VOL. XI. OCTOBER, 1914 No. 10

Price, 10c. Per Copy; Per Annum, $1.00; Foreign, $1.25.

THE Hawaiian Forester AND Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawaii.

ADDRESS ALL COMMUNICATIONS TO

DANIEL LOGAN,
EDITOR "THE FORESTER,"
P. O. BOX 366,
HONOLULU, H. T.

—:—

For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE CO., LTD., Publishers,
217 S. KING ST., HONOLULU, HAWAII.

TABLE OF CONTENTS.

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.

DAVID HAUGHS,
Acting 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 insects 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 by parcels post. 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 and AGRICULTURIST

VOL. XI. OCTOBER, 1914. No. 10

PUBLICITY FOR PREVENTION.

In his report for August the Territorial veterinarian returns to the subject of inefficient dairy inspection and sanitary control, in terms that add force to the editorial remarks in the September number. That 228 dairy cattle, the first lot treated in the present annual test for tuberculosis on this island, refused to react is to Dr. Norgaard "a very promising beginning," but he adds to that view the statement that "it hardly justifies the anticipation of greatly improved total results when viewed in connection with the bacterial counts of 35 samples of milk" presented in his report but withheld from publication. He says that these counts "demonstrate beyond a doubt that a large percentage of the local dairies are disregarding even the simplest sanitary methods for the production of clean milk, and it is therefore not surprising that those dairies which have not yet succeeded in stamping out bovine tuberculosis, after four years' efforts, now find the disease on the increase."

With all the warning that has been given during several months past, in the reports of the Division of Animal Industry, time ought to be about ripe for inflicting on the delinquent dairymen the penalty of publicity. Before the passage of the milk ordinance and the anti-tuberculosis campaign of the division mentioned, when the only efforts to ensure honest and clean milk for Honolulu consumers were those of the pure food branch of the Board of Health, there is no doubt that a large part of the battle, so far as it was successful, consisted in the regular publication in the newspapers of the detections and convictions of persons who sold milk that was diluted or below standard in nutritive contents. Why publicity should not be employed now against those who sell milk charged with noxious bacteria, due to unclean dairying methods, is a question that might well be taken under deliberation.

COMING KING COCONUT.

The following extracts from articles in the initial number of the Tropical Mail (London) ought to be of great interest in Hawaii, where the systematic cultivation of the coconut for commercial purposes has recently been started:

WORLD'S COCONUT PRODUCTION.

The matter which at the moment of writing engages our attention is the copious issue of books on the subject of the cultivation of the coconut. As happened in the earlier days of the rubber and other industries which have rapidly assumed exceptional importance, a number of books and pamphlets are being published upon the subject of coconuts, and many articles are now appearing thereon in the public press—all of which are "signs of the times," and are the usual forerunners and customary indicators of great activity.

These books and articles no doubt serve a useful purpose. Some of them are excellent and accurate, and from all there is to be obtained some information of value. On the other hand, we have seen statements therein which show their authors somewhat too ready to compile statistics of the world's production and European consumption, which cannot be supported by adequate evidence.

For instance, in one article the statement appeared that the world's exports of copra in 1913 amounted in value to £75,000,000 sterling, and that this did not represent a quarter of the total value of coconuts used, or, in other words, that the value of the world's coconut output exceeded £300,000,000 sterling per annum.

In another instance there is an estimate that the value of copra coming into Europe alone now represents some £60,000,000 sterling per annum.

Such extravagant estimates are misleading and to be deprecated; there is nothing to justify them. Accurate statistics as to the value of the world's production of coconuts are not available, nor are they very likely to be so for a long time, if ever.

Only very incomplete figures are available as to the production of copra, coconut oil and desiccated, but an estimate, not entirely unreasonable, formed upon these figures, leads us to put the coconut production of the world at something in the neighborhood of 6,500,000,000 nuts per annum.

Now, if we reckon 5000 nuts to go to a ton of copra, this represents 1,300,000 tons of copra, which at £30 per ton are worth £39,000,000. In addition to the copra, there are, however, to be reckoned the coconut fiber—a valuable item—and also cattle food cake and other important by-products. If the value of these

is added to that of the copra, the world's coconut production may reasonably be estimated at perhaps £50,000,000 per annum.

Whilst the world's population continues to increase, and whilst communities continue to advance towards what we have termed a "higher plane of living," the demand for and consumption of the coconut in the form of edible and industrial fats, fibers, yarns, and the many other articles, must continue to increase. There can be no limitation—the coconut is a necessity and not a luxury.

IMPORTANCE OF COCONUTS.

Perhaps the most important of many almost equally important products of the tropics is the coconut, the foundation and support of a score of great industries.

Though the consumption of coconuts has for many years been very large—and it must be noted that they form the principal food of the native populations of many of the countries in which they are grown—it has remained for recent scientific research to demonstrate the value of their products in the food and manufactures of civilized communities, and to show in what manner they may be utilized.

A mere enumeration of some of the principal of these uses and the manufactures which they support is sufficient to show how largely coconut properties enter into the every day life of the community.

Coconut butter (margarine), lard, desiccated coconut (biscuits, confections, cakes, sweets), cooking and burning oil, soap, candles, mats, matting, ropes, yarns, mattresses, cattle-food-cake, stuffing for furniture, imitation horsehair, brooms, brushes, etc.

SHORTAGE OF ANIMAL FATS.

Food must necessarily rank first in any list of articles, and among foods fat is one of the essentials for support of the human system. Hitherto the demand for this has been met by animal fats, the chief supply of which has been imported from foreign countries—the United States, etc. Of late years, however, a shortage in this supply has been manifested. This shortage is due not only to a diminution in the number of animals, but also to the fact that the countries hitherto exporting a surplus of their animal fats have so largely increased in population that they need all they can raise for their own consumption. The consequence is a serious shortage in this essential food, which is increasing and must continue to increase.

This deficiency in animal fat is filled by coconut butter, pure, scientifically prepared and free from all contamination, which we know under the name of margarine. How great a blessing mar-

garine has been to the working classes is known only by those who have mixed with them.

The housewife who has a large family to feed, and whose weekly allowance will not permit her to think of buying butter at 1s. 4d. to 1s. 6d. per lb., must yet give the children something wholesome and pure to eat; and plenty of it. If only she had an opportunity of expressing her views in this column, she would say that the greatest boon which has come to this class of the community, during the last few years, is the manufacture of coconut butter, the backbone of which is pure coconut fat.

SOME QUESTIONS ANSWERED.

Se much we have said on the subject of the commercial value of coconut products. We will now consider questions which will naturally occur to any prospective planter or investor in plantations. These probably would be:

1. What is the cost of producing 1000 coconuts?
2. What is the market price of coconuts today?
3. How many years will the coconut palm continue to yield its crop?

The answers are as follows:

No. 1. The cost of producing 1000 coconuts, on a good estate, according to reliable figures, is 25s. to 30s., varying according to local conditions. This figure includes management of the estate, and expenses of every kind.

No. 2. A fair average price, whether converted into coconut oil, desiccated coconut, or copra; or whether the nut is sold in the flesh form, is from 90s. to 125s. per 1000.

No. 3. Well-attended palms will continue to produce, on well-kept estates, for upwards of fifty years.

It is therefore easy to see that there is a net annual profit, to the owner of the plantation, of over £3 per 1000 nuts; and that the various tropical countries are taking back from the world's buyers profits in hard cash, amounting to almost £20,000,000 sterling a year.

FOOD FOR THOUGHT.

These profits furnish, without doubt, food for thought to any commercial mind of the 20th century, for, in passing, it should be noted that even in 1903-4, when the market price of coconuts was only from £2 10s. to £3 10s. per 1000 and coconut oils stood at £22 and £24 per ton, the far-seeing man, whose brain was quick enough to observe the signs of the times, gave the advice, "Invest in coconut plantations; it is a sound and good investment."

Unfortunately for many, his advice was disregarded, but today

coconuts are difficult to obtain in quantities, even at the advanced price of £5 to £5 10s. per 1000, and coconut oil has risen to somewhere in the neighborhood of £45 per ton. If in ten years science has enhanced the value of this product to an extent that seems almost incredible, it is the firm belief of farsighted men that it will do so again—and in a less space of time. Scientific investigation is keener every year, and what it accomplished between 1904 and 1914 it will do again between 1914 and 1924.

INDUSTRIES OF THE TROPICAL WORLD.

The man in the street thinks of coconuts as having no better use than being placed upon wooden pegs, at bank holiday time, for the children to knock down. It may surprise him to learn that the coconut show business in the British Isles absorbs only about 4½ millions of coconuts, value £32,000 sterling per annum, which is a small fractional part of the turnover of £50,000,000 per annum. It may therefore with justification be said that the minds of the public require some enlightenment on the subject of this industry.

USES OF SUGAR.

Sugar and molasses are said to be used in the shoe-blacking industry to a considerable extent. Soap-making finds a use for sugar in the place of glycerine. Copying ink is made of one part of sugar added to three parts of ordinary ink. * * * The walls built in this island some two centuries ago are said to have been built with some molasses put into the mortar. Even in the tanning industry and in silvering of glass mirrors, they say sugar is used. We would urge scientists to go forward and find some more uses for our staple commodity in this progressive age.—*Barbados Agricultural Reporter.*

Experiments are being made in Honolulu with molasses as a binder of broken coral in road construction, oil having been proved unsuitable for mixing with coral, although the right thing for binding other macadamizing material.

Dr. Norgaard's technical discussions of diseases of live stock —as, for instance, what he says about a horse distemper on Maui in his August report—ought to be preserved by stock raisers and owners for reference and guidance. When, as in the case mentioned, such a simple thing as the providing of pure water for stock saves the lives of valuable animals, the proverb about the "ounce of prevention" acquires great force.

Importations of thoroughbred livestock of various kinds, which appear in almost every month's report of the Division of Animal

Industry, form one tangible index to progress in the agricultural enterprises of these Islands.

It is gratifying to note the apparent success being met in establishing in Hawaii both the African and the Australian parasites of various noxious flies which were introduced last year by Dr. Silvestri, the Italian scientist. There is considerable promise on the horizon that control of such pests by natural methods will prove more than a dream of enthusiasts. The results of the present expedition of Messrs. Fullaway and Bridwell, in Dr. Silvestri's tracks, will be patiently but eagerly awaited.

Mr. Ehrhorn's flanking tactics against plant pests beat anything in the war news, and the best of it is that his reports from the battle front are incontestable. He can show his dead, either in ashes or in the vials of his museum.

Mr. Hosmer has left the superintendency of forestry in Hawaii with the proud record of having established 37 forest reserves with an area of 798,214 acres, of which 546,222 acres, or 68 per cent, are government land. This Territory lacks mineral wealth, other than limestone, but the day is coming when it can derive revenue for maintaining public services from its forests, as well as from the conservation of water which the forests aid.

More than 2000 tree plants distributed in August is keeping up the record of forest wealth creation by the Division of Forestry.

An item in the report of Superintendent Larrison for August, which is proof in advance that the Division of Hydrography stands to be classed as a reproductive government enterprise, is the promise of a readjustment of charges in water leases. The Territory will be paid for value received by the lessees, and there will be equality of treatment which will tend to make those who may have to pay higher rates than the present ones contented.

DIVISION OF ANIMAL INDUSTRY.

Honolulu, August 31, 1914.

The President and Members of the Board of Agriculture and Forestry.

Gentlemen:—I beg to report on the work of the Division of Animal Industry for the month of August, 1914, as follows:

BOVINE TUBERCULOSIS ERADICATION.

As will be seen from the appended report of the Assistant Territorial Veterinarian, a new general test has been begun, a

total of 228 dairy cattle being injected without a single reaction occurring. Though this is a very promising beginning, it hardly justifies the anticipation of greatly improved total results when viewed in connection with the bacterial counts of 35 samples of milk as herewith presented. These counts demonstrate beyond a doubt that a large percentage of the local dairies are disregarding even the simplest sanitary methods for the production of clean milk, and it is therefore not surprising that those dairies which have not yet succeeded in stamping out bovine tuberculosis, after four years' efforts, now find the disease on the increase.

In regard to the extension of the bovine tuberculosis control work to the other islands, I am pleased to state that during a recent visit to Maui I found the public disposition in regard thereto greatly improved, many milk producers having read with interest the published accounts of what has been accomplished on Oahu, and signifying their willingness to have their herds tested and to eliminate all diseased animals. The Maui deputy territorial veterinarian has therefore been supplied with 2000 doses of tuberculin and the same number of aluminum eartags, and will now pursue this work as fast as his time and opportunities will allow him. In the meantime 10,000 additional doses of tuberculin have been requisitioned from the Federal laboratories in Washington, and while notice has been received of the shipment of the same, it has not yet arrived, but will, upon receipt, be distributed in adequate quantities to the deputies on Hawaii and Kauai so that any milk producer in the Territory who so desires can have his herd tested and join the ranks of those who are helping to save human lives by furnishing non-infectious milk for the infants and children of these islands.

Appended to this report will be found a letter from the Chief of the U. S. Bureau of Animal Industry, pertaining to the bovine tuberculosis eradication work in the District of Columbia, with comments upon our work and methods here. Though the Federal authorities, with their unlimited means and facilities, have been engaged at this work for a slightly longer period than we, and though they are paying an indemnity of nearly 75% of the appraised value of all reactors destroyed, they have not yet succeeded in completely eradicating the disease, their last official record being 1.83 per cent of tuberculous cattle for the year ending June 30, 1913.

CEREBRO-SPINAL MENINGITIS IN HORSE STOCK.

During the latter part of August what threatened to be a severe outbreak of this disease was reported from Maui, and the writer, pursuant to the Board's instructions, proceeded to that island on August 31. Upon arrival it was found that six animals had died on one plantation, while one which was found in

a dying condition was destroyed for postmortem examination. The result of the latter was, as usual, negative in so far as actual pathological changes were concerned except for the presence of a number of aneurisms on the abdominal arteries, in which were found embedded the empryos of the armed wire worm (*Strongylus armatus*). The mature worm was also found in large numbers in the colon and cecum, but no trace of embryos or infarcts caused by these could be found in the brain. These intestinal and blood parasites play, in the writer's opinion, an important role as a direct, or at least a contributing cause to the appearance of that greatly-varying and complex series of symptoms in horses and mules which is most frequently referred to as cerebro-spinal meningitis, though admittedly a misnomer. As part of the life cycle of this parasite is spent in stagnant water, my efforts to prevent the repeated outbreaks of this disease have been principally directed toward the purification of the water supply on premises where the disease occurs regularly, and in a number of cases apparent success in suppressing the disease has resulted. The first rule is therefore to keep all horse stock away from stagnant water and especially to drain all water holes in the Sunday rest pastures where nearly all plantation draft animals are kept from Saturday afternoon till Sunday evening. When once infected such pastures are, however, not easily purified again, and when partly inundated by persistent rains the parasites are frequently carried to distant localities, where new centers of infection become established and a varying number of animals become infected and die. The disease is therefore always at its worst during the rainy season, making its first appearance from one to two weeks after the rains set in. In stables and yards where the water supply can be absolutely controlled much can be accomplished by filtering the water as it comes from the pipes or by said filters placed on open flumes. Medical treatment is of no use, as the embryos in the blood vessels cannot be reached by any form of medication now known to science, and our efforts must therefore be confined to prevention along the lines above indicated.

It is, however, encouraging to note that, even though it continued to rain nearly every day during the two weeks I remained on Maui, only one additional case came under observation, which fact would seem to indicate a decided diminution in the extent of the infection, possibly the direct result of preventive measures carried out during previous outbreaks or perhaps of unusual heavy downpours having washed most of the parasites to sea.

IMPORTATIONS OF STOCK FROM NEW ZEALAND.

After considerable effort permission has finally been obtained from the Secretary of Agriculture for the Parker Ranch to im-

port a number of very fine Merino rams from New Zealand via Sydney, Australia. Neither cattle nor sheep are allowed to enter the United States from any part of Australia, and as it has been practically impossible to obtain transportation for live stock from New Zealand to this Territory direct all importations from the Colonies have hitherto been barred. The Federal Department of Agriculture has, however, finally agreed to admit this shipment of fifty rams, transhipment at Sydney to be made under the supervision of the American consul at that place, the animals to be disinfected and quarantined upon arrival here. The correspondence on the subject will be found appended hereto.

ARRIVAL OF DOGS ON WARSHIPS AND TRANSPORTS.

This subject, which was discussed at length in my report for last month, is supplemented herewith by copies of the correspondence pertaining thereto. An unusually large number of dogs have arrived of late, not less than ten head during the month of August, of which number eight came on naval vessels or transports. Two of these arrived on the U. S. S. Rainbow, direct from the Philippines, in direct violation of the Federal regulations on the subject. These animals were destroyed by gas and the matter reported to Washington.

Very respectfully,

VICTOR A. NORGAARD,
Territorial Veterinarian.

REPORT OF ASSISTANT VETERINARIAN.

Honolulu, August 31, 1914.

Dr. V. A. Norgaard, Chief of Division of Animal Industry.

Sir:—I beg to submit the following report for the month of August, 1914:

Tuberculosis Control.

The following dairy cattle have been tested during the past month:

	T.	P.	C.
Dr. Hansen	6	6	0
Waialae Dairy	1	1	0
Mr. Hopper	3	3	0
P. M. Pond	124	124	0
J. A. Templeton	94	94	0

From the above tabulated list it will be seen that 228 head of dairy cattle have been tested and all passed as free from tuberculosis.

Importations of Live Stock.

August 4—Wilhelmina, San Francisco: 1 dog (collie), Dr. H. F. Hollman; 3 crates poultry.

August 5—Shinyo Maru, Orient: 1 crate mandarin ducks, S. Sheba; 2 crates Japanese games.

August 10—Enterprise, San Francisco: 4 hogs (Tamworth), College of Hawaii; 1 horse, Mr. Ogg, Hilo, Hawaii.

August 10—Manoa, San Francisco: 3 crates poultry, Mrs. F. F. Baldwin, Maui; 1 crate poultry, A. White, Maui.

August 17—Chansler, Monterey, Cal.: 3 rabbits, Mr. Henderson.

August 18—Matsonia, San Francisco: 4 crates poultry.

August 20—U. S. A. transport Dix, Seattle: 397 horses, Quartermaster's Dept.; 1 dog, taken into quarantine while the Dix remained in port.

August 24—Sierra, San Francisco: 1 dog (Airedale), N. G. McCleare; 1 crate pigeons, W. F. X Co.

August 17—Hilonian, Seattle: 275 butcher hogs, A. L. Macpherson; 2 cows (Ayreshire), Cooke Ranch, Molokai; 1 bull.

August 17—U. S. S. Alert, San Francisco: 4 dogs, officers on board.

August 25—Lurline, San Francisco: 1 Holstein bull, 2 Holstein cows, College of Hawaii; 8 crates poultry, Sing Sing Co.

August 12—U. S. A. transport Thomas, San Francisco: 1 dog, Capt. Sibley.

Respectfully submitted,

L. N. Case,
Assistant Territorial Veterinarian.

DIVISION OF ENTOMOLOGY.

Honolulu, August 31, 1914.

Board of Commissioners of Agriculture and Forestry.

Gentlemen:—I respectfully submit my report of the work performed by the Divsion of Entomology for the month of August, 1914, as follows:

During the month 37 vessels arrived at the port of Honolulu, of which 18 carried vegetable matter and one vessel sand.

Disposal.	Lots.	Parcels.
Passed as free from pests	1099	23,100
Fumigated	2	101
Burned	30	52
Returned	1	1
Total inspected	1132	23,254

Of these shipments 23,065 packages arrived as freight, 132 packages as baggage of passengers and immigrants, and 57 packages by the U. S. mail.

RICE AND BRAN SHIPMENTS.

During the month 31,397 bags of Japanese rice, 5 bags of Chinese rice and 2071 bags of Japanese beans arrived at the port. All of these shipments were carefully examined and were found free from pests.

PESTS INTERCEPTED.

Twenty-five packages of fruit and two packages of vegetables were found in the baggage of passengers and immigrants from foreign countries, all of which were destroyed as contraband. One hundred bags of corn from Manchuria were found infested with the common rice weevil and were fumigated with carbon bisulphide before delivery. Forty-two crates of California peaches were seized and destroyed, as they were badly infested with the larvae of the peach moth. One package of plants from New York was found infested with the citrus mealybug and was fumigated before delivery. Three baskets of sweet potatoes from China were infested with the sweet potato weevil and sweet potato moth and were destroyed by burning. A package of taro from the Philippines came through the mail and was returned to the shipper under the ruling of the Federal horticultural law.

BENEFICIAL INSECTS.

During the month 4200 parasites were liberated in various places. They consist of 1000 *Opius humilis* for the Mediterranean fruit fly, 2000 were the three species of hornfly parasites and 1200 were parasites of the pupa of the fruit fly and were liberated in a cucumber field to ascertain if they will attack the pupae of the melon fly. On August 11 I received three samples of ripe coffee berries from the Kona district, Hawaii, for the purpose of ascertaining how far the *Opius* parasite has spread. These samples were from Kaawaloa, Kealakekua, Kiloa and Waipanaula. From all of them was reared *Opius humilis,* the African parasite. From the Kaawaloa lot we were agreeably surprised to rear the Australian Opius (*Biachasma tryoni*). This species was liberated under a tent in the Kona section at Honaunau on June 12, 1913, and up to its appearance this month had not been observed.

HILO INSPECTION.

Brother M. Newell reports the arrival of eight steamers and two sailing vessels at the port of Hilo. Five steamers brought

vegetable matter, consisting of 271 lots and 3252 packages, all of which were passed as free from pests.

INTER-ISLAND INSPECTION.

During the month of August, 61 steamers plying between the islands were attended to and the following shipments were inspected and passed:

Plants	86	packages
Taro	776	"
Fruit	14	"
Vegetables	16	"
Total passed	892	"

The following packages were refused shipment on account of infestation or of having objectionable soil attached to the plants:

Plants	14	packages
Fruit	26	"
Total refused	40	"

Respectfully submitted,

E. M. EHRHORN,
Superintendent of Entomology.

DIVISION OF FORESTRY.

Honolulu, August 26, 1914.

Board of Commissioners of Agriculture and Forestry.

Gentlemen:—I have the honor to submit as follows the report of the Division of Forestry for August, 1914:

FOREST RESERVE MATTERS.

On August 19 Governor L. E. Pinkham and members of the Board of Agriculture and Forestry held a public hearing at the office of the board to consider setting apart certain forest land in the districts of Kipahulu and Kaupo, Maui, as the Kipahulu Forest Reserve. The object of this reserve is to insure protection of the forest on the watersheds of important streams. The total area is 10,600 acres, of which 4600 acres is government land. No opposition developing, Governor Pinkham on August 20 signed a proclamation formally creating the reserve.

At the same hearing there was also considered the setting apart of three blocks of government land along the Volcano road above Glenwood, Olaa, Hawaii, that has never been taken up for homesteading. The object is to preserve as a forest park an accessible section of the native Hawaiian forest in its primitive condition.

The block of forest above Glenwood contains 374 acres. With it is included the seven and a half acres grove of koa trees at 29 miles and the narrow strips along the Volcano road between 18 and 24 miles, reserved when the road was built to protect the forest for scenic reasons. The area of the strips, now included as Section C of the Olaa Forest Park, is 150 acres, making the area of the reserve, as a whole, 531 acres.

The forest strips lying between 13 and 18 miles were not included, for the reason that the forest on them has almost entirely disappeared. This practically constitutes a recommendation to the Land Commissioner to dispose of these strips, under the law, as agricultural land.

The Kipahulu Forest Reserve is No. 36 in the chain of Hawaiian forest reserves. With the exception of two government lands on Oahu—Mokuleia on the Waianae hills and Hauula in Koolauloa—it practically rounds out the system and completes the reservation of the areas of forest needed for the protection of the watersheds of the Territory.

The Olaa Forest Park Reserve (No. 37) is included with the forest reserves largely for administrative purposes. It is set apart for its scientific interest and scenic value, rather than for strictly economic reasons.

The total area of the thirty-seven forest reserves in Hawaii now stands at 798,214 acres. Of this, 546,222 acres, 68 per cent, is land owned by the Territory.

The blocking out and technical reservation of the forest reserve system in Hawaii is practically accomplished. The problem now and for the future is how to manage these forests so that they shall be of the greatest possible service to the people of the islands.

Forest Fencing.

An inspection of the fencing along the government trail crossing the Lualualei Forest Reserve, Waianae, Oahu, was made by me on August 6. About half the posts were then in place. The work was progressing satisfactorily.

On the same day while at Waianae, I officially notified a squatter now making use of a portion of the Waianae Forest Reserve, to move his fence back to the proper boundary of his own lot.

Early in the month the final shipment of material was made

from Honolulu for the Waiaha Spring Forest Reserve fence in North Kona, Hawaii.

Issuance of a Mountain House Permit.

During the month, under authority given by the board at a meeting held on July 22, 1914, I drew up a form of permit granting to Mr. A. M. Brown the privilege of using a small portion of the Kula Forest Reserve on Maui for a mountain house and outing camp. In return for this privilege to use the land, Mr. Brown agrees to do certain tree planting on the upper slopes of Mt. Haleakala, particularly with conifers—pines, spruces and firs—from the temperate zone, which the board wishes to try out at that elevation. The permit is for a five-year period and is non-transferable.

FENCE POST INVESTIGATION.

Through a coöperative arrangement between the Division of Forestry and the College of Hawaii, a test of locally-grown eucalypts is about to be made on the college farm in Manoa Valley, where fenceposts cut from selected trees in the Tantalus forest will be tried out under the personal supervision of Prof. F. G. Krauss, superintendent of the farm. The species to be used are *E. robusta, E. globulus, E. citriodora, E. cornuta* and *E. calophylla.*

The felling and cutting-up of the trees will be done by Division of Forestry men; the hauling and setting of the posts by the college. From time to time statements of the progress of the study will be made by Prof. Krauss and published in the Hawaiian Forester and Agriculturist. As the trees from which the posts are cut are about thirty years old, these tests ought to be of value to all owners of eucalyptus groves in Hawaii.

ROUTINE MATTERS.

In addition to the usual routine work of the month I have, as far as possible, been rounding up all outstanding matters, so as to have no loose ends when I leave the Territory on August 26 to go to my new field of work at Cornell University. A series of notes and memoranda have been prepared that will enable my successor to get in touch at once with all current work. In the meantime, until a new superintendent of forestry is appointed, Mr. David Haughs, forest nurseryman, will attend to routine work and as usual carry on the activities of the section of forest planting.

I am leaving with the president of the board a report covering the work of the Division of Forestry from January 1, 1913, to August 31, 1914, which I suggest be included in the biennial

report of the board to the next Legislature. In it, after recounting briefly the happenings of the last twenty months, I have summarized what I feel to have been the important accomplishments of the Division of Forestry during the past decade, with certain recommendations for the future. I believe the suggestions there made are pertinent and worthy of adoption.

In concluding my work as superintendent of forestry and chief fire warden of Hawaii, I wish to express to the board my cordial appreciation of the support which the forest work has always received from the several commissioners, past and present. On very many accounts I go away from the Territory with regret. I trust I may still find many occasions to be of service in Hawaiian affairs. For wherever I may be located I shall always look back with aloha to my ten years of service in Hawaii Nei.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

REPORT OF FOREST NURSERYMAN.

Honolulu, August 31, 1914.

R. S. Hosmer, Superintendent of Forestry.

Dear Sir:—I herewith submit a report of the principal work done during the month of August:

Nursery.

Distribution of Plants.

	In Boxes Transplanted.	Pot Grown.	Total.
Sold	450	87	537
Gratis	...	1575	1575
	450	1662	2112

Collections—Government Realizations.

On account of plants sold	$ 8.85
Rent of building, Nursery grounds	35.00
Half of cost of fence wire, Nahiku Homesteads	11.15
Total	$55.00

Preservation of Forest Reserves.

The sum of $125 has been deposited with the Treasurer of the Territory as a special fund for the use of the Board of Agriculture and Forestry, collected as follows:

Rent of premises at Half-way House, Tantalus, at $10 per month, April 1 to August 31, 1914	$ 50.00
For use of land, Palolo Valley, April 1 to Sept. 30, 1914	10.00
For use of land gathering ti leaf, Pauoa Valley, April 1 to September 30, 1914	25.00
Permit to cut grass, Makiki forest, at $20 per month, July and August	40.00
Total	$125.00

Tantalus Forest.

In accordance with an agreement between the Division of Forestry and the College of Hawaii, a number of trees have been cut and split into posts, the species being *Eucalyptus robusta, E. citriodora, E. calophylla, E. cornuta* and *E. globulus.* The college has agreed to test and record the durability of the different species in regard to their value as fenceposts. Two laborers were employed by us to do the cutting and splitting, and the college agreed to do the carting.

Makiki Station.

The work at this station has been principally routine and consisted of preparing and sterilizing soil, transplanting seedlings and so forth.

Honolulu Watershed Planting.

The planting of trees in the neighborhood of Sugar Loaf and Round Top is progressing and we will be able now, with the help of six additional men, to make good progress in planting the ridges and valleys lying between Round Top and the Tantalus forest. The trees already planted are doing very well and will very soon be showing above the grass and guava bushes.

Advice and Assistance.

The following in the number of requests for advice and assistance: Calls made in and around the city, 6; by telephone, 5; by letter, 6; at Nursery, 8. Total, 25.

Forest Fences.

The writer paid a visit to the Lualualei Forest Reserve at Waianae for the purpose of examining the fence just completed by J. K. Luka. The fence consists of two lines built across the reserve and running along both sides of the trail leading over Kolekole Pass. After making a thorough examination I found that the fence had been substantially built and the work done according to the plans and specifications.

The repairs to the forest reserve fence running along the mauka boundary of the Lualualei homesteads were also examined and found satisfactory. The latter were under the supervision of Mr. Alika Dowsett.

Very respectfully,

DAVID HAUGHS,
Forest Nurseryman.

DIVISION OF HYDROGRAPHY.

Honolulu, September 16, 1914.

Board of Commissioners of Agriculture and Forestry.

Gentlemen:—The following report of operations of the Division of Hydrography during the month of August, 1914, is submitted:

A comparison of the amounts paid per million gallons per 24 hours for government water under the various water licenses, has revealed the fact that there exists a wide variation in the prices paid under, apparently, similar conditions of cost of water development and application.

The data at hand cover most of the larger ditches on Kauai and Maui, and as a large part of these water license agreements terminate within the next ten years, these data should be carefully studied previous to the leasing of future water rights.

The investigation of the discharge of all ditches diverting government water is now being carried on, and it is anticipated that sufficient data will be available, when needed, to allow for an intelligent estimate of the amount of water furnished under each lease.

OAHU.

The coöperative experimental work with the H. S. P. A. Experimental Sub-station at Waipio was well started by the installation of three permanent weirs on the two main ditches which serve the greater part of the fields. These three weirs in connection with the Venturi meter at the source of supply will register the amounts furnished to and the amounts lost by seepage and

evaporation, in the two main ditches. Two steel portable weirs have been completed to make temporary measurements in the level ditches, which should show the losses incurred in this type of ditch. The actual hydrometric work will be undertaken during September and October.

Two water utilization and power investigations were started on the Kaluanui, Punaluu and Waihee watersheds.

Routine stream and rain-gaging operations and maintenance were carried on during the month, including hydrometric work in connection with the water supplies being investigated in connection with Honolulu's water supply.

The rainfall during the month continued above the average for this time of the year, in the catchment areas along the Koolau mountain range and on the windward coast. Rather exceptionally dry conditions prevailed between the Koolau and Waianae ranges and on the leeward coasts.

KAUAI.

Kauai reports that excessive rainfall conditions continue to prevail over most of the island, especially along the windward side.

Practically the entire month was used on routine stream and rainfall measurement operations in connection with the new stations recently established. A reconnaissance was made of the North Wailua and east branch of the North Wailua Stream to determine the materials needed for the new proposed clock register stations on these streams, the installation of which will put practically all government-owned water on Kauai under investigation.

A special series of measurements was made in connection with the Lihue Ice & Electric Power Co. in connection with turbine power tests.

MAUI.

During the month routine stream and rainfall measurements were made at 30 stream-gaging stations and four mountain rainfall measurement stations. The large rain gage maintained at the 1500-foot level in the Waihee Valley was visited. This gage has a capacity of 300 inches and during the period April 29 to September 1 collected 258 inches of rainfall, or a mean of 64.5 inches per month.

A section of the Honolua ditch was rated and a rating table furnished to the Honolua Ranch Co. to be used in making tests of the power plant now being established.

HAWAII.

Heavy rainfall in the vicinity of Hilo and Kamuela prevented further coöperative work for the Attorney General's department.

SEPTEMBER PLANS.

Oahu.

H. S. P. A. Experimental Station coöperative work will be carried on.

The investigation in connection with Honolulu's water supply will be extended.

Coöperative stream-measurement work for the U. S. Army, the Wahiawa Water Co., the Kahuku Plantation Co., the Laie Plantation Co., etc., will be done.

The special utilization investigations in connection with the Waihee and Punaluu streams will be carried forward.

Kauai.

Stevens clock registers will be established on the North Wailua and east branch of the North Wailua streams.

Maui.

Stream and rainfall-measurement work and general maintenance work will be done. An effort will be made to secure sufficient measurements at all new stations to warrant good ratings of these streams during the present year.

Hawaii.

Should weather conditions permit, further investigation work will be done for the Attorney General's Department in the vicinity of Hilo and Kamuela.

Very respectfully,

G. K. LARRISON,
Superintendent of Hydrography.

RHODES GRASS AND ITS INTRODUCTION INTO THE WEST INDIES.

Rhodes grass is a useful fodder plant known botanically as *Chloris Gayana.* It is a native of tropical Africa, but has been introduced into Australia and various other parts of the world. Towards the end of last year seeds of this fodder plant were imported into Montserrat, where, owing to its drought-resisting powers, it was thought that the plant would be an acquisition in the matter of providing food for live stock. Shortly afterwards, the question arose as to whether the introduction of a new species might not give rise to difficulties in regard to the control of its

spread into places where it was not required. An examination of all the more recent literature dealing with the economic value of this grass leaves little room for doubting its great usefulness, but caution must be exercised to keep it under experimental control at first until it is seen what its behavior is going to be under a new environment.

Before proceeding to deal with the economic characteristics of the plant, it may prove interesting first of all to say a few words about the distribution of the different species of this interesting genus. According to *Index Kewensis,* there are some species of Chloris which are indigenous to different parts of the tropics, but chiefly Africa. There are nine species and several varieties of the genus indigenous to Australia. In the West, there are several indigenous to tropical America, whilst *C. brevigluma* is a native of Cuba, and what is more interesting, *C. propinqua* is indigenous to Guadeloupe. In the present connection it is worth noting that the well-known West Indian grass *Cynodon Dactylon* has been described on one or two occasions wrongly as *C. maritima.*

According to the Kew Bulletin (1908, No. 1), most of the Australian species are excellent forage grasses, having a high reputation with stock owners, who know them as "Blue star grass" and "Dog's tooth star grass," as well as by other popular names. But according to the Queensland Agricultural Journal (Vol. XXVI, p. 164), it is the introduced species, *Chloris Gayana,* that has given most satisfaction. This grass has not only survived, but has grown luxuriantly through the long dry summer months, and has been regarded in many parts as a sort of nursery crop for any animals lacking in condition. In one place, the seed of this grass was sown at the rate of 2 lbs. to the acre together with 2 lbs. of *Paspalum dilatatum*—the well-known fodder grass which is gradually being ousted by *C. Gayana.* It is stated that Rhodes grass, unlike other quick-growing ones, is relished at all stages of development by stock, and does not deleteriously affect dairy products. It has proved a wonderful grass for resisting drought, and will grow and remain green when all other grasses, natural and artificial, are burnt up. It requires a less rich soil than *Paspalum dilatatum.* When harvested, it has an aroma that is not easily defined—very strong, but not unpleasant. It is said to make good chaff, especially when mixed with lucerne. In one trial, the yield per acre of hay was at the rate of 5 tons 7 cwt.

The comparative feeding values of the two grasses are discussed in the Agricultural Gazette of New South Wales (Vol. XXII, p. 238), where it is regarded as established that Rhodes grass has a greater nutritive value than Paspalum grass, being richer in protein and poorer in crude fiber. In this account it is mentioned incidentally that *C. Gayana* has a creeping stem which roots at the joints, but in a thick stand the stems are upright. This power to

percennate must be borne in mind in any considerations bearing upon the danger of this plant in the West Indies as a weed. At the same time the undoubted nutritive value and great drought-resistant powers of the grass are not likely to make its spread undesirable on stock farms.

In Florida and the intermediate region of America a good hay grass has long been a desideratum. It is stated in the Annual Reports of the Department of Agriculture of the United States, 1912, that Rhodes grass, secured from Africa, promises practically to solve the hay question for that portion of the South. Field tests of Rhodes grass are being conducted in Florida in order to determine its climatic and soil requirements and the yield of hay which may be expected. One field of 20 acres has been established near Brookesville, from which results on a commercial scale are expected. This plant has also been introduced into Arizona, where it promises to give much satisfaction, and it is understood that it is also being tried in Porto Rico. The results of these experiments will be awaited with interest.

Whilst discussing forage crops, it may not be out of place to conclude this article with a few remarks concerning other drought-resisting grasses, which have attracted much attention during the last few years. In the Monthly Bulletin of Agricultural Intelligence and Plant Diseases (June, 1913), a note says that Teff (*Eragrostis abyssinica*) was introduced into the Transvaal in 1903, and has since proved itself a complete success, and is fast becoming a staple hay crop throughout civilized Africa, its qualities being palatability, high nutritive value, heavy yield, rapid growth, drought resistance, and ability to smother weeds. Another well-known grass, namely, Soudan grass (*Andropogon halepensis*), is reported in the same journal for July, 1913, to have been imported into the United States from Soudan in 1909. This grass yields well, especially in dry seasons, and the fodder is much appreciated by stock.* The last grass to which we invite the reader's attention is known as Elephant grass or Napier's fodder (*Pennisetum purpureum*). The cultivation of this plant is described in the Monthly Bulletin of Agricultural Intelligence and Plant Diseases (November, 1913). It has proved a very drought-resistant and heavy-yielding fodder crop in Rhodesia. Owing to its succulent character and coarseness of stem it does not make good hay, but as green fodder for stall-fed animals, it can hardly be excelled by any other crop in Rhodesia. In damp situations, where water is liable to stand, it wilts, and is then best replaced by Paspalum, or

---

* A word of caution, however, is here necessary. *Andropogon halepensis* is synonymous with *Sorghum halepense* (Johnson grass)—a plant which when introduced into many places has eventually become for a time uncontrollable as a weed, and has only been eradicated after much difficulty and expense. Drought-resisting grasses are not always unmixed blessings.

by Rhodes grass. In dry situations or in cold localities, it is much to be preferred to sugar cane, and will give better results both in weight of fodder and in food value.—The Agricultural News.

THE SPELLING OF "COCONUT."

The Editor of the Tropical Agriculturist.

Dear Sir:—The following from the Ceylon Morning Leader will prove of interest to your readers:—"The Spelling of 'Coconut.'—Sir Everard im Thurn, speaking at the Royal Horticultural Society, said the nut now known as 'coconut' was similar to the face of a monkey, and so the Spanish word 'coco,' meaning a grin or grimace, was attached to it. When Dr. Johnson was writing his famous dictionary he had an article on the 'Coconut,' but a careless proofreader passed a mistake in the spelling of the word, the compositor having inserted an 'a' and the word appeared as 'cocoanut.' This spelling became general, but the nuts are now known as 'coconuts,' 'kokernuts,' and 'kokers.'"

The present universal spelling "coconut" is rightly claimed to have originated with the Tropical Agriculturist, and the general adoption of the spelling, dropping the extra "a," has materially assisted in establishing the spelling in newspapers and magazines all the world over—the more recent but illogical American "kokers" and "kokernuts" notwithstanding; as this form not only gives a longer sound to the word than is otherwise given it, but would appear to the average reader an entirely new product.

But there are other relative forms of spellings which are often confusing and misleading—not variations regarding one article, but various articles being known by similar names. This fact deserves the serious attention of experts, who should agree to adopt names that would avert confusion.

I refer to the "Cocoa" as still to be seen in the writings of an older generation before *nut* in referring to the Coconut (*Cocos nucifera*); "Cocoa" and "Cacao" meaning the "Chocolate fruit"—as is often heard in the streets of Colombo and occasionally at Peradeniya on passenger days—(*Thebroma, Cacao*); and "Coca" (*Erythroxylon coca*).

Mr. O. W. Barrett, I think, it was who in the course of a treatise on the subject stated that in dealing with *Cacao* from an agricultural and botanical point of view he would leave the manufacturer to deal with "Cocoa"—indicating the origin of the irregular form.

Now that we have "Coconut" fixed and in universal use, and "Coca" not being likely to change, will it not be more in keeping with science to do away with "Cocoa" altogether and substitute the more correct form "Cacao," which will leave three articles that are at present often confused with one another, on separate

forms of spelling and pronunciation, with the least possibility of confusion?

I suggest the Tropical Agriculturist give the lead in adopting *Cacao* as the proper spelling, so that we may have:

Cacao (*Theobroma, cacao*),
Coca (*Erythroxylon coca*),
Coconut (*Cocos nucifera*).

Yours faithfully,

J. S. DE SILVA.

[Our correspondent is not quite correct in stating that *Coconut* is the universal spelling. Probably the vast majority of people spell the word with an *a*. Turning up the Stores List we find "Cocoanut biscuits," "Cocoanut oil"; and confectioners and traders throughout the United Kingdom would spell the word in the same way. Again, while *Coconut* is probably more correct, *Cocoanut* is certainly not incorrect. Thus the Century Dictionary after an exhaustive explanation of the origin of the two forms of spelling adopts *Cocoanut* in the text. Nor are we prepared to scrape the word *Cocoa* especially as *Cacao* is generally mispronounced. Indeed, if we are to come to origins, the ultimate criterion after all of what is correct, *coconut, cocoanut, cocoa, cacao* would all go overboard as designations of trees. The coconut palm was at one time called the *cocoa-tree;* cocoa or cacao, whichever is preferred, the *chocolate-tree,* and is so called now in some countries.—Ed. T. A.] — Tropical Agriculturist (Ceylon).

BANANAS.

The experiments of R. G. Bartlett in Ceylon, in the way of manuring bananas, show that potash is the esential portion of a banana manure, manures wanting in this agent being of little or no good. Mr. Bartlett advocates the manuring of virgin land. The manure he found to give the best results financially consisted of 4 lb. of dried blood, 2 lb. sulphate of potash, and 2½ lb. superphosphate per stool.—*Wealth of India.*

PASSING OF THE HORSE.

"The horse (says the *Pinang Gazette*) has played an important part in the world's affairs, and from a purely sentimental point of view, it is difficult to regard his passing without some feeling of regret. But sentiment has to be stifled in these commonplace days, and it is a cold irrefutable fact that the introduction of machine power is so much appreciated that it will soon be time to consider whether horse traction, with its incurable, objectionable conditions attaching it, should be permitted at all in cities and

towns. We in Pinang have no reason to deplore the passing of the horse," to which we would add, neither should the growers of coconuts. The passing of the horse is creating new demands from old-established industries for substitutes for horsehair. Incidentally, coconut fiber is fast taking the place of horsehair for the stuffing of chairs, omnibus, railway and other seatings, and bedding mattresses, and is found to be a cleaner and more wholesome, germ-proof article, with equal resiliency.—*Tropical Mail.*

UNRECOGNIZED LUXURIES.

It is astonishing how little is known in England of any fruits outside a very limited selection. Yet there are a large number of excellent fruits which, if the public taste could only become familiarized with them, would become popular and important items in tropical imports.

There are few fruits which surpass in exquisite flavor the mango, such as may be got in Bombay and other parts of the eastern tropics. Difficulties of carriage of this rich, juicy fruit have perhaps chiefly interfered with its introduction into European markets, but once let its merits be appreciated by the public and these difficulties would not prove insuperable.

The mangosteen, again, is a most delicately flavored fruit—the cherimoyer of Peru, a species of anona, as is also another species of the same fruit, the sugar apple.

The avocado, or alligator pear, which grows in many ranches in tropical America—the chico or sapodilla; the guava; the roselle and the papaw (papaya), a large fruit not unlike a melon.

All these and many other fruits, varied in character and flavor, are well worthy of attention on the part of the European gourmet.

Bananas are every year more in evidence in the London markets, and will grow still more in public estimation as their mode of ripening becomes better understood. Today they are only too often eaten in a half-ripe condition, their appearance when perfectly ripe being misunderstood for one of decay.—*Tropical Mail.*

THE FOOD OF THE PEOPLE.

It would be difficult to imagine a foundation for investment more sure, more permanent and more steadily remunerative than that of the food of the people. Under pressure of urgent necessity or misfortune many articles of daily use might be dispensed with, but food is indispensable. And food is one of the chief products of the tropics in which investment is invited—butter, lard, confectionery, cocoa, coffee, fruits, etc.

Second only in importance to food are a number of articles intimately associated with our daily life, which may almost be

called necessities of civilization. Soap, candles, mats, mattresses, ropes, yarns, food for our cattle, stuffing for furniture and other things. All these are manufactured, in the best and yet cheapest form, from products of these same countries.—*Tropical Mail.*

"In China," says the Barbados Standard, "a man who killed his father has been executed, and along with him his schoolmaster, for not having taught him better!"

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

COMMISSIONERS.

Albert Waterhouse, *Acting President and Executive Officer.*

J. M. Dowsett
H. M. von Holt
Arthur H. Rice
Walter M. Giffard

DIVISION OF FORESTRY.

——————, *Superintendent of Forestry and Chief Fire Warden.*
David Haughs, *Forest Nurseryman and Acting Supt. of Forestry.*
Joseph F. Rock, *Consulting Botanist.*
Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*
Walter D. McBryde, *in charge of Sub-Nursery at Homestead, Kauai.*
David Kapihe, *Forest Ranger for Tantalus.*

DIVISION OF ENTOMOLOGY.

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Plant Inspector.*
D. B. Kuhns, *Plant Inspector.*
Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

E. Madden,	*Honorary Plant Inspector at*	*Mahukona, Hawaii.*
W. O. Aiken,		*Kahului, Maui.*
W. D. McBryde,		*Koloa, Kauai.*
Dr. W. B. Deas,		*Hana, Maui.*
Capt. C. F. Turner,		*Kaanapali, Maui.*
G. C. Munro,		*Manele, Lanai.*

David T. Fullaway, *Field Entomologist.*
J. C. Bridwell, *Asst. Field Entomologist.*

DIVISION OF ANIMAL INDUSTRY.

Victor A. Nörgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
L. N. Case, *Assistant Territorial Veterinarian.*
H. B. Eliot, *Deputy Territorial Veterinarian for Hawaii.*
J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
A. R. Glaisyer, *Deputy Territorial Veterinarian for Kauai.*

DIVISION OF HYDROGRAPHY.

G. K. Larrison, *Superintendent of Hydrography.*
J. C. Dort, *Engineer in Charge, Kauai, Headquarters at Lihue.*
C. T. Bailey, *Engineer in Charge, Maui, Headquarters at Wailuku.*
H. Kimble, *Engineer in Charge of Construction, Oahu.*
H. A. R. Austin, *Junior Engineer, Oahu.*
E. E. Goo, *Clerk.*

CLERICAL STAFF

Mrs. A. Oram, *Stenographer and Librarian.*
Mrs. C. L. Seybolt, *Clerk.*
Daniel Logan, *Editor of the "Forester."*

Board of Agriculture and Forestry

PUBLICATIONS FOR DISTRIBUTION.

The Board of Commissioners issues for general distribution to persons in the Territory, annual reports, bulletins, circulars, copies of its rules and regulations, and other occasional papers, which may be had, free, upon application.

A complete list of the publications of the Board available for distribution (together with the titles of certain issues now out of print) is to be found on the cover of the last biennial report.

Applications for publications should be addressed to the Mailing Clerk, P. O. Box 207, Honolulu, Hawaii.

DIVISION OF HYDROGRAPHY.

Rooms 20-22 Kapiolani Bldg. Tel. No. 3662.

The Division of Hydrography has on hand free publications relative to the water resources of the Hawaiian Islands. These publications furnish detailed data as to daily, monthly, mean, maximum, and minimum run-off of streams and ditches, and also cuts and maps pertaining to the different islands. Much descriptive data relative to the mountain ranges and physical configuration of each island are also contained. These publications will be mailed free of charge on request.

The United States Geological Survey topographic map of Kauai is also on sale, and copies will be mailed on receipt of 50 cents.

The records and maps of this division are available for inspection by any one who desires information relative to water resources, topography, etc. Blue print copies of hydrographic data relative to any stream, ditch, spring, etc., which may be under observation by this division will be mailed free of charge on request.

This division will also make ditch seepage losses and utilization investigations when the actual cost of the labor, materials, subsistence, transportation, etc., of such investigations is paid by those benefited.

G. K. LARRISON,
Superintendent of Hydrography.