

Knowing Insect Life Histories Aids in Control Measures

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In man's fight against injurious insects, his combat against them can be carried on more profitably and efficiently if he knows their habits and life histories. Nearly all insects have a time or period in their life when they are more susceptible to control operations. On the other hand, most insect damage comes only at certain times of the year or in certain yearly cycles. As an example, the greatest injury by common white grubs may be expected the second summer after the heavy flight of adult beetles, which occurs every third year. Because such knowledge is helpful in combating any particular pest, it is essential that you know the habits and life histories of those which you are attempting to combat.

The problem of fighting injurious insects involves more than an acquaintance with habits and life cycles. One should know the processes of nature which develop natural checks to their outbreaks. What will it profit to employ some costly or laborious control measure if in a short time nature will do the work for us?

Why Webworms Were Serious

Webworms are with us every year, but thanks to their natural enemies they are seldom present in sufficient numbers to attract attention by their injury as they have the past two seasons. Two or three reasons brought on our recent webworm outbreaks. The winters preceding the outbreaks of 1931 and 1932 were unusually mild; great numbers of overwintering forms survived to start the summer generations. The dry summers were unfavorable to their parasitic and predaceous enemies and, moreover, caused the webworm moths to concentrate their egg-laying in artificially-watered areas such as golf greens. Weather brought about these outbreaks and weather will eventually reduce the webworm numbers to a negligible factor for a series of years.

When nature lays down on the job of holding injurious insects in check, it is necessary to use artificial or applied methods of control. Against insects in the soil, we must resort to some measure involving

cropping, cultivation, the use of soil insecticides, or fertilizers.

Numerous measures have been advocated for the control of soil-inhabiting insects. It is evident that their practical application involves more than a study of the effect upon the insect itself. Those engaged in the control of soil insects should recognize the importance of the soil problems which are connected with the subject of insect eradication.

There are many factors which must be taken into consideration in any attempt to control underground insects. The reaction of any treatment upon the physical, chemical, and biological factors of the soil must be known. Insect control measures should not be attempted simply because they control the pest. Subsequent developments may show that they seriously injure the constituency and productivity of the soil.

The use of control measures for underground insects, therefore, should take into serious consideration (1) their effectiveness against the insect; (2) their effect on the physical properties of the soil; (3) their effect on the chemical properties of the soil; (4) their effect on different types of vegetation; (5) their effect on other biological factors such as parasites, predators, fungous diseases, nitrifying bacteria, and finally, (6) the cost of treatment.

The speaker continued with an outline of the various control measures commonly used against insects—insecticides, which require careful handling so that the doses will kill the insects without killing or stunting the grass; repellants, on which further research is needed before definite benefits can be claimed; and fertilizers, which are useful in so stimulating plant growth that moderate insect injury is overcome.

Caution was advised in adopting any control measures. What works well in one locality and on one soil may be most harmful elsewhere. It is better to test on small experimental plots and seek the advice of state and national entomological and soil experts.

After describing the most accepted measures of control for grubs and webworms as developed in the past decade, Prof. Hayes took up the problem of ant control:

*Address at NAGA convention.



Sod webworm. Greatly enlarged.

Ants are common everywhere, and are abundant wherever they occur. They live in colonies which, in some instances, may endure for several years. Those species of ants which build large mounds over their colonies make themselves the greater nuisance on the golf courses.

Certain species destroy all vegetation surrounding the mound. One of these in the western states is the mound-building prairie ant. It cannot tolerate vegetation near its mound and it is cleared away as fast as it grows. Some of these areas cleared by the mound-building ants may measure as much as twenty feet or more in diameter, but the occurrence of such extreme mounds is comparatively rare on a golf course because the colony would ordinarily not be allowed to remain long enough to destroy such large areas of turf. Ants constructing smaller mounds are continually making their presence known on greens and fairways. Some species may not build mounds but simply loosen the soil and injure the grass in such areas.

The food of ants is as varied as their nest locations. A few species feed on planted seed, bulbs, and the bark of tender roots. This damage, while sometimes occurring in grass, is so seldom noticed that it can be considered as negligible.

Clue in Ant Life Habits

Three castes of ants are nearly always present in an ant colony—males, queens (fertile females) and workers (infertile females). The males and queens develop wings which are lost after the mating flight. The workers are wingless. At certain seasons, usually after rains, swarming of the winged males and queens occurs. Enormous numbers leave their nest, take to flight and usually mate in the air. Upon alighting the females kick off their wings and enter the ground to form new colonies. The males soon perish after the marriage flight. The newly fertilized queen begins her colony by laying a few worker eggs. Until these are hatched and the young mature, egg laying is suspended. With the help of workers now available, the queen limits her duties to egg laying and may live many years doing nothing else. One queen was observed to live for 15 years in confinement. Some ant colonies may contain many queens. As a result we find colonies in the soil may vary from those having a single, tiny entrance and a miniature mound with only a few tunnels and galleries below the surface, to those having

extensive underground workings, mounds several feet in diameter and thousands of ants in it.

Kill the Queens

Successful eradication of ant colonies depends on destruction of the queens which, unfortunately, once they have begun to lay eggs, seldom if ever come to the surface. Killing the workers will not prevent the queens from laying more eggs and producing more workers. Heavy rains and other natural enemies may reduce the population of a colony but they are always able to repopulate and thrive again if the queens survive.

Many poisons are recommended and used against ants. They are usually composed of attractive sweets which contain a poison such as tartaric acid or sodium arsenate. The poison must not be strong enough to kill rapidly. The workers who feed upon it must live long enough to return to the colony and feed the queen and young ants by regurgitation. One of the most successful poisons is known as the Argentine ant poison. The formula is complicated and not easily made. It is used extensively in some of the southern states. Further information concerning it can be obtained from any state experiment station.

This Syrup Effective

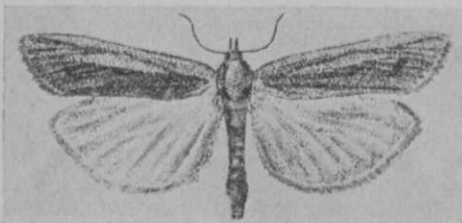
In the northern states a poisoned syrup has been useful against outdoor ants. It is made as follows:

Sugar	1 pound
Arsenate of soda.....	125 grains
Water	1 pint
Honey	1 tablespoonful

The first three materials are boiled until the arsenate of soda is dissolved, after which the honey is added. This poison should be put out by soaking pieces of an ordinary sponge in it and then placing them in perforated tin boxes near the colony.

Fumigating Works Well

Better success in controlling ant colonies in the soil is had by fumigation. Carbon disulfide gas, heavier than air, penetrates deeply into the soil. However, it is highly inflammable and must be kept at a distance from fire. To apply it, choose a time



Sod webworm. Adult.

when the soil is warm and dry, punch holes about a foot apart into the larger nests with a cane or broomstick. They should penetrate until hard ground is felt. Into each of these pour one or two tablespoonfuls of carbon disulfide and fill the holes by pressing them with the foot. A wet canvas or blanket may be thrown over large mounds or several smaller mounds if they are close together. This gas penetrating through the underground galleries will reach the queen and all other inhabitants of the colony.

Calcium cyanide is useful in destroying ant colonies when used in the form of a dust. This material, when exposed to the moisture in the air, liberates hydrocyanic acid gas, one of the most deadly gases known. It should be purchased in dust form. Holes somewhat closer together than for carbon disulfide are drilled into the mounds and with the aid of a funnel pour in one teaspoonful of the dust. An effort should be made to get this dust into the bottom of the nests as the killing gas is lighter than air and will rise to the surface. As with carbon disulfide gas, the holes should be closed to retain the gas as long as possible. *In using either gas, do not spill or scatter the material on surrounding sod as it will kill the grass.*

Detroit Club Official Gives High, Low and Average at Five Clubs

DETROIT, one of the hardest-hit of all golf club sectors, is working its way out of the rough by learning the facts about costs.

Jack Bryant, secy. of the Detroit District Golf Assn., in 1932 compiled statistical information on operations of leading clubs in the district in one of the best, valuable jobs of this kind done during 1932. He had the usual trouble of lack of club response to contend with, despite the fact that the information he endeavored to get was something that every club could use. If there are any copies of this survey left you might be able to get one from Bryant's successor as secretary of the DDGA, E. L. Warner, 1680 First National Bank bldg., Detroit.

Wm. H. Ashton, Detroit, who is on the advisory committee of the USGA Green Section, is on the hunt for figures on course maintenance at metropolitan district clubs. He has sent out to a number of metropolitan district clubs the accom-

Composite of Labor Costs and Averages at Five 18-Hole Detroit Courses

	Men employed			Hours paid for—			Payroll—		
	High	Low	Av.	High	Low	Avge.	High	Low	Avge.
Jan.	2	0	¾	336	0	82	156.31	0	39.11
Feb.	3	0	¾	314	0	76	182.30	0	44.60
Mar.	3	0	1¾	721	76	345	309.52	0	128.15
Apr.	9	6	7½	1,994	910	1,282	586.08	338.10	522.06
May	13	9	10	2,261	1,460	1,937	1,069.96	603.72	838.06
June	10	9	9	2,622	1,817	2,242	1,274.51	366.80	833.47
July	10	8	9	2,387	1,725	2,040	1,145.78	635.42	899.23
Aug.	12	8	9¼	2,806	1,749	2,196	1,322.97	643.97	935.72
Sept.	9	7	8¾	1,848	1,192	1,643	1,009.11	576.00	744.95
Oct.	9	6	7	1,342	542	1,023	755.82	378.90	557.82
Nov.	8	2½	5	487	0	352	234.12	134.26	160.07
Dec.	1	0	¼	232	0	83	106.00	0	41.80
Year's average				15,158	11,678	13,347	8,031.24	4,162.40	5,827.52

Above figures represent labor items only, they do not include the greenkeeper, his salary, or cost of maintaining the lawns and gardens adjacent to clubhouse.

Four of these clubs watered their fairways, all five had Sunday work for mowing greens, etc.

Other Averages

	High	Low	Average
Maintenance—Entire cost for the year, including greenkeeper's salary, labor, payroll and other expenses except lawn and garden	13,589.03	9,810.92	12,066.00
Greenkeeper's salary	3,510.00	1,950.00	2,497.00
Gasoline and oil	510.27	315.26	423.66
Electricity (watering fairway)	1,429.69	726.94	1,031.15
Fairway fertilizer	500.00	200.00	291.74
Labor rate per hour	43½	38	39½

panying report of labor and some other maintenance costs at Birmingham, Grosse Ile, Essex, Orchard and Meadowbrook, and asked clubs receiving this information to exchange figures.

Although the usual criticism of inability to accurately and helpfully compare gross amount reports without considering variations in courses, the figures can be compared on a percentage basis so they will be of value to greenkeepers and chairmen.

Dickinson Gives Pros Greens Lectures, March 16 and 18

PROF. L. S. DICKINSON of the Massachusetts Agricultural college lectured on greenkeeping before audiences of pros, greenkeepers and club officials at Detroit, March 16, and Kansas City, March 18. The Dickinson lectures were details of the PGA educational program. At the Detroit meeting Albert R. Gates of the PGA also spoke, telling about selection of the Ryder cup team and expressing the opinion that with golf clubs getting back to golf the game could expect a good year ahead.

Dickinson's remarks at these meetings gave many of the pros who are responsible for course maintenance for the first time this year an excellent general survey of the job before them. He pointed out that golf's troubles now were not alone due to the general hard times but because the clubs had forgotten their foundation was supposed to be golf. Clubs that now are in difficulties almost invariably must attribute their misery to unduly high clubhouse fixed charges.

As workable averages, course maintenance costs are divided 75% for labor and 25% for materials, Dickinson said. Labor division figures were cited from the GOLF-DOM survey made under Dickinson's direction, as follows: tees, 8%; fairgreens, 12%; rough, 6%; traps, 2%; greens, 37%; construction, 11%; miscellaneous, 24%.

Some of the high spots of the Dickinson addresses:

"The greenkeeping policy should be to inform but not to dictate to committeemen.

"A good part of greenkeeping difficulty is due to working with a living organism.

"If you give grass half a chance or better it will put up a good fight for existence. Turf failures too often are due to acts of men. Nature is trying to help the plant. Reasonably healthy turf is remarkably resistant to trouble.

"Turf failures are due to cumulative errors, construction errors, immediate errors or pestilence. Of the cumulative errors the most frequent is that caused by compaction from poor topdressing.

"Don't use cumulative errors or construction errors as an alibi.

"It's hard to remove the cause of many turf failures because of the difficulty of diagnosing the source of failure. For that reason, too, correction can not be made at once, although immediate correction, of course, is what players always demand, not knowing the frequently complex nature of the problem.

"To eliminate construction errors check on your greens foundation, drainage and design.

"Main causes of immediate or cultural errors are: overwatering to hold the ball, overmowing of fairways, over-fertilization, poor technique, over-use of chemicals, failure to understand fertilizers."

Dickinson also gave his hearers some valuable, elemental information on grubs, fungous diseases and other turf pestilence. He advised them if they were having a lot of mysterious trouble with their greens to see if the source might not be in the topdressing.

The two educational sessions at which Dickinson appeared were successful beyond expectations. There were some misgivings that fellows who should have attended the many greenkeeping short courses during the winter would attend the Dickinson session and expect that Dick would give them deep secrets and some hypnotism that would make them master greenkeepers instantly. His talks tipped off the boys to basic thinking procedure as the foundation of successful greenkeeping rather than attempting to cram them with volumes of technical information.

Although the meetings were under PGA auspices, they were open to all interested in greenkeeping, so they not only benefited PGA members from an operating and educational point of view but gave the pro organization some great publicity for its efforts to contribute freely to the advance of golf.

West Newton, Mass.—New England Toro Co., 1121 Washington st., West Newton (Boston), has issued its 1933 catalog of course maintenance equipment and supplies, copy of which will be sent free. The book is one of the most complete course maintenance purchasing guides and shows some marked reductions in prices



This ambitious and eager group attended the 1933 Rutgers University Turf Convention, held at New Brunswick, N. J.

PICKED UP IN THE ROUGH

By HERB GRAFFIS

THE PLAYER is the No. 1 guy of golf this year. Any pro who figures he outranks the customer in these times when the customer is so coy, is just simply stupid.

Anything a pro can do to make the player feel important means just that many more players, and just that much more money in the pro's pocket. That day when some of the up-stage boys acted like they were doing the members a favor to stick around the club was yesterday.

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DON'T THINK the smart pros don't realize this necessity of staying close to their members. Some of the boys on the Ryder Cup team are in agony because the dates of the U. S. and British Opens and the Ryder Cup matches will keep them away from their clubs from early June until the middle of July; harvest time for the customer crop. But they can't help themselves.

* * *

SOME weeding out of pro ranks is going to be done as a result of leading manufacturers' conferences on credit. Able, conscientious pros, who have suffered the same business miseries as most other business men, have nothing to fear if they are on the cuff but trying to get off. The fellows who pay no attention to bills, but just shift business to another manufacturer, are the boys on whom the heat is to be applied by the manufacturers who finally have realized that credit is entirely under the control of the seller and on that account pros shouldn't be condemned for sour credit so long as a too loose arrangement among manufacturers helps them to get away with it.

Pro credit is founded primarily on character rather than on investment in shop fixtures, etc. Consequently when the manufacturers' credit men pass the word around that a pro's character doesn't justify granting credit, not many clubs will take a chance hiring that fellow.

On the other hand, a prime purpose of the credit men's new conference deal is to help the fellows who are right side up basically, but S. O. L. temporarily, work out of their plight.

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SOME GREENKEEPERS continue to believe the Green Section ain't so much, because of the Section's switch from an earlier high priesthood for the acid soil theory to giving the alkaline policy an even break.

Here's a quotation from an article by Wingate M. Johnson, M. D., in the American Mercury:

"When I graduated in medicine nearly 25 years ago, the addition of limewater to the milk in bottle feeding was almost universal, for it was thought that increased alkalinity was essential. But now the vogue is for the addition of lactic acid to increase its acidity. Babies have thrived equally well on either diet."

If the eminent doctors change their ideas, why should the Green Section scientists be suspected of shortcomings for revising their opinions in the light of later findings?

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GOLF CLUBS and manufacturers should benefit this year from the pros' sharp awakening to the fact that just what the pro will make in 1933 is entirely dependent on the pro. That means the boys who

know what it's all about will work even harder than before to attract and serve members and to supply properly-fitted playing equipment.

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CHARLEY ROBBINS is the new president of Spalding. Uncle Julian Curtiss, who certainly has had as much to do as any one man in putting golf on the American map—probably a lot more—becomes chairman of the board. Boardman Spalding continues as treasurer and becomes vice-chairman of the board. Bill Brown, advertising manager of the company, becomes a vice-president.

Becoming chairman of the board doesn't mean that Uncle Julian has reached those years when he figures he is entitled to sit back, hold some sessions of school for the younger executives, and act important. Curtiss (Yale '79) still can leap from crag to crag with the most agile of them and still has 50 or 60 years to go before he starts living in yesteryears.

These brisk and bright heirs to the hurrah, Robbins and Brown, are no kindergarten students in the problems of the pros. Both of them have pretty good close-ups of the pros' trials, opportunities and hopes, and neither one of them is adverse to sitting down in some pro shop and asking the professor, "What's on your chest, pardner?" Doing the legwork after Curtiss in getting the score on the pro business will make these boys plenty willing to hit the linen after each business day. First time Uncle Julian ever missed a Yale-Harvard boat race was when the race date conflicted with the PGA-Manufacturers' conference at Chicago last fall. Mr. Curtiss has led one of the most adventurous careers of modern times, having risked death by drowning 9,675,438 times when pros have cried on his bosom.

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WILLIE OGG seems to be on his way to his next million. The Worcester Scot's new clubs are being given the welcome of good news from home with check enclosed. Tommy Mac, Wilson's eastern pro department boss, had the new clubs at Pinehurst and pros and amateurs started babbling about them. Willie Hoare, Harry West, Jim Ewell and others of the Wilson headquarters staff have been hitting the high spots of the central states with the new Ogg irons and watching eyes and dough pop out in response to the tale of this innovation.

Willie checked his idea with university and other technical authorities in the East and with many pros before he put the club on the market. The basic idea of the design is a "sweet" line extending from socket to toe of the club by means of a weighted toe compensating for the shaft, hosel and grip weight.

Your correspondent has sat in several sessions with pros discussing the Ogg theory of design, and confesses to being driven dizzy by the arguments pro and con.

At any rate, the design gets them talking and surely ought to cash in on the buying urge for something new that has ruled golf club selling since the Smith-irons, Jones irons, Tom Boys and other flanged sole clubs have come in.

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WONDER IF there isn't some strong selling talk for pro sales in the way that low scoring records have been set since the start of last year. Maybe, instead of the old idea that the big shots could bat the ball around in par with a broom, there is something to the new designs of clubs enabling even the best of the sharpshooters to improve their games. If further perfection can be effected in the games of the luminaries, by improved clubs, what a lot of good these clubs will do to the games of the dubs.

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"DOC" TREACY, secy. of the PGA, is sending out bulletins to sectional secretaries with "the idea of actually starting the annual PGA meeting now instead of waiting till next November and then trying to battle everything to a standstill in 2 or 3 days."

It's a noble and logical idea. All that remains to be done is for the sections to start their battling by mail and such matters as resulted in the defection of sections after the last meeting will be avoided.

The hell of it lies in trying to get the sections to take action in advance, as Doc requests.

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NOTICE from the interesting, accurate figures on the 6-inch Open at Miami-Biltmore that the Hague lead all the heavy-hitters with an average of slightly more than 246 yards off tee. Paul Runyan, winner of the tournament, was 17th in ranking as a distance driver, Paul's tee

shots averaging 220 yards. All of which proves what, and who cares?

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A PRESS DISPATCH telling that Hagen planned to retire from competitive activity after this year does not mean anything to us, even if the statement had been wrung from Walter by the third degree of the Soviet secret police. Too many milk wagons have been overturned by retired fire-horses instinctively busting into a gallop at the sound of the gongs and the sight of the red wagons.

Hagen will be there at the championship first tees, brother, long after you and I have forgotten the story about his retirement from competitive golf to pay more attention to his club and ball business.

Walter could walk into most pro shops, ask for the time and emerge with a club and ball order, if he had that temperament. But to get a picture of Hagen walking into an office at 8:30 a. m., rushing through the mail, then grabbing his samples to go out and peddle to the boys, putting fire on them to pay their bills, etc., is something that will have to be deferred until we can also see Peggy Joyce going around the country lecturing to women's clubs on the care and feeding of infants.

Of course, it may happen, but if it does, Franklin D. Roosevelt can dismiss all worries about the condition of the Union. L. A. Young and Al Link, after revising the distinctive Hagen temperament, then will be recognized as miracle men who can do anything.

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THERE'S a grand story about Walter in April *Golfing*, written by his long-time team-mate, Bob Harlow. There's another great yarn actually written by Gene Sarazen on the cares of the king, in that same issue.

These two features are among many that will stir up golf interest and do the pros and clubs a lot of good. If your members are not getting *Golfing* mailed free to them at their homes April, May, June, July and August, it's because you or your club officials haven't sent in the names and addresses to *Golfing*, 205 W. Wacker drive, Chicago.

Incidentally, *Golfing*, with its 300,000 circulation enables its advertisers to put more selling force behind a product displayed in the pro shops than ever before was possible.

GOLF CLUBS probably are the heaviest taxed of all legitimate enterprises. J. B. Berryman, president of the Crane Co., in a radio broadcast, pointed out that 33 cents of every dollar of income goes to pay the cost of government. He also said that if you have low taxes you have good government; if high taxes, poor government.

With all the agitation for tax reform now apparently arousing some attention, it seems like high time for the golf clubs to again plead their case for a square deal on taxation.

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WHEN WILL some pros get over that screwy idea that there is the wealth of the Indies in a private branded ball of their own?

One nosey amateur picked up a 50 cent ball in Florida being sold under the brand name of a local club. Testing this ball on a driving machine showed the ball 10 yards behind a standard make 35 cent ball and not a bit better than a standard brand 25 cent ball.

The pro probably went into the deal thinking he was going to give the player something "just as good" and with a much longer profit for the pro. But the way it ended was the public was gypped and the pro lost the confidence and prestige as a picker of good merchandise.

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TOURNAMENT BUREAU of the PGA has announced that all old fixtures for the summer schedule will be back, with \$500 added money for a driving contest during the St. Paul Open and a \$1,500 Open tentatively scheduled by Scranton, Pa., for early August.

There is a chance that the PGA championship may be awarded to the Medinah C. C. (Chicago district). Medinah officials are endeavoring to work out an arrangement whereby the guarantee for the PGA can be handled, and part of the gate go for Shrine charitable expenses.

It also is rumored that Florida will put in a strong bid for the PGA championship to be played at the start of the 1933-34 season at Miami. Possibility of displacing one of the present Florida big money tournaments and late date preventing the PGA title-winner from capitalizing his victory, give Florida as PGA championship venue only an outside chance, according to several authorities.

Arlington Putting Grass Plots

Appraised by Nation's Pro Stars

By KENNETH WELTON

Among the pro luminaries who participated in the Green Section test of putting green grasses was Billy Burke, shown here as he was making the tests.



IN OCTOBER, 1932, an opportunity to hold a novel putting test probably the first of its kind, was afforded the USGA Green Section. In the usual putting test players putt against one another on the same putting green, or greens, as the case may be, and the test is obviously one of the skill of the players. In the Green Section test the players did not putt against one another nor against par; they putted against ten different species or varieties of grass. Awards were made by the players to the grasses. After each player finished testing the grasses in his own manner he rated the various grasses in the order of his preference.

Players judged the grasses almost entirely by the results they got with their putters. The players were not greenkeepers or green-chairmen, therefore were not concerned with the kind of grass composing the turf. Some players admitted they did not know one grass from another, but by judging purely from the putting qualities of the various grasses, each player showed a decided preference for at least one of the grasses tested.

The putting greens tested were approximately 24 ft. square and were identical in

shape, grade, and soil. Each green was carefully built several years ago and brought to similar grades by persistent attention. During construction a surveyor's level was used to get the correct grades, and from time to time the greens have been checked with the level so that by using care in topdressing, any hollows which existed could be filled and the grades corrected, with the result that when the greens settled, the grades were mechanically correct. Each green has three grades; the upper 8 feet has a 6 per cent grade, the middle 8 feet changes to a 3 per cent, and the lower 8 feet extends to the next plot on a 1 per cent grade.

Appraise Grass Variety Only.

The similarity of grades on each plot removed a factor which might have unconsciously influenced the players in their choices of grasses. Furthermore these plots had all received cultural care calculated to bring them as nearly as possible to perfection in the matter of growth, putting qualities being considered. All plots were cut alike with a mower having the height of cut set at 3/16 of an inch. Therefore as far as was possible everything had

been done previous to the test so that all factors contributing to the behavior of the ball could be ignored, except the variety of grass. Grasses on the plots were in two series as follows: five greens planted with seed of colonial bent, German mixed bent, Seaside creeping bent, red fescue, and Annual bluegrass, *Poa annua*, (in this case the green was originally planted with *Poa annua* sod); and five greens planted with stolons (the vegetative method) of Metropolitan creeping bent, Washington creeping bent, a pure strain of velvet bent, Virginia creeping bent and Columbia creeping bent.

The players taking part in the test included ten professionals who came to Washington to compete in "The National Capitol Open." Among them were three American Open champions and a runner-up, Billy Burke, Tom Boyd, Wiffy Cox, Abe Espinosa, Johnny Farrell, John Flattery, John Golden, Tom Kerrigan, Willie Macfarlane, and Horton Smith.

The pros were taken individually or in small groups to the USGA experiment garden at Arlington, where miniature putting greens are maintained as show-plots the year around. Most players brought their own putters and balls. The various plots were numbered and staked off, but no information was given as to the variety of grass on each green. Cards with spaces to indicate the various plots were handed the players so that their choices could be indicated by simply marking the rating given as 1-2-3, etc. in the space corresponding to the green on the garden. It was explained to each player that the idea was to rate the various pieces of turf as to their putting qualities, having in mind such things as trueness, speed, resistance, nap, grain and any other factors which might influence putting.

The plots, with two exceptions which will be referred to later, were in excellent condition and some of the pros expressed the opinion that any one of them was better than most tournament putting turf.

Rating By Putters.

The results of the rating were as follows:

1. Velvet bent.
2. Metropolitan creeping bent.
3. Washington creeping bent.
4. Colonial bent.
5. { German mixed bent.
- } Seaside creeping bent.
6. { Columbia creeping bent.
- } Virginia creeping bent.

The *Poa annua* and fescue plots were in poor condition and the turf was not representative of what these grasses are capable of producing. They were therefore not included in the tests. Velvet bent was un-animously placed first.

What They Liked About Velvet.

The velvet bent was considered to be the most upright in habit of growth. The blades of this grass were the finest of those rated and it was the thickest piece of turf on the garden if one considers the number of plants or grass blades to a given area. Perhaps the degree of any one of these factors or a combination of all led the pros to make the following observations regarding this grass in explaining their marked preference for it. They found the turf offered enough resistance that they could stroke the ball firmly. The resistance also made the ball stop dead when the force of the forward impulse became low; they considered this an important point as on some grasses the ball will continue to roll for a time by its own momentum after the force of the blow is expended, thus making it difficult to stop the ball close to the hole. They found the ball held the line perfectly on this grass and had little inclination to "drift" or vary from the line of the putt even when the ball slowed down. They found this characteristic particularly noticeable when making allowances for grade, as when putting along or at right angles to a slope. With such putts this characteristic was most helpful since as the ball slowed down it did not wander off the line, or fade to any extent. They found no grain to the grass and were not forced to make allowances for differences in the speed, as is necessary when putting with or against the grain on some grasses. Several pros commented favorably on the number of factors to consider in putting being reduced to a minimum, since it was only necessary to judge the force of impact needed and the allowance in the line of the putt to be made for grade. The color of the velvet might have had some effect on the selections, as, at the time of the test, it was a remarkably vivid shade of green, which led several to remark on its beauty.

Didn't "Track" Easily.

Another factor which the pros were quite fussy about was the extent of the impressions left in the grass by the feet of previous players. All of the grasses showed impressions more during the test

than they ordinarily would, since heavy rain the day preceding the test made the soil underlying the turf more moist than usual. It was thought that the velvet bent recovered or became upright quickly enough even under the moist conditions, but the point the pros made was that even where the velvet bent had not completely recovered its upright nature, the foot impressions seemed to effect the ball very slightly. They thought this was not the case with some of the other grasses.

The points brought out in discussing the velvet bent were the same as considered in rating the other grasses, and although it is not possible to say how much of a consideration any one factor was in rating the remaining grasses it is worthy to note that the Metropolitan and Washington creeping bents which were second and third choices, respectively, formed turf which was probably as dense in growth as the velvet bent but not as fine in texture nor as upright in habit of growth.

The fourth choice, colonial bent, and the German mixed bent, which was tied for fifth place, were probably more upright in growth than the second and third choices but did not form as dense a turf. The German mixed bent was composed of as much as 70 per cent of colonial bent. The seaside creeping bent, which tied for fifth choice, was slightly less upright and hardly as dense as the third and fourth choices, also its color was not as vivid. Virginia and Columbia creeping bents were given last place. The Virginia bent was considered coarser and more grainy than those selected. The Columbia bent, although finer in texture than all except the velvet bent had a decided grain and provided a rather thin turf; also it did not have a healthy appearance. In October, when these tests were made, most northern grasses have recovered from the more or less harmful effects of the summer and will be found fast growing and healthy. Two grasses not included among the eight grasses found in the ratings still showed effects of summer injury. The *Poa annua* plot was not pure and had a great deal of various species and strains of bent mixed in it. The plot of fescue was rough and irregular and largely contaminated with a variety of grasses. The red fescue with which it was planted had died during the summer.

Most of the arguments regarding the respective merits of different grasses for putting turf can only be decided when the

grasses are tested under similar conditions. Therefore this test by some of the best putters of the country throws a great deal of light upon the often-debated subject of what grass makes the best putting green turf. This information should be valuable to those contemplating the construction of golf courses or to established clubs which may be considering the advisability of changing the turf on their greens. Some established clubs will find that the grass on their greens will not compare in putting qualities with others under equally ideal conditions. Whereas other clubs will be led to search for other reasons for the poor putting qualities of their greens, if the grass on their greens happens to be of the leading choices for putting turf.

Season Is Important.

The problem is not as simple however as it at first might seem. Some grasses might be at their best during a putting test such as the one here described but a month previous to the test or a month later might be out of the question because of some cultural weakness. For example, if this test were held at a time when the *Poa annua* was in the fine condition it is capable of attaining the pros might have reversed their decisions. And if the test were held in a district where fescue thrives the fescue turf would probably have been in good condition and the pros might have preferred it to the velvet bent. Therefore the test plainly did not prove anything insofar as the putting qualities of *Poa annua* and fescue were concerned. It is hoped that an opportunity will occur to test these grasses again when the *Poa annua* is in good condition. As for the fescue, it is not likely that a representative piece of fescue putting turf can be grown in Washington. If either *Poa annua* or fescue are judged as better grasses to putt on than velvet then more work should be done with them to discover if possible methods of maintaining them in good condition over a long period and of growing them successfully over a wider range.

Some Shortcomings.

The velvet bent was planted by the vegetative method with No. 14276 velvet bent, a strain developed at Arlington. It was comparatively slow to form turf when planted and has always been slow to heal after injuries from disease or from mechanical causes such as moving the cup. In 1931 it became badly damaged and discolored due