COMING up to cheerful expectations with an attendance of almost 500 greenkeepers and equipment and supply company representatives, the tenth convention of the National Association of Greenkeepers at Cleveland, Feb. 5-7, presented the most optimistic general picture seen for six years in the course maintenance department of golf.

Program of the conference appraised lessons of the previous year and marked out jobs due for emphasis during 1936. Papers where handled in practical, rather than theoretical vein. Sales at the convention exhibits were better by far than those for several years past, even though the main purpose of the exhibit is to facilitate shopping. Sales were spurred by prospects of price increases in many lines.

The veteran John Anderson of the Essex County (N.J.) CC heads the greenkeepers' association for the coming twelve months. Associated with him are a representative group of officers qualified by experience and temperament to push the organization through a year that is confidently expected to witness a speeding up in greenkeepers' group advance.

With Anderson as president, the association elected John Quaill of Pennsylvania Vice-pres. and A. L. Brandon of Illinois, Sec.-treas. Brandon will also personally contact sectional greenkeepers' organizations and edit the organization's bulletin.

Directors elected for two years: Frank Ermer, Ohio; Peter Stewart, Illinois; and Joseph Ryan, Pennsylvania. Directors for one year; John Gormley, New York; Leo Feser, Minnesota; and John Gray, Ontario. Dr. John Monteith, Jr., of the USGA Green Section, was made an honorary member of the association.

M. C. Farnham, supt. of the Philadelphia CC, as chairman of the conference did an excellent job of conducting the sessions in a way that brought out helpful discussions at the conclusion of the set addresses. Addresses presented at Cleveland will be published in detail in GOLFDOM as quickly as space permits.

Digests of the conference material follow.

Dr. H. B. Sprague of the New Jersey Experimental station at New Brunswick, spoke on Root Development and Grasses. He presented informative charts with his address. Sprague brought out that the grass root system is at least partly regenerated every year. Unless the short-lived root hairs have conditions favorable for their development the grass plant can make but little use of the soil.

Watch Grass Roots

In explaining why he made no recommendations as to specific practice, Sprague said that there is a difference in grasses when they are handled in the same fashion. Kentucky bluegrass has a working depth of 9 inches in the soil in which he studied root conditions; red top, handled in exactly the same way on the same soil, a 7-inch working depth; and red fescue an 11-inch working depth. Weight of the root systems also varied considerably. He advised root study for the greenkeeper to determine what grass will thrive best under local conditions.

Sprague surprised many of his hearers by reporting that the New Jersey investigations showed poa annua was not a shallow-rooted grass. He and his associates have come to the conclusion that poa annua survives or encroaches on turf because it starts fresh from seed every fall.

He spoke on the relations between temperature and watering and root development, pointing out that temperature response has an important bearing on proper treatment of grasses.

The New Jersey scientist made it plain that root investigations are far from being sufficiently complete to permit research men to tell exactly what happens and what practice to employ in assuring proper results in turf culture.

He warned that even if there is a good root development in a wet spring, the grass roots may die or at least stop functioning, should excessive watering water-
log lower soil. Sprague noted the tendency of grass to make growing conditions better for itself by adding to the humus supply. He also went into detail regarding effect of fertilizers on roots. Sprague mentioned that fertilizing practice for developing durable turf might not be at times what the player wants in top growth, but the greenkeepers would have to make a compromise. He gave considerable data on proper cutting heights. Treatment, soil conditions and climatic factors governed cutting height, along with the character of the grass.

Soil Analysis
Is Complex Matter

O. J. Noer, technologist of the Milwaukee Sewerage Commission, had charts passed out to clarify points in his address on Soil Analysis.

The difference, said Noer, between fertile and unfertile soil lies not in the total amount of nitrogen, phosphorus or potash in the soil but on the ability of the soil to make plant foods soluble from the insoluble supply at the time the plant makes its greatest demands. Newer methods of soil analysis determine the available solvent material.

Noer believes that the value of soil analysis is limited at present by data which will correlate analysis with fertilizer experience in the field.

He expressed doubt that determinations of nitrogen are of much value so far as golf turf is concerned, since turf in good condition is absorbing nitrogen, a condition which can be readily determined by experienced greenkeepers. Determination of phosphorus and potassium is not so simple a matter.

Noer advised that soil tests be made by men experienced in the work. Acidity tests, he said, should be made in the field and at various depths. With the charts he went into the variations between soil analysis methods. He noted that tests do not accurately indicate the soil phosphorus supply where lead arsenate is used.

Tregillus Gives
Maintenance Program

C. A. Tregillus, supt. of Mill Road Farm course and former head of the Royal Canadian Golf Assn. Green Section, presented a notable address on features of maintenance work necessary to player and budget satisfaction under conditions that seem due in 1936.

This particularly informative paper is printed in full, beginning on page 15 of this issue.

C. F. Irish, tree specialist of Cleveland, pointed out that tree maintenance is an important, though frequently neglected phase of grounds work because a tree once lost can not be replaced for years. Tree feeding, the most important detail of the tree maintenance program, requires competent experimentation to determine what is the best food for trees under existing conditions. He spoke in interesting and practical detail on tree fertilizing and protection of trees from insects and disease.

Irish gave the greenkeepers many expert pointers on pruning, bracing and lightning protection. Tree planting and drainage were other matters treated by this expert in a manner that every greenkeeper will find worthy of close study when his remarks appear in a following issue of GOLFDOM.

Bob Scott, able greenkeeper of the Baltimore (Md.) CC, presented a most interesting address on his hobby, which consists of constructing museum-like exhibits of factors associated with his work. The displays advocated by Scott not only assist in the education of the greenkeeper in a very pleasant manner, but also unquestionably have wide interest for club members, since the extent and importance of the greenkeepers’ work is brought interestingly to the members’ attention.

In concluding his talk, Scott asked the greenkeepers to cooperate with the Middle Atlantic Greenkeepers Assn. and the USGA Green Section in preparing a greenkeepers’ turf exhibit for display at a flower show to be held in Baltimore.

Monteith Tells Lessons
Of 1935 Course Maintenance

A feature address was that of Dr. John Monteith, Jr., technical head of the USGA Green Section, in which were set forth his observations of 1935 conditions, results and practices; from these, he pointed out factors that will have considerable bearing on greenkeeping work this year. The Monteith paper will not be printed in this issue of GOLFDOM since very much the same ground as he covered in his Cleveland speech was discussed by him in an article appearing in last month’s GOLFDOM, to which readers are referred.

Interpolated during the Monteith address and in answering questions during the concluding discussion, the Washington
A practice green adds maintenance, but it also adds patronage at fee courses. The green shown here, 36 holes in length, prevents impatience when the first tee is crowded at the Mid-City (Chicago) course.

authority made several interesting references.

One concerned the talk he had with Bob Jones of Atlanta concerning over-watering of greens to stop balls. Monteith expressed the hope that Jones and other prominent players would educate the golfing public to the damage done by over-watering through popular demand. Air circulation as a turf disease preventative, and weed control by chemical treatment were two further subjects discussed by Monteith. He warned that chemical weed control has developed to a point where it can be applied with certainty.

Earl Barrows of Minneapolis, a pioneer in the patent grass plant field, spoke on patent grasses, the protective feature and the development of a grass that can be patented because of its distinguishing features. He showed charts of grass growth density made during the research work connected with the patent bent and suggested close study of plugs as a means of acquainting greenkeepers with actual status of growth.

Sod Webworm, Chinch Bug

Dr. J. S. Houser, Ohio Agricultural Experimental station at Wooster, told of work being done to control sod webworms and chinch bugs, the latter more restricted in area of the damage, but an even more baffling menace than sod webworms. Inasmuch as Houser's address is replete with technical data on fighting these pests it is to run in full in two issues of GOLF-DOM; the first installment, on sod webworms, appears in this issue.

A paper by Herb Graffis, editor of GOLF-DOM, on the greenkeepers' publicity problem was read by J. S. Connelly, superintendent of the Army and Navy Club at Washington.

Graffis expressed the opinion that the wave of sub-par scoring in tournaments should not unduly concern golf's rulers. The longer distance of the golf ball is less serious than popularly supposed, inasmuch as the leading winners are among the shortest hitters in golf. He believed that high standards of greenkeeping, making possible many one-putt greens, is an unmentioned but primary factor in low scoring.

This indication of greenkeeping ability and progress, he lamented, was not being used as it should to emphasize the greenkeepers' performance and by inference or directly, the generally underpaid plight of greenkeepers.

He placed responsibility for this error of omission on the greenkeepers and their chairmen, because of their failure to acquaint members with course work, a subject in which members rightly should have some interest inasmuch as the maintenance cost of golf runs from 50 cents to $6 or more per round at private courses. The Graffis paper pointed out that greens department bulletins in locker-rooms and clubhouses frequently were limited to such messages as "Play Winter Rules" or "Play Temporary Green on 16" instead of being lively informative current work bulletins.

He reminded greenkeepers that if they came into their equipment barns and found hung on their tractors signs "On the Bum," with the same bluntness as the "Winter Rule" signs, and there was no-one to explain, the boss greenkeeper would promptly do what is known in the profession as plenty of hell-raising.

He counseled cooperation between greenkeeper and chairman in the preparation
and display of bulletins for member information and satisfaction and eventually a salary-increasing realization of the greenkeepers' work and merit—at present largely unrecognized.

McClure, Authority, Tells
What Happens to Fertilizer

Prof. George McClure of Ohio State university reported on the research in which he has been engaged; the behavior of fertilizer in the soil. He showed charts of the rate of movement of nitrogen to point out how his research was for the purpose of helping greenkeepers to determine what fertilizer to apply for open or tight soil conditions, watering, and other factors. Ammonium nitrogen as supplied by ammonium sulphate or ammonium phosphates has the ability to stay in the soil for a much greater length of time than does nitrate nitrogen, McClure declared. Phosphorus doesn't go down into the soil rapidly, he stated.

Among practical applications of his findings McClure mentioned that prior to new seeding a rather large quantity of high phosphate fertilizer should be mechanically mixed with the upper 4 to 6 inches of soil so it will be down to where it will do roots of the new seeding the most good. Phosphorus is not lost by leaching. By discing in a heavier application of superphosphate than is generally used, then making the usual application of nitrogen and potash for a new seeding, phosphate applications can be forgotten for 4 to 6 years, McClure said. In the case of established turf McClure recommended heavier applications, less frequently, on phosphate-hungry soils. He related a case of heavy phosphate feeding in the fall sharply reducing crabgrass, although he remarked that an arsenate of lead application possibly had something to do with the crabgrass reduction in this instance.

The extended discussion which followed the rather deeply technical McClure address indicated strikingly the representative greenkeeper's advance in scientific knowledge since the time when McClure made his first address before the organization.

How to Determine Equipment Need and Value

Prof. L. S. Dickinson, Massachusetts State college, in an address GOLFDOM is printing in full, emphatically stated that golf course maintenance has a pretty husky diet of scientific data to digest right now and before cramming itself full with an overload it might well direct serious attention to the problems of business administration of the course.

Appraising the need and value of equipment, its efficient use and its financing, is a subject that demanded its share of scientific study at this time, Dickinson said. He outlined definite factors for the greenkeeper and chairman to consider in deciding on equipment purchase and management. He cited instances where inadequate and unreliable measuring devices were responsible for serious and unpardonable misuse of fungicides and fertilizers.

The Dickinson address laid down a buying policy that should have far-reaching value in the golf course field.

Fred Grau, formerly of the Green Section staff and now of the Pennsylvania State college concluded the conference with an address on "trouble-shooting" on Eastern golf courses. Grau's work consists of relaying the extensive and practical work of Profs. White, Musser and other turf stars with whom he is associated at Penn State, to the greenkeepers for practical application.

His talk, which will appear in full in GOLFDOM, abounded in instances of trouble elimination as a result of close cooperation between a state's greenkeepers and its state college staff. The Penn State student's golf course was mentioned by Grau as the site of numerous helpful experiments made by the college agricultural experts.

Grau, who has had much to do with sodium chlorate weed control work, reminded his hearers during his Cleveland address that the chemical methods to date have not proved to be a cure-all for weeds, and at no time ever were ballyhooed as such.

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GOLFING, now in its fourth year, is published April to August only. It is the only national magazine devoted solely to golf. It is sent entirely without charge or obligation to members of private country clubs, provided their clubs furnish us with complete club rosters, with home or business addresses.

You, as a club official, know only too well that the financial success of your organization's fiscal year depends largely on patronage of club departments and that anything which will increase patronage is to be welcomed. Receipt of GOLFING by ALL your members is certain to increase departmental business—because when they read it, their interest in golf and in the club is heightened.

Out they come to the club, perhaps to try some new prescription they read in GOLFING for curing a slice. Of necessity, these members buy food, refreshments and pro-shop merchandise. Thus, subtly, is departmental business increased.

See that ALL your members get GOLFING this year. Send us an uptodate mailing list in any form convenient to you... stenciled on cards or slips of paper, typewritten on sheets, printed (if you issue a year book) or hand written. Home addresses are preferred; business addresses will be accepted.

Don't hold up your list because you want to add the names of men who will be joining the club this spring; these new members can be added to GOLFING'S list later.

As heretofore, GOLFING assures club officials that under no circumstances will names and addresses of members ever be permitted out of our hands or used for any purpose other than the mailing of the magazine.

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WEBWORMS?  USE LEAD

NAGA Convention Paper

By J. S. HOUSER, Chief Dept. of Entomology, Ohio State Univ.

In considering any insect problem, the most important single thing to do at the outset is to identify the pest with which one is dealing. The visible effects of several troubles appear very much the same if one makes only cursory examination of ailing turf; it is only by careful scrutiny that the cause of the disturbance can be determined. The degree of success attained in correcting the situation will depend, in large measure, upon the proper diagnosis of the causative agent, which, in turn, will furnish the key to the selection of the best procedure to follow.

Sod webworms are always present in small numbers, but it is only on occasion that they increase to the proportion of a scourge and cause serious damage.

First indications of an impending outbreak is a flight of moths in early summer. Sod webworm moths are easy to distinguish from all others because of the characteristic manner in which the wings are folded when the insects are at rest. They are so closely applied to the sides of the body that the group is given the name of Close-winged or Folded-winged Moths. When the moths are at rest the sides of the body are almost parallel. The antennae extend forward from the head and the legs outward from the sides. The color is silvery white, light tawny, or light gray, depending on the species, of which there are several. Rarely are the insects over an inch in length, usually they are smaller.

Frequent Inspections to Guard Against Damage

During the daytime the moths remain at rest, but with the approach of darkness they take flight and are strongly attracted to lights. Another criterion for forecasting sod webworm outbreaks is that of observing the moths that are flushed from the fairways and areas of taller grass. When so disturbed, the moths fly a short distance and alight on grass stems, with the body applied closely to the stem and parallel to it.

The greenkeeper who observes either because if taken in time serious harm, particularly to greens, may be averted. At the outset, the taller grass of aprons and of other areas is more subject to damage, but if the insect is not controlled it may spread to the greens. Moreover, the smaller, partly grown larvae are more susceptible to the effect of treatments than are the larger, more nearly mature individuals.

Sod webworm moths seem to drop their eggs in an indiscriminate manner as they fly at night over the turf. After a 10-day period the eggs hatch and the young larvae begin to feed upon the grass blades. As they increase in size they retreat to the lower strata of the turf and feed upon the grass stems as well as the blades. Tunnel-like structures of silken webbing are constructed at the soil surface through which the larvae move freely. Occasionally, burrows are constructed which extend downward as far as an inch into the soil. When the silken webs are broken open and the insect within is disturbed, it will appear as an active caterpillar, dirty gray in color with regularly-spaced brown spots on the body. It is capable of moving either forward or backward with consid-
erable rapidity. When full grown, it measures about an inch in length. Another sign of the presence of sod webworm larvae is the castings or pellets, whitish to very light green in color, found on the soil surface in the feeding area.

Minor damage from sod webworms may easily pass unnoticed, but, if the insects are abundant, large areas of turf may be destroyed. Turf of high quality is more susceptible to damage than if the grass stand is thin; likewise, closely clipped grass is more likely to escape harm than is that of coarse-clipped areas. This last-named fact explains why infestations of putting greens usually arise from caterpillars migrating inward from the aprons.

Lead Arsenate Treatment Effective

In 1931 an unusually severe outbreak of sod webworm occurred in many sections of Ohio. At that time, an intensive research program was executed by the Department of Entomology of the Ohio Agricultural Experiment Station to meet the emergency; a part of the work was done in cooperation with M. M. Parsons, greenkeeper of the Wooster CC. A number of insecticidal formulae were evaluated, but the program of control which gave the best results was the use of lead arsenate. The poison was applied in both liquid and dust forms, but, when everything was considered, the dust treatment seemed the most generally satisfactory. The procedure was as follows: A hand duster of the rotary fan type was employed to distribute the undiluted lead arsenate upon the turf, after which the grass was brushed with a stiff fibre broom for the purpose of increasing the evenness of distribution and also for dislodging as much of the lead as possible from the grass blades and depositing it next to the stems where the webworms were feeding. To each 1000 sq. ft. of surface seven and one-half lbs. were used. The turf was then watered thoroughly by means of a driving spray directed by hand. This treatment dislodged most of the lead that had remained on the upper parts of the grass plants. The use of the conventional, mechanical sprinkling system was not so successful.

Water was withheld from the treated areas for a period of 48 hours in order to allow the webworms full opportunity to feed on the poisoned herbage. With further respect to watering, it developed that areas to be treated should not be sprinkled during 36 hours before the dust was applied and under no consideration should the application be made when the grass is wet. If the grass was clipped short immediately before treatment, it was found that this facilitated lodging of the lead at the point desired at the bases of the plants.

With the exception of one green on the Wooster CC, which was suffering from a mild attack of brown-patch, it was not possible to detect the least sign of damage to grass following the treatment as outlined, regardless of whether the application had been made to the bent grass of golf courses or to bluegrass and other grass mixtures in lawns. On the other hand, the areas so treated, particularly the bent grass of putting greens, seemed to be definitely stimulated, as indicated by excellent growth and improved color.

The control of the webworms was all that could be desired. Twenty-four hours after the poison was applied, dead and dying worms could be found in abundance. This recovery of the greens and other treated areas was particularly gratifying because at the time the lead was applied, some were affected to the extent that they seemed all but doomed. Following our work in 1931, the lead arsenate treatment seems to have been generally accepted not only in Ohio but in other states as well, and numerous reports have come to my attention in which satisfactory control was secured. In some instances the lead has been applied in the form of a spray with good success. Other workers have reported success from the use of contact sprays in which the killing agent was pyrethrum, kerosene, etc.; however, the arsenate of lead would appear to be preferable because the residual effect undoubtedly is of longer duration than that of the contact materials.

A secondary effect of sod webworm infestations is the damage done to the turf by starlings, grackles, and robins. Occasionally, the abundance of birds on the greens is the first evidence the greenkeeper has of an existing sod webworm outbreak.

The balance of this address was devoted to a thorough discussion of chinch bug control. It will appear in an early issue of GOLFDOM.
NINE YEARS AGO at Buffalo I first addressed the Greenkeepers’ association on “The Education of the Greenkeeper”, a subject I was given probably because the first scholastic course for greenkeepers was established at the then Massachusetts Agricultural College and it was my privilege to have founded that course. At that time I stated the course or education should be for greenkeepers and not in greenkeeping—there being a vast difference in the objectives. I said for greenkeepers because I felt that much information could be given to greenkeepers that would be helpful to them, particularly if tempered with the lessons of practical experience and with sensible interpretation of scientific facts.

During these ten years scientific research has discovered many helpful facts, and at the height of the prosperous era they were turned out prematurely and much faster than they could be absorbed. We are starting another such era. Unfortunately semi-scientific articles have been written that lack a practical background. The statements in these articles have been used by greenkeepers as panaceas and alibis, thus hurting both the writer of the article and the greenkeeper. In short, it is my opinion, based upon considerable observation, that for the time being we have reached the saturation point in scientific research in greenkeeping, because the sponge can’t hold any more.

Golf club officials, green-chairmen and greenkeepers must put aside the idea that science can give them a panacea for their golf course troubles, and a robot to do the work. What golf clubs need in the next five years is a consolidation of the scientific facts now known, and a business administration of the golf club and golf course.

I can give you many mechanical, chemical, physical, and biological facts about equipment (if all types of golf course equipment are considered), or I can take one type of major equipment, the lawn mower, and spend two full hours showing very important features. However to be consistent with what I have previously said, I can not do it. Furthermore, it is the business management of equipment that is needed.

What I shall have to say is with the kindest feelings toward equipment manufacturers and salesmen, and with a deep sense of appreciation of their great help in the maintenance of fine turf areas, and it is not my intention to advocate in the slightest degree the use of a less amount of efficient equipment.

Classifies Equipment In Six Main Divisions

Whether it be the dandelion knife or the eleven gang, high speed affair known as a modern fairway mower, equipment can be placed in one of the six following classifications.

I. Entirely time saving.
   A. Labor saving.
II. Entirely for the improvement of cultural and playing conditions.
   A. Playing conditions alone.
III. A combination of I and II.
IV. Neither I or II. (Just a gadget).
V. A necessity, caused by strong desire.
VI. Chairman ordered, or a chairman’s whim.

It should be obvious that equipment falling within classifications I, II, and III has the possibility of being a sound investment for the club, and that if it falls within classifications IV, V, and VI there is a great probability that the club will not only be out the original investment but in addition an annual assessment either in cash, cultural condition or both. Therefore, would not an honest classification of a proposed piece of equipment be good business? If it fell within the first three groups would it not be good business to consider its purchase a business investment, paying for it in advance by an annual or

TO BUY... OR NOT TO BUY?

NAGA Convention Paper

By L. S. DICKINSON
Massachusetts State College
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