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of the

UNITED STATES GOLF ASSOCIATION GREEN SECTION

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Contents

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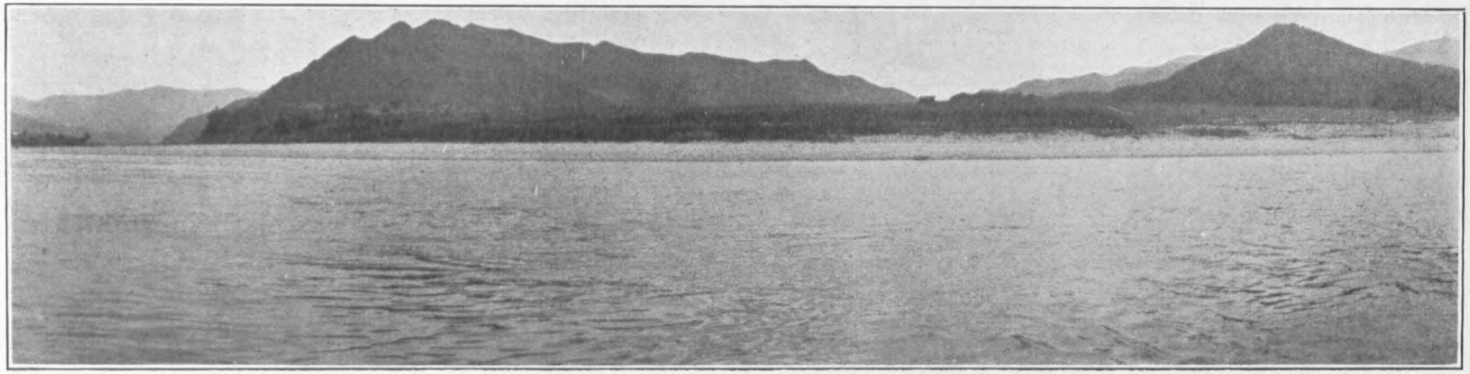
Searching in the Orient for New Turf Grasses

Practically all of the important grasses used on golf courses in the United States have been introduced into the country from some foreign continent. Most of them were introduced in early colonial days and have become so generally distributed throughout the country as to give the general impression that they are native grasses. There is actually only a small proportion of golf course turf in the United States which represents the growth of strictly native species of grass. Early colonial introductions were no doubt accidental, since the seed came with bedding, packing material, as weed seeds in farm crop seeds, and through similar agencies. For centuries wild plants have been transferred from their native lands to other sections of the

Korean youngsters are eager to assist in gathering seed of a grass which may possess special value on golf courses in the northern half of the United States, particularly on fairways and tees

globe and have occasionally been developed as very valuable crops in their new surroundings. In recent years there has been increased interest in the introduction of new plants from foreign countries. As a result there has been a systematic search of different parts of the globe by agricultural explorers in the hope of finding some plant that would serve a useful purpose in a new home. As is to be expected, a large proportion of the plants that are so introduced prove to be of no value. However, the occasional introduced plant that proves to be of value may much more than repay the cost of finding and caring for the large number of unsuccessful introductions. In golf course work the most recent introduction which has some promise for golf course turf is centipede grass for the South.

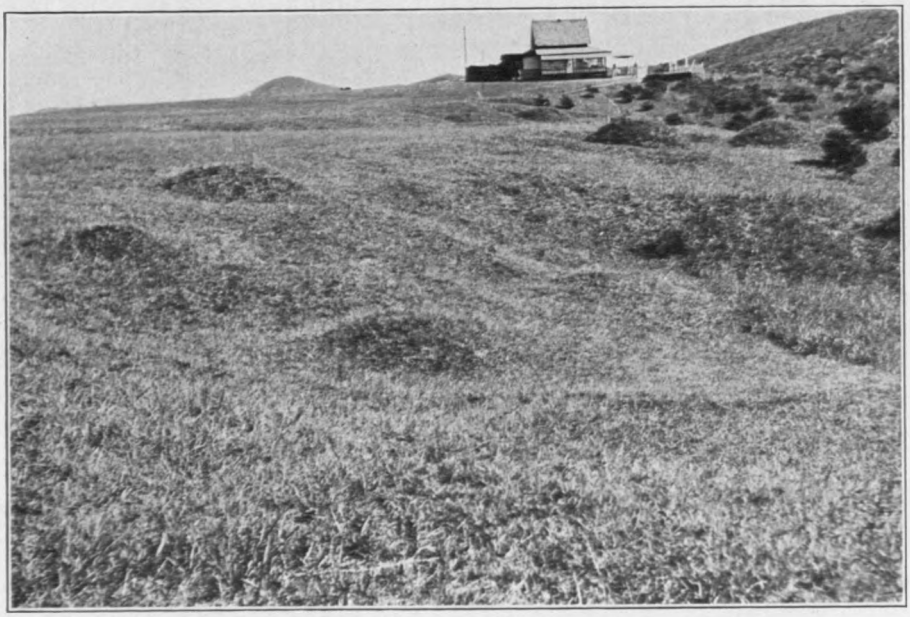


Along northern Korean rivers. Here a hardy variety of Zoysia grass is abundant

Above—Looking across the Seinonko River from Kokai, Korea. The dark areas bordering the bank on the opposite side of the river are covered with Zoysia pungens var. Japonica.

Below—A road along the river bank near Kisen, Korea. The dark patches on each side of the road are covered with this variety of Zoysia, which forms an excellent sod though on a rather coarse, sandy soil.

In the past two years P. H. Dorsett and W. J. Morse, of the United States Department of Agriculture, have been searching in different sections of the Orient for new plants of possible agricultural importance. In recent letters written by these agricultural explorers to the Department of Agriculture there is a report of collections of seed of a variety of grass of the genus Zoysia which is said to have some promise for the production of turf. The seed which they are harvesting in the Orient is being shipped to this country in small lots for experimental purposes. None of this will be immediately available to golf clubs, since it will be necessary to test the grass under a variety of conditions in several parts of the country before it will be advisable for any golf club to use it.



The grass on this Korean golf course is mostly Zoysia. Part of the course extends over a burying ground; the mounds seen in the illustration are graves. Heijo Golf Club, Jidori, Chosen (Korea)

Many of our readers who closely follow the most recent developments and possibilities of turf production will no doubt be interested in reading some of the observations reported by Messrs. Dorsett and Morse. We are therefore quoting from their letter of July 14, 1930, from Dairen, Manchuria, and printing some of their photographs. Our readers will have an opportunity to see the grass to which they refer growing in some of the Green Section turf gardens during the next few years, but none of the seed will be available for distribution to clubs in the near future. Under the present system the large Green Section experimental gardens and the many demonstration turf gardens scattered throughout the country provide an excellent opportunity for putting such new grasses immediately to test in the production of golf course turf. Without such a system of turf gardens it would be extremely difficult to give such importations an adequate trial in a short period of time. Some Zoysia grasses have already been tested in this country, but have not been hardy enough to with-

stand the winters even in our southern States. The particular strain of Zoysia reported in their letter is supposed to have greater possibilities for winter hardiness due to the fact that it thrives in a climate with severe winters.

They write from Dairen:

"The Kokai region of northern Korea has been visited and information, seed, plants, and pictures secured of *Zoysia pungens* var. *Japonica*. This grass was observed by Dr. Mills during a visit to Kokai and he thought it might have possibilities in the United States for airports, golf fairways, and possibly lawns. Our visit to Korea last fall was so late that we did not think it advisable at that time to make the journey, as there was no possibility of securing seed or making any observations that would be of value. We thought that during our stay in Manchuria one of us would find opportunity to visit Kokai at the proper time to secure data and seed of this grass.

"Mr. Suyetake, our interpreter, and Mr. Morse left Dairen, Manchuria, at 9 o'clock in the morning on Tuesday, and arrived at Shinanshu, Korea, shortly after noon the following day. They left Shinanshu at once by bus and reached Kisen, Korea, at about 6 o'clock in the evening (a distance of 66 miles), where they had to remain over night. They left Kisen at 9 in the morning and arrived at Kokai about 3.30 that afternoon (100 miles from Kisen). The 166-mile trip over rough mountain roads, mostly in old Ford cars, was by no means a very pleasant one, but in our opinion the results obtained were well worth the trouble.

"Kokai was found to be a rather large Korean village snuggled in a very mountainous country along the right bank of the Seinonko River, which flows into the Yalu River, the boundary between Chosen and Manchuria. The village is in 41 degrees north latitude. Its temperature during December and January goes as low as 40 degrees below zero. The ground is said to freeze to a depth of 2½ to 3 feet. There is a considerable snowfall during the winter months. The field crops are planted the first week in May, and consist mostly of corn, soy beans, sorghum, and millet. Most of the farms have one or two small fields of white potatoes.

"A general survey was made of the range of this variety of Zoysia about Kokai, the grass being found in abundance on both banks of the Seinonko River both up and down the stream for considerable distances from Kokai. It is growing on a rather sandy soil and forms a rather compact sod. The blades grow to an average length of about 3 inches and the spikes to a height of about 5 inches; it is therefore a rather short or low-growing grass.

"As to the effect of trampling or pasturing on Zoysia sod, little information could be obtained. Here and there a horse or an ox was tethered, but the animal apparently had not been left long enough in one place to give any idea as to the possible effect of hard usage. As the grass grows quite thickly it has possibilities for pasture, and with its compact sod on rather sandy soil may have possibilities for airports and as a grass for sand binding and for embankments.

"A visit was made to the village agricultural society, and two of their agricultural experts went with us to look over the possibilities of collecting seed. The seed was just beginning to mature and would be fully mature within the next 10 days. Arrangements were made with the agricultural society to collect 50 pounds of seed when it

reached full maturity. The seed is to be furnished to us at 35 cents a pound, which is the price quoted us also by a seed house in Dairen. The director of the village seed and nursery experiment farm also promised to send us some plants of the grass in the fall.

"With the aid of some Korean boys we were able to collect a fair-sized sample of mature seed, and we also obtained some plants. The seed and plants were sent to Washington. As to the germination of Zoysia seed, we have received more or less conflicting statements. In Japan one authority stated that the seed would not germinate and that for propagating the grass plants should be used. Another advised that the seed would germinate, but that it should be sown at once, as it would lose its viability after a few months and should never be held over from one year to another. Still another authority informed us that a friend of his in Tokyo had sown seed more than a year old and had obtained over 80 per cent germination. With these various statements there is need for experimental work on the longevity of Zoysia seed. We thought that by sending both plants and seed you would have a better chance of obtaining a start with this grass.

Sod of Zoysia pungens var. Japonica on the bank of the Seinonko River in northern Korea, where the grass forms a rather compact sod on a sandy soil. It has possibilities as a soil-binding grass

"While on our return to Shinanshu we made observations along the way. Zoysia was found growing along the roadsides to some extent, but was most abundant along the sandy river banks. At some places we saw several cattle pasturing on good-sized areas on the river banks; it is therefore apparent that the Koreans use it more or less for pasture. From Shinanshu to Shingishu, Korea (on the Yalu River across from Antung, Manchuria), large areas of Zoysia were noticed along the river banks. It was also observed that the grass is used quite extensively for binding railroad embankments. As we journeyed from Antung, Manchuria, we saw some Zoysia well towards Mukden. At Kungchuling, Manchuria, we found no Zoysia, and the forage-crop expert at the experiment station advised that it did not occur that far north. In our stop at Kaiyuan we were unable to find Zoysia, and we did not observe it again until we were a short distance south of Liaoyang, below Munkden.

"Another interesting thing we have observed is that there is a white-flowered form of the grass and also a purple-flowered form.

The first has a lighter green foliage and light straw-colored seed, while the latter has a purple-tinged foliage and a brown seed tinged with purple. These forms were found near Chinchou and seed of both has been collected. Professor Matsushima, of the South Manchuria railway agricultural bureau, has advised us that there are several strains of *Zoysia pungens* var. *Japonica* in South Manchuria. We have been collecting seed at various places and shall try to obtain seed from as many sources as possible.

"To sum up briefly our general and specific observations on the grass, we have seen it in northern Korea and in southern Manchuria, and we find it a hardy grass, forming a compact sod and of possible value in the United States as a grass for airports, athletic fields, golf fairways, and embankments requiring a binder. In nearly all cases the grass has been found on rather sandy soil; experimental work is therefore necessary to determine its adaptability to the heavier types of soil."

Plant Patents

One of the dreams of the late Luther Burbank has finally come true with the passage of an act to provide for plant patents, passed by the 71st Congress and approved May 23, 1930. Many are familiar with Burbank's extensive work in obtaining new varieties of plants, but remunerations for such contributions were comparatively small. Other than what personal interest an individual had in regard to breeding new types and varieties of plants there was little stimulus, especially of a monetary nature, for intensive or extensive investigation; consequently "plant inventors" were comparatively few. This directly affected the number of desirable plant varieties introduced on the market, because there was no incentive to procure new varieties and even if they were procured there was no protection or rights guaranteed to those responsible for the breeding or propagation of these new varieties.

Congress has at last recognized that discoveries in the plant world justify as much protection to the plant inventor as discoveries in the industrial world justify protection to the mechanical inventor. This recognition is clearly set forth in Section 4886, which reads, "Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof, or who has invented or discovered and asexually reproduced any distinct and new variety of plant, other than a tuber-propagated plant, not known or used by others in this country, before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, or more than two years prior to his application, and not in public use or on sale in this country for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceeding had, obtain a patent therefor."

The protection afforded by this act should stimulate a greater interest in the reproduction of newer and finer varieties of plants. The procedure of having new plants patented promises to be rather complicated at first because of the necessity of differentiating between the established varieties and the new varieties. In the botan-

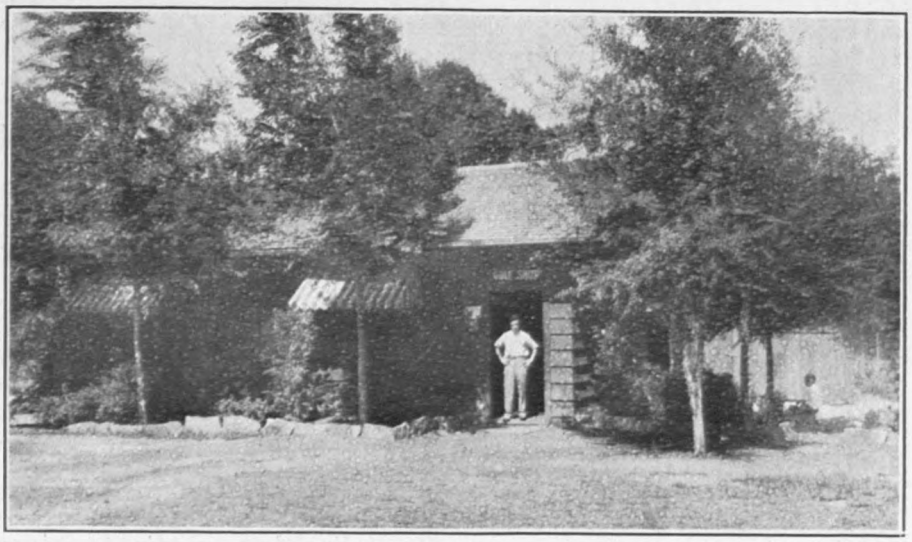
ical classification of plants there are frequently no definite dividing lines between varieties, and considerable overlapping of their characteristics occurs. Just how these obstacles are to be overcome seems to be a problem for the United States Department of Agriculture to solve, since the act also provides that "The President may by Executive order direct the Secretary of Agriculture (1) to furnish the Commissioner of Patents such available information of the Department of Agriculture, or (2) to conduct through the appropriate bureau or division of the Department such research upon special problems, or (3) to detail to the Commissioner of Patents such officers and employees of the Department, as the Commissioner may request for the purposes of carrying this act into effect."

Despite the many complications that are certain to arise from the practical application of such an act, there is little doubt that it will have a valuable influence in the field of plant industry. Apparently this act would make it possible for one to patent a strain of bent grass for golf course use.

A New Elm for the Plains States

By Jay C. Painter
Oklahoma State Golf Association

Late in the winter of 1925 information reached me concerning a superior variety of elm tree that had recently been introduced into the United States from China. This is the Chinese elm (*Ulmus pumila*). The trees were scarce at that time, but after some correspondence I succeeded in obtaining 24 of the trees from the United States Department of Agriculture. Since that time I have received seed imported from China, from which I have raised several thousand trees. During the last couple of years I have obtained seeds of



Oklahoma's fastest growing tree, the new Chinese elm. These trees, which were raised from seed, are only four years old. Some of them are 6 inches in diameter and 20 to 30 feet tall.

this tree from my own plantings, thus making it unnecessary to obtain imported seed.

The Chinese elm is the most rapidly growing tree we have ever had in Oklahoma and has proved to be admirably adaptable to local conditions on the several golf courses where it has been planted in this state. In good soil the seedlings will reach a height of 4 to 5 feet in one season. The trees which I obtained from Washington were ½ inch in diameter and about 4 feet high. They were set out April 1, 1926, and in 1930 one of the trees was 10 inches in diameter and about 30 feet high. Several of the trees grown from seed imported from China in July, 1926, may be seen in the accompanying illustration. When this photograph was taken, in July, 1930, some of the trees were 6 inches in diameter and 20 to 30 feet tall. The trees seem to be immune to disease and unmolested by insects that attack our native trees. They require very little water, and on very poor soil have lived through our hot and dry Oklahoma summers without any attention whatever. They are reported to thrive from northern Minnesota to southern Texas, and it is probable that they can be grown successfully anywhere in the United States.

The leaf of the Chinese elm is similar to the leaf of our native elms but is only about one-fourth as large. Because of their small leaves the trees are particularly desirable on golf courses, since they do not litter up the fairways and greens in the late fall. The trees leaf out very early in the spring and retain their foliage long after other deciduous trees are bare. Several of the nurseries in the West are now producing seedlings of the Chinese elm in large quantities.

Asiatic Beetles as Turf Pests

In relatively recent years there have been three destructive beetles introduced into the eastern part of the United States from Asia. These three beetles are commonly referred to as the Japanese beetle, the Asiatic beetle, and the Asiatic garden beetle. The destruction caused by the Japanese beetle on many eastern golf courses is only too well known. Its damage and methods for its control have been referred to in the Bulletin from time to time. The Asiatic beetle and the Asiatic garden beetle cause damage in many respects resembling that caused by the Japanese beetle; however, they have not yet spread to many golf courses and it is to be earnestly hoped that their spread will be no more rapid than it has been in the few years since the beetles have been introduced into this country. It is well, however, for golf clubs to be on the lookout for these insects throughout the regions adjoining the areas where the insects are known to exist. The grubs of all of these beetles cause similar injury to grass by feeding on the roots. Recently three publications have been written by state and Federal agricultural entomologists which give detailed descriptions of these insects and suggestions for their control. For the convenience of our readers we are printing abstracts of these publications. If further information is desired it may be obtained by consulting these publications referred to or by writing to the authors.

Bulletin 304, issued by the Connecticut Agricultural Experiment Station, New Haven, Conn., entitled "The Asiatic Beetle in Connecti-

cut," was written by Roger B. Friend, assistant entomologist of the Connecticut station.

This 76-page bulletin is chiefly technical but contains much that will be of interest to those who are connected with golf clubs in the vicinity where this beetle is present or in adjacent regions to which the insect in all probability will spread in the near future. The work reported in the bulletin was a cooperative project between the Japanese Beetle Laboratory of the United States Department of Agriculture and the New Jersey State Experiment Station.

The bulletin states that the Asiatic beetle (*Anomala orientalis*, Waterh.) was presumably imported into Connecticut directly from Japan. It has become a serious pest in lawns of New Haven. It is pointed out that as yet the insect has not become abundant over any large area in the United States and its status as an enemy to agriculture is not known. However, it has done considerable damage in the lawns of the residential district of New Haven. It is probable that golf clubs in the vicinity have become interested in this pest and they are likely to hear more of it in the near future. The bulletin estimates that over $30,000 had been spent from State and Federal funds in a territory about one mile square, and that the inhabitants of that territory had probably spent at least an equal sum in an effort to prevent the spread of the insect. This damage was as of March, 1929; so much more has been spent since that estimate was made.

The bulletin includes the results of investigations carried on by the writer in New Haven during the years 1926, 1927, and 1928, and a brief discussion is given of the climatic and soil conditions of the infested region. The observations on the life history and habits of the insect cover a period of three seasons, but most of the control work described in the bulletin was carried out in 1928. The first recorded observation of the insect was in 1875 from specimens collected in Japan. Some time before 1908 it was imported into Hawaii and became established in cane fields in the island of Oahu. In 1920 it was first found in the United States, in a nursery in New Haven, Conn. In 1922 complaints were received of severe injury to lawns by its larvae. Since the nursery where the insect was first found had in 1911, 1912, and 1916 imported plants from Japan, some of them with earth about the roots, it was thought that the insect probably came directly from Japan on this imported nursery stock. At the time the bulletin was written the insect had been found in Connecticut only in the vicinity of New Haven and West Haven. In 1926 the beetle was discovered in Jericho, Long Island, and since has been found in large numbers in neighboring towns. The writer was unable to determine whether the beetles on Long Island came directly from Japan or were the results of a spread from New Haven. He suggests the remote possibility that the beetles might even have spread from Long Island to New Haven. Since 1925 a few beetles have been found in several towns of Westchester County, N. Y. They have also been found in Elizabeth and Rutherford, N. J. The damage caused by the pests in all cases was found to be only on lawns, and the writer points out the possibility of its becoming injurious to grain and forage crops sometime in the future unless its increase of spread is checked.

In lawns in New Haven the writer found many instances where there were 1,000 grubs to the square yard of turf. This the writer

concludes is an indication that the insect was present in New Haven several years prior to its discovery in 1920, since the rate of reproduction is not high when compared with the other insects nor is the natural spread very rapid.

Some encouragement is offered in the writer's statement that "in Hawaii, where there are at least two generations a year and perhaps three, the known distribution in 1918, at least ten years after introduction, extended over an area of but six square miles. . . . The adults do not fly far nor much of the time, and they are difficult to discover. In 1926, twelve scouts secured 2,402 adults in two months, which is a small number compared with the number of larvae present in any one infested lawn." The larvae are easily confused with other grubs of the same family of insects. No injury to grass is apparent when the infestation is below 150 larvae to the square yard. The writer points out that it is quite possible that this insect occurs in localities where it is at present unknown.

A detailed technical description is given of the various stages of the life history of the insect. The various characteristics that distinguish it from related insects are also described. In his summary the writer states:

"The Asiatic beetle, first described in 1875 from Japan, was discovered in Connecticut in 1920 and has since been found in parts of New York and New Jersey. The natural spread of this insect is very slow.

"A brief review of natural conditions in New Haven is given.

"The genus Anomala belongs to the Ruteline Scarabaeidae, and the structural characters distinguishing the larva from other related larvae are described. A brief morphological description is given of all stages of the insect.

"In New Haven the great majority of individuals of this species go through a complete life cycle in one year, but a few require two years for the completion of development. The adults emerge from the pupal stage late in June and during July and August, and oviposit in the soil at a depth of about six inches. The eggs hatch in three or four weeks, and the young larvae move up close to the surface of the soil where they feed on grass roots and decayed organic matter. In September and October the lawns in heavily infested areas are severely injured and the grass in spots completely killed. Late in October and during November the larvae descend into the soil to a depth of about one foot to hibernate, most of them being at this time in the third larval instar. The last of April the larvae come up close to the surface and resume feeding, and the first of June they go down again to a depth of about six inches to pupate. After a prepupal period of about six days they molt and the pupal stage begins. This lasts about two weeks.

"There is at present no effective natural control of this insect in New Haven, and reliance must be placed on insecticides. Lead arsenate and carbon bisulphide have given good control in lawns where properly applied. The latter is used in the form of an emulsion containing 70 per cent carbon bisulphide diluted 200 times with water and applied at the rate of three pints of diluted material to the square foot of surface. This insecticide is effective for a short time only, however, and lead arsenate gives a more permanent control. This may be applied to the surface of the lawn at the rate of two pounds

to 100 square feet of surface and worked into the soil to a depth of one inch. It may be used in a top-dressing of loam at the same rate, or it may be applied as a suspension in water at the rate of three pounds to 100 square feet of surface."

Circular 178, issued by the bureau of statistics and inspection of the New Jersey State Department of Agriculture, Trenton, N. J., entitled "The Asiatic Beetles in New Jersey," was prepared by Edgar G. Rex, director of the office of Japanese beetle suppression.

The author calls attention to the fact that "three species of beetles of Asiatic origin are now known to be existent within the State of New Jersey. Their rate of increase in numbers, in this state, has been relatively unimpeded because of the general absence of their natural parasitic enemies. Thriving under such conditions, the population of the beetles of these three species has grown to the extent that their status, as insects of the damaging type, is well established." These three Asiatic beetles are the Japanese beetle (*Popillia japonica*, Newm.), the Asiatic beetle (*Anomala orientalis*, Waterh.), and the Asiatic garden beetle (*Autoserica castanea*, Arr.).

The circular contains colored plates and drawings executed by Robert J. Sim, of the United States Bureau of Entomology's research laboratories at Moorestown, N. J., which enable the layman to get a clear conception of the differences between these three destructive beetles.

The Japanese beetle is well known to the readers of our Bulletin, since the Green Section gave financial support for some of the experimental work on the control of this insect. Reports of this work have been made from time to time in previous issues of the Bulletin.

The Asiatic beetle and the Asiatic garden beetle are not as well known to our readers, and we suggest that those who are in the region where these insects are likely to occur secure a copy of this circular in order that they may recognize the three species if they occur in new districts. The circular contains maps of New Jersey showing the areas in which these three species of insects are known to occur. The circular briefly summarizes the information available on the distribution and life history of the beetle, which is given in greater detail in Bulletin 304 of the Connecticut Station, reviewed above. The circular recommends a lighter application of arsenate of lead than is recommended in the Connecticut bulletin. It states:

"The application of dry commercial lead arsenate to lawns at the rate of five pounds to 1,000 square feet should provide larval control for a period of three to four years. This material may be applied any time during the growing season. The use of moist soil or sand may be found advantageous in adding bulk to the lead arsenate, thereby facilitating spreading.

"The beetle or adult stage appears about June 25 and persists until the latter part of August. The beetle is extremely inactive, flies for very short distances, and does very little feeding. It therefore seldom becomes necessary to protect vegetation against the beetle feedings."

The Asiatic garden beetle was first found in this country in a nursery near Rutherford, N. J., in 1921. The spread of the beetle has been slow, but the multiplication of its number in a restricted area has indicated that it is an insect of minor destructive capabilities. Observations in New Jersey have failed to establish the fact that the larvae of this insect are responsible for extensive lawn damage.

Feeding of these larvae at different levels from 1 to 2 inches below the surface usually enables the grasses, the roots of which have been damaged, to establish themselves. The adults emerge from the ground about July 1 and persist until about September 1. They fly about only during dusk and night time when the air temperature is 70 degrees Fahrenheit or above. In warm evenings and nights the beetles are very active and feed on the leaves of a variety of ornamental plants. They respond readily to the attraction of light and are found in large numbers around street lamps. The spraying of ornamental foliage with coated arsenate of lead at the rate of 2 pounds to 25 gallons of water may provide the necessary protection.

"A fourth Scarabaeidae beetle of Asiatic origin (*Serica similis*, Lew.) is known to occur in this country. Although having been found on Long Island, it has not yet been reported in New Jersey."

Circular 117, issued in June, 1930, by the United States Department of Agriculture, Washington, D. C., entitled "The Asiatic Beetle, a Serious Pest in Lawns," was written by H. C. Hallock, associate entomologist of the Bureau of Entomology. This circular, like the two publications abstracted above, refers to the early reports of the Asiatic beetle in Japan and Hawaii and tells of the spread of the insect in the United States. It describes the feeding habits of the adult insects and of the larvae or grubs which live in the soil. The author reports that as many as 550 grubs of this insect have been found in one square foot of turf. Concerning the extent of the damage caused by this insect, he writes:

"The total area of turf injured in New York State in 1928 was approximately 15 acres of lawn at widely separated points on Long Island and the lawns on about 12 blocks in Westchester County cities. During 1929 the area in the eastern part of the United States known to be infested with the Asiatic beetle suffered from a drought unusually severe for this section of the country. The lawns in this area were burned brown, and large patches on these lawns were permanently injured. Many eggs and young larvae of the Asiatic beetle died during the dry summer. As a result of these weather conditions of 1929 only about 5 per cent as much injury to lawns by the grub of this beetle was apparent in that year as during the preceding year.

"The damage on the estate of the late Elbert Gary, at Jericho, on Long Island, illustrates the destructiveness of this insect. Here 5,000 pounds of arsenate of lead was used to secure grub-proof turf on approximately 3½ acres of lawn during the years 1926, 1927, and 1928, and there still remained about 2 acres of untreated lawn where the turf was ruined. The infested area at New Haven, Conn., covered about 1 square mile.

"The larvae prefer unshaded lawns where the grass is kept short by frequent mowing. They also appear to avoid plants that have coarse roots when grasses with fine, fibrous roots are abundant."

The circular contains a brief description of the insect and also an account of its development from the egg stage to the adult. This account is similar to the one given in Connecticut Bulletin 304, as described above.

Concerning the adult beetles it is stated:

"The flight is rather swift and short, usually but a few feet, although occasionally individuals have been observed to rise to a height of from 8 to 15 feet and to fly several hundred yards. On a few hot

days, about the middle of July, adults have been observed swarming like bees over lawns. The flights were then short, and only about 1 foot above the ground. When flying to a food plant the beetles generally alight on or near a blossom and soon bury themselves among the petals."

The damage caused by the grub is due to its feeding in the top layer of soil. The author continues: "The grass roots are cut off about half an inch below the surface, and as a result large patches of detached dead turf can be lifted. When the weather is warm and the grubs are active a considerable number can often be found feeding at a depth of from 4 to 8 inches. Feeding continues until freezing. About October 10 a downward migration of the larvae begins."

The author reports promising progress in the control of this insect by the use of insect parasites. He calls attention to the remarkable success which was obtained by introducing the Scolia wasp into Hawaii for the control of the Japanese beetle, which indicates the importance of parasite enemies. This particular wasp was introduced into New Jersey in 1922, but was unable to withstand that climate. Concerning other parasites Mr. Hallock makes the following encouraging report:

"Experimental work has shown that some of the natural enemies of the Japanese beetle, *Popillia japonica* Newman, are also enemies of the closely related Asiatic beetle. Small colonies of three of these natural enemies have been released in the locality infested by the Asiatic beetle on Long Island. It is still too early to predict what success may be expected from the introduction of these parasites.

"In June and July, 1927, a black wasp, *Tiphia vernalis* Rohwer, which had been collected at Suigen, Chosen (Korea), by T. R. Gardner, of the Bureau of Entomology, was released near Jericho, on Long Island, N. Y. During the season 267 adult female wasps and 500 parasitized Asiatic-beetle grubs were placed in the field at the Jericho infestation of the Asiatic beetle, which is one of the largest infestations on Long Island. About one week after the wasps had been released, Asiatic-beetle larvae bearing eggs, apparently of this parasite, were collected in the field.

"In August, 1927, another wasp, *Tiphia popilliavora* Rohwer, a natural parasite of Japanese-beetle grubs, which is now established near Riverton, N. J., was found to attack the larvae of the Asiatic beetle readily. One hundred and twenty-five adult females of this wasp were collected in New Jersey and shipped to Long Island. From this shipment 110 wasps, along with 266 Asiatic-beetle grubs which had been parasitized by these wasps under insectary conditions, were placed in the infested territory near Jericho. In the summer of 1928 this colony was further strengthened by releasing 200 adult female wasps.

"A dexiid parasite, *Dexia ventralis* Aldrich, was found attacking the grubs of several closely related scarabaeid beetles in Chosen in 1922. Nine hundred adults of this species were released in 1927 near Jericho, where grubs of the Asiatic beetle were numerous."

For artificial control, carbon-bisulphide emulsion is recommended for a temporary check of the insect. However, for a more lasting effect the arsenate of lead treatment of turf is recommended, based on the work which was reported in the Bulletin of the Green Section in 1928.

Fourth hole (195 yards), North Course, Los Angeles Country Club, Beverly Hills, Calif.

The one serviceable, safe, certain, remunerative, attainable quality in every study and pursuit is that of attention. My own imagination would never have served me as it did but for the habit of humble, daily, toiling attention.

Charles Dickens