

GUIDE-BOOK EXCURSION C-10

會協學地京東

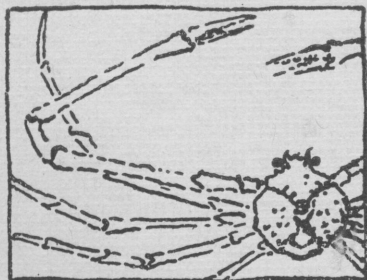
No.

(Nov. 7th, 1926)

TOKYO GEOGRAPHICAL SOCIETY
FOUNDED APRIL 1879.

會協學地京東
五號月四年一

THE MISAKI MARINE BIOLOGICAL STATION

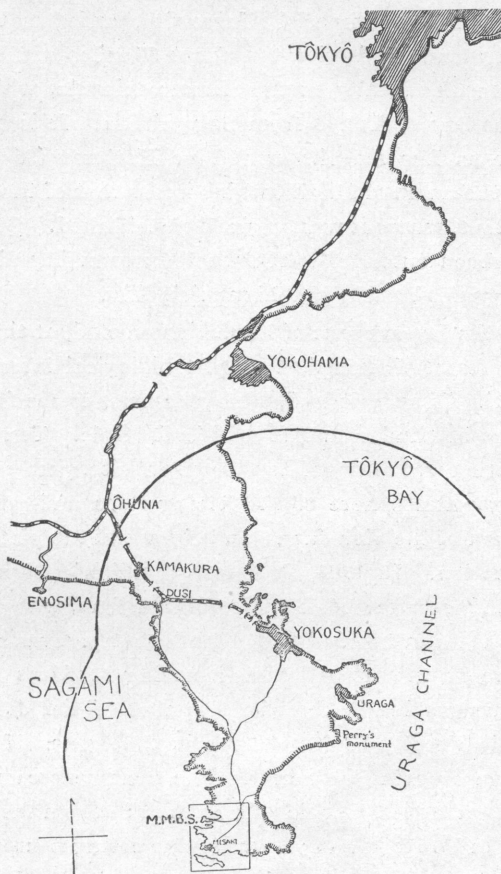


PAN-PACIFIC SCIENCE CONGRESS, 1926

JAPAN

THE MISAKI MARINE BIOLOGICAL STATION

GUIDE MAP TO MISAKI



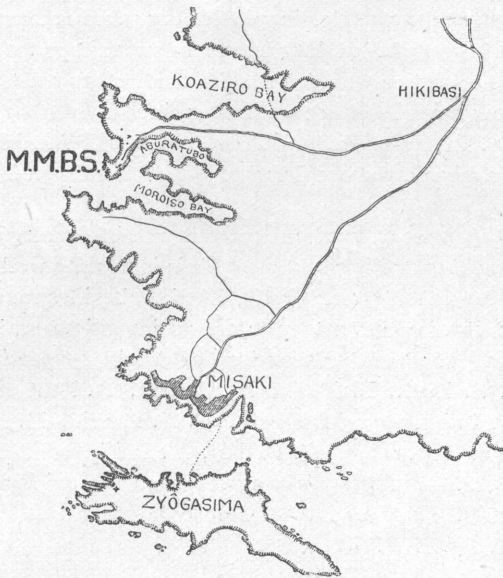
Note:—It is prohibited by order of the military authorities to photograph in the zone of fortifications south of the line drawn across the map.

THE MISAKI MARINE BIOLOGICAL STATION

BY NAOHIDE YATSU

What is it? The Misaki Marine Biological Station is a government
Where is it? institution belonging to the Faculty of Science, Tokyo Imperial University, and has tables for a dozen investigators. It is situated about 37 miles south of Tokyo, near the southern extremity of the Miura peninsula, which juts out and divides the Bay of Tokyo from Sagami Sea. It is on about the same latitude as Los Angeles and Cape Hatteras ($35^{\circ} 9' N$). The station bears the name of Misaki, which is also that of the town, some two miles distant, where it was originally established. Quite recently the name has been extended to the whole surrounding district which has been reorganized as the Misaki municipality.

In 1887, the Department of Education erected, at the suggestion of the late Professor Mitsukuri, a marine biological laboratory in the town of Misaki. It was, indeed, one year prior to the foundation of the laboratory of similar nature at Woods Hole. Ten years later (1897) the Station was removed to the present site, partly to avoid the noise and vulgar atmosphere of the fishing town and partly because of the attraction of the rich fauna and flora and the picturesqueness of the new location. In 1903, Professor Mitsukuri resigned from the directorship and was succeeded by Professor Iijima, who occupied the post until his death in 1921. In 1910 the laboratory was considerably enlarged to meet the necessity of receiving students in suddenly increased numbers, due to the establishment of the department of fisheries in the Faculty of Agriculture in that year. In 1922, Professor Yatsu was appointed director. The next year came the great earthquake (Sept. 1, 1923), which shook the tiles from the roofs of all the buildings and badly damaged two of the cottages used for dormitories. Luckily, however, fire did not break out. In the autumn of 1925, all the buildings were repaired at a cost of about 30,000 yen and put in a decidedly finer shape than before the earthquake.



What has it done?

What does it do?

The Station was primarily meant to enable biology students to become familiarized with marine forms. The main part of the laboratory

work was the study of plankton. This was supplemented by the identification and dissection of common forms, which the students themselves collected. Occasionally a deep sea collection was made with long lines from a small fishing boat. Most of the work carried on at the Station was of the nature of faunistic study, as is attested by the excellent papers published, e.g., those on the polychaetes by Dr. Izuka and on the gephyreans by Dr. Ikeda. Without doubt the Station has admirably fulfilled its mission for the past thirty years. However, to meet the modern phase of biology a new departure has become imperative and since the appointment of the present director endeavors have been made toward the establishment of physiological and chemical laboratories. With its present appropriation, however, it seems that the new undertakings of the Station are likely to be much restricted.

Since the establishment of the department of fisheries, various regular courses, such as those in planktology and oceanography, are being given. It may be of interest to know that notes on various changes in the conditions of the sea in or near the inlets around the Station grounds have been accumulating since December 1913, under the direction of Professor Hara. These notes will furnish invaluable data for the study of the oecology of both animals and plants near the Station.

Every other year a summer course in marine zoology is held for the biology teachers of high schools. This is usually well attended.

Since the establishment of the Station, besides many Japanese workers, the following seventeen overseas investigators have stayed for some time for the prosecution of their respective studies: J. F. Abbott, S. Bock, B. Dean, F. Doflein, A. Durrand, C. Eliot, E. N. and E. B. Harvey, H. Heath, C. A. Kofoid, H. Kuhlenbeck, H. Molisch, Th. Mortensen, W. Patten, M. Philippson, W. E. Ritter, P. Schmit, D. H. Tennent. Among the names of visitors are those of E. G. Conklin, H. Driesch, R. Goldschmidt, D. S. Jordan, Wm. E. Kellicott and J. H. McGregor.

Why was the place selected for the Station?

This is the question which most visitors to the Station ask. It seems a very natural inquiry, because to lay visitors, there is nothing peculiar about the sea around the Station. But the moment the visitor goes down to the tide-pools and looks into the crevices or searches about in the forest of algae, or turns a stone, he is struck by the fact that the water is teeming with life. Better still when strong west winds blow during the winter months, visitors are amazed at the richness of plankton of a tropical nature, which is driven into the inlets from its usual home in the *Kuroshio*, or "Black Current." One can see in the plankton, compound Radiolarians, *Salpae*, *Porpitae*, Heteropods, Pteropods, *Auriculariae* of nearly 20 mm., and many other marine organisms.

Habitats of all descriptions can be found near the Station: rocky shore, sandy beaches, others of stones and gravel, mud flats, bottoms covered with eel-grass, bottoms with coarse shells, ledges projecting horizontally, and caves formed by the waves. Each has its peculiar dwellers and all taken together form a splendid hunting ground for marine life.

Out towards the open sea one can reach the 10 fathom line in

half a mile and the 100 fathom line within 3 or 4 miles off shore. Beyond that line deep sea forms of wonderful varieties can be obtained. It was a hobby of Professor Iijima's to collect those forms, especially glass sponges (Hexactinellids), some like lace of exquisite workmanship, some spiny like a cactus. Besides archaic sharks with more than five pairs of gill slits, luminous black sharks, stalked crinoids, gigantic crabs 10 feet from extreme claw to claw, orange colored hydroids nearly a foot high, red ophiuroids, *Pleurotomaria*, large sea-spiders, gelatinous sea-cucumbers, disc-like octopi, etc., can be brought to light.

It may be added that the Misaki Station is far superior to the two world famous biological centres, Naples and Woods Hole, in respect to the richness of marine forms. The former being situated in the Mediterranean, has hardly any diurnal tidal changes, a feature which makes the collection of certain forms very difficult. Woods Hole has marine forms of a rather boreal type, since it is located on the latitude of $41^{\circ} 35' N$.

Combined with the richness of its fauna and flora, the Misaki Station has another advantage in that it is located at a spot quite secluded from the hustle and bustle of the world, and yet at the same time it can be reached from Tokyo in less than three hours. What is more, beautiful pine-covered hills and fine vistas everywhere around the laboratory make a stay at the Station very enjoyable.

A romantic background

In addition to the above biological features, the Station grounds (12 acres) have a romantic history.

At the place where the dormitory now is, there once stood the castle of Arai, which was occupied for centuries by the Miura clan. Tokitaka, the sixteenth lord, had no son, so he adopted a boy named Yoshiatsu of the Uesugi clan. But afterwards a son was born to Tokitaka and his wife. She urged her husband to take secretly the life of their adopted son. On hearing of this plot, Yoshiatsu fled from the castle and entered the temple of Ashigara. In those days, temples were in a sense sanctuaries, where many a political refugee found temporary shelter. In 1494 Yoshiatsu, at the age of 40, then known by his priestly name of Dōsun, attacked his adoptive father at the Arai castle and killed him. He gave the castle to his son, Arazirō, and he himself went some 22 miles north to occupy the castle of Okazaki. In 1512 Sōun Hōjō, who was already a powerful lord, occupying a vast area, and still eager to increase

his own territory, attacked the castle of Okazaki. Dôsun could not withstand the strong army of Sôun and had to retreat southward to the Arai castle where his son Arazirô was. Sôun came after him and surrounded the castle with ten thousand soldiers, thus trying to starve out the people inside. They withstood the siege for three years living on the rice kept in a rock-hewn granary, *Senda Yagura*, or "Cave of a Thousand Horse-loads." Provisions all gone, yet they would neither escape nor surrender! They were too proud to do anything contrary to the knightly code of those days. One evening in the midsummer of 1516, a banquet was held in the castle of Arai which lasted throughout the night. The lord Dôsun, 62 years old, arose and sang a short song which may be translated: "The conquerer and the conquered are both earthenware, and when crushed all become dust." The next morning Dôsun committed *harakiri*. His son Arazirô, 20 years old, rushed out of the castle gate with his 75 men. Swinging a heavy iron quarter-staff he killed as many of his foes as he could, and finally, *mirabile dictu*, cut off his own head, and threw it high into the air. The head flew to Odawara some twenty miles across the Sagami Sea. There it stopped, and fastening its teeth in a pine branch, stared in the direction of the enemy. The eyes were so ferocious that no traveller dared pass that way. Finally a priest from the temple where the father of the dead man once stayed, came and chanted a poem. No sooner was it ended than the head turned into a white skull. To complete the story it may be added that Sôun Hôjô, the enemy of Dôsun, died three years later. The fall of the castle of Arai marked the end of the Miura clan, which had lasted for four centuries and a half. Four hundred and odd years have passed; the castle is gone, yet the brave lord Dôsun and his son Arazirô are still dear to the hearts of the villagers. Every year in July they hold a festival in memory of the two heroes of the past. When the ground was broken for the erection of our dormitory, a few fragments of the front pieces of a gold helmet were dug out. You can see the pieces now set in a frame in the library.

Once in a while when the farmers are tilling the fields, they come across baked sand-balls with stone cores, which the warriors threw while hot during the battle at the time of Dôsun.

It should be mentioned, (though it is not at all romantic), that the Station grounds and fields near by abound in arrow heads, celts and fragments of pottery used by a race quite different from the

Japanese of to-day, who lived there some twenty or twenty-five centuries ago.

How to reach the Station.

Trains from Tokyo Station will take you to Yokosuka, the terminus of the Yokosuka line, in an hour and forty-eight minutes, through Yokohama and Kamakura. Yokosuka (population 89,326), is one of the three naval ports of Japan and has a large navy yard. The main part of the town was burnt by the fire which was started by the great earthquake.

From Yokosuka an automobile will take you to Hikibashi in 50 minutes. Hikibashi, "Drawbridge," is the place where an ancient drawbridge stood. At that time, if this drawbridge was lifted, access to the southern end of the Miura peninsula, especially to the castle of Arai, was made very difficult. At Hikibashi one gets a fine view on either side. On the left can be seen the Bay of Tokyo, and on beyond it, ten miles away, the mountains of Bôsyû; while on the right is the Sagami Sea. At Hikibashi you leave the main road, which leads to the town to Misaki (population 7600), and take a narrower road to the right. On the left hand side you will see two mounds, where the remains of ancient nobles were interred together with their gold rings, swords, earthen images and other paraphernalia. Mt. Fuji will be seen, if it is fine, directly in front high above the sea.

Passing a gate the road branches in two directions. Going straight on you will find the tombs of Dôsun and Arazirô, each on a pine-covered point.

Topography and Station buildings.

The car stops at a clearing. From here you can command a fine view of Aburatsubo, "Oil Pot Inlet," so named because the water there is always calm. The deepest part is two fathoms. Another inlet, Moroiso creek, can best be seen from the laboratory.

A short lane brings one out on a lawn where the dormitory is situated. This stands on the very spot where the castle once stood. The moat is still to be seen running half round the place. Hidden among pine trees is the Mitsukuri Cottage. The late Professor Mitsukuri, the first director of the Station, built it as a summer home for his family. After his death (1909) his son presented the cottage to the University. From the edge of the lawn, or what is known as Arai Heights, you have a beautiful view over the Sagami Sea to the Island

of Ōshima (30 miles away), with its active volcano, Mt. Mihara (2500 feet high).

A narrow path leads to the Dean Cottage, which Dr. Bashford Dean built and donated to the University when he left Japan in 1905. The house stands on the finest spot in the whole grounds, and commands a view of very picturesque scenery.

Going down the slope you will find another lawn with many evening primroses and some New Zealand flax. Here you can see Enoshima, "Picture Island," and Mt. Fuji (12,450 feet high, 50 miles away) at its best. The Arai beach stretches to the foot of an overhanging cliff.

The Station consists of four buildings :—

- A. A library and research rooms for investigators. A herbarium of both land and marine plants is kept in the library.
- B. A general laboratory for students.
- C. An aquarium and motor room.
- D. A two-storied museum, and two bedrooms for overseas investigators.

Most of the specimens kept in the museum were destroyed by the earthquake, and it will take some time to replenish them, but even now you can get a glimpse of the fauna of Misaki, deep sea as well as littoral. A loggerhead turtle (*Thalassochelys caretta*) with its young is exhibited. Giant crabs (*Macrocheira kaempferi*) are found nailed on the wall. A stalked crinoid (*Metacrinus rotundus*), luminous shallow water pennatulids (*Cavernularia habareri*), deep sea glass-sponges such as Venus's flower basket (*Euplectella*), with penned-in shrimps (*Spongicola venusta*), a glassrope sponge (*Hyalonema*), and a Port Jackson shark (*Heterodontus japonicus*) with its egg case with a spiral ridge and embryo, are a few worth mentioning.

No description of the Station would be complete without some mention of Kuma, our veteran collector and keen observer, who came to the laboratory as a boy and who now is sixty-two years old. He is certainly a "character," the Lo Bianco of Misaki. He is quite a mine of information, true and false, relating to marine life. He will give you such a vivid picture of the bottom at 600 fathoms that you will believe he has been there himself. He has this advantage—the veracity of his tales no one can prove or disprove.

Close by the museum is the *Senda Yagura*, or "Cave of a

Thousand Horse-loads." Most unfortunately about half of this rock-room had to be destroyed in order to make space for the museum. As already mentioned, the people in the Arai castle withstood the siege of Sôun for three years with the grain kept in this cave.

From the waterfront you will see the inlet of Moroiso with its many coves. The deepest part of the inlet is about three fathoms. Turning to the right from the wharf and climbing up the rocks you will find the cave of Benten, goddess of fortune, to which many a devotee from far and near comes to pray for good luck in fishing or other matters.

Above the Benten cave is Azalea Hill, a pine-clad knoll with many wild azaleas growing on it. Climbing this hill from the back of the library building you can have almost an aeroplane view of the whole topography around the Station.

How much did the great earthquake of 1923 affect the fauna and flora?

In closing this guide a word may be said about the great earthquake which shook the vast area around the Bay of Tokyo on September 1, 1923. With the first and greatest shock the water rushed out of the inlets with tremendous rapidity. The sea then rose higher and higher—very much higher than at high tide—and the water receded for good. The land was thus raised nearly four feet above its former level. The elevated part can now be seen as a whitish zone with dead barnacles and oyster-shells. In passing, it may be mentioned that most of these dead barnacles (*Tetraclita porosa*) are now occupied by spiders. The drying up of the sand beaches and mud flats killed all the dwellers there, such as cake-urchins, bivalves and annelids. Most of the green algae, *Reniera*, a very common sponge encrusting the rock, disappeared; but in the past two years new colonies have established themselves, springing from those that survived. The red actinians (*Actinia equina*) are gone forever but the *Onchidia* are coming back.

That immense quantities of shore-sponges were killed by the earthquake can be seen from the sudden increase of monoaxon spicules in the beach sands.

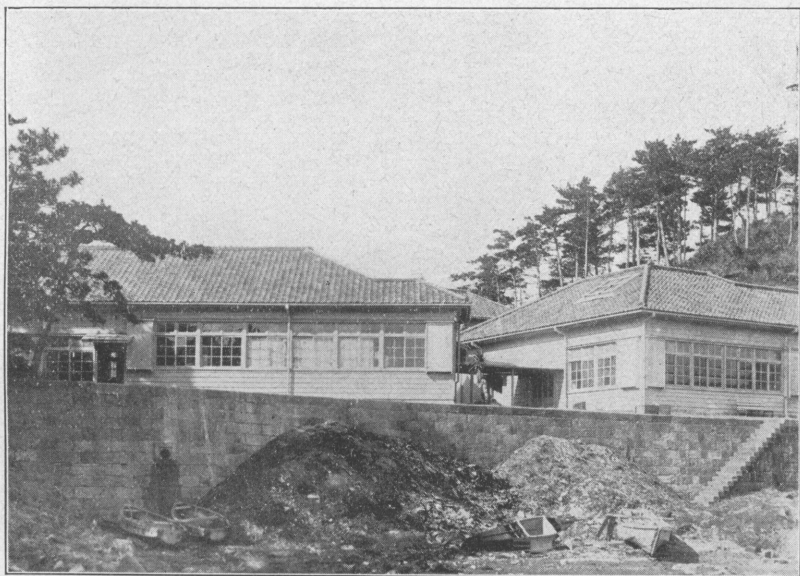
On the morning of the earthquake, fishermen out on the fishing ground found many dead deep-sea fish of the cod family (*Physiculus*) floating on the surface of the sea. At this phenomenon they were frightened thinking something unusual would happen, and so they at once hastened back to land. There they soon witnessed what the

earthquake had done. Undoubtedly the fish were killed by the sudden rushing of water into a newly formed depression at the bottom of Sagami Sea.

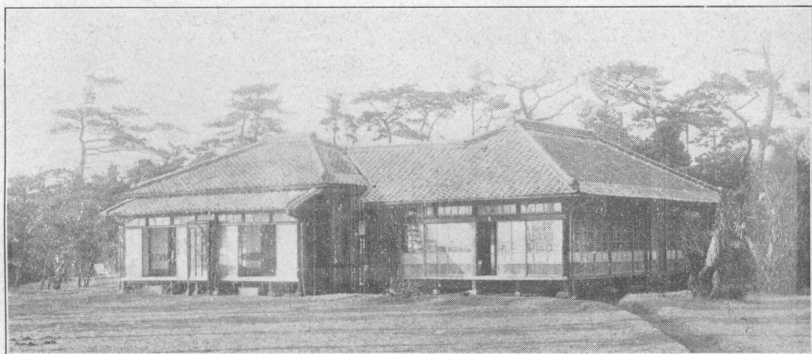
One more thing worth mentioning is that cicadas had been very abundant every year before the earthquake, but in the two summers after the disaster the cicadas considerably decreased in number. This was, I think, due to the fact that the larvae were crushed in the earth during the earthquake.

Quite recently two places of unusual scientific interest have been discovered near the laboratory by A. Imamura, Professor of Seismology at Tokyo Imperial University, one on an almost vertical cliff just below Arai Heights and the other on a hillside close to the rice-fields at the head of Moroiso creek. At the latter place he found four rows of holes in the rock, one above another with intervals varying from 1.5 to nearly 3 meters. The holes were once inhabited by date-shells (*Lithophaga nasuta*), a species closely allied to *L. dactyla*, the holes of which made the pillars of the so-called Temple of Serapis at Pozzuoli very famous. Prof. Imamura can tell us from these holes the approximate year in which took place four sudden upheavals of land due to earthquakes comparable in magnitude to the one which occurred in 1923. The lowest row indicates the high tide mark prior to the earthquake of 1703.

All the photographs and maps reproduced in this guide have been censored by the Commanding Officer of the Fortress of Tokyo Bay.



The laboratory seen from the sea. The aquarium building on the right.



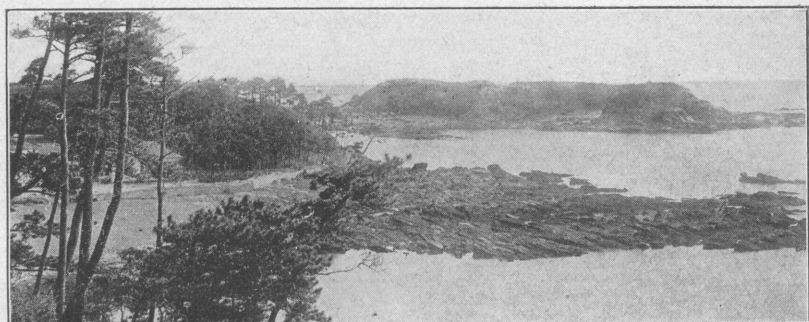
The dormitory.



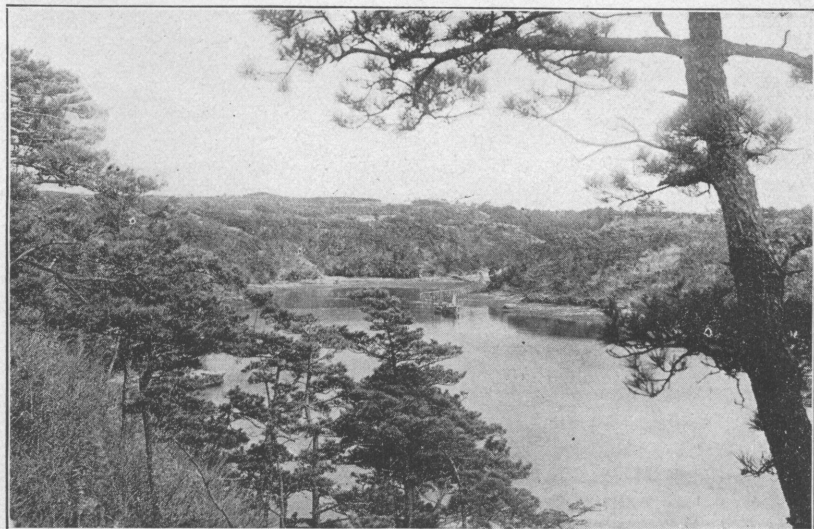
The Museum. The aquarium building on the right.



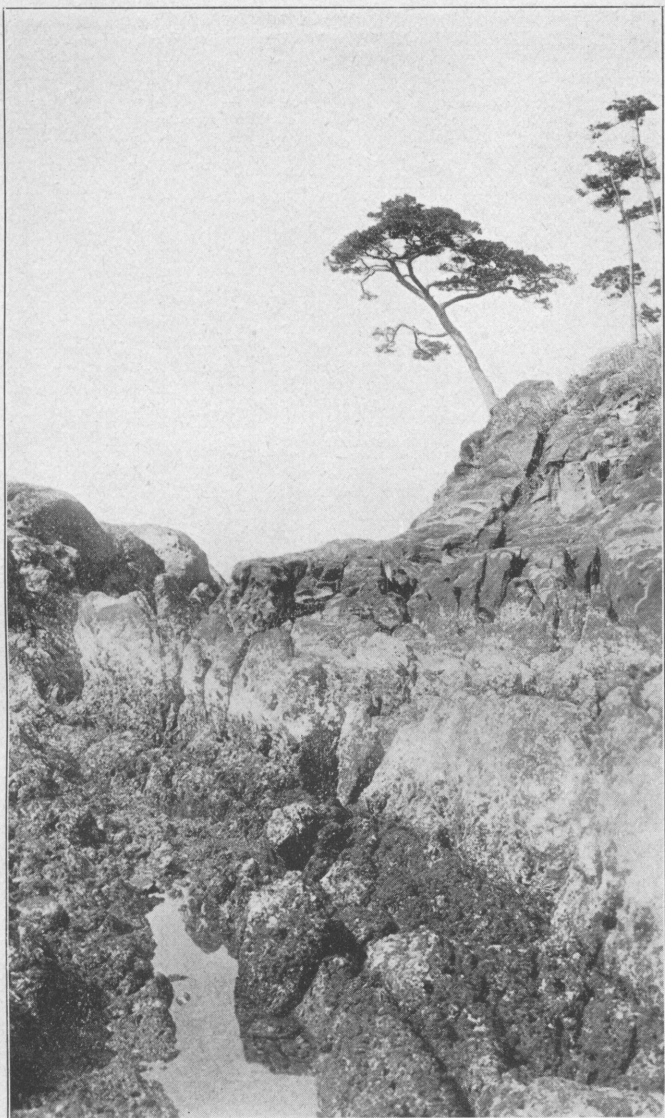
Kuma, the veteran collector of the Station.



The Station shore seen from Arai Heights. The laboratory is hidden behind the pine trees on the left.



Aburatsubo, "Oil Pot Creek" looking east.



A typical tide-pool near the Benten-hill. Note the whitish zone, which indicates the elevation of land at the earthquake of 1923.

大正十五年十二月二十日印行

大正十五年十二月二十五日發行

第三回汎太平洋學術會議

印刷者 木 下 憲

東京市日本橋區兜町二番地

印刷所 東京印刷株式會社

東京市日本橋區兜町二番地

發賣所 東京地學協會

東京市京橋區木挽町九丁目二十九番地

Executive Office : Rooms of the National Research Council,
Department of Education, Tokyo

CABLE ADDRESS :—KENKYU, TOKYO.