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COMPLIMENTARY REMOTE STORAGE

Jacob Kotinsky
ISSUED MARCH 11, 1909.

TERRITORY OF HAWAII
BOARD OF AGRICULTURE AND FORESTRY

DIVISION OF ENTOMOLOGY
JACOB KOTINSKY, SUPERINTENDENT

REPORT
OF THE
DIVISION OF ENTOMOLOGY

FOR THE
YEAR ENDING DECEMBER 31, 1908

REPRINT FROM THE FIFTH REPORT OF THE BOARD OF
COMMISSIONERS OF AGRICULTURE AND FORESTRY



HONOLULU:
HAWAIIAN GAZETTE CO., LTD.
1909

OFFICERS AND STAFF

OF THE

Board of Commissioners of Agriculture and Forestry

1909

COMMISSIONERS

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DIVISION OF ENTOMOLOGY

JACOB KOTINSKY, *Superintendent of Entomology
and Chief Inspector.*

A. KOEBELE, *Consulting Entomologist.*

....., *Assistant Entomologist.*

D. B. KUHN, *Inspector's Assistant.*

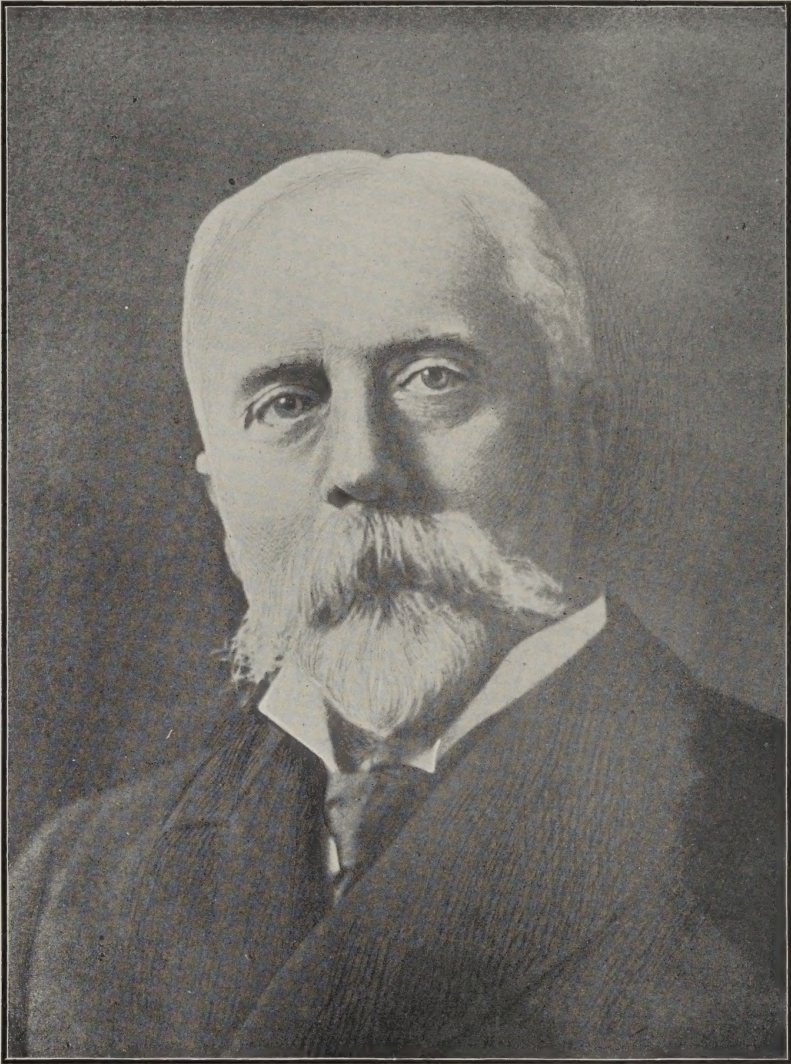
B. M. NEWELL, *Fruit and Plant Inspector at Hilo, Hawaii.*

ROBT. R. ELGIN	} <i>Fruit and Plant</i>	} <i>at Mahukona, Hawaii.</i>		
W. O. AIKEN			} <i>Inspector.</i>	} <i>at Kahului, Maui.</i>
W. D. MCBRYDE					} (Honorary)	} at Koloa, Kauai.

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 of depredation, 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. It is always desirable to have letter accompany specimens. Whether or not specimens are 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 331, HONOLULU, HAWAII.

JACOB KOTINSKY,
Superintendent of Entomology.



Alexander Crow

AUGUST 3, 1850

JUNE 28, 1908

TERRITORY OF HAWAII
BOARD OF AGRICULTURE AND FORESTRY

DIVISION OF ENTOMOLOGY
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THE UNIVERSITY OF ILLINOIS
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[Abstract from REPORT OF COMMISSIONERS OF BOARD OF AGRICULTURE AND FORESTRY for this year pp. 1-2, 4-6 and 8].

PUBLICATIONS.

The publication of *The Hawaiian Forester and Agriculturist* as the official organ of the Board has been continued during 1908. The magazine is edited by Mr. Leopold G. Blackman and is published by the Hawaiian Gazette Company. It contains the official reports submitted by various members of the Board's staff and special contributions dealing with Forestry, Entomology, Animal Industry, Horticulture and General Agriculture. The articles are written with direct reference to Hawaii and contain much that is of value to those interested in these subjects. The volume for 1908 (Vol. 5) contains 364 pages. Many of the articles are illustrated. The subscription price is one dollar a year.

There have also been issued during the year the following publications:

A circular (unnumbered) of the Division of Animal Industry entitled "Rules and Regulations pertaining to the Inspection and Testing of Live Stock intended for Importation from the Mainland of the United States to the Territory of Hawaii."

This circular contains the various regulations that became effective January 1, 1908, and other matter relative to the importation of live stock into Hawaii. This circular was issued January 25, 1908. One thousand copies were printed for local and mainland distribution.

On July 31, 1908, the Governor approved Rule 8 of the Division of Animal Industry, relating to the quarantine of horse stock arriving from or through the State of California. This was printed as an unnumbered leaflet and generally distributed.

General Circular Number 3 of the Board, entitled "Law and Regulations pertaining to the Importation and Inspection of Honey Bees and Honey Into the Territory of Hawaii," was issued on October 8, 1908. Five hundred copies were printed.

DIVISION OF ENTOMOLOGY.

The late Superintendent of this Division, Mr. Alexander Crow, became seriously ill the previous October. In the hope that recuperation on the Mainland would restore his health he sailed hence on February 19 under leave of absence. But he failed to rally and died on June 28. The following resolution, presented by the President, was adopted by rising vote of the Board and an illuminated copy sent to the widow:

"Whereas, The Commissioners of Agriculture and Forestry of the Territory of Hawaii have sustained a great loss in the death of Alexander Crow, Superintendent of the Division of Entomology;

"And, Whereas, The efficient manner in which he administered the duties of his office, has won the respect of all and resulted in lasting benefit to the agricultural interests of Hawaii;

"And, Whereas, By his genial and kindly manner he had endeared himself to his associates and all others with whom he came in contact;

"Therefore, Be it Resolved, That the Commissioners of Agriculture and Forestry extend to his widow their sincerest sympathy in her great bereavement, and that a copy of these Resolutions be spread on the minutes and be engrossed with the signatures of the Commissioners and presented to her.

His photograph (Frontispiece) and Biographical Sketch, by Jacob Kotinsky, are herein reproduced by courtesy of the Hawaiian Entomological Society from its Proceedings, Vol. II, No. 1, pp. 24 and 25, October, 1908:

BIOGRAPHICAL SKETCH OF ALEXANDER CRAW.

BY JACOB KOTINSKY.

"With the death of this remarkable man passes away another prominent figure from the horizon of American horticulture and economic entomology. Few economic entomologists are better known and no one more favorably than was he during his life work. Few entomological workers passed through California without seeking out and making his personal acquaintance, and all were charmed with the man. His unvarying amiability has won for him a lasting abode in the heart of every one that knew him. By early training a capable and successful horticulturist, his indomitable love for plant life later led him to form the vanguard of a fight against horticultural enemies on a scale that was never undertaken before.

"Alexander Crow was born in Ayr, Scotland, August 3, 1850. In 1873 he emigrated to California and after a two years' residence in San Diego, moved to Los Angeles, where he took charge of the famous Wolfskill orange grove. His early training stood him in good stead in the early days of California's growth as a horticultural center. His authority in matters horticultural was never questioned and his advice ever eagerly sought. Presently *Icerya purchasi*, which had preceded his arrival in California by about five years, threatened the destruction of the citrus industry. It is difficult to determine at present who started the movement which culminated in the introduction of *Novius cardinalis* from Aus-

tralia into California by Albert Koebele in 1888. But it is certain that Mr. Craw was a powerful factor in that movement. Never in our conversation in the office did he credit himself with the conspicuous role, yet it is quite evident to me that his constant agitation of the matter before the California horticultural organizations, and the incessant pressure he brought to bear by means of these upon authorities in Washington, was to a considerable degree responsible for Koebele's victorious mission. Once victory was achieved and that so completely and in such an unusual manner he was possessed with the idea of controlling all horticultural insect pests by means of their natural enemies.

"About 1890 he was prevailed upon to accept the office of inspector and entomologist under the California State Board of Horticulture, a line of work not previously undertaken anywhere and in which he spent the remainder of his life. Always kindly yet always firm in the performance of his duty he stood for fourteen years like a rock at the Golden Gate and jealously guarded his adopted state from horticultural pests of the world. All opposition he swept aside with a smile, without making a foe or losing a friend. He was a keen observer, so that in 1891 we find him not only familiar with the common garden and orchard pests, but describing a species of his favorite group, Hymenoptera Parasitica (*Coccophagus (Aspidiotiphagus) citrinus*, Bull. 57, California State Board of Horticulture, 1891). His writings are not profuse, and are confined almost entirely to periodical reports in which he aimed principally to enlighten his horticultural readers on their insect problems as he viewed them. In Bull. 4, Tech. Ser., Division of Entomology, U. S. D. A., he published a list of the Coccidae which he found in course of inspection at San Francisco. A number of species and varieties named *Crawii* may be observed in catalogs of this family.

"In 1904 he was induced to enter the service of the Hawaiian Board of Agriculture as Superintendent of Entomology and Inspector. This office he filled in the same efficient manner that he had carried on the work in California, proving of great benefit to Hawaii in the exclusion of dangerous insect pests, and resulting in a better quality of fruits and vegetables being shipped here. His devotion to duty had the better of discretion, so that when on October 11, 1907, he was overtaken by the serious illness which on June 28, 1908, terminated his life, it was largely the result of overwork."

Mr. Jacob Kotinsky, the Assistant Entomologist, was in August temporarily and in September permanently appointed Superintendent of the Division. No Assistant Entomologist to succeed Mr. Kotinsky has yet been appointed. The Inspector's Assistant, Mr. G. A. Jordan, resigned August 15, and Mr. D. B. Kuhns was

appointed in his place. The balance of the staff remains as before.

Inspection of imported fruits, plants and vegetables is as heretofore the principal work of this Division. Three hundred and forty-five vessels were boarded for inspection, and in the baggage, freight and mails traced and examined 143,822 packages. Because of a variety of insects and diseases 3,437 packages were ordered returned, 566 fumigated or otherwise treated before releasing, 47 refused landing and 198 destroyed.

Early in the year Mr. A. Koebele sent a variety of scale bug enemies from Mexico, which were bred and at least two of them promise results. Later, by arrangement with the Hawaiian Sugar Planters' Association, and the Hawaiian Live Stock Breeders' Association, Mr. Koebele was detailed to Europe in search of natural enemies of the horn fly. He has sent a number of lots which are being looked after by the Hawaiian Sugar Planters' Association entomologists.

As heretofore the Division has supplied information by letter and word of mouth upon injurious insects and diseases, and no request for a professional visit was denied. As a citizen, while consulting the Entomologist, said: "This is an institution for the people and I mean to make use of all such institutions." The Board reiterates its invitation to interested persons to freely consult the officers of this Division whenever necessary.

DIVISION OF ENTOMOLOGY.

Report of Superintendent of Entomology.

BY JACOB KOTINSKY.

Honolulu, Hawaii, December 31, 1908.

Honorable Board of Commissioners of
Agriculture and Forestry of the
Territory of Hawaii.

GENTLEMEN:—I have the honor to present herewith the Fifth Report of the Division of Entomology covering the calendar year 1908.

STAFF.

Superintendent. The Division sustained severe loss in the death of its Superintendent, Mr. Alexander Crow, on June 28, 1908. He fell ill the preceding October and, failing to improve, he sailed by your leave for San Francisco on February 19 in hope of recovering his health. But contrary to hope he failed to rally.

Consulting Entomologist. Mr. Albert Koebele, I am happy to say, is in the service of the Board in capacity of consulting Entomologist, as heretofore.

Assistant Entomologist. During Mr. Crow's illness the writer attended to the work of inspection and shortly after his death was appointed to succeed him. The position of Assistant Entomologist thus made vacant still remains to be filled.

Inspector's and Other Assistants. By your leave the recent Inspector's Assistant, Mr. G. A. Jordan, spent three months in the Orient. During his absence he was substituted by Mr. R. W. Smith. Mr. Jordan having resigned August 15, Mr. D. B. Kuhns, a graduate of the Normal School and an ardent naturalist was appointed to the position. His very faithful service during the shortage of help is of inestimable value to the work of inspection. During several emergencies we employed temporarily, for a day or a day and a half at a time, an outsider

to aid in the clerical work in course of inspection of heavy cargoes. There were no other changes in the staff except that Bro. M. Newell was promoted commensurate with the scope of his work. The roll of our honorary inspectors, consisting of Messrs. R. R. Elgin at Mahukona, Hawaii; W. O. Aiken at Kahului, Maui; and W. D. McBryde at Koloa, Kauai, remains intact and ready to serve when occasion requires. Miss Ella K. Dayton is still clerk and stenographer of the Division, and her faithfulness to duty has not diminished.

ACKNOWLEDGMENTS.

We cannot pass on without making due acknowledgment for assistance given by several individuals and institutions. To the Division of Entomology and Plant Pathology of the Hawaiian Sugar Planters' Association Experiment Station, and especially to their respective directors, we are indebted for identification of material and repeated advice on matters pertaining to their respective specialties; to Dr. L. O. Howard and staff of the United States Bureau of Entomology for identification of material; to Major Casey for a similar service on several Coleoptera; to Mr. D. L. Van Dine for generously undertaking the onerous work of bee inspection; to Dr. E. V. Wilcox for cooperation in quarantine and advice on inspection method and policy; to the Public Works Department for the use of horse, and other favors; last but not least for the numerous courtesies and favors of vital importance to this Division received from United States Customs, Immigration and Postal officials of all grades from the respective chiefs down, and finally to steamship and agency officers the thanks of this Division are due.

LINES OF WORK.

As hitherto the work occupying most of our attention and time pertained to INSPECTION of live vegetable matter coming from abroad. We did not neglect BREEDING AND DISTRIBUTION OF USEFUL INSECTS and what laboratory work was most important. This was necessarily curtailed and fragmentary owing to the absence of a functioning Assistant Entomologist. Nevertheless, as will appear later, this end of the work was not without result. When requested, visits were made to gardens in and out of town and advice on methods of combating injurious insects was always freely given. We are also charged with the duty of collecting and delivering to destination what useful insects arrive from abroad.

INSPECTION, QUARANTINE AND DISINFECTION OF IMPORTED VEGETATION.

RECORDS. By means of a series of printed blanks specially devised for the purpose we are now able to keep accurate record of all vessels we board and cargoes we inspect. Each article under each consignee mark is checked and noted to indicate in no mistakable way the disposal of it and the causes thereof. These data are systematically arranged and kept on our permanent files ready for reference at short notice. By means of "Inspectors' Lists" printed in quantity, and freely distributed among importers who, in accordance with our law, are obliged to supply required data, we are able to keep strict watch of imports with regard to variety, origin and state of freedom from pests. Incidentally we keep record of imports of fruits and vegetables so that we are able to get good insight into the amounts of these consumed by the people of the Territory. If to these data we attach prices we get an approximate idea of our annual green good bill. (See p. 114.)

INSPECTION TABLE. By means of the following table the quantities inspected, released with and without treatment, ordered returned or destroyed and the pests responsible for adverse treatment are shown in concise form.

TABLE I.—MONTHLY, TOTAL AND AVERAGE OF QUANTITY INSPECTED AND MANNER OF DISPOSAL.*

Month 1908	Number of Vessels	Parcels Examined and Action Taken												
		Refused landing	Dipped in Bordeaux	Dipped in Formalin	Destroyed	Fumigated	Fruits returned	Potatoes returned	Passed as free from pests	Total	Fruits and Vegetables	Plants	Seeds	Number of lots inspected
January	27	1				14	100	8726	8840	8818	17	5	357	
February	26		3 cases (5000) Asparagus roots for rust. Also all plants from Florida and Manila.		19	150	7615	7802	7802	7711	64	27	320	
March	36				25	797	12411	13248	13248	13089	115	40	593	
April	31				3	100	8306	8409	8409	8357	7	43	222	
May	34					3	10612	10697	10697	10560	41	41	921	
June	31					33	6589	6641	6641	6601	12	12	512	
July	30					12	9920	10065	10065	10013	28	24	675	
August	29					76	11042	11154	11154	11103	23	23	520	
September	25					183	13163	17897	17897	17821	50	26	808	
October	21					394	16658	16772	16772	16710	40	22	577	
November	25					532	13150	14037	14037	14019	18	18	608	
December	30					115	16439	17460	17460	17302	35	35	793	
Total	345					509	2388	145022	145022	142104	634	296	5916	4
Average	29					43	199	11219	11919	11842	53	25	576	18

* This does not include our inspector's work at Hilo. Owing to lack of proper blanks no adequate records were kept there until the last few months of the year, and these were not included. This applies to Table II as well. These tables do include, however, all vegetable cargo brought for Maui and Kauai.

**SUMMARY
OF TABLE.**

It will be gleaned from this table that on an average we boarded a vessel nearly every day of the year, and found matter for inspection on nearly two-thirds of them. Seeds, plants and fruits were traced in the mails, baggage and freight. On an average 576 lots were inspected each month. A lot varies from one parcel to hundreds, but no lot is passed upon before at least one parcel is inspected, often two or three, and in nearly every case of plants, each individual plant is examined most scrupulously. The total number of parcels examined is enormous and would be incredible, were it not known that they were examined by lots. These figures would doubtless be much more interesting and instructive if it were possible to compare them with similar tables.

**SCABBY
POTATOES.**

As will be seen by reference to the table a large quantity of potatoes (2,388 sacks) was returned this year, all owing to scab and soil. In all this pest was held up seventeen times during the year. Potato scab (*Oospora scabies*) is a fungus disease affecting potatoes, beets, etc., giving the skin a rough, corky appearance, ultimately rotting the affected tuber. Practically all of the potatoes that come here from California are either so-called "Rivers" or "Salinas." The latter are more expensive but have thus far always been found clean and free from scab. The "Rivers" are so-called because they are grown in wet river-bottoms where unfortunately the growth of scab is also promoted so that most of these potatoes coming here are dirty with the adhering soil and very scabby. Their seeming cheapness is their only excuse, but even this is questionable as what is left of the tuber, after soil and scab are removed, costs no less than clean potatoes. What is worse, under the impression that any potato will do for seed, many of our citizens wishing to plant usually select the most scabby tubers for the purpose, thus inoculating the soil and spoiling their chances for getting a paying crop for years to come.

On these grounds it was deemed advisable to order returned all excessively infested and soil-covered "spuds." Such potatoes often come on consignment, i. e., are sent here by San Francisco shipping commissioners on speculation and, in the event of failure to pass inspection, pay the return freight.

**GREEDY
SCALE.**

The quantity of fruit returned is also rather considerable and is largely due to the presence of this scale bug (*Aspidiotus rapax*) on apples. Pears and lemons are also included in the number returned on account of this scale. On the lemons we found purple and San Jose scales (*Lepidosaphes beckii* and *Aspidiotus perniciosus*) in addition. Altogether this pest was held up twenty-six times in course of the

year. Citrus fruits, on the other hand, were, on the whole very clean last year owing probably to the good influence of the California Citrus Union.

The greedy scale, as its name implies, is a very omnivorous insect. In the sections of California invaded it feeds on a large variety of plants and is quite injurious to fruit trees. It occurs also on these islands and thrives especially at higher elevations where it is destructive to a number of native trees of great economic value, such as Koa (*Acacia koa*) and Ohia (*Metrosideros polymorpha*). An additional supply of the pest can scarcely be beneficial. In view of the large quantities of these fruits imported it does not take many bugs to the apple to mount up in the thousands. In one instance within little over a month we were obliged to refuse admission to two large lots of apples sent from the same orchard in California. To the growers' complaint of our action we replied explaining our strict law. Following is a copy of their reply:

“....., Cal., December 3, 1908.

Mr. Jacob Kotinsky,

Honolulu, T. H.

Dear Sir:

Your letter of 18th ult. to hand, and contents carefully noted. In reply, we wish to thank you for your prompt reply and for your views in the matter of shipping fruit into your Territory. We understand that you are doing your full duty when attending to this business for your Territory, and we cannot blame you for enforcing the laws of your people. We believe that you are doing only what is your duty in the matter of inspecting fruit which is shipped to your city.

We will be very careful in selecting our fruit when we are shipping again to Honolulu and see that there is nothing shipped but first class fruit which is free from all insects and diseases.

Thanking you for your kind reply to our letter, we beg to remain,

Yours very truly,

(S).....”

**CABBAGE MAGGOT
IN TURNIPS.**

Very few lots of turnips passed muster last year, twelve having been condemned owing to infestation by cabbage maggot (*Phorbia brassicae*) and thick mats of soil on roots. To our knowledge this maggot has not yet been observed here and it is wisely kept out. Whenever soil alone was the fault soil being one of the prohibited articles, it was removed before releasing the roots. Various forms of the fly were so uniformly present on imported turnips during the last six months and their condemnation was equally so regular that shipments of this vegetable have practically ceased. The head ends of one lot of horse-radish roots were found infested with the same or a similar fly, and accordingly cut off and destroyed.

SOIL.

Soil is one of the most dangerous importations as a source of agricultural pests. It needs but be mentioned that our pernicious Japanese beetle (*Adoretus umbrosus*, var. *tenuimaculatus*) came to us hidden in soil in pots of imported plants. With this knowledge constantly in view we kept strict watch over imports of this article whether it came by the ship-load as ballast or in clots about roots of uncleaned vegetables, and especially about roots of growing plants. Unless free from pests beyond the shadow of a doubt the soil was removed and thrown into the fire. Some plants may have suffered in consequence, but severity was deemed wiser than to jeopardise our agricultural interests.

**FUNGUS INFESTED TARO,
SWEET POTATOES AND
YAMS FROM THE ORIENT.**

After careful survey of the situation we realized that, unless new arrangements are made, we will be unable to give the careful examination to vegetation from the Orient that is accorded matter coming from the other side. For a knowledge of the vegetable portion of the cargo the inspector until then depended upon a list supplied by an officer aboard ship or on a perfunctory examination of suspicious looking containers. The manifest, from which the ship's officer compiled the list for us, most often has matter subject to our inspection lumped under "Merchandise" along with other irrelevant objects. After consultation with the customs brokers we found them willing to prepare for us itemized statements copied from the invoice and the thanks of the service are due them for it. Armed with itemized lists we are able to make careful examination of each cargo, lot by lot. But owing to apparently inflexible regulations of the customs service we cannot make this examination before the stuff has entirely passed out of federal jurisdiction, so that we are obliged to spend an excessive amount of time on these cargoes in waiting for our turn. But

the condition of these imports as we found them upon careful inspection fully warrants this expenditure. Taro, sweet potatoes and yams were found in the majority of cases badly diseased. A plant pathologist was consulted and he confirmed the parasitic nature of the fungus submitted. Garlic was found badly infested with destructive caterpillars; sweet potatoes alive with all stages of the sweet potato borer (*Cylas formicarius*); fresh olives and citrus fruits coming contrary to our regulations, badly decayed and the latter heavily infested with a variety of scale bugs besides. All matter so infested was condemned and burned. It is gratifying that in accordance with a ruling of the United States Treasury Department the consignees whose imports are condemned by us have at least their duty refunded. Following is a copy of this ruling as embodied in the letter to the Collector of Customs, dated September 23, 1908:

“Authority is granted for you to permit the duly authorized territorial officers to inspect any trees, plants, fruits, etc., and if you shall be satisfied that such articles, if admitted would be actually injurious to persons or property, to refuse delivery of the same and to require their exportation, or in default of exportation, to obtain the authority of the court for their condemnation and destruction. When such articles shall have been exported or destroyed the estimated duties paid thereon will be returned to the consignee.”

DESTRUCTION. This is usually done by fire, rarely by throwing condemned articles overboard. Articles are burned only as an inevitable resort, and importers are usually given the alternative of returning condemned goods. Thus, fruit from the Orient or Australia is destroyed in accordance with Board regulations. Insect and particularly fungus-infested vegetables from the Orient are consigned to the flames. Cut flowers brought by passengers are often found infested with a variety of pests and, if abandoned by their owners, are burned. So are also badly decayed or wormy fruits or plants. Prussic acid gas cannot kill worms within fruit hence wormy fruit must be destroyed if not returned. Finally, potatoes from ports to which there are no direct return boats if condemned must be burned.

FUMIGATION. Except in case of infested seeds or grape vines, which are fumigated with carbon bisulfide, fumigation is done with hydrocyanic (or “prussic”) acid gas. The gas is produced by a mixture in definite proportions of cyanide of potash, sulfuric acid and water. The gas is a most violent poison to man and beast, tho to plants under certain conditions it is harm-

less. A plant, whose vitality is sapped by a horde of insect parasites distinctly manifests relief from these after fumigation.

In the majority of cases the inspector resorts to fumigation as a precaution, especially with plants in foliage, or plants coming from the Orient and Australiasia. Small lots of fruits infested with live scale bugs are also fumigated before being released. But there need be no fear to eat fruit so fumigated, as the gas is so light and volatile that 15 minutes after opening of the fumigating room all traces of it are gone.

DIPPING IN

BORDEAUX

AND FORMALIN.

Bordeaux mixture is invariably administered by us or under our direction to asparagus roots to forestall rust, and to growing plants in foliage, like mango and avocado trees from Florida, litchees from the Orient, etc., against possible unknown fungi. The formalin dip was twice applied during the year to seed potatoes to prevent appearance of fungus diseases afterwards.

**MAIL TO
OTHER
ISLANDS.**

Under present arrangements nothing escapes inspection by whatever channel it is consigned to Honolulu or Hilo. All freight consigned to ports on Maui or Kauai comes via Honolulu and is inspected here. But we are not certain of the status of mail matter contained in pouches addressed to post offices other than Honolulu or Hilo. Incidents as related by the late Mr. Crow on page 146 of the Board's Third Report would seem to point at least to the possibility of some things unavoidably slipping past us in the mails. A movement has already been set on foot to enlist the coöperation of proper authorities in Washington in the passage of two postal regulations: (1) Ordering all mail parcels containing live vegetable matter to be prominently labeled indicating their contents, and (2) all parcels for this Territory so labeled be dispatched in bags tagged Honolulu or Hilo, as the case may require. Such regulations, it is believed, will enable us to see everything sent here by mail. No definite result has yet been attained. But we should not relax our activity until the desired goal is reached.

**QUARANTINE OF
IMPORTED PINE-
APPLE PLANTS.**

Owing to the decayed condition of a lot of pineapple plants received from Australia sometime in 1903 the Board at the time passed a regulation prohibiting the importation of these plants from that part of the world. As a direct result our pineapple industry, tho prosperous, was limited to the cultivation of but one or two varieties. The application of a citizen for the privilege of importing plants of a new variety set up an inquiry which produced the information that (1) addition of

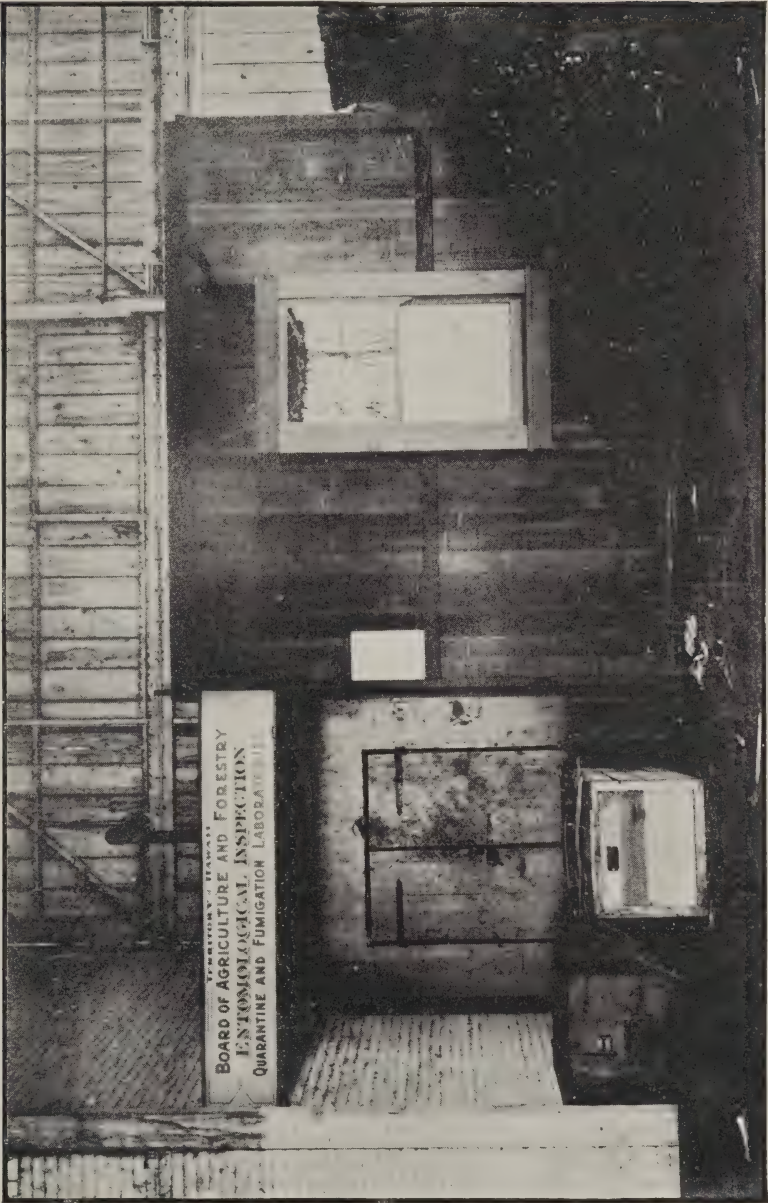
other pineapple varieties is very desirable; that (2) no destructive disease to pineapples in Australia is actually known and that finally (3) with our present facilities for disinfection we need but quarantine facilities to make such importations perfectly safe. Special Agent, Dr. E. V. Wilcox, having placed the facilities of the Agricultural Experiment Station at our disposal for this purpose we felt justified in recommending to the Board to so modify the 1903 pineapple regulation as to make the port of Honolulu an exception. The matter is pending action by the Board and Governor.

**REGULATION PERTAINING
TO HONEY AND HONEY
BEE INSPECTION.**

The existence of serious diseases of honey bees on the Mainland has been common knowledge at least to bee men for some time, as was also the belief that they have not yet been introduced to these islands. This belief was definitely confirmed by Dr. E. F. Phillips of the United States Bureau of Entomology who, during a recent visit, brought home to us the great necessity of taking steps to prevent the introduction of these diseases into Hawaii. The first step in this direction was taken by the Legislature, in 1907, who in its Act 69 (see page 115) clothed the Board with the necessary power to inspect, quarantine and if necessary destroy honey and bees coming to the Territory, since either may carry and transmit the disease. In accordance with this law the Governor approved Rules 4 and 5 of this Division regulating the importation of queen bees and honey respectively. (See p. 116.) As the Legislature in its appropriation failed to provide for the expense of bee inspection the Board was dependent on the good will of Mr. D. L. Van Dine, Entomologist of the Hawaii Experiment Station to do the work in connection with his bee investigations.

**QUARANTINE AND
INSPECTION
LABORATORY.**

What may be considered an important step toward perfecting our system of inspection and quarantine was taken when our new laboratory was erected on the Oceanic dock. Plants from unfamiliar regions require inspection in a closed room provided with an abundance of light. Frequently also plants need special treatment before being released. To cart such plants to the Government Nursery for the purpose is inconsistent. It became evident therefore that to meet such need a quarantine and inspection laboratory must be erected on the water front. The Oceanic dock was chosen because of the central location. With the consent of the Executive Officer a room about 12x16, 10 feet high, was built beside the fumigatories there. The laboratory has already served its purpose several times with entire satisfaction.



INSPECTION, QUARANTINE AND FUMIGATION LABORATORIES ON OCEANIC WHARF.

**FUMIGATORY
EXHAUST.**

An important improvement in the fumigatory has been installed by the courtesy of Mr. Marston Campbell, Superintendent of Public Works. This consists of a 4-inch gate valve and the necessary piping to serve as an exhaust for the noxious fumes after they have served their purpose. Hitherto these were discharged directly onto the dock with no little danger to operators and at times also to unavoidable bystanders.

PESTS INTERCEPTED IN COURSE OF INSPECTION.

Unfortunately the identification of material was possible in only few cases because of the great rush of inspection and office work, and absence of adequate assistance. But most of the material is on hand in good state of preservation so that identification will be possible in the future.

BUGS (Hemiptera-Homoptera).**MEALY BUGS.**

Pseudococcus spp. on Litchee (China); greenhouse plants (U. S.); (2) plants (Japan); (3 spp.) on plants from W. Indies (?); (*citri*) on Fuchsia from U. S.

COTTONY SCALES.

Pulvinaria sp. on mango (Florida).

TERRAPIN SCALES.

Coccus longulus on orange trees (Cal.).
Saissetia hemisphaerica on orchid.

ARMORED SCALES.

Aspidiotus perniciosus (San Jose scale) on pears and lemons (Cal.).
Aspidiotus rapax (Greedy scale) on pears, apples and lemons (Cal.).
Aulacaspis pentagona (2) plants (Japan); peach trees (Japan).
Chionaspis sp. on mangrove (Manila).
Chrysomphalus aonidum on plants (Florida).
Diaspis boisduvalii on orchids.
Hemichionaspis minor ? on Pomelo (Orient).
Hemichionaspis sp. on coconuts (Fanning Island).
Lepidosaphes beckii on lemons (Cal.).
Parlatoria zizyphi on pomelo (Orient).
Parlatoria sp. on maple (Japan).

WHITE FLIES.

Aleyrodes sp. on *Ceratonia celiqua* (U. S. Cal.); (sp.) on primrose (Cal.); on Christmas berries (Cal.).

PLANT LICE.

Aphis on cabbage (U. S.); on mango (Manila).

MOTHS (Lepidoptera).

Anarsia lineatella in peaches (Cal.).
Carpocapsa pomonella (codlin moth) in apples (Cal.).
 Caterpillars in mangrove stools (Manila).
 Caterpillars in Juniper trees (Japan).
 Caterpillars in garlic (China).

ANTS (Hymenoptera).

Monomorium floricola in orchids (Manila).
 Unknown, in orchids (Brisbane).
Pheidole megacephala in yams (China).

BEETLES (Coleoptera).

Sweet potato borer (*Cylas formicarius*) all stages in sweet potatoes (China).
 Curculionid borer in *Dendrobium* (Manila).
 Undetermined (Carabid?) roots of forage plant (U. S.).
 Undetermined borers in orchid and their mounting boards (Manila).
 Staphylinid in yams (China).
 Chestnut weevil in chestnuts (Japan).
 Scolytids ? in mangrove stools (Manila).
 Curculionid in mangrove stools (Manila).

MISCELLANEOUS.

Cabbage maggot (*Phorbia brassicae*) in turnips and (?) horse radish (Cal.).
 Egg batch of rear horse (Mantid) on plants (Japan).
 Fruit flies (?) on citrus fruit (Orient).
 Red spider (Acarid) on cut flowers (Cal.).
 Silver fish (Lepismid) on yams (China).
 Rust on peas (Cal.).
 Rust on asparagus (Cal.).
 Potato scab (*Oospora scabae*), potatoes (Cal.).
 Parasitic fungus on yams and sweet potatoes (Orient).
 Soil about lillies and growing plants (Orient and Occident).

LOCAL INSPECTION.

This was confined wholly to visits in private gardens at the request of owners. A Staphylinid beetle was found in numbers apparently damaging ripening figs at Pearl City. Closer examination seemed to show that their presence was due to several over-ripe figs which they inhabited and from which they overflowed to the others. Instruction was therefore given to remove and destroy infested figs and contents. Scale bugs and faulty irrigation were found injurious to fruit and ornamental plants in several gardens. Advice was given accordingly. The thread scale (*Ischnaspis longirostris*) has been under observation on palms, ilang-ilang (*Canarium adorum*), etc., for some time. In one instance this pest had brought an ilang-ilang plant to a point where destruction was the only alternative that could be offered. This pest has no effective parasite here and is therefore troublesome on a number of ornamental plants. The "Maui Blight" or, more correctly, Lantana scale (*Orihezia insignis*), has invaded the city of Honolulu in full force, and destruction of a number of valued ornamental plants followed. Lantana on the hillsides also suffered severely, but the extended drought had considerable to do with it.

INTRODUCTION, BREEDING AND DISTRIBUTION OF USEFUL INSECTS.

This line of work was circumscribed this year by the absence of an assistant and by the fact that, after the first shipment of the year of useful insects from Mexico (received in Honolulu, January 27) Mr. Koebele was detailed, by arrangement with the Hawaiian Sugar Planters' and Live Stock Breeders' Associations, for investigation in Europe of enemies of horn fly. These he sent to and were cared for by the Hawaiian Sugar Planters' Association Experiment Station Entomologists. An account of this work is given on page 119.

INTRODUCTIONS.

The January shipment above referred to consisted of the ladybirds *Azya luteipes*, Muls., *Chilocorus cacti*, Linn., *Hyperaspis jocosa*, Muls., and a hymenopterous parasite. *A. luteipes* was found a liberal eater of Lecaniid scales, was bred for a while and a number of colonies distributed. The janitor failed to lower the curtain of the insectary one day, and the sun, striking the breeding jars which contained fresh food produced heavy perspiration in the jars which seems to have killed all life in them. One or two larvae have been seen out of doors since and the probability is it will show up in time. *Chilocorus cacti* was bred for a while on the

rose scale (*Aulacaspis rosae*) and the cactus scale (*Diaspis echinocati*). But it made very slow and unpromising progress and finally the colony died out. Only five specimens of *Hyperaspis jocosa* came in larva and pupa state, but all of them were successfully reared to maturity and, as their food is very abundant here, they thrive well and large numbers were distributed in the city and suburbs. We have been able to make no progress whatever with the hymenopterous parasite.

Thru the courtesy of Mr. George Compere, Government Entomologist of West Australia, we were able to release several specimens (male and female) of *Comperiella bifasciata* in May. This insect, Mr. Compere asserts, is an effective enemy of the red scale (*Chrysomphalus aurantii*) in the Orient.

Blastophaga grossorum is the insect that played so conspicuous a rôle in the successful establishment of Smyrna fig culture in California a few years ago. Normally the insect breeds in galls produced within the male fig which is borne on a separate tree (Capritree). As the pollen in these figs is produced simultaneously with the maturity of the insects, these, upon emerging, carry away more or less of the pollen on their bodies. The Smyrna figs which bear the female part of the flower, are also receptive about that time. Failing to distinguish these from the male figs the female flies enter them to oviposit and incidentally fertilize many of the flowers with the pollen on their bodies and thus produce the large number of seeds characteristic of the Smyrna fruit. These seeds, it has been recognized, contain essential oils which give the fruit the peculiar nutty flavor, and make the Smyrna fig such a favorite.

We were aware that the Moanalua Gardens had the requisite Capri and Smyrna trees, but not the insects, without which Smyrna-fig culture is impossible. To bridge the gap the late Mr. Craw communicated with Dr. Geo. Roeding, the moving spirit of the Calimyrna fig industry, and was promised a colony of the insects. On April 7 we received the first colony of these insects. Unfortunately all of them seem to have emerged en route from the figs in which they were sent, and perished—at least we got no satisfactory result. By kindness of Dr. Roeding we received another colony in October but having hardly expected results owing to lateness of season we were not disappointed with failure. However, we are determined to repeat the importation until successful.

**GOOD WORK OF
A RECENTLY NA-
TURALIZED ALLY.**

On page 116 of the Board's Second Report (for 1905) the writer reported the introduction and establishment of the Terrapin scale parasite or Scutellista (*S. cyanea*) in these islands. During the present year it was found so abundant

on the original Coccid host as reported therein and upon the hemispherical scale (*Saissetia hemisphaerica*), another occasionally destructive pest, that its great usefulness could not be overlooked. Its new host is also a fact worth recording.

BENEFICIAL INSECT DISTRIBUTION.

This was far larger in numbers of individuals than colonies. In all 63 colonies were distributed, but some of these were composed of hundreds of specimens. Following is the list of insects distributed:

- Arizona-dung fly parasite (*Eucoila impatiens*).
- Azya luteipes*.
- "Brownie" ladybird (*Cryptolaemus montrouzieri*).
- Chilocorus cacti*.
- Comperiella bifasciata*.
- Fig insect (*Blastophaga grossorum*).
- Lantana leaf bug (*Teleonemia lantanae*).
- Mexican ladybird (*Hyperaspis jocosa*, Muls.).
- Vedalia ladybird (*Novius cardinalis*).
- Scutellista cyanea*.

GENERAL WORK.

The correspondence of the Division is more heavy in the volume of individual letters than in their number because we make the effort to impress upon correspondents the importance of our work and because, owing to the scarcity of published data on our insect fauna, we are obliged to give full explanation in our letters. We also endeavor to put in writing as far as possible all official acts of the Division.

In all 360 letters were written during the year, principally to local people. Financial records of the Division were kept independently of the Board records, serving the useful purpose of comparison and check. The card index of the inventory is up to date as are indices of accessions to the Entomological library according to author and subject. Eleven monthly reports were made to the Board and were subsequently published in the For-ester. Two lectures on Entomological subjects were delivered before classes of the College of Hawaii and one before a Normal School class. Owing to pressure of inspection work little of a systematic nature was accomplished. General Circular No. 3, embodying Act 69 of Session laws of 1907 and Board rules 3 and 4, regulations on importation of honey and honey bees was issued. The 1907 Report was also published and the supervision of this work consumed an enormous amount of time. This is a

concrete instance where a paid executive officer would be a saving to the scientific staff. Our Bulletin 2 on the subject of Aleyrodidae is still in demand among scientists abroad.

RECOMMENDATIONS.

INTER-ISLAND INSPECTION.

Evidence is accumulating pointing to the necessity of instituting inter-island inspection. At one time the Hawaiian Sugar Planters' Association sought our coöperation in preventing the carriage to other islands of a small, cane-top boring beetle known on Oahu only. Several other insects known or suspected to exist in Honolulu and not on the other islands suggest strongly the necessity of some protection for those islands. What should not be lost sight of is that the object of inspection must be to protect the prospective agriculturist as well as the present one. Thus insects infesting citrus plants, for example, are of comparatively little moment now, because the citrus is not yet an economic plant of value to us. But, it is not an impossibility that even citrus may some day play an important role in the economy of these islands and therefore should be afforded *now* all protection of a plant enjoying that distinction. So that it is imperative to maintain pest free as much of the Territory as possible in order to retain the possibility of growing profitably whatever the future might reveal to our advantage.

It seems to us that inter-island inspection is essentially a county business. Counties should protect their respective territories, especially since, because of our geography and the consequent need of an unproportionate number of inspectors, the chances that the Territorial Government will be in a position to undertake the work are remote. County inspection is a regular institution in California and, to our knowledge, valuable and satisfactory. Whatever other officers the counties employ they should have a competent entomological inspector to protect the county against invasion from insect or fungus pests, existing in other counties, and not in their own.

MELON FLY.

If we consider the horn fly (*Haematobia ser-rata*) the *most injurious* insect on these islands at present, the melon fly (*Dacus cucurbitae*) easily holds second place. Indeed, if we realize what a boon cucumbers, melons, cantelopes, etc., must have been to every man, woman and child, rich or poor, on these islands prior to the coming of this pest, and how little we have to replace them the conclusion is inevitable that so long as this fly is allowed to play havoc unmolested the people will suffer a restricted variety of their vegetable diet. The habits of the fly are such that it is impossible to check it by ordinary means,—if we consider natural enemies extraordinary.

The fly doubtless reached us by way of China or Japan, tho it is most definitely known to exist in India. Its economic status in the former countries is unknown. But from correspondence with the Imperial Entomologist of India the writer has ascertained that in India it is kept well in check by a variety of parasites and is therefore seldom injurious. In his effort to combat fruit fly (*Ceratitis capitata*) in West Australia the Entomologist of that State after several attempts claims to have finally succeeded in transporting and establishing there several of these parasites. Upon the strength of these facts the Board addressed the Minister of Agriculture of West Australia a request for colonies of these insects. This was the best that could be done under a limited appropriation. But it is barely possible we should get satisfactory results from correspondence alone. The late Mr. Craw always scoffed at these possibilities. He maintained, and we are inclined to agree with him, that nothing short of detailing a competent entomologist to the field for investigation, discovery and shipment of likely parasites will deliver us from this formidable pest. I would respectfully urge therefore upon the Governor and Legislature of this Territory to give this matter their earnest attention and, if at all possible, provide a liberal fund for this work. There is no more crying need in the Territory at present.

EXECUTIVE OFFICER.

An outsider cannot fully realize the immense tax upon the time of the scientific force that is unnecessarily imposed by executive work. Publication, printing, purchases and a host of similar tasks should be carried on by such an officer to greater advantage to the service as a whole. Such duties are on the State Boards of Agriculture performed by their paid secretaries. Some such officer is a dire necessity on this Board. To strengthen the scientific activity of the staff it must be bound down by lay routine as little as possible.

TABLE II.—QUANTITIES AND PRICES * OF FRUITS AND VEGETABLES IMPORTED VIA HONOLULU DURING 1905-1908.

NAME.	@	pr	1905	Value in \$ \$	1906	Value in \$ \$	1907	Value in \$ \$	1908	Value ^c in \$ \$
Apples	1.50	bx	16636	24954.00	27383	41074.50	19501	29251.50	25185	37777.50
Apricots.....	1.35	bx	588	793.80	58	78.30	242	326.70	902	1217.70
Artichokes ..	4.25	bx	.....	.....	.....	.....	238	1011.50	116	493.00
Asparagus...	4.00	bx	.....	.....	.....	.....	.....	.....	180	720.00
Cabbage	1.50	crt	904	1356.00	1533	2299.50	1401	2101.50	1456	2184.00
Cantalopes..	2.25	bx	209	470.25	385	866.25	366	823.50	660	1485.00
Cauliflower .	2.25	bx	.....	.....	.....	.....	.....	.....	1347	3030.75
Celery	3.00	bx	.....	.....	.....	.....	.....	.....	633	1899.00
Celery root .	2.50	bx	.....	.....	.....	.....	.....	.....	14	35.00
Cherries.....	1.50	bx	310	465.00	299	448.50	410	615.00	588	882.00
Cranberries	13.00	bbi	26	338.00	33	429.00	6	78.00	36	468.00
Garlic.....	2.70	bx	400	1080.00	486	1312.20	559	1509.30	436	1177.20
Grape fruit .	3.75	bx	307	1151.25	327	1226.25	474	1777.50	544	2040.00
Grapes	1.50	crt	2484	3726.00	3080	4620.00	2580	3870.00	3726	5589.00
Horseradish	1.50	bx	.....	.....	.....	.....	.....	.....	57	85.50
Lemons	3.75	bx	2166	8122.50	2348	8805.00	2191	8216.25	2877	10788.75
Nectarines...	1.25	bx	137	171.25	25	31.25	24	30.00	21	26.25
Onions	2.50	bx	6774	16935.00	8111	20277.50	7739	19347.50	12186	30465.00
Oranges	3.00	bx	18637	55911.00	11572	34716.00	20050	60150.00	20507	61521.00
Parsnips.....	.75	bx	.....	.....	.....	.....	.....	.....	30	22.50
Peas	1.00	bx	14	14.00	.....	.....	.....	.....	120	120.00
Peaches	1.25	bx	753	941.25	479	598.75	212	265.00	2646	3307.50
Pears	2.00	bx	1745	3490.00	878	1756.00	785	1570.00	2973	5946.00
Persimmons	1.25	bx	120	150.00	274	342.50	397	496.25	394	492.50
Plums	1.25	crt	2152	2690.00	1872	2340.00	1236	1545.00	2505	3131.25
Potatoes.....	2.00	sk	8446	16892.00	26741	53482.00	32614	65228.00	49842	99684.00
Quinces	1.25	bx	.....	.....	25	31.25	9	11.25	11	13.75
Rhubarb	1.25	bx	.....	.....	.....	.....	19	23.75	172	215.00
Sprouts.....	2.00	bx	.....	.....	.....	.....	.....	.....	54	108.00
Tangerines..	1.25	bx	533	666.25	2555	3193.75	1227	1533.75	2093	2616.25
Turnips.....	.60	bx	396	237.60	387	232.20	257	154.20	258	154.80
Total, \$ \$			\$	140,605.15	\$	178,160.70	\$	199,935.50	\$	277,696.20

* The prices represent closely approximate figures as kindly supplied us by one of the importers.

ACT 69, SESSION LAWS OF 1907.

AN ACT TO AMEND CHAPTER 28 OF THE REVISED LAWS OF HAWAII BY ADDING TO SAID CHAPTER A SECTION TO BE KNOWN AS SECTION 389A.

Be it Enacted by the Legislature of the Territory of Hawaii:

Section 1. Chapter 28 of the Revised Laws of Hawaii is hereby amended by adding a new section thereto to be known as Section 389A and to read as follows:

Section 389A. It shall be the duty of the Board to make rules and regulations, and to amend the same from time to time, in its discretion, subject to the approval of the Governor, for and concerning the importation into the Territory of bees and for the preservation, protection and improvement of bees now within the Territory; and for the quarantine, inspection, fumigation, disinfection, exclusion or destruction either upon importation into the Territory or at any time or place within the Territory of any bees and any box or other container and their contents in which bees have been imported or contained, which is or may be infested with or liable to assist in the transmission or dissemination of any insect or disease injurious to bees. All rules and regulations made as aforesaid shall have the force and effect of law. It shall be the duty of the Board to establish an observational apiary and all bees imported into the Territory shall be there quarantined free of cost to the owners until such time shall have elapsed as to enable the proper entomologist or inspector of the Board, to certify to the owners that such bees are clean and free from disease. The entomologists or inspectors of the Board may enter upon the premises of any bee keeper for the purpose of inspecting apiaries, and of carrying out the orders of the Board, and they shall not be holden guilty of any misdemeanor by so doing nor shall they be personally liable in damages except for acts beyond the scope of their authority or due to their own negligence.

Section 2. This Act shall take effect from and after the date of its approval.

Approved this 17th day of April, A. D. 1907.

G. R. CARTER,
Governor of the Territory of Hawaii.

RULES AND REGULATIONS PERTAINING TO THE
IMPORTATION AND INSPECTION OF HONEY
BEES AND HONEY INTO THE TERRITORY OF
HAWAII BY THE BOARD OF AGRICULTURE
AND FORESTRY.

RULE 4. IMPORTATION OF QUEEN BEES.

In order to prevent the introduction into this Territory of infectious, contagious or communicable diseases among honey-bees it is hereby ordered that

All queen bees imported into the Territory of Hawaii shall be subject to the following terms and conditions hereinafter set forth, namely:

(1) *Labels.* A label shall be affixed to the cage, box or other container in which any queen bee is enclosed, which label shall set forth:

- (a) The number of queen bees enclosed;
- (b) The locality where each was produced;
- (c) The locality from which each was shipped;
- (d) The name of the shipper;
- (e) The name of the consignee.

(2) *Request for Inspection.* The importer shall file with the Board of Agriculture and Forestry, at least two weeks prior to the date at which the queen bee or bees will arrive, a written statement signed by himself or his agent or attorney which shall set forth his purpose to import said queen bee or bees into the Territory of Hawaii, which statement shall contain as accurately and fully as possible the following information:

- (a) The number of queen bees sought to be imported;
- (b) The probable locality where each was produced;
- (c) The locality from which each is expected to be shipped;
- (d) The name of the proposed shipper;
- (e) The address of the importer, and shipping marks.

Said statement shall also contain a request that the Board, upon arrival of said queen bee or bees, proceed forthwith to inspect or cause to be inspected such queen bee or bees.

(3) *Inspection.* Immediately upon the receipt of such request for inspection or as soon thereafter as may be an inspector of the Board shall inspect each queen bee and if it is found free from such disease shall cause it to be transferred from any cage, box or other container in which it shall have been imported and shall transfer it to a new and clean cage properly supplied with clean and fresh candy and with sufficient bees known to be free from disease to properly care for said queen bee.

(4) *Certificate.* The inspector shall thereupon give to the importer a certificate of his findings upon such inspection and deliver to him such of the bees as he finds free from all infectious, contagious and communicable diseases.

(5) *Destruction of Cages, Bees, etc.* Immediately upon the transfer of any queen bee from any cage, box or other container as set forth in Section 3 hereof, said inspector shall cause to be burned and destroyed such cage, box or other container, together with the candy and bees therein, excepting such queen bee.

If said inspector shall at said inspection find any queen bee to be infected with any contagious, infectious or communicable disease he shall in his discretion destroy the same or hold the same for further treatment.

RULE 5. IMPORTATION OF HONEY.

In order to prevent the introduction into this Territory of infectious, contagious or communicable diseases among honey bees and in view of the fact that such diseases are in the majority of cases communicated by the introduction into uninfected territory, of honey, honey-dew or syrup containing honey from districts in which such infectious, contagious or communicable diseases exist, it is hereby ordered that

All honey, honey-dew or syrup containing honey imported into the Territory of Hawaii, shall be subject to the following terms and conditions, to-wit:

(1) *Statement by Importer.* Any person or persons importing into the Territory of Hawaii any honey, honey-dew or syrup containing honey from the mainland of the United States or elsewhere, upon arrival of such honey, honey-dew or syrup containing honey at a port of entry of the Territory of Hawaii, and before such honey, honey-dew or syrup containing honey shall have been landed upon the dock, or if such honey shall have been landed upon the dock without the

knowledge of the importer, then before such honey, honey-dew or syrup containing honey shall have been removed from the dock, shall file with the Board a written statement containing the following information:

- (a) The port from which such honey was shipped;
- (b) The name of the shipper;
- (c) Whether or not the same has been certified by a qualified inspector as hereinafter set forth.

Said statement shall also contain a request that the Board forthwith proceed to have said honey, honey-dew or syrup containing honey inspected, and an agreement on the part of the importer to be responsible for all reasonable costs and expenses of inspection, quarantine and care of the same.

(2) *Inspection.* Immediately upon the receipt of such statement or as soon thereafter as may be, the Board shall cause said honey, honey-dew or syrup to be inspected by its inspector. In case such honey shall bear upon the containers thereof or shall be accompanied by a certificate or a qualified officer of any state or of the United States or other country, that the honey is from healthy colonies of bees, that is, from colonies of bees not affected with any infectious, contagious or communicable disease, then said honey shall be forthwith passed by said inspector and said inspector shall thereupon furnish to the importer thereof a permit to land the same or to remove the same from the dock as the case may be.

In case such honey shall not bear upon its containers, or shall not be accompanied by a certificate from a duly qualified officer as aforesaid that the same comes from healthy colonies of bees as above set forth, then such inspector shall cause said honey to be removed to some place there to undergo such tests as the Board shall from time to time prescribe to determine whether or not said honey, honey-dew or syrup containing honey is infected with any infectious, contagious or communicable disease. Upon the completion of such test said inspector shall certify his findings. If said honey shall be found free from any diseases as above set forth said inspector shall so certify and shall thereupon deliver such honey, honey-dew or syrup containing honey to the said importer. If, however, such honey shall be found infected with any infectious, contagious or communicable disease, the inspector shall forthwith notify the importer of such fact and such importer shall have a reasonable time thereafter to return or export said honey to some port without the Territory of Hawaii. But should said importer refuse to return or export said honey, or

neglect so to do within a reasonable time, then said honey shall be destroyed in such manner as shall be determined by the Board.

These rules and regulations were approved at a meeting of the Board of Commissioners of Agriculture and Forestry, held on September 2nd, 1908.

(S) C. S. HOLLOWAY,
President and Executive Officer,
Board of Agriculture and Forestry.

Approved:

(S) W. F. FREAR,
Governor.

September 17, 1908.

PROF. KOEBELE'S WORK ON HORN-FLY.*

On April 9th, 1908, I wrote Mr. Koebele final instructions as to leaving for Europe in search of horn-fly parasites, and other natural enemies of that pest. Owing to various circumstances it was not till considerably later that he was able to leave New York for Germany. I had requested him, if possible, to call on Dr. Howard, the chief of the Division of Entomology, at Washington, as I had understood that that Division might be doing work of the same nature in Europe, as we were about to attempt. Mr. Koebele was unable to see Dr. Howard personally, but, after correspondence, informed me that work on the horn-fly on these lines would not be undertaken by the entomologists of the Washington Department.

During the summer months Mr. Koebele's time was entirely occupied in making observations in the field, and breeding flies, together with some parasites and predaceous insects from larvae found in cow-dung.

In July he wrote briefly of his observations, and especially mentioned the importance of Hister beetles and their larvae in devouring the larvae of flies that breed in dung, and also the scarcity of parasites, as compared with predaceous insects, at that season.

* The following preliminary report was furnished by Dr. Perkins at the request of the Board and the Hawaiian Live Stock Breeders' Association.

Before proceeding further it may be said that there are two methods of diminishing the numbers of dung-eating flies, (1) the direct method, by the introduction of parasites and predaceous enemies, (2) indirect, by the introduction of harmless dung-eating insects, which quickly remove the dung and so leave less food for the injurious flies to breed in. Somewhat intermediate between these classes is a third lot of harmless species, which, while they live in the dung, do not consume it or remove it rapidly enough to prevent the breeding of the obnoxious flies, but, at the same time, they perforate the cow droppings with passages in every direction, and allow the parasites of the flies to more readily approach and attack these. This class is already represented by several species here in the islands, and Mr. Koebele sent over larvae of a larger and more robust species, than any that we have here. At first I doubted the advisability of liberating these, not because they could possibly do any injury to vegetation, but because they will probably form part of the food supply of the voracious Histers, which may partly turn their attention to these, and therefore destroy a smaller percentage of fly maggots.

Mr. Koebele's method of sending specimens, so far adopted, has been to place the living insects with food in glass tubes of various sizes; these tubes are wrapped in cotton and enclosed in tight-fitting cylindrical wooden boxes. They are thus forwarded by mail to Mr. Ehrhorn, the inspector at the port of San Francisco. Thence to the islands they are sent in cold storage. This method of sending has proven so satisfactory that nothing more need be desired. It is only possible during the cold part of the year, but that is all the better, as it will leave Mr. Koebele free to make his observations and gather material during the summer, to be forwarded here in the winter, which is the most favorable time for establishing the European insects. In all, I have received up to date thirty-nine vials from Mr. Koebele, containing sometimes a single insect in a vial, sometimes two or three, in the case of predators; in some have been sent numerous puparia of flies in the hope of breeding parasites.

Vial 1 contained some living larvae of a dung-beetle (*Aphodius*). Mr. Koebele was of opinion that this species was very desirable, but, partly owing to local conditions, which probably he had not in mind, and partly because the insect belongs to that intermediate class mentioned above, I should not place so high a value on its services, if established. It is likely to thrive best, and to be most useful in wetter districts or in drier ones at a considerable elevation above the sea level. From these larvae sent over, I later on had the satisfaction of breeding a small colony, which were sent to windward Hawaii, and liberated in a place,

where further colonies could be easily obtained later, if they are successfully established, as they probably will be.

Vials 2-8 contained puparia of various dung-eating flies. From these I bred numerous species of a parasite, *Spalangia*, which I cannot separate from one already here, and which has been known here for at least thirty years. I am, however, making further observations on these, as I have received a nearly identical parasite from China, through our Assistant Entomologist, Mr. Terry, and a third also excessively similar is known to me from Mexico.

Vials 9-12 contained similar parasites.

Vials 13-15 contained predaceous beetles (*Hister* and *Saprinus*) hibernating, one in each tube. It is very important to introduce these and similar species, and, but for certain special local difficulties, this would be easy enough.

Vials 16-20 contained larvae of a beetle eating up the larvae and puparia of flies in dung. Mr. Koebele suggests that this will produce a Tenebrionid beetle and this is certainly correct, though the larvae, of which three arrived alive, have not yet matured.

Vials 20-24 puparia of flies likely to produce parasites.

Two species of parasites were bred from these belonging to the Alysidae and the Ichneumonidae. Of the latter no pairing was obtained, but from the former, of which two females and one male emerged at intervals, a brood may be obtained. Both these and other allied parasites in numbers ought to be introduced here, especially as they not only destroy fly larvae in dung, but also those found in dead carcasses, from which, especially, are produced the flies that cause maggots in sheep. The chief hindrance to the establishing of these parasites would seem to me to be the general absence of such flowers on the ranches, as the mature insects visit for the purpose of feeding, and especially of those white-flowered umbelliferous plants, which are found in every field, hillside and pasture in Europe, and attract these parasites in extraordinary numbers.

Vial 25. Larva of *Philonthus*, considered by Mr. Koebele one of the best enemies for horn-fly. This vial, however, contained a larva of a Hister beetle on arrival, so that either an error was made, or the latter devoured the former in transit.

Vial 26-28. *Staphylinus pubescens*, a predaceous beetle, likely to devour the dung-beetles, as well as the injurious flies. These arrived dead, so the species could not be experimented with.

Vials 29-30. *Philonthus aeneus*, three or four mature specimens arrived in fine condition. As mentioned above (Vial 25) Mr. Koebele considers a number of species of this genus are wanted, being very important.

Vials 31-34. Contents mostly dead and of not much importance.

Vials 33-35. Three or four mature Hister beetles received alive recently.

During the coming summer I have suggested to Mr. Koebele that he should get together a lot of material of the above insects, most likely to be successful, and ship them, as soon as the cold weather sets in in America and Europe. He should then visit Northern Africa probably, and the more southern parts of Europe for other kinds of enemies of horn-fly. Certain local conditions here are of paramount importance and must be fully considered in estimating the value of the natural enemies of dung-flies in Europe, and selection of these enemies must be made to suit these conditions or no success will be attained. This is a complicated subject and cannot be entered into in this report; in fact, my observations on the matter, though I have recently given much time to it, are still far from complete.

There has recently been a great deal of talk about the introduction of birds into the islands, and some by no means well advised suggestions have been made in this direction. If birds are to be introduced at all, I know of none more likely to be of great value than a common black and white Australian fly-catcher related to the little native 'Elepaio.' I referred to this bird in the Proceedings of the Hawaiian Entomological Society, Vol. 1, p. 10, as follows: "Another species (of fly-catcher) is commonly seen catching flies off the backs of cattle. It would be most valuable in these islands." An ornithologist, (whose name I forget) connected, I think, with the Museum at Brisbane, informed me that it would be possible to introduce this bird. I myself had daily evidence of its great value.

With regard to Mr. Koebele's work, it will, no doubt, be necessary for this office to make a complete report, when that is possible, either for publication by this Station or by the Territorial Board of Agriculture and Forestry.

We are indebted to Mr. Edward M. Ehrhorn, Entomological Inspector of the State Board of Horticulture of California, at San Francisco, for receiving and forwarding to us the material sent by Mr. Koebele, and to Mr. Kotinsky for promptly delivering the same to us on the arrival of the steamers in Honolulu.

Yours very truly,

R. C. L. PERKINS.

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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 331, 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.
"Notice to Importers," by H. E. Cooper; 4 p.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"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 V; 1904-1908. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar-Cane," by R. C. L. Perkins. Bulletin No. 1; 33 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 B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
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.

** This Bulletin will be sent only to persons interested in the subject.

* Out of Print.



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PUBLICATIONS FOR DISTRIBUTION—Continued.

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.
- 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.

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.
- * "Rules and Regulations, Inspection and Testing of Live Stock." Rules 1 to 7; 10 pp.; 1908.
- * "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
- 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 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.

* Out of Print.