

The MID-PACIFIC MAGAZINE

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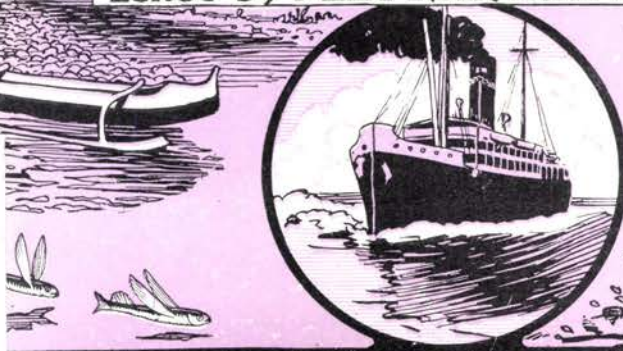
PAN-PACIFIC UNION



Hon. Harry L. Stimson, Governor General of the Philippine Islands and Honorary Vice-President of the Pan-Pacific Union, with Mrs. Stimson, decorated with leis on their arrival at Honolulu on their way to Manila.

Edited by **ALEXANDER HUME FORD**

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The Mid-Pacific Magazine

CONDUCTED BY ALEXANDER HUME FORD

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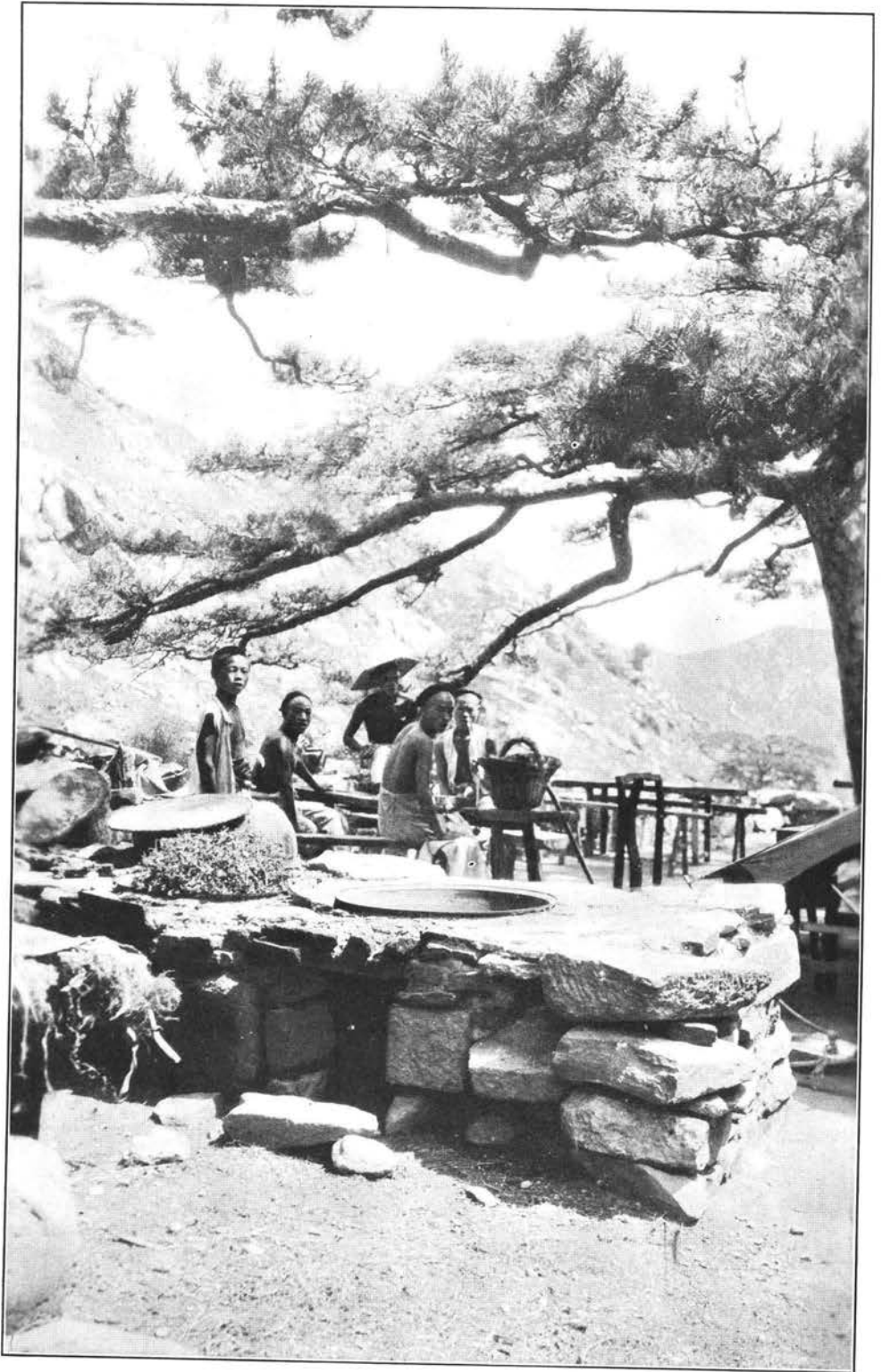
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The Mid-Pacific Magazine

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Outdoor life in China inures the people to hardship, even the meals of the coolies are outdoor feasts, and thoroughly cooked, provide a minimum of danger as to infection; it is the raw fly ridden food in China that fills what hospitals there are.

Progress of Medical Knowledge in China, 1889-1926

By

HARDMAN N. KINNEAR, M.D.

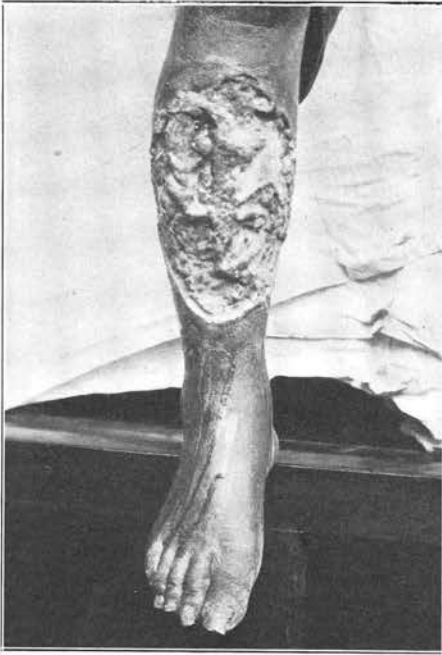
During my thirty-seven years of residence in Foochow many changes have taken place in China, some of them perhaps the most radical that will ever take place in that great country. The changes in medical matters have not been as spectacular as those in the political arena, but they have been very marked. One evidence of this is found in the fact that while in the later '80's there were two or three men who were practicing so-called "Western Medicine" in Foochow, there are now scores of them. In order to measure this progress it is necessary for you to have in mind the character of medical practice as it used to be in China, though there is time for no more than a passing glimpse of it. The supposition has been that every literatus should have read China's medical books as well as her other literature, so that every scholar should be more or less competent to prescribe for illness. The result has been that literati who could not find official or other positions that paid better, were quite likely to hang out the sign "Di-i", that is "Understand healing". There was nothing like licensing men to practice medicine, and indeed even now there is no effective limitation or definition of qualifications for those who wish to practice medicine in China.



Dr. Hardman N. Kinnear

There is also a large group of men who are not even literate who practice medicine in various ways. The herb doctor on the bridge, the tooth puller with his sign made of human teeth that he has extracted, strung on wires to make Chinese characters, the seller of pitch plasters for sores of various sorts are examples of this kind. If a man can claim to be a third or fourth generation doctor he is assumed to have some valuable secrets that he has inherited, and so is likely to be well patronized.

One young man received his inspiration to practice medicine as a result of consulting the idols. His parents depended upon him for a living and he had not been able to win any of the usual positions coveted by literati, so he consulted the idols in a temple near our home. As he came from the temple he was said to have had a vision in which he was instructed to give himself to curing the victims of the cholera epidemic then raging. He was told to perforate the veins of the patients with red hot, hollow, needles, and so allow the evil spirit of the disease to find an exit from the body. As the Chinese doctors refused to answer calls to cholera cases, this young man, for a time, did a thriving business. Some of his cases later came to the hospital. We found the veins of the extremities and even the trunk perforated by the hot needles he had used, and when we undertook to



The horrors of neglect in China; a neglected ulcer cured at Foochow Missionary College. A patient who slept with his "fire stove" because of cold. A neglected malignant growth, a patient who the day his arm was amputated at his shoulder left the hospital to go sightseeing.

give the collapsed patients intra-venous saline injections, it spurted out of the perforations this man had made, so that we had to find another vein to use.

In the earlier years no native practitioner would use a lancet under any conditions. In fact, they used to warn patients that the "foreign" doctor would "use knife," in order to keep them from coming to us. The people have since learned that the knife gives the quickest and surest relief to some troubles, and even the native doctors imitate our methods with more or less success.

In the early '90's we had a case that interested us, and one that we have not duplicated since then. A young man came with the front of his left biceps sliced off, leaving a surface of exposed flesh three inches long by one and a half inches wide. The unusual character of the wound led to careful inquiries as to the cause, and we found that our patient was the son of a near-by banker who had recently died, and that this son had cut the flesh from his arm, and had cooked it and fed it to his father, this being considered the most filial thing that a son could do to promote the recovery of a parent.

While emphasizing the lack of proper qualifications in many of the practitioners of Chinese medicine, I must also make clear the fact that many of the exponents of "Western medicine" are also very inadequately qualified, but that in spite of this fact are often very useful to the communities in which they live. As an extreme illustration of this statement we are reminded of the hospital gateman who was with us a number of years, and was discharged because he was collecting large fees for allowing patients to enter our wards. He went to a town thirty miles away and commenced to practice medicine. The local magistrate of that place dislocated his lower jaw, and the advice of many native doctors having failed to bring relief, he sent for our former gate-keeper. He asked a fee of fifty dollars, and after

the usual bargaining, consented to accept thirty dollars if successful in reducing the dislocation. The gateman had seen such dislocations reduced by me a number of times, and following the instructions he had heard me teach the medical students, he reduced the jaw, and received his fee. Thereafter he enjoyed an increased patronage until he retired, to live upon his son, who had meantime become a successful Y. M. C. A. worker, and has since then been around the world as one of the representatives of China's national association.

The Chinese people were early persuaded that the "foreign" doctor possessed superior skill in the treatment of "external," that is, surgical, diseases and injuries. They were much longer in finding out that Western medicine had something better than native medicine for them in the treatment of "internal" disease. Even now the tendency is to try out the native doctors before they come to Western practitioners for the treatment of purely medical ills.

While noting that in the cities Western medicine has made much progress, one should also say that in the country such progress is much less marked. We have usually spent part of the hot season at a seaside cottage thirty miles from the city. Three summers ago, soon after arriving there, a man came with an immense abscess on his right thigh. When asked how long it had been forming, he said that it had started in the "first month." That is to say he had waited five months for me to come to that place to open the abscess. There were four pints of pus in the abscess, which healed nicely when properly treated. This illustrates that (a) The economic condition of the Chinese people prevents many of them from taking even short journeys to the mission hospitals in the great cities. (b) The moving of sick people over the country foot-paths, and in the kinds of conveyances available presents many



The Foochow Missionary Hospital, built by Dr. and Mrs. Kinnear.

difficulties. (c) The possibility of dying away from home and relatives is a real deterrent to all Chinese in their search for medical relief.

Thus, neglected disease is one of the things that we have to meet constantly. Malignant tumors are seen in great numbers and in every stage of development, but usually too late for successful operative treatment. The pictures shown merely illustrate a few of the more external growths, and might be multiplied almost indefinitely. Formerly the native doctors did nothing like setting broken bones. They were allowed to heal as best they might, under poultices of various sorts, and sometimes as a result, they came to us later for amputation.

Of the remedies used in the treatment of wounds one is reminded of the case of the man, who while walking along a country road, was bitten by a tiger, which jumped out of the jungle as he was passing. The tiger's incisors had torn through the elbow joint, comminuted all the bones, and left a gaping

wound. He reached us the next day with the wound filled with the charred remains of an old felt hat, which had been used as an haemostatic. One wonders what experience had taught the Chinese of the neighborhood to scorch the felt, and thus make it more nearly approach cleanliness. If the accident had happened in most places one could safely wager that the wound would have been filled with elephant dung, which is imported as a favored haemostatic. A great variety of other things are also used for this purpose, including "cat-tail" bloom.

Speaking of the way cases are sometimes neglected reminds one of the snake-bite cases. When thirteen years old a boy was bitten in the left hand by a snake. The arm was ligated just below the axilla to "keep the poison from reaching the body." He came to us when he was nineteen years old, that is six years after the accident. His growth was stunted by the drain of the constant stream of pus that was trickling from his distorted, spade-like hand.

Another boy had not gone so many years but the ligation to which he was subjected led to the spontaneous amputation of the hand at the wrist. Both cases were treated by amputation of the arms at the shoulder with good results, including an almost immediate improvement in the health of the boys.

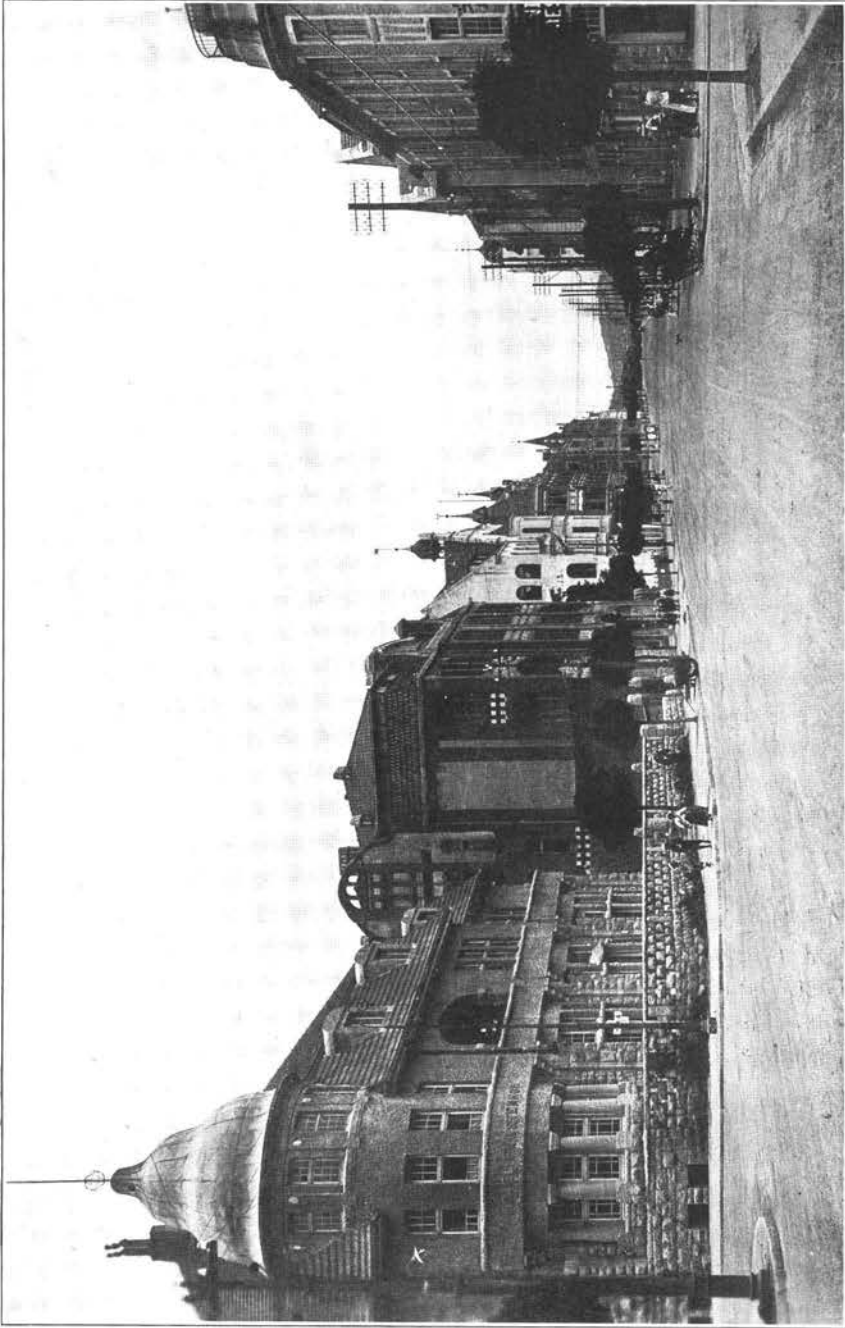
A man came with a left arm that had been ligated for some trouble in the hand. The hand was a mass of slough, and the whole arm was entirely useless. The first thing to be done was to clean it up as much as might be, and the process included removing about two hundred maggots of various sizes from the sloughing remnant of a hand. The morning after the arm had been amputated at the shoulder the patient was not to be found, indeed it was several days before he was caught for an examination. When reproved for his irregular conduct he told us that he had come from the country, had never seen the capitol city before, and that he felt so much better immediately after being relieved of the arm, that he could not resist the temptation to spend long days seeing the city. There are no sight-seeing busses in Foochow. He had to do it all on foot, and in spite of it all the wound healed by first intention.

One more case that illustrates the difficulty in getting to the city for treatment. A man was watching a fruit orchard at night. When thieves approached he fired his old gun at them. The breech exploded, and smashed and tore his whole lower jaw and tongue, so that what remained of the flesh hung down upon his breast bone. It bled profusely and made a horrible sight. His difficulty was to get a boat to bring him to the city, a day's journey. The regular ferry boats would not allow him on board. Other boatmen were afraid he would die on the way and so hoodoo their boats. No one wanted to carry such a looking person and one who so quickly became very offensive. It was five days before he could hire a special

boat. Of course he could not eat or drink during that time, and he reached us in an exhausted condition. It required well toward three hours of patient work to remove all of the loose splinters of bone, the teeth and sloughing parts of the tongue and lips, and then to sew what was left into something resembling a human face, and it was all done without an anaesthetic. Then he had to be fed through a stomach tube until he was nearly healed. A few years later he came into the hospital and told us who he was. It seemed almost incredible that he had made such a good recovery.

Most of our work is of the ordinary sort, but there are enough of the unusual cases to make it very interesting all the time. Amoebiasis and all the intestinal parasites, cholera and plague, when the epidemics come, all the tropical diseases like beri-beri, dengue, and the various forms of malarial infection keep us interested and make one wish for time for more careful study. Leprosy is not uncommon in Foochow, but the cases do not like to come regularly for treatment. A new hospital especially for these cases is contemplated and should be of much use. Smallpox comes in pretty regular epidemics. It is not uncommon to find a case in the waiting room, or to have them come into the examining room. The Chinese seem to think as little of being in the same room, or even in the same seat with a smallpox case as we do of riding in the same car with a coryza victim. Fortunately we have no anti-vaccination societies in China. Vaccination is very popular, and is probably reducing the incidence of smallpox considerably.

A case of burn scars was the result of a degree of poverty not commonly met with elsewhere. The man did not have bedding enough to keep him warm, so he took his little fire-basket to bed with him. The basket contains an earthen bowl, something like a flower pot, in which there are coals covered with



Chinese cities are becoming modernized and cleanly, the foreigner has set the example. This is a street in Tsing Tau showing the cleanliness of the German methods of city construction in China.

ashes. During his sleep he upset the basket and the coals set his bedding on fire, and burned the area that is cicatrized over.

One of the commonest ailments that we have to treat are the various forms of ulcers of the legs. Pictures of a few typical cases are shown. One might confine his practice to treating these ulcers and have all the work that he could do.

During the last few years the writer has given himself almost entirely to treating eye diseases, though much of the time having the management of the hospital in addition. There is no line of work that is more greatly needed all over China than this, and nothing that seems more rewarding. Trachoma is the cause of the greater part of this work. Poverty may account for the great number of cataracts, and for the fact that they seem to occur in younger people than in this country. Scarring of the cornea from ulcers, smallpox, and wounds is common, and often something can be done for these cases by an optical iridectomy.

The two battles in Foochow, that of the revolution in 1911 and that of the Southern invasion in 1923, gave us an undesirable amount of experience in handling the various forms of gunshot and shrapnel wounds. In both cases our hospital was so located that most of the wounded were brought to us, and each time the hospital was filled to overflowing.

A question that is often asked is, "Do not the Chinese military powers have their own hospitals?" It is worth while to answer this question with some care. They do have military hospitals. There were three of them in Foochow. Time and again we have asked the soldiers why they come to us when ill or wounded, why they do not go to the military hospitals provided for them. In the army hospitals they are given medical and surgical care, food and bedding free, and also are given a small

sum for spending money. When they come to us they have to pay at least two dollars a week for board and care, so it is a pertinent question why they come to us even in times of peace. The answer the soldiers invariably give is, "They do not care whether we live or die. You do care. This is the place where soldiers are given the best care and the most consideration." There is probably no class in China from whom it is more difficult to win that sort of testimonial.

Probably our experience is fairly typical of that of mission hospitals in China, in the fact that the military authorities give little or nothing toward the support of such work. To some hospitals they have given small amounts of money, but nothing like enough to pay for what has been done for their soldiers. They also gave us tablets expressing their appreciation! Of course they would argue that they are supporting their own hospitals, even though they must know how very inadequate they are. Some have suggested that we should refuse to admit soldiers to the missions hospitals, but a second thought will persuade one that such a course would not be wise or consistent.

There is much in what the soldiers say about the care they are given in military hospitals. The head medical man is a member of the staff of the general. The various hospitals are put in charge of less well trained men, men who cost less. The appropriations pass to the superior, who allows them to trickle through his hands more or less rapidly, to the support of the hospitals and to pay his medical juniors. The doctor who was at the head of the military hospitals in Foochow was a graduate of Tientsin medical school, and had taken post-graduate studies in Germany, and was a well informed medical man. Some of the junior men had been hospital assistants for only short times. One of the men who was in the medical staff of the Nationalist army had



An old Confucian temple built 250 A. D. that has housed many who have lain ill under its roof.

been five years a student in our hospital and was a fairly good student, but had not been given a diploma. But while there are a few well trained men in such service, it will be of interest to know that the first of last year, five of the hospital staff left to join the Nationalist army as surgeons. One man was the dispenser. A young man of unusual promise, who had done rather more than the usual amount of practical work in medicine. The next was a graduate nurse who had received no medical training beyond that which is given to nurses. The other three were nurse students who had not even finished the three years of nurses' training. The fact that the Southern army will accept such men and use them, is evidence that those in charge of the medical department to not take it very seriously. These young men will be given from forty to sixty or more dollars a month, when they are paid, and this is considered such good wages that there is a veritable scramble for such places on the part of half-trained students.

It is, however, remarkable what good work some of these half-trained men do, and how they develop with their experiences. It may be said that the best trained men are none too good. This is always true. This is the thought of the men connected with the Peking Union Medical College. This institution is a great boon to China, and brings much of promise, but it cannot solve the whole problem of introducing Western medicine into China. Even if it were possible for it to train ten or twenty times as many well-prepared medical men as it can, it would not meet the need. In this connection it should be noted that the well-trained medical men who graduate from Peking and from American medical schools do not fit into the medical needs of the greater part of China. They are trained to have at hand and to depend upon all the appliances of the modern hospital, and to have specialists upon whom they can call for laboratory work of the most up-to-date sort. These facilities can be had in only a few of the larger

cities of China. When these young men come to treat disease in the homes as they now exist, they are at a great disadvantage. A medical friend sent a young Chinese to be educated in Peking. He bore all the expense, expecting that the young man would return to work with him in his mission hospital. The young man finished his course and came back to his native town, and commenced to work with the doctor who had been good enough to give him such unusual advantages, and within a short time, left again saying that he could not work under such conditions. This doctor had private means and so was able to outfit his hospital better than many of the mission hospitals are outfitted, but it was not good enough to appeal to this young man as a great opportunity to serve his own people. Such young men can and do settle in the few port cities, where they gradually build up a practice, but their special training is not something that the average Chinese can appreciate, and so the mere fact of such training does not bring them immediate patronage, as a matter of course. If they enter mission hospitals at all it is usually to do a year or so of internship and not to identify themselves with the places where there is the best opportunity to help their own people. They cannot settle in the more needy towns where there is no clientele of people who have already been won to confidence in Western medicine. In the large port cities this clientele has been prepared by the mission hospitals and the students they have trained. A fine young Chinese received an unusually good training in an American medical school, and took two years of internship in a large city hospital, then went back to his home city. This young man belonged to one of the most wealthy and influential families in the city. The city is one in which there is a greater demand for Western medical practitioners than in most large Chinese cities. This young man had the advantages of wealth, good

family connections that put him in touch with the best society, and would seem to have had everything in his favor, and yet he had to work several years before he could win a paying clientele. Even the members of his own family often preferred to employ the old-fashioned native doctors. This instance is cited to bring out the fact that the wealthy and literate families are just as likely to be conservative about using scientific medicine as are the less well informed, and that the well-trained men have as much or more difficulty in winning a supporting patronage than do the less well trained.

One might even go a step farther and say that the men who have not been away from their home city for training, and have been given the opportunities for practical work which the mission hospitals afford, are better prepared to meet the people as they now are, and the home conditions that now exist, than are the foreign trained men. The best trained men are increasingly needed, and will be given better opportunities as time passes, but the men prepared in such places as the mission hospitals will do more of the pioneering, and of the breaking down of prejudice. This has an unfavorable side. There is already an enormous amount of quackery that is called "Western Medicine" in China. Many of the men who have a little knowledge are using it in discreditable ways. This cannot be avoided. One of our patients told us that a Chinese doctor who pretended to be a disciple of Western medicine, advised him to have an injection of salvarsan three times a day, instead of once a week, as is usual. No doubt that sort of thing occurs, colored water being cheap, even in China, and the Chinese at the present time having a craze for treatment by "strike needle" methods. In spite of this there is reason to say that in general, these men are helping to add to the appreciation of the masses of the merits of modern medicine. Nothing is more certain

than that the less well trained men are feeling their lack of competence as they come into competition with the work of better trained men, and with that done in the mission hospitals. Another certainty is that they will want to have their sons receive a better training than they themselves have had. The assistant that has worked with us the last twenty years has never received any training in any other place. He has become a medical man with remarkably good judgment and no inconsiderable surgical skill. When his son grows up that father will send him to Shanghai, Hongkong or Peking, where he can gain a better training than the father himself has received.

So the medical needs of China's great population are to be met by using every possible means to disseminate a knowledge of what scientific medicine has for the Chinese people. We may call the work of the Peking Medical School an

effort to lift up from above the people. It is needed and is an important kind of work. But the men trained there have but little hold upon the people until the medical missions and the large body of less well trained men have created a clientele for such representatives of Western medicine. Without this preliminary, and more primary, elementary work, the well-trained man can with difficulty earn a living, that will justify the expense of his education. This elementary work is proceeding rapidly, and yet while it is true that much work has been done in the large cities, and while patients come to our mission hospitals from great distances, we must not forget that there are sick people within half a mile of our hospitals that do not even know what the hospitals are for, and that Western medicine and other things from the west have not yet penetrated into the country very deeply.



Women at work on the grounds of the Women's Normal College, Nanking, raising vegetables under modern sanitary conditions.

The Black Spider

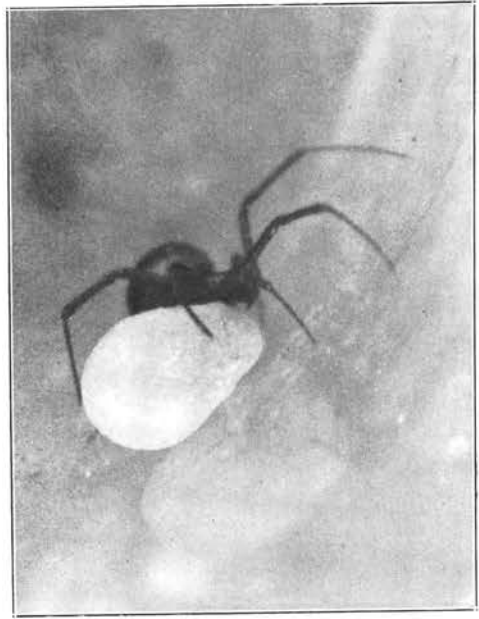
By NILS P. LARSEN, M. D.
Pan-Pacific Research Institute

The Black Spider,—called the hour-glass spider from the red hourglass-shaped mark on its abdomen,—called the shoe button spider from the resemblance as to size and appearance to a black shoe button,—called the black widow from its habit of devouring the male as soon as the latter has served his purpose as an impregnator—and, called *Latrodectus Mactans* because scientists believe learning should be basic—and hard!

This spider looks as the accompanying illustration shows it. The largest female we had, measured from toe to toe, 5 cm. It is prevalent throughout all the southern United States and has been found in the northern ones. Tradition states that the Indians of Southern California made emulsions of these spiders to poison their arrow heads. Throughout the United States it is known as the most poisonous of all spiders. Of 150 recorded hospital cases, sent to hospitals because of the severity of the symptoms following a bite, 10 died. So the chance of death from a bite is less than one in 15 since only the severest cases were sent to hospitals.

It likes the dark, hence most cases bitten were individuals who were making use of outside toilets and the part bitten was the part exposed—to the dark.

It has often been stated that poisonous insects brought to Hawaii from the mainland lose their poison. Since there had been no recorded human cases in the islands and since the spider was present



The black spider, a microphotograph.

here, in fairly large numbers, this fact seemed to lend weight to the "losing poison" theory.

A spider was caught in its natural habitat and after becoming acclimated to the laboratory, several guinea pigs and two rabbits were exposed. The animals were bitten on the nose or ear. Within 10 minutes, the first muscular twitchings began to appear. These twitchings continued at rapid intervals, first one part of the body then another being affected. At times the animal would almost jump from the floor. The animals were seen to froth at the mouth and in about half an hour fell over on their sides semi-conscious and apparently expectantly awaiting death. Gradually recovery would take place and in four to six hours the animals would return to a normal healthy condition. The back legs were sometimes affected and seemed partially paralyzed.

Eggs were then obtained through the courtesy of Mr. Twigg Smith and from one egg about 250 small spiders were hatched. As soon as hatched, these very

active little creatures spun a beautiful network of web. They were separated into several jars and the race for supremacy began. They grew fairly rapidly, but each was prey for the other, so with each day there were some fewer. From this family, however, there finally survived one adult female and one adult male. The adult male was placed in a jar with the adult female. There was definite evidence of mutual coyness, none of the quick darting attack evidence when ordinary prey was thrown into the jar. By next morning the adult male had disappeared. This was in July. In January, the female delivered herself of a large white egg. This was removed to a new bottle on February 1, and on February 27, thinking no live spiders were within, it was opened and a dozen small live spiders hurriedly escaped. There were a large number of undeveloped eggs left behind.

Having raised an adult in the laboratory on a fine diet of flies, the animals were again allowed to be bitten. The same symptoms occurred. However, after the spider had laid two eggs and fed well, another attempt was made with the animals. The first guinea pig developed symptoms in about one-half hour, but these were mild and the pig recovered in about $1\frac{1}{2}$ hours time. The second guinea pig and a rabbit, both bitten, failed to show any symptoms.

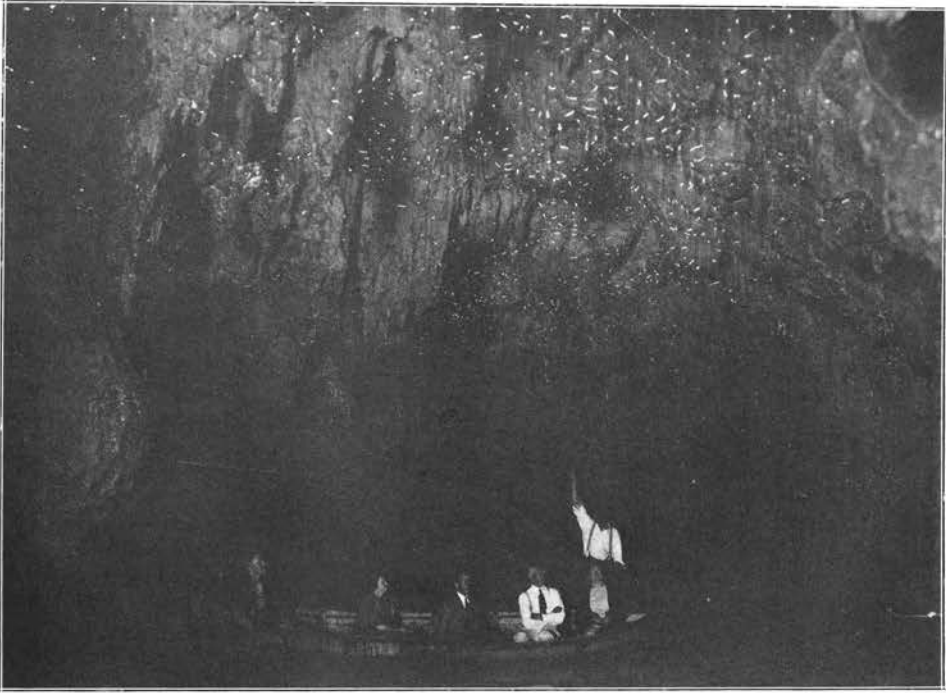
The biting apparatus consists of two saw-toothed prongs, one on each side of the mouth. These two prongs are injected into the enemy and make small holes, from which minute drops of blood ooze after the animal has been bitten.

With man the symptoms are very similar. There is a local pain at the time of the bite, followed in about 10 minutes by cramping and aching pains, first in the part near the bite and later spreading over the abdomen, legs, back and chest, increasing in intensity for about one hour. The intense agony may last for hours and even large doses of morphine fail to relieve. Nausea, vomiting and difficulty in breathing accompanies these symptoms. A little temperature develops, the pulse gets slow and the blood pressure rises. Next day the patient may have pains in the feet and legs and complain of numbness in the soles, which lasts for days. The minute drop injected must be very powerful to produce such symptoms.

Emil Bogen, in a very interesting article on Arachindism, has described in detail a number of clinical cases and gives an excellent account of spider poisoning. The most unique therapeutic measure reported by Bogen is the use of blood from a patient who had recovered. 25 c.c. of this blood were injected intravenously into a patient soon after he had been bitten. The result was a marked improvement within a much shorter time than could otherwise be expected.

However, having seen the marked variation in symptoms in animals, it will be interesting to await further therapeutic tests.

Some other interesting observations made were the ability of this spider to overcome enemies. A large centipede thrown into the jar was immediately attacked and within a very short time was wrapped up in a tight web. In the same way a scorpion was snared and bitten.



The caves and these glow worms are the most wonderful sight which I have seen in New Zealand and I actually saw these worms catch midges and mosquitoes on the suspended threads and draw them up and devour them, thus verifying the mooted question of their carnivorous nature.—B. F. Hulse.

New Zealand Cave Glow Worm

By J. DRUMMOND, F. L. S., F. Z. S.

(The following article and notes were secured by B. F. Hulse and forwarded to the Pan-Pacific Research Institute.)

Particularly brilliant glow-worms have charmed Mr. P. Searl, Glen Massey. Describing them in their young, or larval, stages, he states that they are up to three-quarters of an inch long, hang suspended by a thread about half an inch long, and shine so brilliantly that a newspaper may be read by their light. They are found overhanging a creek or at a cutting in a roadside, usually where it is covered by ferns. They continue to shine when they are picked up and carried for a few hours. Some collected by him were placed with clay in a match box and sent to a friend in Auckland. They were un-

packed two days later and were taken outside in the dark, and an hour later one of them lighted up its lamp.

They are probably the same species as the glow-worms that beautify the Waitomo Caves like sparkling diamonds. Their name is *Arachnocampa luminosa*, that is, luminous spider-like creatures. This refers to their habit of spinning a garment like a spider's web. As far as is known all glow worms in New Zealand belong to that species. Their resemblance to spiders as far as habits are concerned is not fanciful. The thread mentioned by Mr. Searl is usually one of several. Min-

ute globules of sticky substance on the threads give them the appearance of strings of beads. Mr. A. Tonnoir, entomologist at Canterbury Museum, who has New Zealand's glow-worms under observation, explains that when a tiny insect, such as a midge, attracted by the light, touches the thread, it is lost beyond all hope. There it sticks, struggle as it may. The vibrations caused by its struggles attract the attention of the glow-worm, which quickly winds up the hanging thread, in the way in which an angler winds in his line. The midge is eaten and absorbed, and not merely sucked after the manner of the spider and the fly.

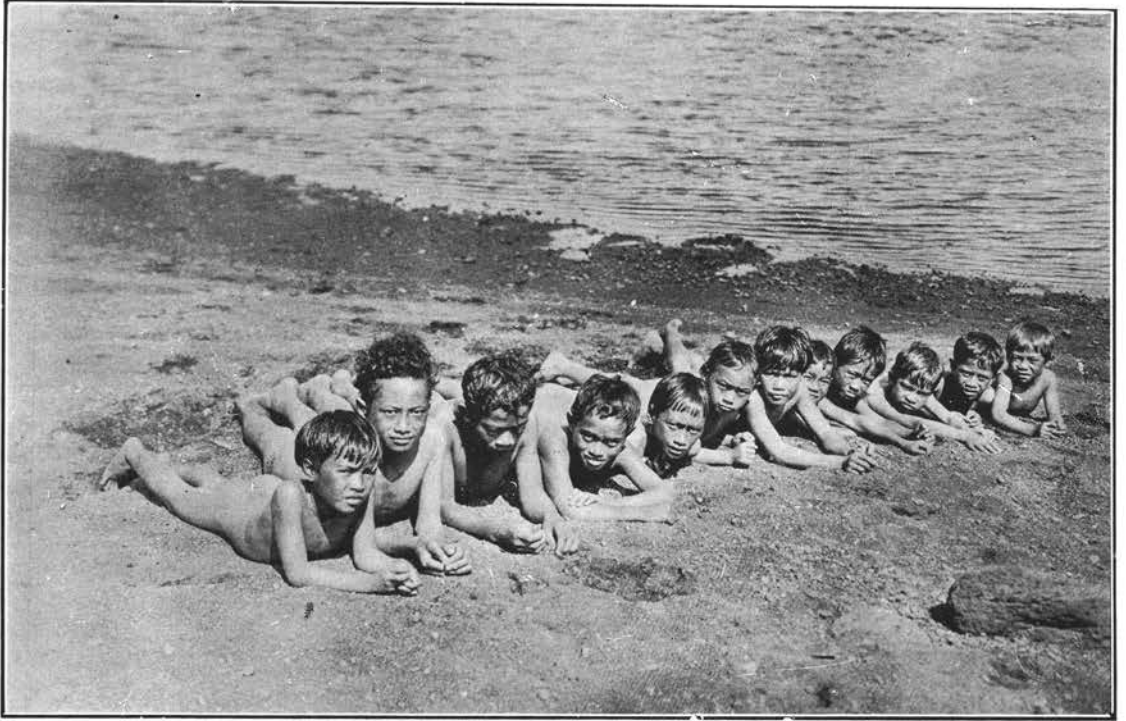
A glow-worm larva—the grub or caterpillar—is slimy, fragile and dirty grey in colour, and has a skin so transparent that it is possible to see all its internal organs. Full grown, it has a segmented body, no legs and a lamp carried inside the last segment. It makes a silk sheath, placed horizontally and saturated with a slimy liquid. Inside that contraption, it glides backwards and forwards. Silken threads are spun and are allowed to hang down from the horizontal sheath. Glow-worms that live in cuttings, on banks and in other open places spin short hanging threads. As the wind often destroys them, fresh ones must be spun during the night. In caves the threads are seldom destroyed, except when an insect is caught in them.

Mr. Tonnoir estimates the average life

of a glow-worm larva at several months, although the length of life depends on the food supply. When it has reached its full size it re-absorbs all the hanging threads. For the first time it leaves the silken sheath, hangs down from it, and then goes through one of the most mysterious and amazing experiences in Nature's wide realm, the change from a grub to a chrysalis. In that stage it retains its luminosity, but takes no food. In a few days another amazing change takes place. Out of the chrysalis there emerges a perfect insect, a dainty, dark-winged fly, about twice as large as a mosquito, and not unlike a small daddy-longlegs. It shuns daylight, and is seldom seen. This is, in part, the life history of New Zealand's glow-worm, but not of any glow-worm in other countries.

In the Waitomo Caves Mr. Tonnoir found ideal conditions for glow-worms. The stream that flows through the cave has a bed exceedingly rich in mud. This contains a large percentage of organic matter, on which millions of midges' grubs feed. The grubs are soon transformed into tiny midges, which, emerging from the water, are attracted by the beautiful glow-worms to the roof of the cave, and there they fall into the silken snares. The hundreds of thousands of glow-worms in the cave—their number is limited by only the roof space above the river—is accounted for, Mr. Tonnoir believes, by their very abundant food supply.





The natural preventorium in Hawaii, the open air and the direct ray of the sun.

The Preventorium

By DR. F. E. TROTTER

Chairman, Board of Health, Territory of Hawaii

No phase of work for the sick or of the campaign against disease today is more remarkable than the great and increasing interest in preventive measures.

It is being realized more and more that health is in a sense a commodity and that, as the late Dr. Biggs said, "is purchasable."

Rosenau, in "Preventive Medicine and Hygiene," states that "preventive measures in tuberculosis are based on two important facts: that the disease is an infection mainly spread from man to man through tuberculous sputum and, secondarily, from cattle through infected milk.

Preventive measures fall into two categories: (1) avoiding the infection, and (2) increasing resistance through personal hygiene. Both are necessary.

The infection may be avoided through segregation; the use of pasteurized milk, or milk from tuberculin tested cattle; education; disinfection; proper disposal of tuberculous sputum; the avoidance of contact with open cases, especially with those who do not use proper precautions; and early diagnosis.

Increased resistance to tuberculosis may be gained through fresh air, good food, rest, and compliance with the dictates of personal hygiene. This part of



Graduate nurses of the dental clinic in Hawaii, their care prevents many diseases. Nurses in Hawaii are of all Pacific races as may be seen in this picture, Oriental, Polynesian and Anglo-Saxon. They are kindly and efficient.

the subject includes sociologic and economic reforms, without which the warfare against tuberculosis cannot succeed.

Improvement in housing conditions, lowering of the cost of living, increase in the scale of wages, and all forms of uplift help secondarily to diminish the amount of the disease.

Furthermore, it will be necessary to consider secondary agencies, as preventive clinics, health insurance, notification, open-air schools, preventoria and day camps."

The preventorium idea has been developed during the past ten or twelve years, and is a logical outcome of the increase of knowledge regarding disease—tuberculosis in particular.

Probably the greatest impulse for the establishment of preventoriums for children came from the discovery that tuberculosis almost always develops from infection in childhood.

Dr. J. H. Elliott, the well known Canadian authority on tuberculosis, has stated: "We know today that during the years of school life fully 75 per cent of children become infected with the tubercle bacillus. We believe that fully one-half of the cases of adult tuberculosis are the direct result of childhood infection, which has been smoldering in the body."

Dr. Godias J. Drolet, Statistician of the New York Tuberculosis and Health Association, tells us that from 1900 to 1925 there have been 122,000 deaths from tuberculosis alone of school children between the ages of 5 and 14, causing an expense to the country of \$366,000,000, an average of \$16,000,000 a year.

While, however, the primary impetus for the establishment of preventoriums came from the broadening of the scope of anti-tuberculosis work, from case-finding and the care of persons suffering from the disease in an active form, to include methods of prevention, the value of preventorium care for other than the so-called "pre-tuberculous child" has

been more and more recognized during the last three or four years.

What is our need for preventorium care?

Dr. A. L. Davis, in the annual report of the Board of Health for 1926, states that there were in the public schools 5,509 underweight children, 8,512 with enlarged tonsils and adenoids, 1,050 tuberculosis suspects, and 358 with heart disease.

Dr. Duryea, in his report for 1927, says that there are 2,985 contacts of tuberculosis under the age of 15 years, more than 50 per cent (1,567) of whom are between the ages when preventorium care is valuable. About 75 per cent of these 1,567 children are in poor general health, with poor home conditions.

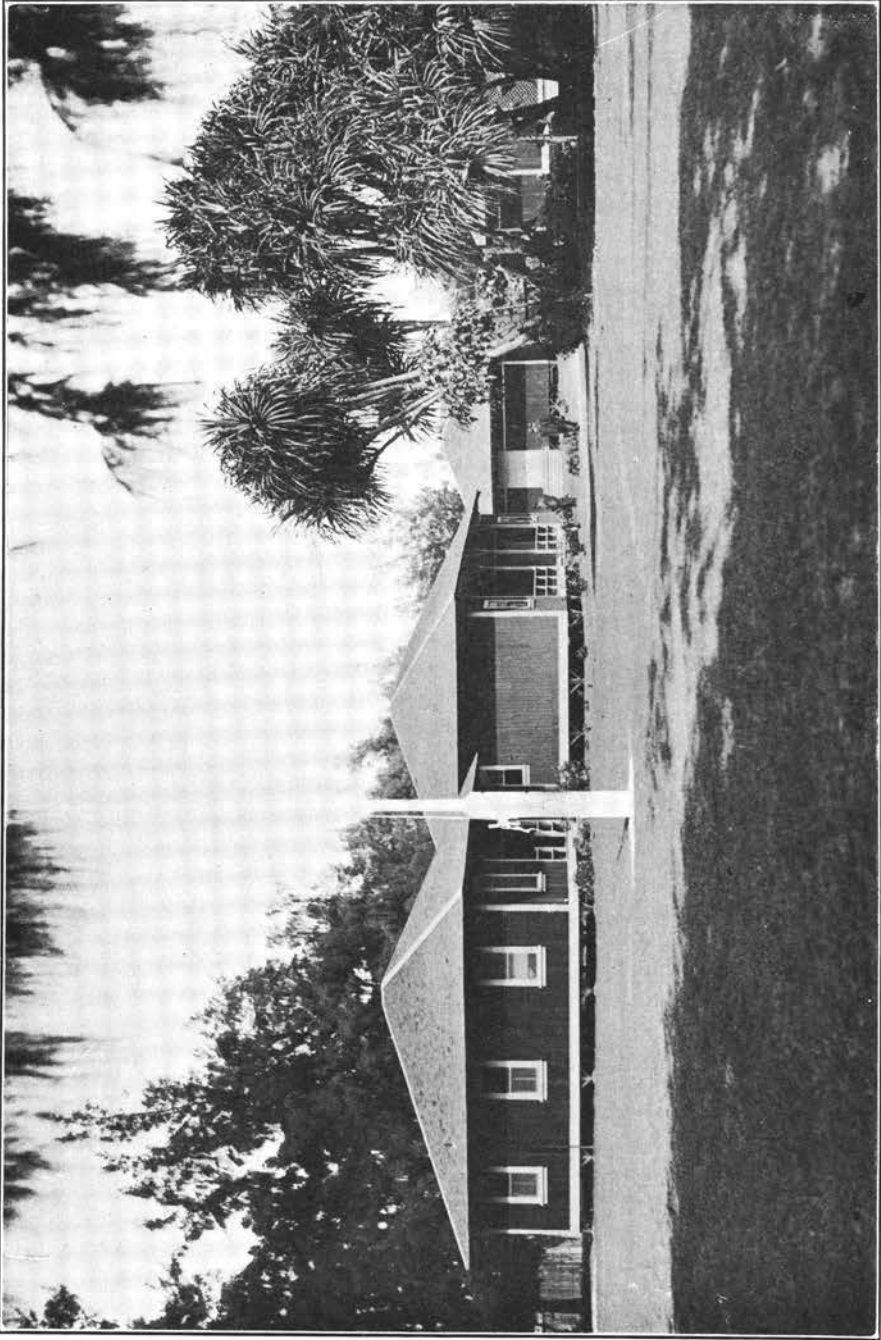
For the five-year period 1923-27 there were 573 children under the age of 10 reported as having tuberculosis, 302 boys and 271 girls. The largest number occurred in the age group of 5 to 9, 347 cases being reported. During this same period there were 206 deaths of children under 10 years of age.

Miss Harriet Stone, Supervisor of Nutrition of the Department of Public Instruction, has furnished me with the number of underweight children in the public schools in which there were nutrition teachers for 1925 and 1927:

	1925	1927
No. of children weighed....	35,611	46,185
No. 7% below average....	4,607	5,568
No. 10% below average....	5,230	5,764
No. 15% below average....	2,591	2,415
Per cent of malnutrition....	35	29.7

The figures are not exactly comparable as more schools in different districts have been included since 1925, and again all schools in the Territory are not included, only those in which there is a nutrition worker.

The increasing attention given to the problem of anemic and malnourished children during the past few years and the more general recognition of the value of fresh air, sunshine, rest and healthful surroundings has increased the demand



The construction of many of the public schools in Hawaii; each classroom a separate building and often the classes conducted outdoors in the open air, the children enjoying the sunshine and open air life even during their studies.

for the type of care and treatment given in the preventorium.

What is a preventorium?

The Committee on Preventoriums of the National Tuberculosis Association, in a tentative report submitted February 9, 1927, gave the following definition: "A preventorium is a twenty-four hour, twelve months institution for the care and observation of children sub-standard in health."

The committee recognized the fact that a preventorium may be successfully operated as a unit of a tuberculosis sanatorium or general hospital or dispensary, but, for practical and psychological reasons, the preventorium should maintain a certain autonomy and be as self-contained as possible, and located some distance from the building in use by the sanatorium patients.

In outlining the standards of eligibility of candidates for the preventorium, children suffering from active pulmonary tuberculosis, nervous diseases, epilepsy, the feeble-minded and the crippled should be definitely excluded.

Selection for the preventorium may be made from the following classes, all candidates, however, being recommended by a physician, general children's clinics, or tuberculosis clinics:

1. Children exposed to tuberculosis at home, or in whose immediate family there has been a recent death from tuberculosis.

2. Children who have had tuberculosis, whose lesions are not active and who appear to be in need of further care and observation.

3. Children suffering from malnutrition.

4. Children who tire easily and are unable to carry on their class work.

5. Children frequently absent because of colds, bronchitis, etc.

6. Children suffering from rheumatic heart disease in Class I, and children in Classes IV and V, of the classification of the American Heart Association, which are as follows:

Class I. Organic heart disease (patients able to carry on habitual physical activity).

Class IV. Possible heart disease (patients with abnormal physical signs, which are probably due to accidental rather than organic changes).

Class V. Potential heart disease (patients with a history or present illness predisposing to heart disease).

No standard plans for preventoriums have yet been developed. For one thing, many preventoriums have been established experimentally in existing buildings that were erected for other purposes, and only in recent years have buildings been planned definitely for the purpose. Broadly speaking, the building should be planned to give the children the essentials of healthy living, namely, fresh air, good food, baths, proper rest and sleep, play and recreation, all in an ordered, regular, habit-forming way, in a spirit of happy comradeship between the staff and children.

Education cannot be neglected and provision must be made for regular school instruction. Because children who are sub-standard in health are usually retarded in their studies, no class in a preventorium school should have at the outside more than twenty-four pupils. Such children require special individual attention and instruction, and the difficulty of mixed school grades must be remembered.

The precise local authority that should establish and maintain a preventorium is not clear. In most cases the educational authorities take care of the education, while the special building required has, in many cases, been provided by some volunteer organization. In some instances the voluntary association continues to maintain the institution, while in others, after maintaining it for a time as a demonstration, it has been taken over by the health authorities.

Fortunately, the tremendous interest being taken today in preventive and health work for children generally has

made it a comparatively easy matter to provide in one way or another for cases needing preventorium care.

One thing, however, is clear, the preventorium offers alike in its establishment and maintenance an excellent opportunity for the cooperation of voluntary and official agencies. The same is true, of course, of the open-air school. Both of these preventive agencies have abundantly proved their usefulness and should form a part of the machinery for health work among children in every community.

Unless a child has come direct from some other institution where he has been under careful supervision, all well conducted preventoria maintain the following procedure:

On entrance to the preventorium each child is kept in bed for two or three days, during which time the temperature is taken several times daily. During this period the child must be isolated, in order to avoid the possible spread of any contagious disease. If there is no marked elevation of temperature the child may be allowed up after two or three days, but should be isolated for a few days longer before entering upon the regular routine of the institution with the other children.

After the preliminary period of observation on admission, the weight of each child is usually taken once a week, and the height once a month, records of both being kept.

While the proportion varies in different places, in the best preventoria there is one trained nurse for every fifteen children.

In addition to a complete physical examination on admission, in good preventoria practice the condition of each child is reviewed every two weeks, on a regularly appointed day, by a visiting physician, and a note is made on the case history.

A complete physical examination is also made upon discharge.

While there is a great variation in this

respect, depending on local conditions, some preventoria furnish fairly complete facilities for diagnosis and treatment, including dentistry and other minor surgical procedure.

Sun baths must be carefully timed and supervised.

Facilities must be provided for occasional cases of illness requiring bed care.

Every opportunity is taken to emphasize hygienic living.

Evaluation of preventorium:

The committee of the National Tuberculosis Association encountered difficulty in arriving at an evaluation of preventoria and health camps as compared with other features of the program for the control of tuberculosis. It agreed, however, that relative value might be assigned to institutions for the control and care of the tuberculous by listing them in what the committee believed to be the order of their importance, viz:

1. Sanatorium .
2. Pavilion or ward for tuberculous children maintained as a unit of a hospital.
3. Preventorium.
4. Summer health camp.

Preventorium class rooms and open-window school rooms are useful adjuncts to these institutions.

While the committee was not definitely charged with inquiring into allied enterprises, such as the open-window room, it felt that such projects are bound up with the question of preventoria, and that a statement concerning them might help to clarify prevailing confused conceptions about them.

The committee believed that the so-called open-window class rooms in which children receive supplementary meals and follow a regime in which rest periods play an important part in the routine, are most important and that every school should have such a room available.

All children described as eligible for the preventorium should be sent first to the open-window class rooms. Those children who do not improve satisfac-

torily here because of unfavorable home conditions, or who are in need of more intensive treatment, should be sent to the preventorium.

On the other hand, patients who have recovered in the sanatorium might well be "promoted" to the preventorium, while patients from the preventorium who have made sufficient progress might be transferred to preventorium class rooms.

In other words, the tuberculous child under ideal conditions would progress from the sanatorium to the preventorium; to the preventorium class room; to the regular class room with or without open windows.

Dr. F. M. Pottenger, Monrovia, California, in dealing with the subject, stated that "it is difficult to estimate the benefits accruing to a community from the preventorium.

"In the first place, it cares for a group of individuals in a human way, giving them what the state or community owes them and at a time when the aid given will return profit to the giver.

"Many of these children must either have the help of such an institution and be given health, or must face ill health and poverty, and untimely death.

"As they become ill and dependent, they become a charge upon the community in some other way, and ultimately cost far more than would be required to return them to health and usefulness when their physical deficiencies first manifest themselves in childhood.

"Every child who is dependent upon the community for aid and who can be prevented from falling ill from a chronic disease like tuberculosis by a limited stay in a preventorium, will save the state many dollars in actual expenditure.

"It is from this unfortunate class of low physical vigor that many of our later demands for charity come.

"From loss of strength they are unable consistently to follow gainful occupation; so they sink into poverty, become victims of disease and through discour-

agement lose interest in life and often develop a disregard for law.

"So that any institution as a preventorium, which takes over the child while young and gives it better bodily vigor and aids it to secure a schooling and at the same time has such complete control of the child as to enable it to inculcate moral principles and healthy ideals of citizenship, will repay many fold the pittance required to maintain it."

To accomplish permanent and lasting results our methods must be educational. By educating and protecting the present generation we are doing much toward improving health conditions for coming generations.

Experience has shown that in doing health work with school children, for instance, that many homes have improved very definitely in their ways of living because of the information which the school child has accumulated. This he brings home, puts into practice, and insists that his mother and father, brothers and sisters, do likewise.

When we succeed in getting the children to live healthy lives and when we can get their families to the point where they will make it possible for them to do so, then and only then will the question of tuberculosis prevention cease to be a problem.

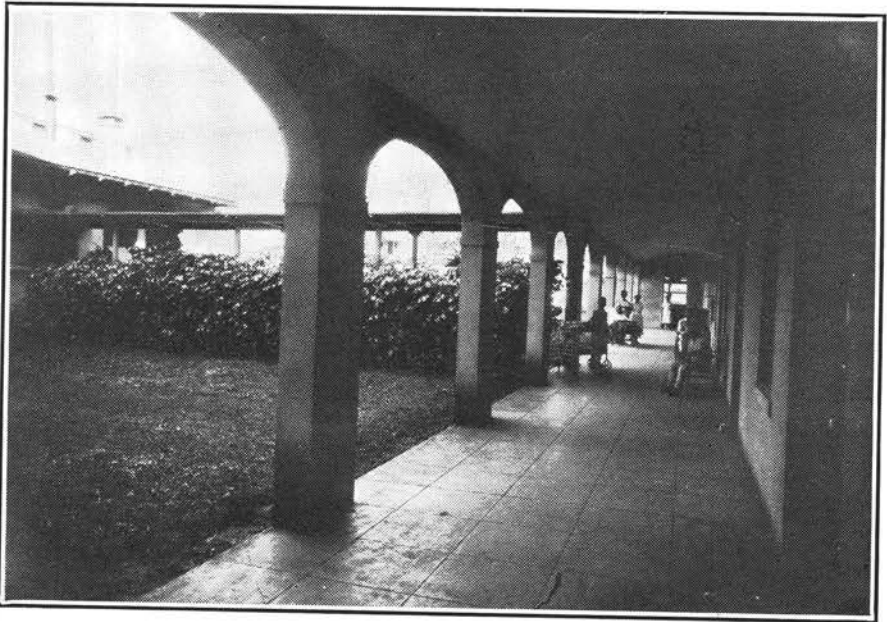
In conclusion:

1. The preventorium is needed in a well-rounded program of public health.

2. The preventorium may be used for all handicapped children who would not be a menace to their companions. It should be used especially for those who have been exposed to tuberculosis.

3. The preventorium should be fostered by medical and educational authorities and eventually supported by public funds.

4. The preventorium should be available to all institutions, associations and individuals who find handicapped children, provided the standard clinic examination shows the child to be eligible for preventorium care.



Every method is used in Hawaii to prevent the transmission of tuberculosis and to control the spread of the disease. Palama Settlement has a full dental clinic and at the Queen's Hospital are great open air lanais for the use of the patients.

The Transmission and Control of Pulmonary Tuberculosis

By A. N. SINCLAIR, M. D. and
C. M., F. A. C. B.

Before a Joint Meeting of the Pan-
Pacific Research Institution and the
Medical Society of Honolulu



Dr. A. N. Sinclair.

Tuberculosis is a disease due to a germ, called the bacillus tuberculosis or Koch's bacillus, having been discovered by Koch in 1882.

It belongs to a group of organisms called the acid fast group because they have a waxy capsule which, when stained with certain dyes, retains the color even when treated with an acid. The leprosy bacillus also belongs to this group.

There are several varieties of the bacillus tuberculosis: (1) the turtle acid fast bacillus of Friedman; (2) the bacillus of avian tuberculosis, or the cause of tuberculosis in birds. Both of these can be dismissed with the statements that the former is the basis of Friedman's cure, that created quite a stir some years ago, but which was found to be dangerous and of little value in the treatment of tuberculosis in humans. The avian bacillus is the cause of a type of tuberculosis that occurs in birds, and which is seldom if ever communicable to other animals.

The third or bovine type is important inasmuch as it occurs in cattle (particularly dairy herds) and produces tuberculosis in humans. But the bovine bacillus generally attacks the lymphatic glands, especially those of the neck, and the in-

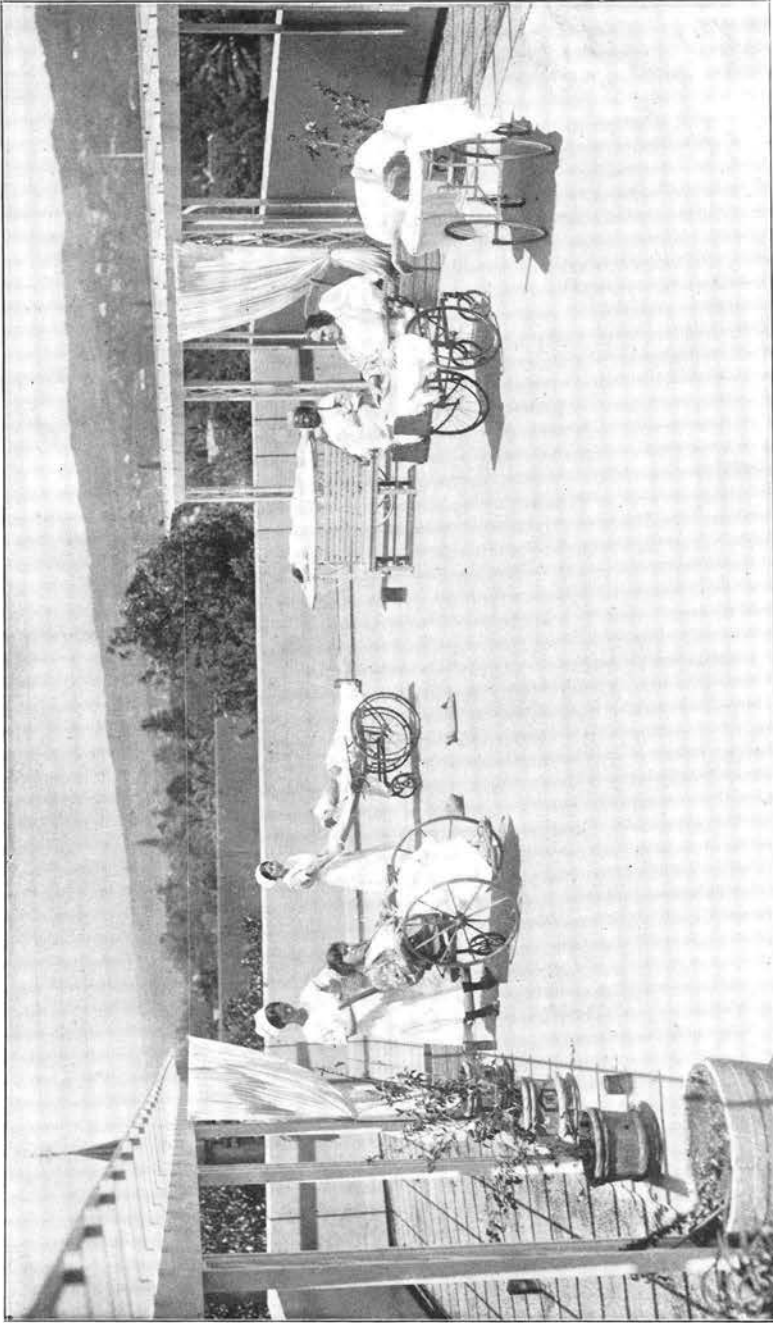
testines, and sometimes the bones. The bacillus of bovine tuberculosis very seldom, if ever, produces tuberculosis of the lungs. This explains in great part why patients with glandular tuberculosis so seldom develop lung tuberculosis; and also explains the fact why this form of tuberculosis is seldom if ever communicable.

The human type of the tubercle bacillus is that which generally attacks man; and the favorite site of attack is the lungs.

Pulmonary tuberculosis therefore is a communicable or infectious disease due to the invasion of the lungs by human tubercle bacilli.

It never arises spontaneously. It must be transmitted from an infected animal, and either directly or indirectly. The modes of transmission will be considered under control of tuberculosis.

We will here state that the opportunities for direct and indirect transmission are legion in number—the human individual is exposed to the infection more



A scene on the roof garden of the Queen Emma Hospital in Honolulu. Here the unobstructed ultra violet ray from the sun may perform its good work while the patients enjoy the wonderful cheering vistas of ocean and mountain range.

or less continuously from birth to old age. Why then do we not all contract tuberculosis? The answer is that certainly over 90 per cent (and probably 100 per cent) of us do contract the disease, but in only a very small percentage does it advance to a serious lesion in the lung.

When the bacillus of tuberculosis (or any other germ, for that matter) invades a part of the body, whether or not serious lesions or disease results depends on three factors:

1. The virulence of the organism.
2. The resistance or amount of immunity possessed by the tissues.
3. The massiveness of the dose.

By virulence of the organism is meant its power to attack the body cells at the time of its invasion. This power varies under certain conditions. It may become very weak when fighting a losing battle against some adverse factor; e. g., exposure to sunlight will lower the virulence of the tubercle bacillus and kill it eventually. The same thing happens when the bacillus is heated—short of the lethal period. Frequently a life of ease and luxury (as when the germ is grown in the laboratory on a specially adapted media at optimum temperature) will lower the virulence of an organism—its faculty to fight for existence decreases with disuse.

If such an organism is injected into an animal, and later recovered, it will be found to have its virulence restored; so we may say that when an organism is fighting a winning battle its virulence will increase.

This varying power of successfully fighting tissue cells (or virulence) is therefore a determining factor of prime importance as to whether or not a tissue is seriously damaged when invaded by the organism.

The second factor: the amount of resistance possessed by the tissues (or degree of immunity) is also variable. A complete immunity may be inherent or

natural (e. g., human tissues have a complete natural immunity to the invasion of some organisms affecting the lower animals). Increased immunity may be acquired in several ways: by a natural process of infection (an attack of the disease caused by the organism); by an intentional transmission to the animal of a light form of the disease; or administration of attenuated or killed organisms.

The human tissues have not a sufficiently complete natural immunity to successfully resist invasion of tubercle bacilli under all conditions—they have to acquire their successful resistance to invasion either through light attacks of the disease or, in some cases, by administration of attenuated or killed tubercle bacilli.

Investigation shows there is something lacking in the body which is capable of being produced by a moderate attack of the disease, and repeated moderate attacks can build up this resistance more and more until complete resistance or immunity is attained. It is therefore evident that the dangerous period for contracting a severe case of tuberculosis is in early life. The new born child is most susceptible and this susceptibility decreases with repeated light or moderate attacks of the disease until adolescence is reached. At the end of adolescence one of three conditions exists.

First, the individual may have a serious and frank case of tuberculosis. Second, he may have an apparently healed spot in the lung, which, however, may break down under unusual strain later in life. Third, he may be completely immune or insusceptible to the disease.

The corollary to this statement is evident; it is only under very exceptional conditions that exposure of an adult to a case of tuberculosis will cause infection. After adult life is reached the danger of exposure is almost *nil* if massive doses are ruled out.

The work of von Pirquet and Hamburger (as well as that of Calmette)

shows that tuberculosis among adults or adolescents is in the great majority of cases the more or less delayed and blazing manifestation of a pre-existing infection contracted *early in life* and stirred up by one or more massive reinfections. As von Behring puts it: "Tuberculosis is almost always the last verse of a rhyme sung by the mother or nurse near the cradle."

The third factor in producing infection or disease is massiveness of dose. By this is meant the invasion by bacilli in such vast number that even though not highly virulent, or in spite of some resistance of the tissues, they can not be completely overcome—they obtain a foothold and produce the lesions of disease.

Massiveness of dose is somewhat a relative term. What would be a massive dose in the early years of a child's life might not be massive in later years—for two reasons.

The preponderance of the lymphatic system and absence of lymph nodes (or filters) in very young children (and tuberculosis is primarily a disease of the lymphatics) renders children in early life highly susceptible. Also, as we have seen, as the child grows older it develops a greater immunity, if its resistance is not overwhelmed.

It is important, therefore, that the greatest precautions should be taken to prevent the overwhelming of the child's resistance, in early life, by preventing exposure to too massive doses of the bacillus of tuberculosis. We can therefore set down the following facts:

Tuberculosis of the lungs is a disease due to the invasion of the lung by the bacillus of tuberculosis.

The virulence of the invading organism is variable, depending on its source and conditions of growth.

The resistance to invasion by the tissues is exceedingly slight in infancy, but increases with repeated unsuccessful attacks of the bacillus to gain a foothold until, at adult age, there may be a com-

plete immunity; and the danger of exposure to a case of the disease is almost negligible.

The young child should be protected from large doses of the bacillus until its resistance has been perfected.

Having gained some conception of the factors upon which successful transmission to an individual depends, we will next consider the means by which transmission is accomplished.

Transmission may be direct or indirect.

Direct transmission is brought about by close contact of an individual with some one suffering from the disease. It occurs more particularly from the patient coughing or sneezing into the face of another.

It is doubtful if the disease can be transmitted beyond two or three feet by coughing or sneezing—the germ being carried by little drops of moisture and this method is known as "droplet" infection. The disease may also obviously be transmitted from mouth to mouth by kissing.

Conveying to the mouth by the fingers, after handling articles that have been immediately used by a consumptive, may also be considered direct transmission.

The indirect methods of transmission would at first sight seem to be legion, but owing to the fact that the tubercle bacillus does not multiply outside the animal body (except under laboratory provisions), the dangers of indirect transmission are not as great as would appear at first sight. Once "droplets" have settled in the atmosphere they are of little menace until they became dust; and to transmit the disease this dust must be protected from sunlight which greatly reduces the virulence of the germ—in fact, can kill it in from a few minutes to a few hours' exposure, depending upon its intensity.

Upon these factors: the dangers of "droplet" infection, care of the hands when in close contact with a tuberculosis patient, and the attenuation or devitaliza-

tion of the tubercle bacillus rest the methods of control of the spread of the disease.

It is evident that if all one had to consider was control of tuberculosis the most effective measure would be isolation and quarantine of an infected individual.

But like many ideal procedures such a method is not practical.

Tuberculosis is so widely disseminated that isolation and quarantine of those having the disease would practically disrupt business and seriously hinder social intercourse.

Fortunately, such stringent measures are not necessary. Business and social intercourse are carried on almost exclusively by adults, and we have learned that adults run little danger from exposure to the disease. Moreover, the treatment of serious cases in a tuberculosis hospital or sanatorium removes a great number of foci of the disease from the community and it has been found that the reduction of the death rate from tuberculosis in different communities is directly proportionate to the number of hospital beds provided for tuberculosis patients.

The sanatorium is one of the most potent factors in preventing the spread of the disease and to a more or less extent serves the practical purpose of isolation and quarantine measures.

For those patients who cannot or will not go to a sanatorium certain rules of conduct can be laid down that will reduce their menace to the community to a minimum.

Bearing in mind the factors favoring transmission, which we have already considered, these rules of conduct can be rationally explained.

When coughing or sneezing a paper napkin should be held in front of the mouth to prevent droplet infection. The napkins can then be burned.

The sputum of the consumptive is loaded with tubercle bacilli. He should

therefore take precautions as to its disposal.

Promiscuous spitting should be forbidden—a paper pocket sputum cup or flask should be used. Unfortunately, the public needs some education on this point, as well as the consumptive.

Suppose some one present this evening were to make use of a pocket sputum cup—it needs little imagination to anticipate the facial expression and voluntary separation of his near neighbors. Why should this be so?

It certainly shows a lack of appreciation. The consumptive is not benefitted by spitting into a cup, but his neighbors are. Is the action caused by contempt or fear?

Why show contempt instead of sympathy for one having tuberculosis? Why show fear when having passed the age of adolescence you are no longer susceptible to infection?

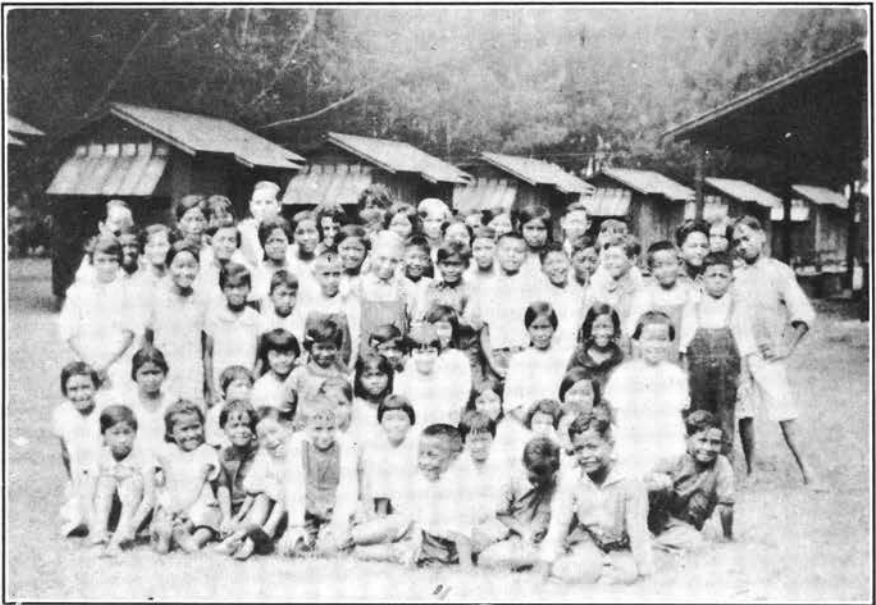
This is a matter of great importance if we are to encourage the use of the sputum cup instead of stealthy expectoration.

We have learned that sunlight is de-vitalizing to the tubercle bacillus: living rooms should therefore be well exposed to sunlight. Also, that the germ falls to the floor and is only dangerous when in the form of dust; we should therefore avoid vigorous sweeping and stirring up the dust in rooms occupied by a consumptive; and under no circumstances should young children be allowed to crawl on the floor of such rooms.

All dishes used by the consumptive should be sterilized by boiling in water, twenty minutes—if this is impracticable the next best thing (but a makeshift substitute at best) is to limit the use of such dishes to the sick one.

The patient should not be allowed to handle dishes or prepare food for others.

He should be warned against contact with very young children or susceptible persons and should be made to sleep alone.



The beginning of the tuberculosis preventorium at Kulu, some 3000 feet up the side of Mt. Haleakala, and a group of children of all races at the permanent Palama fresh air camp on Oahu Island at sea level.

I can lay down other rules of conduct, but with a knowledge of how tuberculosis is transmitted these examples should suffice.

The foregoing rules of conduct are for known cases and apply to the individual. But there are many unknown cases of tuberculosis in the community and these call for general rules to protect the public health.

One of the most important of these is prohibiting the use of the common drinking cup, along with insisting on the sterilization of dishes and glasses in restaurants and soda fountains; and this is as important for the prevention of transmission of other diseases (diphtheria, etc.) as for tuberculosis.

There should be strict enforcement of tenement house regulations concerning lighting (by sunlight), number of inmates to individual rooms and particularly proper ventilation.

The teaching of hygiene, or care of the body, in the schools is most important. We know that the fight against tuberculosis infection is coming sooner or later in the life of the school child and that before specific immunity is established he or she must depend on the metabolism (general resistance) to a great extent to prevent establishment of the disease. The school child should therefore be taught as early as practicable the value of hygiene; proper feeding, proper exercise, and the value of fresh air and cleanliness.

There is no more valuable public health work than the periodic examination of school children. This is a work that should be carried out without a thought of the cost. Its return to the community by the discovery and arrest of early cases of tuberculosis will alone repay whatever money may be expended for this purpose.

We do not need any new cure for tuberculosis. All cases recognized in the early stage are curable. Therefore what we most require are more efficient methods of early detection.

The examination of school children is one of these methods.

That the discovery of early tuberculosis in school children cannot be left to chance has been proven by past experience.

Over and over again we have young children brought to us with the disease so well established that the outcome is doubtful and yet a history is elicited of one or two years of recurring colds, of under weight, and continuous weariness.

How such strongly suggestive symptoms can fail to arouse a suspicion that the child is ill is a surprising fact; especially as a little investigation would disclose a slight fever in the afternoon or evening.

But this blindness to the insidious progress of tuberculosis is not confined to the school child or adolescent—adults are frequently in the same condition.

They may have all these signs: recurring colds, loss of weight, lack of ambition, feeling of fatigue on slight exertion, and even more or less constant cough, and yet they take no steps to determine the cause.

There is a peculiar psychology manifest in many people in regard to tuberculosis. They know or should know that early tuberculosis is almost 100 per cent curable, and yet they fear the discovery that they may be a victim.

Many seem unable to screw up their courage to a deciding test—examination by their physician—until their condition is such that it is all too evident to themselves, and their ultimate cure is at the least problematical.

If this too common warp of mind can be overcome, a great deal can be done in the prevention of tuberculosis and in its transmission to others.

It is not at all an uncommon practice for people to go to a dentist once or twice a year to have their teeth examined—and a good dentist can supply a pretty good substitute for natural teeth;

but it never occurs to a person to go once in a life time to have his lungs examined and these organs cannot be replaced at all.

Besides the discovery of early cases, the periodic examination of school children discloses a number of what have been called pre-tuberculous cases. These are cases in whom tuberculosis is not demonstrable but who are undernourished, of low resistance, and generally favorable to the development of the disease.

These children can be saved at little cost to the community through the preventorium, but this phase of the tuberculosis problem is being presented by another speaker.

Personally I believe that many times more valuable results can be obtained by concentrating our efforts to control tuberculosis upon the early cases and the susceptible portion of our population—the young children and adolescents.

Whenever energies and efforts are limited in expendable time or money, such energies and efforts might well be diverted from such measures as protect the adult to those that protect the child.

I have possibly overstressed the immunity of adults, compared to that of children, because I believe there is a needless fear of contagion that militates against cooperative efforts of tuberculosis workers and the community.

I have done so because in many ways this groundless fear has been brought to my attention. For instance, I have heard of adults afraid of visiting the Leahi Home for fear of contagion when the public has been invited to visit the institution.

Let me assure you that even were tuberculosis contagious to adults there is much less danger of visiting the Leahi Home than going to one of the best hotels—particularly if you put up at the hotel over night.

On the other hand, because I have stressed the immunity of adults, I do not

want to be interpreted as in any way recommending laxity of the rules laid down in this paper for the prevention of the spread of tuberculosis.

Stringent rules are necessary because we cannot guarantee that all who come in contact with or within the zone of infection (direct or indirect) of the consumptive are beyond the age of infection and it is within the range of possibility that some adult susceptible to massive reinfection may come in contact with him.

The only safe procedure for the consumptive to follow is that instilled by habit—by observing at all times the avoidance of infection—not only when he is with susceptible persons. Moreover, the paths of indirect infection are so numerous and subtle that only constant watchfulness can be of value as a safeguard to others.

Again while it is maintained that tuberculosis is almost always the result of early infection, I do not deny absolutely there is a chance that an adult may acquire the disease in later life. There is a very small chance that he may—you can figure it out for yourselves.

It means that the individual has fought infection for almost two decades of life without receiving a sufficiently virulent organism, or a sufficiently massive dose to turn the scale in favor of development of the disease and without developing sufficient immunity to resist the disease in later life.

While this is possible; yet, to those who are familiar with tuberculosis and its wide dissemination, the chance of escape is considered negligible, particularly since recent investigations in Chicago and elsewhere have resulted in the assertion that it may be set down that 10 per cent of any community have active tuberculosis at any one time. Some recover with immunity, some with serious disease and some with latent foci.

As a final argument for still insisting on the strict observance of rules to avoid infection of others, we have the never-

to-be-forgotten fact that tuberculosis is an infectious disease—and the transmission of infection is eminently within our control; and while the most of those having clinical experience with tuberculosis believe in this early immunization theory, some research workers have attacked its validity, and their opinions are worthy of consideration.

We should therefore strenuously insist upon such obvious rules for the consumptive himself as: spitting only into a sputum cup or other receptacle that can be thoroughly disinfected or burned—the covering of the mouth when coughing or sneezing (preferably by paper handkerchiefs that can be burned); the avoidance of contact with young children or susceptible persons; of sleeping with others; of handling or preparing food-stuffs to be used by others—these are all precautions for which there are obvious reasons.

One of the greatest achievements in recent years that gives most promise of control of tuberculosis in the very young is that of Calmette, Director of the Pasteur Institute of Paris.

With the intuition of genius he conceived the idea that the ordinary virulence of the tubercle bacillus could be so reduced by repeated transplanting that it would have powers to immunize against tuberculosis and yet be harmless in its effects.

He therefore began transplanting the organism on a special media, containing bile, and after 230 transplants was successful in securing an organism non-fatal to guinea pigs, the most susceptible of animals to tuberculosis.

As each transplant took two weeks to grow, the time and efforts to secure this organism can be readily estimated.

This organism is an extremely interesting one to the bacteriologist for two reasons: while it retains the power of producing immunity it has lost the power of producing tubercles, the essential minute bodies whose dissemination and growth damage the tissues.

Secondly, no matter how many times the organism is reinoculated into an animal, its virulence cannot be restored—it is still unable to produce tubercles.

Experiments with this organism showed that when ingested by young guinea pigs and rabbits (under ten days old), these animals being extremely susceptible to fatal infections with tuberculosis, they acquired a remarkable resistance, living many months beyond the controls. Presumably, until the immunity from the vaccination had been lowered through lapse of time sufficiently to allow some of the bacilli of the test injection (still alive) to produce infection.

Experiments on chimpanzees and monkeys (whose resistance more nearly approaches that of human beings) resulted in a complete immunity if two conditions were complied with. First, if given before ten days old (in five doses) and if protected from a massive dose until immunity is established (about one to two months).

Furthermore, this complete immunity could be made lasting by repeating the doses at the end of one and two years.

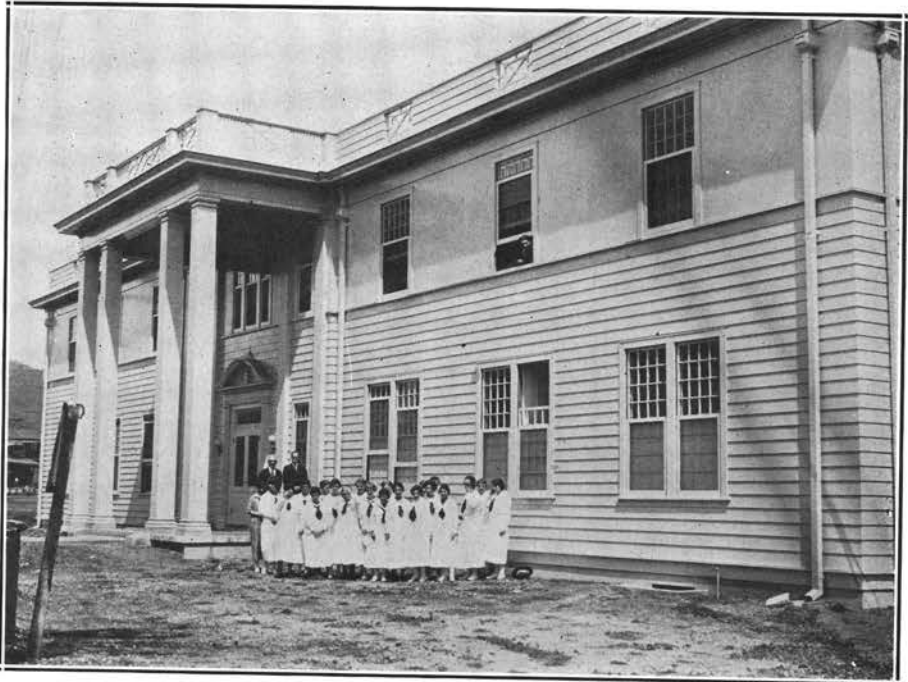
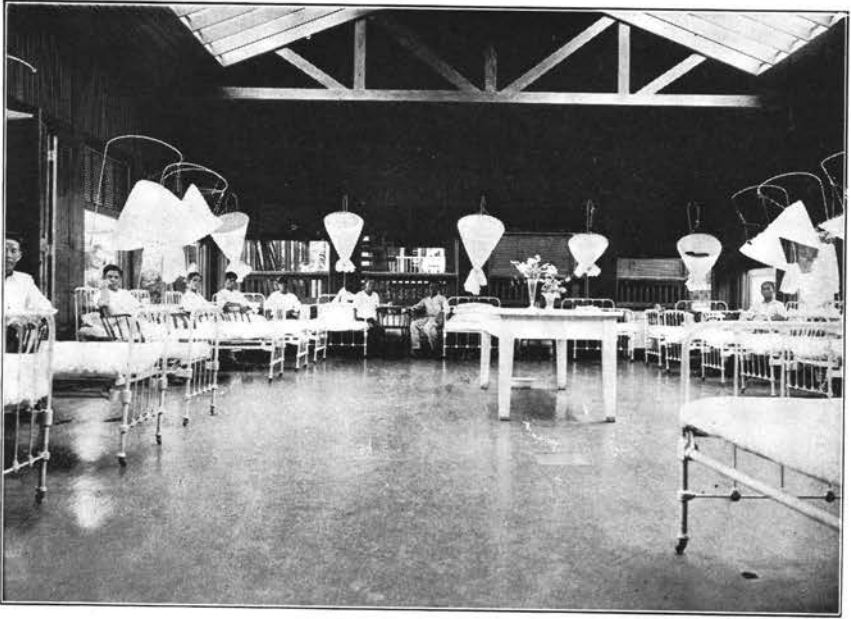
The absolute harmlessness of the vaccine in all animals treated permitted the use of the vaccine in humans.

In July, 1921, the first case was given the B. C. G. vaccine by the mouth in three doses—one dose on the third, fifth and seventh day after birth, respectively. Although this child was brought up in contact with a badly infected grandmother, it is still in perfect health.

Up to January 1, 1925, 5,183 new born infants have been vaccinated. No incident which might be attributed to this vaccination has been reported.

Of this 5,183, 1,317 have been vaccinated by Calmette and Guerin themselves and individually examined.

In France over 25 per cent (and in Paris 32.6 per cent) of children born of tuberculous mothers, or brought up in a contaminated home, die of tuberculosis during the first year of life.



Palama Settlement in the region of the uncared for in Honolulu, where those of all races may find free medical aid. Above is a ward in the hospital of Palama Settlement and the lower picture shows some of the nurses and the medical building.

Among the 1,317 infants vaccinated (not by inoculations) and investigated by Calmette and Guerin personally, the death rate was reduced from 25 per cent of 0.7 per cent; 586 of these children could not be removed from the home to avoid massive doses before immunization was complete, and the death rate for these, having constant exposure, was only 1.8 per cent.

"It seems, therefore, that it must be taken for granted that immunization of the new born by means of the B. C. G. enables us to save at least 93 per cent of children who without such immunization would succumb to tuberculosis during the first year of life."

(Extract from Prevention of Tuberculosis among New Born Infants.—Calmette and Guerin.)

While I have seen no authentic published reports of observations made in Switzerland, I had the opportunity recently of discussing the use of the B. C. G. personally with some Swiss doctors, particularly in Geneva. Their experience agrees with the published reports of Calmette and Guerin both as to the innocuous character and the efficacy of the vaccine.

In the B. C. G. vaccine we have undoubtedly a remedy that promises to do an immense amount of good in the fight against tuberculosis. It is undoubtedly another forward step in the scientific control of the disease, a step equal in importance to any that has been taken in the past.

What have we accomplished in the past?

In a recent booklet entitled "A World's War Against Disease," by John K. Gore, Actuary of the Prudential Insurance Company of America, he states the following:

"One of the greatest triumphs of medical and sanitary science is the tremendous decrease in the death rate from tuberculosis during the last twenty-five years. . . . The intensive campaigns against tuberculosis carried on all over

the world have been remarkably successful, and the economic saving due to the increase in efficiency among the general population has repaid many fold the time and money expended. The nature of the disease makes it much more difficult to control than typhoid fever and other acute infections. When we consider that 80 per cent or more of all persons upon whom autopsies have been performed are said to show lesions from tuberculosis infection, contracted at some time during life, the decrease takes on a new meaning and makes the result accomplished even more striking."

In the table given it is seen that the death rates for tuberculosis in the United States over three five-year periods are as follows:

1901 to 1905.....	194 per 100,000
1911 to 1915.....	147 per 100,000
1921 to 1925.....	91 per 100,000

With this encouragement behind us we can continue the fight against tuberculosis with hope and confidence, until tuberculosis is entirely under control.

My belief is that tuberculous infection never can and never should be eradicated, but that tuberculosis, the disease, can and will be controlled. Without tuberculous infection we would lose our immunity and disaster might follow.

Imagine a community in which tuberculosis has been entirely eradicated for a generation or two and in which, therefore, no specific immunity to the disease has been established.

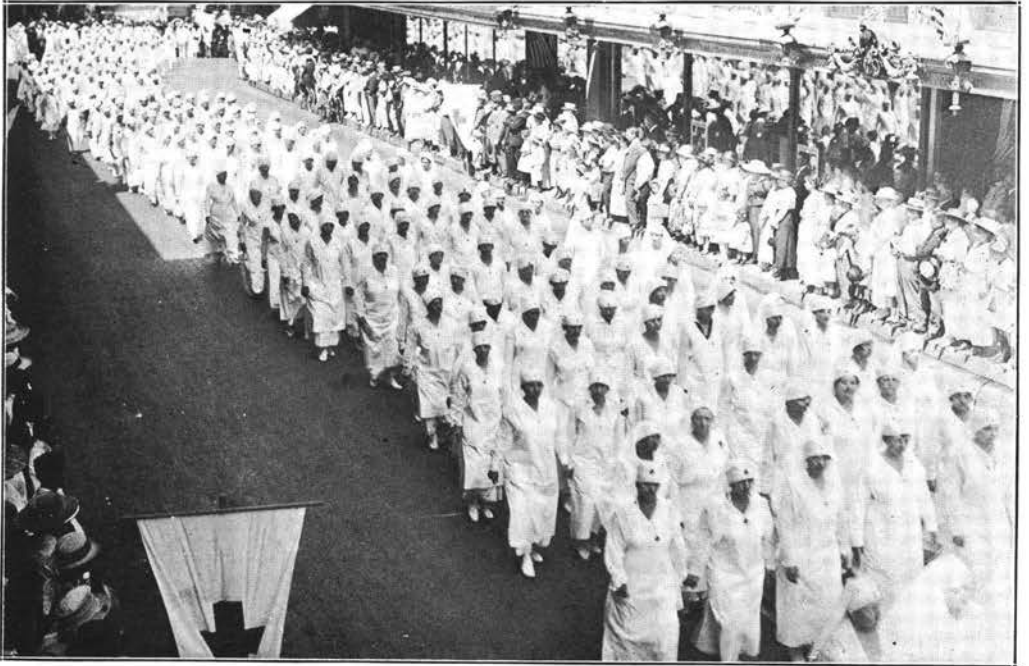
Such a community would have to necessarily shut itself off from all other communities because the introduction of a case into it would cause an epidemic of tuberculosis as serious as our recent pandemic of "flu"—probably more serious, since the population would be 100 per cent susceptible.

Our aim in the future therefore will not be so much to prevent tuberculous infection as to control it, and this will one day, I believe, be accomplished—probably through a rapid method of artificial immunization—similar to that of

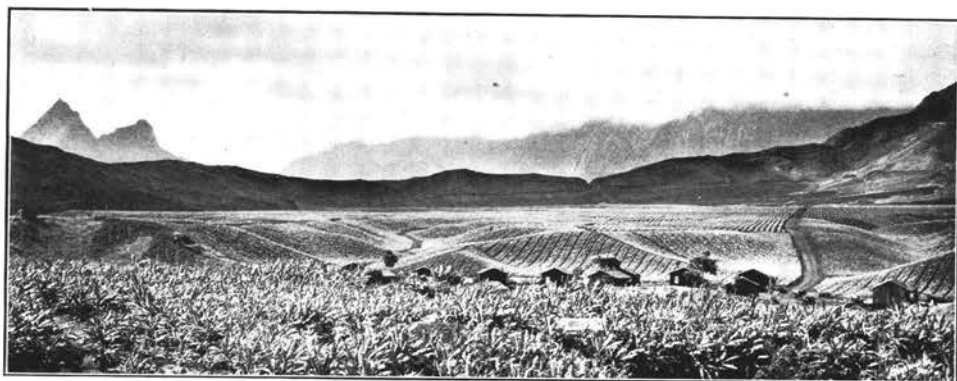
the Calmette and Guerin vaccine which, unfortunately, cannot be used in persons with latent tuberculous foci.

Our present method of immunization is too elaborate and too slow (taking from nine months to a year) to be of value as a general measure—it can only be applied to prevent the development of serious disease in early cases or known infection.

Concentrated research is being applied to the accomplishment of artificial immunization. Such a measure, when discovered, may meet with antagonism from certain factions of the community, but earnest workers in scientific research are little influenced by ignorant criticism. They are content to build upon the knowledge that truth will prevail.



A bit of the Red Cross Army of Hawaii, composed of women and children of all Pacific races.



Chemistry is used in growing pineapples in Hawaii, both in the fertilizer and in the chemical process of making from bagasse the strips of mulch that cover the soil and retain the moisture.

The Present Trend of Chemistry

By DR. LENORA NEUFFER

Of the University of Hawaii, before the Pan-Pacific Research Institution

I shall attempt to give you some idea of what chemistry is aiming to do in our time. My subject suggests a contrast. If we speak of the present trend we must be referring to some difference between the present time and times gone by. Has there been in the course of time a decided change in the aims and purposes and methods of the science of chemistry and if so, what has brought them about and what are they?

In a recent Journal article the well known chemist, A. A. Noyes, made a statement that about forty years ago the physical sciences, chemistry and physics, had reached practically a stationary state. Physicists at that time made the statement that nothing more could be done in physics except to add more decimal places to the constants already determined for natural phenomena. At the same time certain chemists ruled against new hypothesis for explaining natural phenomena and claimed they must be accounted for by known facts.

It would be interesting first of all to

find out what the state of chemistry was in 1890, about forty years ago. Whenever a field of knowledge claims for itself a name it must have some particular purpose and some specific reason for claiming that name. So it is with chemistry. It must have a business of its own. I should first like to point out what the business of chemistry is and how it was pursuing its aims forty years ago and how it is doing the same thing now but with different materials and different methods.

About forty years ago we had reached a place where chemistry was well established as a science. What was chemistry doing up to that time? The same thing it is doing now, studying substances. The business of chemistry then and now was to study substances, all the substances that make up the material world, be they the wood of this table, the soil, dyes, glass, blood, paper, flesh, or cloth.

We refer to the 92 elements which we know make up the universe, and the combinations that these 92 elements can fall



The chemists have even analyzed the gases that are formed in the living crater of Kilauea, getting samples from varying depths in the lake of molten lava.

into due to conditions under which they exist or will be created for them in the chemical laboratory. If I say that chemistry deals with the study of substances, you ask how about the other natural sciences, by which I mean those based upon personal experimentation. (Incidentally, we differentiate between natural science and science. Psychology, social science, political science have laid claim to the name "science". The group of workers who base their investigations on personal experimentation have adopted a new name, natural science. Certainly physics deals with substances, and botany zoology, any of the natural sciences. The difference between chemistry and other natural sciences must lie, then, in the way in which chemistry deals with substances. That is the point I wish to make, so that when we contrast the period of 1840 with the present time, we understand we are talking about the study of substances in a particular way.

Chemistry is interested in the substances which make up the world,—the 92 elements and all their possible combinations,—in two ways. First, from the standpoint of their composition; second, from the standpoint of change into new substances. The physicist can make use of glass and of sulphur in various ways. He might be interested in glass from the standpoint of whether it would make a good lens. The chemist is interested in it from the standpoint of the elements it contains. The physicist might be interested in sulphur from the standpoint of the electrical charge that could be developed on it by rubbing. The chemist would be interested in it from the standpoint of what it is composed of and from the point of view that by burning it he could cause it to combine with oxygen and make an entirely new substance. The geologist is interested in marble from a certain standpoint, in its crystalline structure, for instance. The chemist is interested in marble from the standpoint that it contains calcium, carbon and oxy-

gen, and can be converted into other substances by treatment with acid.

With this view of chemistry we will go on to consider the contrast between the two periods, keeping in mind that chemistry is a study of substances from the standpoint of their composition and the possibility of changing them into other substances. This is a very general idea of the science and when I say we are interested in changes into new substances I have not mentioned all of the energy changes we are concerned with. The chemist is concerned with all of the concomitants of change into new substances.

I shall trace briefly the evolution of chemistry up to forty years ago, and then see what happened in 1890 to bring about the changes we know took place. Three periods can be mentioned without going into too much detail to tell you what has happened historically that allowed it to lay claim to a name and purpose of its own.

No matter what I say in this brief historical account you will find that in every case I am talking about substances. We can go back to the ancients if we care to. There is little that can be said there of interest to chemists except that there were certain experimenters who knew how to make vinegar and alcohol through certain transformations and who knew something of glass, pottery, dyes and metals. Coming on to the period of more interest to chemistry proper, I would mention the age of alchemy which extends over probably 1200 years, from about 376, the time of Sozimus the Egyptian, to about 1500, the time of the Reformation, when Basil Valentine was carrying on his investigations.

During this period of 1200 years chemistry was based more or less on superstition and mysticism. Astrology was often called in to solve problems. The alchemists had two main objects in all of their investigations. No matter how unscientifically they worked they were still aiming to do what chemistry is aim-

ing to do today, that is, change substances. But they had different purposes and not entirely unselfish motives. The two great objects were to find what they called the "Elixir of Life," to take care of all human ills and cause eternal life. They believed there was a perfectly pure, absolutely uncontaminated matter which could accomplish this purpose. The second object was to find a substance called the "Philosopher's Stone," which would enable them to convert the baser metals into gold.

The age of alchemy ended in about 1500 because of the objections to the methods of alchemists by certain men who worked in a truly scientific fashion and included Paracelsus, Black, Stahl, Priestly, and Scheele. These men followed the alchemists and paved the way for the work of Lavoisier, the "Father" of modern chemistry. He was the first chemist to put the science of chemistry on a proper basis as a distinct and separate science. His great contribution was that he analyzed the substances he worked with and based his conclusions upon experimentation and accurate analytical work. From his time until 1890 we have the period when chemistry really developed and worked out its salvation as we find it today. During the time it worked out its own terminology, language, laws, and definitions. With the help of such men as Dalton, Avagado, Davy, Berzelius, Fischer, Perkins, Ostwald, and Pasteur, chemistry reached the standard we find it maintaining in 1890. Up to that time it had defined for itself a very specific purpose, and had put itself into a position to be called a natural science based upon laboratory experimentation with the object of examining and studying new substances from the standpoint of composition and changes into new substances.

In 1890 chemistry was doing little more than analyzing substances and attempting to synthesize new substances. Why the transition just at this time? From 1885 to 1890 there were two revolutionizing

influences that came into the physical sciences and that have had a decided influence on the trend of chemistry in the past thirty or forty years. I shall discuss the first rather briefly and the second one in more detail.

The first of the two big contributions that were made to science in 1890 to upset its so-called stationary situation was the study of solutions. We all realize that chemists deal much with solutions of substances. At this time Van't Hoff and Arrhenius had made a particular study of solutions and had given to the scientific world the results of their investigations showing that solutions possessed certain properties that had not been attributed to them before. Chemists were obliged to consider these new properties in their further use of solutions.

The second influence was the discovery of X-rays and of radioactivity, experimentation with vacuum tubes and electrical discharge through gases. These two influences gave birth to what is now known as physical chemistry. Chemistry was working alone up to that time with its own methods and procedures. Since these discoveries, which were largely physical in their nature, throughout the past forty years the ideas of physics have not been able to be divorced from chemistry. Chemistry was no longer merely a science for analyzing substances and building up new substances. From 1890 on chemistry developed in the light of these new ideas.

What have these new influences done to the science of chemistry? What is important to chemists today and what is its value to other fields?

Considering for just a few minutes the first influence, the discovery of new properties of solutions not recognized before: Wherever possible the chemist makes use of solutions. He dissolves his substances before subjecting them to various changes. It had been customary to think of water as a convenience or a medium; working with a solution of salt in water meant working with the

salt, disregarding the water. To take a concrete example: The very common substance, table salt, is made up of two kinds of atoms, sodium and chlorine. It was generally considered for centuries before 1890 that matter was atomic, that it was discontinuous in its nature and by the combination of atoms various compounds were produced, that a combination of atoms gave molecules. A mass of sodium chloride or salt was looked upon as a mass of molecules, made up of atoms. It was customary, before the new ideas of solution were brought out, to think of a solution of salt as salt. After the contribution of Van't Hoff and Arrhenius it was necessary to introduce entirely new ideas. Instead of thinking of a solution of salt as having the properties of salt, it became necessary to think of it as having other properties. It was found that when any of the three large classes of substances, acids, bases, salts, was put into water solution the water solution would conduct an electric current. This property had not held any special significance before.

Why do these conduct an electric current? These three large and important classes of substances, when put into a water solution, were found to break into parts and instead of existing as whole molecules they existed as charged atoms or groups of atoms. When we put ordinary table salt into water it is broken down into two parts, sodium particles and chlorine particles, each definitely known to be charged with electricity.

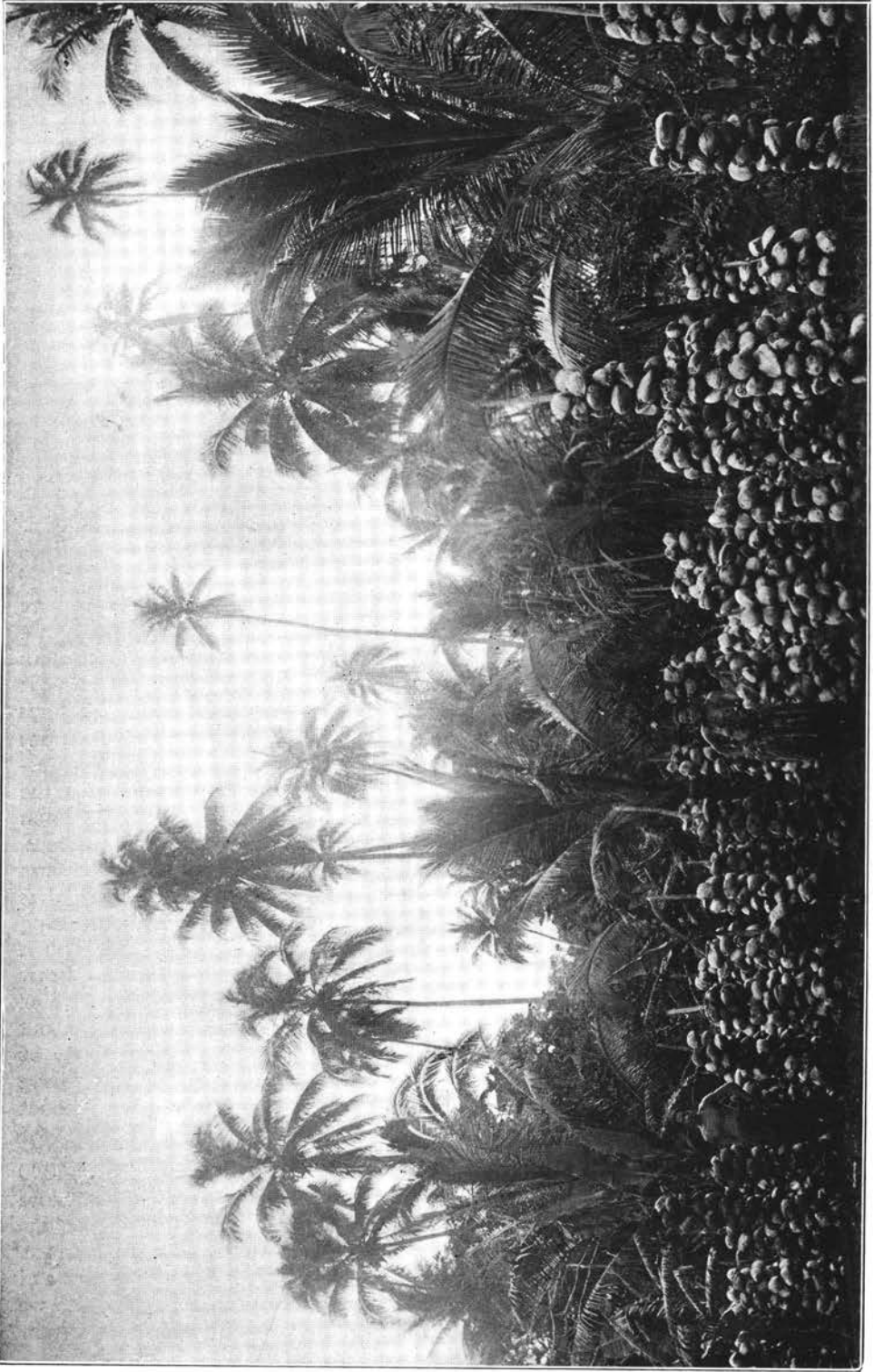
We have no longer any right to consider solutions from the standpoint of whole molecules, but from the properties into which the parts have broken. The white crystal or solid salt is not like the sodium chloride which is found in solution. Sodium particles with positive charges are not the same as ordinary sodium which has no charge at all. Ordinary sodium is poisonous; charged sodium particles formed in solution are not poisonous. The substance chlorine is a green, poisonous, very disagreeable

gas. Negatively charged chlorine in solution has none of these undesirable qualities.

The breaking of substances into charged particles in solution is called ionization. The charged particles are called ions. When it came to be realized that in all solutions of acids, bases, and salts charged particles existed, substances were studied from the standpoint of what they produced in solution rather than of what they were originally.

It is now definitely known that the ions present have a great influence in determining properties and in determining what will happen under certain conditions. I can illustrate this better by considering one kind of ion, the hydrogen ion. I will refer only to this particular ion because it has interesting applications in certain fields. Every time we dissolve an acid in the solution we create these hydrogen ions carrying positive charges of electricity. It is found that the amount of hydrogen ion present in certain fluids is of unique importance. It is definitely known that certain secretions of the body are dependent upon how much of this there is in the gland or in gland secretions. It is definitely known that the secretion of the kidneys depends upon how much of hydrogen ion is present. Respiration depends upon hydrogen ion concentration of the blood. There has developed a definite way of expressing hydrogen ion concentration. We term it the pH of a solution. In 1890 we knew nothing about these particles into which substances break. Now we talk about them all the time. We cannot study or investigate substances at all, that have anything to do with solutions, without knowledge of ion concentration.

The second influence of about 1890 that I mentioned probably will be more interesting because it is more in the line of our regular, every-day experience. This was the discovery of the X-ray and radioactivity. Since these discoveries we have come to think of matter in a new way. These discoveries force us to con-



One of the first announcements at the birth of the Pan-Pacific Research Institution was that of one of its chemists that the pulp of the young coconut contained the exact constituents of mother's milk. A baby given no other food for a year remained in perfect health.

sider what is called the "ultimate constitution" of matter. How are we to deal with these 92 substances in the light of these discoveries? If I am to interpret properly the two important purposes of chemistry, I must know not only that matter is made of small particles called atoms but also what is discovered about the inside of those atoms. For a long time matter has been said to be discontinuous, or made up of atoms. It was almost gospel with the chemists that those particles could never be broken down and that we never would know anything more about matter than we know about the atoms.

To consider atoms and molecules as the ultimate units of matter is all right for many purposes, and the chemist can do a great deal without knowing anything about the inside of the atom. But for the most complete work he must face the situation and decide to use the information and material that we have at hand now, since the discoveries made about 1890 and since.

Two groups of experimenters are responsible for the work done. The first passed electrical charges through rarified gases in tubes and from observation decided there were three kinds of rays produced. They found one set was positively charged, the canal rays; that the second set was negatively charged, the cathode rays; and another set formed at the same time which was neither positive nor negative, called Roentgen or X-rays.

These rays from vacuum tubes were artificial productions of approximately the same effects as we obtain naturally in radioactive substances. We say that the substances are breaking down or deteriorating in some way, that energy is being given off. We call this radioactivity. It is nothing more or less than the natural production of these same three kinds of rays as may be artificially produced in the vacuum tubes. When radioactive substances break down three kinds of emanations result. The positive kind is found to correspond almost exactly with the positive rays that we get from the

vacuum tubes, the negative with the negative, and so on. That is, there are some substances which are naturally radioactive and which break down to give these emanations. But in vacuum tubes substances which are not radioactive may be caused to break in the same way that radioactive substances break spontaneously.

The conclusions are that when radioactive substances break down, or other substances are artificially broken down in the vacuum tubes, the three kinds of emanations which are produced correspond to certain parts of the atom itself. That is, the rays which I have said are positive are the positive units which help to constitute the atom; the negative rays are the negative units which constitute the atom; and the X-rays are similar in nature to light rays. So the conclusions are that in every case we are disrupting atoms, we are breaking atoms into parts.

What was really discovered about 1890 with reference to X-rays and radioactivity was simply this,—that the atom itself is divisible and can be broken into its parts and these parts have been definitely investigated. We know now that when we do break down an atom it breaks into positive and negative parts and that one of the consequences of the whole break are X-rays, for reasons which we shall see.

The present trend of chemistry is toward a more detailed and accurate application to the study of substances of this information concerning what constitutes the atom. We are interpreting everything that has to do with chemistry in the light of what we know about disrupting the atom.

There are 92 elements, which means there must be 92 kinds of atoms. Formerly we believed the difference in atoms was a difference in weight. Now we know that atoms are made up of two kinds of electrical particles, and that the atoms of the 92 elements are all different. If they are all made up of the same electrical particles their differences must be due to the number of the particles and

their arrangement in each atom. The positive particles are called protons; the negative particles are called electrons. When a certain number of these units are brought together in certain arrangement a particular element results. This idea of the atom was developed by Rutherford and Bohr, and contributions were made by Lewis and Langmuir.

It is now generally considered that these particles exist for all atoms, a different number and different arrangement for each. The atom is nuclea in the sense that all of the positive particles and about half the electrons are concentrated at the center. It is also considered that electrons outside of the nucleus are in constant motion. This is a very important consideration in the application of these facts to chemistry. It has been proved that these particles are moving in definite elliptical orbits around the positive center. Very often the atom is compared to the solar system with the nucleus in the center.

We no longer explain chemical changes in terms of some vague ideas of affinities between small hard indivisible units called atoms. We explain chemical changes now in terms of these particles of which we know the atom is made up. No attempt at explaining change and compound formation and the union of atoms with each other not based upon this can be looked upon as modern or scientifically up-to-date. From this standpoint chemistry has taken on an entirely new trend. We explain chemical change in a very simple way, by what we call loss and gain of electrons. When we change one substance into another there has been a disturbance throughout the atom of its electrons. Electrons are able to leave one atom and go to another one. Atoms are able to add or lose electrons.

We find an interesting illustration of what this study of the atom has lead to if we talk about a particular kind of change, oxidation. The customary notion is that oxidation is the union of any

substance with oxygen. If coal burns, we call the process oxidation. Now we say that anything has been oxidized when it has lost electrons.

Here I wish to say a word about energy. We hear that if we could harness the energy from one small atom, great things could be done with it, implying that in these atoms there is a great deal of stored up energy. What does the energy content of an atom depend upon? A. P. Mathews, in a recent article in *Science*, speaks of the action of oxygen in various forms. We are no longer able to say that oxygen atoms are all alike,—we say that they may exist in a great many different states depending on their energy content. The electrons of atoms are moving about in orbits. It is known that these electrons can jump from one orbit to another. Every time an electron moves from one orbit to another there is an energy change in the atom. When the electrons come from the inner part to the outer part the atom becomes highly energized. It has been known for a long time that certain physiological processes are accompanied by electrical changes; electrical characteristics have long been recognized in the body. Whenever the heart beats there is an electrical disturbance propagated through the whole body. We can see now the connection between those electrical disturbances noted in physiological processes and the nature of the atom. As a definite example, consider eating food and building up body tissues. We say that plants inhale carbon dioxide and exhale oxygen; we say that animals inhale oxygen and exhale carbon dioxide. Foods are utilized in body processes. Let us keep in mind the fact that oxygen may exist, depending upon conditions, in various states, at one time highly energized, at another time very little energized. We know that chlorophyll can absorb the sun's energy by virtue of the fact that its atoms can become energized by having their electrons moved to outer orbits.

The oxygen in carbon dioxide is oxygen

very little energized. Oxygen free has a great deal of energy in it and that energy is available. When the plants get oxygen they get it in the form of carbon dioxide together with energy from the sun. The minute the atom of oxygen gets that energy its electrons are sent to the outer orbits and it becomes highly energized. The oxygen is freed, the carbon remains and unites with the water and with that builds up carbohydrates, which we know as plant products. The animal inhales the oxygen in its most energized state. It passes this energy to the tissues of the body and thus goes back to its un-energized state and carbon dioxide is exhaled. The energy that has been given to the tissues is passed on to the foods that we eat. These foods are very inert, inactive substances, but when they become energized by this energy that has been passed to the tissues we have the metabolic process. It is Mathews' idea that the highest energized state of the atom is the kind we find in living matter, and that living matter consists of atoms existing in their highest energized state.

Why is it that the atom sodium, the atom chlorine, are very active whereas the rare gases do not react with anything? We are explaining chemistry in an entirely new language based upon the discoveries of X-rays and radioactivity. What have X-rays to do with the disruption of the atom? It is definitely known that whenever the particles called electrons in large masses impinge upon solid matter with a high velocity, X-rays are developed. So that X-rays are a product of this disruption of the atoms either by artificial means in vacuum tubes or the natural breaking down of the radioactive substances.

Speaking of the changes that have been brought about in the methods and ways of chemistry, through the discovery of X-rays, it is true that whenever we use X-rays in the treatment of certain pathological conditions we are bringing about changes into new substances. When we subject certain tissues of the body to X-rays chemical changes occur because

the X-rays carry a high amount of energy. There is a destruction of tissues in certain cases, as in destroying cancer, affecting certain glands, and killing parasites. The actual material content of tissues is changed into something new. When we destroy a parasite we are changing substances from their old forms into new forms, and that is the business of chemistry. We have an interesting use of the X-ray now in such difficulties as cancers. We first inject the cancer with certain substances and then we irradiate with X-rays. We cause to arise secondary radiations. This is generally looked upon as a medical treatment. There are a number of other uses of the X-rays which have caused chemistry to take on a new line of investigation, to follow out new paths

The number of elements which should exist is 92; the number we actually know is 90. Two elements we believe have never been discovered. In the last three or four years three new elements were discovered, 43, 25 and 61, by the use of X-rays.

We have known a little about crystal form and structure in the past but our knowledge has been concerned with outside crystalline form; we have known very little about the inside of crystals. Now, by means of X-rays, having discovered that crystals themselves can act as diffraction gratings for X-rays, we have discovered just where the atoms and groups made up of crystals are placed. We are getting this information about the inside of the substances which take on crystalline form by means of X-rays. X-rays have been applied to analytical methods. The methods of analysis have always been long, hard to carry out, tedious. This same method which has been used in crystal analysis has been applied to certain organic compounds. In the course of the past few months a chemist in England prepared four new organic substances called ketones. Without letting anybody know how she prepared them or what their properties were,



*Rayon, the chemical synthetic silk, promises to largely curtail the work of the silkworm.
Even the spiny cactus chemistry now compels to yield rubber for commercial uses.*

she sent them away to be investigated by X-rays. It was discovered that these four substances contained 22, 18, 16 and 19 carbon atoms respectively. These corresponded exactly with what she knew of the chemical properties of the ketones. Ketones are characterized by certain structures. In these four substances that particular group was located exactly and correctly in each one of the carbon chains. This leads to the conclusion that in the future X-rays will certainly be applied to chemical analysis as never before. The application has already been made in identifying fibers of certain materials, cotton, wool, silk, etc., and in determining the structure that makes up these materials.

Since we know something about the inside of the atom, a problem has come back to chemistry which has been long laid aside. Chemists and physicists are trying to transmute the elements one into the other. Alchemy aimed to transmute the baser elements into gold. After chemistry became a pure science that was

looked upon as a ridiculous effort. The way in which the effort will be made to transmute the elements will be to break up the inside nucleus, to throw out of the atom certain positive particles and certain negative particles. If we treat an atom with five protons so as to knock out three of them we ought to have an atom which has normally two protons. You can see that this opens up a big field for the future of chemistry.

Also in the new trend of chemistry, the methods of chemical analysis will undoubtedly undergo some radical changes due to the uses of the microscope. Chemical microscopy is one of the big fields receiving attention.

In talking of the present trend of chemistry the subject of asymmetry in molecules needs mention. It has been proved that some molecules are unsymmetrical in their structure. In modern times the importance of asymmetry has been emphasized, particularly in its influence on the study of biological processes. There are two forms of nicotine,

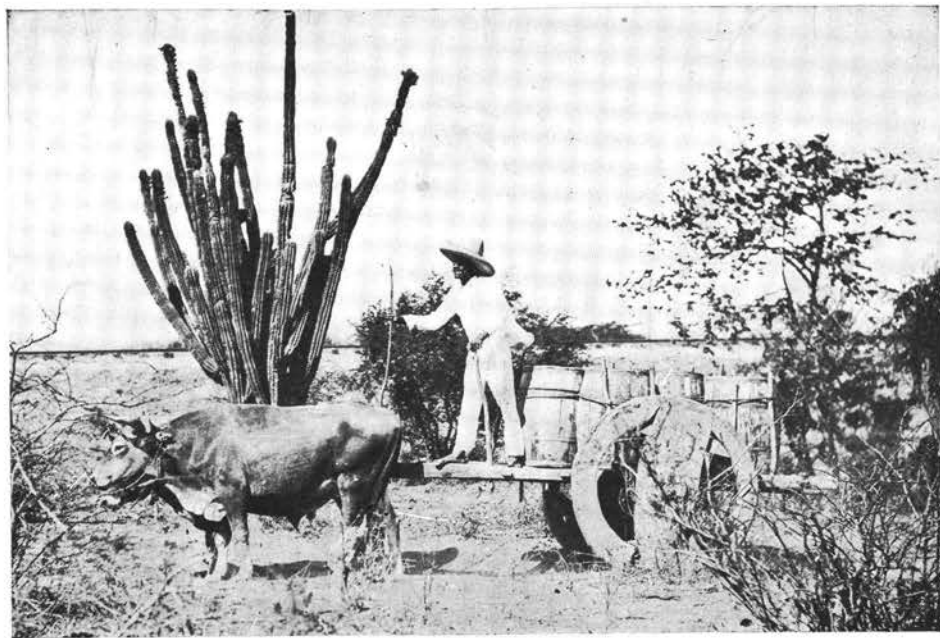
one which rotates the plane of polarized light to the left, and the other to the right, one extremely poisonous, the other not so poisonous. It has been said that the more we find out about the body structures the more we will know about the reactions that are such puzzles now in biological processes.

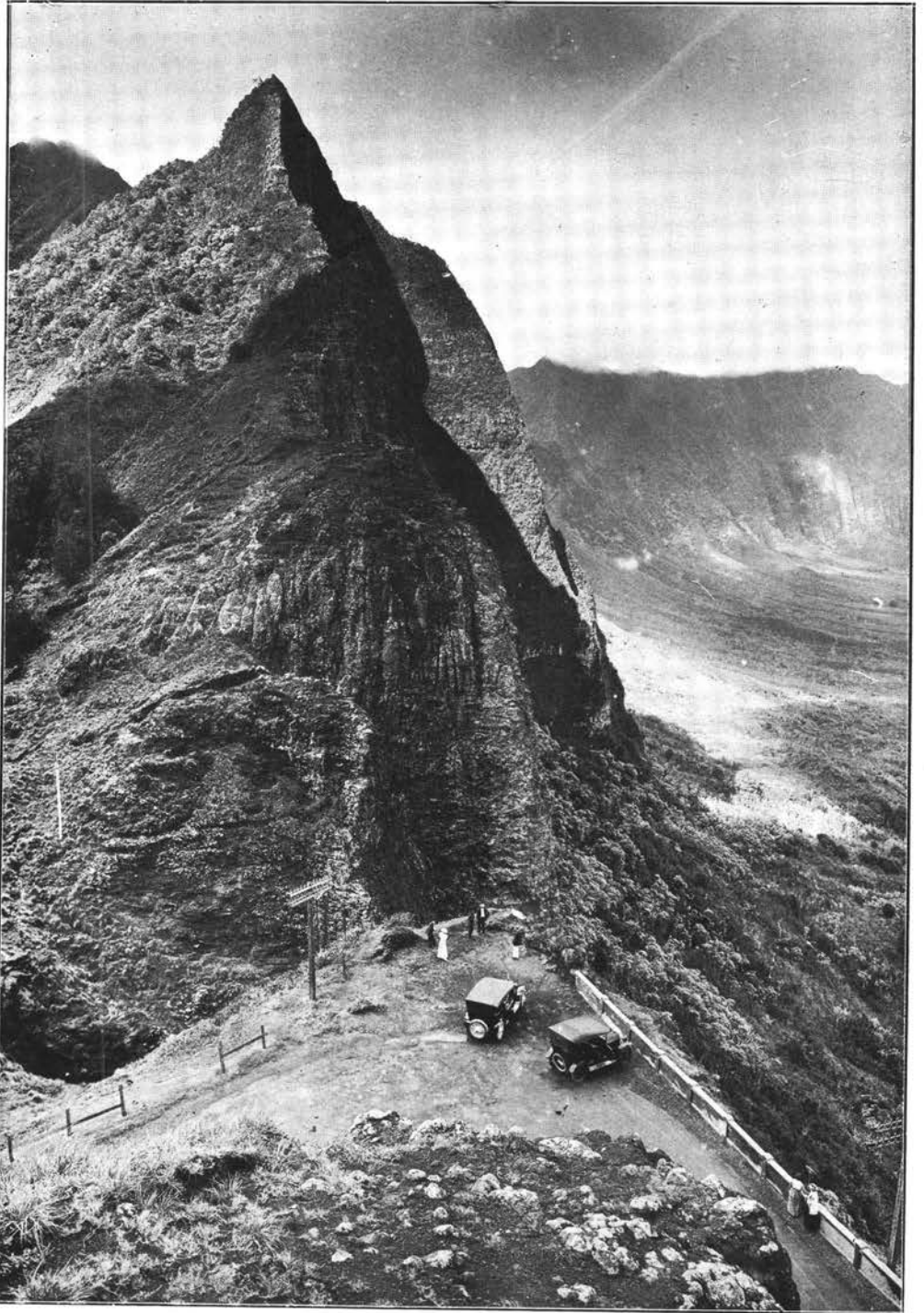
Chemistry is generally recognized as rendering service in various fields: Medicine, agriculture, matters of national defense, the investigation of the nature of leather (the National Leather Association of the United States has established its first laboratory in Cincinnati), and in photography.

With reference to medicine chemistry is serving medicine in various ways,—in the synthesizing of drugs, the conversion of certain substances into others. In the field of nutrition and the study of vitamins chemistry is rendering a great service. A most interesting part is that chemistry has undertaken to learn something about those very elusive and difficult things which we call germs and bacteria. In analyzing tuberculosis germs

recently a peculiar kind of fat body has been discovered. Pneumonia germs have been analyzed in the same way and attempts made to establish the chemical nature of them. The next thing chemistry must do in medicine is to find out the nature of the substances of which tissues, normal and diseased, are made. That is the most difficult thing chemistry can undertake because the handling of tissues requires great skill.

To summarize briefly: The present trend of chemistry is largely due to the two influences I have mentioned, the additional information about solutions and the study of X-rays which leads to a knowledge of the inside of the atom. The changes in the methods are being greatly influenced by microscopy and by X-rays. Chemistry will continue to render its service to the particular fields I have mentioned. Asymmetry in molecules requires further study and interpretation. In all of these chemistry will still be a study of substances from the standpoint of composition and their changes into new substances.





As the Pali, or precipice view, bursts on the vision from an eminence of 1200 feet, below is spread out the map of windward Oahu, one of the most remarkable lessons in visual geography.



A relief map of the Island of Oahu.

Geography of the Island of Oahu

(Area, 598 square miles)

By LAWRENCE HITE DAINGERFIELD

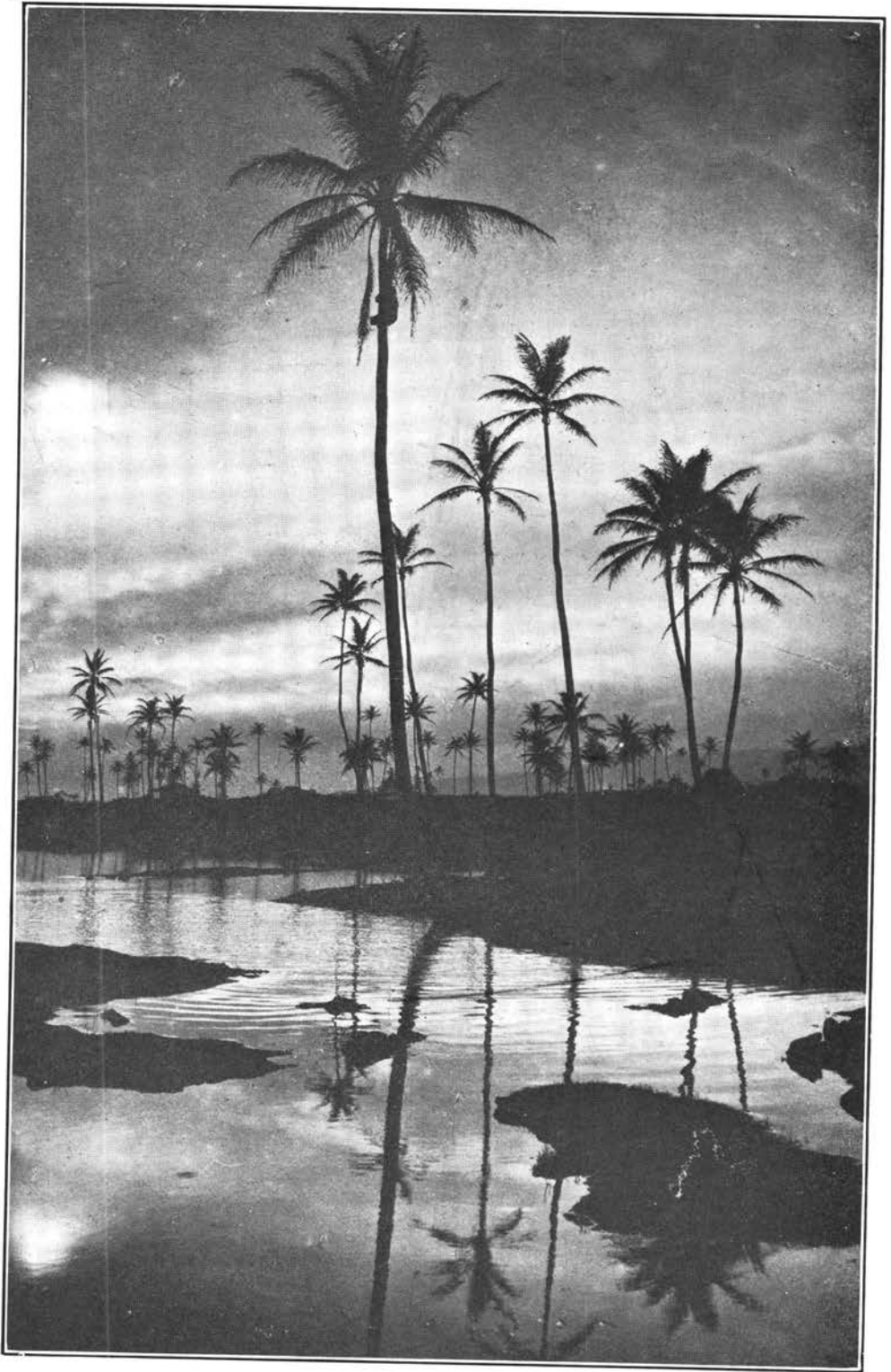
Physical Features: While the mountain features of Kauai protected the Kingdom of Nualolo from the enemy, the geography of O-a-hu led to the final overthrow of King Ka-la-ni-ku-pu-le when he met Ka-me-ha-me-ha the Great in the last great battle of Nu-u-a-nu Pa-li.

Long ago, in fact so long that none may guess the time, volcanoes brought forth live lava from the two volcanoes to form the two ranges which give a triangular outline to the Island of Oahu.

Unlike Kauai, Oahu has two mountain systems. They are known as the

Ko-o-lau Range and the Wai-a-nae Range. The Koolau Range extends through about forty miles in a northwest to southeast direction from Kahu-ku Point to Ma-ka-pu-u Point. This range is the real backbone of the Island, rising to 3105 feet above sea level at Pu-u Konahuanui.

The northeast slope is steep and the windward spurs, too, are usually extremely steep as well as short. An abrupt pali, rising at the head of each intervening valley, has made travel so difficult that the Nu-u-a-nu route, the only available pass in the early days,



A typical scene along one of the lagoons of the Hawaiian Islands. From reef and strand the coconut palm groves to a height of sixty feet or more, its roots often in the salt soil.

is now the only one in the entire Koolau Range through which an automobile road has been built.

The windward spurs, too, are usually short and steep, with a pali at the head of each intervening valley. Northwest of Ka-ne-ohe Bay, however, these spurs are somewhat longer, though each has an extremely steep pali at the valley head.

Wai-a-ho-le, Wai-ka-ne, Ka-ha-na, Pu-na-lu-u, and Kai-lua are some of the windward valleys that lie between the seaward slopes. The famous Ka-li-u-wa-a, or "Sacred Falls," tumbles down into the Kaluanui valley, about two miles back of Ha-u-u-la.

The Koolau Range has many pu-us, or peaks. Beginning at the southeast with Ma-ka-pu-u, it is easy to point out Puu-o Kona, La-ni-po, Olympus, Kona-huanui, Tantalus, La-ni-hu-li, Ka-hu-a-uli, Ke-a-hi-a-ka-ho-e, and Kai-wi-po-o, as they follow each other toward the northwest. The good road up Tantalus has made it an attractive spot for the summer homes of many of the residents of Honolulu.

The Wai-a-nae Range occupies the western part of O-a-hu. It extends in a twenty-mile curve from the extreme northwest point of the Island at Ka-e-na, thence southeast and south toward Barber's Point. Beginning at the north end and progressing southward, the most important peaks are: Ka-a-la (elevation 4,030 feet, the highest on Oahu), Ka-le-na, Ku-ma-ka-li, Ha-pa-pa, Ka-ne-ho-a, Ka-u-a, Pa-li-kea, Mau-na Ka-pu, and Ma-na-wa-hu-a. The range is cut by Ko-le-ko-le and Po-ha-kea passes. The former is easily reached by a good automobile road up the windward or east slope from Schofield. A trail leads from this pass down the steep leeward slope to Wai-a-nae village by the sea. The Po-ha-kea Pass is reached by a difficult trail up the windward slope and is not suited for passage through the range. Like the Koolau Range the Waianae Mountains have a number of spurs, the

longest of which are on the leeward or west side. The most important of the intervening valleys are Na-na-ku-li, Lua-lua-lei, Wai-a-nae, Ma-ka-ha, and Ma-ku-a, named in order from south to north.

The Koolau and Wai-a-nae ranges are from ten to fifteen miles apart. A central plateau, extending from Wai-a-lu-a Bay on the north to Pearl Harbor on the south lies between the two ranges. This plateau rises to a thousand feet above sea-level in the vicinity of Schofield Barracks.

Oahu has two fine land-locked harbors, one at Honolulu, the other being Pearl Harbor. Beside these, many smaller bays follow each other around the coast in the following order: Mau-na-lua, Ha-nau-ma, Wai-ma-na-lo, Kai-lua, Ka-ne-ohe, Ka-ha-na, Lai-e, Wai-me-a, Wai-a-lu-a, Ka-i-a-ka, and Poka-i. Pearl Harbor and Ka-ne-o-he are the two largest of these bays that make the coast line very long.

It was the lava flow of the far-off days that helped to make this irregular coast line, with its many indentations.

Jutting far out into the sea are Diamond Head and O-lu-pau Head, each crowned by tuff craters. Ko-ko Crater, another tuff crater, rises to a height of 1,205 feet, near the east end of the Island. Its bleak dry west rim drops abruptly to the crater floor for almost a thousand feet. These three "tuff" craters were active long before the history of the Hawaiian people began, for for there is no hint of their activity in any of their stories. When active in that far away time, great quantities of dust or ash were thrown far aloft. Much of that dust was washed down with the rain and deposited about the crater where it was expelled, forming layer upon layer of an easily weathered clay-like substance.

It is interesting to see that the west or southwest sides of all these tuff craters are always higher than the east or northeast sides. This indicates that the

trade winds blew in that ancient time just as they do now, carrying the greater part of the dust from the craters to their leeward rims. Only a short distance to the northeast of Koko Crater, near the mouth of Ka-la-ma valley, stands Palmer's Crater, named after the geologist who has made a study of it. It is small, rising only about 100 feet above the valley floor. It is extremely interesting, however, owing to the presence of bright, fresh-looking "a-a," or rough lava. It appears as new as the lava found elsewhere in the Island, not over a century old. It was probably at this point that the most recent volcanic activity occurred on Oahu.

Ka-a-u, at the head of Pa-lo-lo valley, is the largest known crater on the Island. It appears to be of great age. Its rim and pit are covered with ohia lehua, ferns, and vines. At present a pond or small lake of water occupies a part of the Kaau Crater. There is some evidence, according to the geologist Palmer, that a great volcano once existed a short distance off Ka-ne-o-he Bay, where the sea remains relatively shallow.

Observe the physical map of Oahu. See how the ridges and valleys on the leeward slope of the Koolau Mountains radiate like the spokes of a giant wheel from a common point off Kaneohe Bay. Observe that the bench of shallow water (less than 100 fathoms or 600 feet in depth), is somewhat wider than around Kauai. The ocean drops off to a depth of 13,000 feet about 25 miles northeast of Kahuku Point, and to a depth of 10,000 feet about twelve to fifteen miles off Barber's Point on leeward Oahu. Mount Ka-a-la rises steeply from this abyss off Barber's Point.

The streams of the Koolau Range are shorter on the windward than on the leeward slopes, but they carry more water. All these streams have their sources against the steep pali slopes. The O-pae-u-lu, the North and South

Kau-ko-na-hua, the Ka-li-hi, the Nu-u-a-nu, and Ma-noa, can be easily traced as they follow each other in order from north to south on the leeward side. The valleys of the last three have been developed into fine residential sections in Honolulu.

The small streams that rise far up in the Waianee Range, in the rain forests, flow down the leeward slopes in the Ma-ku-a, Ma-ka-ha and Wai-a-nae valleys.

Climate

When we look at the physical map of Oahu we are immediately impressed with the position of the two mountain ranges. Having observed the influence of the Kauai mountains on climate, we at once compare Oahu's mountains with those of Kauai. How are the Koolau and Waianae mountains exposed to the trade winds? The Koolau mountains are first reached by the northeast trade winds. Should they be wetter or drier than the Waianae mountains? Should the plateau region lying between these mountain ranges be wet or dry, and why?

Suppose we take an imaginary trip from Kahana Bay, on the northeast coast, across the Koolau Range in a westerly direction, then right across the central high region and the Waianae mountains to the leeward coast. Starting on this trip, we find a good stream of water flowing down the valley through the sugar cane, rice, and taro fields. Going up the valley, we soon have to wade many times through the Kahana stream. The water reaches well above our knees, yet, when we look up the valley, the mountain wall or pali at the head is only a short distance away. From whence does all this water come?

Passing farther up the valley, the grass, trees, ferns, and vines become luxuriant and dense. Many lau-ha-la trees clutter the trail with their long, slippery leaves. We finally reach the Wai-a-ho-le Water Company ditch trail. Traveling

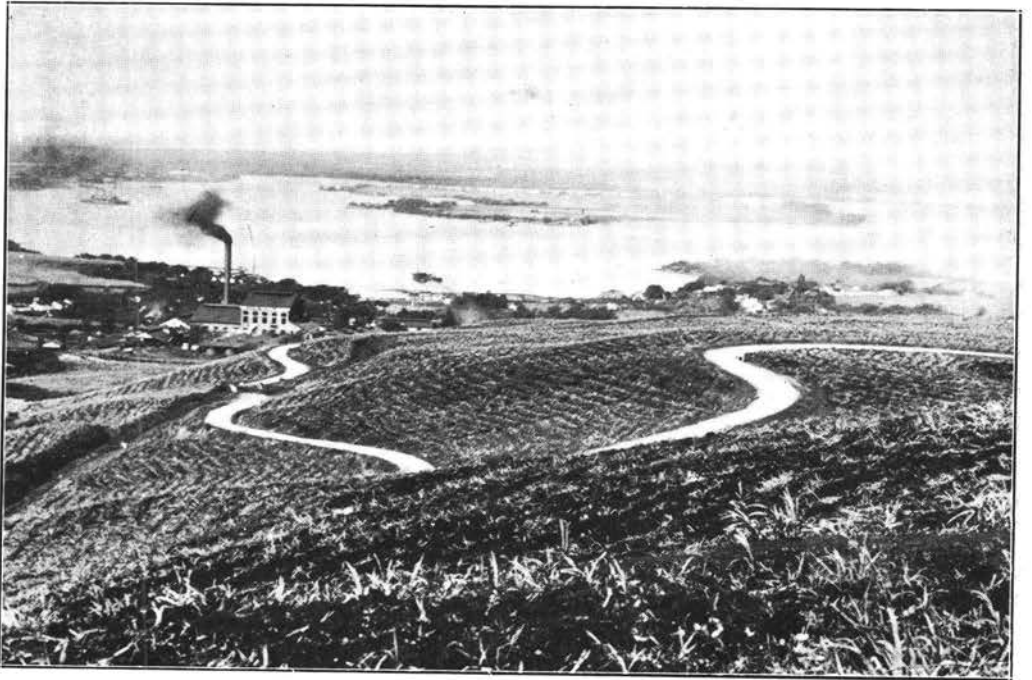
along this trail we observe that many tiny streams and springs are trapped in steep little valleys above the trail. The captured water is carried through the main ditch and tunnels. We wonder where and how all this water is used. Climbing out of the valley head on a long curved trail to the left and to Kahana Point on the pass over the Koolau Range (that is about 2,500 feet above the sea at our starting point), we find a region of o-hi-a le-hua forest that opens up in all directions. This indicates a heavy rainfall. We ask ourselves, "Why should the rainfall be excessive at this point?" The trade winds are found to sweep over this pass. The temperature has fallen eight or nine degrees below what it was at our starting point at sea level.

Passing down the long leeward (west) spur from the Koolau, we look over the valley of the north fork of the Kau-kona-hu-a stream. We observe the heavy tropical jungle below us. Down in this valley, near its head, we find a large rain gauge. We examine its readings for past years. We discover that 239 inches of rain falls here in a normal year—this is the wettest known spot on Oahu. Here is a case where the water vapor that was brought in by the trade winds from the ocean strikes the steep windward or east slope pali of the Koolau, where it is quickly uplifted. The crest of the Koolau mountains is extremely narrow. The trade winds sweep up the pali slope, become chilled, form clouds and then rain, which is carried past the crest to be deposited in its greatest amount at the leeward valley head.

Passing down the slope to the Wahiawa and Schofield plateau, the forest cover disappears. The rainfall declines to about forty inches a year. Grass replaces the trees, and great fields of pineapples are crossed, until the east slope of the Waianae Range is reached. It is quite evident that the Koolau Range has taken much of the moisture from the passing trade winds.

Ascending the Waianae Range, we find much drier conditions than at like elevations on the windward side of the Koolaus. We should expect this in view of the great amount of water that has been taken from the air in crossing the Koolaus. After passing through such dryland vegetation as guava and lantana, we again enter the realm of the ohia lehua—this time above two thousand feet. Soon we are above the loftiest of the Koolau peaks. Now the moisture increases rapidly. The lobelias and the a-pe a-pe plants appear amid tree-ferns and a tangle of i-e i-e vines. Reaching the summit of Mt. Ka-a-la, 4,030 feet above the sea, we find abundant clouds and much rain. The rainfall, however, is probably only about half that found near the crest of the Koolau Range. Here there is a dense jungle of ohia lehua, tree ferns, and vines. The temperature has fallen twelve or fifteen degrees below that at sea-level. Dropping down rapidly on the west or leeward side, we quickly pass out of the wet forest. We are in the dry shadow of the Waianaes. The vegetation soon becomes desert-like. Algaroba, klu, and cactus dot the lowlands and fringe the beaches. The rainfall has dropped to about twenty inches annually, and the sun burns down upon an arid region. The moisture has been taken from the air in crossing the two mountain ranges as water is wrung from a sponge. Here the nights are cool and the days are hot throughout the year. The bright, clear air allows the warm sun rays to reach the earth by day and the heat to escape at night.

The Oahu plateau and all of the lowlands are moderately dry to arid. All of the valleys in the Koolau range are wet near their heads, except those far down toward Ma-ka-pu-u Point—the southeast end of the Island. Only those valleys are wet in the Waianae range that head against the very highest mountains.



A birdseye view of the lower part of Honolulu from Punchbowl hill, and a view of a portion of Pearl Harbor and one of the sugar fields surrounding it.

Forest Cover

Unlike Kauai, with its central forested region, the forests of Oahu are found in two rather long, narrow strips. These regions are roughly outlined by the two mountain ranges. Ohia lehua cover the wet, high zones, mixed with tree ferns, la-pa la-pa, scivola, a scattering of palms, lobelias, and many lowly lichens, mosses, vines, sedges, and ferns. Passing down the slopes, where the rainfall is less torrential, we find the koa trees in profusion, much staghorn fern, i-e i-e vines and ti plants. Down in the valleys and steep, short gulches, great ku-ku-i or candlenut trees grow. Here also may be found a few splendid groves of o-hi-a ae, or "mountain apples." In wet, open glades, a pest, known as "Hilo grass," has appeared, taking the place of the tender native vegetation. The ancient sandalwood has practically disappeared on Oahu, although a few of these trees may still be found at moderate elevation.

On the dry spurs and slopes, lantana and vervain have taken a firm hold. Cactus, klu, and algaroba grow in the dry soil, lava, and coral of the lower slopes, in the valleys, and near the beaches. They are abundant over leeward Oahu. Wild pigs roam through the wet forests, where a few native birds also may be found. Beautiful land shells may still be found on trees and undergrowth, well up toward the wet forests, but not in such profusion as in the early days.

The Chinese thrush has gained a wide range in the deep valleys and over the mountain crests, making the woodland delightful with his cheerful songs. Years ago his cheerful ancestors were brought from the Orient. His feathered children have now scattered far and wide over all the islands. Over the dry, sparsely clad palis and crests range wild goats, the descendants of the earlier domestic goats.

Crops and Occupations of the People: Like Kauai, sugar is the main product of the soil. The several plantations of the Island occupy the

lowlands. The cane is raised largely by irrigation, aided by natural rainfall. Many years ago men of vision saw how water could be brought from the wet windward side of the Island to the dry leeward. They spent much money and employed many engineers and laborers to drill a hole through the Koolau mountains at the head of the Waiahole valley, at a point about eight hundred feet above the sea. This is called the Waiahole tunnel. Water is brought to this tunnel from the many small streams that trickle down the mountain sides near the valley heads. Small dams were placed across these many streams and the clear, cool water was turned into a long ditch. This ditch winds in and out of the little valleys, always bringing the water toward the tunnel. The water from the union of these many small streams increases as it approaches the great tunnel.

There are several Japanese families living along this long ditch beside which there is a lovely trail, winding around sharp hills, into deep valleys, and under kukui, ohia lehua, koa and hala trees. The Japanese men are the ditch tenders. They live in cozy cottages under great trees. Their wives seem happy and contented. They have chickens and little gardens and always lovely flowers about their homes. Sometimes one may see little children playing on the lanais or in the grass about the home of a ditch tender. These little children never stray far from their mother or father, for it is a wild, jungle country up there. Rains come quickly and are sometimes very heavy. The streams rise rapidly and might easily drown these little folks. Although the ditch tenders and their families live up in the mountains and alone, they are busy and happy. They all have burros to carry their burdens and to bring their food and other necessities from the stores far away on the beach.

The ditch tenders must see that the ditches and tunnels are kept open and in repair; that the "intakes" or tiny dams across the little streams are holding the

water; that the trails along the ditch are in good condition. They also measure the amount of rain that falls in rain gages. The water in the ditches is also measured with stream gages.

When the water from all the little streams is finally brought to the great Waiahole tunnel it receives much added water from the walls of the tunnel as it passes through the Koolau range. Other Japanese ditch tenders live on the leeward or west side of the Koolau mountains at the tunnel's mouth or "outlet" in Wai-a-wa valley and along the ditch which leads the water to the great fields of cane. To this day, if we go up the Waiawa valley, we can see where the old railroad track was laid long ago to carry the necessary supplies up the valley when the tunnel was being built through the mountain. Beside the water from the tunnel, a large part of the water that is used to irrigate the fields of cane comes from artesian as well as ordinary wells. The wells are bored far down into the soil and rock. The rock of Hawaii is mostly lava. If examined closely, it will be found to be filled with tiny holes that were left when the last of the gas burned out in the long ago. Thus the rock is extremely porous or open. The water from the heavy rains accumulates or gathers in large quantities in the porous lava rock. Much of this water is retained in the porous rock of the mountain masses far up at the heads of the valleys. When a well is bored at some lower level the water frequently overflows the top of the well. Such wells are called "artesian." This is due to the fact that water always "seeks its level." It will rise as high as its source. There are many wells, however, that do not overflow. The water is pumped from such wells. Many pumping stations are located in and above cane fields and millions of gallons of water are thus brought to the thirsty cane through flumes and ditches. This

system is extensively practiced on Oahu and Maui.

Finally, the water that has been so carefully watched and brought through the mountain, is carried out to the cane field. Last year the black and deep soil of this field was turned over with "gang plows" that were pulled back and forth across the field by a great "tractor." Then cane joints were set about three feet apart in furrows that run true and straight across the field. The young cane grew from these joints and was carefully watered (irrigated) and hoed by the laborers in the field. The cane has been "hilled up" on each side since it was planted last year. Now that the stalks are tall and green with fine, broad leaves, the laborers, men and women alike, turn the water from the small ditches through the field on the higher ground into the furrows between the rows of healthy cane. Next year, when the cane has reached its full growth and contains the greatest amount of sugar, it will be harvested. The dry blades will be burned off and the men and women will cut the cane stalks off close to the ground with heavy broad-bladed knives.

As they are doing these things in a nearby field, let us go over there. Railway tracks have been laid through this field of harvested cane. Small engines with great smokestacks are pushing and pulling many flat cars back and forth over the tracks. Laborers carry bundles of cane stalks on their shoulders up plank walks from the ground to the cars, that are piled high with their burdens. The sky is bright and the sun warm out in the field.

A mile or so down the slope black smoke is rising from a tall gray stack at the end of the building built of wood and steel. The engines from the field pull long strings of cars laden with cane toward the building with its smoke stack. Arriving at the mill, the cars are "switched" under a long shed, where the cane is unloaded on a moving track by a machine with long, rake-like "fingers."

The stalks are carried up the moving track and between rollers that completely crush the cane, squeezing out the sweet juice. The crushed cane is mixed with water and again pressed dry. This process removes the remaining sugar in the cane. The dry remnants, known as "bagasse," are frequently used for fuel in the mill furnaces. The juices of the cane are then "clarified" by using a little lime to remove the mud. Then the water is evaporated, or changed by heat from the liquid to the vapor state. This process leaves the sugar behind in the form of syrup. The syrup is boiled and then whirled rapidly in a container, where most of the sugar is removed. (This is called "centrifuging.") The syrup is boiled again to remove the last possible amount of sugar. Reduced by these several processes the final sugar weighs only about one-eighth as much as the cane stalk that came from the field.

At last the sugar runs through "shoots" into sacks with 100-pound capacity. These sacks are sewed up and stacked high in great store rooms. From these they are loaded into cars of the Oahu Railway and Land Company and whirled away to the shipping pier at Honolulu. Here the cars are unloaded and the sacks are carried by a moving track or crane to the "hold" of the great ship bound for some "sugar refinery" thousands of miles distant on the Mainland. At the refinery the sugar is again treated with fire and the impurities further removed, until at last the beautiful, white, "granulated" grains come forth ready for use in many ways. (Think of the many ways in which sugar may be used.)

Many, many hands and many nations of many colors have toiled to produce the sugar that we use daily on our tables. Let us go back for a little while to visit the mill town where the sugar was made. Here we find the Chinese families. They came here many years ago from their great home country in Asia. (See general geography.) Many of the stores scattered throughout the town are owned

and run by Chinese merchants. Here are the Portuguese. Their forefathers came years ago across the Atlantic and Pacific oceans to Hawaii. Here are the Filipinos, recently arrived from that frontier of America—the Philippines. Here are the Japanese from the Island Empire off the coast of Asia. Here are the people from Porto Rico, the American island in the West Indies, beyond the Panama Canal. Then there are other people from many other lands, all living in this tiny community. What a story of the world, all the world, they might tell, if each should tell his part. All are learning to know and understand one another better. All are being educated to see that the world is not so very large after all. Their children go to the same town schools, learn from the same books, are taught by the same teachers, become citizens of the same great America. Even the little folks, barely past four years of age, have their kindergarten, where their teachers lead these little people to take up problems and work them to their solutions. Their plays are really stories of the growth of the human race. Thus the kindergarten and the grade schools bring the children of all lands together in a little Pan-Pacific Union. Here the so-called "Oriental Problem" is finding a happy solution through the education and association of the children.

Up on the hills and ridges, as well as on the Schofield-Wa-hi-a-wa Plateau, pineapples grow a thousand feet or more above the sea. Out over the eastern or windward side of Oahu, near the level of the ocean, are other thousands of acres of pineapples. It will be found that pineapples grow best where there is abundant sunshine and light rainfall. They are grown entirely without irrigation. Look at the spine-like leaves of the plant. Each leaf is a tiny water trough leading to the stem of the plant. Thus they catch and save most of the water which falls on them. Observe, also, that the leaves are tough, thus retaining or holding the moisture or water within.

There is little evaporation (transpiration) because the fruit itself is covered with a tough, thick rind. This, obviously, helps to retain the water in the fruit and keep it juicy. Fortunately there are large areas over Oahu well suited to growing pineapples. Recently these fields in which pineapples grow have been cleared of grass, cactus, lantana, and small trees far up on the ridges and plateaus.

These fields are "turned" with gang plows, much as the cane fields are prepared. Then the laborers bring in great truck loads of "suckers" taken from around the base of the matured pineapples. These suckers are the plume-like tops that are plucked from the pineapples at harvest time. These are set in double rows, about three feet apart, in the freshly plowed soil. Soon these small plants become rooted and begin to grow. Then the men have to keep the soil soft and mellow and free from weeds by cultivating and hoeing between the rows and around the plants.

Pineapples were once grown in Europe in "hot houses" covered with glass. That is no longer done since the ships travel every sea. Now the fruit is brought to the colder places of the earth from Africa, the West Indies, Mexico and Central America, and Queensland, Australia, as well as from Hawaii.

In eighteen or twenty months after the fruit is planted, the pineapples become full-grown and are ripe and ready for their harvest. Then the laborers, men and women, break the fruit from the stems, heaping the pineapples in piles between the rows. They are then measured by iron rings of different sizes to class them as "firsts," "seconds," etc. The pines are then placed in wooden crates, according to their class. These full crates are then loaded high on automobile trucks and hurried to the cannery. Here the fruit is peeled, sliced by machinery, which also removes the cores. The sliced fruit only is handled by the girl or boy employees, clothed in rubber gloves. Here the fruit is again sorted

and graded. The sliced fruit is thoroughly cooked, after being placed in the cans by machinery; the juice is seasoned with a fixed amount of sugar, and the cans sealed at a high temperature. Even the labels are placed on the cans by machinery. The cans are inspected after they have cooled to see if the fruit is in good condition. All cans that pass inspection are then crated—twenty-four cans to the crate. These crates are then carefully marked as to the grade of fruit and stacked in the stock rooms, from where they are soon hauled to the pier. There the belt-elevator or crane lifts them into the ship-hold and they are carried to the markets of the world.

A single cannery has been known to fill over 43,000 crates of 24 quarts in a single day at the height of the season. The Islands produce nearly 9,000,000 crates of canned pineapples yearly. Oahu leads all the islands in production of pineapples. Although the pineapples, like cane, are raised mostly on large plantations, there are many small plantations. Japanese or Chinese frequently raise pines to sell to the big canneries. A pineapple village is quite similar to community centers on sugar plantations. The canneries on Oahu, however, differ from the sugar mills, which are found in outlying districts and on the plantations. The pineapple canneries require much help from the boys and girls. For this reason many canneries are located in Honolulu on Oahu, and in other large towns. The pineapple harvest is at its height during July and August, school vacation months, thus giving helpful and healthful employment to many at a most opportune time. A list of the pineapple plantations and canneries, with their output, will be found in the appendix.

There are regions on Oahu too high, dry, rough, and rugged for any kind of crops. Here the cattle graze the native grasses, the cactus, and the algaroba beans. Ranching is an important industry. Rice and taro are grown in the low,

flat lands, which can be easily covered with fresh water.

Papaias and bananas are grown successfully. Many bunches of bananas are raised in the moist valleys and plains districts where much fresh water can be brought to the plants. The young plants are set out in rows six or eight feet apart. It is largely a Chinese industry. The Chinese are excellent gardeners and carefully tend the young plants. A banana tree brings forth fruit in about a year from the time of planting. When the fruit reaches full size, while still green in color and quite solid, the bunches are cut from the plants, and carried to the cleaning and packing shed. There the Chinese gardeners carefully clean the bananas and pack the whole bunches in banana leaves, ready for shipment. Many thousand bunches are thus brought to the pier and stacked on ship-deck, ready to be carried to the mainland markets.

The banana is a native fruit. It has been modified largely, however, by bringing in new varieties from other lands. Far back in the deep valleys of Oahu and even on the mountain sides and pali slopes groves of wild bananas may still be found.

Wide-spreading mango trees, the smooth-barked guavas, and the great-leaved breadfruit trees are still found widely distributed over the Island. None of these are of great commercial importance, although delicious jelly is made from the fruit of the guava.

The honey industry is important in the vicinity of Barber's Point—the southwest promontory of the Island. The bees extract the nectar from which they make the honey from the klu and algaroba blossoms. These thorny shrubs and trees cover the arid coral plains beyond Ewa. The bees were brought to the Islands many years ago from foreign lands.

Population: Oahu leads all of the islands in population. Even back in 1920 the U. S. census showed a population of nearly 125,000 people. The prin-

cipal city of Oahu is Ho-no-lu-lu, where nearly half of the population of the entire Territory reside. Honolulu is located on one of the few land-locked harbors, adjacent to the great Pearl Harbor, on the southwestern or leeward side of the Island. It is noted for its public buildings, churches, schools, stores, banks, its beach at Wai-ki-ki, and its excellent harbor. It is here that the great ships pass and repass. Passenger steamers of the Matson Navigation Company, the Oceanic Steamship Company (now, also, the Matson Navigation Co.), the Dollar Steamship Company, the Canadian-Australian Royal Mail Line, the Los Angeles Steamship Co. and the Nippon Yusen Kaisha call at Honolulu on regular schedules. Steamers of the Inter-Island Steam Navigation Company ply regularly between Honolulu and the many ports of the several islands. Freight steamers of the Matson Navigation Company, the Barber Line, the Standard Oil Company, the Blue Funnel Line, and many other lines are frequently in port at Honolulu. Beautiful yachts and other pleasure boats from the mainland and many foreign ports call at intervals. Ships from all the navies of the world are occasionally welcomed. Thus the mainland of the United States, Canada, Panama, the countries of South America, New Zealand, Australia, Samoa, Fiji Islands, the Philippines, China, and Japan are all within a few days' reach of Honolulu. The various routes to all these lands are shown in the map: The Crossroads of the Pacific. Estimating that the average steamer will travel 350 miles in a day, find how long it will take to go from Honolulu to the several Pacific lands.

When ships laden with passengers arrive or sail, they are greeted by the strains of A-lo-ha-o-e and Ha-wai-i Pono-i, played by the Royal Hawaiian Band. Aloha oe is that beautiful song of both greeting and farewell, written by the late Queen Li-li-u-o-ka-la-ni. Hawaii Pono-i is the National Anthem of Hawaii, written many years ago by Captain

Henri Berger, the early leader of the Royal Hawaiian Band. leis of sweet flowers, beads, or bright seeds are placed about the necks of those who arrive or depart. The vivid colors, the soul and heart-stirring music and the people of all lands who greet the new arrival or speed him on his way, bespeak the soul of Honolulu and of all Hawaii.

The chief beauty of Honolulu lies in the flowering trees and shrubs that line the streets. The most exquisite of these are the so-called "shower trees," which reach their prime in May or June. White, yellow, pink, lavender, and crimson blossoms dazzle the eyes from the canopied trees. Hedges of hibiscus of many varieties and of many shades of color border the lawns. Purple-flowered Bougainvillea on la-nai or trellis adds its charm. The creamy or red Plumeria, heavy with its sweet odor, is everywhere. Of fruits, there are ever the mango, the avocado or alligator pear, the banana, the coconut, and the breadfruit of poetry and romance. The banyan, monkey pod, many palms, including the stately Royal Palm, eucalyptus, Norfolk Island pine, ironwood, and algaroba are found in abundance throughout the city. Few, indeed, of these flowering trees and vines and shrubs are native to Honolulu or the Territory. If we omit the banana, coconut, and breadfruit, all have been introduced since the coming of the missionaries by such nature lovers as Dr. Hillebrand, Dr. Wm. T. Brigham, Mr. W. M. Gifford, and Mr. Gerrit P. Wilder. No account of the flowering plants and trees of Honolulu would be complete without including the "night-blooming Cereus." Great hedges of this cactus plant, with its creamy blossoms, opening at nighttime only, are found. The most noted of these hedges borders the campus of Punahou Academy and Oahu College.

The real interest in Honolulu, however, is centered in her people. Here are gathered white people from America, Europe, Australia, and New Zealand. Here have come the people from the

Orient. And here have lived through the many centuries the people of Hawaii—the Polynesians themselves. The Hawaiians have always been through the long, long years, generous and kindly to a fault. With an aloha for the ma-li-hi-ni (newcomer) they have treated him as a brother. There is no doubt but what this kindly nature of old Hawaii, that is still shown in her people, has had much to do with maintaining the good feeling between all the races that meet and mingle here. The people of Japan greatly outnumber those of any of the other races found in Honolulu.

There are numerous military and naval establishments in and about Honolulu. Back of Diamond Head is Fort Ruger, in charge of the artillery defenses in that extinct volcanic crater. Between Waikiki and Honolulu harbor are Fort DeRussey and Fort Armstrong. Out at the end of North King street is Fort Shafter, the headquarters of the Hawaiian Department of the U. S. Army. If we follow the excellent concrete road out through Mo-a-na-lu-a, passing the wide cane fields to the mill town of Ai-e-a, thence through Pearl City, and on through other long stretches of cane fields, down through Ki-pa-pa and Waika-ka-lu-a gulches, thence on through the wide pineapple fields of the Wa-hi-awa plateau, we shall arrive at Schofield Barracks. This is the largest military post in the Territory. It lies about twenty miles northwest of Honolulu at an elevation of one thousand feet. Here may be found practically all branches of the army—the infantry, cavalry, artillery, the air service, motor transport, engineering, and hospital services, as well as many other branches. The thousands of soldiers at Schofield Barracks have delightful surroundings. Not far to the west and northwest are Ko-le Ko-le Pass and Mt. Ka-a-la, in the Wai-a-nae mountains. Over to the east the jagged tops of the Ko-o-lau range cut the skyline. A few miles to the north the coast line from Wai-a-lua to Ka-wai-lo-a may be

seen. At nighttime, the lights of Honolulu may be seen glimmering against the tropic sky.

Only a few miles to the west of Honolulu lies the great Pearl Harbor. Here is located the Government's large Naval and Air Stations. Here the mammoth Pearl Harbor drydock was completed in 1919. Here the Government's war vessels enter and the submarines may find anchorage. Here are quartered other thousands of sailors, marines, and aviators. Here is the fine, new naval hospital. Here is located the headquarters of the commandant and staff. Out in the harbor is a low, flat strip of land, known as Ford Island. Here Luke Field is located—the landing field and headquarters for army and navy aviators.

The permanent population of Oahu is gathered largely in Honolulu and around the several sugar cane and pineapple plantations. A list of the plantations and their mill towns may be found in the appendix. The typical plantation or town, described on Kauai, applies to Oahu. The largest plantation town in the whole Territory is located at Wai-pa-hu, the mill town of the Oahu Plantation. This is the third city of Hawaii in population. It is located on the north shore of Pearl Harbor on the main line of the Oahu Railway.

The Oahu Railway passes through the plantation towns of Ai-e-a, Pearl City, Wai-pa-hu, E-wa, Wai-a-nae (west of Waianae mountains), thence around Ka-e-na point (northwest point of Oahu) to Wai-a-lua and Ha-le-i-wa, thence around Ka-hu-ku Point at the northmost point to Ka-hu-ka. There are many villages and small settlements at intervals between the mill towns along the route. There is a stretch of coast line between Ma-ku-a around Ka-e-na point to near Ka-wai-ha-pai where the railway offers the only means of travel. A small plantation railway is in operation from the end of the Oahu Railway at Ka-hu-ka to Ka-ha-na on the east coast, at the foot of the valley of that name. This line

passes through the Mormon settlement at Lai-e, down the coast by Hau-u-la and Pu-na-lu-u to Ka-ha-na, at the foot of a beautiful valley and on Ka-ha-na Bay.

Leaving Honolulu over the great Kame-ha-me-ha automobile highway, paved with concrete, we climb up the Nu-u-a-nu valley to the Pa-li of that name. From this point we can look down on the pineapple fields on the windward plains to the northeast and the winding highway leading down the steep slope. Half way down the slope a branch of the highway leads off to the right by Kailu-a to Wai-ma-na-lo village and sugar plantation, a short distance from Makapu-u point, the eastmost end of the Island. The main Kamehameha Highway leads northward and northwestward around the coastal side of the Island, through Ka-ne-o-he, He-ei-a, Libbyville, Wai-a-ho-le, Ka-a-a-wa, and Wai-ka-ne. All of these small villages are connected with the pineapple industry, with grazing, with fishing, or, in a small way, with the rice culture. Arriving at Ka-ha-na, the Kamehameha highway passes through the same villages and mill towns as the railways, until Wai-a-lu-a is reached. Here it turns to the left, ascended the Wahi-awa-Schofield plateau, at first through cane fields of the Waialua Agricultural Company, then through long stretches of pineapples to Castner, near Schofield Barracks, and thence down the long slope to Honolulu.

Government: Honolulu is the capital of the Territory as well as the county seat of Honolulu county, which includes Oahu, Midway Island, twelve hundred miles northwestward, and a number of small volcanic-coral islands, where birds make their homes, far from the haunts of man.

The chief executive officer is the Governor, who is appointed by the President of the United States. His office is in the Palace, now the Capitol building, on King Street, Honolulu. His staff consists of a Secretary, an Attorney-General, a

Treasurer, a Superintendent of Public Works, a Commissioner of Public Works, a Superintendent of Public Instruction, and six School Commissioners, an Auditor, and a High Sheriff, as well as the Private Secretary to the Governor. All the officers of the staff are in the Capitol Building.

The Territorial Legislature meets in Honolulu at the Capitol Building every other winter, unless called together more frequently by the Governor in extra session. There are fifteen senators, six of whom are elected from Honolulu county by the direct vote of the people. There are thirty representatives, twelve of whom are chosen from Honolulu county. The members of the Legislature have the power to pass all laws, when in harmony with the "Organic Act," according to which the Territory of Hawaii was created by the United States Government. When signed by the Governor, the measures passed by the legislature become the laws of the Territory. The Governor of the Territory is the Commander-in-Chief of the National Guard of Hawaii. His department staff consists of six officers.

The Supreme Court of the Territory consists of a Chief Justice and two Assistant Justices. They, with the five judges of the Circuit Courts, are appointed by the President of the United States. Besides the judges, there are nine District Magistrates on Oahu: two in Honolulu, one in Ewa, one in Waianae, two in Waialua, two in Koolaupoko, and one in Koolauloa district.

There are several boards and commissions of the Territorial Government located in Honolulu, among which are The Board of Harbor Commissioners, Board of Commissioners of Agriculture and Forestry, the Division of Forestry, the Division of Entomology, the Division of Plant Inspection, the Division of Animal Industry, the Land Board, the Board of Commissioners of Public Archives, a Board of Health, an Industrial Accident Board, a Board of Examiners, the Com-

missioners of Insanity, the Public Utilities Commission, a Child Welfare Board, the Commissioners of Deeds, the Board of Fish and Game Commissioners. Besides these there are the Territorial Survey Office and the offices of the Assessors and Collectors of Territorial Taxes. The duties of the several commissions are to protect the life of the people and to work for the highest degree of efficiency in all the various activities of the citizens.

There is a complete public school system, with teachers under the direction of the Superintendent of Public Instruction for the Territory. There are public schools well distributed throughout the Island in all the districts of Honolulu, E-wa, Wai-a-nae, Wai-a-lua, Ko-o-lapo-ko, and Ko-o-lau-loa. The schools are graded through the eighth or grammar in the larger mill towns, such as Waipahu, Ewa, and Waialua. In Honolulu there are several grade schools besides the central or McKinley High School. The teachers are required to pass certain rigid educational tests before they are permitted to teach. There is a Territorial Normal School located in Honolulu in which teachers are trained. The University of Hawaii is located in Honolulu. All of these educational institutions that have been named are supported by the Territory of Hawaii, through taxation of the people.

There are also many private schools, including free kindergartens for children between four and six years of age. The most noted of the private schools in Honolulu are the Ka-me-ha-me-ha School for boys and girls of Hawaiian parentage, Pu-na-hou Academy and Oahu College, St. Louis, Mills, Ka-pi-o-la-ni, and Honolulu Military Academy. The private schools are all maintained by the endowments of money or the proceeds of large land estates, or by the contributions of generous people.

There are many Federal offices in Honolulu, representing the various works of the United States Government. These

include two Judges of the U. S. District Court, one U. S. Attorney, one Assistant U. S. District Attorney, the U. S. Marshal and his several assistants, two U. S. Commissioners, one Referee in Bankruptcy, a Collector of Customs and several assistants, a Collector of Internal Revenue and several assistants, the Agent in Charge of Income and Estate Taxes and his assistants, the Agent in charge of the Narcotic Division and his assistants, the U. S. Department of Labor, the Immigration Service, the Department of Agriculture, U. S. Weather Bureau, the Department of Commerce, Magnetic Observatory (Sisal, Oahu), the Hawaii Experiment Station, the U. S. Public Health Service, the U. S. Lighthouse Service. The majority of these Federal offices are located in the Federal Building on King Street.

There are many city and county officials: A Mayor, Sheriff, Clerk, Auditor, Treasurer, City and County Attorney and three deputies, seven Supervisors, a County Engineer, Chief Engineer of the Fire Department, Superintendent of Lights, Prosecuting Attorney, Bandmaster of the Royal Hawaiian Band, and a Superintendent of Public Works.

The following foreign countries have representatives in Honolulu; usually ranked as Consuls: Belgium, Brazil, Chili, China, Cuba, Denmark, France, Great Britain, Italy, Japan, Netherlands, Norway, Panama, Peru, Portugal and Spain.

Commerce: When one beholds the vast fields of cane, it is easy to realize that sugar production is the main business of Oahu. It is necessary to visit the mills, however, to see them grinding the cane, boiling the juices, and sacking the sugar, month after month, with scarcely a break, before one realizes how great is the sugar industry. Then if we go to the harbor front to see the sugar loaded in the holds of the great boats, sack after sack in endless procession, on its way to the mainland refineries, and

finally to the markets of the wide, wide world, we shall more fully realize sugar's place in Hawaii's commerce. Over two hundred thousand tons of sugar are taken from the plantations of Oahu annually, going mostly to American ports.

The pineapple crop is next to sugar in importance. The pineapple has expanded since modern machinery has developed the canning industry to such an extent as to make the Hawaiian brands excell all others. New lands have been opened up and old plantations that have proved to be unsuited to cane have been given over to the culture of pineapples. Experts are still studying in order to increase the value of this crop which annually produces well in excess of eight million cases of canned fruit. Three-fourths of the quantity exported is sent from the canneries of Oahu.

The minor products of the Territory which are shipped from Honolulu, include canned fish, bananas, hides and skins, honey, rice, raw wool, molasses, manufactures of wood, especially ukuleles.

The value of the annual exports from the Territory now exceeds \$125,000,000. Most of the exports leave Honolulu harbor, although large quantities of sugar are shipped direct from the harbors nearest the plantations.

Imports exceed \$75,000,000 annually, or about three-fifths the value of the exports. Being a highly specialized region, with sugar and pineapples in excess of all other productions, what should be the nature of the imports? Check off the following imported list in the order of their importance to Oahu: Agricultural implements, animals, automobiles and parts, books, maps, magazines, etc., boots and shoes, manufactures of brass, breadstuffs, brooms, cement, chemicals and drugs, clocks, watches, coal, confectionery, copper manufactures, cotton manufactures and clothing, dishes, eggs, electrical machinery and instruments, explosives, fertilizers, fish, fruit and nuts, furniture of

metal, glass and glassware, india rubber and manufactures of, iron and steel products, jewelry, oils, paint, paper, phonographs, radios and radio supplies, photograph supplies, beef products, hog products, dairy products, rice, salt and manufactures of, soap, straw manufactures, sugar, molasses and syrup, tea, tin and manufactures of, tobacco and manufactures of, toys, vegetables, wood manufactures, such as lumber, shingles, boxes or crates, floors, furniture, trimmings and other manufactures; wool and manufactures of. Most of these articles come through the port of Honolulu. Why? From what countries do they come? Consult your general geography.

Places and Points of Interest: On the physical map of Oahu you will find many valleys that are separated by ridges, extending outward from the main Ko-o-lau range. Most of these ridges and valleys have trails leading to places of sublime beauty and interest. Tantalus peak and Nu-u-a-nu Pali are two of these famous points, easily reached from Honolulu. Difficult trails lead to the summits of Ko-na-huanui (3105 feet), to the right of the "Pali," and La-ni-hu-li (2775 feet), to the left. Imagine the magnified and supreme outlook to be gained from these lofty summits rising just above Nuuanu Pali!

Another wonderful view of the land and sea may be had from Ko-le Ko-le pass, in the Waianae mountains, back of Schofield Barracks; here Lua-lua-lei and Waianae valleys open up before and be-

low you, with the great ocean far beyond. Again imagine the expanded vision you may have from Mt. Ka-a-la in the Waianae mountains (4030 feet), the highest peak on Oahu, over to your right; or of Mt. Ka-u-a (3110 feet) rising to your left. When on Kole Kole pass, Schofield Barracks and the great pineapple fields lie below and back of you, while the whole Koolau range cuts the eastern horizon.

In going around the Island by train and automobile we follow many bays, quaint mill towns, Hawaiian settlements, vast fields of cane and pineapples, the great Pearl Harbor, with its naval base and aviation field, the marine gardens at Ha-le-i-wa and Ka-ne-o-he, Mo-ka-pu point and O-lo-ma-nu peak. From Honolulu, one route passes the ancient volcanic crater at Diamond Head, beyond Waiki-ki, Ko-ko Crater beyond Ho-nau-ma bay, with the Spouting Horn on its makai base, then on past Palmer's Crater to the eastmost end of Oahu at Ma-ka-pu-u Point.

Honolulu has its parks, the aquarium, the Bishop Museum, Fort Shafter, Mo-a-na-lua Garden, the Harbor Front, and Punchbowl.

Pacific and A-le-wa Heights, Ma-no-a, Ka-li-hi, Pa-lo-lo, and Nu-u-a-nu valleys, the Japanese tea gardens, the Royal Mausoleum, and Waikiki Beach are among the many points of interest in Honolulu reached by street car or easy walk. The pineapple canneries are usually open to visitors, who are conducted by efficient and interesting guides.

JOURNAL

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A Periodical Record of Investigations Bearing on Problems of Food Production, Distribution, Conservation and Consumption, as well as on Public Health, and Race and Population Problems as Related to the Countries Bordering on the Pacific.

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More frequent publication as acceptable material is contributed.

LIST OF AUSTRALASIAN FISHES AVAILABLE FOR EXCHANGE PURPOSES.

Submitted by Gilbert P. Whitley, the Australian Museum, Sydney.

- SQUALIDAE. *Isistius brasiliensis* Quoy & Gaimard.
- HETERODONTIDAE. *Heterodontus philippi* Bloch & Schneider.
- ORECTOLOBIDAE. *Orectolobus maculatus* Bonaterre.
- HEMISCYLLIIDAE. *Chiloscyllium ocellatum* Bonaterre.
- DUSSUMIERIIDAE. *Stolephorus robustus* Ogilby.
- GONORHYNCHIDAE. *Gonorhynchus greyi* Richardson.
- LEPTOCEPHALIDAE. *Congermuraena habenata* Richardson.
- SYNODONTIDAE. *Saurida tumbil* Bloch.
- MYCTOPHIDAE. *Diaphus caeruleus* Klunzinger. *Diaphus perspicillatus* Ogilby. *Dasy Scopelus naufragus* Waite. *Myctophum hygomii* Lutken.
- MACRORHAMPHOSIDAE. *Macrorhamphosus elevatus* Waite.
- CENTRISCIDAE. *Centriscus cristatus* De Vis.
- SYNGNATHIDAE. *Solegnathus spinosissimus* Gunther. *Phyllopteryx foliatus* Shaw. *Hippocampus novae-hollandiae* Steindachner.
- PEGASIDAE. *Parapegagus natans* Linnaeus.
- HEMIRHAMPHIDAE. *Hemirhamphus far* Forskal. *Hyporhamphus intermedius* Cantor. *Hyporhamphus regularis* Gunther.
- TRACHICHTHYIDAE. *Trachichthys australis* Shaw. *Hoplostethus intermedius* Gunther.
- BERYCIDAE. *Trachichthodes australis* Gunther.
- MONOCENTRIDAE. *Cleidopus gloriarius* De Vis.
- MELANOTAENIIDAE. *Melanotaenia nigra* Richardson. *Pseudomugil signifer* Kner.
- STROMATEIDAE. *Seriola brama* Gunther.
- CORYPHAENOIDIDAE. *Coelorhynchus*, *Paramacrurus australis* Richardson. *Coelorhynchus*, *Paramacrurus fasciatus* Gunther. *Lepidorhynchus denticulatus* Richardson. *Malacocephalus laevis* Lowe.
- GEMPYLLIDAE. *Machaerope latispinis* Ogilby.
- SCOMBRIDAE. *Scomber australasicus* Cuvier & Valenciennes.
- CARANGIDAE. *Alectis ciliaris* Bloch. *Caranx forsteri* Cuvier & Valenciennes.
- APOGONIDAE. *Apogon savayensis* Gunther. *Archamia macroptera* Kuhl & van Hasselt.
- SERRANIDAE. *Gilbertia semicincta* Cuvier & Valenciennes. *Callanthias allporti* Gunther. *Acanthistius serratus* Cuvier & Valenciennes. *Caesioperca rasor* Richardson.
- THERAPONIDAE. *Therapon theraps* Cuvier & Valenciennes. *Therapon servus* Bloch.
- PLESIOPIIDAE. *Paraplesiops poweri* Ogilby.
- DENTICIDAE. *Nemipterus theodorei* Ogilby.
- LETHRINIDAE. *Pentapus setosus* Cuvier & Valenciennes.
- SPARIDAE. *Sparus australis* Gunther. *Pagrosomus auratus* Forster.
- GIRELLIDAE. *Girella elevata* Macleay.
- GERRIDAE. *Xystaema ovatum* Gunther.
- SCORPIDIDAE. *Scorpius violaceus* Hutton. *Atypichthys latus* McCulloch & Waite.
- CHAETODONTIDAE. *Chaetodon setifer* Bloch. *Chaetodon aureofasciatus* Macleay. *Gonochaetodon triangulum* Cuvier & Valenciennes.
- SCORPAENIDAE. *Scorpaena bynoensis* Richardson. *Neosebastes scorpaenoides* Guichenot.
- SYNANCEJIDAE. *Synanceja horrida* Linnaeus.
- PATAECIDAE. *Pataecus fronto* Richardson.
- APLOACTIDAE. *Aploactis milesii* Richardson.
- POMACENTRIDAE. *Acanthochromis longicaudus* Alleyne & Macleay. *Amphiprion percula* Lacepede. *Glyphisodon curacao* Bleeker. *Glyphisodon palmeri* Ogilby. *Parma microlepis* Gunther. *Daya jerdoni* Day, var. *fusca* McCulloch.
- ELEOTRIDAE. *Philypnodon grandiceps* Kreff.
- GOBIIDAE. *Callogobius hasseltii* var. *muscosus* Gunther. *Rhinogobius nebulosus* Forskal.
- ECHENEIDAE. *Echeneis naucrates* Linnaeus.
- CALLIONYMIDAE. *Callionymus calcarius* Macleay.
- PARAPERCIDAE. *Parapercis cylindrica* Bloch.
- BLENNIIDAE. *Salarias crenulatus* Weber. *Ecsenius mandibularis* McCulloch. *Petroscirtes anolius* Cuvier & Valenciennes. *Petroscirtes rotundiceps* Macleay. *Petraites fasciatus* Macleay. *Petraites heptaeolus* Ogilby. *Tripterygion annulatum* Ramsay & Ogilby. *Lepidoblennius haplodactylus* Steindachner.
- BATRACHOIDIDAE. *Coryzichthys diemensis* Le Sueur.
- GOBIESOCIDAE. *Diplocrepis costatus* Ogilby.
- BALISTIDAE. *Balistapus aculeatus* Linn.
- OSTRACIIDAE. *Ostracion*, *Lactoria*, *cornuta* Linn. *Anoplacapros lenticularis* Richardson.
- TETRAODONTIDAE. *Tetraodon armilla* McCulloch & Waite. *Spheroides hamiltoni* Richardson.

The above list is subject to slight variation.

A Catalogue of the Fishes of Korea

By TAMEZO MORI,

Professor of Zoology in the Preparatory Department of Keijo Imperial University,
Seoul, Korea.

Family 1. EPTATRETIDAE

1. *Eptatretus burgeri* (Girard). Nuta-unagi. Fusan.

Family 2. PETROMYZONTIDAE

2. *Entosphenus japonicus* (Martens). Kawa-yatsume. Tumen R.
3. *Lampetra reissneri* (Dybowski). Suna-yatsume. Kaniko.

Family 3. HETERODONTIDAE

4. *Heterodontus japonicus* (Duméril). Neko-zame. Mokpo.

Family 4. CARCHARHINIDAE

5. *Triakis scyllium* Müller & Henle. Doji-zame. Jinsen.
6. *Cynias manazo* (Bleeker). Hoshi-zame. Genzan, Mokpo.
7. *Cynias griseus* (Pietschmann). Inu-zame. Jinsen, Mokpo.

Family 5. SPHYRNIDAE

8. *Sphyrna zygaena* (Linné). Shumokuzame Jinsen, Mokpo.

Family 6. ALOPIDAE

9. *Alopias vulpinus* (Bonnaterre). Onagazame. Chinnampo.

Family 7. SQUALIDAE

10. *Squalus mitsukurii* Jordan & Fowler. Tsuno-zame. Fusan.
11. *Squalus japonicus* Ishikawa. Togari-Tsunozame. Fusan.
12. *Squalus suckleyi* (Girard). Jinsen.
13. *Squalus brevirostris* Tanaka. Fusan.

Family 8. SQUATINIDAE

14. *Squatina japonica* Bleeker. Kasu-zame. Fusan.

Family 9. PRISTIOPHORIDAE

15. *Pristiophorus japonicus* Günther. Nokogiri-zame. Mokpo.

Family 10. RHINOBATIDAE

16. *Rhinobatos schlegeli* Müller & Henle. Sakata-zame. Fusan, Mokpo.

Family 11. RAJIDAE

17. *Raja kenojei* Müller & Henle. Gangi-ei. Mokpo, Jinsen.
18. *Raja meerdervoortii* Bleeker. Komonkasube. Fusan.
19. *Raja porosa* Günther. Mokpo.

Family 12. DASYATIDAE

20. *Dasyatis akabei* (Müller & Henle). Akaei. Fusan.
21. *Urolophus fuscus* Garman. Shiroei. Fusan.

22. *Pteroplatea japonica* Temminck & Schlegel. Yokosaei. Fusan.

Family 13. MYLIOBATIDAE

23. *Myliobatis tobijei* Bleeker. Tobiei. Fusan, Mokpo.

Family 14. MOBULIDAE

24. *Mobula japonica* Müller & Henle. Ito-makiei. Mokpo.

Family 15. CHIMAERIDAE

25. *Chimaera phantasma* Jordan & Snyder. Ginzame. Mokpo.

Family 16. ACIPENSERIDAE

26. *Acipenser sinensis* Gray. Reisui.
27. *Acipenser dabryanus* Dumeril. Jinsen, Ruganho.
28. *Acipenser mikadoi* Hilgendorf. Chōzame. Genzan.

Family 17. ELOPIDAE

29. *Elops machnata* Forskål. Kara-iwashi. Fusan.

Family 18. DROSOMATIDAE

30. *Clupanadon punctatus* (T. & S.) Konoshiro. Fusan.
31. *Clupanadon osbecki* (Cuvier & Valenciennes). Jinsen.
32. *Clupanadon nasus* (Bloch). Chinnampo.

Family 19. CLUPEIDAE

33. *Clupea pallasii* C. & V. Nishin. Fusan, Genzan.
34. *Etrumeus micropus* (T. & S.). Urumeiwashi. Fusan, Jinsen.
35. *Spratelloides japonicus* (Houttuyn). Kibinago. Fusan.
36. *Sardinia melanosticta* (T. & S.). Iwashi. Fusan.
37. *Sardinella immaculata* (Kishinouye). Hoshinashi-iwashi. Fusan.
38. *Sardinella zunashi* (T. & S.). Zunashi. Fusan, Genzan.
39. *Ilisha elongata* (Bennett). Hira. Jinsen.
40. *Zunasia chinensis* (Basilewsky). Genzan.

Family 20. ENGRAULIDAE

41. *Engraulis japonicus* T. & S. Katakuchi-iwashi. Genzan, Fusan.
42. *Setipinna gilberti* Jordan & Starks. Fusan, Mokpo.
43. *Thrissocles hamiltoni* (Gray). Fusan.
44. *Stolephorus koreanus* Kishinouye. Ainoko-iwashi. Ruganho.
45. *Coilia nasus* T. & S. Etsu. Fusan.
46. *Coilia ectenes* Jordan & Seale. Chōsen-etsu. Fusan, Jinsen.

Family 21. SALMONIDAE

47. *Oncorhynchus masou* (Brevoort). Masu. Seishin.
48. *Oncorhynchus keta* (Walbaum). Sake. Tumen R., Rakuto R.
49. *Oncorhynchus gorboscha* (Walbaum). Karafuto-masu. Joshin.
50. *Oncorhynchus ishikawae* Jordan & McGregor. Joshin.
51. *Oncorhynchus kisutsch* (Walbaum). Ginmasu. Tumen R.
52. *Hucho ishikawae* Mori. Kōrai-ito. Headwaters of Yalu R.
53. *Brachymystax lenok* (Pallas). Headwaters of Yalu R.
54. *Brachymystax* sp. Tumen R.
55. *Brachymystax* sp. Headwaters of Yalu R.
56. *Thymallus articus jaluensis* Mori. Headwaters of Yalu R.

57. *Salvelinus malma* (Walbaum). Headwaters of Yalu R.
58. *Salvelinus latus* Ota. Hira-iwana. Tumen R.
Family 22. PLECOGLOSSIDAE
59. *Plecoglossus altivelis* T. & S. Ayu. Yalu R., Rakuto R., Genzan.
Family 23. OSMERIDAE
60. *Osmerus dentex* Steindachner. Kiuriuo. Genzan, Seishin.
61. *Hypomesus vercundus* Jordan & Metz. Chinnampo.
62. *Hypomesus olidus* (Pallas). Wakasagi. Genzan, Seishin.
Family 24. SALANGIDAE
63. *Salangichthys microdon* Bleeker. Tumen R.
64. *Neosalanx iwasei* Wakiya & Takahashi. Mokpo.
65. *Protosalanx hyalocranius* Abbott. Heijo, Keijo, Yalu R.
66. *Salanx coreanus* Wakiya & Takahashi.
67. *Parasalanx ariakensis* Kishinouye. Mokpo.
Family 25. SYNODONTIDAE
68. *Saurida eso* Jordan & Herre. Tokage-eso. Fusan.
69. *Saurida argyrophanes* (Richardson). Eso.
70. *Saurida tumbil* Bloch. Chinnampo.
71. *Harpodon nehereus* Hamilton. Chinnampo.
Family 26. SILURIDAE
72. *Parasilurus asotus* (Linné). Namazu. Keijo, Taikyū, Heijo.
73. *Parasilurus* sp. Head water of Yalu R.
Family 27. BAGRIDAE
74. *Pelteobagrus fulvidraco* (Richardson). Kōrai-gigi. Keijo, Heijo.
75. *Pelteobagrus vacheli* (Richardson). Keijo.
76. *Leiocassis longirostris* (Günther). Inoshishi-gigi. Keijo, Heijo.
77. *Leiocassis ussuriensis* (Dybowski). Heijo.
78. *Pseudobagrus emarginatus* Sowerby. Yalu R.
79. *Liobagrus andersonii* Regan. Keijo, Seishu.
80. *Liobagrus ? reini* Hilgendorf. Akaza. Kokujo.
Family 28. COBITIDAE
81. *Cobitis taenia* Linné. Shima-dojō. Tumen R.
82. *Cobitis sinensis* Sauvage. Kara-shima-dojō. Keijo, Heijo.
83. *Misgurnus anguillicaudatus* (Cantor). Dojō. Very common.
84. *Misgurnus decemcirrosus* Basilewsky. Kara-dojō. Keijo, Heijo.
85. *Lefua costata* Kessler. Hime-dojō. Tumen R.
86. *Lefua pleskei* (Herzenstein). Ichimojidojō. Kōgen.
87. *Barbatula toni* (Dybowski). Takanohamodoki. Tumen R., Yalu R.
88. *Barbatula intermedia* (Kessler). Tumen R.
89. *Barbatula pechiliensis* (Fowler). Heijo.
Family 29. CYPRINIDAE
90. *Cyprinus carpio* Linné. Koi. Very common.
91. *Carassius auratus* (Linné). Funa. Very common.
92. *Hemibarbus labeo* (Pallas). Korainigoi. Keijo, Heijo.
93. *Hemibarbus mylodon* Berg. Waiyo.
94. *Hemibarbus longirostris* Regan. Dunaga-nigoi. Taiden, Keijo.
95. *Pseudogobio esocinus* T. & S. Kamatsuka. Keijo, Taikyū.
96. *Pseudogobio rivularis* (Basilewsky). Suigen, Kōshu.
97. *Pseudogobio yaluensis* Mori. Yalu R.
98. *Gnathopogon strigatus* (Regan). Keijo, Taikyū.
99. *Gnathopogon coreanus* (Berg). Waiyo.
100. *Gnathopogon tsuchigae* Jordan & Hubbs. Heijo.
101. *Gnathopogon majimae* Jordan & Hubbs. Heijo.
102. *Gnathopogon longifilis* Jordan & Hubbs. Heijo.
103. *Pseudorasbora parva* T. & S. Mutsugo. Very common.
104. *Ladislavia taczanowskii* Dybowski. Yalu R., Waiyo.
105. *Sarcocheilichthys morii* Jordan & Hubbs. Heijo, Keijo.
106. *Sarcocheilichthys koreensis* Mori. Junshō.
107. *Sarcocheilichthys kobayashii* Mori. Taikyū.
108. *Sarcocheilichthys wakiyae* Mori. Chōko.
109. *Sarcocheilichthys soldatovi* (Berg). Yalu R.
110. *Saurogobio dabryi* Bleeker. Yalu R., Keijo.
111. *Saurogobio athymius* (Jordan & Starks). Jinsen.
112. *Gobio gobio* Linné. Tumen R., Yalu R.
113. *Gobio gobio macrocephalus* Mori. Tumen R.
114. *Coreius cetopsis* (Kner). Jinsen.
115. *Pungtungia herzi* Herzenstein. Mugitsuku. Keijo, Heijo, Taikyū.
116. *Aphyocypris ensarca* (Jordan & Starks). Ruganho, Fusan.
117. *Achahara brandti* (Dybowski). Tumen R.
118. *Achahara waleckii* (Dybowski). Yalu R., Tumen R.
119. *Achahara hakonensis* Günther). Ugui, Ulsan, Fusan.
120. *Achahara semotilus* (Jordan & Starks). Genzan.
121. *Phoxinus phoxinus* Linné. Tumen R.
122. *Phoxinus lagowski* (Dybowski). Tumen R., Yalu R.
123. *Phoxinus lagowski variegatus* Günther. Tumen R.
124. *Phoxinus lagowski oxyrhynchus* Mori. Hokusei, Tumen R.
125. *Phoxinus percnurus sachalinensis* Berg. Tumen R.
126. *Phoxinus percnurus mantschuricus* Berg. Tumen R.
127. *Phoxinus bergi* (Jordan & Metz). Genzan.
128. *Achahara semotilus* (Jordan & Starks). Genzan.
129. *Acheilognathus coreanus* Steindachner. Korai-tanago. Keijo.

130. *Acheilognathus signifer* Berg. Waiyo.
 131. *Acheilognathus cyanostigma* Jordan & Starks. Ichimoji-tanago. Chōko.
 132. *Acheilognathus yamatsutae* Mori. Yalu R.
 133. *Acanthorhodeus asmussi* Dybowski. Otanago. Heijo.
 134. *Acanthorhodeus gracilis* Regan. Kanpei, Seishu.
 135. *Acanthorhodeus taenianalis* Günther. Chōko.
 136. *Rhodeus chosenicus* Jordan & Metz. Suigen.
 137. *Rhodeus ocellatus* Günther. Suigen.
 138. *Rhodeus sericeus* (Pallas). Tumen R., Genzan.
 139. *Pseudoperilampus honda* Jordan & Metz. Suigen.
 140. *Opsariichthys bidens* Günther. Koraihasu. Keijo, Taikyu, Yalu R.
 141. *Zacco platypus* (T. & S.). Hae. Keijo, Taikyu, Yalu R.
 142. *Zacco temmincki* (T. & S.). Kawamutsu. Keijo, Taikyu, Yalu R.
 143. *Squaliobarbus curriculus* (Richardson). Akame. Keijo.
 144. *Parapelecus jouyi* Jordan & Starks. Jinsen.
 145. *Parapelecus eigenmanni* Jordan & Metz. Suigen, Kōkei.
 146. *Culter ilishaeformis* Steindachner. Kawahira. Keijo, Taikyu.
 147. *Culter recurviceps* (Richardson). Jinsen.
 148. *Culter breviceuda* Günther. Taikyu.
 149. *Hemiculter leuciscus* Bleeker. Kawaiwashi. Keijo, Heijo.
 150. *Ochetobius lucens* Jordan & Starks. Jinsen.
 Family 30. FLUTIDAE
 151. *Fluta alba* (Zuiew). Ta-unagi. Keijo, Zenshu.
 Family 31. ANGUILLIDAE
 152. *Anguilla japonica* (T. & S.). Unagi. Keijo, Heijo, Taikyu.
 153. *Anguilla bengalensis* Gray. Kani-kui. Saishu, Fusan.
 Family 32. CONGRIDAE
 154. *Astroconger myriaster* Brevoort. Manago. Fusan.
 151. *Anago anago* (T. & S.). Anago. Fusan.
 Family 33. MURAENESOCIDAE
 152. *Muraenesox cinereus* Forskål. Hamo. Fusan.
 Family 34. MURAENIDAE
 153. *Muraena pardalis* T. & S. Tora-utsubo. Mokpo.
 154. *Gymnothorax kidako* (T. & S.). Utsubo. Mokpo.
 Family 35. OPHICHTHYIDAE
 155. *Ophisurus macrorhynchus* (Bleeker) Umiebi. Fusan.
 Family 36. CYPINODONTIDAE
 156. *Aplocheilichthys latipes* (T. & S.). Medaka. Heijo, Keijo, Taikyu.
 Family 37. SYNGNATHIDAE
 157. *Syngnathus schlegelii* Kaup. Yojiuo. Genzan.
 158. *Hippocampus coronatus* T. & S. Tatsunootoshigo, Reisui.
 Family 38. AULORHYNCHIDAE
 159. *Aulichthys japonicus* Brevoort. Kudayagara, Fusan.
 Family 39. GASTEROSTEIDAE
 160. *Gasterosteus cataphactus* Pallas. Itouo. Koryo, Fusan.
 161. *Pungitius sinensis* (Guichenot). Tomiyo. Genzan.
 162. *Pungitius brevispinosus* (Otaki). Kitano-tomiyo. Seishin.
 Family 40. BELONIDAE
 163. *Tylosurus anastomella* (C. & V.). Datsu. Fusan.
 Family 41. HEMIRHAMPHIDAE
 164. *Hyporhamphus sajori* (T. & S.). Sayori. Fusan, Jinsen.
 Family 42. SCOMBRESOCIDAE
 165. *Cololabis saira* (Brevoort). Samma. Fusan.
 Family 43. EXOCOETIDAE
 166. *Cypselurus hirundo* (Steindachner). tsubame-tobino-uo. Fusan.
 167. *Cypselurus agoo* (T. & S.). Tobino-uo. Reisui.
 Family 44. MONOCENTRIDAE
 168. *Monocentris japonicus* C. & V. Matsukauo. Fusan.
 Family 45. SPHYRAENIDAE
 169. *Sphyraena obtusata* C. & V. Kamasu. Fusan.
 170. *Sphyraena pinguis* Günther. Fusan.
 Family 46. OSPHROMENIDAE
 171. *Macropodus opercularis* (Linné). Keijo, Heijo, Taikyu.
 FAMILY 47. OPHIOCEPHALIDAE
 172. *Ophicephalus argus* (Cantor). Fusan, Keijo, Heijo.
 Family 48. MUGILIDAE
 173. *Mugil cephalus* Linné. Bora. Fusan.
 174. *Liza haematocheila* (T. & S.). Sukuchi. Keijo, Fusan, Genzan.
 Family 49. BERYCIDAE
 175. *Beryx decadactylus* Cuvier. Kimmedal. Fusan.
 Family 50. CYBIIDAE
 176. *Scomber japonicus* Houttuyn. Saba, Fusan, Seishin.
 177. *Scomberomorus sinensis* (Lacépède). Inu-sawara. Fusan.
 178. *Cybiium koreanum* Kishinouye, Hirasawara. Fusan.
 179. *Sawara nipponia* (C. & V.). Sawara. Fusan.
 180. *Auxis thazard* Lacépède. Sōda-Katsuo. Fusan.
 Family 51. ACANTHOCYBIIDAE
 181. *Acanthocybium sara* Bennet. Oki-sawara, Fusan, Mokpo.
 Family 52. THUNNIDAE
 182. *Thunnus orientalis* (T. & S.). Suji-gatsuo. Fusan.
 Family 53. TRICHIURIDAE
 183. *Trichiurus japonicus* T. & S. Tachi-no-uo. Jinsen, Makpo.
 184. *Trichiurus muticus* Gray. Chinnampo.
 Family 54. CARANGIDAE
 185. *Trachurus japonicus* (T. & S.). Ma-aji. Fusan.
 186. *Trachurops torva* (Bloch). Fusan.
 187. *Seriola aureovittata* T. & S. Hiramasa. Fusan.

188. *Seriola quinqueradiata* (T. & S.). Buri. Fusan.
189. *Decapterus muroadsi* T. & S. Muro-aji. Fusan.
190. *Caranx equula* T. & S. Hira-aji. Fusan.
- Family 55. STROMATEIDAE
191. *Psenopsis anomala* (T. & S.). Ibot. Fusan.
- Family 56. PAMPIDAE
192. *Pampus argenteus* (Euphrasen) Managatsuo. Fusan, Jinsen.
193. *Pampus echinogaster* (Basilewsky) Korai-managatsuo. Chinnampo.
- Family 57. EQUULIDAE
194. *Leiognathus argentea* (Houttuyn) Hii-ragi. Fusan.
195. *Leiognathus rivulata* (T. & S.). Okihiragi. Fusan.
- Family 58. RACHYCENTRIDAE
196. *Rachycentron canadum* (Linné), Sugi. Fusan.
197. *Rachycentron nigrum* Bloch. Gunzan.
- Family 59. APOGONIDAE
198. *Apogon lineatus* (T. & S.). Tenjiku-dai. Fusan, Genzan.
- Family 60. PRIACANTHIDAE
199. *Priacanthus macracanthus* C & V. Benjimebaru. Fusan.
- Family 61. MORONIDAE
200. *Lateolabrax japonicus* C. & V. Suzuki. Fusan, Genzan, Jinsen.
- Family 62. EPINEPHELIDAE
201. *Coreoperca herzi* Herzenstein. Kōrai-oyanirami. Keijo, Taikyū, Heijo.
202. *Coreoperca kawamebari* (T. & S.). Oyanirani. Chōko.
203. *Siniperca chua-tsi* (Basilewsky). Keijo, Heijo.
204. *Siniperca scherzeri* Steindachner. Chōko.
205. *Stereolepis ischinagi* (Hilgendorf). Ishinagi. Fusan.
206. *Epinephelus tsrimenara* (T. & S.). Chirimennara. Fusan.
207. *Epinephelus septemfasciatus* (Thunberg). Mahata. Fusan.
208. *Epinephelus awoara* (T. & S.). Aoara. Fusan.
209. *Epinephelus ionthus* Jordan & Metz. Fusan.
- Family 63. HAEMULIDAE
210. *Pomadasis hasta* (Bloch). Fusan.
211. *Hapalogenys nigripinnis* (T. & S.). Seto-dai. Fusan.
212. *Hapalogenys mucronatus* (Eydoux & Souleyet). Higedai. Fusan.
213. *Plectorhynchus cinctus* (T. & S.). Koshōdai. Fusan.
214. *Scolopsis inermis* T. & S. Tamagashira. Chinnampo.
- Family 64. BANJOSIDAE
215. *Banjos banjos* (Richardson). Chōsenbakama. Fusan.
- Family 65. SPARIDAE
216. *Pagrosomus major* (T. & S.). Madai. Fusan, Jinsen, Genzan.
217. *Eynniss cardinalis* (Lacépède). Chadai. Fusan.
218. *Taius tumifrons* (T. & S.). Kidai. Fusan.
219. *Sparus macrocephalus* (Basilewsky). Kurodai. Jensen, Fusan.
- Family 66. SCIAENIDAE
220. *Nibea japonica* (T. & S.). Nibe. Fusan, Chinnampo.
221. *Nibea iharae* (Jordan & Metz). Chōsen-nibe. Fusan, Chinnampo.
222. *Nibea albiflora* (Richardson). Aka-guchi. Jinsen.
223. *Nibea manchurica* (Jordan & Thompson). Kiguchi. Jinsen.
224. *Nibea schlegeli* (Bleeker). Guchi. Fusan, Chinnampo.
225. *Laramichthys rathbunae* Jordan & Starks. Fusan, Chinnampo.
226. *Othonias undovittatus* Jordan & Seale. Chinnampo.
227. *Collichthys lucidus* Richardson.
228. *Collichthys fragilis* Jordan & Seale. Fusan, Chinnampo.
229. *Collichthys niveatus* Jordan & Starks. Chinnampo.
- Family 67. APLODACTYLIDAE
230. *Goniistius zonatus* C. & V. Takanohadai. Fusan.
- Family 68. MULLIDAE
231. *Upeneoides bensasi* (T. & S.). Himeji. Jinsen.
- Family 69. POLYNEMIDAE
232. *Polydactylus plebeius* (Broussonet). Tsubame-Konoshiro. Fusan.
233. *Polydactylus prionostomus* (Basilewsky).
- Family 70. OPLEGNATHIDAE
234. *Oplegnathus fasciatus* (T. & S.). Ishidai. Fusan.
- Family 71. SILLAGINIDAE
235. *Sillago sihama* (Forskål). Kisu. Fusan.
236. *Sillago japonicus* (T. & S.). Ao-kisu. Fusan.
- Family 72. LATILIDAE
237. *Latilus japonicus* (Houttuyn). Smaidai. Fusan.
- Family 73. EMBIOTOCIDAE
238. *Ditrema temmincki* Bleeker. Umitanago. Fusan, Genzan.
239. *Neoditrema ransonneti* Steindachner. Okitanago. Fusan.
- Family 73a. POMACENTRIDAE
240. *Chromis notatus* T. & S. Suzume-dai. Fusan.
- Family 74. LABRIDAE
241. *Semicossyphus reticulatus* C. & V. Kobudai. Fusan.
- Family 75. CORIDAE
242. *Pseudolabrus japonicus* (Houttuyn). Sasanoha-bera. Fusan.
243. *Halichoeres bleekeri* Steind. & Döderl. Hon-bera. Fusan.
244. *Halichoeres poecilopterus* (T. & S.). Kiusen. Fusan.
245. *Duymaeria flagellifera* C. & V. Ohagurobera. Fusan.
- Family 76. ZEIDAE
246. *Zeus japonicus* C. & V. Mato-dai. Fusan.
- Family 77. TEUTHIDAE
247. *Teuthis fuscescens* (Houttuyn). Fusan.
- Family 78. MONACANTHIDAE
248. *Monacanthus japonicus* (Tilesius). Yosogi. Fusan.
249. *Monacanthus cirrhifer* T. & S. Kawahagi. Fusan.
250. *Pseudomonacanthus unicornu* (Bas.) Umarurahagi. Fusan.

251. *Alutera monoceros* Osbeck. Nagasaki-ikkaku-hagi. Fusan.
Family 79. TETRAODONTIDAE
252. *Spheroides rubripes* (T. & S.) Tora-fugu. Fusan, Seishin.
253. *Spheroides pardalis* (T. & S.). Higan-fugu. Genzan, Seishin.
254. *Spheroides xanthopterus* T. & S. Shima-fugu. Chinnampo.
255. *Spheroides niphobles* Jordan & Snyder. Kusa-fugu. Genzan.
256. *Spheroides borealis* Jordan & Snyder. Oshu-fugu. Seishin.
257. *Spheroides vermicularis* (T. & S.). Nagoya-fugu. Seishin.
258. *Spheroides basilewskianus* (Basilewsky). Chinnampo.
259. *Spheroides ocellatus* (Osbeck). Me-fugu. Keijo, Heijo.
260. *Spheroides alboblumbeus* (Richardson). Komon-fugu. Fusan.
Family 80. TRICHODONTIDAE
261. *Arctoscopus japonicus* Steindachner. Chinnampo.
Family 81. SCORPAENIDAE
262. *Sebastodes schlegelii* (Hilgendorf). Kuro-mearu. Seishin, Fusan, Chinnampo.
263. *Sebastodes güntheri* Jordan & Starks. Mearu, Chinnampo.
264. *Sebastodes ijimae* Jordan & Metz. Fusan.
265. *Sebastodes inermis* (C. & V.). Kurosoi. Jinsen, Fusan.
266. *Sebastodes taczanowskii* (Steindachner). Ezo mebaru. Genzan.
267. *Pteropodus trivitattus* (Hilgendorf). Shimasoi, Jinsen, Seishin.
268. *Pteropodus mitsukurii* (Cramer). Mitsukuri-mearu. Fusan.
269. *Pteropodus pachycephalus* (T. & S.). Murasoi. Jinsen.
270. *Sebastichthys elegans* (Steind. & Döderl.). Yoro-i-mearu. Fusan.
271. *Sebastichthys vulpes* (Steind. & Döderl.). Fusan.
272. *Sebastichthys marmoratus* (C. & V.). Kasago. Fusan.
273. *Inimicus japonicus* C. & V. Oni-okoze. Ruganho.
274. *Hypodytes rubripinnis* (T. & S.). Ha-okoze. Fusan.
Family 82. HEXAGRAMMIDAE
275. *Pleurogrammus azonus* Jordan & Metz. Seishin.
276. *Agrammus agrammus* (T. & S.). Kujime. Fusan, Genzan.
277. *Hexagrammos otakii* Jordan & Snyder. Siname. Fusan, Chinnampo.
278. *Hexagrammos aburako* Jordan & Starks. Fusan.
Family 83. COTTIDAE
279. *Cottus poecilopus* Heckel. Yalu R., Heijo, Waiyo.
280. *Cottus czerskii* Berg. Tumen R.
281. *Myoxocephalus jaok* (C. & V.). Tuman R.
282. *Ceratocottus namiyei* Jordan & Snyder. Onikajika.
283. *Trachydermis fasciatus* Heckel. Sikake. Yalu R. Keijo.
284. *Gymnocanthus intermedius* (T. & S.). Sikajika. Fusan.
285. *Furcina ishikawae* Jordan & Starks. Sarasa-Kajika. Fusan.
286. *Bero elegans* (Steindachner). Bero. Jinsen, Fusan.
287. *Pseudoblennius percoides* (Richardson) Ana-haze. Fusan.
288. *Pseudoblennius marmoratus* Steindachner. Aya-anahaze.
Family 84. HEMITRIPTERIDAE
289. *Hemitripterus villosus* (Pallas). Kajika. Joshin.
Family 85. PARABEMBRIDAE
290. *Parabembras curtus* (T. & S.). Ubagochi. Fusan.
Family 86. PLATYCEPHALIDAE
291. *Platycephalus indicus* Linné. Gin-gochi. Fusan.
292. *Cocius crocodilus* (Tilesius) Ine-kochi. Fusan.
293. *Inegocia japonica* (Tilesius) Tokagegochi. Fusan.
Family 87. TRIGLIDAE
294. *Cheilidonichthys kumu* (Lesson & Garnot). Hōbo. Fusan.
295. *Lepidotrigla guntheri* Hilgendorf. Kanado. Jinsen.
296. *Lepidotrigla microptera* (Günther).
Family 88. PERISTEIIDIDAE
297. *Peristedion orientale* T. & S. Ki-hōbo. Fusan.
Family 89. AGONIDAE
298. *Tilesina gibbosa* Schmidt. Oni-shachi-uo. Genzan.
299. *Percis japonica* (Pallas). Inu-gochi. Seishin.
300. *Podothecus gilberti* (Collett). Kōri-tokubire. Genzan.
301. *Podothecus thompsoni* Jordan & Gilbert. Yase-tokubire. Seishin.
302. *Podothecus accipiter* Jordan & Starks. Taka-tokubire. Seishin.
303. *Podothecus hamlini* Jordan & Gilbert. Hakkaku-uo. Joshin.
304. *Anoplagonus inermis* (Günther). Genzan.
305. *Agonomaŷus jordani* Schmidt. Genzan.
306. *Draciscus sachi* Jordan & Snyder. Shachi. Joshin.
Family 90. ECHENEIDAE
307. *Echeneis naucrates* (Linné). Koban-itadaki. Reisui.
Family 91. CYCLOGASTERIDAE
308. *Cyclogaster tanakae* Gilbert & Burke. Kusa-uo. Fusan.
Family 92. CYCLOPTERIDAE
309. *Eumicrotremus orbis* (Günther). Ibo-dango. Seishin.
Family 93. ELEOTRIDAE
310. *Odontobutis obscurus* (T. & S.). Donko. Keijo.
311. *Odontobutis potamophilus* Günther. Yalu R.
312. *Percottus glehni* Dybowski. Tumen R.
Family 94. PERIOPHTHALMIDAE
313. *Periophthalmus cantonensis* (Osbeck). Tobi-haze. Jinsen, Fusan.
314. *Apocryptes chinensis* Osbeck. Mutsugorō. Fusan.
Family 95. GOBIIDAE
315. *Rhinogobius bernadoui* (Jordan & Starks).
316. *Rhinogobius similis* (Gill). Yoshinobori. Fusan.
317. *Rhinogobius hadropterus* (Jordan & Snyder). Gokuraku-haze. Suigen, Keijo.

318. *Rhinogobius pflaumi* (Bleeker). Moyō-haze.
319. *Rhinogobius bedfordi* Regan. Seishu.
320. *Rhinogobius sowerby* Ginsburg. Yalu-R.
321. *Chaenogobius macrognathus* (Bleeker). Ukigori. Seishin, Genzan, Tumen R.
322. *Aboma tsushimae* Jordan & Fowler. Tsushima-haze. Fusan.
323. *Chloea sarchynnus* Jordan & Snyder. Niku-haze. Genzan.
324. *Chloea nakamurae* Jordan & Richardson. Koshino-haze. Genzan.
325. *Chloea laevis* (Steindachner). Shikaku-haze. Ulchin.
326. *Pterogobius elapoides* (Günther). Nijiki-nobaru.
327. *Pterogobius zonoleucus* Jordan & Snyder. Shirosuji-haze. Fusan.
328. *Chasmichthys gulosus* (Sauvage). Drome. Genzan, Fusan.
329. *Chasmichthys dolichognathus* (Hilgendorf). Ago-haze. Genzan.
330. *Acanthogobius flavimanus* (T. & S.). Ma-haze. Genzan, Fusan.
331. *Acanthogobius hasta* (T. & S.). Ugui-haze. Jinsen, Chinnampo.
332. *Acanthogobius stigmathonus* (Richardson). Fusan.
333. *Chaeturichthys hexanemus* Bleeker. Dainan-haze. Fusan.
334. *Chaeturichthys stigmatius* Richardson. Yakūn-haze. Ruganho.
335. *Triaenopogon barbatus* (Günther). Shōki-haze. Ruganho.
336. *Tridentiger obscurus* (T. & S.). Chichibu. Genzan, Tumen R, Jinsen.
337. *Tridentiger bifasciatus* Steindachner. Shima-haze. Fusan, Genzan.
338. *Lophiogobius ocellicauda* Günther (Rawelina). Chinnampo.
- Family 96. GOBIOIDIDAE
339. *Taenioides abbotti* Jordan & Starks. Manshu-warazubo. Jinsen, Ruganho.
340. *Taenioides lacepedei* (T. & S.). Warazubo. Reisui.
- Family 97. PARAPERCIDAE
341. *Parapercis snyderi* Jordan & Starks. Korai-torakisui.
342. *Neopercis sexfasciatus* (T. & S.). Kurakake-kisu. Fusan, Jinsen.
- Family 98. TRICHODONTIDAE
343. *Arctoscopus japonicus* (Steindachner). Hatahata. Genzan.
- Family 99. URANOSCOPIDAE
344. *Uranoscopus japonicus* Houttuyn. Mishima-okoze. Fusan.
345. *Uranoscopus bicinctus* T. & S. Naganeuo. Fusan.
346. *Gnathagnus elongata* (T. & S.). Somishima. Fusan.
- Family 100. CALLIONYMIDAE
347. *Callionymus valenciennesi* (T. & S.). Nezumi-Gochi. Fusan.
348. *Callionymus lunatus* (T. & S.). Numerigochi. Fusan.
349. *Calliurichthys japonicus* (Houttuyn). Yone-gochi.
- Family 101. PHOLIDAE
350. *Pholis taczanowskii* (Steindachner). Hakodate-ginbo. Genzan, Fusan.
351. *Enedrias nebulosus* (T. & S.). Ginbo. Fusan, Genzan.
- Family 102. CEBIDICHTHYIDAE
352. *Zoarchias aculeatus* Basilewsky.
353. *Dictyosoma temmincki* Bleeker. Dainan-ginbo. Fusan.
- Family 103. STICHAETIDAE
354. *Dinogunnellus grigorjewi* (Herzenstein). Nagazuka. Jōshin, Chinnampo.
355. *Ernogrammus hexagrammus* (T. & S.). Musuji-gaji. Genzan.
- Family 104. ZOARCIDAE
356. *Zoarces gilli* Jordan & Starks. Korai-gaji. Fusan.
- Family 105. GADIDAE
357. *Eleginus navaga* (Koelreuter). Tumen R.
358. *Gadus macrocephalus* Tilesius. Tara. Genzan.
359. *Theragra chalcogramma* (Pallas). Suke-tō-tara. Genzan, Seishin.
360. *Lota lota* Linne. Headwater of Yalu R.
- Family 106. HIPPOGLOSSIDAE
361. *Paralichthys coreanicus* Schmidt. Hirame. Fusan, Genzan.
362. *Paralichthys percocephalus* (Basilewsky).
363. *Paralichthys olivaceus* (T. & S.). Fusan, Jinsen.
364. *Verasper variegatus* (T. & S.). Hoshigarei. Fusan.
365. *Verasper moseri* Jordan & Gilbert. Kurusuji-karei. Chinnampo.
366. *Cleisthenes herzensteini* (Schmidt). Chigo-garei. Seishin.
367. *Xystrias grigorjewi* (Herzenstein). Mushi-garei. Fusan, Genzan.
- Family 107. PLEURONECTIDAE
368. *Pleuronichthys cornutus* T. & S. Meitakarei. Fusan.
369. *Platichthys stellatus* (Pallas). Takanoha-karei. Genzan.
370. *Kareius bicoloratus* (Basilewsky). Ishigarei. Genzan.
371. *Liopsetta obscura* (Herzenstein). Kurokarei. Jinsen, Genzan.
372. *Lepidopsetta bilineata* (Ayres). Kokegarei. Genzan.
373. *Limandella yokohamae* Günther. Makogarei. Genzan.
374. *Limandella schrencki* Schmidt. Korigarei. Genzan.
375. *Limanda aspera* (Pallas). Ibo-garei. Seishin.
376. *Clidoderma asperrimum* (T. & S.). Same-garei.
377. *Microstomus stelleri* Schmidt. Babagarei.
- Family 108. SYNAPTURIDAE
378. *Zebrias fasciatus* (Basilewsky). Fusan.
379. *Zebrias japonicus* (Bleeker). Seto-ushinoshita. Fusan.
- Family 109. CYNOGLOSSIDAE
380. *Symphurus orientalis* (Bleeker). Azuma-garei.
381. *Areliscus hollandi* Jordan & Metz. Ushinoshita. Fusan.
382. *Areliscus abbreviatus* (Gray). Fusan.
383. *Areliscus rhomaleus* Jordan & Starks. Jinsen.
384. *Areliscus gracilis* Günther.
- Family 110. LOPHIDAE
385. *Lophius litulon* (Jordan & Sindo). Ki-ankō. Fusan.
386. *Lophiomus setigerus* (Vahl). Ankō. Fusan.

A Check of the Marine Fishes of Oregon and Washington

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This paper is a unit in the series of check-lists of Pacific fishes being published in this journal. It covers an area which, except for Puget Sound, has largely been neglected by ichthyologists. This gap in our knowledge of West American fishes was one of the chief incentives which led me, with Leonard P. Schultz as assistant, to collect extensively on the coast of Oregon and Washington in the summer of 1926. In this work we obtained one new species (*Pholis schultzi*) and a considerable number of others hitherto known only to the south or north of these states. These new extensions of ranges are duly incorporated into the following list.

There are included in the list, in addition to the shore-fishes, the deep-water and pelagic fishes which have been captured off the coast, and the anadromous and estuarine fishes, and the very near relatives of these even if known only from strictly fresh water; also the few freshwater species which descend into the bays to mingle with marine types.

One new generic name is here proposed—*Decagrammus*, in the family *Hexagrammidae*.

As I hope later to discuss the fish fauna of Oregon and Washington in greater detail, I ask my colleagues to call my attention to any omissions or errors which they may discover in the present list.

In order to interpret the nomenclature adopted in this paper, when at variance with that generally employed by other writers, reference may be made to my several reports on the fishes of Western North America. For convenience in this connection, and as a collation of my work, there is included a complete list of my papers on the fishes of the North Pacific.

1915a. Flounders and soles from Japan collected by the United States Bureau of Fisheries Steamer "Albatross" in 1906. Proc. U. S. Nat. Mus., 48: 449-496, pl. 25-27.

1916a. Notes on the marine fishes of California. Univ. Calif. Publ. Zool., 16: 153-169, pl. 18-20.

1916b. Report on the Japanese macrurid fishes collected by the United States Fisheries Steamer "Albatross" in 1906, with a synopsis of the genera. Proc. U. S. Nat. Mus., 51: 135-214, pl. 8-11. (Junior author with Charles Henry Gilbert.)

1916c. Notes on the distribution of three California rays. Copeia, 37: 87-88.

1916d. A second record of the scombroid fish *Germo macropterus* from the coast of California. Copeia, 38: 93.

1917a. A note on the food of *Squalus sucklii*, the California dogfish. Copeia, 43: 37-38.

1917b. The fishes of the Santa Ana system of streams in southern California. Lorchina, 1: 82-83. (Junior author, with George B. Culver.)

1917c. The breeding habits of the viviparous perch, *Cymatogaster*. Copeia, 47: 72-74.

1917d. Description of *Hymenocephalus tenuis*, a new macrurid fish from the Hawaiian Islands. Proc. U. S. Nat. Mus., 54: 173-175. (Junior author, with Charles Henry Gilbert.)

1918a. *Colpichthys*, *Thyrinops*, and *Austromeniidae*, new genera of atherinoid fishes from the New World. Proc. Acad. Nat. Sci. Phila., 1917: 305-308.

1918b. A revision of the viviparous perches. Proc. Biol. Soc. Wash., 31: 9-14.

1918c. The fishes of the genus *Atherinops*, their variation, distribution, relationships and history. Bull. Am. Mus. Nat. Hist., 38: 409-440, 1 map.

1918d. The flight of the California flying-fish. Copeia, 62: 85-88.

1918e. Supplementary notes on flounders from Japan with remarks on the species of *Hippoglossoides*. Ann. Zool. Jap., 9: 369-376.

1919a. The stickleback: a fish eminently fitted by nature as a mosquito destroyer. Calif. Fish and Game, 5: 21-24.

1919b. Studies in ichthyology. A monographic review of the family of *Atherinidae* or silversides. Stanford Univ. Publ. (Univ. Ser.): 1-87, pl. 1-12. (Junior author, with David Starr Jordan.)

1920a. The macrurid fishes of the Philip-

pine Islands and the East Indies. Bull. U. S. Nat. Mus., 100, 1 (7): 369-588, fig. 1-40.

1920b. Protective coloration and habits in the kelp-fish. Copeia, 80: 19-20.

1920c. The bionomics of *Porichthys notatus* Girard. Am. Nat., 54: 380-384.

1920d. Notes on the rays of California. Copeia, 86: 81-82.

1920e. A note on the California species of *Osmerus*. Copeia, 88: 97-98.

1921a. Notes on *Cottus asper* and *Cottus aleuticus*. Copeia, 90: 7-8.

1921b. Description of a new sciaenoid fish from Santa Catalina Island, California. Occ. Pap. Mus. Zool. Univ. Mich., 92: 1-3, pl. 1.

1921c. The latitudinal variation in the number of vertical fin-rays in *Leptocottus armatus*. *Ibidem*, 94: 1-7, 1 map.

1921d. Notes on the clupeoid fishes collected by Edmund Heller in San Felipe Bay, Gulf of California. Proc. Biol. Soc. Wash., 34: 47-48.

1921e. The ecology and life-history of *Amphigonopterus aurora* and of other viviparous perches of California. Biol. Bull., 40: 181-209, fig. 1-5.

1921f. Description of a new genus and species of goby from California with notes on related species. Occ. Pap. Mus. Zool. Univ. Mich., 99: 1-5.

1921g. Notes on the pipe-fishes of California. *Ibidem*, 100: 1-4.

1921h. Notes on Sebastodes. 1. A second record of *Sebastodes atrorubens* Gilbert. 2. The food of *Sebastodes auriculatus* Girard. Copeia, 93: 27-28.

1921i. Notes on a postlarval sciaenoid fish with three anal spines. Copeia, 101: 86.

1922a. A list of the lancelets of the world with diagnoses of five new species of *Branchiostoma*. Occ. Pap. Mus. Zool. Univ. Mich., 105: 1-16.

1922b. A revision of the Holarctic lampreys. *Ibidem*, 120: 1-14, pl. 1. (Junior author with Charles W. Creaser.)

1924a. The life-cycle and growth of lampreys. Pap. Mich. Acad. Sci., Arts and Letters, 4: 587-603, fig. 16-22.

1924b. Studies of the fishes of the order *Cyprinodontes*. I-IV. Univ. Mich. Mus. Zool. Misc. Publ., 13: 1-31, pl. 1-4.

1924c. Studies of the fishes of the order *Cyprinodontes*. V. Notes on the species of *Goodea* and *Skiffia*. Occ. Pap. Mus. Zool. Univ. Mich., 148: 1-8.

1925a. Racial and seasonal variation in the Pacific herring, California sardine and California anchovy. Calif. Fish and Game Comm., Fish. Bull. No. 8: 1-23, pl. 1-4.

1925b. A revision of the osmerid fishes of the North Pacific. Proc. Biol. Soc. Wash., 38: 49-55.

1925c. Record of fishes obtained by David Starr Jordan in Japan, 1922. Mem. Carn. Mus., 10: 93-346, fig. 1 and pl. 5-12. (Junior author with David Starr Jordan.)

1926a. The metamorphosis of the California ribbon-fish, *Trachypterus rex-salmonorum*. Pap. Mich. Acad. Sci., Arts and Letters, 5: 469-476, fig. 26.

1926b. The structural consequences of modifications of the developmental rate in fishes, considered in reference to certain problems of evolution. Am. Nat., 60: 57-81.

1926c. Notes on the gobioid fishes of California, with descriptions of two new genera. Occ. Pap. Mus. Zool. Univ. Mich., 169: 1-6, pl. 1.

1926d. Descriptions of new genera of cottoid fishes related to *Artedius*. *Ibidem*, 170: 1-16.

1926e. A revision of the fishes of the subfamily *Oligocottinae*. *Ibidem*, 171: 1-18.

1926f. The supposed intergradation of the two species of *Sebastolobus* (a genus of scorpaenoid fishes) of Western America. Am. Mus. Nov., 216: 1-9.

1926g. Studies of the fishes of the order *Cyprinodontes*. VI. Material for a revision of the American genera and species. Univ. Mich. Mus. Zool. Misc. Publ., 16: 1-84, pl. 1-3.

1927a. The range of *Cottus aleuticus*. Copeia, 162: 3-4.

1927b. Notes on the blennioid fishes of western North America. Pap. Mich. Acad. Sci., Arts and Letters, 7, 1926: 351-394.

1928a. The northward occurrence of southern forms of marine life on the Pacific Coast in 1925 and 1926. Calif. Fish and Game (in press).

1928b. *Pholis schultzi*: a new species of blennioid fish from the West Coast of the United States. Occ. Pap. Mus. Zool. Univ. Mich. (in press).

In the following list references are frequently made to the foregoing bibliography, as a brief method of explaining the nomenclature adopted. These references are given in parentheses following the specific name. The item in parentheses following the serial number for each species is the number used by Jordan and Evermann, in their great report on the *Fishes of North and Middle America*. In that work the descriptions, synonymies, and keys necessary for the understanding and identification of most of the forms may be found. I have studied Oregon or Washington material of all those species which are notated with an asterisk. A few of the species included may have been erroneously ascribed to the area treated in this check-list. Further investigations will no doubt markedly increase the list.

Family I.

EPTATRETIDAE. The hagfishes.

- (5) *Polistotrema stouti** (Lockington). California hagfish.
- Polistotrema deani** Evermann and Goldsborough. Alaska hagfish. (1926f: 1) Specimens at hand from Oregon, taken at latitude 43° 54'.

Family II.

PETROMYZONIDAE. The lampreys.

- (11) *Entosphenus tridentatus** (Gairdner). Pacific lamprey. (1922b: 6 and 10; 1924a: 588 and 592)
- (14, part) *Lampetra fluviatilis** (Linnaeus). European river lamprey. (1922b: 7 and 12)

5. (14, part) *Lampetra planeri** (Bloch). European brook lamprey. (1922b: 7 and 13; 1924a: 590 and 594)
Family III.
- HEXANCHIDAE. The cow sharks.
6. (17) *Notorhynchus maculatus* Ayres. Mud shark.
7. (18) *Hexanchus griseus* (Gmelin). Shovel-nose shark.
Family IV.
- SCYLLIORHINIDAE. The cat sharks.
8. (24) *Scylliorhinus brunneus* (Gilbert). Brown shark.
Family V.
- GALEIDAE. The gray sharks.
9. (38) *Prionace glauca* (Linnaeus). Blue shark.
10. (63) *Alopias vulpes** (Gmelin). Thresher shark. (1928a) Taken in 1926 in Coos Bay, Oregon.
Family VI.
- LAMNIDAE. The mackerel sharks.
11. (67) *Lamna nasus* Bonnaterre. Salmon shark. Has been recorded from California and Alaska (perhaps erroneously).
Family VII.
- SQUALIDAE. The dogfishes
12. (72) *Squalus suckleyi** (Girard). California dogfish. (1917a; and 1925c: 103)
13. (76) *Somniosus microcephalus* (Bloch and Schneider). Sleeper shark.
Family VIII.
- RAJIDAE. The skates.
14. *Raja kincaidii** Garman. Black skate.
15. (103) *Raja inornata* Jordan and Gilbert. California skate. (1916a: 153) recorded by Gilbert from Straits of Juan de Fuca.
16. (102) *Raja binoculata** Girard. Once Big skate. (1916c: 87, and 1920d: 81)
17. (101) *Raja rhina* Jordan and Gilbert. Long-nose skate.
18. (106) *Raja stellulata* Jordan and Gilbert. Prickle skate.
19. (108) *Raja trachura* Gilbert. Rough-tail skate. Known from deep-water off California and Alaska, but not yet actually reported for Oregon or Washington.
Family IX.
- CHIMAERIDAE. The chimaeras.
20. (142) *Hydrolagus collicii** (Lay and Bennett). Ratfish.
Family X.
- ACIPENSERIDAE. The sturgeons.
21. (145) *Acipenser transmontanus** Richardson. White sturgeon.
22. (146) *Acipenser medirostris** Ayres. Green sturgeon.
Family XI.
- CLUPEIDAE. The herrings.
23. (686) *Clupea pallasii** Cuvier and Valenciennes. Pacific herring. (1925a: 5)
24. (687) *Sardinia caerulea** (Girard). California sardine. (1925a: 11)
25. (693) *Alosa sapidissima** (Wilson). Shad. (Introduced.)
Family XII.
- ENGRAULIDAE. The anchovies.
26. (738) *Engraulis mordax mordax** Girard. California anchovy. (1925a: 14)
Family XIII.
- ALEPOCEPHALIDAE. (Deep-sea fishes.)
27. (748) *Bathytroctes stomias* Gilbert.
Family XIV.
- COREGONIDAE. The whitefishes.
28. (755) *Prosopium coulteri* (Eigenmann and Eigenmann). Big-scaled whitefish.
29. (756) *Prosopium williamsoni* (Girard). Rocky Mountain whitefish.
30. *Prosopium oregonum** (Jordan and Snyder). Oregon whitefish.
Family XV.
- SALMONIDAE. The salmon and trout.
31. (773) *Oncorhynchus gorboscha* (Walbaum). Humpback salmon.
32. (774) *Oncorhynchus keta* (Walbaum). Dog salmon.
33. (775) *Oncorhynchus tshawytscha** (Walbaum). King salmon.
34. (776) *Oncorhynchus kisutch** (Walbaum). Silver salmon.
35. (777) *Oncorhynchus nerka** (Walbaum). Sockeye salmon.
36. (779a) *Salmo clarkii clarkii** (Richardson). Cutthroat trout.
37. (781c, on p. 2821) *Salmo crescentis** Jordan and Beardslee. Lake Crescent trout.
38. (781b, on p. 2819) *Salmo beardsleei** Jordan and Seale. Beardslee trout, or blueback trout of Lake Crescent. Other types of trout from Lake Crescent, and Lake Southerland nearby, have received names, but I doubt their distinctness. *Salmo eremogenes* Evermann and Nichols, from Crab Creek, Washington, is perhaps valid.
39. (781) and (781a) *Salmo irideus irideus** Gibbons. Coast rainbow or steelhead.
40. (780) *Salmo irideus gairdneri** Richardson. Columbia River steelhead.
41. (784) *Salvelinus malma parkei** (Suckley). Dolly Varden trout.
Family XVI.
- OSMERIDAE. The true smelt.
42. (792) *Allosmerus attenuatus** (Lockington). San Francisco whitebait. (1925b: 53).
43. (790) *Thaleichthys pacificus** (Richardson). Eulachon. (1925b: 53).
44. *Spirinchus starksi** (Fisk). Night surf smelt. (1925b: 53 and 1928a) Taken by us at Yaquina Head, Oregon.
45. (791) *Spirinchus thaleichthys** (Ayres). San Francisco Bay Smelt. (1925b: 54).
46. (796) *Hypomesus olidus* (Pallas). Fresh-water smelt. (1925b: 54) Not yet

- definitely recorded from Washington or Oregon, though known from Alaska and near San Francisco.
47. (795) *Hypomesus pretiosus** (Girard). Surf smelt. (1925b: 55).
Family XVII.
- ARGENTINIDAE. (Deep-sea fishes.)
48. (800) *Leuroglossus stilbius* Gilbert. Recorded only from California and Alaska.
Family XVIII.
- MICROSTOMIDAE. (Deep-sea fishes.)
49. (804) *Bathylagus pacificus* Gilbert.
Family XIX.
- CHAULIODONTIDAE. The viper fishes.
50. (873) *Cyclothone microdon* (Günther).
51. (878) *Chauliodon macouni* Bean.
Family XX.
- CATOSTOMIDAE. The suckers.
52. (288) *Catostomus macrocheilus** Girard. Columbia River sucker. Descending into the bays.
Family XXI.
- CYPRINIDAE. The minnows.
53. (352) *Mylocheilus lateralis** Agassiz and Pickering. Columbia River chub. Descending into the bays.
Family XXII.
- SCOMBRESOCIDAE. The sauries.
54. (1076) *Cololabis saira* (Brevoort). Pacific saury. (1916a: 157) Recorded only from Japan, Vancouver Island and California.
Family XXIII.
- ALEPISAUROIDAE. The lancet fishes.
55. (889-893) *Alepisaurus ferox* Lowe. Lancet fish.
Family XXIV.
- PARALEPIDAE. (Pelagic fishes.)
56. (898) *Arctozenus coruscans* (Jordan and Gilbert).
Family XXV.
- MYCTOPHIDAE. The lantern fishes.
57. (858) *Myctophum californiense* Eigenmann and Eigenmann.
58. (865) *Tarletonbeania crenularis* (Jordan and Gilbert).
59. (841) *Lampanyctus leucopsarus* (Eigenmann and Eigenmann).
60. (842) *Lampanyctus nannochir* (Gilbert).
61. (846) *Diaphus theta* Eigenmann and Eigenmann.
Family XXVI.
- NEMICHTHYIDAE. The snipe eels.
62. (606) *Nemichthys avocetta* Jordan and Gilbert.
Family XXVII.
- TRACHYPTERIDAE. The ribbon fishes.
63. (2972) *Trachypterus rex-salmonorum* Jordan and Gilbert. California ribbon fish. (1926a).
Family XXVIII.
- BERYCIDAE. (Deep-sea fishes.)
64. (1223) *Plectromus lugubris* (Gilbert). Recorded from California and Alaska, but not yet from Oregon or Washington.
65. (1226) *Plectromus cristiceps* (Gilbert).
Family XXIX.
- MOLIDAE. The ocean sunfishes.
66. (2172) *Mola mola** (Linnaeus). Sunfish.
Family XXX.
- SERRANIDAE. The sea basses.
67. (1530) *Roccus saxatilis* (Walbaum). Striped bass. (Introduced.)
Family XXXI.
- CENTRARCHIDAE. The sunfishes and black basses.
68. (1410) *Aplites salmoides** (Lacépède). Large-mouth black bass. (Introduced, and descending into the bays.)
Family XXXII.
- ATHERINIDAE. The silversides.
69. (1178) *Atherinopsis californiensis californiensis** Girard. Jack smelt. (1919b: 85) Taken by us in Yaquina Bay, Oregon.
70. *Atherinops affinis oregonia** Jordan and Snyder. Oregon bay smelt. (1918c: 420, and 1919b: 84.) This form proves separable from typical *affinis* as a subspecies.
Family XXXIII.
- SPHYRAENIDAE. The barracudas.
71. (1204) *Sphyræna argentea* Girard. California barracuda.
Family XXXIV.
- STROMATEIDAE. The butterfishes.
72. (1367) *Peprilus simillimus* (Ayres). California pampano.
Family XXXV.
- ACROTIDAE. (Deep-water fishes?)
73. (1372) *Acrotus willoughbyi* Bean.
Family XXXVI.
- BRAMIDAE. The pomfrets.
74. (1359) *Brama rarai** (Bloch). Pomfret.
Family XXXVII.
- ZAPRORIDAE. (Pelagic fishes?)
75. (1372a, on p. 2850) *Zaprora silenus** Jordan.
Family XXXVIII.
- SCOMBRIDAE. The mackerels.
76. (1253, part) *Pneumatophorus diego* (Ayres). California mackerel. (1925c: 211, and 1928a).
Family XXXIX.
- CYBIIDAE. The bonitos and Spanish mackerels. (1925c: 212).
77. (1260) *Sarda chilensis* (Cuvier and Valenciennes). California bonito.
Family XL.
- THUNNIDAE. The tunas. (1925c: 215)
78. (1258) *Germo alalunga** (Gmelin). Albacore. (1928a) Taken for us between Coos Bay and Suislaw River, Oregon.
Family XLI.
- SCIAENIDAE. The croakers.
79. (1789) *Artractoscion nobilis* (Ayres). White sea bass.
Family XLII.
- EMBIOTOCIDAE. The viviparous perches.
80. (1886) *Hyperprosopon argenteum** Gibbons. Wall-eyed perch. (1918b: 12).
81. (1887) *Tocichthys ellipticus** (Gibbons). Silver pogie. (1918b: 12) Taken

- by us north to Clallam County, Washington; usually called by the latter name, *Hyperprosopon* or *Toxichthys agassizii*.
82. (1888) *Holconotus rhodoterus** Agassiz. Pogie. (1918b: 12, in part). Occurs north to Cape Flattery (northern records of *Amphistichus argenteus* refer to this species).
83. (1882) *Cymatogaster aggregatus** Gibbons. Shiner. (1917c; and 1918b: 11).
84. (1883) *Brachyistius frenatus* Gill. (1918b: 12).
85. (1891) *Taeniotoxa lateralis** (Agassiz). Squawfish. (1918b: 11) I have been unable to verify northern records of the related species *Embiotoca jacksoni*.
86. (1892) *Phanerodon furcatus** Girard. Split-tail perch. (1918b: 11)
87. (1896) *Damalichthys argyrosomus** (Girard). Pile perch. (1918b: 11)
- Family XLIII.
- SCORPAENIDAE. The rock-cods.
88. (2180) *Sebastes paucispinis** (Ayres). Bocaccio; grouper.
89. *Sebastes flavidus** (Ayres). Yellowtail black bass. Taken by us northward to Cape Flattery; confounded by Jordan and Evermann (1898, p. 1781) with *S. serranoides*, but properly distinguished by Eigenmann and Eigenmann (1890).
90. (2183) *Sebastes melanops** (Girard). Black bass.
91. (2185) *Sebastes mystinus** (Jordan and Gilbert). Black bass.
92. (2193) *Sebastes alutus* (Gilbert). Long-jaw rock-cod.
93. (2194) *Sebastes proriger* (Jordan and Gilbert). Rock-cod. Described from Puget Sound by Starks as *S. clavilatus*.
94. (2195) *Sebastes pinniger** (Gill). Orange rock-cod.
95. (2200) *Sebastes saxicola* (Gilbert). (1916a: 162, pl. 19).
96. (2201) *Sebastes crameri* Jordan. Rock-cod.
97. (2203) *Sebastes diploproa** (Gilbert). A deep-water species, taken for us in Hoods Canal, Washington.
98. (2216) *Sebastes rupestris* (Gilbert). A deep-water form not yet actually listed for Oregon or Washington, but recorded from southern California and southern Alaska.
99. (2218) *Sebastes zacentrus* (Gilbert). Another deep-water form; described from Puget Sound as *Sebastes deani* by Starks.
100. *Sebastes wilsoni** Gilbert. A deep-water species taken by the "Albatross" at Sta. 3078, off Oregon.
101. *Sebastes emphaeus* Starks. (Deep-water.)
102. (2219) *Sebastes elongatus** (Ayres). Reina. (1916a: 163) Taken for us in Hoods Canal.
103. (2206) *Sebastes introniger* (Gilbert).
104. (2207) *Sebastes ruberrimus** Cramer. Red rock-cod.
105. (2210) *Sebastes rosaceus* (Girard).
106. (2221) *Sebastes rubrivinctus* (Jordan and Gilbert). Spanish flag. Recorded for California and Queen Charlotte Islands.
107. (2222, and 2222a) *Sebastes auriculatus* (Girard). Brown rock-cod. (1921h: 28).
108. (2224) *Sebastes caurinus** (Richardson). Rock-cod.
109. (2226) *Sebastes maliger** (Jordan and Gilbert). Yellow-back rock-cod.
110. (2230) *Sebastes nebulosus* (Ayres). Chinese rock-cod.
111. (2232) *Sebastes nigrocinctus* (Ayres). Black-handed rock-cod.
112. (2175) *Sebastes alascanus** Bean (1926f)
113. (2176) *Sebastes altivelis** Gilbert. (1926f)
- Family XLIV.
- ANOPILOPOMATIDAE. The black cods.
114. (2255) *Anoplopoma fimbria** (Pallas). Black cod; skil.
115. (2256) *Ereilepis zonifer* (Lockington). Priest-fish.
- Family XLV.
- HEXAGRAMMIDAE. The rock-trout.
116. (2258) *Decagrammus decagrammus** (Pallas). Kelp-cod.
- Decagrammus* Hubbs, new genus (type, *Chiropsis constellatus* Girard); characterized by having two pairs of flaps on head, etc.
117. (2259) *Octagrammus octogrammus* (Pallas). Alaska greenfish. (Port Angeles record needs confirmation).
118. (2260) *Hexagrammos stelleri** Tilesius. Greenling.
119. (2261) *Lebius serperciliosus** (Pallas). Kelp-cod.
120. (2263) *Ophiodon elongatus** Girard. Ling-cod.
121. (2264) *Zaniolepis latipinnis** Girard.
122. (2266) *Oxylebius pictus** Gill. Convict-fish.
- Family XLVI.
- COTTIDAE. The sculpins or bullheads.
123. (2267) *Jordania zonope* Starks.
124. (2268) *Paricelinus hopliticus* Eigenmann and Eigenmann.
125. (2269) *Alcideia thoburni* (Gilbert).
126. (2270) *Scorpaenichthys marmoratus** (Ayres). Blue cod.
127. (2271) *Chitonotus pugetensis** Steindachner).
128. (2273) *Tarandichthys filamentosus** (Gilbert).
129. (2273) *Tarandichthys tenuis** (Gilbert). Dredged by us in Hoods Canal, and by J. R. Dymond in Departure Bay, British Columbia.
130. (2277) *Icelinus borealis** Gilbert. *I. strabo* is now regarded as a synonym of this species.

131. *Icelinus burchami** Evermann and Goldsborough. Taken by us in Hoods Canal; described from California by Gilbert as *Icelinus fuscescens*.
132. (2281, and 2284) *Astrolytes fenestralis** Jordan and Gilbert). (1926d: 1).
133. (2280) *Parastrolytes notospilotus** (Girard). (1926d: 2).
134. (2283) *Artedius lateralis** (Girard). (1926d: 7).
135. (2285) *Axyrius harringtoni** Starks.
136. (2289) *Ruscarius meanyi** Jordan and Starks.
137. (2297) *Radulinus boleoides* Gilbert.
138. (2298) *Radulinus asprellus** Gilbert.
139. (2301) *Triglops beani* Gilbert.
140. (2304) *Prionistius macellus* Bean.
141. (2308) *Hemilepidotus hemilepidotus** (Tilesius). Irish Lord.
142. (2309) *Calycilepidotus spinosus** Ayres. Taken by us north to Cape Johnson, Washington.
143. (2310) *Aspicottus bison** Girard. Buffalo.
144. (2314) *Cottus asper** Richardson. Some of the species of *Cottus* here listed are probably not valid; all need further study.
145. (2315) *Cottus gulosus** (Girard).
146. (2327) *Cottus klamathensis* Gilbert.
147. (2316) *Cottus evermanni* Gilbert.
148. (2317) *Cottus rhotheus** Smith.
149. (2319) *Cottus bairdii punctulatus* Cope.
150. (2330) *Cottus beldingii* Eigenmann and Eigenmann.
151. (2326) *Cottus perplexus* Gilbert and Evermann.
152. (2328) *Cottus aleuticus** Gilbert.
153. (2335) *Cottus princeps* Gilbert.
154. (2336) *Cottus bendirei* (Bean).
155. (2338) *Cottus marginatus* (Bean).
156. (2339) *Cottus tenuis* (Evermann and Meek).
157. (2351) *Myoxocephalus polyacanthocephalus* (Pallas).
158. (2361) *Zesticelus profundorum* (Gilbert) Known only from great depths off Alaska and California.
159. (2362) *Dasycottus setiger* Bean.
160. *Malacocottus kincaidi** Gilbert and Thompson. Abundant in Hoods Canal near Holly.
161. (2379) *Leptocottus armatus armatus** Girard. Bullhead. (1921c).
162. (2384a, on p. 3179) *Rusciculus rimensis** Greeley. (1926e: 5) Taken by us north to Cape Johnson, Washington, and by J. R. Dymond at Gabriola Island, British Columbia; described by Gilbert and Thompson as *Stelgidonotus latifrons* from Friday Harbor, Washington, and as such recorded by Evermann and Goldsborough from Admiralty Head, Washington.
163. (2381) *Oligocottus maculosus** Girard. (1926e: 6).
164. (2384b, on p. 3181) *Dialarchus snyderi** Greeley. (1926e: 8) Abundant on reefs of outer coast of Oregon and Washington.
165. (2384) *Allocottus embryum** (Jordan and Starks). (1926e: 14).
166. (2383) *Oxycottus acuticeps** (Gilbert). (1926e: 15).
167. (2385a) *Blennicottus globiceps** (Girard). (1926e: 17).
168. (2387) *Blepsias cirrhosus** (Pallas).
169. (2389) *Nautichthys oculo-fasciatus** (Girard).
170. (2393) *Synchirus gilli* Bean.
171. (2394) *Ascelichthys rhodorus** Jordan and Gilbert.
172. (2395) *Psychrolutes paradoxus* Günther.
173. (2396) *Gilbertidia sigolutes** (Jordan and Starks). Abundant in cavities of sponges, Hoods Canal.
- Family XLVII.
RHAMPHOCOTTIDAE.
174. (2397) *Rhampnocottus richardsoni** Günther. "Sea horse".
Family XLVIII.
AGONIDAE. Sea poachers.
175. (2400) *Hypsogonus quadricornis* (Cuvier and Valenciennes).
176. (2401) *Stellerina xyosterna* (Jordan and Gilbert).
177. (2402) *Occa verrucosa* (Lockington).
178. (2407) *Pallasina air** Starks.
179. (2413) *Podothecus acipenserinus** (Tilesius). Alligator fish.
180. (2417) *Averruncus emmelane** Jordan and Starks.
181. (2426) *Xeneretmus triacanthus** (Gilbert).
182. (2425) *Xenopyxis latifrons** (Gilbert).
183. (2423) *Asterotheca pentacantha* (Gilbert).
184. *Asterotheca infraspinata** (Gilbert).
185. (2424) *Asterotheca alascana* (Gilbert).
186. (2422) *Bathygonus nigripinnis** (Gilbert).
187. (2427) *Odontopyxis trispinosus* Lockington.
188. (2428) *Bothragonus swanii** (Steindachner). Taken by us near Cape Johnson, Washington.
189. (2433) *Anoplagonus inermis* (Günther).
Family XLIX.
CYCLOPTERIDAE. The lump suckers.
190. (2436) *Eumicrotremus orbis* (Günther).
Family L.
LIPARIDIDAE. The rock-suckers.
191. (2445 and 2446) *Neoliparis mucosus** (Ayres).
192. (2444) *Neoliparis callyodon* (Pallas).
193. (2447) *Polypera greeni* (Jordan and Starks).
194. (2450) *Liparis cyclopus* Günther. [I have not yet studied our liparid material, which comprises several species.]
195. (2455) *Liparis dennyi* Jordan and Starks.
196. (2451) *Liparis fucensis* Gilbert.
197. (2457) *Liparis pulchellus* Ayres.
198. (2468) *Careproctus melanurus* Gilbert.

199. (2469a, on p. 2866) *Careproctus cypselurus* (Jordan and Gilbert).
 200. (2473) *Paraliparis cephalus* Gilbert.
 201. (2475) *Paraliparis mento* Gilbert.
 202. (2478) *Paraliparis ulochir* Gilbert. Recorded from Gulf of California and Bering Sea.
 203. *Paraliparis deani* Burke. Recorded from Alaska and California.
 204. *Rhinoliparis attenuatus* Burke. Recorded from Bering Sea and Monterey Bay.
 205. *Nectoliparis pelagicus* Gilbert and Burke.

Family LI.

GASTEROSTEIDAE. The sticklebacks.

206. (1098, 1099 and 1100) *Gasterosteus aculeatus aculeatus** Linnaeus. (1925c: 201).
 207. (1101a) *Gasterosteus aculeatus microcephalus** Girard. (1919a, and 1925c: 201).
 208. (1103) *Aulorhynchus flavidus** Girard.

Family LII.

SYNGNATHIDAE. The pipefishes.

209. (1113) *Syngnathus griseo-lineatus** Ayres. (1916a: 159, and 1921g: 2).

Family LIII.

GOBIIDAE. The gobies.

210. (2537) *Rhinogobiops nicholsii** (Bean). (1926c: 1).
 211. (2581) *Lepidogobius lepidus** (Girard). (1926c: 3).
 212. (2582) *Gillichthys mirabilis* Cooper. (1921f: 1, and 1926c: 3).
 213. (2584) *Quietula y-cauda* (Jenkins and Evermann). (1921f: 4) Recorded north of California only from Vancouver Island.
 214. (2586 and 2587) *Clevelandia ios** (Jordan and Gilbert). (1921f: 5).

Family LIV.

BATHYMASTERIDAE. The ronquils.

215. (2627) *Ronquilus jordani** (Gilbert). Ronquill.

Family LV.

TRICHODONTIDAE. The sandfishes.

216. (2632) *Trichodon trichodon** (Tilesius). Sandfish.

Family LVI.

BATRACHOIDIDAE. The toadfishes.

217. (2654) *Porichthys notatus** Girard. Singing fish; midshipman.

Family LVII.

GOBIESOCIDAE. The clingfishes.

218. (2659) *Caularchus maeandricus** (Girard).

Family LVIII.

CLINIDAE. The tropical blennies.

219. *Gibbonsia elegans montereyensis* Hubbs. Kelpfish. (1927b: 354). Known north of California only from Vancouver Island.
 220. (2688) *Heterostichus rostratus* Girard. Kelpfish. Recorded north of California only from British Columbia.

Family LIX.

ANARHICHADIDAE. The wolf-fishes.

221. (2806) *Anarrhichthys ocellatus** Ayres. Wolf-eel. (1916a: 165).

Family LX.

STICHAEIDAE. The northern blennies or "eels."

222. (2765) *Bryostemma nugator** Jordan and Williams.
 223. (2764, part) *Bryostemma decoratum* Jordan and Snyder.
 224. (2777) *Anoplarchus purpureus purpureus** Gill. (1927b: 374).
 225. (2779 and 2780) *Phytichthys chirus chirus** (Jordan and Gilbert). (1927b: 383).
 226. (2781) *Xiphister mucosus** (Girard). (1927b: 384). "Eel".
 227. (2782) *Epigeichthys atro-purpureus** (Kittlitz). (1927b: 386).
 228. (2787) *Plectobranthus evides** Gilbert.
 229. (2789) *Poroclinus throrocki* Bean. Recorded from deep-water off Alaska and California.
 230. (2791) *Lumpenus anguillaris** (Pallas).
 231. (2798) *Delolepis giganteus** (Kittlitz). (1927b: 377). "Congo eel." Taken by us south to Heceta Head, Oregon.
 232. (2800) *Lyconectes aleutensis** Gilbert. Red devil. Taken for us in Hoods Canal, Washington.

Family LXI.

PHOLIDIDAE. The butterfishes.

233. (2774, part) *Pholis ornatus** (Girard). (1927b: 389)
 234. (2774, part) *Pholis lactus** (Cope). A valid species long confused with *P. ornatus*, ranging from Alaska south to Del Norte County, California.
 235. (2774, part). *Pholis schultzi** Hubbs. (1928b) A reef species ranging from Puget Sound to Del Norte County, California.
 236. (2766 and 2767) *Apodichthys flavidus** Girard. (1927b: 390)
 237. (2768) *Xerorpes fucorum** (Jordan and Gilbert). (1927b: 392)

Family LXII.

SCYTALINIDAE. The burrowing blennies.

238. (2811) *Scytalina cerdale* Jordan and Gilbert. (1927b: 393)

Family LXIII.

ZOARCIDAE. The eel-pouts.

239. (2814) *Embryx crotalinus* (Gilbert). Recorded only from Alaska and southern California.
 240. (2815) *Lycodopsis pacificus** (Collett).
 241. (2826) *Lycodes palearis* Gilbert.
 242. (2827) *Lycodes brevipes* Bean.
 243. (2835) *Furcimanus diaptera* (Gilbert).
 244. *Bothrocara remigera* Gilbert.
 245. (2839, part) *Lycogramma brunnea* (Bean). (1925c: 321)
 246. (2864) *Lycodapus ferasfer* Gilbert.

Family LXIV.

BROTULIDAE. The brotuloid fishes.

247. (2873) *Brosomphycis marginatus** (Ayres).

Family LXV.

AMMODYDITAE. The sand launces.

248. (1214) *Ammodytes tobianus personatus** (Girard).
Family LXVI.
GADIDAE. The cods.
249. (2901) *Merluccius productus** (Ayres). California hake.
250. (2905) *Theragra chalcogramma fucensis* (Jordan and Gilbert). Puget Sound pollack.
251. (2907) *Microgadus proximus** (Girard). Tom-cod.
252. (2910) *Gadus macrocephalus** Tilesius. Pacific cod. (1925c: 326)
253. (2915) *Antimora microlepis* Bean. Recorded from Alaska, British Columbia and California.
Family LXVII.
- CORYPHAENOIDIDAE. The grenadiers.
254. (2948) *Coryphaenoides pectoralis* (Gilbert). (1916b: 161)
255. (2961) *Coryphaenoides acrolepis* (Bean). (1916b: 143 and 162)
Family LXVIII.
- PLEURONECTIDAE. The flounders.
256. (2975) *Atheresthes stomias* (Jordan and Gilbert). Arrow-tooth halibut.
257. (2977) *Hippoglossus hippoglossus** (Linnaeus). Halibut.
258. (2978) *Lyopsetta exilis** (Jordan and Gilbert). (1916a: 168)
259. (2979) *Eopsetta jordani** (Lockington). Sole.
260. (2981) *Hippoglossoides classodon* Jordan and Gilbert. (1918e: 373)
261. (2984) *Psettichthys melanostictus** Girard. English sole.
262. (3007) *Pleuronichthys coenosus** Girard. Sole. (1916a: 169) I find no grounds for the separation of the nominal Puget Sound species *P. nephelus* Starks and Thompson.
263. (3009) *Parophrys vetulus** Girard. Small sole.
264. (3010) *Inopsetta ischyra* (Jordan and Gilbert).
265. (3011) *Isopsetta isolepis* (Lockington). Rock sole.
266. (3012) *Lepidopsetta bilineata** (Ayres). Sole. (1918e: 376)
267. (3023) *Platichthys stellatus rugosus** Girard. Flounder. (1915a: 488)
268. (3025) *Microstomus pacificus* (Lockington). Chinese sole.
269. (3028) *Errex zachirus** (Lockington). Rex sole.
Family LXIX.
- BOTHIDAE. The sand dabs.
270. (3048) *Citharichthys sordidus* (Girard). Sand dab.
271. (3051) *Citharichthys stigmaeus** Jordan and Gilbert. Speckled sand dab.

The Pan-Pacific Research Institute will welcome check-lists of the fish of any country of the Pacific, or of any portion of the Pacific Ocean, these lists to be published in the Journal of the Pan-Pacific Research Institution and bound together finally in book form.

Science papers are welcomed. The very technical ones will be published in the Journal of the Institute while Popular Science articles with illustrations will be held for use in the quarterly, Popular Science number, of the Mid-Pacific Magazine.

BULLETIN

OF THE

PAN-PACIFIC UNION

An unofficial organization, the agent of no government, but with the good will of all in bringing the peoples of the Pacific together into better understanding and cooperative effort for the advancement of the interests common to the Pacific area.

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AIMS OF THE PAN-PACIFIC UNION

From year to year the scope of the work before the Pan-Pacific Union has broadened, until today it assumes some of the aspects of a friendly unofficial Pan-Pacific League of Nations, a destiny that both the late Franklin K. Lane and Henry Cabot Lodge predicted for it.

The Pan-Pacific Union has conducted a number of successful conferences; scientific, educational, journalistic, commercial, fisheries, and most vital of all, that on the conservation of food and food products in the Pacific area, for the Pacific regions from now on must insure the world against the horrors of food shortage and its inevitable conclusion.

The real serious human action of the Pan-Pacific Union begins. It is following up the work of the Pan-Pacific Food Conservation Conference by the establishment of a Pan-Pacific Research Institution where primarily the study and work will be along the lines necessary in solving the problems of food production and conservation in the Pacific Area,—land and sea. Added to this, will be the study of race and population problems that so vitally affect our vast area of the Pacific, the home of more than half of the peoples who inhabit this planet. The thoughts and actions of these peoples and races toward each other as they are today, and as they should be, for the welfare of all, will be a most important problem before the Union, as well as the problem of feeding in the future those teeming swarms of races, that must be well fed to preserve a peaceful attitude toward each other.

The Pan-Pacific Union is an organization in no way the agency of any Pacific Government, yet having the goodwill of all, with the Presidents and Premiers of Pacific lands as its honorary heads. Affiliated and working with the Pan-Pacific Union are Chambers of Commerce, educational, scientific and other bodies. It is supported in part by government and private appropriations and subscriptions. Its central office is in Honolulu, because of its location at the ocean's crossroads. Its management is under an international board.

The following are the chief aims and objects of the Pan-Pacific Union:

1. To bring together from time to time, in friendly conference, leaders in all lines of thought and action in the Pacific area, that they may become better acquainted; to assist in pointing them toward cooperative effort for the advancement of those interests that are common to all the peoples.
2. To bring together ethical leaders from every Pacific land who will meet for the study of problems of fair dealings and ways to advance international justice in the Pacific area, that misunderstanding may be cleared.
3. To bring together from time to time scientific and other leaders from Pacific lands who will present the great vital Pan-Pacific scientific problems including those of race and population, that must be confronted, and if possible, solved by the present generation of Pacific peoples and those to follow.
4. To follow out the recommendations of the scientific and other leaders in the encouragement of all scientific research work of value to Pacific peoples; in the establishment of a Research Institution where such need seems to exist, or in aiding in the establishment of such institutions.
5. To secure and collate accurate information concerning the material resources of Pacific lands; to study the ideas and opinions that mould public opinion among the peoples of the several Pacific races, and to bring men together who can understandingly discuss these in a spirit of fairness that they may point out a true course of justice in dealing with them internationally.
6. To bring together in round table discussion in every Pacific land those of all races resident therein who desire to bring about better understanding and cooperative effort among the peoples and races of the Pacific for their common advancement, material and spiritual.
7. To bring all nations and peoples about the Pacific Ocean into closer friendly commercial contact and relationship. To aid and assist those in all Pacific communities to better understand each other, and, through them, spread abroad about the Pacific the friendly spirit of inter-racial cooperation.

Pan-Pacific Women's Conference Approaches

Through the courtesy of the Pan-Pacific Union, its Bulletin is again available to the Central Committee of the 1928 Pan-Pacific Women's Conference whose sessions will last from August 9-19, for the publication of timely conference information, accounts of preparatory work in some participating countries, and advance Conference contributions. Owing to distances which some of the delegates have to travel, this will be the last Bulletin which can be placed in their hands from Honolulu prior to their setting out. Insofar as the Conference Committee is able in imagination to place itself in the position of the delegates who are planning to attend, this Bulletin will attempt to answer the questions which arise in their minds. In addition it delineates some of the facts known about the delegates from different countries, so that the composition of the Conference, when it convenes, may be understood. In order to have it reach all Pacific countries prior to the departure of the representatives, it is being printed in advance, and will later be included in the July issue of the "Mid-Pacific Magazine"

With the approach of the Conference within measurable distance of time, after a period of preparation extending over four years, the Central Committee realises with even greater force the potentialities which the Conference holds. As news comes in of the interested response and persistent efforts to obtain and finance delegates on the

part of different countries, the Committee is impressed anew at the value the gathering may have. It realises that women of Australia and New Zealand for example, have a great experience before them in their contacts with women of oriental countries; it further realises that women of China and Japan, have, in addition to the contribution which they will give, much to gain in inspiration and information from women of larger organisational experience. Indeed by interchange of thought of every group, there is value in advance which is becoming increasingly evident.

This issue contains a reprint of an article published in the Pan-Pacific Monthly of Shanghai, which seeks to see the relationship between this conference and other international groups of women. While the Pan-Pacific Women's Conference aims to gather together women of Pacific lands who have too long remained isolated, it is natural that women asked to participate should give thought to the question of possible relationships. The article in question was written out of consultation with the many women of different nationalities in Shanghai who have relationships with existing women's international organisations which are accustomed to use the machinery of international conference. As the Pan-Pacific Women's Conference approaches, the article in question becomes pertinent for consideration.

Plans for Hospitality at the Pan-Pacific Women's Conference

The official delegates to the Pan-Pacific Women's Conference will be the guests of the Pan-Pacific Union during the entire duration of the Conference, from August 9th to 19th. Hospitality is indeed available for these from August 7th. in the Punahou School, through the courtesy of the Board of Directors of this extremely interesting institution. The Conference will gain by being associated with this, known as "the oldest educational institution in American Territory West of the Rocky Mountains." For those interested in historical aspects of these islands, this school, established by missionaries soon after their arrival in 1820, will prove interesting. The oldest building now extant in the grounds bears the date 1852. It is regarded as the premier private school in the Islands. Its position on the hills, with commanding views of ocean and valleys, with spacious rooms and wide "lanais" or balconies, and with delightful leafy grounds where the flowering trees will be at their best during the Conference, ensures success in advance.

The Conference Committee congratulates itself and the Conference in having Miss Elsie Wilcox, one of Commissioners of Education in the Islands, as its hostess. Miss Wilcox has her home in the island of Kauai, some hundred miles distant from that of Oahu, on which Honolulu is situated. She has been associated with many valuable social movements in the Islands. With gracious courtesy Miss Ada Erwin, teacher of Home Economics at Punahou School, will take charge of the living arrangements for the Conference. This, during what is normally

her vacation period, is a much appreciated service. The assistance of yet others has been obtained for details of laundry, for typewriting work, so that the comfort of the official delegates has been considered in every way.

The Pan-Pacific Union is furthering the possible success of the Conference to a still greater degree by making available additional courtesy accommodation for official delegates at the Pan-Pacific Research Institution in Manoa Valley. This building, with spacious grounds in a beautiful location, was given to the Pan-Pacific Union by the Castle family in 1924. Simple accommodation without cost will be arranged for those delegates who desire it, for short period both before and after the Conference Sessions.

Associate delegates and visitors should seek their own accommodation in the city. Many have already done so in advance. Hotels at Waikiki Beach, some half hour by street car from the Punahou School, have charges ranging from six dollars upward. Residential hotels in the vicinity of the Conference grounds have similiar charges. These include room, bath and meals. "Fernhurst," the Y.W.C.A. home-stead, whose accommodations are excellent, charges two dollars per day for room and two meals. It is, however, unlikely that there will be many vacancies at Fernhurst. An excellent series of cafes and cafeterias making living arrangements easy for those who desire to rent rooms, provides another possibility. Enquiries from those desiring information will be welcomed and handled by Miss Satterthwaite, Secretary of the Women's Conference.

Pan-Pacific Women's Conference, 1928

The Pan-Pacific Women's Conference was originally termed, when first conceived in 1924, a "Motherhood and Child Welfare Conference." After the first Committee meeting, however, its scope was widened to include five divisions of Health, Education, Women in Industry and Professions, Women in Government and Social Service.

The Conference will convene on Thursday, August 9th, and preliminary committee sessions will occupy the first days. On Monday, August 13th, Conference sessions will begin. After the first day, it is expected that voting and associate delegates will meet in morning sessions devoted to Round Table discussions. Provision is being made for each section to present, at the hand of outstanding members of the Conference, in platform addresses, some during the day, some in the evening, subjects of general interest and education for the whole conference. Visitors may also be present at these public meetings. Since the Auditorium in Bishop Hall of the Punahou School, in which the Conference sessions will be held, is limited in seating capacity to some 500 people, arrangements will be made for holding the larger meetings elsewhere. Each division of the pre-elected sectional conference program will come up for Round Table Discussion, for which four morning sessions will be available. Additional afternoon sessions will be arranged if desired.

The general trend of the Sectional Program content has already been determined by correspondence with delegates, and the chairmen will confer further with them upon arrival. Should any matter of paramount importance subsequently need place upon the program, this is within the province of the Conference

to determine, upon the unanimous vote of all countries represented.

In the Health Section, the general subjects "Child Welfare," "School Health Supervision," and "Industrial Hygiene" have been chosen. Dr. Vivia Appleton, Chairman of the Health Committee, has been particularly active, and, as a result, has already in advance several papers as contributions to the Conference. Some of these have already been published in the Pan-Pacific Bulletins: excellent contributions from Dr. Stadtmuller, of the Bureau of Child Hygiene of the California State Board of Health; from Dr. Alice Hamilton, of the School of Public Health of Harvard University, and from Dr. Emily Seideberg of New Zealand, have been received. In addition, valuable exchange of medical journals and reprints of scientific articles has resulted, which are available for consultation by delegates during the conference. The coming of Dr. Stadtmuller, Dr. Valeria Parker from the United States; Dr. Emily Seideberg of New Zealand; Dr. Yoyoi Yoshioka from Japan; Dr. Maria Pan Mendoza-Guazon from the Philippines, and possibly Miss Charlotte Whitton from Canada, gives promise of excellent discussions and valuable leadership.

In the Education Section, whose Honolulu Chairman is Miss Frances Lawrence, requests have come for consideration of Pre-school Education—Kindergartens, Nursery Schools, etc: the New Psychology in Child Training; Progressive Methods and New Standards in Education. The prospective presence in the Conference of Mrs. Sumi Oe, Founder of the Home Economics School in Japan, and Mrs. Inouye, who has done special investigation into the standard of living in Japan; Dr. Louise Stanley, Chief of the

Bureau of Home Economics in the U. S. Department of Agriculture: Miss A. S. Marlatt, Department of Home Economics, University of Wisconsin, and Mrs. J. C. de Veyra of the Philippines will give special interest to methods of education in Home Economics. An interesting advance paper has been contributed by Miss Margaret Swann upon "Education Developments in Australia."

The Section on Women in Industry, whose Honolulu Chairman is Miss Alice Brown, is particularly fortunate in having within it in prospect Miss Mary Anderson Director of the Women's Bureau, Federal Department of Labor, Washington; Mrs. Katherine Phillips Edson, Division of Industrial Welfare of the State of California; Miss Elizabeth Christman of the National Women's Trade Union League; Miss E. M. Emerson, Factory Inspector, New Zealand; Miss Kyong Bae-tsung, Industrial Secretary of the Shanghai Y. W. C. A.; Miss Y. Shoda, Sociology Department of the Women's University of Japan; Miss Eleanor Hinder, who has had experience in industrial relations in Australia, and more lately in China; Miss Lina Brisette of the United States National Catholic Welfare Council's Industrial Relations Section. Requests have been received for consideration of such basic questions as "Occupations of Women; Women's Occupational Preparation and Training"; "Conditions of Employment of Women"; "Legislation Affecting the Employment of Women"; "National Standards of Child Labor as an International Problem"; "Women in Professional Life."

The Section devoted to Social Service, whose Honolulu Chairman is Miss Nell Findley, Chief of the Social Service Bureau of this city, stands to gain tremendously by the presence in it of the Conference Chairman, Miss Jane Addams, whose national and international reputation in social work is unequalled. Its personnel will be further enriched by Mrs. T. E. Taylor, J. P., from New Zea-

land; Brigadier Sophia Harris, Head of the Pacific Coast and Orient Division of the Salvation Army; Miss Martha Randall, Policewoman, of Portland, Oregon; Miss Taki Fujita from Japan, and possibly Mrs. H. C. Mei from China. Advance articles on "The Policewomen's Movement in the United States," by Helen D. Pigeon, Executive Secretary of the International Association of Policewomen; "Some Suggestions in Organization and Methods of Policewomen," by Martha Randall, have been communicated to this section.

The Section on Women in Government, whose Honolulu Chairman is Mrs. J. P. Morgan, will consider the political status of women in various countries. Legal regulations as affecting them in Health, Education, Industry and Professions, and Social Service, will receive deliberation. In this section an extremely good delegation is expected from Australia, including Mrs. B. M. Rischbeith and Mrs. A. V. Roberts; Mrs. G. A. Fraer, J. P., Head of the delegation from New Zealand; Mrs. G. L. Buland, Chairman of the Legislative Committee of the Federated Clubs of Oregon; Miss Kikue Ide and Miss Fusage Ichikawa from Japan will also contribute much valuable experience. There is hope that Mrs. Bertha Landes, former Mayor of Seattle, may consider the committee's invitation, and Miss Soumay Tscheng, prominent in political circles in China, may be returning from Europe during the Conference period. Advance papers: "Women in Government in New Zealand," by Mrs. G. A. Fraer; "The History and Problems of Women's Suffrage in Japan," by Miss Kikue Ide, are available. The Joint Committee of Shanghai Women's Organizations has prepared and is printing an interesting brochure, giving, in so far as the residential women of Shanghai were able to gather facts from their own countries, the present position of women in government in many countries in the world. The whole forms

an extremely interesting running statement, whose communication to the conference is timely and fundamental.

The Conference content and schedule thus outlined bid fair to be extremely interesting. That they are also of enormous potential import will also be ap-

parent. Educationally the public addresses will count for much; while the round table periods, handled by leaders of experience in their subjects and in the art of discussion, will provide for fundamental analysis leading to ultimate understanding.

Conference Delegations

The Chinese Women Plan to Be Present

"Chinese women wish to be represented at the Conference of Women of Pacific countries when it convenes in August. In so far as China can gain from such stimulus and from such contacts they desire to be present from this point of view. They are conscious also that there is an immense interest in the womanhood of China among the women of other Pacific countries. It is known that the country is passing through epochal changes, which are having their results upon its women, and women of other countries are anxious to know at first hand of the problems which Chinese women face, and their efforts toward their solution. Chinese women need to be adequately represented at the Conference . . . they know that through their women they can make their national hopes understood."

This is an extract from the Pan-Pacific Monthly of Shanghai, and gives an indication of the interest which Chinese women are evincing in the Conference. For more than a year there has been in existence a China Preparation Committee, representative of six women's organizations. They conceived that they had a threefold task: to find and invite the delegates, who should be women of achievement in the various sections of the Conference; to assist in the gathering of material to send to the Conference, and to try to find the finance for the sending of ten delegates, two in each of the conference sections. In order to do the last named, they sought the cooperation of the Pan-Pacific Association of Shanghai, which organization ar-

ranged a public tiffin on their behalf, inviting General Huang Fu, Minister for Foreign Affairs in the Nationalist Government, to speak. In his speech the Minister made the important point that the delicate questions of relationships between countries should not be left merely to the handling of Governments, but should be the concern of every citizen. The Pan-Pacific Union he felt had worked for greater international understanding. To this end he welcomed the Conference of Women which the Union was calling.

The China Preparation Committee followed up this strategic advantage by forwarding to the Central Executive Committee of the Nationalist Government, and to the Ministry of Foreign Affairs, petition asking for financial assistance. Within three weeks they learned that the Government would make available to them the sum of three thousand Mexican dollars. Such expression of interest and conviction in the value of the Conference is particularly gratifying. A public function will also take place in Shanghai, part of the funds from which will be given to the China Preparation Committee. In this, the Pan-Pacific Association is taking an active part. A goal of \$15,000 Mex. is being aimed at by the Association.

The delegates were chosen by vote of the six women's organizations, which

are represented on the China Preparation Committee. Invitations to attend have been issued by the Committee, among others, to Mrs. C. Y. Tang of the Kiangsu Provincial Education Department, Mrs. T. C. Chu of Peking, Miss Kao Kyong-shan of the Kiangsu University, Nanking; to Miss Kyong Baetsung, Industrial Secretary of the Shanghai Y. W. C. A.; Miss Nyien of the Women's Bank, and to Miss Soumay Tscheng, formerly head of the District Court in Shanghai.

In addition to the China Preparation Committee, a second organization is, by invitation of the Pan-Pacific Union, participating in the Conference. The Joint Committee of Shanghai Women's Organizations is a unique body in the Pacific. It is composed of representatives of twelve women's organizations, representing ten distinct national groups. Because of language difficulties, these tend to line up upon a purely national basis, and the Joint Committee provides a valued medium for common action in civic and international matters. Groups within the Joint Committee have arranged, during the past year, Pan-Pacific programs, which have stimulated interest in the coming Conference. From this Joint Committee, Miss A. Viola Smith, an American Trade Commissioner in Shanghai, and Miss Eleanor M. Hinder have been nominated as resident delegates.

Japan's Representation at the Conference

In Japan, Prince Tokugawa, President of the Pan-Pacific Association of Japan, took the initiative with regard to the Conference by calling a Committee of nine women to make plans for the obtaining of a Japanese delegation. This Committee issued invitations to each of twenty-five women's organizations, asking them to nominate and finance a delegate. Eight women's organizations responded, including the Japanese Y. W. C. A., Women's Peace Society, Women's

Suffrage Alliance, Alumnae of the Japan Women's University, Alumnae of the Higher Normal School, and the Japan Medical Association. The Pan-Pacific Club of Osaka, composed of both men and women, have agreed to finance another.

These delegates include some of Japan's finest professional women. They include Miss Fujita, from the Y. W. C. A., Chairman of the Industrial Committee of that institution; Mrs. Gauntlett of the Peace Society; Miss Fusae Ichikawa, active in women's suffrage efforts, and Madame Yoshioka, founder of the Japan Women's Medical College. Considerable public interest has been aroused in the conference by the action of a well-known newspaper, "Yomi-Uri." It enquired of the organizing Committee to discover under what circumstances its nomination of a woman, to be chosen by popular vote would be accepted. The Committee stipulated that the women chosen should be conversant with problems relating to women in industry, should be able to speak well in English, and be of undisputed reputation. Thereupon the paper opened a vote—one post-card one nomination or vote. Public interest became intense. 330,000 votes were cast. The district postmaster in vain protested to his superior officers! The winner in the poll, Miss Yoshiko Shoda, obtained 120,000 votes, while the next in order polled 90,000. In all a delegation of eleven members is expected from Japan. Its women have much to give, and assert they have much to gain, by the contacts they will have.

Korea

Miss Helen Kim, delegate in 1927 to the Institute of Pacific Relations, at present in the United States, head of a large Girls' School in Korea, will probably be able to attend the Conference sessions. Her educational institution has agreed to extend her leave of absence to enable her to do so.

Women From the North American Continent

As may be expected, because of the shorter distance to be traversed, United States women are available for the Conference in greater numbers than from the Orient. Hawaii being a part of the United States, the Conference Committee in Honolulu has itself nominated and invited the women from the mainland to attend as voting delegates. Associate delegates and accredited visitors are being chosen with the co-operation of the National Council of Women. The fact that it is the year of Presidential Elections precludes the coming of several women prominent in the section of Women in Government. In addition to the International Chairman of the Conference, Miss Jane Addams, Dr. Valeria Parker, Chairman of the National Council of Women; Miss Mary Anderson, director of the Women's Bureau, Federal Department of Labor; Dr. Louise Stanley, Chief of the Home Economics Division of the U. S. Department of Agriculture; Dr. Ellen Stadtmuller, Bureau of Child Hygiene, California State Board of Health; Mrs. Katherine Phillips Edson, Division of Industrial Welfare, State of California; Miss Cornelia Marvin, State Librarian, Portland, Oregon, are among the official delegates who have already accepted invitation to attend. The full quota of twenty-five is expected to be filled.

The wide interest engendered in the Conference, however, has induced Dr. Valeria Parker to attempt to organize, with the assistance of Mrs. Frances P. Parks, a "tour" of delegates, associate delegates and visitors. The number of associates from the United States is limited to fifty. The tour is being organized by the "World Acquaintance Tours," and is giving publicity to the convening of the Conference in many parts of the United States.

Canada as yet has not named many delegates, but the Committee is confident that other will register. Miss Charlotte Whitton of the Canadian Council of Geneva, finally regrets her inability to be present. Mrs. A. R. Scott of the National Council of Women will attend. The Conference Committee is using cable facilities to enable it to bring the significance of the gathering before the Canadian women who have evinced interest but found it impossible so far to accept the invitations.

The Philippine Islands, with Indo-China, Dutch East Indies, and India consider the Conference. The promise of attendance of Mrs. Jaime C. de Veyra, president of the National Federation of Women's Clubs of the Philippine Islands, means that wide sweep of interest will be engendered in all the club groups she represents, and ensures a valuable and experienced conference member to the gathering. In addition, Dr. Maria Paz Mendoza-Guazon brings to the Health Section knowledge of problems related to tropical aspects of health which will be very valuable.

India, though not "Pacific," is Asiatic, and no conference which would include other women of Asiatic countries would omit Indian women. The Conference is fortunate in having the promise of attendance of Mrs. S. Naidu, celebrated Indian poetess. The committee working to obtain a delegation, or even one representative, from the Netherlands East Indies still writes courageously of efforts being made. It is trying to obtain support for the project from Javanese groups by trying for the sending of a Javanese woman. Though the Indo-Chinese government has indicated it is unable to help Mademoiselle Karpeles to attend, the Conference Committee is urging a willing Pan-Pacific Union to subsidize both her and a delegate from the Netherlands East Indies.

The Southern Hemisphere Comes North!

Honolulu shows the Southern Cross in its soft night skies. The Southern women will not, therefore, leave their accustomed surroundings in coming to the conference. More than encouraging interest has been evinced by New Zealand from the moment of the sending out of first letters about the Conference, and already a strong delegation is nominated. Miss Jean Begg of the Auckland Y. W. C. A., who has herself considerable "Pacific" experience, has been an indefatigable secretary of the New Zealand Conference Committee. Its delegation includes Mrs. C. A. Fraer, J. P., President of the New Zealand National Council of Women; Mrs. Denton Leech, J. P.; Dr. Emily Siedeberg and Dr. Ada Paterson in the Health Section; Miss E. M. Emerson, Inspector of Factories, Auckland; Dr. Mildred Staley, interested in Penal Reform. In the Education Section splendid women have been named. New Zealand bids fair to make an important contribution to the Conference.

Australia, though somewhat later in naming her delegates, is now promising some splendid people. At first the Conference Committee hoped to obtain State representatives, four to five from each of the six states. Tasmania acted early, appointing five. Later the Australian women formed, upon the initiative of Mrs. B. Muscio, Chairman of the New South Wales National Council of Women, a Joint Committee of five organizations with international affiliations. Each of these is now doing its utmost to find and finance adequate representatives. Mrs. B. M. Rischbeith, Mrs. A. V. Roberts, Mrs. Britomarte James, and others in the section of Women in Government, are particularly valuable. The possibility of Miss Muriel Swain, who has been nominated by the National Y. W. C. A., brings promise of splendid support to the Section on Women in Industry.

Latin American Countries

The Conference Committee has had a long and extensive correspondence with women of Latin American countries, not only those bordering the Pacific Ocean, but also those whose outlook is toward the Atlantic. The active part played by women interested in suffrage at the Pan-American Conference in Havana in February, 1928, whereby with genius they worked to invoke the machinery of international conferences to obtain a convention upon the question of suffrage which must, ipso facto, be considered by the governments concerned, raised the hopes of the Committee with reference to representation at the Pan-Pacific Women's Conference. It regrets that up till now no assurance of attendance is forthcoming. It will continue, however, in its endeavor, for it is the conviction of the Committee that a Pacific conference without representatives from Latin American countries is incomplete.

The Hawaiian Territorial Delegation

The issuing of invitations to those who belong to the Islands has been one of the most recent activities of the Conference Committee, and as a result the full list of delegates is not yet available. There will be a maximum of twenty-five voting delegates from the Territory. The Committee has proceeded upon the principle that half of these shall be of European or American origin, and half from other races on the Islands — Japanese, Chinese, Filipino, Hawaiian. Five delegates are being invited in each section. In addition, some courtesy invitations are being issued and associate delegates are also being invited.

The Committee has issued invitations to Honorary Membership to the wives of Consular officials and of the Trustees of the Pan-Pacific Union. The Honolulu Chairman is Mrs. Francis M. Swanzy, a much beloved and respected leader of women in Honolulu. The acting Chair-

man is Mrs. A. L. Andrews, president of the Y. W. C. A.

In addition to the Section Chairmen, who are admittedly splendidly representative, several important women have accepted. Among them are Mrs. Jeannette Hyde, who, as Collector of Customs, is an appointee of the President of the United States; Miss Elsie Wilcox, one of the Commissioners of Education for the Territory; Mrs. G. M. Bennett, prominent educationally in the Island of Hawaii; Miss Melicent Waterhouse, Supervising Principal of the Island of Kauai; Mrs. Alfred Yap, prominent in Chinese educational circles; Mrs. T. Kishimoto, active in Japanese welfare and educational work; Miss Harriet Stone, responsible for Nutrition work, and Miss Helen Baukin, Supervisor of Dental Hygiene in the Territorial Schools; Dr. Ellen Leong, first Hawai-

ian-born Chinese woman to graduate in Medicine; Dr. K. F. Li, graduate of a Medical Educational Institution in China; Dr. Ruth Alexander; Miss Margaret Ashford, leading woman attorney; Miss Alice Brown, Industrial Welfare Worker in the plant of the California Packing Corporation; Miss Helen Morita, assistant Nematologist, Experiment Station, Pineapple Association of Hawaii; Miss Hai Soo Whang, Korean Welfare Worker, Y. W. C. A. International Institute; Mrs. Cayetano Ligot, wife of the Philippine Commissioner; Mrs. Lahilahi Webb, formerly lady-in-waiting at the court of Queen Liliuokalani, now attached to the Bernice P. Bishop Polynesian Museum; Mrs. Yee Kim, Chinese Welfare Worker, Y. W. C. A. International Institute; Miss Ada Erwin, Home Economics, Punahou School; Miss Lucy Ward, Hawaiian Social Service worker.

Pan-Pacific Women's Conference in Relation to World Conferences

ELEANOR M. HINDER

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The convening of the Pan-Pacific Women's Conference at Honolulu in 1928 is an event of immediate consequence, and of incalculable potentiality. It instantly throws into relief former international women's conferences held throughout the world. To visualize its significance and possibilities, an analysis of its relationship with other conferences and world organizations of women is necessary. Indeed an evaluation of the whole latter-day development of international conferences is equally vital to a realization of the place of the Pan-Pacific Women's Conference.

International organizations of an official and a voluntary nature have been one of the features of world-life in the

twentieth century. In every department of human endeavor the need has been found for sharing the experience of national groups one with the other; to this end organizations have been formed and periodical international conferences been a frequent phase of their functioning. Historically one of the earliest such Conferences was called in Europe in the sixties of the last century, which concerned itself with internationalizing postal services for the better communication of country with country. Has it, for example, occurred to most of us that there had to be an international arrangement whereby a nation consented to waive the right to collect postage upon mail entering it, on the principle that there was a

probable equalization of this loss of income, in that other countries did likewise?

To observe the list of international organizations which for the most part head up in Europe, is to know how widespread is this ramification of endeavor. International groups of employers lined up according to trade interest; similar international trade organizations of workers; multifarious professional groups; social polity groups; scientific groups; academic groups; educational groups and workers' educational groups; peace groups; women's groups . . . These in addition to the official international lineup of nations, with its labor, economic, health, cultural, migration, and political phases.

At times the number is bewildering, and one is tempted to ask whether the tendency to organize has not run riot in this century, and whether international conferences are not expensive machinery to achieve a measure of common action. It may be good to share the experience of one nation with another, or one interest group within a nation to meet with similar groups from other countries; but in time and money, does it represent an outlay which can scarcely be justified? There are those who claim that with each international contact, international understanding is engendered. There are others who claim that national differences are sharpened by a clearer understanding of them and tolerance may be the last result obtained.

To trace out the ramifications of international organizations within any one sphere is to understand this new phase of human inter-relationship, and perhaps to help evaluate it. At the Third Pan-Pacific Science Congress held in Tokyo, Dr. Joji Sakurai in his Presidential address analyzed existing international scientific organizations in the world. He showed them to be of four kinds—a first group such as the International Metric Commission, resting upon formal conventions between governments, which aims at

establishing uniformity in standards of measurement. This is the oldest existing international scientific organization dating back to 1869. A second type consists of those organizations where cooperation of observation is essential. As example he quotes the arrangement made between a number of astronomical observatories for the preparation of an astrographical chart. A third type consists of members whose interest is in one aspect of science, such as the Botanical Congress of the United States of America. A fourth is the International Research Council, which aims at coordinating the activities of other international scientific groups. It has been instrumental in correlating the activities of the International Unions of Astronomy, Chemistry, Geography, Biology, Mathematics, Physics, Radiotelegraphy, whose activities otherwise remain entirely in their respective spheres. It does not itself undertake any scientific work. Dr. Sakurai then proceeds to examine the place of a Pacific Science Congress in relation to International Science groups.

"After this general survey and analysis of various international scientific undertakings, past and present, it will be plain that the Pan-Pacific Science Congress differs in its organization and other respects from all others. It deals not with one but with several branches of science. And not with science in its absolute sense but with science as applied to certain problems. This is a necessary consequence of the primary object of the Congress.

"Its primary object is to study the scientific problems of the Pacific by co-operative effort. It is not the direct advancement of knowledge in general, hence it is plainly evident that the activities of the Congress should be limited to sciences as applied to definite Pacific problems. A paper dealing for example, with Atomic Disintegration in general would thus be out of place, while one dealing with the Chemistry and Physics of the sea water in different parts of the

Pacific Ocean would not be only an appropriate but also a valuable contribution to the proceedings of the Congress."

In the sphere of women's activities there have arisen several large international voluntary organizations. Of these, the International Council of Women has the most universal interests. In addition there are the more special though strongly supported groups—the International Alliance for Suffrage and Equal Citizenship; the Women's International League for Peace and Freedom, and the World's Young Women's Christian Association. The headquarters of all these women's organizations center in Europe—three in London, one in Geneva. American women's organizations have a lively relationship to all of them. Those of the British Commonwealth of Nations, especially in its Anglo-Saxon portions, have equally close affiliations. In some cases the women of the Orient have touch with them, but the success of this international link is dependent upon the strength of the women's organizations within the country concerned as well as the vividness of contacts. Not as yet in Asiatic countries, is there a degree of development of group formation approximating that in other countries—and it is possible that the peoples of the Orient will find other methods of expressing their interest than by "organization."

Of the four international groups mentioned, the only one with any reality to touch in China, for example, is the Y. W. C. A., and this because of the wealth of resident women from many countries who have come to work with the China organization in the last twenty years. The Women's International League for Peace and Freedom has seen the need for sending a delegation of a British and a French woman to China in 1928. In their considered opinion, the available woman power is not sufficient to proceed to the organization of a national section of the League. Though there is a National Council of Women, it is not national in scope, and its function-

ing is intermittent. There is a Women's Suffrage Association, though its activities are also limited by the number of women interested or available for the work.

The calling of a Pan-Pacific Women's Conference is then an effort of a regional nature. What is the scope and value of a Pacific Women's Conference? What is its place in relation to international women's organizations?

When the earliest forecasts of this Conference were made, the Joint Committee of Shanghai Women's Organizations wrote to ask what was its scope. Would it concern itself with the discussion of the sections outlined by the Conference, as "life" issues, or a "Pacific" issues? Wherein should the Pacific emphasis come? In the educational section, for example, the discussion of the importance of the pre-school age in children is not a "Pacific" problem, it is a "life" problem. Pacific peoples have different experience in their efforts to find the solution to the problems of the pre-school age, but the world has made a contribution to the outlining of the problem. Shall we say, as did Dr. Sakurai, (changing the "scientific" to "educational" terms) "The object of the Conference is not the direct advancement of knowledge in general, and it is plainly evident that the activities of the Congress should be limited to "education" (changing "sciences") as applied to definite problems. A paper dealing for example with "child psychology" in general (changed from "Atomic Disintegration") would thus be out of place, while one dealing with experience in "child thought" in different parts of the Pacific ("changing dealing with the Chemistry and Physics of the sea water in different parts of the Pacific") would not only be appropriate, but a valuable contribution to the proceedings of the Congress."

This problem is an important one. Until it is cleared, and a common basis reached, the proceedings of the Women's Conference will lack point; the proceed-

ings and the emphasis of the Conference will determine the outcome of the Conference. What is this to be?

Is there to be set up yet another "Regional International Grouping of Women?" If the Pacific Women's Conference deliberates purely in terms of the Pacific, this will probably be the outcome, if not immediately, at any rate in a not-too-distant future. A Continuation Committee may be elected to provide for future Conferences which would ultimately form a Pacific Women's Organization. If on the other hand, the problems under consideration are treated as "world" or "life" issues, the outcome will probably be vastly different. It must be admitted that the distance of many Pacific lands from European centers where International Women's Organizations head up, is such that touch with them is an unreal thing. Distance and money considerations make attendance at world conferences impossible, but for the very few. Has not the time come for the recognition of a Pacific Basin in women's international groupings, and for the creating of a Pacific focus for them? Regional conferences held, say in Honolulu, within the spheres of interest of the larger women's organization, would result in immense stimulation of countries bordering the Pacific. Australia is six weeks' sail from Europe; so also is China. Each is two weeks' sail from Honolulu.

One of the logical results of the recognition of a Pacific focus is not only regional conferences, but the establishment of a clearing house for the material produced in agencies which center in Europe, and its dissemination to the Pacific countries. This is by no means a duplication of activity. It is a practical method of bringing Europe close to the

Pacific. The establishment of a Pacific office where the results of effort of the suffrage groups, the peace groups, the International Council activities, could concentrate, would mean that bordering countries would be nearer the ideas which were purveyed to them from such a focus. The geographical position would mean possibility of visits to contiguous countries by an organizing secretary for the stimulating and maintaining of interest. Women's groups are recognized as enormously valuable agencies for adult education and can not be ignored in a developing Pacific consciousness. Can the vision of the continued education of Pacific women be enough to set this machinery in action?

It must not be imagined that the "focus" would be merely a clearing house. Immediately constructive Pacific thinking would assert itself and become available to the European focus. That European women feel their links with the women of the Pacific to be poor, is evidenced by two experiences which have come to the attention of the Joint Committee of Shanghai Women's Organizations. Early in 1928, the Women's International League for Peace and Freedom sent delegates who frankly stated that they desired to discover what stage women's activities in China had reached. Not otherwise could they visualize an yadequate world relationships for and with them. Again, both the International Council of Women and the International Women's Suffrage Alliance have written to the Joint Committee regretting the slenderness of connection with similar Chinese women's organizations and expressing the hope that more vital relationships might be established.

What then should be done by Pacific women?

Mark Cohen's Last Letter to the Pan-Pacific Union

Hon. Mark Cohen of New Zealand, a member of the Board of Trustees of the Pan-Pacific Union, passed away in Auckland on March 5th. It was Mark Cohen, a member of the upper house of the New Zealand Legislature, who suggested and urged the calling of a Pan-Pacific Women's Congress. Speaking at one of the banquets tendered the Pan-Pacific Food Conservation Congress in 1924, to which he was a delegate, the Hon. Mark Cohen set forth the reasons why New Zealand desired the holding of a Pan-Pacific Women's Congress that would discuss child welfare, and asked that the Pan-Pacific Union issue the call for such a conference and promised that he would himself attend in an advisory capacity.

For nearly four years the Hon. Mark Cohen has been an ardent worker for this conference of women, and his country, New Zealand, will be well represented.

His last letter to the Union, written from Auckland shortly before his death, is as follows:

"My Dear Mr. Hume Ford:

"Your cable reached me here in due course, and in accord with your wishes I at once let the Prime Minister and those interested in the forthcoming Pan-Pacific Women's Conference know of the changed date of assembly.

"I congratulate you, and in the name of the potential New Zealand delegates thank you for the prompt manner in which you have acceded to their wishes. It would have been a thousand pities if the Dominion had been unrepresented at such an important gathering. I have no manner of doubt that the alteration of the date will have an agreeable effect on the New Zealand representation, which will now be worthy of us and at the same time give the executive of the Pan-Pacific Union every satisfaction.

"When I return to Wellington at the end of this month I shall consult the Prime Minister (who is spending the vacation in the Far North among his own people) and the Minister of Health, and will then doubtless learn something definite as to the personnel of the New Zealand delegation, and advise you accordingly.

"Meanwhile, accept my best wishes for a happy and prosperous year in 1928, and please convey my dutiful respects and kindest regards to Miss Satterthwaite, your valued and much esteemed first lieutenant.

"Kiaora and aloha.

"Always sincerely yours,

"MARK COHEN."

The idea of holding a Pan-Pacific Women's Conference was originated by Mr. Cohen on August 8, 1924, at a luncheon given by the Women's Auxiliary of the Outrigger Canoe Club in honor of the delegates to the Pan-Pacific Food Conservation Conference. Under the inspiration of Mr. Cohen's eloquent appeal to add to the Union's list of important conferences, one to consider the problems of mother and child welfare, the idea spread quickly at the luncheon and Mrs. Francis M. Swanzy, president of the Free Kindergarten and Children's Aid Association, and leader in a number of other women's organizations, was named temporary president of a conference to be held in the summer of 1928. Mr. Cohen has communicated constantly with Mrs. Swanzy and the Pan-Pacific Union in the intervening years. He was very anxious to have Sir Truby King, the famous child health specialist and president of the Royal New Zealand Society for the Health of Women and Children, attend the conference as a special speaker, and

bring before the delegates the work of the Plunkett nursing system which is one of the factors enabling New Zealand to have the lowest infant mortality in the world. Mr. Cohen was always interested in mother and child welfare, and carried on an immense personal correspondence all over the world on this subject, his letters always appearing in his own handwriting.

It must have been a gratification to him to know that Sir Truby King expects to attend the Pan-Pacific Women's Conference and speak on the subject of "Estab-

lishment and Maintenance of Maternal and Infantile Health and Fitness."

Some dozen or fifteen delegates from New Zealand have been named to attend the Pan-Pacific Women's Conference, representing the five divisions of the program—Health, Education, Women in Industry and the Professions, Women in Government, and Social Service. The conference opens on August 9, just four years and one day from the date of Mr. Cohen's inspiration to hold such a meeting.

Child Health in Japan

The last number of the Bulletin of the Oriental Child Health Association gives a very interesting account of an informal reception held in Kyoto, Japan, January 16, in honor of the 25th anniversary of the founders of the Department of Pediatrics at the Kyoto Imperial University. Dr. I. Hirai, the founder, who is now Professor Emeritus, was present and received congratulations from many of his former students from active members of the present staff.

The formal celebration of this quarter of a century of work for sick children will be held in Kyoto in November of this year during the coronation ceremonies. A large number of alumni expect to attend.

Dr. Tadashi Suzuki has charge of the Children's Clinic of the Kyoto Imperial University. He is editor of the Oriental Journal of Diseases of Infants. In honor of the 25th anniversary of the Department of Pediatrics, the Journal is hereafter to be published bi-monthly instead of quarterly.

It is indeed a suitable occasion to re-

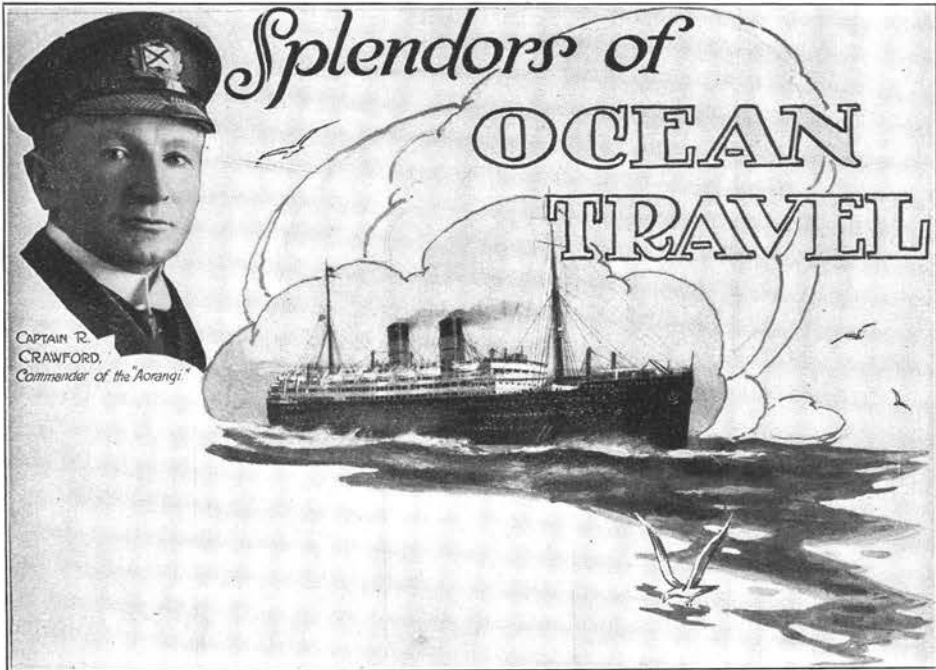
view the achievements of this department, which has not only done excellent work in the past, but still continues to increase its activities. The opening ceremony of the Kitano Hospital in Osaka was held March 11. This well-equipped new hospital is the Osaka branch of Kyoto Imperial University Hospital. Beside surgical and medical wards, it has a well-organized Children's Clinic, which is an extension of the Children's Clinic of the Kyoto Imperial University.

It is hoped that much more may be learned about what Japan is contributing to the field of child hygiene, school health supervision, and industrial hygiene, in relation to women and children when these subjects are discussed at the Pan-Pacific Women's Conference in Honolulu in August. A good Japanese delegation is expected, including Dr. Yayoi Yoshioka, the famous woman physician, who heads the Yoshioka Hospital in Tokyo. It is hoped also that one of the workers from the Kyoto Imperial University Children's Clinic will also attend.

ADVERTISING SECTION

THE MID-PACIFIC

1



M.S. "Aorangi," Queen of the Pacific.

From Vancouver via Honolulu, Suva, Auckland to Sydney

The Canadian-Australasian Royal Mail line of steamers maintains a regular four-weekly service by palatial steamers between the Canadian-Pacific Railway terminus at Vancouver, B. C., and Sydney, Australia, via Honolulu, Suva, Fiji, and Auckland, New Zealand.

In itself this is a South Sea cruise de luxe, but at Suva one may rest a bit, cruise by local steamer among the Fijian Islands, then take a Union Steam Ship Co. of New Zealand palatial flyer for a visit to Samoa, Tonga, and New Zealand, or if the trip by the Canadian-Australasian vessel is continued to Auckland, here again by the Union Steam Ship Co. vessels are cruised to every part of New Zealand, to the Cook Islands, or to Tahiti. In fact, one may return by these steamers to San Francisco via Papeete, Tahiti, with a stop-over at the famous French possession.

If the trip from Vancouver is continued to its terminus, Sydney, here again one may secure bookings on the

ADVT.

Union Steam Ship Co. boats for other cruises.

The Niagara of the Canadian-Australasian Royal Mail Line is one of the finest vessels afloat on the Pacific. The M.S. "Aorangi," the largest motorship in the world, makes the trip from Vancouver to Sydney in about three weeks.

Either from Australia or Canada there are tempting visits across the Pacific via the South Sea Islands. From Australia this is the richest and most comfortable route to London and the European Continent.

Both the Canadian-Australasian Royal Mail Line and the Union Steam Ship Co. of New Zealand have offices in the chief cities of the Pacific. In Honolulu, Theo. H. Davies & Co., Ltd., are the agents. The steamers of these lines are famous for their red smokestacks. In fact, this affiliated company is known as the Red Funnel Line. The red funnel is familiar in every port of Australia and the South Seas, to say nothing of California and Pacific Canada.

AROUND ABOUT HONOLULU



The Moana Hotel at Waikiki

The Territorial Hotel Company, Ltd., maintains the splendid tourist hotel at Waikiki Beach, the Moana, facing the surf, as well as the Seaside family hotel nearby, and the palatial Royal Hawaiian Hotel, with its golf links at Waialae.

The Honolulu Rapid Transit Co. maintains an electric train system to practically every portion of the city. The cars pass all of the hotels, so that visitors may reach the city, mountains, or the beach by the commodious open cars of the company, from which there is an ever-moving panorama of mountain, sea, and valley, besides visions of the loveliest city in the Pacific.

Ishii's Gardens, Pan-Pacific Park, on Kuakini street, near Nuuanu avenue, constitute one of the finest Japanese tea gardens imaginable. Here some wonderful Japanese dinners are served, and visitors are welcomed to the gardens at all times. Adjoining these gardens are the wonderful Liliuokalani gardens and the series of waterfalls. Phone 5611.

The City Transfer Company at 833 Nuuanu Street has its motor trucks meet all incoming steamers and it

gathers baggage from every part of the city for delivery to the out-going steamers. This company receives and puts in storage, until needed, excess baggage of visitors to Honolulu and finds many ways to serve its patrons.

The Honolulu Motor Coach Co., Ltd., has brought Schofield Barracks within hourly service of Honolulu. The busses leave on schedule time from the office in the yard of the Army and Navy Y. M. C. A. on Hotel Street, stopping at the Young Hotel. These spacious safety coaches are splendidly equipped and travelers enjoy every comfort and security during the delightful ride. Round the island and other trips can be arranged by calling phone 3666.

The Oahu Ice & Cold Storage Company has spacious buildings at Hustace and Cooke streets. It receives all kinds of fruit, meats and vegetables, where they may be kept in perfect condition for months at negligible cost and always ready to be drawn upon. This Company has erected buildings for its cold storage service that are a credit to any city and are well worth a visit. Telephone No. 6131.

About the Big Island

Twice a week the Inter-Island Steam Navigation Company dispatches its palatial steamer, the "Haleakala" to Hilo, leaving Honolulu at 4 P.M. on Tuesdays and Fridays, arriving at Hilo at 8 A.M. the next morning. This vessel leaves Hilo every Thursday and Sunday afternoon at four for Honolulu, a fifteen-hour run. From Honolulu, the Inter-Island Company dispatches almost daily excellent passenger vessels to the island of Maui and three times a week to the island of Kauai. There is no finer cruise in all the world than a visit to all of the Hawaiian Islands on the steamers of the Inter-Island Steam Navigation Company. The head offices in Honolulu are on Queen Street, where every information is available, or books on the different islands are sent on request. Tours of all the islands are arranged.

Connected with the Inter-Island Steam Navigation Company is the palatial Volcano House overlooking the everlasting house of fire, as the crater of Halemau-*mau* is justly named. A night's ride from Honolulu and an hour by automobile, and you are at the Volcano House, the only truly historic caravansary of the Hawaiian Islands, recently reconstructed and turned into a modern up-to-date hotel of luxury for the tourist and those from Honolulu and Hilo spending vacations at the Volcano.

Should you wish to continue at leisure your sightseeing or business trip around the Island of Hawaii, there are hotels every few miles.

Building on the Island of Hawaii.—The Hawaiian Contracting Company maintains working offices at the great Hilo pier, where all steamers discharge their freight for Hilo and the big island. This concern, with branches throughout the Territory, has for its aim building for permanency. It contracts for buildings and highway construction, having a corps of construction experts at its command. In Hilo, Frank H. West is in charge of the company's affairs.

ADVT.

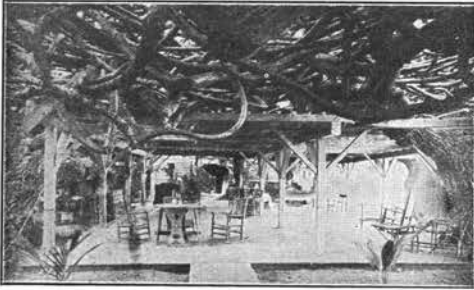
The Hilo Boarding School, Levi C. Lyman manager, is a school for boys which combines academic and industrial training. The afternoons are given to the learning of blacksmithing, carpentry, wood-turning, automobile polishing, printing, some crafts and agriculture. This is a forty acre farm. A crafts shop is maintained at 130 Kamehameha Avenue, and sales rooms of Hawaiian goods in koa, where the output of calabashes, ukuleles, trays and novelties in koa may be obtained. Prices of these or information about the school is sent on request.

The Bank of Bishop & Co., Ltd., has its Hilo branch at 12 Waianuenue Street with sub branches at Kealakekua and at Alaa and Pahoia. Le Baron Gurney is the branch manager at Hilo, and the Bank of Bishop & Co. serves the Island of Hawaii through its branch at Hilo, as it does the entire group, from its palatial quarters in the modern up-to-date Damon building in Honolulu, named after the long-time president of the Bishop Bank.

The Honolulu Dairymen's Association, Ltd., is represented by Russell L. Ransom as manager in Hilo, with dairy at Piopio and Kamehameha Streets.

Hawaii's Famous Coffee.—The Captain Cook Coffee Company produces and handles the standard coffee of Hawaii, and this product, "Kona" Coffee, has become known the world over for its delicious mildness. The Captain Cook Coffee Company selects and ages its coffee beans until they are ready to give forth that delicious aroma that makes coffee grown within the radius of the spot where Captain Cook was slain, known to all devotees of good coffee. The agency for the Captain Cook Coffee Company in Honolulu is with the Henry Waterhouse Co.

HOME HOTELS IN HONOLULU



Famous Hau Tree Lanai

The Halekulani Hotel and Bungalows, 2199 Kalia Road, "on the Beach at Waikiki." Include Jack London's Bungalows and House Without a Key. Rates from \$5.00 per day to \$115.00 per month and up. American plan. Clifford Kimball.

The MacDonald Hotel is a stately mansion surrounded by cottages amid sub-tropical foliage. It is located at 1402 Punahou Street in the great residence district of Honolulu. There are tennis courts on the grounds, and the transient as well as the permanent resident has here all the comforts of home at the reasonable rates of \$3 a day or \$65 a month. The guests enjoy delicious home-cooked meals, which are also served to outsiders. This hotel is near Central Union Church and Oahu College.

Vida Villa Hotel and cottages are on the King street car line above Thomas Square. This is the ideal location for those who go to the city in the morning and to the beach or golfing in the afternoon. The grounds are spacious and the rates reasonable. This hotel has been under the same management for a score of years, which speaks for itself. Both transient tourists and permanent guests are welcomed.

The Donna Hotel, 1286 S. Beretania, is delightfully situated within ten minutes' ride from the center of Honolulu. Here, amidst the surroundings of a sub-tropical park, one may enjoy all the comforts of home. The rooms in the main buildings or in one of the attractive screened cottages are cheery, well-furnished, and have hot and cold running water. The delicious home cooked meals are served at little cozy tables which are grouped about an artistically decorated open lanai. Permanent rates are \$65 a month or \$3.00 a day and up.

Gray's by the Sea is one of the most delightful estates facing the surf at Waikiki, a desirable family hotel in tropical surroundings. Cottages for two, three or four may be had at moderate prices, with the very best of sea bathing right at the door. Tourists as well as permanent guests receive a cordial welcome. La Vancha M. Gray, proprietor.

At Child's Blaisdell Hotel and Restaurant, at Fort Street and Chaplain Lane, Child's Hotels and Apartment Service accommodations are masters at getting you settled in real home-like style. If you wish to live in town there is the Child's Blaisdell Hotel in the very heart of the city, with the palm garden restaurant where everything is served from a sandwich to an elegant six-course dinner. If we haven't the accommodation you desire we will help you to get located.

The Colonial Hotel and cottages on Emma street are in the midst of a delightful residence park district, on the car line, but within a moment's walk of the business center of the city. An excellent cuisine under skilled direction is maintained. Historic Honolulu is also but a moment's walk from the Colonial, and it is but a brief stroll to the hills.

Wonderful New Zealand

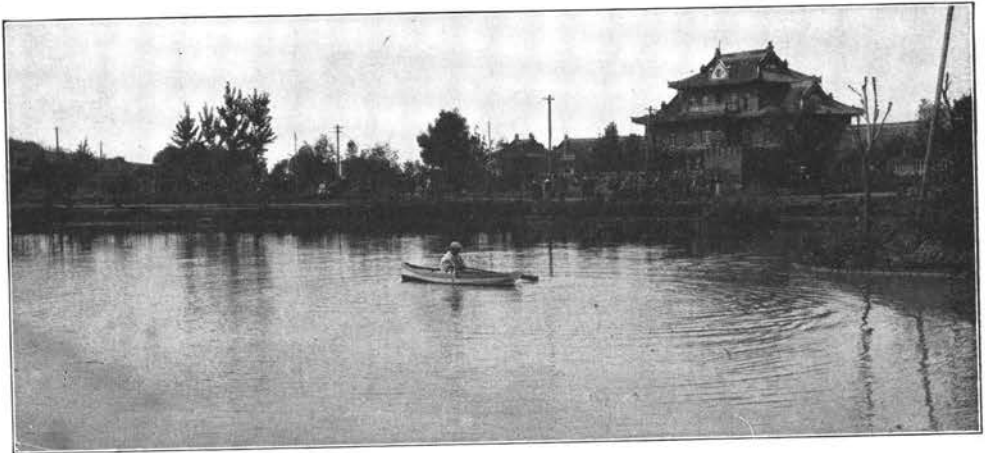
Scenically New Zealand is the world's wonderland. There is no other place in the world that offers such an aggregation of stupendous scenic wonders. The West Coast Sounds of New Zealand are in every way more magnificent and awe-inspiring than are the fjords of Norway.

New Zealand was the first country to perfect the government tourist bureau. She has built hotels and rest houses throughout the Dominion for the benefit of the tourist. New Zealand is splendidly served by the Government Railways, which sell the tourist for a very low rate, a ticket that entitles him to travel on any of the railways for from one to two months. Direct information may be secured by writing to the New Zealand Department of Tourist and Health Resorts, Wellington, New Zealand.



An ancient Maori stockade

SOUTH MANCHURIA RAILWAY COMPANY



Tangkangtsu Hot Springs.

HOT SPRINGS IN SOUTH MANCHURIA

Tangkangtsu ("Hot Water Hill"), is an attractive pleasure resort, possessing the typical characteristics of Manchuria. It is visited by increasing numbers of people annually, who go there for the baths and for the views on Chien-shan, one of the beauty spots of Manchuria. Within a day's walk of this spa is more delightful scenery than is found in any other district of the province.

Hsungyaocheng (Lit., "Bear Mt. Castle"), has not only hot springs, but also has the added attraction of pleasant nooks along the ADVT.

paths of the near-by mountains as an inducement for occasional picnics and rambles.

Wulungpei (Lit., "Five Dragons' Back") is a good health resort at all seasons. It is beautifully situated in park-like surroundings.

Thirty per cent reduced fare return tickets to these spas issued at the principal S. M. R. stations.

Write for illustrated booklets and for information generally (post free).

SOUTH MANCHURIA RAILWAY

Dairen Tokyo Shanghai Peking New York

LEADING AUTOMOBILES IN HAWAII

The P. M. Pond Company, with spacious quarters on Beretania and Alapai streets, act as distributors of the sturdy, low-priced car for the tropics, of the finest quality, the Studebaker Standard Six Duplex Phaeton, the most powerful car for its size and weight, with roller side enclosures giving protection in stormy weather by a move of the hand. The cash price of this exclusive car in Honolulu is \$1,485.00

The Universal Motor Co., Ltd., with spacious new buildings at 444 S. Beretania street, Phone 2397, is agent for the Ford car. All spare parts are kept in stock and statements of cost of repairs and replacements are given in advance so that you know just what the amount will be. The Ford is in a class by itself. The most economical and least expensive motor car in the world.

The Schuman Carriage Co., besides handling the Ford car, is agent for the Essex car, Honolulu price \$1,105, and the Hudson Super-Six, Honolulu price \$1,575. The Hudson-Essex is now the largest selling six-cylinder car in the world. On the island of Maui the Schuman Carriage Co. is represented at Wailuku by the Maui Motors Co., and on Kauai by the Garden Island Motor Co., Lihue.

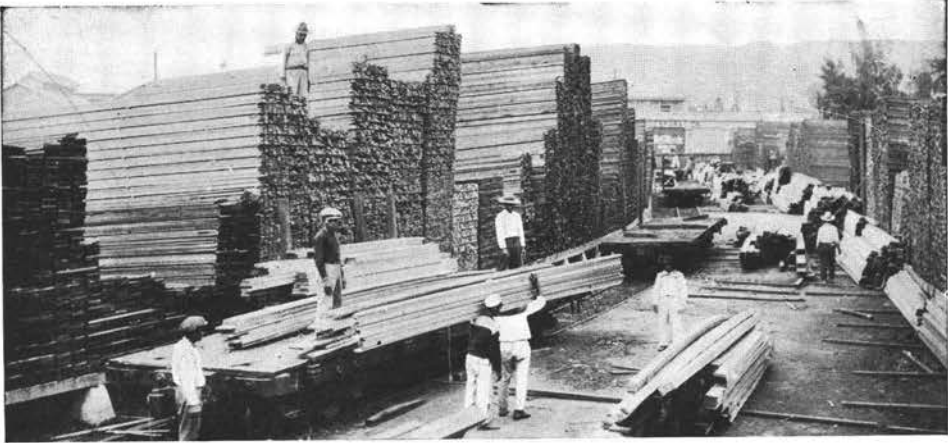
The Chrysler Four and Six Cylinder Cars, the culmination of all past experiences in building automobiles, is represented in Hawaii by the Honolulu Motors, Ltd., 850 S. Beretania street. The prices of Four Cylinder Cars range from \$1200 to \$1445 and those of the Six from \$1745 to \$2500. The Chryslers are meeting with remarkable sales records as a distinct departure in motor cars.

The von Hamm-Young Co., Ltd., Importers, Machinery Merchants, and leading automobile dealers, have their offices and store in the Alexander Young Building, at the corner of King and Bishop streets, and their magnificent automobile salesroom and garage just in the rear, facing on Alakea Street. Here one may find almost anything. Phone No. 6141.

The Royal Hawaiian Sales Co., with agencies in Honolulu, Hilo and Wailuku, has its spacious headquarters on Hotel and Alakea streets, Honolulu. This Company is Territorial Distributors for Star and Auburn passenger cars. They are Territorial Distributors also for International Motor Trucks, Delco-Remy service and Goodyear Tires.

The Graystone Garage, Ltd., at Beretania and Punchbowl streets, is agent for several exclusive cars: the Paige, the most beautiful car in America; the Jewett, "in all the world no car like this"; the Willys-Knight, a marvel of engineering in every detail, and the Overland, with bigger engine, bigger power, bigger comfort and bigger value than any. All of these cars may be seen and examined at the spacious warehouses.

The Hupmobile, fours and eights, is represented in Honolulu by Burgess & Johnson, Ltd., 237-243 S. Beretania Street. This is the first time Hupmobile has made a Six Cylinder and the motor-car buying public should see this car before making a decision on another make of car in its class. This firm also represents the Pierce-Arrow Motor Car Co. and the Reo Motor Car Co. In tires they find Mohawk Heavy-Duty Cords go farther.



Lewers and Cooke, Ltd., Iwilei Yard

Lewers & Cooke, Limited, have, since 1852, been headquarters for all varieties of building material, lumber, hollow tile, cement, brick, hardwoods, oak flooring; as well as tools of the leading manufacturers, wall papers, Armstrong linoleums, domestic and oriental rugs, and the superior paints made by W. P. Fuller & Co.

They are also agents for many building specialties, Celotex, Colormix, Bishropic Stucco, corrugated Zinc, Los Angeles Pressed Brick Company products and architectural Terra Cotta, David Lupton Sons Company, Steel Windows, the Kawneer Company line, and prepared roofings and roofing tile.

OAHU RAILWAY AND LAND COMPANY



Loading sugar cane on one of the plantations on the line of the Oahu Railway—the scenic route around the island from Honolulu.

MODERN BANKING IN HONOLULU



NEW HOME BANK OF BISHOP & CO., LTD.

The **S. M. Damon Building** pictured above is occupied by the Bank of Bishop & Co., the oldest bank in the Territory. Organized in 1858, the name Bishop & Co. has long been known by travelers for its service and welcome.

Bishop Street, Honolulu, T. H.

The **First National Bank** of Hawaii demonstrates the many ways in which a bank can serve. It has recently moved into its own building, one of the architectural splendors of Honolulu, on Bishop and Fort Streets, where both the First National Bank of Hawaii and the First American Savings and Trust Company of Hawaii, Ltd., closely affiliated with the First National Bank and functioning as a savings bank, are continuing their growing business in a home built to meet their exact requirements.

It was less than four months after Hawaii became a territory of the United States that the First National Bank of Hawaii opened its doors. During the war the First National Bank played a

prominent part in furthering the interests of the government in the various Liberty Loan drives and thrift campaigns in which its President, Mr. L. Tenney Peck, served as chairman of the Territorial Central Committee.

The **Bank of Hawaii, Limited**, incorporated in 1897, has reflected the solid, substantial growth of the islands since the period of annexation to the United States. Over this period its resources have grown to be the largest of any financial institution in the islands. In 1899 a savings department was added to its other banking facilities. Its home business office is at the corner of Bishop and King streets, and it maintains branches on the islands of Hawaii, Kauai, and Oahu, enabling it to give to the public an extremely efficient Banking Service.



THE WORLD'S MOST DELICIOUS PINEAPPLE

Canned Hawaiian Pineapple is considered by epicures to possess the finest flavor in the world. Because of exceedingly favorable conditions in soil and climate, and remarkable facilities for canning immediately the sun-ripened fruit, the Hawaiian product has attained a superiority enjoyed by no other canned fruit.

Crushed Hawaiian Pineapple is meeting favor because of its convenience in

cooking. It is identical with the sliced in quality and is canned by the same careful sanitary methods.

Many tasty recipes for serving Hawaiian Pineapple in delicious desserts, salads and refreshing drinks are suggested in a recipe book obtainable without cost at the Association of Hawaiian Pineapple Canners, P.O. Box 3166, Honolulu. Readers are urged to write, asking for this free book.



FERTILIZING THE SOIL

Millions of dollars are spent in Hawaii fertilizing the cane and pineapple fields.

The **Pacific Guano and Fertilizer Company**, with large works and warehouses in Honolulu, imports from every part of the Globe the many ship loads of ammonia, nitrates, potash, sulphur and guano that go to make the special fertilizers needed for the varied soils and conditions of the islands. Its chemists test the soils and then give the recipe for the particular blend of fertilizer that is needed.

This great industry is one of the results of successful sugar planting in Hawaii, and without fertilizing, sugar growing in the Hawaiian Islands could not be successful.

This company began operations in Mid-way Islands years ago, finally exhausting its guano beds, but securing others.



Banking and Business in Honolulu

The Hawaiian Trust Company, Limited, of Honolulu, is the oldest and largest trust company in the Territory of Hawaii. How successful it has become may be gathered from the fact that it has real and personal property under its control and management with a conservative, approximate value of \$50,000,000. The resources of this organization as of Dec. 31, 1927, amounted to \$3,718,923.49, with a capital stock of \$1,250,000.00; surplus, \$1,000,000.00; special reserve, \$50,000, and undivided profits, \$81,408.95, making the total surplus of resources over liabilities \$2,381,408.95. The full significance of these figures will appear when it is remembered that the laws of Hawaii provide that a Trust Company may not transact a banking business. Mr. E. D. Tenney is president and chairman of the board and Mr. J. R. Galt is senior vice-president and manager.

The International Trust Company, with offices on Merchant street, is, as its name indicates, a really Pan-Pacific financial organization, with leading American and Oriental business men conducting its affairs. Its capital stock is \$200,000 with resources of over \$500,000. It is the general agent for the John Hancock Mutual Life Insurance Company of Boston, and other insurance companies.

The Union Trust Company, Ltd., occupying a building on Alakea Street, between Hotel and King (1025 Alakea Street), was incorporated in 1921, engages in all lines of trust business, and as agents for individuals, firms and corporations, invites correspondence. Its resources are well over a million.

The Trent Trust Company, with spacious offices on Fort street, grew from the real estate and general agency business established in 1904 by Richard H. Trent, known as the Trent Company. It was incorporated in 1907 under its present name. With it is closely asso-

ADVT.

ciated the mutual Building and Loan Society, which promotes and finances the building of homes.

The Bishop Trust Company, Limited, is one of the oldest and largest Trust Companies in Hawaii. It now shares with the Bishop Bank its new home on Bishop, King and Merchant Sts., known as the S. M. Damon Building, jointly owned and occupied by the Bishop Trust Company, Ltd., and the Bank of Bishop & Co., Ltd. One of the many attractive features of its new quarters is the Safe Deposit Vaults which are the largest, strongest and most convenient in the Territory.

The Henry Waterhouse Trust Co., Ltd., was established in 1897 by Henry Waterhouse, son of a pioneer, incorporated under the present name in 1902, Mr. Robert Shingle becoming president, and Mr. A. N. Campbell treasurer of the corporation. The company now has a paid-up capital of \$200,000 and a surplus of an almost equal amount. The spacious quarters occupied by the Henry Waterhouse Trust Co., Ltd., are on the corner of Fort and Merchant streets.

The Liberty Investment Company Ltd., at 942 Bethel Street, does a business in real estate, insurance loans and investments. It has successfully handled some of the choicest divisions in Hawaii including beautiful seaside coconut groves that have been cut up into choice building lots as well as city tracts that have been transformed into new residence areas for those who wish to own their own homes at a moderate price.

Pacific Trust Company, Ltd., in Honolulu, and the Baldwin Bank, Ltd., Kahu-lui and Wailuku, Maui, are allied institutions. The combined assets of these two institutions amount to over four and a half million dollars. Pacific Trust Company, Ltd., has its offices at 185 S. King Street, in the Lewers & Cooke Building, and is growing rapidly under the careful management of a number of Honolulu's leading business men.



The Home Building in Honolulu of the American Factors, Ltd., Plantation Agents and Wholesale Merchants.



Tasseled sugar cane almost ready for the cutting and crushing at the mills.

ADVT.

ON FASHIONABLE FORT STREET

The commodious and palatial sales-rooms of **Jeffs Fashion Co., Incorporated**, Honolulu's leading establishment for women who set the pace in modern dress, is at the Mauka (Mountainward) Ewa corner of Fort and Beretania Streets, where all cars pass. This is the head and beginning of Honolulu's great shopping area on Fort Street. At "Jeffs" the fashions in women's dress in Honolulu are set, and here the tourist and visitor may outfit and be sure of appearing in the latest styles.

Diagonally across the street from "Jeffs" is **The Hawaii Photo Materials Co.**, the home of the "Brownie Camera," and every supply in films and photographs which the purchaser can conceive. Here may be secured the wonderful color photos of Hawaii that have made the islands famous.

The Office Supply Co., Ltd., on Fort street near King, is as its name denotes, the perfectly equipped store where every kind of office furniture and supplies are on display. This is the home of the Remington typewriter and of typewriter repairing. Offices are completely outfitted at quickest notice. The Company also maintains an up-to-date completely stocked sporting goods department.

There is one **East Indian Store** in Honolulu, and it has grown to occupy spacious quarters on Fort Street, No. 1150 Fort, Phone No. 2571. This is the headquarters for Oriental and East Indian curios as well as of Philippine embroideries, home-made laces, Manila hats, Oriental silks, pongees, carved ivories and Indian brass ware. An hour may well be spent in this East Indian Bazaar examining the art wares of Oriental beauty.

Bergstrom Music Company, the leading music store in Hawaii, is located at 1140 Fort Street. No home is complete in Honolulu without an ukulele, a piano and a Victor talking machine. The Bergstrom Music Company, with its big store on Fort Street, will provide you with these; a WEBER or a Steck piano

for your mansion, or a tiny upright Boudoir for your cottage; and if you are a transient it will rent you a piano. The Bergstrom Music Company, Phone 2294.

Hawaii Music Co., 1021 Fort Street, handles high grade pianos and Sonora Phonographs, together with a full line of Victor, Vocalion and Odeon Records by the best orchestras in Europe; but its specialty is the new Pathex Motion Picture Camera and Projector. The Pathex Camera takes motion pictures just as easily and at no greater cost than taking photographs, and you can screen them in your own home with your Pathex Projector. Camera and Projector complete with tripod and carrying case, \$102.50.

The Bailey Furniture Co., Ltd., are now displaying at their store, 1180 Fort Street, the finest line of furniture and draperies that Honolulu has ever seen. Their drapery department is under the able management of Mr. Moreido. He is a master Interior Decorator and is always pleased to submit plans for making your home "A Better Home." The famous Nachman Mattress is also a feature of this store. Try a Nachman for better sleep.

The "Flower Shop," at 1120 Fort Street, is Honolulu's leading floral establishment. It is a complete palace of flowers and well worth a visit, or you may call No. 2690 and have the choicest flowers sent to departing friends on the boat, or to acquaintances at home or in the hotels, or to weddings or funerals. The choicest gardens in Hawaii supply "The Flower Shop," and any flowers grown in the islands may be ordered.

E. O. Hall & Son, Hawaii's oldest and most reliable establishment, carries a large selection of golf and sporting goods, athletic outfitting, general hardware, household goods, and are distributors for the Sherwin-Williams line of paints. Their fishing tackle department carries a very fine line of deep sea rods, reels and lines of the finest manufacture. The big retail store is at the corner of Fort and Merchant Streets.

ALEXANDER & BALDWIN



A canefield in Hawaii years ago when the ox team was in use.

The firm of **Alexander & Baldwin, Ltd.**, (known by everyone as "A. & B.") is looked upon as one of the most progressive American corporations in Hawaii.

Alexander & Baldwin, Ltd., are agents for the largest sugar plantations of the Hawaiian Islands and second largest in the world, namely, the Hawaiian Commercial & Sugar Company at Puunene, Maui. They are also agents for many other plantations and concerns of the Islands, among which are the Maui Agricultural Company, Ltd., Hawaiian Sugar Company, McBryde Sugar Company, Ltd., Kahului Railway Company, Kauai Railway Company, Ltd., Baldwin Packers, Ltd., Kauai Fruit & Land Company, Ltd., Haleakala Ranch Co., and Ulupalakua Ranch, Ltd.

In addition to their extensive sugar plantations, they are also agents for the following well-known and strong insurance companies: American Alliance Insurance Association, Ltd., Commonwealth Insurance Company, Home Insurance Company of New York, Newark Fire Insurance Company, Springfield Fire and Marine Insurance Company, ADVT.

Union Insurance Society of Canton, Ltd., New Zealand Insurance Co., Ltd., Switzerland Marine Insurance Co.

The officers of this large and progressive firm, all of whom are staunch supporters of the Pan-Pacific and other movements which are for the good of Hawaii, are as follows:

W. M. Alexander, President; J. Waterhouse, Vice-President; H. A. Baldwin, Vice-President; C. R. Hemenway, Vice-President; J. P. Cooke, Treasurer; R. T. Rolph, Assistant-Treasurer; R. G. Bell, Assistant-Treasurer; R. E. Mist, Secretary; D. L. Oleson, Assistant-Secretary; G. G. Kinney, Auditor. Directors: W. M. Alexander, J. Waterhouse, H. A. Baldwin, C. R. Hemenway, W. O. Smith, C. R. Hemenway, F. F. Baldwin, J. R. Galt, H. K. Castle, E. R. Adams, R. T. Rolph, S. S. Peck, J. P. Winne, J. P. Cooke.

Besides the home office in the Stangenwald Building, Honolulu, Alexander & Baldwin, Ltd., maintain offices in Seattle, in the Melhorn Building and in the Matson Building, San Francisco

INFORMATION ON HAWAII

Honolulu Paper Company, successor to "The Hawaiian News Co.," deals in Books of Hawaii. At Honolulu's largest and most fashionable book store, in the Alexander Young Building, all the latest books may be secured, especially those dealing with Hawaii.

Here the ultra-fashionable stationery of the latest design is always kept in stock together with the Royal and Corona typewriters, Merchant calculators and Sundstrand Adding Machines.

Here, also, music lovers will find a home for a complete line of musical instruments, including the Edison Phonograph and records.

This store is one of the show places of Hawaii in the very center of the great shopping district.

The Hawaii and South Sea Curio Store on Bishop street, in the Young Hotel is the largest and most varied curio store in Hawaii. It is open day and night, convenient to visitors, and has branches in both the Alexander Young Hotel and in the Moana Hotel at Waikiki.



The Island Curio Company, at 170 Hotel street, opposite the Alexander Young Hotel, is the home of Hawaiian curios, stamps, coins, souvenirs and post cards. This spacious art store is well worth a visit.

Sharp Signs have been known for half a century in Hawaii. "Tom" Sharp, as he is lovingly known to his thousands of friends, is an artist of no mean order, and has done many paintings in

oils that have been used for advertising purposes. What more natural than that "Tom" Sharp should be elected president of the "Ad" Club of Honolulu. Every kind of sign is painted, built, or manufactured in the work shop of Tom Sharp at Punchbowl and Beretania streets.

The Honolulu Dairymen's Association supplies the pure milk used for children and adults in Honolulu. It also supplies the city with ice cream for desserts. Its main office is in the Purity Inn at Beretania and Keeaumoku streets. The milk of the Honolulu Dairymen's Association is pure, it is rich, and it is pasteurized. The Association has had the experience of more than a generation, and it has called upon science in perfecting its plant and its methods of handling milk and delivering it in sealed bottles to its customers.

Stevedoring in Honolulu is attended to by the firm of **McCabe, Hamilton and Renny Co., Ltd.**, 20 South Queen Street. Men of almost every Pacific race are employed by this firm, and the men of each race seem fitted for some particular part of the work, so that quick and efficient is the loading and unloading of vessels in Honolulu.

Brown's Shoe Repairing Store on Union, off Hotel street, is the one absolutely responsible place of its kind in Honolulu. Mr. Brown, a shoe man of a quarter of a century's experience, is in personal charge and is known to all of Honolulu's leading residents and to visitors who have need of shoe repairing.

CASTLE & COOKE

The Matson Navigation Company, maintaining the premier ferry service between Honolulu and San Francisco, have their Hawaiian agencies with Castle & Cooke, Ltd., and here may be secured much varied information. Here also the tourist may secure in the folder racks, booklets and pamphlets descriptive of almost every part of the great ocean.

Castle & Cooke, Ltd., is one of the oldest and most reliable firms in Honolulu. It was founded in the early pioneer days and has been a part of the history

of the Hawaiian Islands. It acts as agent for some of the most productive plantations in the whole territory and has been marked by its progressive methods and all work connected with sugar production in Hawaii. It occupies a spacious building at the corner of Merchant and Bishop Streets, Honolulu. The ground floor is used as local passenger and freight offices of the Matson Navigation Company. The adjoining offices are used by the firm of their business as sugar factors and insurance agents; Phone 1251.

C. BREWER & COMPANY



C. Brewer & Company, Limited, Honolulu, with a capital stock of \$8,000,000, was established in 1826. It represents the following Sugar Plantations: Olowalu Company, Hilo Sugar Company, Onomea Sugar Company, Honomu Sugar Company, Wailuku Sugar Company, Pepeekeo Sugar Company, Waimanalo Sugar Company, Hakalau Plantation Company, Honolulu Plantation Company, Hawaiian Agricultural Company, Kilauea Sugar Plantation Company, Paauhau Sugar Plantation Company, Hutchinson Sugar Plantation Company, as well as the Baldwin Locomotive Works, Kapapala Ranch, and all kinds of insurance.

ADVT.



The Honolulu Construction & Draying Co., Ltd., Bishop and Halekauwila Sts., Phone 4981, dealers in crushed stone, cement, cement pipe, brick, stone tile, and explosives, have the largest and best equipped draying and storage company in the Islands, and are prepared to handle anything from the smallest package to pieces weighing up to forty tons.

The Waterhouse Co., Ltd., in the Alexander Young Building, on Bishop street, make office equipment their specialty, being the sole distributor for the National Cash Register Co., the Burroughs Adding Machine, the Art Metal Construction Co., the York Safe and Lock Company and the Underwood Typewriter Co. They carry in stock all kinds of steel desks and other equipment for the office, so that one might at a day's notice furnish his office safe against fire and all kinds of insects.

Allen & Robinson have for generations supplied the Hawaiian Islands with lumber and other building materials that are used for building in Hawaii; also paints. Their office and retail department are in their new quarters at the corner of Fort and Merchant Sts., Honolulu, where they have been since June 1, 1925. The lumber yards are located at Ala Moana and Ward Sts., where every kind of hard and soft wood grown on the Pacific Coast is landed by steamships that ply from Puget Sound, and other Pacific and East Coast ports.

ADVT.

Thayer Piano Co., Ltd., at 116 S Hotel St., is Honolulu's grand piano headquarters. In this new and spacious store may be tested the Steinway and other makes of grands as well as uprights and player pianos. Here one may obtain Brunswick and Victor phonographs and records from Brunswick, Victor and Columbia. They also handle a complete line of sheet music and band instruments. You will feel at home while doing your musical shopping at Thayer's.

Honolulu is so healthy that people don't usually die there, but when they do they phone in advance to **Henry H. Williams**, 1374 Nuuanu St., phone number 1408, and he arranges the after details. If you are a tourist and wish to be interred in your own plot on the mainland, Williams will embalm you; or he will arrange all details for interment in Honolulu. Don't leave the Paradise of the Pacific for any other, but if you must, let your friends talk it over with Williams

Honolulu as Advertised



The Liberty House, Hawaii's pioneer dry goods store, established in 1850; it has grown apace with the times until today it is an institution of service rivaling the most progressive mainland establishments in the matter of its merchandising policies and business efficiency.

The Mellen Associates, Successors to The Charles R. Frazier Company, oldest and most important advertising agency in the Pacific field, provide Honolulu and the entire Territory of Hawaii with an advertising and publicity service of a very high order. The organization, under the personal direction of George Mellen, maintains a staff of writers and artists of experience and exceptional ability, and departments for handling all routine work connected with placing of advertising locally, nationally or internationally. The organization is distinguished especially for originality in the creation and presentation of merchandising ideas.

The Honolulu Star-Bulletin, 125 Merchant Street, prints in its job department the Mid-Pacific Magazine, and that speaks for itself. The Honolulu Star-Bulletin, Ltd., conducts a complete commercial printing plant, where all the details of printing manufacture are performed. It issues Hawaii's leading evening newspaper and publishes many elaborate editions of books.

ADVT.

The Honolulu Advertiser is Hawaii's oldest newspaper and maintains a job department that has been built up with seventy years of effort of experience behind it. The Honolulu Advertiser gets out all kinds of half-tone and color work, prints books and publishes a number of periodicals. The leading morning newspaper of Hawaii, it holds a unique position.

The Honolulu Gas Company has been the pioneer in heating and in lighting the city. Honolulu is now a city of nearly a hundred thousand population and more than ever the people of the city cook with gas. The mains and pipes have been laid even in the outlying districts so that the Honolulu Gas Company helps the city to grow.

The main office of this company is on Hotel Street near Fort, with extensive warehouses and repair shops in other parts of the city. Gas is less expensive in Honolulu than in almost any other city of its size in America. The gas is made from oil brought from California and develops splendid lighting and heating qualities.

The Architects and Engineers of Hawaii

The Architects Society of Hawaii has organized that the people of the Territory may be kept informed as to what the architects established in Hawaii have done, what they are capable of doing, and why employment of their services should be profitable to those who build in Hawaii.

Examples of the work of Honolulu architects may be seen in the city and throughout the islands. Call 4476 or 4468 for a list of residences and commercial buildings designed and decorated by local architects and see for yourself what they are doing.

The architects of Hawaii are sincere in their stand that the difference between a house and a home is decoration. Four walls and a roof make a house. When they are arranged and augmented in a decorative way that subtly expresses the personality of the family, they become a home.

Architects in Honolulu become acquainted with you. They can and will consult with you on every development of the house that is to be your home, not only in its larger phases, which make it suitable to the island climate and habits of life, but in its decorative features.

Many of the finest residences and business and public buildings in Hawaii are the creation of those who constitute the Architects Society of Hawaii. They will be glad to meet you, and information regarding the society may be had by phoning to 4468 or 4476.

In the Architects Society of Hawaii are Herbert Cohen, Damon Bldg.; Davis & Fishbourne, Boston Bldg.; C. W. Dickey, Damon Bldg.; Emory & Webb, James Campbell Bldg.; Furer & Potter, Hawaiian Trust Bldg., Rothwell, Kangeter & Lester, 82 Merchant St.; Hart Wood, Castle & Cooke Bldg.

The Pacific Engineering Company, Ltd., construction engineers and general contractors, is splendidly equipped to handle all types of building construction, and execute building projects in minimum time and to the utmost satis-

ADVT.

faction of the owner. The main offices are in the Yokohama Specie Bank Building, with its mill and factory at South Street. Many of the leading business buildings in Honolulu have been constructed under the direction of the Pacific Engineering Company.

Wright, Harvey & Wright, engineers in the Damon Building, have a branch office and blue print shop at 855 Kaahumanu Street. This firm does a general surveying and engineering business, and has information pertaining to practically all lands in the group, as this firm has done an immense amount of work throughout the islands. The blue print department turns out more than fifty per cent of the blueprinting done in Honolulu.

Walker & Howland, with offices in the new First National Bank Building on King and Bishop streets are chiefly fire protection engineers. They represent Grinnell Company of the Pacific, with its main offices in Los Angeles, this firm producing automatic sprinklers, pipes, valves, and fittings, needed in architectural engineering work, and suited to a climate that has no winter and is ever gentle spring.

Lewis Abshire, consulting engineer in the Lincoln Building, is developing much needed lines of work in connection with landscape engineering, construction, and surveying, as well as building. The office is at 178 South King Street, room 2 Liberty Building, telephone 2453, with 79311 as a home number. With his past experience of many years in Honolulu, Mr. Abshire is well acquainted with local conditions and needs in building in Hawaii.

The J. L. Young Engineering Co., Ltd., acts as consulting engineers and contractors, with offices at Kawaihao and King Streets—telephone 2842 and 6247. J. L. Young is president and general manager. The firm has a long career of successful building for the Army, Navy, Government, and private corporations and individuals.

Some of Honolulu's Leading Business Firms

The Hawaiian Electric Co., Ltd., with a power station generating capacity of 32,000 K.W., furnishes lighting and power service to Honolulu and to the entire island of Oahu. It also maintains its cold storage and ice-making plant, supplying the city with ice for home consumption. The firm acts as electrical contractors, cold storage, warehousemen and deals in all kinds of electrical supplies, completely wiring and equipping buildings and private residences. Its splendid new offices facing the civic center are now under course of construction and will add another bit of architectural beauty to the business section of Honolulu.

The Consolidated Amusement Company, as its name implies, is a consolidation of all the leading theaters in Honolulu, featuring two of the most luxurious theaters in the Pacific, the New Princess and the Hawaii Theater, where the latest first-run films are shown to the Honolulu public. The Consolidated Amusement Company supplies practically all of the movie theaters in Hawaii with their films and brings to the island everything that is worth bringing, showing the great run pictures while they are still being seen in New York and Chicago. Visitors can always reserve seats at the theaters of the Consolidated Amusement Company by phoning to the theater selected.

The Honolulu Music Company, 1107 Fort Street, is the home of the Mason and Hamlin pianofortes in Hawaii. Here Dame Nelly Melba purchased two of these superb instruments. The superb Knabe piano also has its home here. Mr. Bergstrom, of Hawaii's one great family of music dealers, is manager of the Honolulu Music Company and here one may be advised by experts as to the kind of musical instruments suited to Hawaii, as well as the kind of music to secure.

ADVT.

Harte's Good Eats is the name of the restaurant in the Wolters Building on Union Street, famous for its home cooking. Miss Edna B. Harte has built this restaurant up to its landmark position in Honolulu by carefully supervising every department in person.

Alton J. Cohn, Realtor, 316-317 Hawaiian Trust Bldg., 116 South King Street, has entered the real estate field with the up-to-date modern ideas of this business, handling the best properties and satisfying the customer. Choice properties in every part of Honolulu to suit every income are listed by this realtor, who has found that he had had to take others into partnership to take care of the increasing business.

The Ben Hollinger Co., Ltd., with Ben Hollinger as President and Manager, owns and operates the Hollinger Garage, and is disbursing central for the Vesta Battery Corporation, and representatives for The Fisk Tire Company, Inc., in the Territory of Hawaii. The main offices of the company are at Alakea and Queen Streets, adjoining the garage.

The Rycroft Arctic Soda Company, on Sheridan Street, furnishes the high grade soft drinks for Honolulu and Hawaii. It manufactures the highest grade ginger ale—Hawaiian Dry—from the fresh roots of the native ginger. It uses clear water from its own artesian well, makes its carbonated gas from Hawaiian pineapples at the most up-to-date soda works in the Territory of Hawaii.

A monument to the pluck and energy of Mr. C. K. Ai and his associates is the **City Mill Company**, of which he is treasurer and manager. This plant at Queen and Kekaulike streets is one of Honolulu's leading enterprises, doing a flourishing lumber and mill business.

Honolulu Business Items

The Honolulu Planing Mill, of which John Lucas is President and Manager, is the only planing mill in the Territory electrically equipped, and it manufactures its own electricity. This pioneer planing mill of Hawaii, established in 1864, has its workshops at Ala Moana Coral and Keawe Streets, Honolulu, where it manufactures mouldings and every conceivable need in building the house and home.

The World's Dairy Farm is a title which New Zealand, the greatest exporter of milk products, has truly earned. A mild, equable climate, careful herd selection, scientific manufacture and a rigorous grading system, account for New Zealand's pre-eminence. "Anchor" Brand Dairy Products represent the cream of the Dominion's output and in 30 countries are acclaimed as the world's best.

Bailey's Groceteria is the big success of recent years in Honolulu business. The parent store at the corner of Queen and Richard Sts., has added both a meat market and a bakery, while the newly constructed branch building at Beretania and Piikoi is equally well equipped and supplied, so that the housekeeper can select all that is needed in the home, or, in fact, phone her order to either house.

The Metropolitan Meat Market on King street, near Fort, is the most completely equipped meat market in the Territory of Hawaii, and the most sanitary. It occupies its own building, which is built and equipped on successful principles of sanitation. Its splendid meats are carefully selected and supplied by the Hawaii Meat Company, which operates its own cattle steamers between the islands, so that fresh and perfectly fed beef is always on the counters, under glass, at the Metropolitan Meat Market.

ADVT.

Howard W. Laws, at Ala Moana Avenue and Ward St., is the general roofing contractor in Hawaii, being distributor for Carey's roofing and building materials, telephone 5949. Before putting on your roof in Hawaii, it is wise to secure expert advice on the kind of roof the section you build in needs. Howard W. Laws can give this advice with years of experience behind his opinion.

L. Fullard-Leo, the building contractor, with a factory at Queen and Ward streets, is Honolulu's manufacturer of hollow concrete building tiles, as well as of roof tiles and French floor tiles. A specialty is made of fibrous plaster cement plate walls and of every kind of ornamental plastering, modeling, imitation stone, etc. Excellent examples of this work may be seen in the new Castle & Cooke Building and in the Bishop Bank building.

The Hub Clothing House, at 79 S. Hotel Street, is just around the corner from Fort Street and in the busiest portion of the city. Quick sales make it possible to dispose of the constantly arriving stock of men's clothing and apparel at the lowest prices in the city for the high class gentlemen's wear.

Walker & Olund, Ltd., with headquarters at 820 Piikoi St., build with Walker & Olund's concrete tile, and build permanently. This firm has contracts for many of the big new business and other buildings now being erected in Honolulu. Their feature of concrete tiling saves the trouble of double walls and makes the home absolutely water-proof, bug-proof, and by actual test more fire-proof than the imported clay tile. Walker & Olund's concrete tile is slightly cheaper laid up in the wall than good double board construction, and a great deal more weather resisting.

Maui No Ka Oi

(Maui is the best)

The **Maui Chamber of Commerce** is behind the plan for an auto road to the summit of Haleakala, earth's vastest crater, situated on the island of Maui, its summit ten thousand feet above the sea from which it will be distant, when the auto road is completed, scarce fifty miles of easy riding. The Chamber also advocates the round-the-island auto road that now connects Wailuku and Lahaina with Hana with the plan now to push the building of this auto route entirely around the island of Maui. It was the Chamber that got behind the Maui Annual Fair, the best of its kind in the islands. All of the business men of Maui are members of their Chamber, and it stands for the progress of Maui No Ka Oi (Maui, Best Of All).

The **Wailuku Hotel** is the delightful caravansary conducted by Mrs. George K. Trimble, enlarged from year to year until it is now one of the really up-to-date hotels in the Territory with every convenience for the visitors. This hotel has a clientele of many years standing, drawing to itself the best of the traveling public to which it caters.

The **Haleakala Ranch Company**, with head offices at Makawao, on the Island of Maui, is as its name indicates, a cattle ranch on the slopes of the great mountain of Haleakala, rising 10,000 feet above the sea. This ranch breeds pure Hereford cattle and is looking to a future when it will supply fine bred cattle to the markets and breeders in Hawaii.

The **Kahului Railroad Company**, with its main offices at Kahului on the Island of Maui, serves the island both as regards passenger and freight service, with regular trains running to the Haiku district, Paia, Puunene and Wai-ADVT.

luku. The company is agent at Kahului for the Inter-Island Steam Navigation Company and for the firm of Alexander and Baldwin, Ltd. William Walsh is general manager.

The **Kahului Store**, Wm. A. Sparks manager, is conducted by the Hawaiian Commercial and Sugar Company. The immense store in Kahului carries everything that is needed in plantation or home life, it maintains branches at Puunene, Spreckelsville, and at Kihei. The plantation store is an institution in Hawaii, bringing everything that is needed direct to the laborer and to workers of all kinds.

The **Hawaiian Cooperative Poultry Association** with its poultry ranch and head offices at Wailuku, supplies the island with its dressed poultry and eggs. It sometimes sends its produce to Honolulu, where there is a quick demand. This is an enterprise of Wm. F. Pogue and his son. Mr. Pogue is also proprietor of the Homelani Ranch with his sons, who give it their personal service.

The **Paia Store**, which is conducted by the Maui Agricultural Co., Ltd., is managed by Fred P. Rosecrans. This is one of the very big plantation department stores in Hawaii. Every conceivable need of the housekeeper or homemaker is kept in stock. The store covers an area of more than a city block in a metropolitan city, and is the department store adapted to the needs of modern sugar plantation life.

The **Honolulu Dairymen's Association, Ltd.**, is represented on Maui by Fred Lamb at Wailuku.

Hilo, Hawaii's Second City

Locate in Hilo.—The Chamber of Commerce of Hilo is now located in the Volcano Building, Wainuenue avenue, the very center of Hilo's business district. Those desiring information concerning Hilo and its opportunities are invited to call at the Chamber, which represents the interests of a city of 13,000 inhabitants, as well as the general interests of the Island of Hawaii, the largest island of the group forming the Territory of Hawaii. Those who contemplate visiting Hawaii or doing business in Hilo are invited to correspond with the Chamber of Commerce of Hilo, Gordon H. Scruton, executive secretary. Hilo has many important business houses and from Hilo the various points of interest on the island are visited.

The Hilo Hotel is the rendezvous of the tourist and the visitor. Almost hidden in a tropical garden facing the sea, its bungalow cottages afford the maximum of comfort. At the Hilo Hotel rooms with or without baths may be secured at moderate rates, and in the great dining hall the delicacies of Hawaii are served. The Hotel is conducted on the American plan.

Hawaii Consolidated Railway, Ltd., Hilo, Hawaii, the Scenic Railway of Hawaii, one of the most spectacular trips in the world, thirty-four miles, costing nearly \$4,000,000; it crosses 10 sugar plantations, 150 streams, 44 bridges, 14 of which are steel from 98 to 230 feet high and from 400 to 1,006 feet long, and many precipitous gorges lined with tropical trees, and with waterfalls galore; sugar cane fields, villages, hundreds of breadfruit and coconut trees and palms along the way, and miles of precipices. W. H. Hussman, general freight and passenger agent.

Motor Service from Hilo.—The Hawaii Transportation Company maintains a regular daily automobile service to the volcano of Kilauea, thirty-odd

miles distant from Hilo. It also sends passengers by auto around the island of Hawaii or to any part of the island. Its cars meet the steamers at the wharf, or can be secured at any time by phoning either 82 or 92. R. Sevier is president and manager. A letter or a message to the Hawaii Transportation Company will assure prompt service and waiting cars.

Hilo as a Manufacturing Center.—The Hawaiian Starch Co. is a Hilo enterprise that has the support of the entire territory. This company puts out a starch made from the edible canna that has twice the strength of other food starches, so that only half the amount usually specified in cook books may be used. This is the starch par excellent for a dull laundry finish. Hawaiian sugar and Hawaiian pineapples are known the world over as the highest standard, and it now seems that Hawaii will lead in producing a perfect starch.

Hilo as a Cattle Market.—The Hilo Meat Co. at 12 Keawe Street is the town end of the Shipman ranch, V. D. Shutte, manager. This company supplies Hilo and sometimes Honolulu with meat from the famous Shipman ranch, of which Mr. W. H. Shipman has been the experienced head for more than a generation. Hawaii has made herself independent of the mainland for meat of all kinds, and in the Hilo market there is a choice of the very best cuts from home raised cattle from the Shipman ranch.

The Moses Stationery Co., Ltd., Hilo, Hawaii, of which E. Moses is president, has its main office and store at No. 55 Kamehameha Avenue. They also control and operate the Hawaii Music Co. in Hilo. In Honolulu two more stores are controlled—the Moses Office Equipment Co., Ltd., at 72 South King Street, also the Sonora Shop at 1158 Fort Street, where the famous Sonora phonographs and the Baldwin Piano are featured.

ADVT.

Establish Your Business in Hilo

The First Trust Company of Hilo occupies the modern up-to-date building adjoining the Bank of Hawaii on Keawe Street. This is Hilo's financial institution. It acts as trustees, executors, auditors, realty dealers, guardians, accountants, administrators, insurance agents, and as your stock and bond brokers. You will need the services of the First Trust Company in Hilo whether you are a visitor, or whether you are to erect a home or a business block.

Own Your Home In Hilo.—The home or business builder in Hilo will need Charles H. Will, the foremost general contractor of the big island of Hawaii. He is the first aid of the builder, with an office in the Old Bank Building on Waiuanue Street. His work is in road building, reinforced steel and concrete buildings, a builder of bridges and wharves, streets and highways. Agent for the Polk System of Reinforced Concrete, Charles H. Will erects the concrete chimneys, an important thing in a land of sugar mills. Estimates are furnished on every class of construction work.

Hilo's Department Store.—The E. N. Holmes Department Store on Waiuanue Street, near Kamehameha, is one of the business landmarks of Hilo. Here more than a generation of Hiloites has bought its groceries, dry goods, men's furnishings, crockery, household furniture, and all that goes to make home happy. Mr. Holmes is now assisted by his son in the management and the business still expands and keeps up with the times, keeping to the front as Hilo's one big department store.

Own Your Own Car in Hilo.—The Volcano Stables and Transportation Company, J. W. Webster, president; and A. L. Ruddle, secretary and manager, is proprietor of the Volcano Garage. At Kamehameha and Pauahi Streets it has three acres of buildings and is agent and distributor for the two cars that stand alone in their separate classes,—the Ford for everybody and the Studebaker for those who desire a high-class car at a moderate price. The company is also distributor for the Ford and White trucks, Fordson tractors, and the Good-year and Federal tires.

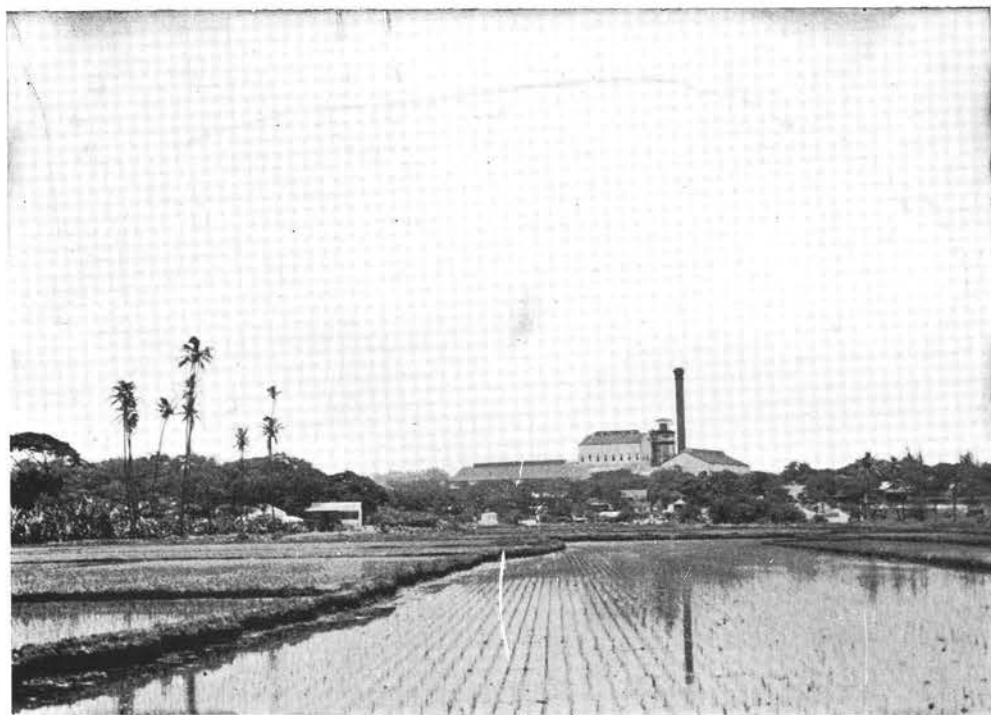


A cattle ranch on the Island of Hawaii.

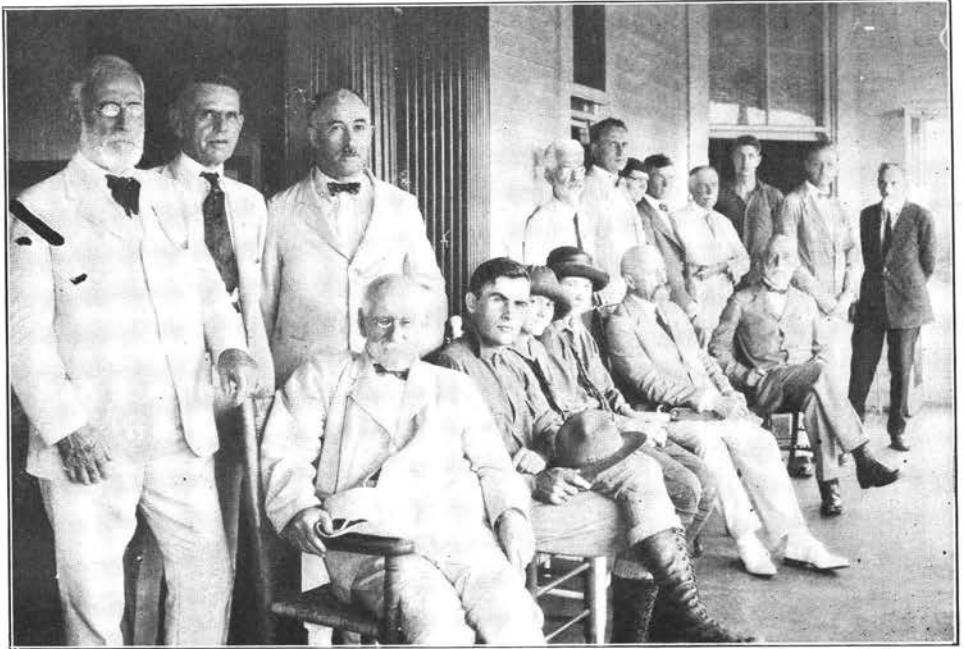
Hawaii's Two Great Industries The Tourist and Sugar



The Royal Hawaiian Hotel at Waikiki.



ADVT. *A typical scene in Hawaii. The sugar mill, coconut palms, rice fields, and the sugar plantation.*



The late Hon. Mark Cohen, Member of Parliament of New Zealand (seated), on the occasion of the dedication of the Pan-Pacific Research Institution, of which he was a member. It was Mr. Cohen who first instigated the idea of the Pan-Pacific Women's Conference being held in Honolulu in August, 9 to 19.