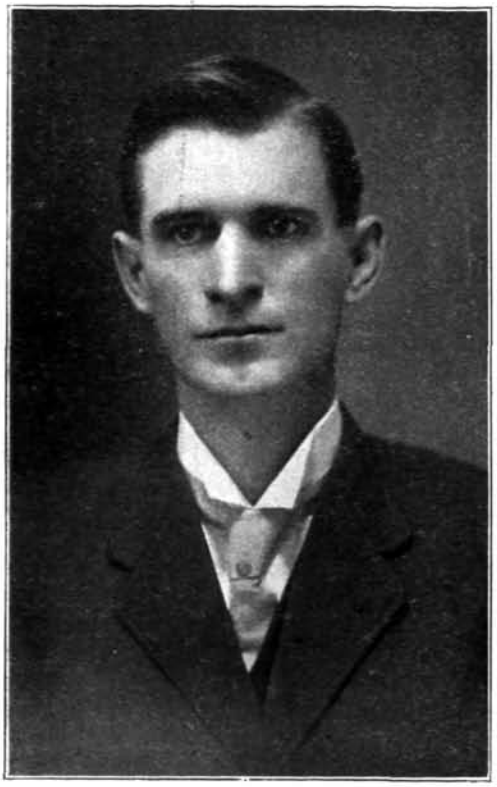
The Green Section Loses Carrier



Lyman Carrier, Advisory Member. Prof. Carrier severed his connection with the Green Section April 15, 1924.

On April 15, 1924, Prof. Lyman Carrier severed his relations with the Green Section, to take up commercial work. By his resignation the organization has sustained a loss that is irreparable. Professor Carrier has served with the Green Section from the beginning and has made himself immensely valuable to the golf clubs of the country. His advice and suggestions have proved 100 per cent sound and helpful. As a diagnostician of sick golf courses he is unexcelled, and no one can prescribe for their troubles better than he. In his qualifications are found the rare combination of years of experience and training, good judgment and tact, and unbounded enthusiasm and devotion. Wherever he has gone he has made friends. Men of Carrier's stamp are not encountered every day, nor are the institutions of learning or the agencies of experience turning them out in large numbers. What a real economic and social loss his leaving causes! Here is a man who is peculiarly fitted for the field in which he was engaged—a field crowded with large and important possibilities, a field which needs him and in which he can serve better than in any other. Why can not such men be encouraged to continue in the sphere of their greatest usefulness to society? Carrier's departure from the Green Section leaves a real vacancy and has greatly increased the burden of those who are carrying on. May health, happiness and success attend him! Should he ever come this way again he will be welcome.

The Japanese Beetle and Its Relation to Golf Courses

Address Delivered by B. R. Leach, U. S. Department of Agriculture, before the Annual Meeting of the Green Section, January 5, 1924.

The Japanese beetle was first observed in this country in the summer of 1916, a few beetles having been collected that year at Riverton, New Jersey. Since that time the insect has increased in numbers by leaps and bounds until at this writing the beetles infest a circular area of 2,500 square miles situated in the states of New Jersey and Pennsylvania. The center of this area is heavily infested. The degree of infestation di-

minishes as one approaches the circumference. The area of light infestation and the area of heavy infestation are both increasing proportionately in size.

A study of the insect in the course of this gradual spread during the several years of its presence in this country has thrown considerable light on its life-history and habits, while the damage and financial loss occasioned by it within the present area of infestation have given ample indication of its importance as an insect of first rank.

The life-history of the Japanese beetle is briefly as follows. The grub, which is very similar to that of our native May beetle, winters in the soil at about plow depth. In the spring it comes up near the surface, feeds upon the plant roots, undergoes certain changes, and in June and July emerges as the adult beetle. The beetles feed upon foliage, fruit, and flowers of various sorts, and deposit their eggs in the soil, preferably that covered with vegetation. After these eggs hatch the young grubs feed on decaying vegetation and live roots. The grubs grow rapidly, and in the fall, as the ground chills, go down 6 to 12 inches in the soil, where they winter over until spring.

From the standpoint of general agriculture, there have been only a few instances of injury to crops by the grubs. It is the beetle or adult stage of the insect which defoliates shade and fruit trees, ruins the foliage and flowers of shrubbery and ornamentals, and consumes large portions of the crops of such fruits as apples, plums, peaches, grapes, and cane fruits. To date more than 215 species of plants are recorded as having been attacked by the Japanese beetle.

While the adult beetle must be considered as a source of annoyance from the standpoint of golf-course upkeep, since it will injure the shade trees and shrubbery on the club grounds, the importance of the beetle stage is, from the standpoint of damage and annoyance, nevertheless essentially secondary to that of the grub stage. That the Japanese beetle grub is capable of considerable damage in this connection is evident when one considers the artificial nature of golf courses and in addition certain biological facts in respect to the insect's activities in this country.

The average golf course, located in the suburbs or open country, comprises a limited area of well-kept turf with 9 or 18 smaller areas of hand-tailored turf comprising the greens. The golf course is surrounded on all sides by fields and woods receiving indifferent care and in a comparative state of barrenness as compared with the rich turf of the course. In accord with nature's laws it follows that the golf course will be the mecca for every turf-feeding insect in the vicinity. May beetle grubs, June beetle grubs, and other grubs of various sorts are present in varying numbers with damage resulting in varying degree. Occasionally these native grubs increase greatly in numbers on a given course and cause outstanding injury to the turf; but such instances of severe damage are sporadic, because these native grubs are preyed upon by hosts of parasites which check their increase in numbers beyond the point where serious injury will result.

While the native species of grubs are held down by parasites in this way, the same thing can not be said with respect to the Japanese beetle. This insect is of foreign origin, its particular parasites were not imported with it, and the beetle has spread and is continuing to spread, increasing in numbers with virtually no natural check of consequence. Herein lies

the specific menace in respect to the Japanese beetle, a condition of affairs which will not, in all probability, be corrected until its parasites can be imported from abroad and introduced into this country to serve as a check to the insect. For this purpose we now have specialists in Japan, China, Russia, India, the Hawaiian Islands, Korea, and other places. During the last three years the Government has imported thousands of these parasites, and some of them have been liberated; and they are being continually studied at the Riverton laboratory. The earthquake in Japan in the fall of 1923 probably ruined the best year's efforts that have to date been put in on that special phase of the problem. Just prior to the earthquake the Government had a shipment of several hundred thousand parasites in a cave on the outskirts of Yokohama, all ready to go forward; but the earthquake wiped it out. The men have returned to this country in the meantime, but will go back again this spring to take up the work where it was left off. The earthquake was an unfortunate thing, in that it ruined the efforts of several years of consistent work.

The golf course, with its broad expanse of turf, furnishes an attractive breeding ground for this insect. The rich soil and heavy turf of the greens and select spots in the fairways attract the beetles, and eggs are deposited in enormous numbers during June, July, and August. Under these circumstances, the turf suffers from the destructive grub attack, and the killing of the grass is quick and pronounced. Since the putting greens are the choicest portions of turf on the course, it follows that they will be most heavily infested and suffer proportionate injury.

During summers of normal rainfall, when the grass throughout the course retains its green color, there will be a general and fairly even infestation in the fairways and rough and a heavier infestation in the greens. In dry summers the infestation will be largely confined to the moist portions of the fairways and rough and will be heavily centralized in the greens.

The story of the insect's depredations on local golf courses is as follows. It was first definitely observed injuring grass roots in the spring of 1921. During that summer the infestation in the greens of the Riverton Country Club, Riverton, New Jersey, was light (about 100 to the square yard) and the injury was confined to the edges of the green, which had not been properly watered. In 1922 the infestation in these same greens was heavier (about 300 grubs to the square yard), and injury to certain of the greens was pronounced. At the same time the Moorestown Field Club, four miles distant, on the edge of the heavy infestation, was undergoing the 1921 experience of the Riverton club. During 1923 the turf of the greens on the Riverton course was in some places ruined. The infestation in the greens was running as high as 1,000 grubs to the square yard. The situation on the Moorestown course is virtually the same as at Riverton, while the Torresdale Golf Club, in Pennsylvania, is now undergoing the 1921 experience of the Riverton club.

The observations of this laboratory indicate that the well-kept turf of golf greens is capable of supporting without injury an infestation by 100 grubs per square yard. Any added numbers will be evidenced by injury in proportion to the density of infestation. The beetle varies to some extent from year to year in the date of its emergence and subsequent egg-laying and larval development. Similarly the period when turf injury may be looked for varies with the above seasonal variation of the insect. In view of these facts it seems advisable for the clubs now infested or in

danger of infestation in the near future, to cooperate with our Japanese Beetle Laboratory at Riverton in the handling of this new problem, since no specific statements can be made at this time capable of serving as a guide for general information.

The writer recently gave an account[1] of experiments conducted during 1922 which resulted in the finding of a method of control for this grub with negligible injury to the turf. The method in brief consisted in emulsifying carbon disulfid with soap, diluting with water, and applying the mixture to the turf of the green by means of hose and special nozzles. Since the publication of that paper the experimental work has been continued, with special attention to large-scale treatments under the usual golf course conditions. The results of last year's work have corroborated the preceding year's conclusions and indicate that the method as now used will control any infestation of Japanese beetle grubs, May beetle grubs, ants, etc., in the greens. These conclusions are based on the treatment, during 1923, of the 27 greens of the Riverton and Moorestown country clubs. Those interested are referred to the October, 1923, number of THE BULLETIN for a complete account of the work to date on the control of this grub in golf greens.

We have been asked whether precautionary measures can be taken in the control of the Japanese beetle on golf courses. We do not, however, know of anything that can be done in that direction. As stated, the golf course as a whole, and especially the greens, attract the beetles. They are going there to lay their eggs no matter what you do. We have done considerable spraying around the Riverton, New Jersey, golf course, but it does not deter the beetles from laying their eggs in the greens. It is necessary to watch the course closely, and, as soon as the egg-laying is over, to get busy and treat the greens. The presence of the grub in turf may be detected by making diggings from time to time in the greens; a well-trained man will have no difficulty in finding the grubs. The beetle will, however, be noticed long before any effects of the grub are detected. Ordinarily the beetle will be present a year or two before it increases in numbers sufficient to occasion material injury to greens, so that you will know the beetle is there long before your greens are being actually injured.

The outstanding points in connection with the Japanese beetle in its relation to golf courses are as follows:

1. The insect is now causing serious injury, in the heavily infested area, to the courses above referred to.

2. Observations indicate that neighboring courses will be infested in the near future.

3. It is improbable that the spread and increase of the insect can be checked until its parasites can be introduced from abroad.

4. When the greens of a golf course become infested to a certain degree it will be necessary to resort to an annual insecticidal treatment in order to maintain the turf in condition for play.

5. An insecticidal treatment has been developed at the Japanese Beetle Laboratory which gives indication of being of sufficient value in this connection.

This control method, I should add, is effective not only with the Japanese beetle, but also with the May beetle, any June beetles which happen to be in the turf at the time of treatment, and ants. So far as

[1] "A Control for Japanese Beetle Larvae in Golf Greens." Bulletin of the Green Section of the U. S. Golf Association, June 21, 1923, Vol. III, No. 6.

ants are concerned, however, we should perhaps state that we have conducted no experiments, but Hugh I. Wilson, of the Merion Cricket Club, has done considerable experimenting with this method in the control of ants, and we understand he has discarded his other methods in favor of this one.

The cotinus, or June beetle—the one which in the late summer throws up mounds of earth on the green—is essentially a different insect to control.[1] We have said that this method will kill any of these species which are in the ground at the time the treatment is applied; but the eggs of the cotinus are laid everywhere—not only in the greens, but around the greens. As the grub of the June beetle gets larger, it comes up at night and pushes along on its back. It will travel many feet in the course of a night, so that while you may get the few cotinus grubs which are in the green, there are many outside which you will not get. We have often thought that the cotinus problem should be approached from another angle; and we believe it could be solved if the proper research were done on it; but, of course, the various phases of the Japanese beetle are now occupying all the time of the force at our Riverton laboratory. At present the only remedy we know is kerosene emulsion, which works well in limited areas.

We have also been asked whether the carbon disulfid treatment will kill earthworms. It would not be economical to use the method for this purpose. In all probability the best remedy for the presence of earthworms is some corrosive substance, such as corrosive sublimate.

Grass Experiments at Rothamsted, England

By C. V. Piper

At the Rothamsted Experiment Station, near London, England, an extensive series of experiments in the fertilizing of grass-lands has been carried on continuously for nearly 70 years, that is, since 1856. Specifically the tests are on a clay loam soil and the results are measured in hay yields. While the maintenance of grass-land for hay crops is not the same thing as its upkeep for producing turf, nevertheless the Rothamsted work is not without bearing on greenkeeping. It must be borne in mind that the results of parallel experiments in fertilizing differ with the soil and with the climate; also that the effect of fertilizers on such hay grasses as timothy and orchard grass does not directly concern golf courses. It is also to be remembered that there are many English plants that do not occur in America, and vice versa. Naturally the behavior of such plants can not be compared for the two countries. But with these limitations borne in mind, the Rothamsted results nevertheless carry lessons of high importance in the growing of golf turf.

These results are presented in a very technical book entitled "Manuring of Grass-Land for Hay" by Winifred E. Brenchley. The word manuring in England, it may be said, means the use of any kind of fertilizers, and not only of dung, as is the common significance of the word in the United States.

The data are presented first in the form of tables displaying the effects of each type of fertilizer on the mixed population of grasses and weeds that covered the land when the experiments began. The different fertilizer treatments were as follows:

1 The control of the June beetle is discussed at length in the articles beginning on page 60 of the April, 1921, Bulletin, Vol. I, No. 4.