COMMENTS ON

T U R F C U L T U R E

Issued By The

UNITED STATES GOLF ASSOCIATION GREEN SECTION

P. O. Box 73, Benjamin Franklin Station
Washington, D. C.

MAY, 1936

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Executive Offices, 73 East 57th Street, New York, N. Y.

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P.O. Box 73, Benjamin Franklin Station, Washington, D. C.
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Dr. John Monteith, Jr., in Charge of Washington Offices
Executive Offices, 73 East 57th Street, New York, N. Y.

Vol. 1, No. 2 May, 1936

GREEN SECTION COMMITTEE MEETING

A meeting of the Green Section Committee of the United States Golf Association will be held on Thursday, June 5 at 11 A. M. at the Baltusrol Golf Club, Springfield, N. J., during the Open Championship.

The Committee comprises:

Frank M. Hardt, chairman, Philadelphia, Pa.
Robert F. Arnott, Upper Montclair, N.J.
Leo S. Bauman, St. Louis, Mo.
Fred A. Burkhardt, Rocky River, Ohio
Dixwell Davenport, San Francisco, Cal.
Spencer M. Duty, Cleveland, Ohio
Robert J. Foley, Huntington, W. Va.
Dr. Walter S. Harban, Washington, D. C.
Richard L. Jackson, Ridgefield, Conn.
George R. Jacobus, Ridgewood, N. J.
Norman Macbeth, Los Angeles, Cal.
Dr. M. A. McCall, Washington, D.C.
Robert McLean, Jr., Baltimore, Md.
John J. Mitchell, 3d., Philadelphia, Pa.
Dr. John Monteith, Jr., Washington, D.C.
James Morrison, Cincinnati, Ohio
Harry E. Radix, Chicago, Ill.
C. A. Tregillus, Everett, Ill.
Frank H. Wilson, Newton Centre, Mass.
R. A. Young, Indianapolis, Ind.

THE CONTROL OF ANTS IN TURF

The Green Section has made numerous tests with various ant remedies and has received many suggestions from outside sources.

No method has yet been devised for ant control that is entirely efficient and practical for all purposes. One important difficulty is that there are numerous species of ants which are troublesome in turf and these species vary in their feeding habits.

Most of the ants on golf courses build nests in the ground in the immediate vicinity where they are feeding. Each colony has one or more queens which lay eggs in large numbers in the nests. These eggs hatch into larvae, which are fed with food brought in by the workers of the colony. In this manner the ant colony resembles a swarm of bees. Any treatment that merely kills the worker ants provides only a temporary checking of the insect. If poison can be applied into the ant nests to kill the queen and the young, the entire colony is destroyed. Now colonies may, however, move in from nearby and establish new nests.

The following suggestions are presented for trial. If one is not suitable for certain conditions, it is well to try others.

Killing Individual Colonies: Various methods have been used to kill ant colonies quickly. In the vicinity of buildings, walks or driveways they may be destroyed by drenching the nests with boiling water or injecting small quantities of kerosene or coal oil. These treatments, however, are likely to destroy grass and therefore cannot be used on turf.

A similar method, in which the killing agent is a volatile liquid (carbon bisulphide), has been used frequently on putting greens. It is described briefly on page 155 of Volume 5 of the Bulletin of the United States Golf Association Green Section, as follows:

"In using carbon bisulphide the hole in the ant hill is enlarged with a sharp instrument and two or three drops of carbon bisulphide are injected into the hole by means of a spring-bottom oil can. The hole is then at once closed by plugging with earth. Care must be exercised in the use of carbon bisulphide as in the use of gasoline, since it is equally as explosive."

One important objection to this method, however, is that unless used with great caution the carbon bisulphide is likely to injure the turf.

Extracts of pyrethrum have recently been substituted for carbon bisulphide. The method is essentially the same as the carbon bisulphide method. The ordinary commercial extract of pyrethrum is diluted 1 part to 100 in water, placed in an oil can, and used in practically the same manner as the carbon bisulphide. In tests at Arlington this treatment completely destroyed ant colonies without any injury to turf. Pyrethrum extract is a common insecticide sold under various trade names.

Where colonies form large ant nests, two or three ounces or more of either carbon bisulphide or pyrethrum extract is required. In such cases the treatment has been found to be more effective if the ant hill is covered with a wet blanket or heavy cloth for a time to retain the fumes of the chemical.

The above method, however, is impractical where the ant colonies are numerous, because of the excessive labor involved. In such cases it is best to use a less laborious treatment to get rid of most of the ants and to depend on the above for the final clean-up.

Calcium cyanide (Cyanagas) applied at the center of the hill is also effective. The amount held by the point of a pocket-knife blade is enough for a colony. Gas evolves as soon as the powder comes in contact with moisture, in this case from that in the soil. Care must be taken not to spill the chemical on grass and to keep it stored in a dry place.

Poisoned Baits: Ants can be controlled with poisons. In using poisoned baits it must be remembered that the right kind of bait must be used to attract the particular species that is present. Some species of ants prefer sweet substances, whereas others prefer fatty materials. If strong poisons are used the ants that eat them are immediately killed and the other ants will avoid that particular substance. Therefore, the principle of using ant baits is to use the poison sufficiently diluted so that before the worker ants feel any ill effects from the poison they will have been able to carry large quantities of it back into the nests where it may be fed to the reproductive forms and to the young and thereby destroy the entire colony. Ants frequently appear suspicious of poisoned baits and will avoid them. It is therefore well to change to different combinations when any particular poisoned bait no longer appears effective.

Various ant poisons are available on the market under trade names. In many of these proprietary mixtures the basic poison is thallium sulphate. This chemical is extremely toxic to grass and in general should be avoided on golf courses until more information is available as to its possibilities for harm. In tests at the Arlington turf garden extremely small quantities of thallium sulphate sterilized soil so effectively that grass would not grow upon it for at least a year. Concentration of this poison by the ants in their nests may lead to serious turf injuries. Thallium sulphate baits, however, can be used with safety around the clubhouse or other buildings of golf courses.

Some ant poisons contain borax, which also is likely to cause injury to turf and therefore should be avoided in excess on putting greens.

Several simple baits which have been found to be effective are listed below. The sirup baits may be used most effectively by dipping pieces of sponge, absorbent cotton or cloth into the sirup and then placing them in containers such as metal salvo boxes or heavily paraffined pasteboard containe Small openings are made in the containers so that the ants may have easy acces to the sirup. The containers may be placed on the green in the evening and lifted in the morning.

The following poisoned sirups have been found effective:

Formula A: Dissolve 4 ounces of sugar in a quart of hot water. Then add ½ ounce tartar emetic.

Formula B: Dissolve 1 pound of sugar in 1 quart of hot water. Add 125 grains of sodium arsenate, boil and strain.

Formula C: (Recommended only for the control of the Argentine ant, which occurs only in some of the Southern States and in certain parts of California)

Add 9 pounds of granulated sugar, 6 grams (approximately 30 grams equal 1 ounce) of tartaric acid (crystalized), and 8.4 grams of benzoate of soda to 4 ½ quarts of water.
Boil the mixture slowly for 30 minutes, then allow it to cool.
Dissolve 15 grams of sodium arsenite (C.P.) in ½ pint of hot water and allow it to cool. Add this poison solution to the sirup and stir well.
Then add 1-1/4 pounds of strained honey and mix thoroug

Another method for using the poisons listed above is to mix the sugar and chemicals dry with an equal volume of bran or corn meal. Add enough weak honey solution (honey in water) to make a crumbly mixture which can be scattered about the green.

Another dry mixture that is usually effective is:

Mix 1 ounce Paris green with 1 pound brown sugar.
Sprinkle the crumbs very lightly around the ant hills.

The poisons may also be mixed with lard to make a paste-like bait which attracts the species that feed on fatty materials. It must be remembered to keep the poison sufficiently diluted so that it may be carried to the nests.

Repelling with Water: A method that has some times been used effectively is that of driving ants from greens by leaving sprinklers running all night for several nights in succession. The ants dislike this excess water and will leave the greens. Because of the danger of complications due to excess water on heavier soils this method can only be recommended for greens with excellent drainage and sandy topsoil.

Tobacco dust and other repellants have proved to be effective under certain conditions. However, like the watering method, these remedies are only partially effective since they merely cause the ants to move out to new territory, from which they migrate back onto the greens as soon as conditions are again favorable.

Warning: The poisons listed above (except pyrethrum extract) are extremely poisonous to human beings and animals. Extreme care should therefore be excercised in their preparation, use and storage. The sirups especially should never be left where they may be reached by small children.

UNUSUAL WEATHER CONDITIONS IN 1936

Greenkeeping practices must always be modified in conformity with the prevailing weather conditions. Many golf course officials have for years been hoping for some standardized golf course maintenance methods. It is impossible, however, to standardize greenkeeping methods until someone develops a system of standardizing the weather. In the maintenance of grass, allowance must be made for not only the weather conditions prevailing at the time but also for unusual weather conditions of previous months, as well as anticipating possible extremes in the months to come.

The season of 1936 started with a variety of unusual conditions that have already had a decided influence on golf course turf and will no doubt influence turf culture throughout this summer.

The long, cold winter with plenty of snow, followed by a cold, wet spring, in many parts of the country resulted in severe damage from snowmold and winterkill. In many sections of the country the growth of turf; particularly annual bluegrass, was stimulated in early March by early spring thaws and in some places was completely killed by cold weather later in the month. The result was that large areas of golf course turf were destroyed and the cold weather that followed the seeding of these injured areas resulted in slow germination. The seedlings in these large areas, whether they are from seed that was sown in the soil this spring or from seed of Poa annua already in the soil, are faced with the possibilities of extremely hot, unfavorable weather before they are well established. This circumstance therefore will continue to threaten through the summer. Excessive fertilizing and watering to speed up the growth of grass in these weakened areas at this late date may only make conditions worse if early summer weather conditions prove unfavorable.

As an example of the extreme weather conditions that prevailed in the early part of 1936, the United States Weather Bureau has reported that in Oklahoma, for instance, the 111 days from January 1 to April 20 had approximately one-fifth of the normal rainfall for that season. This represents the smallest amount of rainfall that is on record for that period in Oklahoma. The driest previous record for a similar period was in 1910, which had, however, 60 per cent more

precipitation than was recorded in 1936.

During that same interval the Kansas weather bureau records showed less than 30 per cent. normal rainfall, which was the lowest on record. Missouri likewise had the driest similar period since records have been kept. Texas in that same interval had only 40 per cent. of its normal rainfall.

While the above States were scoring weather bureau records for dryness, many of the Eastern States were setting flood records. The average rainfall; for instance, in Pennsylvania for the month of March was nearly 7 inches, or about 30 percent. more than the previous high record. New York, West Virginia and Virginia each had the second heaviest rainfall on record for March.

In regions having excessive rainfall during the spring months, golf course turf is likely to be shallow rooted and therefore more apt to be severely innured by hot, dry weather in early summer. Where turf is watered, more care must be exercised to avoid excessive drying of surface soil if there is a shallow root system than if conditions have been favorable for the development of deeper root systems. Also, it is especially important under such conditions to control attacks of turf diseases promptly to avoid extensive damage, since grass with a shallow root system will not recover as rapidly from such attacks as will turf with a better root system.

MR. NORTH JOINS THE GREEN SECTION

The Green Section is glad to announce the addition to its technical staff of Mr. H. F. A. North, who during the past 6 years has been conducting experimental work with grasses and turf at the Rhode Island Agricultural Experiment Station. Mr. North is a graduate of the Iowa State College and later did graduate work and served on the staff of the West Virginia University. Since going to Rhode Island in November, 1929, he has devoted much time to the study of velvet bent for turf purposes. This study included not only the comparison of the best strains of velvet bent in turf but also a study of the possibilities of each strain for seed production, with the view to making a dependable supply of seed of these grasses available on a commercial basis. His work in Rhode Island also included a study of fertilizers for turf purposes as well as observations on the control of diseases and insects.

In connection with the experimental work at Rhode Island, Mr. North visited a large number of clubs in the New England district and became thoroughly familiar with the golf course turf problems in that region. For the past two years he has been Secretary of the Rhode Island Greenkeepers' Club.

Mr. North will be located at the Green Section headquarters in Washington and will continue his turf investigations at the Arlington turf garden as well as take part in the technical advisory service of the Green Section.

BERMUDA GRASS SEED

The necessity for reseeding large areas of Bermuda grass turf on Southern golf courses this spring raised several questions as to the relative speed of germination of the ordinary Bermuda grass seed as compared with seed from which the hulls have been removed. It has been claimed that the ordinary seed is as much as three or four weeks slower in germinating than is the dehulled seed of Bermuda grass. Such differences would be of much importance in reseeding Bermuda turf.

In order to ascertain how much quicker the dehulled seed would germinate, a test was conducted in a greenhouse in April under favorable growing conditions. Part of a lot of good Bermuda seed was dehulled mechanically. Equal weights from each kind of seed were carefully weighed in duplicate and planted in boxes of soil. Plantings were all made on April 8 and by April 16 a large number of seedlings were showing. On this and each succeeding day until April 28 the seedlings were removed and counted.

It was found that approximately 50 per cent. more seedlings came up from the samples of dehulled seed than from the samples of the ordinary seed during the period of 20 days that the count was continued (887 and 885 for the two boxes of dehulled as against 623 and 611 for ordinary seed).

Seventy-eight per cent. of the seedlings from dehulled seed appeared during the first 8 days, as compared with 46 per cent. from the ordinary seed. However, from the common seed 77 per cent. of the seedlings appeared during the first 10 days.

From this particular test with a representative sample of good seed planted under favorable germinating conditions, it would appear that the dehulled (hulled) seed is two days quicker than the ordinary (unhulled) seed of Bermuda grass. This under special conditions may be an important difference. Since three-fourths of the ordinary seeds that germinated were up in 10 days, the difference in speed of germination due to presence or absence of hulls is not a matter of general importance. In cooler, less favorable conditions the difference no doubt would be somewhat greater.

Although the dehulled seed does not germinate much more rapidly under favorable conditions than does the ordinary Bermuda grass seed, it has other advantages which justify a somewhat increased price. A much larger number of seedlings is obtained from each pound of seed and also there are likely to be fewer weed seeds in a good grade of dehulled seed than similar grades of ordinary seed.

CUTWORMS AND ARMY WORMS

Cutworms are naked caterpillars, the larvae of night-flying winged moths or "millers." They frequently appear in greens during warm weather to cut off small areas of grass each night, making a blemished and unsightly putting surface. Usually the cutworm hides during the day in a burrow which may be marked at either end by the closely-cut almost scalped patches.

Army worms are similar to cutworms in appearance and habits except that occasionally under favorable conditions they reproduce in enormous numbers and migrate as a veritable army, eating or destroying relatively all low-lying vegetation in their path. The measures given for the control of cutworms apply to the army worm as well. For a more complete account of this pest see pages 166-169 of the Bulletin of the United States Golf Association Green Section, Vol. IV (1924).

The adult cutworm moths have dark forewings which expand from one to two inches and are variously marked with darker or lighter spots and narrow bands. The wings are folded over the back when at rest. Like the larvae, they feed at night, sipping the nectar from flowers, and may be noticed during the day as they fly out of reach and settle again on greens or other turf. The females prefer to lay their eggs on grass land. The young larvae which hatch in late summer feed upon the plant roots until frost, when they burrow deeper to hibernate until spring.

The larvae are voracious feeders. They become full grown by late spring or early summer and are then 1½ to 2 inches long, of a dull brown or gray color and more or less marked with stripes and oblique dashes along the back, depending upon the species. The larvae change to moths (pupate) by midsummer in the Central and Northern states and earlier farther south. There is usually only one generation in the North and commonly two and sometimes three in the South.

Control: There are two methods of controlling cutworms; (1) poisoning the vegetation they are feeding upon, and (2) applying poison bait.

The more nearly certain, immediate control is obtained by coating the grass blades with arsenate of lead, using 1½ to 2 pounds to each 1,000 square feet. It may be applied as a spray or may be mixed with approximately 4 quarts of screened and dried sand for 1,000 square feet. The arsenate of lead is dusted on the leaves, as the sand falls through the turf, in quantities sufficient to poison the worms. This quantity of sand may be spread rapidly with a wheelbarrow seeder. The arsenate of lead is a more expensive method than the poison bait but it remains in the turf, where it continues to act as a control for earthworms or grubs.

The standard formula for poison bait is as follows:

Wheat bran	50 pounds
Paris green or white arsenic	2 pounds
Cheap molasses	2 quarts
Water	2 to 4 gallons or more as needed.

Mix the dry bran and poison. Dilute the molasses with some water and mix it with the poisoned bran. Add sufficient water to make a moist, crumbly mixture. Middlings or alfalfa meal may be substituted for the bran. The bait is more potent if allowed to stand several hours after mixing. Scatter just before nightfall at the rate of approximately 3 pounds to 1,000 square feet. This treatment may be repeated as needed.

The poison bait provides a rapid and inexpensive method for controlling these pests. It may be used on putting greens as well as approaches and fairways. By scattering poison bait early in the season on the turf surrounding the putting greens, much damage from cutworms may be avoided, since these worms frequently migrate to the putting greens from drier turf at considerable distance from the greens.

Caution: Arsenate of lead, Paris green and white arsenic are serious poisons that should not be inhaled during mixing or spreading and should be thoroughly washed from the hands. Unless the bait is lightly and evenly spread it may cause injury to greens due to an excess of arsenic in the larger lumps. Birds are apt to be poisoned by the lumps also.

CONTROLLING CLOVER

Due to unusually wet and cold weather this spring in certain sections clover has become particularly troublesome on golf courses. Until a specific chemical treatment has been perfected, the control of clover must depend very largely upon skillful fertilization.

White clover, like other legumes, usually obtains a large quantity of the nitrogen required for growth from the air in the soil through the activity of bacteria living within swollen growths (nodules) on the roots. Grasses are incapable of obtaining nitrogen in this way and must depend upon the supply available in the soil.

A relatively permanent control depends upon the supplying of enough nitrogen so that the grasses may compete against the clover on better than equal terms. It is important also that plenty of nitrogen be available early in the season. This may involve the application of mineral fertilizer, since organic fertilizers break down slowly in cool weather.

Grasses particularly when closely clipped are limited to a relatively shallow layer of soil, while the clover may absorb water and plant food from a much deeper layer. Grasses are thus placed at a disadvantage during periods when the reserve moisture becomes depleted in the upper layers.

Moderate amounts of phosphorus, potash and lime are probably more nearly sufficient for the grass than for the clover.

It has been observed that dense growing grasses such as velvet and creeping bent are less invaded than colonial bent or seaside bent. Bent or red fescue fairways have less than Kentucky bluegrass turf where these are all successfully grown.

Hard-packed turf usually has more clover than areas receiving less compaction. Any method of correction, whether that of distributing the trampling more evenly or opening up the turf by spiking or forking, should promote a more favorable competition of the grass with the clover. Incorporating organic matter in soil and providing good drainage are other factors in this connection.

There is usually less clover in acid than in relatively neutral or basic turf. However, the grasses are seldom improved in growth as a result of making the soil acid and may be seriously injured if this procedure is carried far enough to eradicate the clover.

Often it is good policy to deliverately burn the turf by applying mineral nitrogen such as sulphate of ammonia or a complete fertilizer high in nitrogen when dew is on the grass. The clover is usually injured more and recovers more slowly than the grass. The severity of the burn may be regulated by the amount of the fertilizer applied and the interval until the fertilizer salt is dissolved from the leaves by watering or rain. Sulphate of ammonia applied in this way at the rate of 3 pounds to 1,000 square feet gives a decided burn to putting green turf. If only a few patches are to be treated, the sulphate of ammonia may be salted on from a large-sized shaker and left a few hours before water is applied. If one is not familiar with this method it is well to try it first on a few patches until the right quantity is determined. The sulphate of ammonia will turn the grass brown as well as the clover, but the grass will recover unless the dosage is too severe.

The burning of clover in this manner should be done in spring or fall while conditions are favorable for a rapid recovery of grass. There is still time to use this method but it should not be attempted from the middle of June until the end of August, except on Northern courses.

SEASONAL REMINDERS

Remove Excess Stolons: During the spring months when creeping bent is growing vigorously an excess of stolons is produced on the surface. This is particularly the case with certain undesirable strains. Unless this excess growth is removed or covered with top-dressing the turf will develop an objectionable grain which will lead to many complaints from players during the summer months.

The best way to remove this excess growth is by raking or severe brushing, followed by close mowing. Such severe raking or brushing should be done not later than the end of May while the grass is still growing vigorously and therefore able to cover up scars quickly. Greens that show a tendency to produce objectionable grain should be given light brushings frequently throughout the summer. Severe treatments, however, should not be attempted during mid-summer months.

Dollarspot: During the month of May dollarspot usually makes its first appearance in most of our bent-growing districts. Frequently these first attacks are neglected and are permitted to make bad scars before fungicides are applied. The first attack of dollarspot should be the signal for applying a heavy dose of mercury fungicide. Even though the first attack is slight it is wise to use a heavy treatment of fungicide. When turf is protected by a generous dose of mercury in May the succeeding attacks of dollarspot and brownpatch are less likely to cause serious damage before additional treatments can be applied. The most economical and lasting of the mercury fungicides used to control dollarspot is calomel. The May treatment with calomel should be at the rate of 3 ounces to 1,000 square feet.

Excessive Watering: The operation of watering turf on the majority of courses starts in May. Therefore, this is a good time to warn clubs that much of the serious damage to turf on putting greens during the summer months is directly or indirectly attributable to excessive watering. If putting greens are kept soaked during May and early June a shallow root system, which is the result of this practice, is almost certain to give the greenkeeper plenty of trouble during hot, sultry periods throughout the rest of the summer.

Crabgrass: Crabgrass usually opens its season in May. This pest is encouraged by a liberal supply of water and fertilizers if they are supplied between now and August. Therefore, to keep crabgrass from smothering out the permanent grasses, it is advisable to use fertilizers and water as sparingly as practicable during the next three months on those areas where this weed is prevalent.

Brown Areas in Fairways: On courses in the regions where there has been an excessive amount of rain this spring and frequent heavy showers, there appears to be an unusually large infestation of leafspot on Kentucky bluegrass. Many areas of fairways and tees that have a good covering of bluegrass turf have nevertheless appeared brown and generally unthrifty. An examination of individual leaves shows that the injury is due to leafspot. Many of the leaves have been entirely killed and have given the affected area a generally brown appearance. A description of this injury together with illustrations are given on pages 146, 147 of the August, 1932, number of The Bulletin of the United States Golf Association Green Section.

No satisfactory cure for this ailment is yet known. Where this condition is observed on golf courses it is well to keep the mowers set as high as the players will tolerate until the bluegrass has had a chance to recover from this spring attack of leafspot.

Brownpatch: During the latter part of May or early June brownpatch usually begins to appear. Whether or not it shows up in May, at least most greenkeepers can feel sure they will see it in June. Therefore, it is well to have a supply of fungicides on hand to use when this disease appears. In purchasing fungicides it is well to remember that the effectiveness of the group of mercury fungicides is primarily dependent on the amount of mercury each contains. The more soluble ones are more quickly effective and therefore more desirable for the control of brownpatch. For this purpose, corrosive sublimate is the most effective and economical of the large number of fungicides that have been tested by the Green Section.

In order to prevent burning by any of the mercury fungicides during periods of unusually hot, sultry weather, it is well to greatly reduce the dosage. In the early-season treatments the dosage with corrosive sublimate (bichloride of mercury) may be as heavy as 3 ounces to 1,000 square feet, but in days of unusual heat and excessive moisture it is well to reduce the rate to 1 ounce and in some cases as low as $\frac{1}{2}$ ounce of corrosive sublimate to 1,000 feet. Other fungicides should be reduced accordingly wherever they show a sufficient supply of mercury to permit of such reduction. Upon inquiry the Green Section will be glad to advise member clubs as to the relative effectiveness of the various brownpatch fungicides on the market.

Turf Nurseries: Where a golf course is not equipped with an adequate turf nursery to provide sod for patching purposes, it is well to be reminded that there is no time like the present for breaking a piece of land and cultivating it during the summer months to have it ready for starting a nursery in early September. Turf nurseries may be considered as a form of turf insurance. If something happens to a patch of grass in a putting green, it is very convenient to have readily available a piece of sod which has been maintained like the putting greens that can be lifted and placed in the injured patch.

White Grubs: In May and June the adult beetle (May beetle or June bug) of the common white grub is active and laying eggs for the next brood of white grubs. These well-known beetles spend the night in trees, where they feed on the young foliage. The females fly down to the turf particularly in the early morning hours just before daylight, immediately burrow into the soil and deposit eggs. In a comparatively short time these eggs hatch and the young grubs start feeding on the grass roots, and become most destructive the following year. If they are sufficiently abundant, they greatly weaken or even kill the turf grasses.

These beetles seem to prefer the white or burr oak foliage and therefore are most abundant in groves of these trees. They are also found in such trees as hickory, poplar, elm, willow, locust, ash and walnut. The females ordinarily do not fly far from the trees which they inhabit. Therefore, the area of greatest grub infestation is invariably in the immediate vicinity of trees which have been heavily populated by beetles.

At this season of the year it is well to have members of the greenkeeping staff on the lookout for these beetles. The beetles fly to the trees about dusk and, if numerous, with the aid of a flashlight they may be seen flying around the trees during the early evening. Wherever they are observed in large numbers, it is well to anticipate grub injury within the next few months. Important turf in such infested areas may be treated with arsenate of lead at the rate of 5 pounds to 1,000 square feet during the summer to poison the young grubs before they do serious damage to the turf.

REPORT OF THE GREEN SECTION COMMITTEE FOR 1935
Under the Chairmanship of Harold W. Pierce

The Green Section activities for 1935, as in the previous year, were chiefly confined to routine correspondence and advisory service. The heavy rains together with prolonged periods of excessive heat and humidity in the Middle West led to much more than the ordinary injuries to turf in that part of the country. These conditions were responsible for an increase in correspondence with clubs in that area.

In April, after years of faithful service, Mr. Kenneth Welton, who had been on our Green Section staff since 1928, submitted his resignation in order to join the Soil Conservation Service of the United States Department of Agriculture. Mr. Welton's departure was a severe loss to our organization and we wish to take this opportunity to wish him success in his new work.

During the season it was possible to continue experimental work at the Arlington Turf Garden. This work was chiefly in connection with weed control with chemicals, and a study of the influence of air circulation on the development of turf diseases, with the result that effective control of such weeds as clover, chickweed, dandelions and plantain has been accomplished in

fairway turf without destroying the bluegrass and fescue, at a cost for chemicals in many cases well below $1.00 an acre. Work on a smaller scale was continued on the Mid-West turf garden.

During the winter the Green Section staff took part in the programs of short courses in greenkeeping offered by the State colleges of Iowa, Wisconsin and Michigan, as well as the Annual Convention of the National Association of Greenkeepers of America. During the year the staff took part in the educational programs of local and Green Section organizations in Chicago, St. Louis, Indianapolis, Cincinnati, Detroit, Cleveland, New York, Philadelphia, Baltimore and Washington.

For the benefit of those critics who state that Green Section research work is more important than the other activities of our Association, we are giving below figures for the last nine years showing the percentage of member club dues spent on Green Section work. If consideration is given to the necessary expense of our New York office, it will be seen that if it were not for the income from Championships, materially less funds could have been allotted in the past to Green Section work.

Statement of U.S.G.A. Dues, Green Section Receipts, Disbursements Gross, Disbursements Net, and Percentage Net Disbursements to Dues, from December 1, 1926 to November 30, 1935.

Nov. 30	U.S.G.A. Dues	Green Section Receipts	Disbursements Gross	Disbursements Net	Percentage Net Disbursements to Dues
1927	$ 29,450.00	$ 3,627.53	$ 24,301.14	$ 20,673.61	70.2
1928	31,350.00	3,565.19	27,099.41	23,534.22	75.1
1929	32,130.00	3,885.79	36,879.26	32,993.47	102.7
1930	32,520.00	3,265.44	41,918.58	38,653.14	118.8
1931	31,770.00	1,802.68	47,032.82	45,230.14	142.3
1932	26,685.00	2,695.63	37,449.36	34,753.73	130.2
1933	23,085.00	3,098.32	29,354.13	26,255.81	113.7
1934	21,760.00	2,410.83	14,396.45	11,985.62	55.1
1935	21,455.00	1,775.04	12,864.41	11,089.37	51.7
Totals	$250,205.00	$26,126.45	$271,295.56	$245,169.11	98. (Ave)

The Executive Committee of our Association realizes the importance of Green Section research work, and it is their intention to allot to this work as much of our income as is possible.

In order to obtain more funds for this work, our policy was changed this year, by permitting donations from those not connected with our Association. Such contributions amounted to $405.00. We urge those who are interested to make or obtain such contributions for the future.

In 1935, $15,750.00 plus the donations of $405.00 was allotted to Green Section work. At our Executive Committee meeting on November 21, $15,000.00 was allotted to the Green Section for work in 1936, and in addition there remains the unexpended balance from the 1935 fund, amounting to $4,660.63, making a total of $19,660.63 available for 1936 Green Section activity. By not spending our entire appropriation in one year we are able

to budget our expenses and set aside funds to assure the continuance of incomplete experiments.

It is our hope that sufficient funds may be made available so that the Bulletin may again be issued to member clubs, either annually or semi-annually. If this is not possible, we shall advise member clubs by occasional letters of up-to-date information on greenkeeping based on the results of our experiments.