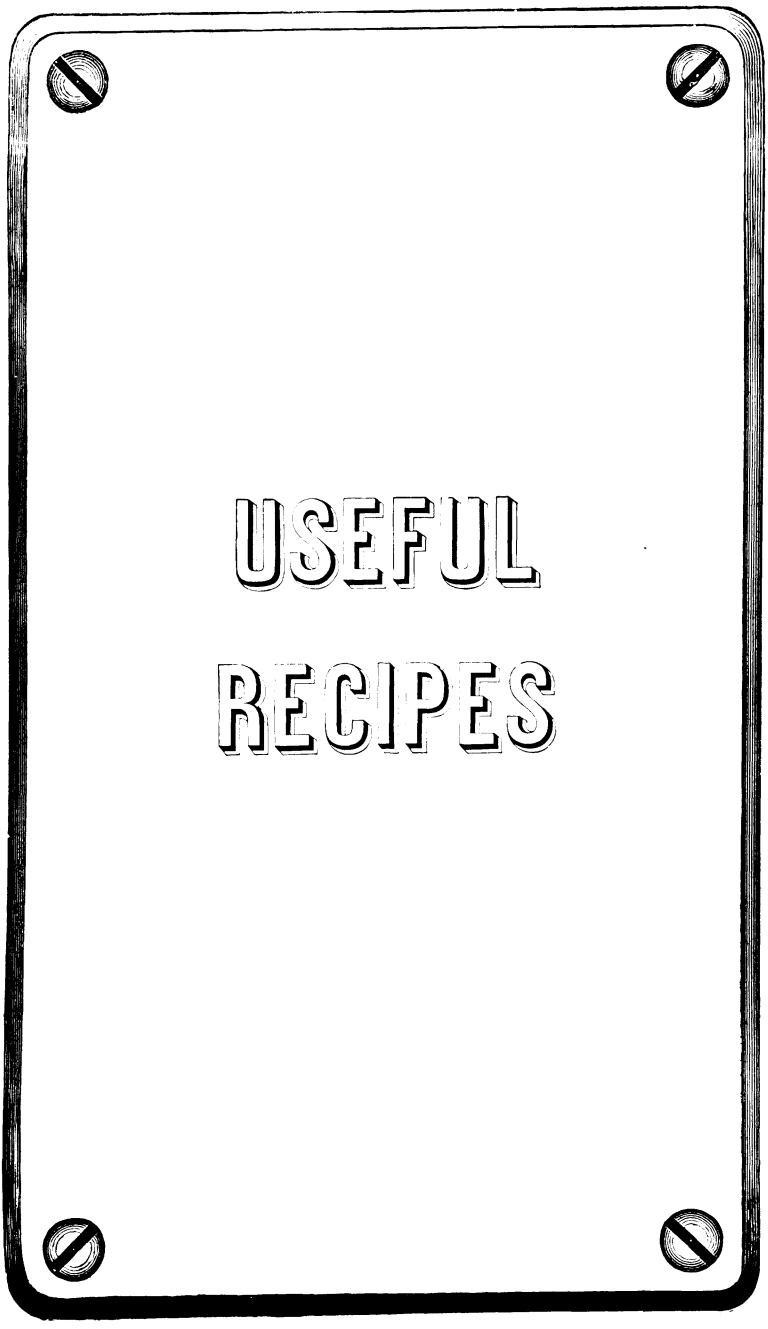
USEFUL
RECIPES

"A machinist must love the tools he uses. They are his work-day companions during life; he learns to handle them with skillful gentleness; he learns to regard them with that sort of warmth of feeling which, during the long years of association with them, unfolds itself into a genuine love for those that have stood by him—have remained 'good to the last.' They are his 'never fail me's,' and with certain ones he would not part for ten times their cost to him."

WORKSHOP RECIPES.

A recipe, in popular usage, is a receipt for making almost any mixture or preparation.

Shop recipes pertain to the shop, and embrace a thousand processes, receipts, kinks and formulas, in common report among mechanics; these are passed along from man to man and frequently are printed and thus pass into literature.

Each establishment has its own particular collection of recipes, and many of them are applicable only in their own home-land, where necessity has given them birth. In the same way, each machinist, engineer and artisan should possess, as a part of his private equipment, a good store of these useful and most helpful items of knowledge.

Each one is advised to keep a memorandum-book in which he may record, from time to time, such recipes as, in his line of activity, may be considered valuable, eliminating and omitting—like old lumber—all such as belong to outside affairs and hence of no service to the compiler of what may be properly called a "list of useful recipes."

A few only, of many of such in current use, are here presented, more as a guide for such collections which each one can make for himself, rather than as a complete exhibit of recipes and formulas.

BABBITT METAL.—Babbitt metal is an alloy, composed of tin 45.5, copper 1.5, antimony 13, lead 40 parts.

Formerly the alloy, originated by Isaac Babbitt, was used for all purposes, but there is no one composition that will bring equally good results in all kinds of machinery, hence are given the following:

WORKSHOP RECIPES.

Babbitt metal for light duty is composed of 89.3 parts of copper, 1.8 parts of antimony, 8.9 parts of lead.

Babbitt metal for heavy bearings is composed of 88.9 parts of copper, 3.7 parts of antimony, 7.4 parts of lead.

SOLDERS.—Alloys employed for joining metals together are termed "solders," and they are commonly divided into two classes: hard and soft solders. The former fuse only at a red heat, but soft solders fuse at comparatively low temperatures. Common solders are composed of equal parts of tin and lead; fine solder, two parts of tin to one of lead; cheap solder, one of tin and two of lead; common pewter contains four lead to one of tin; German silver solder is composed of copper 38, zinc 54, nickel 8 parts=100.

HOW TO SOLDER ALUMINIUM.—In soldering aluminium, it is necessary to bear in mind that upon exposure to the air a slight film of oxide forms over the surface of aluminium, and afterwards protects the metal. The oxide is the same color as the metal, so that it cannot easily be distinguished. The idea in soldering is to get underneath this oxide while the surface is covered with the molten solder. With the following procedure quick manipulation is necessary: 1, clean off all dirt and grease from the surface of the metal with a little benzine; 2, apply the solder with a copper bit, and when the molten solder is

NOTE.—The best treatment for wrought steel, which has a knack of growing gray and lustreless, is to first wash it very clean with a stiff brush and ammonia soapsuds, rinse well, dry by heat if possible, then oil plentifully with sweet oil, and dust thickly with powdered quick lime. Let the lime stay on two days, then brush it off with a clean very stiff brush. Polish with a softer brush, and rub with cloths until the lustre comes out. By leaving the lime on, iron and steel may be kept from rust almost indefinitely.

covering the surface of the metal, scratch through the solder with a little wire scratch-brush. By this means you break up the oxide on the surface of the metal underneath the soldering, and the solder, containing its own flux, takes up the oxide and enables you, so to speak, to tin the surface of the aluminium.

TO TIN A SOLDERING IRON.—File the bolt clean over the part to which the tinning is to be applied. Wet this part with soldering fluid. Heat the bolt till it is hot enough for use and rub it into solder placed upon a piece of tin. If this does not secure an even coating, heat the bolt again and attend to the bare spots in the same manner as before. If you use a soldering pot, you can keep sal-ammoniac on top of the solder, and dip the iron into the solder through the liquid.

BRAZING CAST IRON.—The reason that cast iron cannot be brazed with spelter as wrought iron can, is that the graphitic carbon in the former prevents the adhesion of the spelter, as a layer of dust prevents the adhesion of cement to stone or brick. A process to remove this graphite has been patented in Germany, consisting essentially in applying to the surfaces to be united an oxide of copper and protecting them against the influence of the air with borax or silicate of soda. When the joint is heated the oxide of copper gives up its oxygen to the graphite, converting it into carbonic oxide gas, which escapes in bubbles, while particles of metallic copper are deposited on the iron.

NOTE.—For removing rust from iron the following is given: Iron may be quickly and easily cleaned by dipping in or washing with nitric acid one part, muriatic acid one part and water twelve parts. After using wash with clean water.

Any oxide of iron which may be formed is dissolved by the borax, and the surfaces of the iron, thus freed from graphite, unite readily with the spelter which is run into the joint before it cools, the copper already deposited on the iron assisting the process. The inventor claims that cast iron can in this way be readily brazed in an ordinary blacksmith's forge.

A CHEAP LUBRICANT FOR MILLING AND DRILLING.—Dissolve separately in water, 10 pounds of whale-oil soap and 15 pounds of sal-soda. Mix this in 40 gallons of clean water. Add two gallons of best lard oil, stir thoroughly, and the solution is ready for use.

SODA WATER FOR DRILLING.—Dissolve three-fourths to one pound of sal-soda in one pailful of water.

FUSING POINTS OF TIN-LEAD ALLOYS.

Tin 1 to lead 10, . . .	558° F.	Tin 1½ to lead 1, . . .	334° F.
" 1 " " 5, . . .	511° F.	" 2 " " 1, . . .	340° F.
" 1 " " 3, . . .	482° F.	" 3 " " 1, . . .	356° F.
" 1 " " 2, . . .	441° F.	" 4 " " 1, . . .	365° F.
" 1 " " 1, . . .	370° F.	" 5 " " 1, . . .	378° F.

USE OF LIME TO KEEP SHOP FLOORS CLEAN.—In the Elevated Railroad shops of Chicago it has been found that the use of lime aids in cleaning up the shop floors and in keeping them in good condition. This lime is simply swept over the floor every day, in addition to the regular cleaning. Very little remains on the floor after the sweeping, but it is sufficient to counteract the effect of the oil

NOTE.—Among all the soft metals in use there are none that possess greater anti-friction properties than pure lead; but lead alone is impracticable, for it is so soft that it cannot be retained in the recess of a bearing. In most of the best and most popular anti-friction metals in use, sold under the name "Babbitt," the basis is lead.

MARKING SOLUTION.

and grease, and to make it easy at the beginning of each day to clean up what has fallen the previous day, as well as to improve the appearance of the floor.

NICKEL-PLATING SOLUTION.—To a solution of 5 to 10 per cent. of chloride of zinc (5 grains, drams or ounces, to 95 of water, or 10 parts to 90 of water) add enough sulphate of nickel to produce a strong green color, and bring to boiling boint in a porcelain or stoneware vessel. The piece, or article, to be plated must be free from grease (by dipping in dilute acid); it is introduced by hanging on wire by a stick across the vessel, so that it touches the sides as little as possible. Boiling is continued from 30 to 60 minutes, water being added to supply that lost by evaporation. During boiling, the nickel is deposited as a white and brilliant coating. Boiling for two or three hours does not increase the thickness of the coating. As soon as the object appears to be plated, wash in water having a little chalk in suspension, and then carefully dry. Polish the article with chalk. The chloride of zinc and nickel sulphate must be free from metals precipitable by iron. If, during the precipitation of the nickel on the articles, the solution becomes colorless, more nickel sulphate should be added. The liquid spent may be used again by exposing it to the air until the contained iron (from the articles) is precipitated, filtering and adding the salts as above.—W. B. BURROW in *Power*.

MARKING SOLUTION.—Dissolve one ounce of sulphate of copper (blue vitriol) in four ounces of water and half a teaspoonful of nitric acid. When this solution is applied on bright steel or iron, the surface immediately turns cop-

per color, and marks made by a sharp scratch-awl will be seen very distinctly.

FOR BLUING BRASS.—Dissolve one ounce (or any other unit in the same proportions will do) of antimony chloride in twenty ounces of water and add three ounces of pure hydrochloric acid. Place the warmed brass article into this solution until it has turned blue. Then wash it and dry in sawdust.

TO PROTECT BRIGHT WORK FROM RUST.—Use: 1, a mixture of one pound of lard, one ounce of gum camphor, melted together, with a little lamp-black; or, 2, a mixture of lard oil and kerosene, in equal parts; or, 3, a mixture of tallow and white lead; or, 4, of tallow and lime.

VARNISH FOR COPPER.—To protect copper from oxidation a varnish may be employed which is composed of carbon disulphide 1 part, benzine 1 part, turpentine oil 1 part, methyl alcohol 2 parts and hard copal 1 part. The varnish is very resisting; it is well to apply several coats of it to the copper.—*Die Werkstatt.*

TO REMOVE THE SAND AND SCALE FROM IRON CASTINGS.—Immerse the parts in a mixture composed of one part of oil of vitriol to three parts of water; in six to ten hours remove the objects, and wash them thoroughly with clean water; this is called "pickling." A weaker solution can be used by allowing a longer time for the action of the solution.

NOTE.—A common sewing needle held in a suitable handle makes an excellent scriber for accurate work. It is so cheap that grinding is unnecessary, as, when dull, it can be simply replaced by a new one. The point on a needle is ground by an expert, and is far superior to anything possible by the ordinary machinist.

EXTRACTING BROKEN TOOLS.

RUST JOINT COMPOSITION.—This is a cement made of sal-ammoniac 1 lb., sulphur ½ lb., cast-iron turnings 100 lbs.; the whole should be thoroughly mixed and moistened with a little water; if the joint is required to set very quick, add ¼ lb. more sal-ammoniac. Care should be taken not to use too much sal-ammoniac, or the mixture will become rotten.

RUST JOINT (slow setting)—Two parts sal-ammoniac, 1 flour of sulphur, 200 iron borings. This composition is the best, if joint is not required for immediate use.

CEMENT FOR FASTENING PAPER OR LEATHER TO IRON.—The following ingredients are required: 1 pound best flour, ¼ pound best glue, ½ pound granulated sugar, ½ ounce powdered borax, ½ ounce sal-ammoniac, ¼ ounce alum. Soak the glue in three pints of soft water for 12 hours, or if you have glue already melted, pour in the quantity. Mix the flour in one quart of soft water, mix all together, and boil over a slow fire, or cook with a steam jet. When cool it is ready for use. The face of the pulley or surface where the leather is to be applied must be thoroughly clean and free from grease.

EXTRACTING BROKEN TOOLS.—To extract the fragment of a drill, punch or steel tool, which has broken off while working any metal but iron or steel. The object containing the broken-off piece is immersed in a boiling solution composed of 1 part common alum to 4 or 5 parts of water. This solution may be held in a vessel of stoneware, porcelain, copper, etc., but not of iron. The object should be so placed that the gaseous bubbles that form as the alum attacks the metal are easily disengaged. At the end of a short time the fragment of the tool is entirely dis-

solved. A piece of steel spring, one-sixteenth of an inch thick, dissolved in a concentrated solution of alum in three-quarters of an hour.—*Herr Bornhauser, Prussia.*

LUBRICANTS FOR USE IN CUTTING BOLTS AND TAPPING NUTS.—Dissolve 1½ pounds of sal-soda in three gallons of warm water, then add one gallon of pure lard oil. This is called a soda solution. Pure lard oil is the best for fine, true work. Never use mineral oil.—*Acme Machinery Co.*

SOLDERING FLUIDS.—Add pieces of zinc to muriatic acid until the bubbles cease to rise, and the acid may be be used for soldering with soft solder.

Mix one pint of grain alcohol with two tablespoonfuls of chloride of zinc. Shake well. This solution does not rust the joint as acids are liable to do.

When soldering lead, use tallow or resin as a flux, and use a solder consisting of one part tin and 1½ parts lead.

PREVENTING RUST ON TOOLS.—To prevent rust on tools, use vaseline, to which a small amount of gum camphor has been added; heat together over a slow fire.

IN LAYING OUT WORK—on planed surfaces of steel or iron, use blue vitriol and water on the surface. This will copper-plate the surface nicely, so that all lines will show plainly. If on oily surfaces, add a little oil of vitriol; this will eat the oil off and leave a nicely coppered surface.

A METAL THAT WILL EXPAND IN COOLING—is made of 9 parts lead, 2 parts antimony, and 1 part bismuth. This metal will be found very valuable in filling holes in castings.

AID TO THE INJURED.

TO COPPER THE SURFACE OF IRON OR STEEL WIRE.—Have the wire perfectly clean, then wash with the following solution, when it will present at once a coppered surface: Rain water, three pounds; sulphate of copper, 1 pound.

TO KEEP WATER FROM FREEZING.—Common salt is the best material, and by using common (agricultural) salt the expense is the least.

AN OIL THAT WILL NOT GUM.—Take good Florence olive oil and put it in a bottle with some strips of zinc and shavings of lead, which should be clean. Expose the bottle to sunlight until the curdy matter ceases to be deposited; this will require considerable time, but the oil when decanted will be of very fine quality and will not gum.

AID TO THE INJURED IN ACCIDENTS.

A noted surgical writer has said that the fate of an injured person depends upon the acts of the one into whose hands he first falls. In the time of an accident, the presence of a person with a knowledge of what to do and the presence of mind to carry such knowledge into effect, is invaluable.

NOTE.—Few subjects can more usefully employ attention and study than the proper treatment and first remedies made necessary by the peculiar and distressing accidents to which persons are liable who are employed in or around machinery; under the title of "First Aid," etc., there are most helpful instructions printed and distributed, well worth the study of the advanced machinist; where enough in number of the trade are together, it would be worthy of praise, for owners to provide each year, a short course of lectures, illustrated, for the benefit of those unfortunately injured, as they are sure to be from time to time, and in a greater or less degree.

USEFUL RECIPES.

A clear head, a steady hand and some practical knowledge of what is to be done, are what are needed in the first moments of sudden disaster of any kind; an experienced machinist or engineer is nearly always found, in the confusion incident to such a time, to be the one most competent to advise and direct the efforts made to avert the danger to life, limb or property, and to remedy the worst after-effects.

To fulfill this responsibility is worth much previous preparation, so that the best things under the circumstances may be done quickly and efficiently. To this end the following advice is given relating to the most common accidents which are likely to happen, in spite of the utmost care and prudence.

1, Keep cool. 2, Summon a surgeon at once. 3, Send a written message, describing the accident and injury if possible, in order that the surgeon may know what instruments and remedies to bring. 4, Remove the patient to a quiet, airy place where the temperature is comfortable. 5, Keep bystanders at a distance. 6, Handle the patient gently and quietly.

IN CASE OF WOUNDS.

Arrange the injured person's body in a comfortable position; injuries to the head require that the head be raised higher than the level of the body; when practical

NOTE.—An entire chapter on "*Accidents and how to avoid them*," would be useful; the first advice might be this: To resolve firmly *to be constantly careful*, and *determine*, with all the solemnity of an oath, neither to be injured oneself, nor to cause injury to another. This has been the author's rule and it has resulted well; again: *always to look in the direction in which one is moving.*

lay the patient on his back with the limbs straightened out in their usual natural position. Unless the head be injured, have the head on the same level as the body. Loosen the collar, waist-band and belts. If the patient should be faint, have his head rather lower than his feet. If the arm or leg be injured, it may be slightly raised and laid on a cushion or pillow.

Watch carefully if unconscious.

If vomiting occurs, turn the patient's body on one side, with the head low, so that the matters vomited may not go into the lungs.

If a wound be discovered in a part covered by the clothing, cut the clothing in the seam. Remove only sufficient clothing to uncover and inspect the wound.

All wounds should be covered and dressed as quickly as possible. If a severe bleeding should occur, see that this is stopped, if possible, before the wound is finally dressed.

Bleeding is of three kinds: 1, from the arteries which lead from the heart; 2, that which comes from the veins which take the blood back to the heart; 3, that from the small veins which carry the blood to the surface of the body. In the first, the blood is bright scarlet and escapes as though it were being pumped. In the second, the blood is dark red and flows away in an uninterrupted stream. In the third, the blood oozes out. In some wounds all three kinds of bleeding occur at the same time.

The simplest and best remedy to stop the bleeding is to apply direct pressure on the external wound by the fingers. Should the wound be long and gaping, a compress

of some soft material large enough to fill the cavity may be pressed into it; but this should always be avoided, if possible, as it prevents the natural closing of the wound.

Pressure with the hands will not suffice to restrain bleeding in severe cases for a great length of time, and recourse must be had to a ligature, this can best be made with a pocket handkerchief or other article of apparel, long enough and strong enough to bind the limb. Fold the article neck-tie fashion, then place a smooth stone, or anything serving for a firm pad, on the artery, tie the handkerchief loosely, insert any available stick in the loop and proceed to twist it, as if wringing a towel, until just tight enough to stop the flow.

Examine the wound from time to time, lessen the compression if it becomes very cold or purple, or tighten up the handkerchief if it commences bleeding.

Some knowledge of anatomy is necessary to guide the operator where to press. Bleeding from the head and neck requires pressure to be placed on the large artery which passes up beside the windpipe and just above the collar bone. The artery supplying the arm and hand runs down the inside of the upper arm, almost in line with the coat seam, and should be pressed with the finger or thumb.

The artery feeding the leg and foot can be felt in the crease of the groin, just where the flesh of the thigh seems to meet the flesh of the abdomen, and this is the best place to apply the ligature. In arterial bleeding, the pressure must be put between the heart and the wound, while in *venous* bleeding it must be beyond the wound, to stop the flow as it goes toward the heart.

AID TO THE INJURED.

In any case of bleeding, the person may become weak and faint; unless the blood is flowing actively, this is not a serious sign, and the quiet condition of the faint often assists nature in staying the bleeding, by allowing the blood to clot and so block up any wound in a blood vessel.

Unless the faint is prolonged or the patient is losing much blood, it is better not to hasten to relieve the faint condition; when in this state anything like excitement should be avoided, external warmth should be applied, the person covered with blankets, and bottles of hot water or hot bricks to the feet and arm-pits.

In Case of Cuts.

The chief points to be attended to are: 1, arrest the bleeding; 2, remove from the wound all foreign bodies as soon as possible; 3, bring the wounded parts opposite to each other and keep them so; this is best done by means of strips of adhesive plaster, first applied to one side of the wound and then secured to the other; these strips should not be too broad, and space must be left between the strips to allow any matter to escape. Wounds too extensive to be held together by plaster must be stitched by a surgeon, who should always be sent for in severe cases.

For washing a wound, to every pint of water add 2½ teaspoonfuls of carbolic acid and 2 tablespoonfuls of glycerine—if these are not obtainable, add 4 tablespoonfuls of borax to the pint of water—wash the wound, close it, and

Note.—Severe bleeding is not usual after machinery and railroad accidents, as the wounds inflicted are such that the blood vessels are generally closed, because they are torn and twisted off. This is not the case with cuts.

apply a compress of a folded square of cotton or linen; wet it in the solution used for washing the wound and bandage down quickly and firmly.

If the bleeding is profuse, a sponge dipped in very hot water and wrung out in a cloth should be applied as quickly as possible—if this is not to be had, use ice, or cloth wrung out in ice water.

Wounds heal in two ways: 1, rapidly by primary union, without suppuration, and leaving only a very fine scar; 2, slowly by suppuration and the formation of granulations and leaving a large red scar.

Do not touch the wounds with the hands either during examination, or while applying dressings, unless they have been previously made clean.

After dressing a wound, do no more to the patient unless necessary to restore him to consciousness or relieve faintness.

If suffering from shock, place him in a comfortable position and await the arrival of the surgeon.

IN CASE OF BROKEN BONES.

The treatment consists of: 1, carefully removing or cutting away, if more convenient, any of the clothes which

NOTE.—"Bones do not break directly across; they break zig-zag and one bone overlaps the other, sometimes with many sharp points, and if you pick up a patient and do not pay special attention to how you carry him, the first thing you know, one sharp end of the bone will be sticking out. This is a great element of danger to the case. If he is to be conveyed some distance, and no one is on hand to attend to him, the best thing to do is to apply a splint and bandage. Take a piece of board about four inches wide and two and one-half feet long and put it on the back side of the leg, then put two or three turns of the bandage around it. This will answer well enough to convey the patient some distance."—J. EMMON BRIGGS, M.D.

are compressing or hurting the injured parts; 2, very gently replacing the bones in the natural position and shape, as nearly as possible, and putting the part in a position which gives most ease to the patient; 3, applying some temporary splint or appliance, which will keep the broken bones from moving about and tearing the flesh; for this purpose, pieces of wood, pasteboard, straw, or firmly folded cloth may be used, taking care to pad the splints with some soft material and not to apply too tightly, while the splints may be tied by loops of rope, string or strips of cloth; 4, conveying the patient home or to an hospital.

To get at a broken limb or rib, the clothing must be removed, and it is essential that this be done without injury to the patient; the simplest plan is to rip up the seams of such garments as are in the way. Boots must be cut off. It is not imperatively necessary to do anything to a broken limb before the arrival of a doctor, except to keep it perfectly at rest.

HOW TO CARRY AN INJURED PERSON.

In case of an injury where walking is impossible, and lying down is not absolutely necessary, the injured person may be seated in a chair, and carried; or he may sit upon a board, the ends of which are carried by two men, around whose necks they should place his arms so as to steady himself.

Where an injured person can walk he will get much help by putting his arms over the shoulders and round the necks of two others.

A seat may be made with four hands and the person

may be thus carried and steadied by clasp around the necks of his bearers.

If only one person is available and the stand up, let him place one arm round the bearer, bringing his hand on and in front of shoulder of the bearer. The bearer then pl behind the back of the patient and grasps his at the same time catching firmly hold of the patient resting on his shoulder, with his other by putting his hip behind near the hip of the p support is given, and if necessary, the bearer off the ground and as it were, carry him along

To carry an injured person by a stretche be made of a door, shutter or settee—with shawls or coats for pillows), three persons are n lifting the patient on the stretcher *it should be foot to his head*, so that both are in the same then one or two persons should stand on each raise him from the ground and slip him on th

NOTE.—A broad board or shutter may be employed but if either of them be used, some straw, hay, or clotl placed on it, and then a piece of stout cloth or sacking; useful in taking the patient off the stretcher when he bedside.

Always test a stretcher before placing the patient o uninjured bystander upon it and let the bearers carry hi tance, practicing placing him upon it, laying down, raisi around, etc.

Never allow stretchers to be carried on the bearers'

Always carry patient feet-foremost, except when g In cases of fractured thigh or fractured leg, if the pat carried down hill, carry the stretcher head-first.

In carrying a patient on a stretcher, care should be lifting the stretcher over walls or ditches.—*Johnson's Firs*

this to avoid the necessity of any one stepping over the stretcher, and the liability of stumbling.

If a limb is crushed or broken, it may be laid upon a pillow with bandages tied around the whole (*i. e.*, pillow and limb) to keep it from slipping about. In carrying the stretcher the bearers should "break step" with short paces; hurrying and jolting should be avoided and the stretcher should be carried so that the patient may be in plain sight of the bearers.

IN CASE OF BURNS AND SCALDS.

Burns are produced by heated solids or by flames of some combustible substance; *scalds* are produced by steam or a heated liquid. The severity of the accident depends mainly, 1, on the intensity of the heat of the burning body, together with, 2, the extent of surface, and, 3, the vitality of the parts involved in the injury; thus, a person may have a finger burned off with less danger to life than an extensive scald of his back.

In severe cases of burns or scalds the clothes should be

NOTE.—The immediate effect of scalds is generally less violent than that of burns; fluids not being capable of acquiring so high a temperature as some solids, but flowing about with great facility, their effects become most serious by extending to a large surface of the body. A burn which instantly destroys the part which it touches may be free from dangerous complication, if the injured part is confined within a small compass; this is owing to the peculiar formation of the skin.

The skin is made up of two layers; the outer one has neither blood vessels nor nerves, and is called the scarf-skin or cuticle; the lower layer is called the true skin, or cutis. The latter is richly supplied with nerves and blood vessels, and is so highly sensitive we could not endure life unless protected by the cuticle. The skin, while soft and thin, is yet strong enough to enable us to come in contact with objects without pain or inconvenience.

removed *with the greatest care*—they should be carefully cut, at the seams, and not pulled off.

In scalding by burning water or steam, cold water should be plentifully poured over the person and clothes, and the patient then carried to a warm room and laid on the floor or a table, but not put to bed as there it becomes difficult to attend further to the injuries.

The secret of the treatment is to avoid chafing, *and to keep out the air*. Save the skin unbroken, if possible, taking care not to break the blisters; after removal of the clothing, an application to the injured surface, of a mixture of *soot and lard* is, according to practical experience, an excellent and efficient remedy. The two or three following methods of treatment also are recommended according to convenience in obtaining the remedies.

Take ice well crushed or scraped, as dry as possible, then mix it with fresh lard until a broken paste is formed; the mass should be put in a thin cambric bag, laid upon the burn or scald and replaced as required. So long as the

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NOTE.—A method in use in the New York City Hospital known as the "glue burn mixture," is composed as follows: "7½ Troy oz. white glue, 16 fluid oz. water, 1 fluid oz. glycerine, 2 fluid drachms carbolic acid. Soak the glue in the water until it is soft, then heat on a water bath until melted; add the glycerine and carbolic acid and continue heating until, in the intervals of stirring, a glossy, strong skin begins to form over the surface. Pour the mass into small jars, cover with paraffine papers and tin foil before the lid of the jar is put on and afterwards protect by paper pasted round the edge of the lid. In this manner the mixture may be preserved indefinitely. When wanted for use, heat in a water bath and apply with a flat brush over the burned part."

ice and lard are melting, there is no pain from the burn; return of pain calls for a repetition of the remedy.

In burns with lime, soap, lye or *any caustic alkali*, wash abundantly with water (do not rub), and then with weak vinegar or water containing a little sulphuric acid; finally apply oil, paste or mixture as in ordinary burns.

INSENSIBILITY FROM SMOKE.

To recover a person from this, dash cold water in the face, or cold and hot water alternately. Should this fail, turn the patient on his face with the arms folded under his forehead; apply pressure along the back and ribs and turn the body gradually on the side; then again slowly on the face, repeating the pressure on the back; continue the alternate rolling movements about sixteen times a minute until breathing is restored. A warm bath will complete the cure.

HEAT-STROKE OR SUN-STROKE.

The worst cases occur where the sun's rays never penetrate and are caused by the extreme heat of close and confined rooms, overheated workshops, boiler-rooms, etc. The symptoms are: 1, a sudden loss of consciousness; 2, heavy breathing; 3, great heat of the skin, and 4, a marked absence of sweat.

Treatment.—The main thing is to lower the temperature. To do this, strip off the clothing, apply chopped ice wrapped in flannel to the head; rub ice over the chest, and place pieces under the armpits and at the side. If no ice can be had use sheets or cloth wet with cold water, or the body can be stripped and sprinkled with cold water from a common watering pot.

USEFUL RECIPES.

FROST BITE.

No warm air, warm water, or fire should be allowed near the frozen parts until the natural temperature is nearly restored; rub the affected parts gently with snow or snow water in a cold room; the circulation should be restored very slowly; and great care must be taken in the after-treatment.

TO REMOVE FOREIGN BODIES IN THE EYE.

Take hold of the upper lid and turn it up so that you can look on the inside of the upper lid. Have the patient make several movements with the eye; first up, then down, to the right side and to the left. Then take a tooth-pick with a little piece of absorbent cotton wound around the end and moistened in cold water, and swab it out. The foreign body will adhere to the swab and you will get the object out of the eye without any trouble.

DEATH SIGNS.

The note following is added with some doubt as to its useful application, but this whole subject relates to very serious occurrences, and it may be well, considering all things, to print it.

NOTE.—Hold the hand of the person apparently dead before a candle or other light, the fingers stretched, one touching the other, and look through the space between the fingers toward the light. If the person is living, a scarlet red color will be seen where the fingers touch each other, due to the still circulating fluid blood as it stows itself between the transparent, but yet congested tissues. When life is extinct this phenomenon ceases. Another method is to take a cold piece of polished steel, for instance a a razor blade or table knife, hold this under the nose and before the mouth; if no moisture condenses upon it, it is safe to say that there is no breathing.

In cases of severe shock, etc., it is not sufficient to test the cessation of the heart-beat by feeling of the pulse at the wrist. An acute ear can generally detect the movement of the heart by the sound when the ear is applied to the chest or back. The electric battery may be used under the advice of a physician in doubtful cases.

AID TO THE INJURED.

THE D'ARSONVILLE METHOD OF RESUSCITATION FROM ELECTRIC SHOCK.

The proof of the efficacy of this method is now so complete that no one following pursuits in which there is danger from electric shocks, is justified in neglecting to make himself familiar with it.

First, it must be appreciated that accidental shocks seldom result in absolute death unless the victim is left unaided for too long a time, or efforts at resuscitation are suspended too early.

In the majority of instances the shock is only sufficient to suspend animation temporarily, owing to the momentary and imperfect contact of the conductors, and also on account of the indifferent parts of the body submitted to the influence of the current. It must be appreciated also that the body under the conditions of accidental shocks seldom receives the full force of the current in the circuit, but only a shunt current, which may represent a very insignificant part of it.

When an accident of this nature occurs, the following rules should be promptly adopted and executed with due care and deliberation:

1.—Remove the body at once from the circuit by breaking contact with the conductors. This may be

NOTE.—The introduction of electricity as an industrial and useful agent has been attended with many distressing accidents, causing great suffering and frequently loss of life; while happily these accidents are becoming less frequent, none the less it is important to both know and observe the rules for safety so constantly repeated.

Currents of electricity passed through the limbs affect the nerves with certain painful sensations, and cause the muscles to undergo involuntary contractions. The effect experienced by the discharge with high potential difference is that of a sharp and painful *shock*.

accomplished by using a dry stick of wood, which is a non-conductor, to roll the body over to one side, or to brush aside a wire, if that is conveying the current. When a stick is not at hand, any dry piece of clothing may be util-

Fig. 299.

ized to protect the hand in seizing the body of the victim, unless rubber gloves are convenient. If the body is in contact with the earth, the coat-tails of the victim, or any loose or detached piece of clothing, may be seized with impunity to draw it away from the conductor. When this has been accomplished, observe Rule 2.

Fig. 300.

2.—Turn the body upon the back, loosen the collar and clothing about the neck, roll up a coat and place it under the shoulders, so as to throw the head back, and then make efforts to establish artificial respiration (in other words,

make him breathe), just as would be done in case of drowning. To accomplish this, kneel at the subject's head, facing him, and seizing both arms draw them forcibly to their full length over the head (as shown in fig. 299), so as to bring them almost together above it, and hold them there for two or three seconds only. (This is to expand the chest and favor the entrance of air into the lungs.)

Then carry the arms down to the sides and front of the chest, firmly compressing the chest walls, and expel the air from the lungs (as shown in fig. 300). Repeat this manœuvre at least sixteen times per minute. These efforts should be continued unremittingly for at least an hour, or until natural respiration is established.

3.—At the same time that this is being done, some one should grasp the tongue of the subject with a handkerchief or piece of cloth to prevent it slipping, and draw it forcibly out when the arms are extended above the head, and allow it to recede when the chest is compressed.

This manœuvre should be repeated at least sixteen times per minute. This serves the double purpose of freeing the throat so as to permit air to enter the lungs, and also, by exciting a reflex irritation from forcible contact of the under part of the tongue against the lower teeth, frequently stimulates an involuntary effort at respiration. If the teeth are clenched and the mouth cannot be opened

NOTE.—Linemen's rubber gloves are designed to prevent the frequent and often fatal accidents occurring to linemen from shock while handling electric light wires or other wires in contact with the same, and also the dangers of line work from lightning in stormy weather. The gloves are also useful in handling the strong acids of batteries, being impervious to the same.

readily to secure the tongue, force it open with a stick, a piece of wood, or the handle of a pocket-knife.

Commence always with pulling the tongue, but the method of artificial respiration should be applied at the same time if possible.

Concurrent efforts should be made to bring back the circulation by rubbing the surface of the body, smartly striking it with the hands or wet towels, throwing from time to time water on the face, and causing the victim to inhale ammonia and vinegar.

The dashing of cold water into the face will sometimes produce a gasp and start breathing, which should then be continued as directed above. If this is not successful the spine may be rubbed vigorously with a piece of ice. Alternate applications of heat and cold over the region of the heart will accomplish the same object in some instances. It is both useless and unwise to attempt to administer stimulants to the victim in the usual manner by pouring it down his throat.

While this is being done, a physician should be summoned.

COLIC.

Apply heat in the form of hot water bags, or bottles, hot plates, and mustard plaster over the seat of pain. Hot baths are sometimes useful.

VOMITING.

Give large amounts of hot water, as hot as can be taken. Patient should always lie down. Small bits of ice held in the mouth or swallowed, will relieve vomiting caused by indigestion. A lump of ice held against the pit

of the stomach will sometimes bring relief. When other means fail, apply a mustard plaster to the pit of the stomach.

BANDAGES.

These are frequently made by cutting a piece of linen or calico forty inches square into two pieces crosswise, and may be used either as a "broad" or "narrow" bandage. The broad is made by spreading the bandage out, then bringing the point down to the lower border, and then folding into two folds. The narrow is made by drawing the point down to the lower border, and then folding into three; a bandage should always be fastened either by a pin or by being tied with a reef-knot.

When rolled into strips, the following sizes have been found advantageous: for hand, fingers, and toes, one inch wide, one to two yards in length; for arms, legs, and extremities, two and a half inches wide, seven yards in length; for thigh, groin, and trunk, three inches wide and eight to ten yards in length.

POULTICES.

These outward applications are useful to relieve sudden cramps and pains due to severe injuries, sprains and colds. The secret of applying a mustard poultice is to apply it hot and keep it so by frequent changes—if it gets cold and clammy it will do more harm than good. A poultice to be of any service and hold its heat should be from one-half to one inch thick. To make it, take flaxseed, oatmeal, rye meal, bread, or ground slippery elm; stir the meal slowly into a bowl of boiling water, until a thin and smooth dough is formed. To apply it take a piece of old linen of the right size, fold it in the middle, spread the

dough evenly on one-half of the cloth and cover it with the other.

To make a "mustard paste" as it is called, mix one or two tablespoonfuls of mustard and the same of fine flour, with enough water to make the mixture an even paste; spread it neatly with a table knife on a piece of old linen, or even cotton cloth. Cover the face of the paste with a piece of thin muslin.

CARE OF SELF.

Want of care is the cause of more injuries than want of knowledge; hence care and knowledge should be well commingled. It is easier to form a habit than to break one off, therefore we should strive to form correct habits in relation to avoiding accidents.

PRINCIPLES INVOLVING THE RESPONSIBILITY OF EMPLOYERS FOR THE SAFETY OF THEIR WORKMEN.

The following are abstracts chiefly from recent decisions in the higher courts of various states. In general they are indicative of the law throughout the country:

The risks and dangers assumed by an employee are such as are incident to his employment, such as are known to him, and such as are obvious and patent. (*Pa. 9 Dist. Rep. 291.*)

To show that an employee assumed the risks connected with the operation of a machine it must appear, not only that a defect was patent, but that he knew the danger of operating it in its defective condition. (*Minn. 92 N. W. Rep. 981.*)

NOTE.—The portions of the above abstracts printed *in italics* are the Law References to cases which have established and confirmed verdicts in test cases. *The American Machinist* is entitled to the credit for this list of cases.

RESPONSIBILITY OF EMPLOYERS.

A minor cannot recover for an injury received while working a machine when the danger of the machine is such as can readily be seen, and he was duly instructed in its use, and the machine was in good condition. (*Pa. 17 L. L. Rep. 247.*)

Where an employee is injured while obeying the orders of his employer to perform work in a dangerous manner, the employer is liable, unless the danger is so imminent that a man of ordinary prudence would not incur it. (*88 Ill. App. Ct. Rep. 169.*)

In order to recover for defects in the appliances of the business, the employee must establish by proof three propositions: First, that the appliance was defective; second, that the employer had notice or knowledge of such defect, or should have had; third, that the employee did not know of the defect, and had not equal means of knowing with the employer. (*87 Ill. App. Ct. Rep. 551.*)

It is incumbent on an employer to exercise ordinary care to provide and maintain a reasonably safe place and reasonably safe machinery and appliances in which and by means whereof an employee is to perform his service. (*U. S. Ct. App. 163 Fed. Rep. 265.*)

It is not only the duty of an employer to warn his employee against the danger that lies in the unskillful or careless operation of machinery, involved in his employment or task, but he should also give suitable instructions as to the manner of using the same so as to avoid danger. (*13 Pa. Sup. Ct. Rep. 219.*)

While it is settled law that an employee assumes the ordinary and apparent risks of his employment, he does

not assume the risk from defects in the plant itself, which the employer is bound to make and keep in a reasonably safe condition. (*Mc. 46 Atl. Rep. 804.*)

An experienced workman of mature years cannot continue to operate a machine, which he knows is dangerous, without assuming the risk, simply because the employer has assured him that it is safe, when the workman has just as much knowledge of the danger arising from its use as the employer. (*Mich. 82 N. W. Rep. 797.*)

The burden of proving that an accident arose out of and in the course of the workman's employment lies on the employee; but the burden of proving serious and willful misconduct lies on the employer. (*Eng. 80 L. T. 317.*)

If the negligence of the employer operates as a concurring and efficient cause of an injury to an employee, his liability will not be relieved by the negligence of fellow-employees also concurring. (*88 Ill. App. Ct. Rep. 162.*)

To constitute fellow-servants they must either directly co-operate in the particular business so that they may exercise an influence on one another promotive of proper caution, or their duties must be such as to bring them into habitual association so that they may exercise such influence on each other. (*88 Ill. App. Ct. Rep. 169.*)