

turned, merely were cutting off the runners and leaving the roots to multiply the runners one hundredfold. I put an end to this business by discharging the offenders and starting a system whereby I inspected the weeds pulled by each man every day. If there was not a large proportion of roots in the day's takings, there was the devil to pay. The greenkeeper who has a problem like that will do well to investigate his men's weed-pulling methods, as it is extremely hard to get men who have enough patience to do a proper job of weeding."

Firing the offenders may seem like a heroic measure, but the author of the system has one of the best kept courses in the state.

Hard-to-Learn Tasks.

Other tasks which course superintendents always find difficult to teach new men include absolute disposal of grass clippings, keeping grass sufficiently watered on the banks of traps, cutting the greens from a new angle on each occasion, and filling in gouges made by pitched balls. Something else which it is perennially difficult for greensmen to learn not to do is tampering with the cutting machinery, a task which should be under the sole jurisdiction of the club mechanic.

Good Mechanic Essential.

The belief is becoming more and more prevalent on the Pacific coast that a good golf course is dependent upon a good shop run by an efficient mechanic. Not so many years ago in California, every broken part meant a special trip to the factory distributor for a replacement, and expensive hours of delay while cumbersome machinery was taken apart by inadequate tools to effect the repair. At the present time although machinery is vastly better than it used to be, the mechanic and the shop occupy a more significant place in the scheme of things because there is more machinery run at high speed. Some of the courses in the vicinity of Los Angeles at the present time are so well equipped with lathes, forges, and other apparatus that they are able to make many parts for existing machinery and in addition they are able to make tools of their own especially adapted to their peculiar needs.

Local greenkeepers assert that there is nothing like well kept tools to keep their men satisfied and for this reason the last five years has seen a remarkable improvement in shops and their equipment and a

consequent rise in the status of the course mechanic. This was evidenced during the recent turf equipment demonstration sponsored by the southern California greenkeepers at which time a large number of the visitors was composed of club mechanics whose immediate superiors were striving to keep in close contact with the latest in mechanical developments. Such a procedure would have been unknown a few years ago.

Study Use of Course Workmen Displaced by Machinery

ONE subject discussed during the question-box confabs at the Massachusetts Agric. College's greenkeepers' winter school conference in March was whether a greenkeeper, having purchased new labor-saving machinery, was justified in laying off the labor saved, or whether he should utilize this labor to perform maintenance tasks previously left undone and thereby raise the standards of the course.

While it was conceded that the solution of this problem depended in large measure on the financial status of the club, the conclusion reached was that utilizing this saved labor for attending to the little things, unimportant in themselves but essential if a course is to appear well-groomed, was the smart procedure. In other words, purchase of labor-saving machinery should mean improvement of maintenance standards rather than reduction of maintenance costs.

Save Hose by Telling Late Players to Use Valves

LATE afternoon golfers often find sprinklers at work on the greens. It is common practice to send a caddie ahead to pinch the hose and thus shut off the flow of the water until the balls have been holed out.

This is extremely hard on the hose; it will repay clubs to post notices at the first tee or otherwise inform the members that water should be turned off at the water outlet and that under no circumstances should caddies be permitted to double up the hose to cut off the water flow.

You see what to buy for thrifty operation in GOLFDOM's advertising pages.

Big Turnout Expected at P. G. A. Columbus Business Conference

By HERB GRAFFIS

FURTHER development of the plans for the P. G. A. first business conference outlines program features that give definite assurance of great aid to pro merchandising.

Among these program highlights, tentatively scheduled at a recent session of P. G. A. officials, are:

- Shop arrangement.
- Training of assistants.
- Use of P. G. A. instruction films.
- Sales to women.
- Pro bookkeeping.
- Selling at fee courses.
- New sales ideas.

It is intended to have the sessions at Hotel Deshler-Wallick, Columbus, Tuesday and Wednesday, June 23 and 24. Due to the crowded day-time program of Ryder cup week, these meetings will be held in the evenings, probably from 8 to 11. Experts from the pro and manufacturing fields will appear on the program. The manufacturers are keenly interested in this latest evidence of pro business development and see in the enterprise an opportunity to be of substantial assistance to the master professionals not only in teamwork toward the solution of problems that are of urgent value to the pros but in the very necessary job of training the assistants.

It is the consensus of pro opinion that the education of assistants in business operations and instruction has been one of the jobs generally neglected due to press of other duties. Now, with pro business generally established on a sound basis, the work must be carried on until it prepares the professional part of the game for a future that will be to extend pro value. It is hoped that this attention given to assistants will result in qualifying today's youngsters to handle the constantly increasing problems of golf's business growth.

Ask Pros to Send Boys

Because of the heavy playing schedule crowded into the last two weeks in June, it is believed that some of the pros may not

be able to take additional time out for the business conference. Plans for the event, therefore, are being made with the idea of seeing that every professional, whenever possible, encourage his assistant to come to Columbus. It is the idea of the program makers to have sessions of such straightforward value that each ambitious and alert assistant will take back to his pro employer's service practical sales ideas that will quickly repay the expense of conference attendance.

Logically the master pros are intensely concerned with the conference, and are planning to attend in considerable numbers, for the sessions are the first at which pro business problems will be generally discussed.

Organization of the P. G. A. Merchandising committee is nearing completion and by the time of the Columbus conference it is expected that the new committee will be functioning in lively fashion. The opportunity afforded to get an extensive close-up on pro business problems during the Columbus meeting should be a worthwhile factor in getting the new group started off right.

The Ways and Means committee of the P. G. A. does its work in handling relations between the pros and the manufacturers. It is the intention that the Merchandising committee's province will be the field between the pro and his player market. The new committee is slated to have a spirited and sound educational program which will be inaugurated at Columbus.

It was originally intended to have the Columbus conference cover a three evening session, but as the qualifying event for the remaining two places on the Ryder cup team will take place on Monday, it has been decided to avoid any possibility of an over-crowded daily schedule.

Rooms for Manufacturers

Surrounding the meeting hall of the P. G. A. business conferences are rooms

Every member expects this convenience!



2 sizes of type to choose from

Members of more than 3200 Golf Clubs have learned the many advantages and definite economy of

FULNAME BALMARK SERVICE

If your club has no FULNAME Marking Machine, send the coupon for our 15 DAY FREE TRIAL plan. We'll send you one of the latest model and 5 FULNAME Dies (retail price \$3.60 each*) and full details of our plan by which your club may own this machine without one cent of cost—under conditions easily, conveniently and profitably fulfilled.

(*Liberal discount to pros.)

SPECIAL TO PROS

When you have sent us an order for 12 member dies we will send you, extra and without cost, a die reading "PRACTICE BALL"—for your practice balls.

FULNAME now comes beautifully finished in color and bright nickel. A business magnet for any pro shop.



Hundreds of Pros are adding substantially to their shop incomes with FULNAMES. Let us show you how to make your FULNAME pay from the start.

THE FULNAME COMPANY,
707 Southern Railway Building, Cincinnati, Ohio.

Ship me at once the Fulname Marking Machine together with five (5) dies (names of 5 active playing members printed on attached sheet of paper) for 15 DAYS FREE TRIAL. With the machine send full details of offer whereby we may keep the machine without cost.

Name of Club Shipping Address

Name of Pro or Official

(Note: Attach to this Coupon—printed names of five (5) playing members—for five (5) dies to be shipped with machine on 15 DAYS FREE TRIAL.)

DEMONSTRATING TO BRING

**YOURS
FOR A DAY'S PLAY - free!
- ask your Pro -**

Take the coupon from this page to your club pro. It is a free ticket to a trial of the new Wilson matched you come - a 4 club set they give you your own course with a better set of clubs than any you have ever handled. ** The leveled toe blades are deep and close coupled - especially designed for effectiveness with the new standard size ball. The shafts are carbonized and anchored by an exclusive Wilson method that keeps hands and wrists from slipping. ** But above all these superbly-matched clubs will impress you, and improve your play, by their absolute uniformity in swinging weight - a feature ignored in the ordinary process of matching clubs - now brought to the highest degree of perfection by Wilson. Try them. You'll acknowledge a remarkable difference.

**Wilson
GOLF EQUIPMENT**

WILSON - WESTERN SPORTING GOODS COMPANY, CHICAGO, ILL.

1001 BUCKINGHAM
1001 BUCKINGHAM
1001 BUCKINGHAM

**WILSON PAYS
THE BILL --
EVERY
DOLLAR
OF IT**

Your Advertising on the Demonstration Plan
... Two-page advertisement in full color appearing in American Golfer, Golfer's Magazine and Golf Illustrated in April ... Single page appearing in Collier's, May 9, and American Golfer, Elks Magazine, Golfer's Magazine, and Golf Illustrated in May, Country Club in April and Game and Gossip in March.

WILSON - WESTERN SPORTING GOODS

NEW YORK BOSTON KANSAS CITY

A WILSON PLAN YOU BUSINESS

HERE'S copy on your advertising in great national publications, also in all leading golf magazines—extending this unusual offer to your club members (Wilson pays the bill)—

“Play before you pay! Demonstrate to yourself how these beautifully made, perfectly balanced Wilson matched pro-irons will help your game. Ask your Pro to let you try them on your own course.”

This campaign will bring new and profitable business to every professional who gets one of these demonstration sets early and puts it to good use.

This is the first time in the history of the business that any manufacturer has given to the professional man a complete merchandising and advertising service at no cost to him.

Have you sent in your request? Remember, we lend you the set free.

Wilson
GOLF EQUIPMENT

COMPANY, CHICAGO, ILLINOIS
SAN FRANCISCO LOS ANGELES PORTLAND DALLAS



A Real Hazard

Eliminate it
with SANI-TREADS
in the locker room!



SANI-TREADS provide the sure, comfortable and inexpensive means of keeping "athlete's foot" out of your club. These soft, water-resistant fibre slippers have a tapered toe that enables them to fit any foot snugly and gives plenty of toe room. They save wear and tear and extra laundering on towels because these are not used for scrubbing dirt off bare feet. Write for trial offer.

SANI-TREAD CO., INC.,
567 Washington St., Buffalo, N. Y.

SANI-TREADS

The Fibre Bath Slippers That Fit Any Foot

available for exhibits of manufacturers. Charts of these rooms are being mailed to the pro suppliers and display rooms will be allotted in order of reservation receipt. There are three large rooms available at \$30 a day and 12 smaller rooms, costing \$10 a day. The displays will afford manufacturers a chance to show their complete lines and will have interest for the large number of players in Columbus as the gallery for Ryder Cup week.

The rates are those charged by the hotel. The P. G. A. is assuming the promotion expense for the event and deriving no financial profit from the conference. In the promotion of a big attendance at the meeting the P. G. A. expects to have lusty co-operation from the manufacturers and their salesmen. The manufacturers have as much to gain from the success of this promising experiment as do the pros, their assistants and the clubs. Because of that unity of interest, the P. G. A. and manufacturers are bent upon getting a big turnout of first-class professionals and their assistants.

Pacific Northwest P. G. A. Polices Business

A SUCCESSFUL experiment in putting golf goods retailing on a better basis for pros and manufacturers is being conducted by the Pacific Northwest P. G. A. The Pacific Northwest organization has a Business Relations committee functioning between the pros and manufacturers. On this committee are: F. J. Henwood, pres. of the association; Neil Christian, vice-pres.; Jack Martin, secy.-treas.; Bob Johnstone, Walter Pursey and Bill Hanley.

Although the association had only six members on C.O.D. terms, the committee decided to help these boys get back in good standing. It was possible for members of the committee to call on four of the six boys and bluntly state that unless there was an improvement in the credit rating, their memberships in the association would be suspended, nor would any effort be made to prevent the manufacturers from going to the clubs with the accounts. It was found possible with three of the four visited to improve the situation considerably. The three boys had been in a slump and a comparison of experiences and ideas helped them out. One of the laddies didn't take the matter seriously and, according to reports, is just barely holding his own. The two the committee was unable to con-

tact personally were written. One of these boys batted up promptly; the other still is slow but improving.

The committee wrote to several professionals who were not members of the association and explained to them the many benefits of a good credit rating.

One of the toughest jobs of the committee is the unfair competition of retailers who cut prices on standard pro brands, making the items leaders for brief sales. Rumors of unfair discounts also have been tracked down. Although the positive evidence of such discounts is difficult to obtain, the committee has found that by talking things over with both the price-cutting and price-maintaining dealers and getting them sold on the idea of standard discounts that don't allow any competitors an unfair advantage, this angle straightens out.

The price slashing was handled by contact direct with the manufacturers who shot straight with the pros and saw that the most violent price cutters were brought back into line so everyone could make a little money.

Representatives of leading manufacturers meet regularly with the committee.

This Pacific Northwest committee has performed so well that it is expected a Business Relations committee will become a part of most of the P. G. A. sections. The Illinois P. G. A. has formed such a committee which already is functioning on several important matters concerning pro merchandising.

East-Western Vet Pro Tourney Ryder Cup Week Feature

AMONG the features of Ryder cup week at Columbus there may be held the first national veteran pro tournament. Possibility of holding such an affair has been mentioned by the pros and the Columbus folks. The week also will have a tournament carrying the alluring title of "The Johnny Walker cup match," in which representatives of big business, the press and the stage will exhibit athletic antics.

WORTHINGTON OPENS NEW BRANCH IN ST. LOUIS, MO.

St. Louis, Mo.—Worthington Mower Co. has opened a sales office and service branch at 1505 De Soto Ave., in charge of Lou Nobbe, formerly assistant to John Dee, manager of Worthington's mid-western division. Nobbe will handle sales and service in the Missouri territory.

How Mercury, Lead Arsenate Control Nitrification

By PROF. J. W. WHITE

Pennsylvania Agricultural Experiment Station

A STUDY of the bulletins of the U. S. G. A. Green Section concerning recommendations for the development and maintenance of turf grasses brings out some interesting facts worthy of consideration. The purpose of this article therefore is to give my impressions of certain recommendations found in these bulletins. I trust that what I have written will not be taken as destructive criticism, but rather as helpful suggestions that may lead to a better understanding of the fundamental principles underlying the art of greenkeeping and fairway management.

After a study of the bulletins in preparation for the first Greenkeepers' conference at Penn State in 1929, I resolved to face the issues squarely even though my ideas may be entirely contrary to those previously presented. Therefore, I wish to review in general the recommendations given at our Penn State conference in 1929 and 1930. The exacting demands of the green committees concerning the development of a perfect turf, free from weeds, lead to recommendations entirely contrary to the fundamental principles of soil fertility and which have led to disaster in many instances, especially in our eastern states. Continuous and excessive use of sulphate of ammonia and the ban on lime and phosphorus have been the cause of many of our trials and tribulations. The evils of an extremely acid soil are too well known to the soil chemist to warrant its development as a means of weed control, for a soil too acid to grow weeds can not support a normal growth of turf grasses. The most logical means of weed control is through the development of a vigorous turf which leaves no room for weed invasion. The use of some form of phosphatic fertilizer and lime in moderation should under proper management attain this end. There is no logical reason to believe that golf grasses require fundamentally different treatment than is

accorded those found in lawns and well kept pastures.

Maintaining Right Reaction

Grasses which are grown under very acid conditions and are abnormally stimulated in growth by too frequent applications of ammonium sulphate are more susceptible to fungus disease and other injuries than grasses grown under normal soil conditions where the plant has the opportunity to assimilate plant food in accordance with the fundamental principles of plant nutrition.

It is our recommendation in Pennsylvania that the soil reaction should be maintained approximately between pH 5.8 and 6.5 and that superphosphate should be applied each year and also that if necessary limestone should be applied at intervals to maintain the proper control of excessive soil acidity. The amounts of phosphorus, limestone and nitrogen to be applied naturally varies with soil conditions. An annual application of seven pounds of superphosphate per 1,000 sq. ft. should be sufficient under average conditions. If sulphate of ammonia is used as the source of nitrogen, limestone should be applied at the rate of 75 lbs. for each 100 lbs. of ammonium sulphate applied. In other words, an annual application of 11.5 lbs. of ammonium sulphate per 1,000 sq. ft. requires the use of 8.6 lbs. of limestone.

At the time of Penn State's conference it was pointed out that in many instances failure of turf grasses during the summer months was due to the toxic effect of soil acidity and not to the invasion of fungus diseases. This was proven by the fact that mercury compounds even after repeated applications failed to restore the turf to normal color and vigor. However, an application of lime restored the grasses to normal condition. The evils of soil acidity brought about by the excessive use of am-

monium sulphate were first noted on poorly drained greens where there occurred an accumulation of salts. Where it becomes necessary to use lime during the growing season it is recommended that limestone be used rather than hydrated lime since the latter has a tendency to cake and discolor the green while limestone particles, being heavier, work in between the grasses and entirely disappear from view.

Effects on Soil Nitrification

The statement that certain grasses have the ability to utilize nitrogen in the form of ammonia has not been entirely accepted in this country. In accordance with our modern conception of plant nutrition, most of our economic grasses depend upon soil nitrates as their source of nitrogen. The ability of certain grasses such as those of the *Agrostis* family, which includes the bents, to grow under very acid soil conditions is attributed to their ability to utilize ammonia instead of nitrates. The writer believes that the relative resistance to acidity of such grasses as those included in the *Agrostis* family is due primarily to the fact that they are strong feeders of calcium. That is, they have the ability to utilize small amounts of calcium in forms and amounts unavailable to other grasses such as the *Poa* family which includes Kentucky bluegrass. Under sod conditions such as found on greens, fairways, pastures and lawns there exists at all times during the growing season a scarcity of soil nitrates; in other words, nitrates become a limiting factor in plant growth. This is due to several causes:

(1) Under sod there exists keen competition between the grasses and the soil micro-organisms for the available nitrogen present. The soil micro-organisms use, as their source of food or energy, the old roots of the grasses, high in carbon. These soil organisms require nitrogen in a definite proportion to the carbon assimilated in order to balance the composition of their bodies which, like the higher plants, contain definite ratios of carbon to nitrogen.

(2) Under condition of sod, especially in case of greens frequently rolled, nitrification is reduced due to poor aeration; that is, the supply of oxygen in the soil atmosphere is insufficient to meet the demands of the nitrifying organisms.

(3) In case of extreme soil acidity, the activity of the nitrifying organisms is con-

siderably reduced. The optimum reaction for soil nitrification is between pH 6.0 and 7.5.

(4) The presence of an excess of ammonium salts, brought about as the result of poor drainage where large amounts of ammonium sulphate have been applied, has been found to reduce nitrification.

There are many other soil factors which may control nitrification such as excess of water, low temperature and the presence of an excess of soluble organic matter and certain mineral salts. Of the heavier metals mercury and silver have the most pronounced effect in reducing the activity of nitrifying organisms. The effect of these metals is to precipitate the protoplasm or destroy the cell structure of soil micro-organisms.

Tests Mercury Compound Effect

In order to gain further information concerning the controlling influence of mercury compounds on the activity of nitrifying organisms, the writer applied to both an acid and neutral soil mercury compound commonly used for the control of brown-patch and other fungous diseases of turf grasses. The soil used was taken from the ammonium sulphate plot of the Pennsylvania field experiments which had received a total of 2,740 lbs. of ammonium sulphate distributed uniformly over a period of 47 years. This soil has a pH of 4.77. An equal portion of the same soil was treated with limestone in amounts sufficient to produce a neutral soil of pH 7.0.

The field plot soil in addition to ammonium sulphate had received liberal applications of superphosphate and muriate of potash during the period of the field experiment. In addition to the mercury compounds, lead arsenate used for the control of grubs was also included in the nitrification studies. One-half of each soil was treated with ammonium sulphate at the rate of 226 lbs. per acre or 5.2 lbs. per 1,000 sq. ft. of soil. The experiment was conducted for a period of two weeks. The table herewith shows the rate of application of mercury and arsenic compounds and the total nitric nitrogen produced in case of each treatment.

A study of the results shown in the above table brings out the fact that on the unlimed soil, parallel to the condition found on many greens and fairways of our eastern golf courses, mercury has consid-

Effect of Mercury Compounds and Arsenate of Lead on Soil Nitrification.

Results expressed as parts per million of nitric nitrogen produced in 14 days.

Materials used and rate per 1,000 sq. ft. of soil.	Unlimed Soil pH 4.77.		Limed Soil pH 7.02.		Totals	
	No	Amm.	No	Amm.	No	Limed.
	Sul.	Sul.	Sul.	Sul.	Lime.	Limed.
Untreated soil	55	43	58	41	98	99
½ lb. bichloride of mercury.....	41	25	61	38	66	99
2 lbs. bichloride of mercury.....	44	26	61	41	70	102
¾ lb. calomel.....	46	30	52	38	76	90
2 lbs. calomel.....	46	24	58	44	70	102
1 lb. semesan.....	55	34	56	37	89	93
3 lbs. semesan.....	45	28	60	38	73	98
11½ lbs. arsenate of lead.....	59	45	62	40	104	102
46 lbs. arsenate of lead.....	94	44	66	38	138	104

erably reduced the activity of the nitrifying organisms. Arsenate of lead, on the other hand, has stimulated the production of soil nitrates in case of each soil. The addition of lime, however, has eliminated the injurious effect of the mercury compounds as shown from the fact that on the unlimed soil the three mercury compounds reduced nitrification on an average of 25% compared to only 1.5% on the soil which had received limestone. The reduction of nitrification in case of each of the three mercury compounds used was as follows: bichloride 31%, calomel 26% and semesan 17%. Arsenate of lead increased nitrification on the unlimed soil 40% and on the limed soil 5%.

Shows Lime Need

In addition to the factors already mentioned which may reduce the supply of available nitrates in the soil, we now learn that mercury compounds used for the control of fungous diseases also produce an injurious effect on nitrifying organisms in acid soils. The addition of lime, however, has been shown to overcome this toxic effect. The results of this experiment are presented to you with no idea in mind of discouraging the use of compounds of mercury necessary to combat fungus diseases of turf grasses, but rather to call to your attention the fact that such materials may reduce the available nitrogen of the soil, especially in case of those soils which are in need of lime.

The slow recovery of grasses, often noted following repeated application of fungicides, may be due to the reduction in the supply of available nitrogen in the soil as the result of injury to nitrifying organisms.

In conclusion may I say that today we are facing a new era in the scientific management of greens and fairways. The greenkeepers are turning to their state

agricultural experiment stations for advice gained as the result of many years of careful research. The soil chemist, the pathologist and the plant breeder are joining hands in an effort to aid those responsible for the development and maintenance of our American golf greens and fairways. The results of various turf grass experiments initiated by the United States Department of Agriculture are beginning to bear fruit. Art and science, theory and practice are going forward hand in hand and there should be no conflict between them.

Illinois Pros Entertain Club Officials at Meeting

FOR their first meeting of the year, the Illinois P. G. A. on April 20 put over a novel and valuable stunt by inviting club officials to sit with them for an evening and learn the many ways in which pros expect to serve their clubs better in 1931 than ever before.

Among the speakers were Jim Wilson, pro at Ravisloe and president of the local body, who told of the association's aims for the year; Albert R. Gates, administrator of the national P. G. A., who gave the latest news of that organization; George Laadt, chairman of the Chicago Junior Association of Commerce tournament committee, who described the J. A. C.'s progress toward sponsoring a Chicago \$10,000 open tournament this summer; and Bob Harlow, manager of the P. G. A. tournament bureau, who gave a resume of the winter circuit.

As an additional feature, the slow motion reels of Jones, Vardon and Joyce Wethered were presented.

The meeting was the first of its type ever attempted by the Illinois P. G. A. and the results indicate more to come.