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DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from $1.00 to $2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 207, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 207, HONOLULU, HAWAII.

EDW. M. EHRHORN,
Superintendent.

THE HAWAIIAN

FORESTER & AGRICULTURIST

VOL. IX. JULY, 1912. No. 7.

Recent bulletins of the Hawaii Agricultural Experiment Station are the following entitled: Sisal and the Utilization of Sisal Waste, by E. V. Wilcox and Wm. McGeorge; The Pineapple in Hawaii, by J. E. Higgins; Index to Publications, July 1, 1901, to December 31, 1911, by A. T. Longley.

Mr. David Smith, a fruit and banana merchant of Flinder's Lane, Melbourne, writing on the 30th ultimo, on the banana trade, points out that there is always a good market awaiting Fiji bananas in Melbourne. At present they are practically relying on Queensland for supplies, "and the stuff they are shipping is not worth classing as bananas, being small and very discolored in appearance; however, we have to make the best of them."—Western Pacific Herald.

The foregoing may contain a suggestion for Hawaii to act upon when the Panama canal has been opened.

The Tropical Agriculturist (Ceylon) for May copies from the FORESTER for January the article by E. M. Ehrhorn, Territorial entomologist, "Clean Cultural Practice Method for Fighting Insect Pests." The same magazine has reproduced in two numbers, concluding it in the May, T. H. Gibson's report on the "Course of Study for Elementary Schools," from the FORESTER.

According to Colonial Reports, the cultivation of limes continues to occupy the position of principal agricultural industry in Dominica, and further expansion has once again to be recorded. The crop for the year was 369,000 barrels, an increase of 85,000 barrels over the crop of 1909. This remarkable increase is partly attributable to the coming into bearing of young plantations established within recent years.

A HANDSOME FLOWERING PLANT.

The Agricultural News (West Indies) gives, from various authorities, an account of *Baikiaea insignis,* belonging to the family of pod-bearing plants (Leguminosae) and a specimen of which, it is said, may be seen in the Dominica Botanic Garden. It is

noted for the size of its flowers. The tree reaches a height of about 60 feet; it is provided with short pinnate leaves which bear very stiff, naked, large, elongated leaflets which are often alternate: there may be two or three pairs, or only one. The white flowers are in short recemes, and are among the largest and most splendid flowers of the Leguminosae. The thick calyx is provided with velvety hairs, and is more than 3 inches long; the petals are broadly oblanceolate or inverted egg-shaped spatulate, and reach the considerable length of over 6 inches.

The account goes on to say that this beautiful flowering tree was discovered originally in Fernando Po (in the Gulf of Guinea), and among much additional information, states that it has also been collected near Lolodorf (in Kamerun), where it was found as a bushy tree 36 to 60 feet high, with a brownish-grey bark, glassy, bright-green leaves, and a not very hard wood. A very similar plant to *B. insignis* is *B. minor,* which only differs in the possession of smaller flowers and more pairs of leaflets.

RABIES IN CANADA.

Rabies, precautions against which here some people hastily flouted at, would appear to be taking a world range this year. In a previous number the FORESTER told of its appearance in the Philippines and of the steps taken for its repression there. Dr. Norgaard in his last month's report gave information of cases, one at least fatal, in California. Now comes news of a fearful visitation in Canada, with some dire results, contained in the following press dispatch:

Goderich, Ont., June 20.—A serious outbreak of rabies has developed in Goderich township where cattle have been infected and died in great agony. Some two weeks ago a steer on the farm of Mrs. Joseph came home acting rather peculiarly as if affected with some form of paralysis. A local veterinarian was immediately summoned, but did not consider the trouble serious.

However, the affliction of two more of the cattle a day or so later gave fears that something was wrong. Government veterinaries from Toronto and Ottawa were summoned, who, on investigation, pronounced the disease to be rabies.

Some six cattle of the farm have since suffered most agonizing deaths. Two rushed to the lake and were killed as they hurled themselves over the bank.

Two sons and a daughter of Mrs. Salkeld, who had assisted in treating the cattle, have gone to Toronto for the Pasteur treatment. Farther east in the country, Reginald Sturdy, aged eighteen, was attacked by a dog, on Tuesday, and in attempting to fight it, received several bites, the flesh of one hand and arm being literally torn off. The dog escaped and several search parties have failed to locate it.

The board of health has issued a proclamation that all dogs must be chained up or muzzled for thirty days.

SAW GINS VERSUS ROLLER GINS FOR CARAVONICA COTTON.

By C. K. McCLELLAND, Federal Experiment Station, Honolulu.

There has been some uncertainty among the various producers of Caravonica Cotton in Hawaii as to the advisability of ginning the cotton upon saw gins thinking that the fibre might be injured by so doing. Roller gins of equal capacity as small saw gins cost several times as much. At the Experiment Station we have the smaller types of both the saw and roller gins, and the saw gin, which cost less than half as much as the roller gin, has a capacity of about five times as much lint per hour, representing a saving in the cost of the machine, of labor, of gasoline, and of wear and tear upon the engine and gin. In order to find out if the claim "that long staple cottons should be ginned upon roller gins" held true for Caravonica cotton, we submitted samples to the Wonolancet Company of Nashua, N. H., for test. They have reported as follows:

	Saw-ginned cotton.	Roller-ginned cotton.
Amount received	261.4 lbs.	414.12 lbs.
Picker room returned...	248.6	394.12
Loss	12.8	20.
Loss in per cent.....	5.27	4.83
Card room returned....	236.5	384.
Total loss	24.87	30.12
Total loss in per cent..	9.12	7.27

The comparison was carried no further, as the company claimed that practically all the broken fibres would be eliminated in these two steps.

The company say that the roller ginned cotton with a loss of 7.27 per cent. is about equal to Peruvian which loses 7.25 per cent. They also say that it is about equal to Peruvian in roughness, and consequently is of equal money value. They allowed us 18½ cents a pound for the roller-ginned cotton, that being the current price of Peruvian at that time; but on account of the greater loss in the saw-ginned cotton they allowed us but 18⅛ cents for it. The transportation amounted to about 1.45 cents per pound.

This report shows but very little difference between the two methods of ginning, but when the relative costs of ginning are considered, the difference will be found to be somewhat in favor of the saw-ginning. And, furthermore, the company submitted samples to the U. S. Department of Agriculture at Washington for strength tests, and after the final stage in the preparation of the cotton for yarn the breaking strength of the saw-ginned cotton was found to be 9.36 grammes as against 8.19 grammes for the roller-ginned.

The company offer the very likely reason for this difference by saying that probably the weaker fibres only have been broken by the saw gin, which when removed in the above processes leave the saw-ginned cotton with a higher average strength than has the roller-ginned.

It might be well to add here, however, that only in case the ginning is very carefully done upon the saw-gin is such a small difference likely to be shown. To do as little damage as possible to the cotton it is necessary that the gin be run at a lower rate of speed than the manufacturers have recommended since in their recommendation they were thinking of short staple cotton. The higher speed would give a greater capacity to the gin, but it might result in greater damage to the staple.

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*PARASITES OF INSECTS ATTACKING SUGAR CANE.**

By R. C. L. Perkins.

In this Bulletin is described a number of very minute parasites, nearly all of which were bred from eggs of insects attacking cane in countries other than these islands.

The American species were obtained by Mr. Koebele, when investigating insects in the cane fields in Mexico, where he spent a short time during the winter months of 1908. All the rest were obtained by Mr. Muir in Fiji, China and the Malay islands. Many of these parasites are of great interest and importance, since they are important agents in limiting the numbers of injurious species which, if introduced into the islands without their parasites, would be likely to cause great loss to the sugar plantations. It has been advisable, therefore, to work out these insects and put them on record, so that in the event of any of the species which they attack turning up in the islands, information would be at hand as to where to look for natural enemies without delay. Although there is now a regular inspection of all imported plants and, without doubt, the vast majority of injurious insects is intercepted and destroyed, yet there are means of introduction which no inspection can provide against. Also there are some insects which are liable to be passed over by the most shrewd inspector and against which treatment by fumigation is ineffective. We know that in spite of the fact that there has been a systematic inspection of introduced plants for nine years, during the last few years numerous insects have appeared and become abundant. Because this is the case there is no reason to regard inspection as futile, for as has been said, there is no doubt that the majority of imported species is thereby prevented from becoming established. With the opening of the Panama canal and with quick

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* Report of work of the Experiment Station of the Hawaiian Sugar Planters' Association. Introduction to Bulletin 10, Entomological Series. (Printed by permission H. S. P. A. Experiment Station.)

steamers from Central America we may safely predict that an entirely new lot of insects will be brought here, and that the duties of inspectors will become still more onerous. Many of these insects will be particularly dangerous, because we know that species from the warmer parts of the American continent readily become established and thrive here, whereas the native insects of California, though they have often been brought here, generally fail to establish themselves. This climate is evidently not suited to them. Although cane is no longer imported into the islands, yet many bad cane pests are by no means restricted to cane, but may easily be brought with other plants. It is well known that steamers have put in here from Fiji carrying cane on board, from which insects might easily have escaped to the shore, although such cane is not landed. It is also known that both on cane and on other plants, carried on deck, insect pests are frequently numerous. Mr. Muir has observed this to be the case with sugar cane carried on deck from Fiji, and Mr. Koebele and myself noticed great quantities of fruit fly maggots dropping from fruit carried on the deck of steamers, when we were traveling along the Australian coast. These fruit-fly maggots were crawling into cracks of the deck and pupating there, and some would certainly be likely to hatch out and gain the shore at other ports. Quick traveling steamers may carry even mature insects an enormous distance, so that they reach new countries by flight, when in or near port. Mosquitoes were still seen on board the ship on my last journey to San Francisco, five days after leaving Honolulu. On another journey numbers of a Chinese moth were seen about the decks the whole way to San Francisco. It would be very difficult and probably impracticable to keep such things from becoming established in a country suitable to them.

FREE LITERATURE ON PINEAPPLE CULTIVATION.

There is a great demand for pineapples in the world, and on account of the keeping qualities of the fruit the advantage in transportation is important. When cut at the proper time and carefully handled the fruit will reach the United States and European markets in good condition.

In our country the proper soil conditions for this cultivation can be found, and our proximity to the large American markets assure the cultivation of this aromatic fruit a profitable investment.

The General Department of Agriculture has recently published an excellent bulletin which treats on the "Cultivation of Pineapples in Porto Rico," written by the horticulturist of the agricultural experiment station on said island. This bulletin is for free distribution and can be had by addressing General Agricultural Department.—*Review of Tropical Agriculture* (Mexico).

*NOTES ON FOREST INSECTS.**

The Hawaiian forests are inhabited by a very large number of species of insects, most of which are so hidden and of such inconspicuous appearance that the forest region appears to be tenanted by very few kinds to people who have not paid particular attention to the habits of the creatures. Very few of the native insects do such damage as to be considered injurious, and at the present time very few imported species have caused any considerable destruction of forest trees. Consequently it may be said that the Hawaiian forests are probably more free from injurious insects than those of most, if not any, other parts of the world.

It is in many cases extremely difficult even for a trained entomologist to decide on the exact status of an insect found in connection with dead, dying or diseased timber. Such timber is always very attractive to many kinds of creatures, and the outsider observing these to be abundant, almost invariably attributes to them damage which has been brought about by quite different causes. Many of the insects supposed to be injurious in such cases are really highly beneficial, for they perforate and break up the dead wood, allowing water to penetrate to the heart of the timber and hasten decay, so that even a hard-wooded tree may be rapidly converted into humus. Further, in the case of old and diseased trees, the attacks of insects, that are partial to these, hasten the death of the tree and make room for younger and more healthy growth. There are, however, cases where, owing to various causes, a temporarily unhealthy condition of the forest is induced, and trees so affected are readily attacked by a number of species of insects. This may result in the actual death of trees, which, if unattacked, might fully recover. The commonest cases of this kind that we have observed in the islands are primarily due to the interference of man. For instance, such attacks commonly follow after a forest fire, trees slightly scorched often becoming badly affected by insects; forests where previously there has been a dense or uniform growth either of the trees themselves or of the undergrowth, and consequently a great retention of moisture, when opened up by cattle or by thinning and so rendered much drier, are very liable to attack, because many of the trees suffer from such change of conditions. That this is true is readily seen from the fact that in virgin forests, never entered by cattle, one never observes this great multiplication of individuals of species that attack the timber, and it is possible to search for days in such forests without finding a single individual of such species. It is a well known fact that the Hawaiian forests are singularly susceptible to any interference with the natural conditions—in fact, to an extent that is rarely, if ever, seen in the case of forests of other countries. This is perfectly natural, when we consider that they have developed under conditions very

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* By Dr. R. C. L. Perkins. (Printed by permission of the Hawaiian Sugar Planters' Experiment Station.)

unlike most other forests, having been originally free from the effect produced directly or indirectly by the larger animals. Owing to the work originated for scientific purposes by a committee of English societies, aided by the trustees of the Bishop Museum, it is probable that the habits of the forest insects of these islands are better known, and have been more studied, than those of any other tropical country. In the following account not only actually injurious insects will be referred to, but also others which are frequently, but erroneously, supposed to be injuring the native forests.

The insects, to which damage is attributed most commonly in the case of the island forests, are generally spoken of as "borers" by those interested. In most cases the "borers" referred to are the larvae of large or moderately large beetles. There are, however, many small kinds of borer-beetles; in fact, these are far more numerous than the larger ones, though they escape observation from their diminutive size. Besides the beetle-borers, there are also a large number of other borers, especially the larvae or caterpillars of small moths. These are usually found in or beneath the bark of trees which have advanced to a further stage of decay than is attractive to most of the large beetle-borers, while quite decayed wood is often perforated through and through by various species of myriapods, creatures somewhat resembling small centipedes, but with the legs much more numerous.

Of the large beetle-borers three types are most conspicuous. All the larvae are white or yellowish grubs, most of them with-

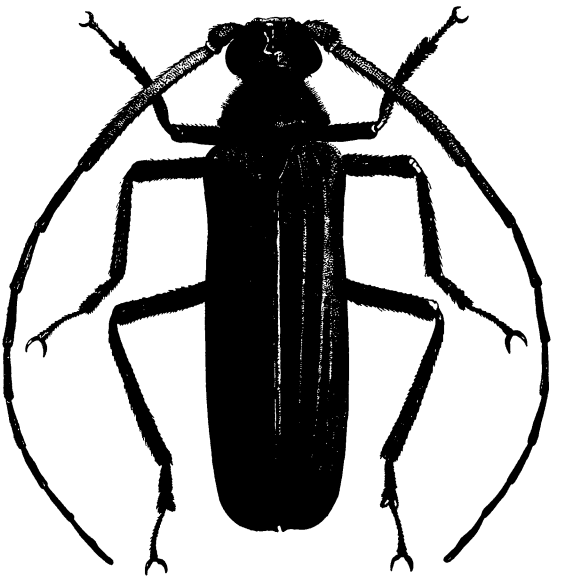

FIG. 1

out legs, but two kinds have three pair of very minute legs, one pair on each of the three segments of the body following the head. The largest of these produces the beetle *(Aegosoma reflexum)* here figured with its larva (Figs. 1 and 2), and it can

FIG. 2

not be mistaken for any other Hawaiian insect. It is not at present known from elsewhere, though very similar species are found in other countries. This beetle is remarkable for the diversity of its habits. The grub feeds sometimes in the wood of the hardest forest trees, generally in dead trees, but sometimes in those that are apparently healthly—e. g., in living trees of "Naio," the bastard sandal. On the other hand, it breeds freely in old decayed tree trnnks or smaller logs, that are sometimes so rotten that they can be pulled to pieces by the hands, and so wet that the water can be squeezed from them as from a sponge. This species is found throughout the forests of all the islands. In some localities, where forest land has been cleared for raising cane or coffee, the beetle persists for some years. On Maui we once found numbers in cane fields, where they lived beneath the soil, boring through the stools and doing some damage. In Olaa, when coffee was being grown in that district, many trees were injured by being cut through or perforated beneath the soil by these large grubs. The latter and the beetle itself vary much in size, so that some of the adults are not more than half the size of others. The beetles are attracted by light at night and so are sometimes captured as curiosities, but otherwise they are much less frequently noticed than the larvae.

The only other large borer grub, which possesses the minute legs referred to, has very much the habits and appearance of the preceding. It is very partial to dead or partly dead Koa trees, but is found in other trees—e. g., the Kopiko and Koolea, and also in quite rotten logs that lie upon the ground. It is doubtful whether it ever attacks the living parts of apparently healthy trees, as the preceding does. The mature beetle is a large, dark brown, flattish beetle, found beneath bark in the forest and attracted by light at night. The male has very large, prominent jaws, like those of some stag-beetles. Its name is *Parandra puncticeps,* and it is peculiar to the islands.

The borer beetles, whose work is most commonly noticed by the non-entomologist both on cattle ranches and in forest clearings, form a group (with many species) which is quite peculiar to the Hawaiian forests. The mature beetles are of extraordinary

appearance and have a superficial appearance of some crickets rather than of more ordinary beetles. The species figured *(Plagithmysus darwinianus,* Fig. 3) is one of those that attack the "Mamani" on the Island of Hawaii. The larvae of these beetles much resemble the borers previously mentioned, but are easily distinguished by the absence of the small legs on the three segments of the body behind the head. Owing to the fact that numerous species attack the two common and important forest trees, the Koa and Mamani, and that their work is so conspicuous on the dead trees when the bark falls off, many complaints as to the injury done by them to the forest have been received from various localities, but more especially from the upper forest country of cattle ranches on Hawaii.

The cricket-like beetles referred to in the previous paragraph (fig. 3) which are so often reported from the forests as injur-

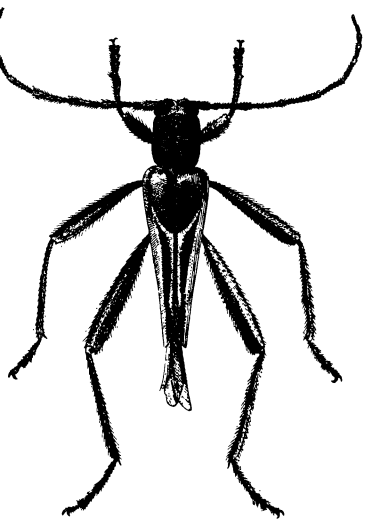

FIG. 3

ing the trees, are not only of interest from their peculiarities of structure, but also from their habits. Nearly all the known species described and undescribed (which at present exceed 50 in number) attack, each one, only one kind of forest tree. The exceptions to this rule are very rare. Some trees, like the Koa, Mamani, Alani and Mamaki, have several or many species that feed on them, but a good many native trees have never yet been found subject to their attack. Other trees commonly affected by these borers are the Ohia, Ohia-ha, Ahakea, Aiea, Naeo, Heae, Akoko, Koolea, Opuhe, and others more rarely. The stems of the Akala are also bored by one species. There is no doubt that, injurious as these borers appear to be, very few of them will attack trees that are in a really healthy condition. As soon as a tree is in-

jured in any way by fire or axe, by drought or by exposure of the surface roots to a hot sun from destruction of undergrowth, by defoliation from swarms of caterpillars or from natural decay, it is liable to be attacked by the special kind or kinds of these borers that affect it. By the outsider the work of the borer is usually noticed after the death of part or the whole of the tree, when the borings beneath the bark and the numerous exit holes of the beetles become obvious; but those who are observant may notice the beetles themselves running rapidly in the sunshine over the trunks and branches of still living trees. At night and on wet days they usually remain hidden in the undergrowth. If held in the hand, they squeak audibly, and some of them have no less than three different sets of sound-producing apparatus. A few appear to be found in apparently healthy trees and not to particularly injure these, since they produce abundant seed annually in spite of the attack. These beetles are so rarely found in forests that have not been interfered with by man and his animals, that it is quite certain that, in a natural condition of the forest, they are beneficial rather than injurious insects, as they help to remove old and sickly trees and make room for younger growth. Two parasitic wasps attack the larvae of these borers, and in some cases cause a great mortality. In the case of one species, of more than one hundred larvae collected, only two produced beetles, all the others yielding parasites. One species of the latter is a comparatively recent introduction, the other, though doubtless an accidental importation, has been known for more than thirty years. On Maui a very remarkable native bird *(Pseudonestor)* exists, which is peculiar to that island, and is specially formed for securing the larvae and immature beetles of these borers. On many occasions its food was found to consist solely of these, and the number destroyed was remarkable. Other native birds that are allied to the *Pseudonestor*, and which are seen in the same trees, feed on other species of borers, but either are not able to obtain this kind or else they have no liking for them. It is a matter for surprise that, excepting on Maui, none of the common native birds with woodpecker-like habits should have availed themselves of such a food supply.

In Figs. 4 and 5 are shown two small weevils much magnified, since they do not exceed one-quarter of an inch in length or are still smaller. Fig. 4 is a species of *Dryophthorus*, of which there are many different kinds, black and reddish in color, small dirty-looking insects, often smeared with excretions and adherent particles of rotten wood. They are frequently extremely numerous in dead trunks or branches of trees and also in rotten logs lying on the ground. Many individuals associate together, and these companies frequently consist of several different species. None of the species can be considered as at all injurious to the forests, though they are sometimes supposed to be so by those who have not studied their habits. On the lowlands one species, which is no doubt an introduction, does much damage to boards, if they

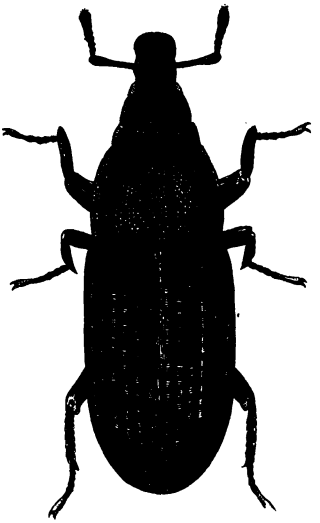

FIG 4.

are left lying on the ground, especially in damp places, where it perforates the wood in all directions. These beetles appear to be very rarely attacked by parasites, but some of them are freely eaten by native birds. Fig. 5 shows one of the more or less

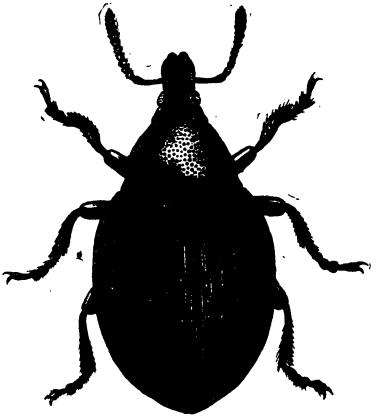

FIG. 5

metallic or brassy weevils *(Oodemas)* that are quite peculiar to the islands, and occur in all forests. They never attack healthy wood, and rarely that which is not entirely dead, so that any supposition that they are the cause of the death of trees or their branches is erroneous. Many other small native beetles are also found in connection with dead forest trees, but none of these can

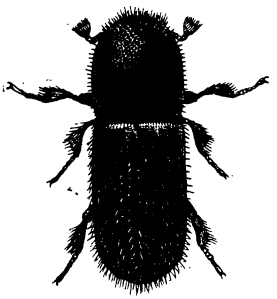

FIG. 6

be considered of any economic importance. Fig. 6 is a representation of a very minute beetle, about one-eighth of an inch in length, much magnified. This borer *(xyleborus pubescens)* belongs to a family notorious throughout the world, but especially in colder countries, for the injury that is done by its members not only to forest, but also to shade and fruit trees. To the same genus belongs the so-called "shot-borer" of the cane fields in the West Indian Islands. There are many species of these "shot-borers" in the forests, most of them being indigenous and apparently doing no harm, since they only attack very unhealthy trees, while others like the one figured attack trees, which, if not perfectly healthy, at least would be likely to recover, but for the borers. On one occasion a forest fire in the mountains of the Waialua district of Oahu slightly scorched many large Koa trees, which would almost certainly have recovered had they not been attacked by this common shot-borer, which rapidly increased to many millions in the area of the fire. On another occasion the Halapepe trees, once numerous in Nuuanu valley, were attacked by another species, almost every tree being riddled with its borings and many trees were killed outright. Closely allied to the shot-borers are other still more minute beetles *(Hypothenemus)* which are occasionally injurious in the lower forest, and one of the species is notorious from the fact that it attacks the alligator pear trees and becomes very numerous. It is questionable, however, whether the trees, so attacked, have not first become diseased. The smallest species of all *(H. eruditus)* is not only numerous in the lower forests and on the lowlands, but sometimes is found in houses, boring into the covers of books or other material. This species is occasionally attacked by a very minute parasite, but, generally speaking, all these small borers are free from parasites.

Very similar to the shot-borers, but rather larger than most of these, is another borer *(Crossotarsus externedentatus)* which is also found very numerously in alligator pear trees, often in company with the former. It is easily recognized by the different structure of the legs and the remarkable form of the wing cases,

which end in an acute point on each side, and leave the tip of the body exposed to view.

Though not injuring the trees themselves, mention must be made of a curious weevil, of remarkable form and sculpture, which first became injurious in Honolulu in 1900, having, no doubt, been imported with ferns, somewhat previous to that date. On the settlement of Pacific Heights it must have been carried up with ornamental ferns, and it soon spread along the ridge, attacking the native tree-ferns. By 1902 it had become extremely numerous and injurious over a limited area, and is slowly spreading across the mountains. Being without wings, its progress is naturally slow, as compared with a flying insect. This borer is only known elsewhere from Australia, and was described under the name of *Syagria fulvitarsa.*

(To be continued.)

SEA ISLAND COTTON IN HAWAII.

One difficulty which has been experienced in growing Sea Island Cotton in Hawaii is that of excessive yield, which results in a too prostrate form of growth.

In one locality on the windward side of Oahu, where the rainfall is about 70 inches per year, two acres of Sea Island cotton required about 5000 props in order to keep the branches from lying upon the ground and causing the bolls to rot. In this respect the Caravonica cotton is superior to Sea Island, since it invariably has an upright habit of growth. The difficulty experienced with the prostrate habit of the Sea Island can be appreciated from a consideration of the fact that, in the two-acre field just mentioned and in another one-acre field, on the leeward side of Oahu, the average number of bolls per plant was 700, and on one tree 1200 bolls were counted at one time. This produces a weight under which the slender branches of the Sea Island can not support themselves in an upright position.

An elaborate series of pruning experiments is now being carried out with the idea of learning a method by which an upright growth can be induced in the Sea Island cotton, at least for the second and subsequent years of the crop. Some promise is already held out by these experiments. A strain of Sea Island, secured from one of the best plantations of James Island (South Carolina) shows a more upright habit of growth than any other strain of Sea Island which has thus far been secured.—*Agricultural News* (W. I.).

PINEAPPLES AND DIVIDENDS.

While pineapples are probably grown with more profit in the Hawaiian Islands than any part of the world, it is only because the planters have studied this product, and applied to it the most adaptable methods to produce a finely matured fruit. And the result has read something like a fairy story from King Midas; the profits have even astonished the planters who were interested in the estates growing pines, and ten years previous to their first big crop in 1902, you could scarcely get a Hawaiian planter to look at a pineapple. It was because a longheaded man, then secretary of the Planters Association of Hawaii, told that body of men that some day their sugar crop (which is the principal product of the Islands) would fail. Then what would they have to fall back on, except small crops of coconuts, rice and bananas, which would not tide them over to another season. Some of the members sat up and took notice. Immediately all the information and samples possible were obtained from the other pineapple-growing countries of the world. Companies were formed, areas planted with different species, and the authorities established an experiment station, where a scientific study of pineapples was conducted. The outcome has been a most delicious and healthy fruit which is gaining a famous reputation around the world. The renewed interest in the pineapple situation here begins to look as if the subjects would be taken up seriously before long, and investigated with a view to undertaking the pineapple project on a substantial scale. While most of the planters of Ceylon have rubber to fall back on if tea should fail, and *vice versa,* at the same time, inter-planting has seen its best day, and even now many of our largest planters are contemplating its abolition as a method conducive to producing either better tea or better rubber, each planted separately. Some of the planters will eventually devote themselves to one or the other exclusively. In any event, both rubber and tea crops are subject to ravages by droughts, pests and storms, while the pineapple, hardy and easily cared for, grows low, and is in nine cases out of ten, a sure crop.

That the pineapple is to be one of the principal fruit productions of all tropical countries is exemplified in the reports of the agricultural departments from Japan (covering Formosa), the Philippines, Java, Cuba, Puerto Rico, Panama, Florida, Mexico, Southern California, parts of India; and experiments are even going on in certain districts of British South Africa. At first the problem of shipping from Ceylon seems a difficult one; but when it is considered that the pineapple can be shipped, partly ripe, and by the time it reaches its destination, is in the pink of condition; also when the shipments are once under way, and kept going, the transportation question shrinks into insignificance. Another point in favor of growing pineapples is that first class, finely matured fruit always brings a good market price, and the

demand is invariably strong. Second and third grade fruit finds a ready market for preserving and canning purposes in all of the big world centers. One large canning factory in New England last year offered to contract for, and take all the pineapples which Cuba, the Philippines and Hawaii could raise together. And they all refused to make contracts, for the individual market demand was so great that they could afford to be independent. We are glad that our government officials are looking into the matter, for we have faith in Ceylon as a future pineapple country, and if our planters can produce as fine a grade of this fruit as of tea and rubber, it is our prediction that within ten years we will be running Hawaii a close race for first position. Once the pineapple industry is started on a proper scale, and handled judiciously, there is little doubt as to the profits and certainty of crops. Dividends of from 40 to 60 per cent. on common pineapple shares are reported from Honolulu last season, and many of the Cuban companies paid as high as 50 per cent., which is an excellent showing in consideration of the quality of Cuban pines as compared with those grown in Hawaii. We have recently received several interesting letters with regard to pineapple growing, and some definite action will no doubt be taken soon, as to a further investigation of this subject.—*Tropical Agriculturist.*

GIANT ALOE AT KEW.

On one of the lawns near the cactus house at Kew there is now a magnificent example of the pulque plant *Agave atrovirens,* from the Ilanois or plains of Apam, Mexico. For many years this plant has been a striking object among the many species of agave cultivated in the cactus house, its age being about thirty years. Until the pole-like flower spike commenced to develop there was ample head room in the house for the plant, huge though it is; but when the spike reached the roof, the end of the house was removed and the plant run out on planks and rollers to its present position where, unless the weather of the next few weeks disagrees with it, the flower spike should be at its best towards the end of June. At present the spike is about 12 feet high and 6 inches in diameter, but, judging by a specimen which flowered about twenty-five years ago, it should attain a height of 25 feet, with numerous branches arranged candelabra fashion, and bear a large number of yellow lily-like flowers. The leaves are arranged in an enormous rosette about 12 feet in diameter, and they are about 8 feet long, 10 in. wide, very thick and solid, their color glaucous green, their margins clothed with short spines, and the apex armed with a long sharp spike. In a broad sense this is one of the American aloes or century plants, whose life period varies from ten to fifty years, or even longer, according to circumstances, but they

ALL FLOWER ONLY ONCE AND THEN PERISH.

A. atrovirens is of exceptional economic interest, as from it is prepared the fermented drink called pulque, the favorite beverage of the Mexicans, who cultivate the plant on an extensive scale for the sake of the sweet sap which it secretes when it has arrived at maturity and is about to flower. The sap is obtained by cutting off the top of the flower stalk at any early stage and hollowing out the stem to form a cup into which the sap flows, and is removed several times each day until it ceases to run. The sap is then placed in bull-hide vats to ferment, a kind of yeast being added to hasten fermentation, the entire process resulting in the end in a variety of wine, resembling in color and general appearance the *weissbier* of Germany. It is an agreeable wholesome drink, being a valuable nutrient as well as a mild stimulant, as it contains from 4 to 8 per cent. of alcohol. Pulque is said to be good for inflammatory and catarrhal conditions of the bladder and kidneys, and to be an almost unfailing remedy for what is known as Bright's disease. It is now prescribed by American physicians, who even send their patients to Mexico to drink fresh preparations of it, as it is liable to secondary fermentation a few hours after it has been made, which renders it unwholesome.

There are countries in the British Empire where the conditions of soil and temperature are such as would favor the growth of this agave; for example the plains round Johannesburg, where, to those engaged in the mines, a plant that yields both wine and medicine and requires practically no cultivation would be a blessing. There is a useful fibre also in the leaves of this plant, not so good perhaps as sisal hemp, but good enough for many purposes. If once established in a country this agave would reproduce itself naturally, and most likely with great prodigality, by means of seeds and stem bulbils, which it bears in profusion. Of course it might prove a nuisance by providing a cheap intoxicating drink to natives, thus reducing their value as workers. It is worth trying on a small scale, anyhow.—*Field,* April 13.

"THE LARGEST PIECE OF RUBBER."

In our last issue we asked if any of our readers knew of the largest piece of raw rubber on record. We referred to a biscuit weighing 559 pounds, which was exhibited at the Rubber Exhibition of 1908, and also to a block which figured at several tyre exhibitions, and weighed about 8 cwt. This week we are enabled, by the courtesy of the St. Helen's Cable and Rubber Co., Ltd., Warrington and London, to publish a photograph of a piece of Fine Hard Para, which they bought about five or six years ago. This block weighed nearly half a ton, to be exact 1100 pounds, and was shown at several exhibitions about the country. It is claimed that this is the largest piece of rubber ever imported.—*India Rubber Journal,* April 20.

POSSIBILITIES OF RUBBER PRODUCTION.

"West Indian rubber planters have awakened to the fact that quite a number of their trees, believed to be pure Hevea Brasiliensis, are hybrids. This has caused the planters not a little distress, because these particular hybrids are much less productive of good rubber than the pure Hevea," says the India Rubber World; "but it serves once more to bring up the general subject of hybridization, with its natural suggestion of the possibility of such hybridization, or cross fertilization or grafting, as will enable some variety of the rubber-producing tree to be grown in the more southerly sections of the United States.

"It is doubtful if a botanically pure Hevea Brasiliensis actually exists. There are twenty varieties of the Hevea along the Amazon; there are seven or eight varieties of Manihot in the most easterly part of Brazil; and of Castilloas there are, north of the Amazon, probably twenty different varieties. Which of these many varieties represents the pure parent stock—if any of them does—it is impossible to tell. Hybridization seems to be the general law in the rubber family, and if it could be directed in such a way as to produce a rubber tree capable of withstanding such temperatures as we have in our more southerly States, a vast field for rubber planting would be opened at once.

"The advantages of such rubber planting are too obvious to need enumeration. The most conspicuous may be referred to in a few words—the utilization of great tracts of land now practically going to waste; the easy solution of the labor, provision and sanitation problems that are so difficult in the Amazon country; a great decrease in transportation charges; freedom from exacting duties. All these and many other advantages point to the great desirability, if practicable, of rubber growing in our own country.

"On the face of it, it does not seem necessarily impracticable. There are several plants indigenous to the United States that are quite closely related to the varieties of the rubber tree. Our ordinary milk weed, of which there are some fifty different kinds in the United States, is a cousin of the Hevea Brasiliensis, and some of its varieties, particularly those in Florida, that attain the size of a tree, bear something of a family resemblance."

WOODLOTS ON FARMS.

"Growing a Woodlot from Seed" is the subject of an article in American Forestry for June written by J. A. Ferguson of the University of Missouri. Part of it deals with this very subject Mr. Cox has mentioned, and says:

"Every farm should have a woodlot to furnish fuel, fence posts and other wood material needed. Especially is this true in the less wooded regions like the prairies, where wood products must

often be transported long distances at considerable expense. Nearly every farm contains some land that is too poor for raising crops or that is not available for grazing or other purposes, which usually lies idle year after year. This land is a burden to the owner because it brings in no returns, yet must bear its share of the taxes. Such land ought to be devoted to the raising of forest trees. When we consider that an acre of land planted to fast-growing trees will produce from one to three thousand fence posts in twenty years, and that with some species fence posts can be secured in less than ten years, a farmer, by allowing waste places to stand idle, is losing a return he could secure by a slight effort. It is not a difficult matter to start a woodlot, neither is it an expensive one. It can be done without any cost to the owner except the time and effort necessary to grow and plant the trees.

"One reason why farmers do not start forest plantings is because they believe large trees are necessary which can be purchased only at considerable cost. The best trees for starting a woodlot are one-year-old seedlings, which can easily be grown from seed by the farmer himself. Every farm should have a forest nursery for growing trees for starting forest plantings. Such a nursery can also be used to grow larger trees for planting about the house, along the roads and for making windbreaks. It should be located on well-drained fertile soil such as might be selected for a garden. Where the space can be spared a portion of the vegetable garden makes an ideal nursery site. The soil should not be made excessively rich, as too fertile a soil will produce a rank growth in the seedlings, making them difficult to handle in transplanting."—*The North Woods* (Minnesota Forestry Association).

RELIGION OF THE WOODS.

Tribute to the presence of God in the woods, recently was paid by Rev. George R. Gebauer, pastor of the First Unitarian church in Duluth, while delivering a sermon on the subject, "Influences." The following pretty eulogy of the stars and woods and the sermons they preach, came from him:

"It was none less than the great Kant who said: 'The two things which most overawe me are the starry heaven above and the moral law within.' He said nothing of any relationship between the two, but to me there seems to be such. I am convinced that if only we would take our children into the star-lit silence of the night, and in the presence of this visible Infinite speak to them of the Infinite and the eternal law of goodness, we should find them much more receptive than in our Sunday schools with their sanctimonious trimmings. What the stars preach to us is truly 'heavenly,' and the sweet influences of the Pleiades creates a reverence which holy scripture will hardly give in such rich and pure measure.

"It is wrong to speak of a dead world of matter, if thus the very stars speak to us. No, this is not a soulless universe and Arcturus and Vega, and the farthest nebula are filled with the divine soul and try to draw us upward. And as the stars preach to us, so does the earth; nature about us uplifts the sore and troubled soul. The woods and the hills say to us, when we come with fevered brow from the daily pursuits, as Emerson puts it: 'Why so hot, little man?' Yes, it is nature that tells us that man is more than a dollar-earning or dollar-grasping animal, and that his life may be measured by something else than the capacity for making money, and wasting wealth. Yes, life in the end is only true life when it is close to nature; a life is only full when it can look in reverence up to the stars and love nature as a divine mother.

"I think it would be a blessed thing to close for the summer not only the school, but the churches, and turn the saints and sinners to pasture, if people would only forget themselves there. How it might expand those shriveled souls, the souls of poor over- and under-formed humanity, of pale-faced, gospel-ridden churchgoers, of miserable sermon-crammed sinners, simply to go into the woods and become saints and sinners and reformers and 'such like.' Not that we do not need the prophets and preachers, but that it is well to get away from them for a time."

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PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box , Honolulu.

BOARD.

Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
Report of the Board of Commissioners of Agriculture and Forestry, for the biennial period ending December 31, 1910; 240 pp.; 45 plates.
"Notice to Importers," by H. E. Cooper; 4 pp.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.

PUBLICATIONS FOR DISTRIBUTION—Continued.

"Important Notice to Ship Owners, Fruit Importers and Others. Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.

"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VII; 1904-1910. To be obtained from the Hawaiian Gazette Co., Honolulu. Price $1 a year.

DIVISION OF FORESTRY.

* "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
* "Suggestions in regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
* "Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.
"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwahiwa." Press Bulletin No. 6; 8 pp.; 1909.
"Eucalyptus Culture in Hawaii," by Louis Margolin. Bulletin No. 1; 88 pp.; 12 plates; 1911.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.
Report of the Division of Forestry, for the biennial period ending December 31, 1910. Reprint from Report of the Board; 86 pp.; 22 plates.

DIVISION ON ENTOMOLOGY.

"The Leaf-Hopper of the Sugar Cane," by R. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.
** "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and Bro. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Rule VII: "Concerning the Prevention of Distribution of the Mediterranean Fruit Fly"; unnumbered leaflet; 1910.
Rule VIII: "Concerning the Importation of all Banana Fruit, Banana Shoots or Plants"; unnumbered leaflet; 1911.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.
Report of the Division of Entomology, for the biennial period ending December 31, 1910. Reprint from Report of the Board; 70 pp.; 10 plates.

DIVISION OF ANIMAL INDUSTRY.

* "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.
* "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
* "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
* "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
* "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
"Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws, 11 pp.; unnumbered pamphlet; Revised 1910.
Report of the Division of Animal Industry, for the year ending December 31, 1905 Reprint from Second Report of the Board; 62 pp.
Report of the Division of Animal Industry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 41 pp.; 3 plates.
Report of the Division of Animal Industry, for the year ending December 31, 1907. Reprint from the Fourth Report of the Board; 104 pp.; 6 plates.
Report of the Division of Animal Industry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 44 pp.
Report of the Division of Animal Industry, for the biennial period ending December 31, 1910. Reprint from Report of the Board; 59 pp.; 13 plates.

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* Out of print.