open, the acetabulum gouged out; the dislocation is then reduced, and the limb placed in such a fixed position as to maintain it. After a short time passive motion is instituted which is gradually increased in force and frequency. The mortality in connection with this operation is quite high. In some cases the joint is left ankylosed.

Two radiographs[1] are here reproduced showing the condition of the hip before and after the Lorenz operation. The patient is a boy six years old. I reduced the hip April 1, 1906, and removed the cast August the 20th following at which time the second radiograph was taken. During this time, with the exception of the first two or three weeks the patient ran about as other children, experiencing little discomfort on account of the cast. After lessening abduction and flexion a lighter cast was put on in place of the old one. There is every evidence that this case will be absolutely successful as the hip is in good position, the head of the bone is developing and the socket becoming better formed and deeper. Radiograph No. 1 shows the head of the femur well up on the ilium while No. 2 shows it in correct position, it also shows the position of abduction and flexion in which the limb must be maintained during the period in which the first cast is worn.

1. Cuts 7, 8, 11, 12, 13, 14, 15, 16 are re-drawn from radiographs made by George M. Laughlin, at the American School of Osteopathy.

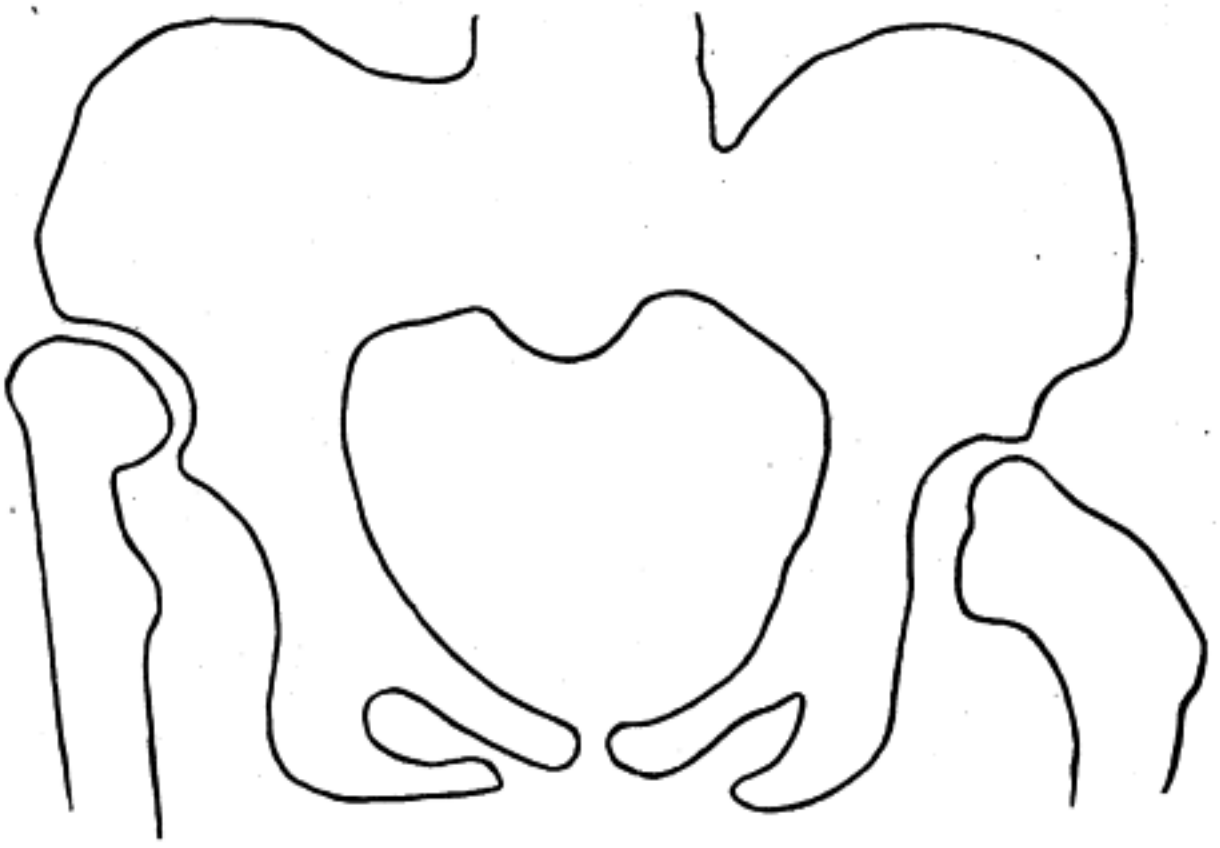


FIG. 7.—Position of the femur before reduction.

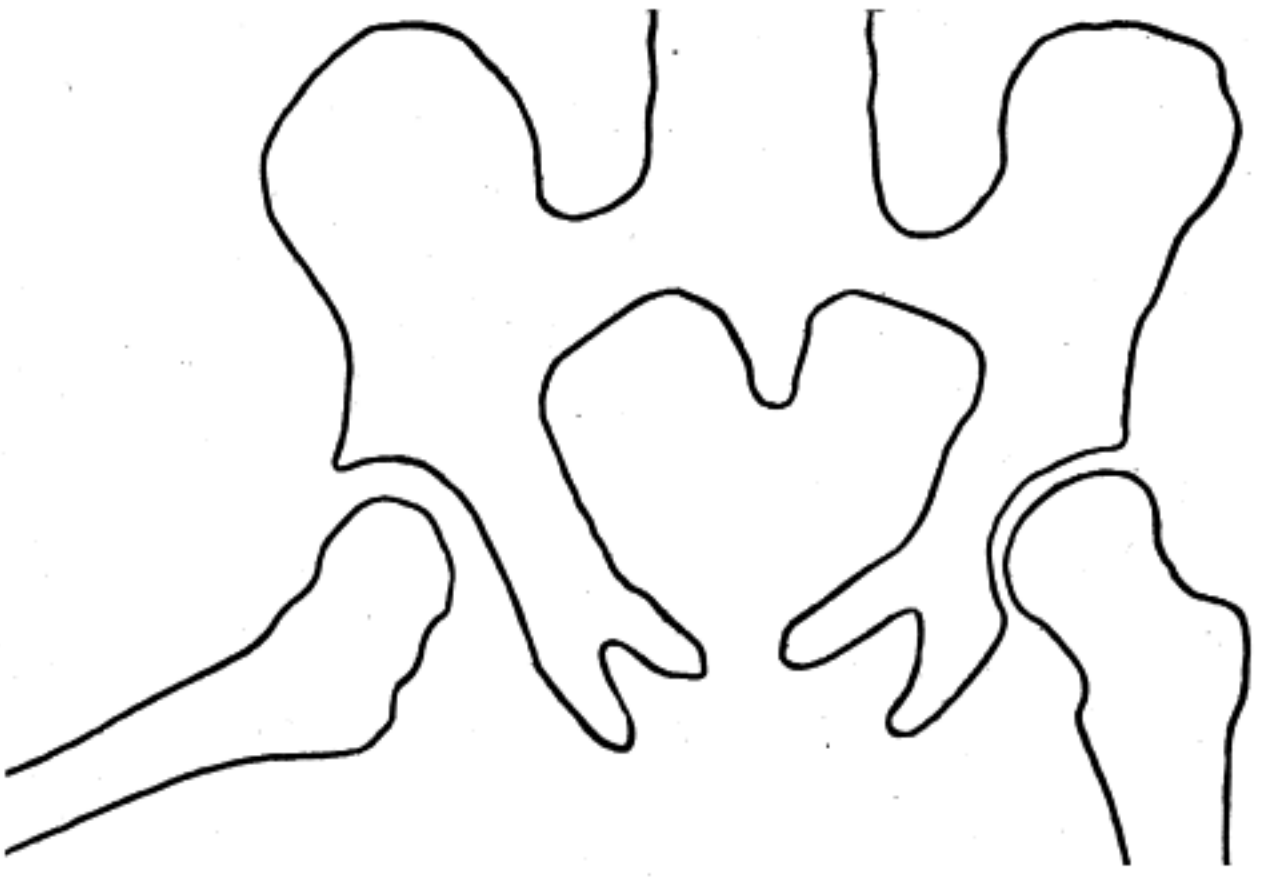


FIG. 8.—Position of the femur after reduction and the cast removal.

HIP-JOINT DISEASE.

Hip-joint disease is an arthritis of the hip-joint, tuberculous in character, and usually chronic. Unless the disease is checked by treatment or natural processes it results in destruction of the joint with permanent shortening of the limb; it is, however, not the only disease of the joint that may terminate in its destruction. In some cases of rheumatism and rheumatoid arthritis the joint undergoes destructive changes that cause permanent deformities. Following pneumonia and many of the other infectious diseases, the hip-joint may become infected by the germs of these diseases finding their way into the tissues about it, and thus setting up an arthritis. This is usually acute in character and often terminates in suppuration. In all of these inflammatory conditions of the joint we find, to a greater or less extent, the ligaments and cartilages giving way and the bony tissue forming the articulation becoming carious and breaking down. The **causes** of hip-joint disease are **predisposing** and **exciting.** Constitutional weakness, predisposition on account of inherited tendencies, unhygienic surroundings, injury to the hip, or any other cause that might lessen the vitality of the articular tissues, are the most prominent predisposing causes. The exciting cause is the tubercle bacillus.

Symptoms and Physical Signs.—More commonly the disease makes its appearance between the ages of three and twelve, although it may begin at an earlier or later period. The patient, therefore, is usually a child and the first sign of the disease to be noted is a slight hip limp. There is often a history of some minor injury to the hip some weeks or months prior to this time. This injury is often lost sight of by the parents, not being sufficiently serious to require any treatment and from which the child had apparently recovered. For a time this lameness may disappear only to make its appearance again in a more pronounced form. Later on the child usually complains of pain at the hip and knee. In the **early stages** of the disease the leg may be lengthened as much as two inches; this condition is brought about by the pelvis

being rotated forward and downward on the affected side. The spine is curved toward the affected side in the lumbar region. The leg is advanced when the child stands; it is also everted, flexed and abducted. This deformity is a result of the disease of the joint and not a cause of it, as it becomes more pronounced as the disease advances. On account of the irritation in the joint the muscles about it are contracted—nature's effort to give the joint rest. The deformity that has so far taken place is chiefly the result of the patient's effort to secure the greatest ease possible by assuming the position that will remove pressure from



FIG. 9.—Hip-joint disease of right hip, showing lengthening and eversion of the leg. Early sign.



FIG. 10.—Hip-joint disease of the left hip showing stage of adduction, shortening and inversion of the leg. Late sign.

the inflamed joint. As time goes on the pain and lameness are more pronounced, the child becomes restless and frequently cries out at night, being suddenly startled from sleep. This last symptom is so diagnostic of bone disease that it is known as the "osteitic" cry. As the disease farther advances the capsular ligament degenerates, allowing the head of the femur to pass upward and backward on the ilium. At the same time, however, the rim of the acetabulum and more or less of the head of the femur are destroyed. A **change in** the **deformity** is now observed. The leg is shortened; the pelvic bone on the affected side is ro-

tated backward; and the spine is curved toward the sound side. The limb is still flexed, but is now adducted and inverted. After the breaking down process has commenced one or more abscesses about the hip may develop, acting not only as a great source of annoyance to the patient but as an absolute menace to his life. **Fever** and **constitutional disturbances** are then observed. From the very beginning of the disease the motion of the hip-joint is limited; this becomes more marked as the disease advances. Early in the disease the gluteal region is flattened and the muscles are soft, but after shortening once commences this region becomes prominent not only from the fact that the femur is displaced upward and backward, but also on account of the formation of new fibrous tissue behind and above the great trochanter, and from the thickening and hardening of the surface of the bone near the joint as a result of periostitis. When this last condition is present it is an indication that the disease has spread from the cancellous portion of the bone to the surface and into the joint cavity.

Pathological Anatomy.—The primary focus of infection may be in the synovial membrane of the joint, if so synovitis is an early symptom; in the periosteum near the joint; in the cancellous portion of the head or neck of the femur; or the acetabulum. From any of these original foci the infection may spread until it involves all parts of the joint.

In the great majority of cases the infection primarily takes place in the epiphysis of the head of the femur. When the bony parts are involved they become enlarged and rarefied or carious. The septa between the cancellous spaces are destroyed which leaves the bone soft and honey-combed. In some instances the entire head of the bone is absorbed and the acetabulum enlarged and elongated. Sequestra of necrotic bone are occasionally met with. If the joint becomes infected with pus-forming germs it is rapidly destroyed. In such cases spicules of dead bone are often discharged from the abscesses. The ligamentum teres and capsular ligament undergo softening and are absorbed, in part, and replaced by fibrous tissue. The whole destructive process is one of chronic inflammation, characterized by the formation of tuberculous tissue and granulation tissue. When bone in-

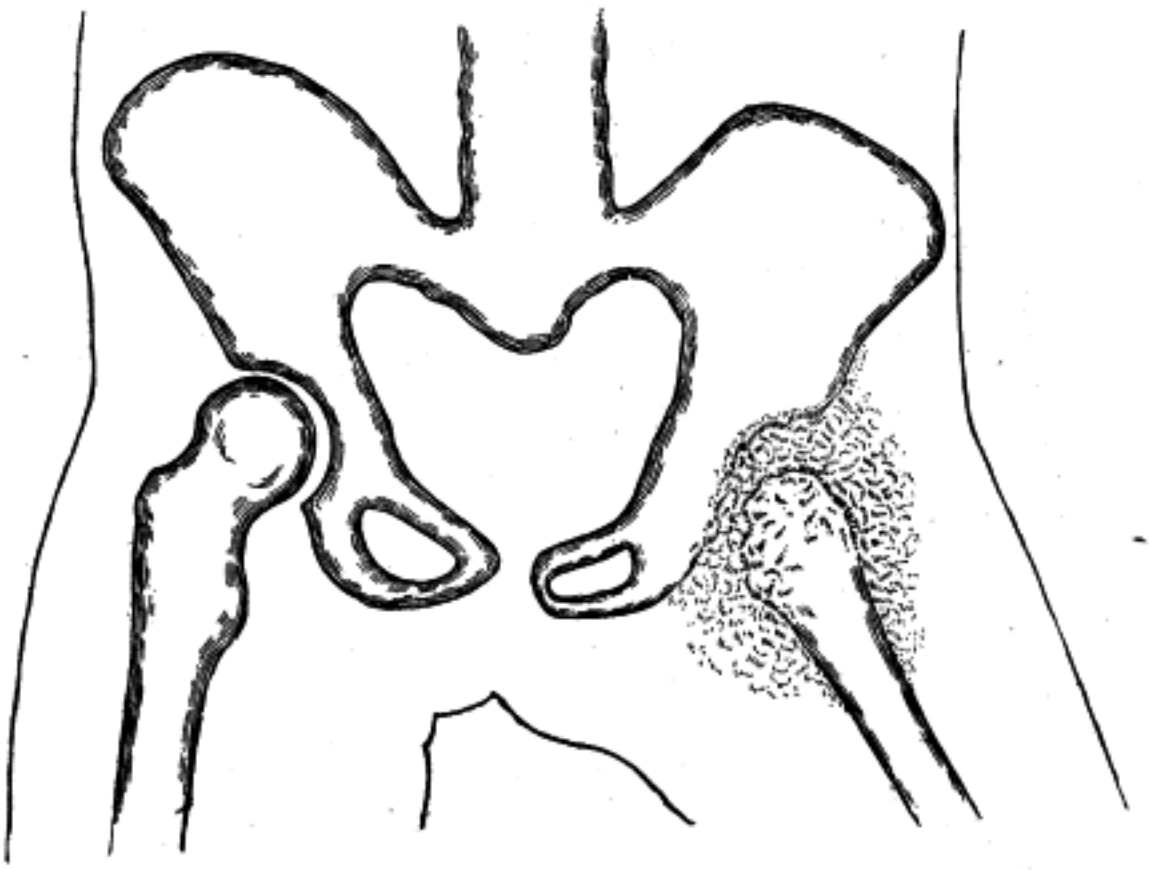


FIG. 11.—This is a case of tuberculosis of the right hip in a little girl six years old. Posterior view. You can observe that the pelvis is tilted down on the lame side. This condition accounts for the lengthening of the leg in the first stage in hip-joint disease. You will also notice the abduction of the right femur. Diseased bone does not give as definite a shadow as healthy bone. This condition is noticed here in the difference between the right and left hips, the right or diseased one giving a much less distinct shadow, due to the rarefied condition of the bone. The diseased bone is still in the socket. No abscess in this case. This case has had one year of osteopathic treatment and has shown remarkable improvement. The condition at first was that of much restricted motion, severe pain, and general poor health. The child could not move from the bed. After one month the child began to walk on crutches and since that time the improvement has been steady in every particular. After one year there is no pain, good motion, but the child still uses crutches. I believe in another year the crutches can be discarded and a cure will result without marked deformity or dislocation. The progress of the disease was evidently stopped during the first few months of treatment, otherwise, deformity would result from absorption of the bone. Treatment in this case consisted in straightening up of the spine, the lumbar portion being posterior and somewhat lateral. Treatment was also applied to straightening of the pelvis. Very little treatment was given to the hip itself in the way of rotation of the leg. Length of standing of the disease, two and one-half years.

(These notes on this case were made over five years ago. After the time that these notes were made, the child returned to her home and continued treatment under an osteopath; she was treated irregularly for about a year and a half. I recently saw the case and noted the following: Patient in the best of health, large and well grown, had discarded crutches and walked without a limp; there was about one-half inch of shortening but motion in hip was good. Result, permanent cure with practically no deformity. In this case crutches only were used to protect the joint.)

flammation becomes quiescent, the rarefied or carious portion not absorbed in the active stage of the disease becomes dense and hard. Bony ankylosis in joints that were once diseased takes place as a result of this change where the surfaces of two diseased bones are in contact.

Course and Prognosis.—The disease runs a variable course of from a few months to four or five years or even longer. Cure may be obtained at any stage of the disease with bony or fibrous ankylosis, while if cure takes place early in the disease before much destruction has taken place, motion may not be greatly impaired, or at least, after the disease becomes thoroughly quiescent the motion can be greatly improved by treatment. If abscesses occur and are allowed to become infected, serious complications arise that may cause the case to terminate fatally. The presence of pus in the hip for a long period gives rise to fever, profuse perspiration and much constitutional disturbance. This condition may terminate in sapremia, pyemia, or amyloid disease of the kidneys. When any of these complications arise the case assumes an unfavorable outlook. The course of the disease is usually favorably affected by proper treatment and hygienic surroundings, but any case even under the most favorable circumstances may do poorly, progressing from bad to worse and finally terminating in destruction of the joint with more or less deformity, or in death from some complication already mentioned. Cases that do poorly sometimes develop miliary tuberculosis of the lungs or some other part from which, as a rule, death results.

Diagnosis.—The diagnosis, as a rule, is not difficult. The history of a case and the physical signs are sufficient to differentiate any stage of this disease from a partial or complete traumatic dislocation. I have known of hip disease being treated for obturator dislocation during the early stage of apparent lengthening of the limb, the patient being greatly injured at the very time when a cure is possible with little or no deformity. It is differentiated from sacro-iliac disease by the following tests: In sacro-iliac disease tenderness on pressure is elicited over the sacro-iliac articulation; there is no limitation of motion of the hip as in hip-joint disease; and if the pelvis is compressed pain

will be complained of. This last symptom is not present in hip-joint disease.

To distinguish hip-joint disease from an arthritis that frequently develops in connection with acute infections like scarlet fever, pneumonia, etc., it is well to remember that the latter condition is acute, and suppuration, when it occurs, takes place rapidly. In hip-joint disease, as a rule, many months' elapse before abscesses appear. In hip-joint disease physical signs develop before symptoms, while in any acute arthritis symptoms make their appearance first.

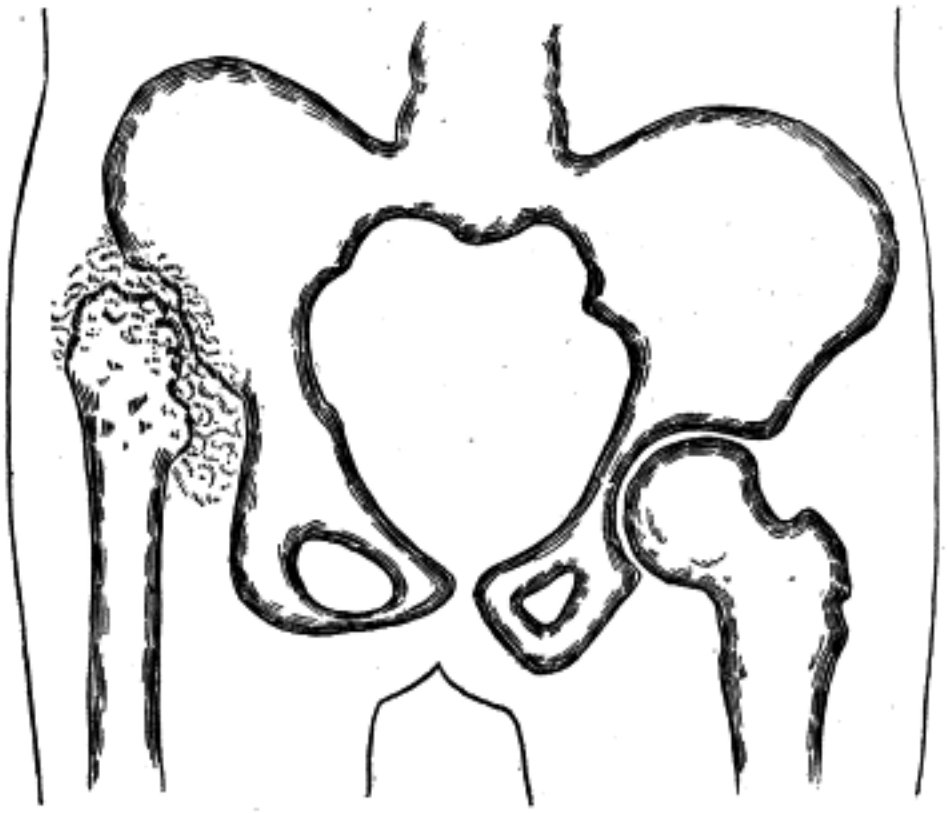


FIG. 12.—Case of tuberculosis of the hip-joint showing complete destruction of the head and neck of the femur. The rim of the acetabulum is also missing.

Treatment.—Osteopathy has added much of value to the treatment of hip-joint disease. But it must be remembered that manipulation alone is not the only means to be used in treating this condition, and indeed where it is used at all, it must be administered carefully and with good judgment. A knowledge of the pathological condition of the joint during the various stages of the disease will enable the practitioner to determine the character of treatment required in each case. The practitioner will be

able to determine to a reasonable degree of certainty, the condition of the joint in any case by the physical signs and symptoms present, but the use of the X-ray is of the greatest importance in determining this matter. A good skiagraph will show to what extent the bone has been absorbed. In the active stages of the

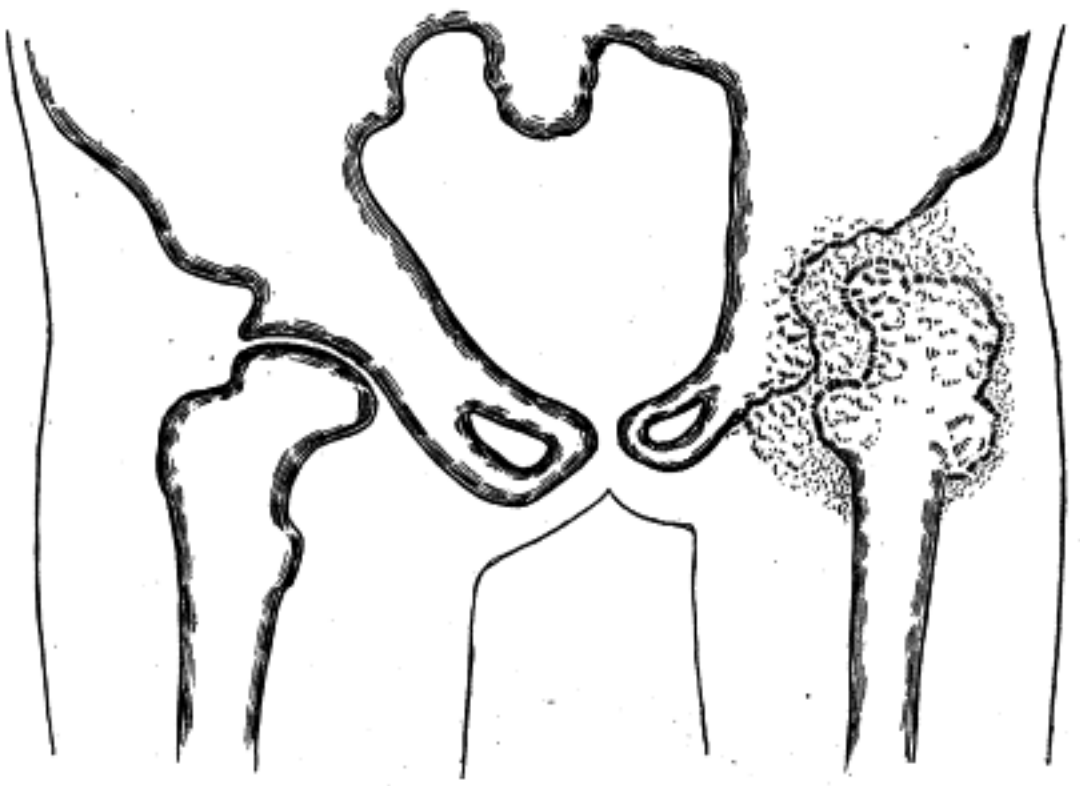


FIG. 13.—This cut is taken from a drawing made from a radiograph in a case of tuberculosis of right hip. The head of the bone and acetabulum are both eroded to a considerable extent, producing shortening of the limb. At the time this picture was made the disease was well advanced but still active. The extreme rarefied condition of the bone on the diseased side is detected by the very light shadow made by it. This case has been under my observation or treatment for the past four years. At the time the case reported for treatment the joint had already broken down and the leg was flexed to a right angle with the body. There was extreme pain and inflammation. Rest in bed and gentle treatment soon put the patient in such condition that he could go about on crutches. Results at present time are: Good, general health, no pain or inflammation, motion almost normal, leg can be fully extended with about an inch and one-half shortening. The disease has apparently quieted, but patient still uses crutches. They can be laid aside soon.

This radiograph was made two years ago. Note the twist in the pelvis and the adducted leg on the lame side—both conditions being the reverse of those found in the first stage of this disease.

disease when a rarefying osteitis exists, its extent can be outlined by the light shadow made by bone thus diseased. It is also of great value in determining in the quiescent stage whether or not bony ankylosis exists.

There are certain **general principles** that must be observed

in the treatment of this disease in all its active stages; viz., the joint must be given rest, and the general nutritional condition of the body must be kept up to its highest possible point. As soon as the disease is discovered, the child should be placed on crutches and instructed to refrain from placing any weight on the diseased limb even though it may cause him no pain. It is often well to have an extension of two or three inches placed on the sole of the shoe on the sound side in order to better protect the diseased hip. If the stiffness and pain in the hip becomes more marked, the patient should be confined to the bed until all symptoms have thoroughly subsided. Prolonged rest in bed however, with or without traction, is too baneful in its effects on the general health to be advised. Even from the very beginning of the disease, in all cases, the joint must be relieved from weight bearing and in order to further protect the hip, a fixation splint is often advisable.

The **osteopathic treatment** given in the early stages of the disease consists chiefly of manipulation directed to the spine to improve elimination and digestion. The lumbar region of the spine which is more or less rigid and curved should be carefully corrected. This can best be accomplished with the patient sitting on the table, the osteopath standing in front. At the same time the twisted pelvis can be carefully forced back toward the normal position. The hip, with the patient on the back or side, can be gently rotated, flexed and extended, provided it causes the patient no pain and the movements are not given against resistance. In fact, no movements either to the pelvis or hip should be given if they cause the patient the slightest pain. The reasons for this caution are apparent. Hip-joint disease is a chronic inflammation of the articular structures, and one of the cardinal principles in the treatment of any inflammation is rest with the removal or prevention of any irritation. At the same time, if the circulation to the inflamed part can be improved, the result will be beneficial. Movements that are painful to the patient irritate the diseased joint and hasten the destructive processes, while violent treatments may even crush the bony tissue, already

rarefied and softened by an inflammatory process, and permanently destroy the joint.

The following manner of caring for cases of tuberculous hip, I have found very satisfactory: As soon as the patient is presented for treatment and the diagnosis of hip-joint disease made, the patient, if not already using crutches, is instructed to use them and an extension on the sole of the shoe for the sound leg is ordered. The patient should be kept in the open air as much as possible during pleasant weather and the diet should be nutritious and only that amount and quality given that can be easily digested. I have never had any trouble in keeping the patients strong and healthy by the treatment already described, except where infected abscesses existed. The patient should be kept under treatment or observation for some months after all signs of inflammation have subsided even though several years may be required. If at any time the disease shows evidences of advancing, manifested by such signs as slight shortening; thickening of the tissues behind and above the great trochanter; and increased flexion, all of which indicate the beginning of a breaking down process of the joint, the child should be confined in bed and traction employed for some time until the deformity is reduced, after which a long splint should be applied to the leg and pelvis to prevent the recurrence of the deformity and to make limited fixation for the joint. The patient is now allowed to walk about with crutches and the spinal treatment already described continued. Where **traction** is employed to correct deformity, it should be used in the direction of the long axis of the femur with the knee elevated. After a time, the leg can be brought down in line with the body, and then the long splint should be applied, which should be worn continuously for some months or until the diseased process has subsided. Sayre's long hip splint is probably among the best for this purpose.

If **abscesses** develop at any time during the course of the disease, great care should be exercised in their treatment. Their presence is detected, before they open on the surface, by a fluctuating swelling at some point about the hip or down the front part of the thigh. Sometimes this fluid or tuberculous pus is

absorbed and the abscesses do not open, but as soon as they appear to be coming through to the surface, they should be opened and drained. Great care must then be taken to keep the abscesses from being infected from without. The surface about them should be kept thoroughly cleansed and the openings padded with sterilized gauze or cotton. They should be dressed daily and in some cases oftener. If infection should take place, it sometimes does good to irrigate the abscesses with borated glycerin or some other mild antiseptic solution.

When the **disease becomes quiescent,** if bony ankylosis does not result, great benefit can be given the patient by improving the motion of the joint. This is accomplished by gradually and gently breaking up adhesions about the joint. In this manner a part of the fibrous tissue near the joint is absorbed and motion improved. Where there is much **deformity,** a long course of treatment is usually required to secure a satisfactory result. The osteopath should use great care in determining that the disease is thoroughly quiescent before attempting to secure better motion in the joint, as it is possible to start up the destructive process again if treatment is commenced too soon. If at any time the joint should show signs of inflammation, the treatment should be postponed.

The best results in these cases are secured by using **plenty** of **time** and **mild measures.** Vigorous manipulations of the hip or forcibly breaking up the adhesions under an anesthetic do not secure the same satisfactory results in quiescent cases of hip-joint disease as are secured in cases of fibrous ankylosis following many of the other inflammatory joint affections.

FRACTURE OF THE NECK OF THE FEMUR.

The large number of cases that come to the osteopath for treatment for an old fracture of the neck of the femur, is the reason for discussing this subject in this place. In many instances, the patient thinks his trouble a dislocation, and the physician to whom he goes for treatment often makes the same mistake. It is not our purpose to discuss here the treatment for recent fracture, except to state in a general way the principles of

such treatment, but rather to consider the treatment of those old cases of fracture where the patient is left with a deformity. Of the many cases of lameness with shortening in people past fifty where there is a history of comparatively recent injury, probably 95 per cent. suffered from fracture of the neck of the femur with non-union or fibrous union in bad position. Out of a series of sixty cases above the age of forty-five and where there

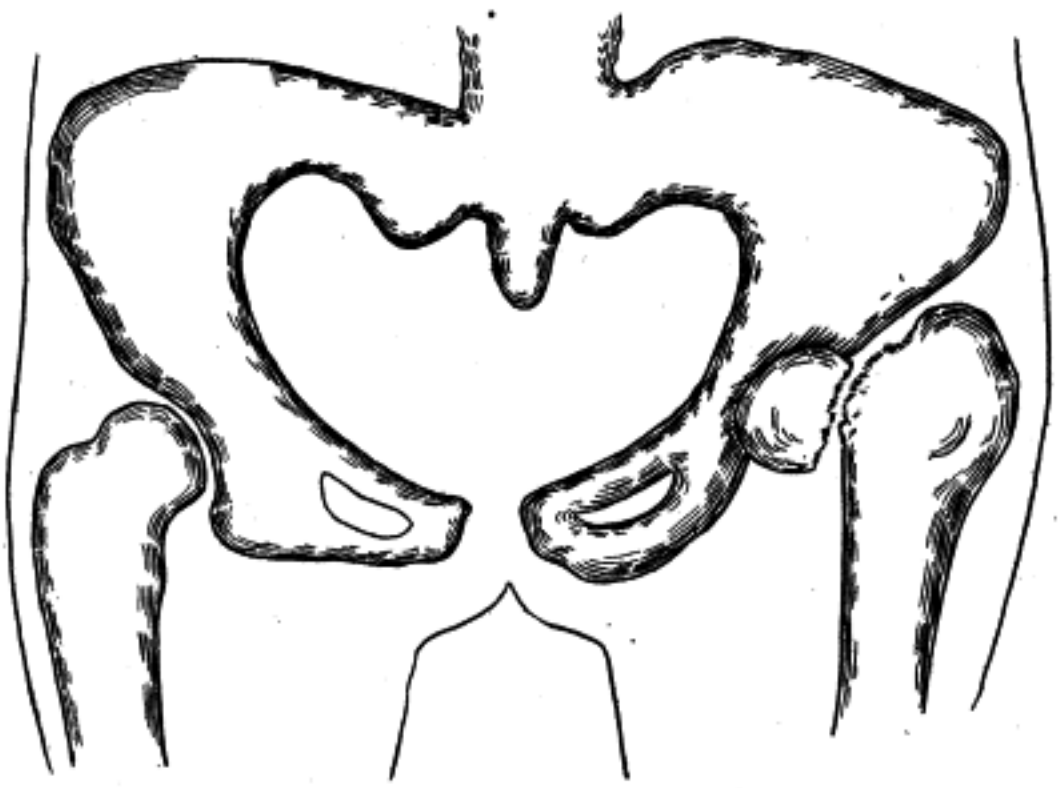


FIG. 14.—This is an interesting case. It is that of a woman fifty years of age who, about a year ago, fell and fractured the neck of the femur on the right side. The fracture was correctly treated and good position was maintained for sometime but union did not result. The head of the bone can be seen in the socket and the line of fracture and non-union plainly made out. At the time of this injury the innominate, on the affected side, must have been thrown back full three-quarters of an inch as it was found in that position on first examination. Perhaps this condition lessened the chances for union as it certainly affected nutrition to the joint. There was an inch of telescopic motion in this case.

was a history of injury followed by permanent shortening, examined by the X-ray, all but two showed fracture of the neck of the femur.

Fracture of the neck of the femur usually occurs in people past middle age, although it may occur at a much earlier age. In our own practice, we recently had one such case in a boy of fourteen. In young people, bony union results, the limb being

left in good or bad position depending on the character of treatment following the injury, but in older people, bony union is rare, probably never occurring in cases past sixty.

In one case in our own experience, bony union occurred in a patient fifty-two years of age, while in several others, ranging from thirty-five to forty-five, non-union resulted, the same treatment being employed in all cases. Whether or not bony union will result and the patient be left with a useful limb without



FIG. 15.—This is a case of fractured femur, left hip, in a woman sixty years of age. Fibrous union resulted here. The patient was greatly benefited by treatment, being able to discard her crutches after six months. The fracture occurred eighteen months before beginning treatment.

deformity, will depend upon the age, constitutional vigor of the patient, and the mode of treatment employed in the case.

In old people a very slight injury may result in fracture while in the young it only results from severe violence. Dislocations of the hip occur from indirect violence; fractures from direct violence, force usually being directed against the great trochanter, as, for example, from a fall directly upon it.

Physical Signs and Symptoms.—In cases of old fracture with deformity, there is always a history of injury immediately fol-

lowed by inability to use the limb. The patient usually remains in bed for some weeks or even months, after which, if not too old and feeble, he gets about on crutches. At this time it will be found that the patient is unable to bear his full weight upon the limb, there is more or less shortening, the limb is everted and there is marked limitation of motion at the hip. In some cases there is much pain at the knee and hip, while in others it is absent. The great trochanter is prominent and advanced upward. If there is non-union, crepitus can be detected and there is some telescopic motion.

Diagnosis.—Fracture of the neck of the femur can be readily differentiated from dislocation of the hip by the age of the patient and the marked difference between the physical signs in each. It can be differentiated from any arthritis resulting in shortening by the difference in the clinical histories. Shortening following hip-joint disease, rheumatism, rheumatoid arthritis, or any infective acute arthritis develops slowly in comparison to the shortening following fracture. Then, too, a history of injury is usually lacking in arthritis, but when such a history is obtained, the injury is not sufficiently serious to completely disable the patient for any considerable length of time immediately following it.

Treatment.—Treatment **immediately following** a **fracture** consists of maintaining the leg in proper position by the use of splints to prevent shortening and eversion, to keep the fractured ends in proper position and to prevent motion at the point of fracture so that union may occur in good position; or sand bags may be placed at both sides of the limb and extension applied to the leg in the form of a weight and pulley. As the patient must remain in bed for some weeks, this treatment cannot be successfully used where the patient is old and feeble. From the long continued recumbent position hypostatic congestion of the lungs may result or the patient may succumb to the shock of the injury and the confinement of the treatment. In favorable cases, good results are usually obtained from this treatment, but non-union may occur even in middle aged people, especially if the patient is in poor health. In **impacted fracture,** great care should be taken not to disturb the impaction.

Old fractures may be divided into **four classes** for the purpose of discussing the treatment for each. **First,**—Where bony union results in good position; **second,** impacted fractures; **third,** fibrous union with shortening and eversion; **fourth,** non-union with telescopic motion.

In cases where the **fracture** has **united** in **good position** it often happens that the patient is left with much pain about the hip, that the motion of the hip-joint is greatly impaired from the formation of new tissue about it and that there is great difficulty in walking on account of weakness and pain in the limb. One case of this kind was unable to walk without crutches for several years after the time the fracture occurred. In this case complete recovery took place after six months' treatment.

In this class of cases passive motion of the limb should be instituted as soon as the fracture has safely united, and continued until practically all soreness and limitation of motion has disappeared from the hip. The lumbar spine which is usually rigid should also be thoroughly loosened up. At first the treatment should be given very gently but later on as the case improves, more vigorous manipulations may be successfully employed. In impacted fracture, the same treatment may be used after union has taken place. The object in view is to improve the motion and strength of the limb by carefully breaking up the fibrous tissue about the joint and causing its absorption. Of course, some shortening and limitation of motion will result, but the limb will be rendered more useful by this treatment.

The great majority of **old cases** that we have seen belong to the third class, where there is shortening and eversion with more or less fibrous union. In most of these cases, no treatment was attempted at the time of injury, the physician in attendance overlooking the fracture or allowing it to go untreated for some other reason. It has been my observation that in most all **untreated cases** there is more or less fibrous union but considerable shortening and eversion. In such cases, the patient is left with a limb that, after a time, he is able to walk upon with the use of a single cane or stick. It seems that where shortening is allowed to take place immediately following the injury, as in untreated

cases, fibrous union is more apt to occur than in cases where the fracture is maintained in good position by extension. At least, unless good firm union takes place while the fractured parts are maintained in good position, the limb will be less useful than in cases where the fracture is allowed to go untreated.

The treatment for cases of this class is somewhat similar to the treatment already described except that great care should be taken not to break up the adhesions about the fracture. At the same time it is desirable to improve the motion of the hip-joint by careful manipulation of the hip and limb. Traction and rotation gently applied in these cases is more satisfactory than forced flexion. Sometimes **bony union** occurs in **bad position,** if so, more vigorous passive motion may be given the limb. In any of these cases, all that can be hoped for is to increase the usefulness of the limb and to relieve pain. The deformity cannot be corrected.

In cases of **non-union, crepitus,** even in long standing cases, can be detected when traction and rotation are applied to the femur in a partially flexed position. The femur also can be felt to slip up and down. In such cases, the patient is unable to walk without the support of crutches and often complains of much pain. He is also unable to flex the thigh. I have found it beneficial in these cases to treat the hip in the following manner: Have the patient sit in an ordinary chair. The osteopath then stands with one leg between the patient's knees and then stoops to an almost sitting position and balances himself by resting his weight on the patient's sound knee, he then lifts the fractured limb across his knee. The osteopath places one hand against the ilium and the other under the patient's knee and in this manner applies steady traction and rotation. Many of these cases are greatly helped by increasing the strength and tone of the muscles and by removing inflammation and pain, but it is very doubtful if sufficient union will ever take place to enable the patient to walk without support.

In all cases of **old fracture** in order to secure the best results, the treatment should be continued for some months or even for a year or more. Special attention should always be given to the condition of the patient's general health.

HIP DEFORMITIES IN INFANTILE PARALYSIS AND OTHER SPINAL DISEASES.

As a result of spinal diseases, such as infantile paralysis, where there is much atrophy of muscles and contraction of the tendons in the legs, the deformity is frequently so marked that the condition is often mistaken for dislocation of the hip. The

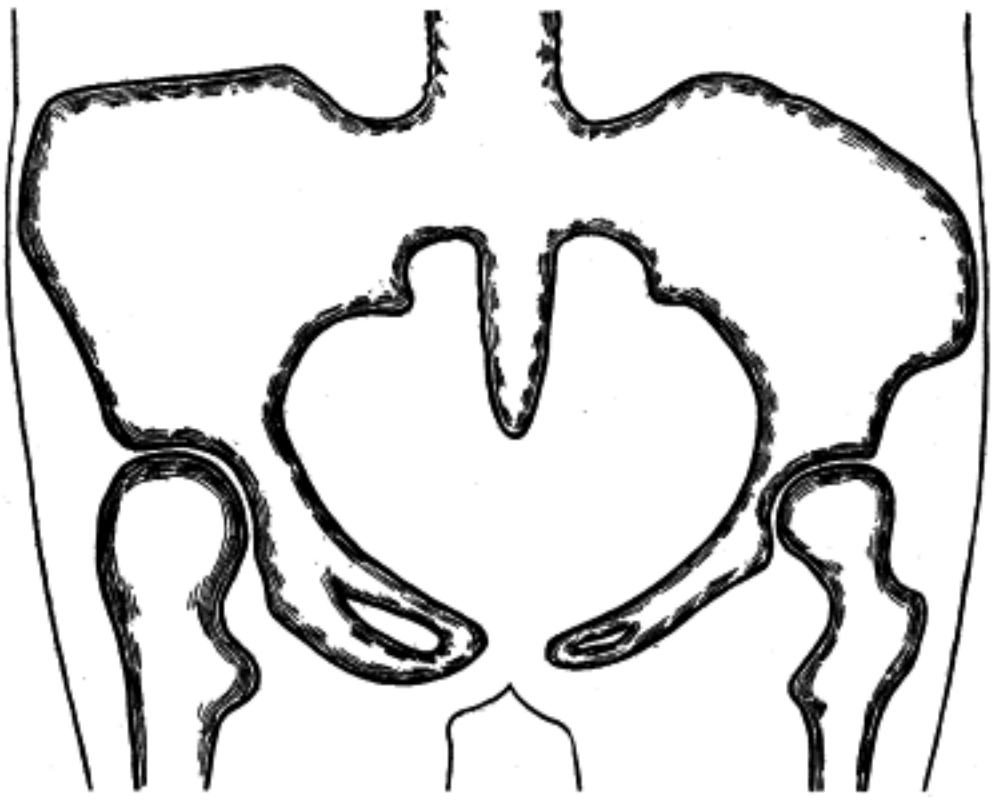


FIG. 16.—This is a case of infantile paralysis of the right leg in a young lady of twenty-five, and is of twenty years standing. In this case the affected leg is about three inches shorter than its fellow, and the patient cannot support her weight upon it except with the use of a brace. This radiograph is reproduced for the purpose of showing the condition of the hip-joints. The right hip, although undeveloped, rests in the upper part of the socket. The left one is normal in every particular.

Figures 1-2-3-4-5-6, used in this chapter are re-drawn, by permission, from Cohn's system of Physiological Therapeutics. P. Blakiston's Son & Co., publishers.

physical signs of dislocation are not present, but where a mistaken diagnosis is made of dislocation, it is attributed to the fact that the patient walks with a marked limp and that there is sometimes more or less shortening.

I have examined a great many cases of infantile paralysis with the X-ray. Although I usually find partial dislocation, I have yet to find a case where the hip was completely out of the socket. Where one leg only is affected, the trouble is more apt to be diagnosed as a dislocation than where both legs are involved. It should be remembered that dislocations do not produce an extreme atrophy nor marked tendon contractions afterwards. It should also be remembered that the atrophy and deformity which follow spinal diseases are due to degeneration of the cord and that whenever partial dislocation of the hip results, it is not a cause for the bad condition of the limb, but is simply a result of the disease of the cord.

The accompanying radiograph shows the difference between a normal and an abnormal hip-joint in a case of infantile paralysis where one limb alone is affected.

Treatment.—In old cases of infantile paralysis with deformity of one or both legs, treatment should be directed to the spine for the purpose of improving circulation to the cord. In this manner a favorable influence is exerted upon those cells or fibers lying in close proximity to the degenerated areas, but, of course, no change can be made upon the degenerated neurons that have been replaced with fibrous tissue. The deformed limb should be forcibly flexed, extended and rotated and the contracted muscles and tendons thoroughly stretched. If the deformity is not great, it can be corrected or greatly improved by a long course of treatment carried out on the above lines, but if there is marked deformity, tenotomy and forced correction under an anesthetic followed by fixation of the corrected parts must be resorted to.

In cases of many years standing, we have improved the nutrition to the limb by manipulation directed to the spine and limb for a number of months, to the extent of increasing its circumference as much as two or three inches.

In cases of deformity of the legs due to brain lesions or to lesions in the lateral columns of the cord, followed by a spastic condition of the muscles with contractions and deformity, spinal correcti vework given for the purpose of improving the circulation to the parts of the cord or brain involved will often exert a

favorable influence on the deformity by lessening the spasticity of the muscles. For the correction of deformity that does not respond to spinal treatment, the same procedures should be followed as in cases of infantile paralysis.

Arthritis of the Hip-Joint.—By the term arthritis, we mean any inflammation of the joint which involves all of the structures of which it is composed, namely—bones, ligaments, cartilages and synovial membrane. We have already discussed tuberculous arthritis which is, as a rule, a chronic affection, but under this heading, we will take up a number of other and special forms of arthritis involving the hip, which may terminate in its destruction.

Any form of arthritis is usually due to infection of the joint cavity with bacteria which reach it usually from within the body; for example, if the patient is in low state of health, the natural germicidal powers are diminished and if germs are present in the system, they gain access to the blood stream and finally attack any weak or damaged tissue producing therein a suppurative inflammation. A slight injury to the hip in a child recovering from pneumonia, measles or scarlet fever, may result in this condition.

Arthritis may also be produced by the lodgment of a pyemic embolus in the joint. It also often follows as a result of gonorrhea, but usually runs its course without suppuration. It may follow acute infective osteo-myelitis, the inflammation in the bone extending into the joint and setting up a destructive arthritis.

I have recently had under treatment, a patient who had suffered destruction of the hip-joint as a result of acute rheumatism, but in this case there was no suppuration. Suppuration practically always occurs in cases following pneumonia, scarlet fever, measles or where the arthritis is secondary to osteo-myelitis.

Rheumatic Arthritis.—Rheumatic arthritis is met with in connection with acute or chronic rheumatism. As a rule, in acute rheumatism the joints completely recover, but in some severe cases, particularly where only a few joints are attacked, the condition may terminate in partial or absolute disorganization of

the joint, but without suppuration. In one of my own cases there was five inches of shortening in the limb, as a result of this disease. The limb was maintained in extreme adduction by adhesions about the disorganized joint. When the inflammation had entirely subsided in the hip, the patient was given a number of treatments with but slight improvement. The adhesions were afterwards forcibly broken up under an anesthetic and the shortening largely overcome and the limb rendered more useful.

Typhoid Arthritis.—In connection with or following typhoid fever, an arthritis may develop in the hip-joint due to the invasion of the joint with typhoid bacillis. In this condition, as a rule, synovitis with effusion is most marked and a spontaneous dislocation may occur as a result of it, or the joint may undergo resolution without deformity. If mixed infection should occur, however, it is quite probable that suppuration will insue and that the joint will be completely destroyed.

Pneumococcal Arthritis.—I will describe herein two cases of arthritis in connection with pneumonia that will serve to describe the condition of the joint in this affection.

CASE ONE.—I was called last year to see a case of pneumonia in a lad ten years of age. He got along very well so far as the condition of his affected lung was concerned, but his recovery was slow. After the crisis came in the pneumonia, he developed a severe inflammation in the right hip. There was marked pain, especially on motion. The boy held the limb in a rigid and fixed position and would not allow it to be moved. There was slight swelling about the joint. I at once determined that he had an arthritis or a periarthritis due to the infection of the joint with the pneumococcus. In this case, however, there was complete resolution of the joint without suppuration after three weeks. The hip was given complete rest and the pain was relieved by the application of hot fomentations and applications of hot antiphlogistine and the spinal treatment given to improve the circulation to the joint. No attempt was made to manipulate the hip.

CASE TWO.—I recently examined a young lady eighteen years of age for a hip trouble. She gave me the following history:

Two years previous, she had had pneumonia and when recovering developed arthritis of the left hip-joint. Within two weeks after its appearance, abscesses came to the surface at several points, the hip in the meantime being very painful and swollen. The physician in attendance opened the joint, thoroughly washed it out and established drainage. The abscesses healed up, but the suppurative inflammation having disorganized the joint, left the hip ankylosed. At the time she came to me, I found the hip stiff. There was about an inch of shortening, but the joint tissues were in good healthy condition and she walked on the leg without pain. An X-ray examination revealed bony ankylosis between the upper part of the head of the bone and the acetabulum. This was successfully broken up under an anesthetic and a movable joint established. This breaking up, however, would not have been attempted had the bony ankylosis been complete between the entire surfaces of the head of the bone and the acetabulum, as an attempt to do so, might have resulted in fracture of the neck of the femur rather than breaking up the ankylosis.

Practically all of the cases of arthritis so far described were acute in character and due to infection. I now desire to describe a form of chronic arthritis other than already spoken of and the one that frequently attacks the hip-joint. I have observed in a number of cases of injury to the hip in people past middle age, that a chronic arthritis frequently develops afterwards, never being severe enough to cause the patient to stop walking upon the leg, but which in time, results in a slow process of disorganization of the joint and shortening of the limb. The pathology of this condition is similar to that found in rheumatoid arthritis, except that in the condition herein described, a single joint alone is affected.

I will describe one case of this character which came under my notice sometime ago. A man sixty years of age fell from a street car on the pavement and injured his hip. Although the fall stunned him considerably, he was able to get up and walk to his office. From that time on, his hip gave him more or less trouble, although he continued to walk upon it using only a cane for support. There could have been no dislocation or fracture,

because he was not disabled to the extent that either of these conditions would have rendered him. After a year or two he noticed that his leg was getting shorter and that his foot was gradually turning outward. He had more or less pain all the time in the leg and hip. I saw him six years after the accident or original injury and found the following physical signs present: The leg about two inches short, foot everted, motion in hip-joint somewhat limited, marked crepitus in the joint, some pain about the hip and in the leg; but the patient walked fairly well with the use of a cane. An X-ray examination revealed the cause of the shortening. The head of the bone and acetabulum were both considerably eroded so that the acetabulum had become much larger than normal and about half the head of the bone was absent.

Now without a complete history of the case, it would have been very difficult to have diagnosed this condition from an old fracture of the neck of the femur. Of course the radiograph revealed the true condition of the hip.

Treatment.—In cases of acute arthritis following an infectious fever, the patient should be kept quietly in bed and the hip given complete rest. No attempt should be made to move the joint although the tissues about it may be safely manipulated with beneficial effect. Spinal treatment should be given several times daily during the febrile stage, and the pain can be controled by hot fomentations over the joint. The spinal treatment improves the circulation to the joint and thus favors resolution. If suppuration ensues and abscesses appear, they should be opened, irrigated and drained. If the case progresses favorably, a limited amount of motion should be kept up in the joint to prevent ankylosis. After all inflammation about the joint has subsided and the tissues are in a healthy state, the adhesions resulting can be safely broken up, thus greatly improving the usefulness of the limb.

In cases of non-suppurative arthritis as that which follows gonorrhœa or which occurs in connection with acute rheumatism, the same general principles of treatment should be used throughout as in the suppurative forms, except in the former,

more particular attention should be paid to the excretories—the bowels and kidneys being kept active. In rheumatoid arthritis following injury to the hip, special attention should be given the spine for the purpose of improving the condition of the nervous system in general and the circulation to the affected hip.

In this disease, the hip can be safely manipulated to a reasonable degree and with benefit to the patient at any time during its course.

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