

ward from Izu Shima, can be avoided by keeping to the eastward of a line established by Ha Shima in range 197° with the eastern extremity of Takezaki Hana, a point about 1 mile southeastward of Tsu Saki.

Ogono Shima, on the eastern side of Aoshima Suido, is a sparsely wooded islet with a clump of pine trees near its northeastern extremity and a large solitary pine standing on the summit of its easternmost point. The shores of the islet are everywhere foul to a distance of about 200 yards.

Taka Shima.—To the eastward of Ogono Shima lies the southwestern part of Taka Shima, the largest of the islands in the entrance of Imari Wan. They are separated by a channel about 600 yards wide, which is not recommended because of the dangers in its southern approach. Tawara Ishi, with a depth of 2 fathoms, lies on the eastern side of the southern part of this channel, and Kita Sone, on which there is a rock awash, lies in the middle of the southern approach, about $\frac{1}{4}$ mile westward of the southwestern extremity of Taka Shima.

From its southwestern extremity the coast of Taka Shima trends in a general north-northeasterly direction for about $3\frac{3}{4}$ miles to Ao Hana, the northernmost point of the island. This side of the island is much indented, and about 1 mile southward of Ao Hana is the entrance of Ao Ura, a narrow inlet extending east-northeastward for about $\frac{1}{2}$ mile. A village, at which local storm signals are displayed (see page 29), stands at the head of this inlet, which is suitable only for small craft with local knowledge. Close eastward of the village rises Atago Yama, which is black, thickly wooded, and conspicuous. Between Ao Ura and Ao Hana the coast is fringed with foul ground to a distance of about $\frac{3}{4}$ mile. Yobo Se, 9 feet high, is a pointed rock that lies about 1 mile southwestward of Ao Hana and constitutes the outermost danger of this foul area.

From Ao Hana the coast trends for about 1 mile southeastward to Ugeiwa (Ugeya) Hana and is foul. The outermost danger is Kita Sone, almost $\frac{1}{2}$ mile eastward of Ao Hana, which dries 2 feet and is sometimes marked by breakers. The remainder of the eastern side of this island is described with Hibi Suido, and its southern side with Imari Gaiwan.

Kuroshima Seto and Kuro Shima.—Kuroshima Seto, the passage between the western side of the northern end of Taka Shima and Kuro Shima, more than 1 mile westward, has its fairway reduced to about $\frac{1}{4}$ mile by the dangers on either side. In addition, a 5-fathom rocky patch lies approximately in mid-channel, almost $\frac{1}{4}$ mile southwestward of Yobo Se.

Kuro Shima is a flat-topped island, the highest part of which, Kompira Yama, rises near its southeastern end. This hill is 317 feet high and has a conspicuous pine wood on its summit. The coasts of the island consist of steep cliffs, and shoal water and foul ground extend

from its southeastern and eastern extremities for respective distances of 200 and 300 yards. Near the outer end of this latter projection is Hitotsu Se, which dries 9 feet. Honajiro Hana, its northern extremity, has pine trees on its summit and is conspicuous from westward.

Islets and dangers in the northern approach to Hibi Suido.—Muku Shima, the various points of which terminate in steep cliffs, lies about $1\frac{1}{2}$ miles northeastward of Ao Hana, the northern extremity of Taka Shima. Its summit, at the southern end, is 230 feet high and is surmounted by a clump of pine trees. The northern part of the island is flat, and near its middle is a large and conspicuous pine tree. A shoal, on which there are two rocks that dry 5 feet, extends northward from the island for about 400 yards, and foul ground extends southward from it for about $\frac{1}{2}$ mile. The southernmost dangers on this foul area are Kajima Sone, with a depth of less than 6 feet, and a 3-fathom rocky patch about 200 yards to the eastward of it.

Aka Se, 31 feet high, is a reddish-brown islet that lies about 900 yards southeastward of Kajima Sone. About 200 yards northeastward of Aka Se is a detached 1-fathom rock.

Ki Se, 1 foot high, lies about $\frac{1}{2}$ mile northeastward of Aka Se and $\frac{3}{4}$ mile southwestward of O Saki, in a position 800 yards off the mainland; it is usually marked by breakers, and from it a rocky ledge extends southeastward for a short distance.

The tidal currents in the vicinity of Muku Shima are irregular, but they do not exceed a rate of 1 knot and turn about 3 hours after the times of high and low water.

Hibi Suido leads between the northeastern side of Taka Shima and the mainland, and is somewhat narrow and intricate, as reefs, which dry to a short distance offshore, project from the various salient points. Because of the dangers between Muku Shima and the mainland, vessels using this channel should approach Hibi Suido through the passage between Muku Shima and Taka Shima, where the fairway has a least width of about 1,400 yards between Kita Sone and Kajima Sone. Although the depths in this channel are sufficient to accommodate vessels of any draft it should not be attempted without local knowledge, as the fairway is tortuous and encumbered with many dangers.

Kondomari Hana, a point about 1 mile southwestward of O Saki, has a rocky spit extending about $\frac{1}{4}$ mile southwestward from it. Mo Se, a rock awash, lies on this spit.

Daziku (Dajiku) Ura, entered southward of Kondomari Hana, is a cove that indents the mainland at the northern end of Hibi Suido. Anchorage, sheltered from all winds except those from northwestward, can be had in Daziku Ura in depths of $5\frac{1}{2}$ to 10 fathoms, mud.

Koura Saki ($33^{\circ}27' N.$, $129^{\circ}46' E.$, *Plan on H. O. Chart 2329*) lies about $\frac{1}{2}$ mile south-southeastward of Ugeiwa Hana on the western side

of the northern end of Hibi Suido. About 600 yards northward of the point and 350 yards offshore is Uchi Sone, a detached steep-to rock with a depth of $3\frac{3}{4}$ fathoms. Towatashi Se, with a least depth of $2\frac{3}{4}$ fathoms, lies in the fairway in a position almost 700 yards southeastward of Koura Saki.

From Koura Saki the coast curves south-southwestward for almost $\frac{1}{2}$ mile to Waraiba (Sarashiba) Hana. About 250 yards southeastward of this point is Wan Se, a detached rock with a depth of less than 1 fathom.

From Boshino Hana, about $\frac{1}{2}$ mile southeastward of Waraiba Hana, a shoal spit extends northward for about 700 yards, and at its extremity lies Tsutsura (Tsuzura) Se, with a depth of $1\frac{1}{4}$ fathoms.

From a position about 600 yards southeastward of Boshino Hana **submarine cables**, indicated on the chart, are laid in a northeasterly direction across the strait to Daiga Saki.

Daiga Saki is fringed with shoal water to a distance of about 150 yards, and a detached $4\frac{3}{4}$ -fathom patch lies about 400 yards northwestward of the point.

Hiagari Hana, on the western side of the southern end of Hibi Suido, lies about 1 mile southeastward of Boshino Hana, and from it a reef extends eastward for about 300 yards. Two rocks that dry 7 feet, named Hiagari Sho, lie near the outer end of this reef. A spit, with a depth of 4 fathoms at its extremity, projects from the northern side of Hiagari Hana to a position about 650 yards northward of the point.

A number of dangers exist in the southern entrance to Hibi Suido and its approaches. Miyazaki Dashi, with a least depth of 3 fathoms, rock, lies about $\frac{1}{4}$ mile east-southeastward of Hiagari Hana. About 700 yards east-northeastward of Miyazaki Dashi is Ushi Shima, and between them lies Ugai Dashi, with a depth of $2\frac{3}{4}$ fathoms. Shoal water extends southeastward and west-northwestward from Ushi Shima for distances of 400 and 600 yards, respectively. Two rocks that dry 2 feet, named Gasai Se, lie on this western shoal.

Imari Gaiwan, the outer and larger part of Imari Wan, is enclosed on the westward by Ao Shima and the Hoshika Peninsula, on the southward by a stretch of the mainland, on the eastward by Fuku Shima (described hereinafter), and on the northward by the southern coast of Taka Shima. Numerous islets occupy the middle of the eastern half of the bay, and there are scattered shoals in the southern portion of the western half, but to the northward of these shoals is a broad unobstructed area, suitable as an anchorage for large vessels.

Western and southern sides of Imari Gaiwan.—Takezaki Hana ($33^{\circ}23' N.$, $129^{\circ}41' E.$, *H. O. Chart 2329*) the eastern ex-

tr extremity of the Hoshika Peninsula, lies about 1 mile southeastward of Tsu Saki. This point is surmounted by Shiro (Jo) Yama, a 484-foot hill, thickly covered with pine trees, which appears black from a distance and is very conspicuous.

Hoshika Ura, a small cove on the southwestern side of Takezaki Hana, is entered through a narrow channel that leads between the mainland and a chain of reefs which extends southward for about $\frac{1}{2}$ mile from the eastern entrance point of the cove. Near the outer end of these reefs is Fuku Se, which dries 4 feet.

From Hoshika Ura the coast trends for about 1 mile southward to Kompira Hana, the northern entrance point of Mikurya Ura. The southern shore of this cove is foul to a short distance, and in 1937 a basin was under construction. The water in this cove is deep, and it is sheltered from all winds except those from the westward.

Hitotsu Se, with a least depth of $4\frac{1}{2}$ fathoms, rock, lies about 800 yards eastward of Kompira Hana; it is comparatively steep-to.

Hachikan Saki is a salient headland that lies about 1 mile southeastward of Kompira Hana, and from its extremity a reef, with depths of less than 5 fathoms, projects northwestward for about 800 yards. Coves indent the coast on either side of Hachikan Saki, and Kuroshio Ura, the one to the eastward, affords shelter to small craft with local knowledge.

About 1 mile to the southeastward of Hachikan Saki lies the mouth of the Shisa Kawa, and between them the coast is fronted by a shoal flat to a distance of $\frac{1}{4}$ mile. A number of islets with red cliffs stand on this flat. The town of Shisa, connected to the general telegraph system, stands at the mouth of the river, and in 1935 it had a population of about 3,500.

Okino Sone, with a least depth of $1\frac{3}{4}$ fathoms, rock, lies at the northern extremity of a shoal that extends for a little over 1 mile north-northwestward from Kashiwa Saki, a point about $\frac{1}{2}$ mile northeastward of the mouth of the Shisa Kawa. Binga Se, on the eastern side of this shoal, dries 4 feet. About $\frac{1}{2}$ mile north-northeastward of Okino Sone is Gaze Dashi, a 5-fathom rock, and 750 yards northwestward of this same point is a detached $4\frac{1}{2}$ -fathom shoal.

Furo Zan (Yama), 952 feet high, rises about 2 miles southeastward of Kashiwa Saki. On the summit of this hill stands a solitary pine, and on its northern slope is a clump of pine trees, the whole forming a good mark.

About $\frac{3}{4}$ mile east-northeastward of Kashiwa Saki stands the village of Yeguchi, and the same distance farther in the same direction is another village, Mayebama. The coast in their vicinity is fronted by a shoal flat, which extends offshore to a maximum distance of 1,200 yards. Ko Shima, 51 feet high, and somewhat conspicuous,

lies close inshore between the two villages; some clumps of pines grow on it. About 1,100 yards northwestward of this islet is Kuroshima Dashi, with a depth of $4\frac{1}{4}$ fathoms.

Imafuku Ura is entered between Yattoo Hana, about 1 mile northeastward of Ko Shima, and No Saki, about $1\frac{1}{2}$ farther east-northeastward. From about 15 fathoms in the entrance the depths shoal gradually toward the head. A detached rocky 5-fathom patch, named Gakuno Se, lies about $\frac{1}{4}$ mile offshore and $\frac{1}{2}$ mile east-northeastward of Yattoo Hana. Imafuku Ko is a fishing harbor, undergoing improvement (1937), situated in the southwestern part of this bay. **Local storm signals** are shown at the village, which had a population of about 4,000 in 1935. Secure anchorage can be had in Imafuku Ura, in depths of 9 to 14 fathoms, mud bottom, good holding ground.

Kanai Hana, on the western side of the main entrance of Imari Ko, lies about 1,300 yards eastward of No Saki, and between them is a coal mine marked by a small chimney that continually emits smoke. From Kanai Hana the ground rises steeply to Taira Yama, 572 feet high, a flat-topped hill surmounted by a clump of pine trees. From a distance this clump of pines has the appearance of a single large tree and is conspicuous, especially from Tsusaki Suido.

Southern side of Taka Shima.—Funatozu, on the southern side of Taka Shima and close to the western end of the island, has a basin. From Funatozu the coast trends southeastward for about $\frac{5}{8}$ mile to Inu Saki, the southern extremity of Taka Shima. Inu Saki, a rocky point of reddish color, has a small red rock, 10 feet high, close off its extremity, and 200 yards farther southward is a $2\frac{1}{2}$ -fathom rock, steep-to on its outer side. The depths in the vicinity of Inu Saki are generally irregular.

From Inu Saki the coast trends for about 3 miles east-northeastward to Uno Hana. This stretch is very irregular and foul with underwater rocks. About midway a headland, Oteishi Hana, projects from this coast, and three inlets, Urashima Ura, Tonono Ura, and Kurozu Ura, indent its shoreline. These inlets are available only to small craft with local knowledge because of the dangers that encumber their approaches.

Uno Hana, from which a reef extends about 300 yards southward, lies about 700 yards south-southwestward of Hiagari Hana, the western entrance point at the southern end of Hibi Suido.

Fuku Shima, roughly triangular in shape, separates the outer and inner bays of Imari Wan, its base, about 4 miles long, forming the eastern side of Imari Gaiwan and the eastern side of the main entrance channel of Imari Ko. Its summit, 587 feet high, rises nearly in the middle of the island.

Hatsu Saki ($33^{\circ}25' N.$, $129^{\circ}48' E.$, *H. O. Chart 2329*), the northwestern extremity of Fuku Shima, lies about 1,300 yards south-south-

eastward of Uno Hana, and the channel between these two points forms the southern approach to Hibi Suido and the western approach to the passage separating the northeastern side of Fuku Shima from the mainland. Hatsu Saki is thickly covered with pine trees, which circumstance renders it somewhat conspicuous.

From Hatsu Saki the west coast of Fuku Shima trends first south-eastward and then southward for almost 3 miles to the main entrance of Imari Ko. With a few exceptions this stretch has no outlying dangers. Hiagari Se No Gottu, with a depth of $1\frac{1}{4}$ fathoms, lies about 650 yards offshore, almost $1\frac{1}{2}$ miles southward of Hatsu Saki, and midway between this rock and the shore is another with the same depth.

The northeastern and southeastern sides of the island are described later with Imari Naiwan.

Islands and dangers in the eastern part of Imari Gaiwan.—Futa Shima, almost $1\frac{1}{4}$ miles southward of Oteishi Hana, consists of two islets of nearly equal size, joined by a drying ridge of sand and gravel. The western islet is 133 feet high, and both are thickly wooded with pines. About 400 yards northwestward of the eastern islet is Aka Se, 4 feet high, which is joined to this islet by a number of drying rocks.

Otobi Shima, the largest of these islets, is located about 1 mile eastward of Futa Shima and almost $1\frac{1}{4}$ miles southwestward of Hatsu Saki, with its longer axis lying in a northwest-southeast direction. This islet rises to two hills, on the lower and northwestern of which stands a large pine tree. The higher southeastern hill attains an elevation of 265 feet. There are dwellings on the southwestern side of the islet, between which and Kotobi Shima a small bay, open northwestward, is formed.

Kotobi Shima, the southernmost islet of the group, lies close southward of Otobi Shima, and the channel between them is shoal. Between Kotobi Shima and Futa Shima lies Kasa Se, with a rock, 7 feet high, near its southeastern extremity.

Yama Shima, 55 feet high, lies about 650 yards north-northwestward of the northwestern extremity of Otobi Shima and is the northernmost islet of the group. There is a sparse growth of pines on Yama Shima, and reefs extend for about 250 yards northward and 300 yards southeastward from it.

The passage between the islets and dangers just described and the western side of the northern end of Fuku Shima is more than 1 mile wide, but the width between the 10-fathom curves is reduced to just over $\frac{1}{4}$ mile by dangers on either side. Takaiwa Se, with a depth of $5\frac{1}{4}$ fathoms, lies about 600 yards eastward of the eastern extremity of Otobi Shima. Hiagari Se No Gottu has been described with the

western side of Fuku Shima. The depths in this general vicinity are uneven, with two 8-fathom rocky patches lying almost in mid-channel.

Tides and tidal currents.—The mean high water interval at Mikuriya Ura, on the western side of Imari Gaiwan, is 9h.04m, the mean range is 4.9 feet, and the spring range is 7.7 feet.

The tidal currents in Imari Gaiwan do not exceed a rate of $\frac{1}{2}$ knot.

Anchorage, in depths of 11 to 20 fathoms, mostly mud bottom, can be obtained by a large number of vessels in Imari Gaiwan.

Imari Naiwan, the inner part of Imari Wan, includes the water area on the eastern side of Fuku Shima with the channels that lead to it, and Imari Ko, to the southward of that island, with its entrance channel, which leads between the southern part of the western side of Fuku Shima and the mainland to the southward of Kanai Hana.

Channel on the eastern side of Fuku Shima.—Fuku Shima is separated from the mainland to the eastward by a tortuous and danger-encumbered channel, which is much constricted near its northwestern and southwestern entrances. These narrows are known respectively as Kojibo Seto and Tatsuno Seto.

Naka Sone, a detached steep-to 3-fathom patch, lies about 1,100 yards east-northeastward of Hatsu Saki and nearly in the middle of the northern entrance of the channel. Shoals and exposed rocks project for about 600 yards from the shore to the northeastward of this rocky patch. Takakushi Ko is a fishing harbor that indents the coast of the mainland to the eastward of Naka Sone. **Local storm signals** (see page 29) are exhibited here, and harbor works are (1937) in progress.

Kojibo Seto is deep in mid-channel, but the fairway is very narrow. These narrows open out into a wide expanse, which is much encumbered with islets and reefs, the positions of which can best be seen on the chart.

The fairway through Tatsuno Seto is extremely narrow and is fringed on either side with rocky ledges; it is navigable by boats only.

Imari Ko, to the southward of Fuku Shima, is entered through a channel about $1\frac{1}{2}$ miles long and not less than 800 yards wide between the 10-fathom curves. No dangers exist in the fairway, but a depth of 9 fathoms, rock, is charted almost $\frac{3}{4}$ mile southeastward of Kanai Hana.

The northwestern limit of Imari Ko is defined by a line extended in a southwesterly direction from Shiraiwa Hana, the southern extremity of Fuku Shima, to the village of Uranosaki on the mainland. Shiraiwa Hana is precipitous and steep-to.

Ishikura Yama, 1,023 feet high, rises about $2\frac{1}{4}$ miles southward of Kanai Hana, and furnishes a useful mark to vessels entering by way of Aoshima Suido.

Shoal water extends from the western side of the harbor for as much as $\frac{1}{4}$ mile in places, and on the eastern side are a number of islets and rocks, the positions of which can best be seen on the chart. A shoal flat occupies the head of the harbor as far northward as Ko Shima, an 85-foot islet that lies about $1\frac{1}{2}$ miles southward of Shiraiwa Hana, but inside the limits imposed by these dangers is an unobstructed area, with a radius of approximately $\frac{3}{4}$ mile, in which the depths are more than 5 fathoms.

U Se, close eastward of Ko Shima, has a depth of less than 6 feet, and about 1 mile eastward of Ko Shima lies Kugi Shima, a conspicuous islet with a pointed summit.

Kusuku is a town at the head of the harbor on the western side, about $1\frac{3}{4}$ miles southward of Ko Shima. **Local storm signals** (see page 29) are displayed at the town.

Anchorage, in depths of 5 to 10 fathoms, mud, can be obtained in the unobstructed area of Imari Ko by vessels of almost any size.

Directions.—To enter Imari Wan from the westward approach Tsusaki Suido with Takezaki Hana in range 151° with the pine trees on the summit of Furo Zan. This range will lead northeastward of Chozu Se and about 350 yards southwestward of Matsu Shima. When Ha Shima is opened southeastward of Matsu Shima and bears about 70° steer for the conspicuous pine tree on the summit of Taira Yama on a bearing of 111° . When the northern extremity of Futa Shima comes in range 60° with Hatsu Saki alter the course to 94° and proceed until Shiraiwa Hana is opened northeastward of Kanai Hana and bears more than 140° . Then alter course gradually to 177° , passing through the entrance of Imari Ko in mid-channel, and when Maki-shima, about $\frac{3}{4}$ mile southward of Kugi Shima, bears 147° steer for it on that bearing until the desired anchorage is reached.

It is recommended that vessels approaching Imari Wan from the northward enter by way of Aoshima Suido. Pass more than 600 yards westward of Kuro Shima and gradually alter course to the eastward until the western extremity of Kuro Shima is brought in range 15° astern with Banshotsuji (see page 590). Maintain this range astern, passing through Aoshima Suido in mid-channel, until the northern extremity of Futa Shima is open southward of Inu Saki and bears less than 116° . Thence alter course to bring Ishikura Yama ahead on a bearing of 142° and steer thus until the northern extremity of Futa Shima comes in range 60° with Hatsu Saki. Thence follow the directions given for vessels entering by Tsusaki Suido.

Imari ($33^{\circ}17' N.$, $129^{\circ}53' E.$, *H. O. Chart 2329*) is situated near the mouth of the Imari Kawa and had a population of about 8,800 in 1935. A representative of the Nagasaki customhouse is stationed here.

The town of Imari can be reached by nothing but boats, but at Uranosaki a pier projects about 100 yards into the harbor. Two mooring buoys lie off the head of this pier, which is equipped with a coal conveyor and is capable of accommodating vessels of 1,000 tons deadweight. There is a boat basin at Kusuku, and a fishing harbor is under construction at Kugi Shima.

Coal and water can be supplied at the pier at Uranosaki, and there is a water boat of small capacity for the accommodation of vessels at anchor.

O SAKI TO HADO SAKI.—O Saki ($33^{\circ}29' N.$, $129^{\circ}48' E.$, *H. O. Chart 2329*) rises steeply to a grassy hill, 285 feet high. A reef extends for about $\frac{1}{4}$ miles northwestward from the point, and at its extremity lies Osakino Se, a $2\frac{1}{4}$ -fathom rocky patch, which is steep-to on its seaward side.

Kariya Ko is entered between Miya Saki, about 1 mile southeastward of O Saki, and Takaiwa Hana, 700 yards farther in the same direction. About 100 yards westward of Takaiwa Hana is Kuchino Kami Iwa, 20 feet high. A conspicuous pine tree stands on the point, and close eastward of it rise three wooded hills. The fairway in the entrance has a least width of 350 yards between the 5-fathom curves, and the depths are sufficiently great to accommodate vessels of any draft. Immediately within the entrance the fairway widens to a least width of 600 yards for a distance of about $\frac{1}{2}$ mile, where it opens into the bay proper. Kariya Ko is practically free of hidden dangers and the shores can be approached to a distance of 200 yards in most places; the depths are moderate, with a bottom which is mostly soft mud. There are two groups of islets, one in the northeastern and the other in the southern part of the bay. Takenoko Shima is the northwesternmost in this latter group. The fishing village of Kariya, with a population of about 800 (1935), is situated on the northeastern shore of the bay.

Anchorage.—Kariya Ko affords almost landlocked anchorage in depths of 5 to 12 fathoms, soft mud. A good position for small vessels with local knowledge is in a depth of 8 fathoms between Takenoko Shima and the village of Shozu, on the mainland to the westward, or off Kariya, in a depth of 7 or 8 fathoms.

Tides.—The mean high water interval at Kariya Ko is 9h. 22m., the mean range is 4.1 feet, and the spring range is 6.1 feet.

Directions.—To approach Kariya Ko from the westward pass northward of Muku Shima, on an easterly course, giving that island a berth of more than 800 yards. When the entrance to the inlet is well opened steer for the solitary pine on Takaiwa Hana on a course of 153° . Pass through the entrance in mid-channel, giving Kuchino Kami Iwa a berth of at least 150 yards, and proceed to the desired anchorage.

From the northward pass $\frac{3}{4}$ mile westward of Chika Saki, a point about $2\frac{1}{2}$ miles northward of Takaiwa Hana, and steer for the solitary pine on the latter point on a course of about 160° . On nearing the entrance follow the directions given for vessels approaching from the westward.

Coast.—Chika Saki ($33^{\circ}31' N.$, $129^{\circ}50' E.$, *H. O. Chart 2309*), the southwestern entrance point of Hokawazu Ura, is a low, flat, rocky headland, greenish in color, which is very conspicuous from a distance. Between Takaiwa Hana and Chika Saki some rocky islets lie close to the shore.

Hokawazu Ura is a long narrow inlet, which is separated from Kushino Ura, to the northeastward, by a peninsula terminating in Kushi Saki. It is free of dangers and affords sheltered anchorage to small vessels with local knowledge. The village of Hokawazu is situated on its southwestern side, at a position almost 1 mile within the entrance.

Kushi Saki is a low flat point, from which a reef extends northwestward for about 1,100 yards. At the extremity of this reef is Tojin Se, with a least depth of $1\frac{1}{4}$ fathoms.

The coast between Kushi Saki and Kuro Se, about $\frac{7}{8}$ mile northward, recedes eastward, and near the southern part of this stretch it is still farther indented by Kushino Ura, a narrow inlet, available to small craft with local knowledge and sheltered from all winds except those from northwestward.

Nada Saki, about 1 mile northward of Kushi Saki, is a rocky point, with a cove on its southern side. Both entrance points of this cove are foul, and joined to the southern by a drying shoal is Kuro Se, 12 feet high.

Hado Saki, surmounted by three pine trees, is a low rocky peninsula that lies about $\frac{3}{4}$ mile northward of Nada Saki. When first seen from the westward or southwestward it appears to be a low islet. The peninsula is fringed with reefs on all sides and should not be approached to within $\frac{1}{2}$ mile. Kami Se, which dries 6 feet, lies close off its northern extremity, and Goto Se, 7 feet high, lies off the northwestern extremity, to which it is joined at low water. On the southern side of Hado Saki is a bight, foul with underwater obstructions, in which there is a boat basin. **Local storm signals** (see page 29) are shown near the western extremity of Hado Saki.

During westerly winds heavy seas run in the vicinity of Hado Saki, particularly with ebb tidal current. When these two conditions exist concurrently heavy seas and broken water extend from the vicinity of Kami Se toward the southern end of Kakara Shima, to the northward.

IKI SUIDO (*H. O. Chart 2475*).—This channel leads between the western part of the northern coast of Kyushu and Iki Shima. It is about 11 miles wide between Hado Saki and Iruka Hana, the southern extremity of Iki Shima, and in it lie a number of islets and shoals with deep navigable channels between them.

Caution.—In navigating Iki Suido at night care must be taken to avoid fishing vessels, which may be encountered in groups, and the numerous fishing nets that are laid near the fairway. **Submarine cables**, indicated on the chart, are laid in and across Iki Suido.

Current.—In Iki Suido there is a general southwesterly set counter to the northeasterly trend of the Kuroshio through Tsushima Kaikyo. A rate of as much as $1\frac{1}{2}$ knots has been experienced during November.

Futagami Shima lies in the middle of the western approach to Iki Suido, about $5\frac{3}{4}$ miles northward of the northern extremity of Azuchi Oshima. The island is saddle-shaped, attains an elevation of 321 feet, and has no off-lying dangers at a distance greater than 200 yards offshore.

Kofutagami Shima, a small steep-to islet, lies about $1\frac{3}{4}$ miles west-northwestward of Futagami Shima, and about $1\frac{1}{2}$ miles northwestward of this latter islet lies Karato Sho, steep-to and 11 feet high.

Futagami Shima Light ($33^{\circ}36' N.$, $129^{\circ}33' E.$, *H. O. Chart 2475*) is shown from a white octagonal concrete tower, 46 feet high, located near the southwestern extremity of the island. (See Light List.)

Madara Shima ($33^{\circ}34' N.$, $129^{\circ}45' E.$, *H. O. Chart 2329*), on the southern side of the main fairway through Iki Suido, lies with Ozaki Hana, its western extremity, about $9\frac{1}{2}$ miles east-southeastward of Futagami Shima. The eastern part of the island rises to a rounded flat-topped hill, but in the western part is a row of sharp peaks, dominated by Banshotsuji (Banshono Tsuju), 776 feet high. To the northwestward of Banshotsuji and connected to it by a ridge is O Yama, a wooded peak that rises abruptly from the cliffy northwestern extremity of the island. Both of these peaks are conspicuous from a distance, and the unusual shape of the island makes it easily identifiable in clear weather.

The coasts of the island, with the exception of the southwestern side, are in general steep-to. O Se, 41 feet high, is a pointed steep-to rock that lies about 300 yards northwestward of Ozaki Hana, and Bungoro Se, with a depth of $4\frac{1}{4}$ fathoms, rock, lies about $\frac{1}{4}$ mile offshore in a position $\frac{3}{8}$ mile south-southeastward of Ozaki Hana. From about the middle of the southwestern coast a reef, known as Hira Se, projects for about 300 yards, and at its extremity is a rock, 18 feet high. About 250 yards southward of this rock is Ikadzuchi (Kaminari) Se, which dries 3 feet, and about $\frac{1}{2}$ mile southwestward of Hira Se is Ishizaki Sone, with a least depth of 7 fathoms.

A short distance northeastward of the southern extremity of the island is Madara Ura, a small cove with a village at its head. A gravel shoal, which dries 9 feet, lies close off its northern entrance point. The cove is protected from all winds except those from southeastward, and near its head is a basin used by small craft with local knowledge.

Southern side of Iki Suido.—Matsu Shima lies about 3 miles eastward of Madara Shima and $1\frac{3}{4}$ miles northward of Hado Saki. The southwestern side of the island is foul to a distance of 300 yards, and in this foul area are several exposed rocks, the largest of which are Taka Se and Komatsu Shima.

Between Matsu Shima and Kakara Shima, to the northeastward, is a navigable channel with a least depth of 7 fathoms in the fairway. Kaki Se, 3 feet high, lies about 300 yards off the eastern side of Matsu Shima, near the edge of a coastal flat on which the depths are less than 6 fathoms. Open anchorage can be obtained off this side of the island.

Kakara Shima is a steep-to irregularly shaped island that rises to a height of 401 feet. Kuro Se, 24 feet high, is a flat rock that lies about 300 yards off the island, eastward of the high ground near its southern extremity. Futame Se, which dries 9 feet, lies about $\frac{1}{4}$ mile southward of Kuro Se.

Ogawa Shima lies about $1\frac{1}{4}$ miles eastward of Kakara Shima, from which it is separated by a comparatively deep channel. At the southern end of this island are two conspicuous hills, the eastern of which is thickly covered with pines and 250 feet high and the western of which is surmounted by a hut. The land slopes downward toward the northern end of the island and consists of flat hillocks. Onna (Me) Se, 20 feet high, lies close westward of the southwestern extremity of the island, and in its vicinity are several drying rocks. A detached $3\frac{3}{4}$ -fathom rocky patch lies about 350 yards southward of the southeastern extremity of the island.

About 1 mile south-southeastward of the southeastern extremity of Ogawa Shima is Amashiri Se, with a least depth of $3\frac{3}{4}$ fathoms. Between Amashiri Se and the point, from south to north, are Hira Se, with a 21-foot stone wall enclosure, Yakata Se, 23 feet high and black, and Ore (Ori) Se, which dries 3 feet. Maru Sone, a $5\frac{1}{2}$ -fathom shoal, lies about 800 yards westward of Ore Se, and midway between it and the southeastern extremity of Ogawa Shima is a shoal with a least depth of $3\frac{3}{4}$ fathoms. The summit of Hime Shima (see page 602) in range 90° with Kaya Yama (see page 606) leads about $\frac{1}{4}$ mile southward of these dangers.

Northern side of Iki Suido.—The western part of the northern side of Iki Suido is formed by the southern coast of Iki Shima.

Na Shima ($33^{\circ}44' N.$, $129^{\circ}52' E.$, *H. O. Chart 2337*) is a group of islets lying on a rocky shoal about 7 miles northward of Kakara

Hana and about 3 miles off the southeastern coast of Iki Shima. From southwest to northeast the three largest are Megame (Mae) Shima, flat-topped and 57 feet high, Maye (Moto) Shima, 53 feet high, and Kujira Shima, 44 feet high. A channel, not less than $1\frac{1}{4}$ miles wide between the 10-fathom curves, leads between Na Shima and Iki Baku Se, a small detached rocky patch with a depth of $1\frac{3}{4}$ fathoms, lies about $1\frac{1}{2}$ miles south-southeastward of Megame Shima.

Izumi Iwa are two flat rocks, each 14 feet high. Shimo Izumi Iwa, the western, lies about $2\frac{1}{4}$ miles eastward of Megame Shima, and Kami Izumi Iwa lies about 1,300 yards farther in the same direction.

Game Se, with a depth of $2\frac{1}{4}$ fathoms, rock, lies about $\frac{3}{4}$ mile northward of Shimo Izumi Iwa.

Gabu Se, with a depth of less than 6 feet, lies at the southeastern end of a small shoal almost 1 mile south-southeastward of Shimo Izumi Iwa; it is usually marked by breakers.

Yeboshi (Eboshi) Shima, in the middle of the eastern approach to Iki Suido, lies about 4 miles southeastward of Kami Izumi Iwa and is steep-to on all sides. From the northwestward and northward it appears to be rugged, and from the eastward it presents a pointed summit.

Yeboshi Shima Light is shown from a white octagonal framework tower, 56 feet high, standing on the summit of the island. (See Light List.)

IKI SHIMA (*H. O. Chart 2337*), on the western side of the Genkai Nada, lies with Iruka Hana, its southern extremity, about $7\frac{1}{2}$ miles northward of Madara Shima. The surface of the island is mainly tableland, consisting for the most part of sand, rock, stone or lava. Takeno Tsugi, the highest hill on the island, rises to an elevation of 695 feet about $2\frac{1}{4}$ miles northward of Iruka Hana; a tile-roofed building stands on this hill. Tsunokami Yama, surmounted by a dense growth of pine trees, is located in the western part of Iki Shima, and O (On) Take rises near its northeastern extremity. Each of these hills is conspicuous. A large number of islands and dangers fringe the much indented coast of Iki Shima. In 1930 the island had a population of about 40,700, engaged principally in agriculture and fishing.

Southeastern side of Iki Shima.—Iruka Hana ($33^{\circ}42' N.$, $129^{\circ}43' E.$, *H. O. Chart 2337*) is a low flat headland, which is easily identified. Haze Ura, a cove frequented by fishermen, is entered eastward of the point, and off its entrance, about 700 yards northeastward of Iruka Hana, is Miyama Sone, with a depth of $1\frac{3}{4}$ fathoms.

From Iruka Hana the southeastern coast of Iki Shima trends northeastward for about $5\frac{1}{2}$ miles to Gongen Hana, the southern entrance point of Yawata Ura, and is fringed with islets and reefs to a distance of 1,600 yards in places.

Kagamidake Hana, about $\frac{1}{2}$ mile northeastward of Iruka Hana, is a precipitous headland that rises steeply from the shore to a pointed summit, densely wooded and conspicuous.

Indoji Ura, entered almost 3 miles northeastward of Iruka Hana, is a small harbor, suitable only for small craft with local knowledge. It is afforded some protection by Ko Shima, a small islet that lies in the middle of the entrance, and Tsuma Shima, a larger islet that lies close off the entrance. **Local storm signals** (see page 29) are shown at the village that stands at the head of the inlet. **Submarine cables**, indicated on the chart, are landed a short distance eastward of Indoji Ura.

Yawata Ura, entered between Gongen Hana and Chojabaru Saki, 1 mile northward, is a shallow inlet that indents the eastern side of Iki Shima for almost 2 miles. Foul ground extends for about 1 mile off Gongen Hana and terminates east-northeastward in Kanashiro Iwa, a rocky 38-foot islet, which is whitened with guano. A reef extends for almost $\frac{1}{2}$ mile southeastward from Chojabaru Saki, and within the entrance and almost in the middle of the harbor lie two islets, Ao Shima and Aka Shima. The inlet is further obstructed by reefs that lie northeastward and southeastward of Aka Shima, and these dangers together with the shoal depths limit its use to small vessels with local knowledge.

Northeastern side of Iki Shima.—Sakyo Hana lies about $\frac{1}{2}$ mile northward of Chojabaru Saki, and from it the coast trends northwestward for about 2 miles to the southern entrance point of Ashibe Ura. About midway along this stretch a shoal spit projects for about 700 yards.

Ashibe Ura is a small inlet, which is exposed to the eastward. Detached rocky patches lie within 400 yards of either entrance point, and close within the entrance the depths shoal to less than 3 fathoms. Small craft with local knowledge can, however, find shelter in the basins which have been constructed at Ashibeura and Setoura, located, respectively, on the southern and northern shores of the inlet. **Local storm signals** (see page 29) are displayed at Ashibeura.

Uwotsuri Saki, about 2 miles northward of the northern entrance point of Ashibe Ura, is the southeastern extreme of the promontory that forms the northeastern extremity of Iki Shima. Naka Sone, with a depth of $1\frac{3}{4}$ fathoms, lies about $\frac{1}{2}$ mile eastward of this point, and about 700 yards farther east-southeastward is Oki Sone, with a depth of $2\frac{3}{4}$ fathoms. Gongen Hana, in range 182° with Sakyo

Hana, leads more than $\frac{1}{2}$ mile eastward of Oki Sone. Akase Hana is the northwesternmost point of this promontory.

Kazamoto Ura is a harbor that is formed at the northwestern end of Iki Shima by a chain of islets that extends obliquely west-northwestward from the northern side of the island. The outer harbor, in which the depths range from $3\frac{1}{2}$ to 10 fathoms, affords only limited protection, but small vessels with local knowledge can obtain shelter in the inner harbor, a cove indenting the southern side of Kazamoto Ura near its inner end. A breakwater projects from either entrance point of this inner harbor, and a basin has been constructed within.

The islets that form the northern side of the harbor are named, from east to west, Nagarasu Shima, joined to the mainland by shoals, Nyaku Shima, which has a wooded summit, and Tatsu Shima, composed of three islets that are joined at low water. Between Nagarasu Shima and Nyaku Shima is Naka Seto, a narrow channel available only to small craft with local knowledge.

The shores of the harbor are fringed with shoals, and particularly dangerous is a rock, with a depth of less than 1 foot, which lies at the outer end of a reef that projects about 400 yards southward from the southern extremity of Tatsu Shima. **Submarine cables**, shown on the chart, cross the entrance to the harbor.

The town of Kazamoto, with a population of about 6,500 (1935), stretches around the shores of the inner harbor. **Local storm signals** (see page 29) are shown here.

Nyaku Shima Light ($33^{\circ}52' N.$, $129^{\circ}41' E.$, *H. O. Chart 2337*) is shown from a white octagonal stone tower, 30 feet high, standing near the northern extremity of the island. (See Light List.)

The tidal currents off Nyaku Shima set eastward with the flood and westward with the ebb, attaining velocities of $2\frac{1}{2}$ and $3\frac{1}{4}$ knots, respectively, at springs.

Caution.—During the summer large groups of fishing vessels may be encountered at distances up to 6 miles from Nyaku Shima Light.

Northwestern side of Iki Shima.—Tenaga Shima lies about $\frac{1}{2}$ mile off the northwestern side of Iki Shima, in a position about 2 miles south-southwestward of Tatsu Shima. From it a chain of rocks and islets extends southward to the northwestern extremity of a peninsula projecting northwestward from the main island, forming the western side of the outer part of Yunomoto Ura.

Yunomoto Ura, with the village of Yunomoto at its head, is somewhat encumbered with islets and reefs in its middle part, and its shores are rocky. During northeasterly winds swells sweep round the northwestern end of Iki Shima and enter the inlet. Small vessels with local knowledge, however, find some shelter here. **Local storm signals** (see page 29) are shown at the village.

Hansei Ura, about 3 miles southward of Tenaga Shima, is a narrow inlet that indents the western coast of Iki Shima in an easterly and then southeasterly direction for about 2 miles. Its southern side is formed by the northern coast of the Watara Hanto, a peninsula which separates this inlet from Gonoura Ko. As it is exposed to the northwestward and is encumbered with shoals of less than 5 fathoms, it cannot be recommended as an anchorage. A **submarine cable**, indicated on the chart, is landed in Hansei Ura.

Gonoura Ko and approaches.—This harbor, on the southwestern side of Iki Shima, is formed by the southwestern side of the main island, the southern and eastern sides of the Watara Hanto, and the chain of islands that extends south-southwestward from Eboshi Saki, the southern extremity of that peninsula. Anchorage, with protection from most winds, is afforded in general depths of 10 to 18 fathoms.

Hira Shima, the outermost islet on the western side of the approach to Gonoura Ko, lies about $2\frac{3}{4}$ miles southwestward of Eboshi Saki. Its summit is bare, its sides consist of steep black cliffs, and a reef projects for about 400 yards from its northern side. Tsuru Sone, with a depth of $1\frac{1}{4}$ fathoms, lies about 800 yards southeastward of Hira Shima.

Haru Shima and Naga Shima, both flat and thickly covered with pines, lie about $1\frac{1}{2}$ miles northeastward and $1\frac{1}{4}$ miles northward, respectively, of Hira Shima. Roku Se, between Hira Shima and Haru Shima, is a rocky patch with a depth of 2 fathoms.

Kanajiro Iwa, 33 feet high, is a black rock that lies on a shoal on the western side of the approach to Gonoura Ko, in a position $\frac{3}{4}$ mile southeastward of Haru Shima. Close westward of this rock is Tsukue Shima, two islets lying close together on the same shoal. On the same side of the fairway Sora Sone and Mottaro Se, with respective depths of $3\frac{1}{4}$ and $4\frac{1}{4}$ fathoms, rock, lie $\frac{1}{2}$ mile and $\frac{3}{4}$ mile north-northeastward of Kanajiro Iwa.

O Shima, close northward of Naga Shima, lies off the southwestern side of the Watara Hanto, from which it is separated by Jogashima Seto, with a least width of almost $\frac{1}{2}$ mile. This channel can be used only by small craft with local knowledge.

On the eastern side of the approach to Gonoura Ko is Gono Se, 23 feet high and black, which lies almost 2 miles eastward of Kanajiro Iwa and almost $1\frac{1}{4}$ miles westward of Iruka Hana, the southern extremity of Iki Shima.

Hozo Saki, the eastern entrance point of Gonoura Ko, lies about $1\frac{1}{2}$ miles northwestward of Gono Se; it is thickly covered with pines and is conspicuous. Between these two positions and within $\frac{1}{2}$ mile of the coast O Sone and Sora Se, two rocks awash, lie on the same shoal; they are on the northern side of the approach to a shoal cove.

Gonoura Ko is entered between Eboshi Saki and Hozo Saki, more than 1 mile southeastward. Inside the harbor the area with depths of more than 10 fathoms is somewhat restricted by several dangers. Hira Se, awash at high water, lies about 600 yards eastward of Eboshi Saki, and Shin Sone, with a depth of $5\frac{3}{4}$ fathoms, lies $\frac{1}{2}$ mile east-northeastward of Hira Se and almost in the middle of Gonoura Ko. On the eastern side of the harbor and within $\frac{1}{4}$ mile of the shore are a drying rock, also named Hira Se, Naka Sone, with a depth of $2\frac{1}{2}$ fathoms, and Sakura Sone, with a depth of 5 fathoms. A number of submarine cables are landed at Hozo Saki and one on Eboshi Saki; their routes are indicated on the chart.

The town of Gonoura, at the head of an inlet on the eastern side of the harbor, had a population of about 4,500 in 1935. Local storm signals (see page 29) are shown here.

Anchorage.—Gonoura Ko is open to the southward, but anchorage sheltered from other directions can be obtained. The best position for moderate sized vessels is, in a depth of 12 fathoms, with the northwestern side of Hira Shima in range 228° with the southeastern side of Haru Shima, and the summit of O Shima bearing about 265° . For small vessels the best position is in a depth of 12 fathoms, with Tama Saki, a salient point on the western shore of the harbor, in range 220° with Eboshi Saki and distant about 400 yards.

Directions.—If approaching from the westward pass at least 1 mile southward of Hira Shima and steer to attain a position about $\frac{1}{2}$ mile southward of Kanajiro Iwa. Thence shape a course that will appear to lead midway between Hozo Saki, on the starboard hand, and the wooded summit of Tsunokami Yama, on the port hand, taking care to give ample clearance to Sora Sone. When abeam of Hozo Saki alter course for the anchorage.

From the eastward pass about 1 mile southward of Iruka Hana and steer with the summit of O Shima in range about 308° with the northeastern extremity of Haru Shima. When the wooded summit of Tsunokami Yama comes in range about 20° with Hozo Saki make a gradual turn to starboard and follow the directions given for vessels approaching from the westward.

YOBUKO KO AND APPROACHES (*H. O. Chart 2309*).—To the eastward of Hado Saki the coast of Kyushu curves southeastward, eastward, and then northeastward to form a bight, the greater portion of which is occupied by an island named Kabe Shima. The eastern and western parts of this bight are almost separated by reefs and shoals that extend northwestward from Benten Hana, on the main island, and southeastward from the southeastern extremity of Kabe Shima. Yobuko Ko is the general term applied to the water area between Kabe Shima and the main island of Kyushu, but in its more

specific application it refers to the bay constituting the eastern part of this area.

Two narrow inlets lead off Yobuko Ko, one from the bay to the eastward of Benten Hana and one from the bay to the westward of that point.

The depths in Yobuko Ko are sufficient to accommodate vessels of practically any draft, and with the exception of the area in the vicinity of Benten Seto there are no outlying dangers.

Kabe Shima lies with Tachiishi Saki ($33^\circ 34' N.$, $129^\circ 53' E.$, *H. O. Chart 2309*), its northern extremity, about $1\frac{3}{4}$ miles east-northeastward of Hado Saki. In the vicinity of Tachiishi Saki the coast consists of black lava cliffs and is comparatively steep-to, the 10-fathom curve lying less than 200 yards offshore. Tendo Take, 364 feet high, is the greatest elevation on the island; it rises near the southern end and is surmounted by a large, conspicuous, and solitary pine tree. The southwestern extremity of the island is fringed with shoal water to a distance of about 200 yards.

A measured distance course is charted in the western part of Yobuko Ko. Its course of $309^\circ 23'$ is indicated by the alinement of two beacons and a white post, located on Hado Saki, on a point almost $\frac{1}{2}$ mile southeastward of Hado Saki, and on the eastern shore of Nagoya Ura, in a position $\frac{3}{8}$ mile southward of Benten Hana. It runs roughly parallel with the southwestern shore of the bay and is 6,125 feet long between the two pairs of beacons that indicate its limits.

Nagoya Ura is the inlet that leads off the western bay. It is narrow, about $1\frac{1}{4}$ miles long, and is entered between Benten Hana and the coast of the mainland, about 700 yards southwestward. The town of Nagoya is situated on the western side of the inlet a short distance within the entrance.

Benten Seto is the narrow channel leading between the southern end of Kabe Shima and the mainland to the southeastward. Its navigable width is constricted to just over 100 yards by a reef extending about 400 yards northwestward from Benten Hana and a spit projecting from the southeastern extremity of Kabe Shima. The reef projecting from Benten Hana dries in places, and on it stand two islets known as Futako Shima. Both are thickly covered with pine trees, and the northwestern islet, about 100 yards from the extremity of the reef, attains a height of 59 feet. Shimoikari Se, which dries 2 feet, lies about midway between this islet and the outer end of the reef.

Kamiikari Se, with depths of less than 6 feet, lies on a detached shoal at the eastern entrance of Benten Seto, almost in mid-channel. This danger further complicates the navigation of this somewhat intricate passage, which is recommended only to small vessels with local knowledge.

An overhead cable, with a minimum clearance of about 150 feet, spans Benten Seto between Futako Shima and the southeastern extremity of Kabe Shima. The iron supporting towers are conspicuous.

Eastern approach to Yobuko Ko.—Usu Shima is the northwestern of two islets in the northeastern approach to Yobuko Ko. It lies on a detached shoal in a position almost $\frac{3}{4}$ mile east-southeastward of Tachiishi Saki and nearly south-southwestward of Amashiri Se. The islet is flat, and on it stands a conspicuous round stone wall enclosure, 22 feet high.

Menoha Se and Banyan Se, with respective depths of 3 and $4\frac{1}{4}$ fathoms, rock, lie about 350 and 450 yards southeastward of Usu Shima.

Taka Shima, standing on a detached shoal, at about $\frac{1}{2}$ mile southeastward of Usu Shima, is rocky, densely wooded, and has a steep cliff at its northern end. A **light** is shown from a white octagonal concrete tower, 20 feet high, located at the northern extremity of the island. (See Light List.) Maru Sone, a detached $4\frac{1}{2}$ -fathom rocky patch, lies about 700 yards southeastward of Taka Shima and is sometimes marked by tide rips.

Tomo Saki, about 1,200 yards south-southeastward of Taka Shima, is a precipitous headland, from which shoal water extends northward for about 300 yards. **Submarine cables**, indicated on the chart, are landed in the coves on either side of this point.

Yobuko Ko is entered between Onoshita Hana, about 1,200 yards westward of Tomo Saki, and Miya Saki, the eastern extremity of Kabe Shima. The harbor is about $\frac{3}{8}$ mile wide, and its southeastern shore is indented by a narrow inlet, on the eastern side of which stands the town of Yobuko. **Local storm signals** (see page 29) are shown at Yobuko, and a **line-throwing apparatus** is maintained.

The harbor limits of Yobuko Ko are defined by a line extended from Miya Saki to Tomo Saki and by a line extended from Hado Saki to the northwestern extremity of Kabe Shima.

Anchorage.—Good anchorage can be obtained in the western bay off the entrance to Nagoya Ura. The best position is in a depth of 12 fathoms, mud and sand, with Taka Shima Lighthouse in range 48° with the northwestern extremity of the northwestern Futako Shima islet, and the conspicuous pine on Tendo Take bearing 281° .

In the eastern bay good anchorage is afforded, in depths of 12 to 14 fathoms, sand and mud, with the southeastern Futako Shima islet in range 231° with a hillock to the westward of Nagoya, and the conspicuous pine tree on Tendo Take bearing 280° .

The tidal currents in Yobuko Ko run at a rate of 2 to 3 knots, the east-going current flowing from about 3 hours after low-water to about 3 hours after high water and the west-going current running the balance of the cycle.

Directions.—The approach to the western bay of Yobuko Ko can be made without difficulty, the only danger being the reef extending northward from Hado Saki. This can be cleared by more than 300 yards by steering for the conspicuous pine tree on Tendo Saki on a bearing of 125° . When nearing the anchorage care must be taken to clear the shoal extending from the southwestern extremity of Kabe Shima.

If approaching the eastern bay from the westward round Tachiishi Saki at a distance of 400 yards and pass midway between the northeastern coast of Kabe Shima, on the one hand, and the islets of Usu Shima and Taka Shima, on the other. When the tidal current is flowing westward take care to avoid being set onto Miya Saki.

From the eastward approach the eastern bay by keeping Onoshita Hana in range 251° with the southeastern extremity of Kabe Shima. This range leads about midway between Maru Sone and the shoal projecting from Tomo Saki.

Tidal currents (*H. O. Charts 2329 and 2475*) in the passage between Matsu Shima, Kakara Shima, and Ogawa Shima, on the northward, and Kabe Shima and the Kyushu coast, on the southward, flow for about 6 hours in either direction; the east-going current commences about 3 hours after low water and the west-going about 3 hours after high water.

In its initial stages the axis of the east-going current lies about midway between Hado Saki and Matsu Shima. The greater part then flows between Kabe Shima and Ogawa Shima, with a smaller branch setting northward between Kakara Shima and Ogawa Shima. As the east-going current strengthens, south-going currents flow into it through the channels on either side of Kakara Shima, and it then passes southward of Hira Se and sets northeastward across the approach to Karatsu Wan. A branch of this main current sets hard against the northern extremity of Kabe Shima, is diverted southward around the southern end of that island, passes through Benten Seto and the eastern bay of Yobuko Ko, and rejoins the main current.

The west-going current first flows southwestward, and after setting against the northeastern side of Ogawa Shima it divides into two branches. One flows westward along the northern coast of Ogawa Shima, and the other flows southward along the eastern side of that island, setting against Yakata Se and Hira Se. This branch again divides, the smaller part flowing rapidly between Hira Se and Ogawa Shima, while the main portion turns westward, passing to the southward of Hira Se. A branch of this main stream passes to the eastward of Taka Shima and turning westward impinges on Miya Saki, where it once again divides. One portion sets northwestward along the coast of Kabe Shima, rejoining the main current in the vicinity of Tachiishi Saki, while the other flows through Yobuko Ko and Benten Seto, re-

joining the main current in the vicinity of Hado Saki. During the early stages of the west-going current the set is variable in the channel between Ogawa Shima and Kakara Shima, but as the main current gains strength the set in this channel becomes southerly and joins the main current. Westward of Tachiishi Saki the main stream of the west-going current acquires a southwesterly trend, forming tide rips off Hado Saki.

The maximum velocity of the main divisions of both east-going and west-going currents is 3 knots.

GENKAI NADA (*H. O. Chart 2475*).—This is the name given to the southern part of the sea of Japan lying between Iki Shima on the west, O Shima on the east, and the coast of Kyushu on the south.

Oro Shima ($33^{\circ}52' N.$, $130^{\circ}02' E.$, *H. O. Chart 2475*), almost 11 miles north-northeastward of Yeboshi Shima, lies in about the middle of Genkai Nada. It has two peaks, the southern of which is 357 feet high, and its eastern side is cliffy. Close off the northern extremity of the island are two exposed rocks, but it can be approached to a distance of $\frac{1}{2}$ mile on all sides. A small settlement is situated on the southern side of the island.

Abnormal magnetic variation is reported to exist in a position about 7 miles north-northwestward of Oro Shima.

Okino Shima lies about 22 miles northward of Oro Shima, about midway between Tsushima and the entrance to Shimonoseki Kaikyo. The island is densely wooded, and its summit, 800 feet high, rises somewhat southwestward of its middle part. The northeastern extremity of the island is a sheer cliff, which is very conspicuous, and its coast is for the most part precipitous. There is a settlement on the southern side, where **submarine cables**, indicated on the chart, are landed.

From the southwestern extremity of the island a reef extends for about $\frac{1}{2}$ mile southward, with a $\frac{1}{2}$ -fathom rock near its outer end. About 600 yards southeastward of this rock is Koya Shima, a group of jagged exposed rocks.

Okino Shima Light is shown from a white square concrete tower, 52 feet high, located on the summit of the island. (See Light List.)

Current.—Okino Shima lies within the influence of the Kuroshio, and the prevailing set is northeasterly. At springs, however, a southwesterly current may run for 2 or 3 hours. A southeasterly tidal current, with a rate of $1\frac{1}{2}$ knots, has been reported. Tide rips sometimes occur off the western and northern sides of Okino Shima.

KARATSU WAN (*H. O. Chart 2305*) is a comparatively large bay, capable of providing sheltered anchorage to ocean-going vessels. It is entered between Mese Hana, almost 3 miles east-southeastward

of Tomo Saki, and Hotoke Saki, about 7 miles farther east-northeastward.

Kashiwa Shima and Hime Shima lie in the entrance, dividing it into three channels, only the middle one of which is recommended.

At the head of Karatsu Wan, about midway between its southwestern and northeastern sides, is the promontory of Kushi Saki, which to a certain degree divides the bay into two parts. In the extreme southwestern part is Karatsu Ko, a busy coal port, and at the northeastern end are two coves, Funakoshi Ura and Shinmachi Ura, the former of which affords sheltered anchorage to moderate-sized vessels.

The shores of the bay are in general low and sandy, with occasional rocky points, and are backed by extremely steep hills.

Two rivers, the Matsuura Kawa and the Tamashima Kawa, flow into the western half of the bay on its southern side.

The depths decrease with a fair degree of regularity from 18 fathoms in the main entrance toward the head of the bay, and there are few outlying dangers.

Landmarks.—Uki Take ($33^{\circ}28' N.$, $130^{\circ}06' E.$, *H. O. Chart 2305*) is conspicuous among the mountains at the head of the bay; it rises to a height of 2,638 feet about 3 miles southeastward of Kushi Saki.

Tombo Yama, 1,774 feet high, lies about $1\frac{1}{2}$ miles westward of Uki Take; it is surmounted by a large conspicuous boulder.

Hirefura Yama, flat-topped and 926 feet high, lies about $3\frac{1}{2}$ miles southwestward of Uki Take and about 1 mile from the shore of the bay. A conspicuous solitary pine tree stands on its western shoulder, and at night there are about 100 electric lights along the road that ascends this hill; they can be seen from about 10 miles from seaward.

On the western side of the mouth of the Matsuura Kawa a good mark is afforded by a small densely wooded hillock, 125 feet high, surmounted by the ruins of a castle.

O Shima, nearly in the middle of Karatsu Ko, rises to a height of 638 feet to the tops of the pointed and very conspicuous clump of trees that surmounts its summit.

There is a conspicuous stack at Myoken, on the mainland southwestward of O Shima, and nearby a good mark is afforded by the white concrete quarantine station, two stories high.

Western part of Karatsu Wan.—Between Tomo Saki and Mese Hana, the southwestern entrance point of the bay, is the rugged promontory of Karawaki Saki.

Kashiwa Shima lies close off Mese Hana, and on its central part stands an extremely conspicuous clump of pines. Shoal water and rocks fringe this island to a distance of 200 yards, and from its

northern end a sand and gravel spit extends southwestward for almost $\frac{1}{2}$ mile. Between this spit, the extremity of which is sparsely covered with pines, and the western shore of the island is a shoal bight, with a village at its head. **Local storm signals** (see page 29) are displayed at the village.

At the village of Minato, just southward of Mese Hana, a groin is (1938) under construction.

Oga Saki, a salient promontory, lies $\frac{3}{4}$ mile southward of the southern extremity of Kashiwa Shima. About $\frac{1}{4}$ mile eastward of the point is a detached 3-fathom rocky patch.

In the southwestern portion of the southwestern half of Karatsu Wan is **Karatsu Ko**, described more fully hereinafter. From the mouth of the Matsuura Kawa, just westward of the eastern harbor limit of **Karatsu Ko**, the coast curves in an easterly direction for about 3 miles to the mouth of the Tamashima Kawa. This stretch is known as Nijino Matsubara, and is composed of white sand beach backed by green pine trees.

The town of Hamasaki is situated at the mouth of the Tamashima Kawa on its southern side; it had a population of almost 5,000 in 1935. On the opposite side of the river mouth a basin is (1935) under construction.

Matsuura Se, a rock with a least depth of $1\frac{1}{2}$ fathoms, lies about $1\frac{3}{4}$ miles northwestward of Hamasaki.

Kushi Saki is a densely wooded point, 208 feet high, which projects into **Karatsu Wan** from about the middle of the head of the bay. It lies about $2\frac{1}{4}$ miles northward of the Tamashima Kawa mouth, and the coast between is rocky.

Channels.—There are three entrance channels into **Karatsu Wan**: the western leads between Mese Hana and Kashiwa Shima; the middle channel lies between Kashiwa Shima and Hime Shima, $3\frac{3}{4}$ miles northeastward; and the eastern leads between Hime Shima and Hotake Saki.

The western channel is about 700 yards wide between the island and the mainland, but the depths in it are less than 4 fathoms, and it is available only to small craft with local knowledge.

The middle channel is wide, with no outlying dangers, and is the one generally used. Hime Shima, on its northeastern side, is wooded, circular, and fringed with drying reefs to a distance of 200 yards. The northwestern side of the island is precipitous, with a scar resembling a yellow line. From the southern extremity of the island a shoal reef named Hime Shima Sone extends for more than $\frac{3}{4}$ mile southward. On this reef, just southward of the island and joined to it at low water, is a gravel bank, 11 feet high.

The eastern channel has a least depth of 8 fathoms in the fairway, but its navigable width is somewhat restricted by the shoal water

extending from Hotoke Saki and by Maye Sone, a detached rocky shoal, with a least depth of $4\frac{1}{2}$ fathoms, that lies about $\frac{5}{8}$ mile eastward of the southern extremity of Hime Shima.

KARATSU KO, occupying the southwestern part of **Karatsu Wan**, is well sheltered from all winds, but with strong northerlies heavy seas run into the harbor, making it difficult to work cargo. The harbor is divided into two parts by O Shima and the causeway that connects this island with the mainland. The western part, formerly called Tobo Byochi (*H. O. Chart 1966*), is known as **Nishi Ko** (Western Harbor), and the eastern part is called **Higashi Ko** (Eastern Harbor). **Karatsu Ko** is an open port. (See page 20 for regulations.)

The harbor limits of **Karatsu Ko** are defined by lines extended west-northwestward and southward, respectively, to the mainland from the northern and southeastern extremities of Taka Shima, an island to the eastward of O Shima. These limits are shown by dashed lines on *H. O. Chart 2305*.

Depths.—The general depths in **Nishi Ko** are from 4 to 5 fathoms, and a depth of 24 feet is maintained alongside No. 2 Mooring Quay and its approach channel. **Higashi Ko** is used mostly by small craft with local knowledge, although depths of 4 to $5\frac{1}{2}$ fathoms prevail in its outer part.

Islets and dangers in Karatsu Ko.—O Shima, about $1\frac{1}{2}$ miles southward of Oga Saki, has been mentioned with the landmarks. On its southeastern side is a small basin, and on its southwestern side are coal dumps with a number of small coaling piers. These are served by a railroad, which crosses on the causeway connecting O Shima to the mainland. A boat channel, spanned by a bridge, cuts this causeway and connects the eastern and western harbors.

Taka Shima, surmounted by a 553-foot conical hill, lies at the northeastern extremity of **Karatsu Ko**, about $\frac{3}{4}$ mile eastward of O Shima. There is a clump of pine trees at its southeastern end, and a shoal, with a depth of less than 3 fathoms, extends southward from the island to the mouth of the Matsuura Kawa.

Tori Shima, 111 feet high, lies in the middle of **Higashi Ko**, about $\frac{1}{2}$ mile southeastward of O Shima; southward of this islet the depths are less than 3 fathoms.

Lights—Beacons.—The harbor works in **Karatsu Ko** are located principally in an artificial harbor at the southeastern part of **Nishi Ko** (see *H. O. Chart 1966*), close westward of the causeway connecting O Shima to the mainland. Two **beacons** mark the eastern edge of the dredged fairway leading to these facilities, and a **light** is shown from an iron tower, 11 feet high, standing on the head of the breakwater at the western entrance to this artificial harbor. Another **light**

is occasionally shown from a position about 350 yards south-southwestward of the first. (See Light List.) In addition to these navigational lights the lights on Hirefuri Yama, already described, and a red neon advertising sign in the middle of Karatsu afford good marks.

Anchorage.—In Nishi Ko (see *H. O. Chart 1966*) good anchorage can be had off the western side of O Shima in depths of $3\frac{3}{4}$ to $5\frac{1}{2}$ fathoms, hard mud bottom mixed with fine sand and coal dust. In order to obtain maximum shelter and to facilitate the working of cargo it is recommended that vessels take a position as close as possible to O Shima; it is also recommended that they moor.

In Higashi Ko heavy seas run in during northerly winds, making it unsuitable as an anchorage for large vessels, but small craft can find anchorage sheltered by O Shima, Taka Shima, or Tori Shima. Native craft usually take shelter within the mouth of the Matsuura Kawa.

Anchorage outside Karatsu Ko can be had off Nijino Matsubara, but care must be taken to avoid Matsuura Se.

Winds and weather.—During the summer southerly winds prevail, and during the rest of the year northerly winds predominate with the exception of January and February, when westerly winds are prevalent. The mean maximum temperature in August is 77° F., and the mean minimum in February is about 43° F.

Pilots.—Unlicensed pilots are available at Karatsu Ko. If notified in advance of the time of arrival, they will usually board in the vicinity of Kashiwa Shima.

Directions.—From the westward round Kashiwa Shima at a distance of at least $\frac{1}{2}$ mile, and keep Yeboshi Shima Lighthouse bearing less than 360° to clear the 3-fathom patch eastward of Oga Saki. When past this danger shape a course for the desired berth. Care must be taken to avoid fishing nets that are sometimes laid as far as $\frac{1}{2}$ mile eastward of both Kashiwa Shima and Oga Saki. The outer edges of these nets are marked by red flags and red lights, but these markers cannot be depended on.

From the eastward Karatsu Wan can be entered on either side of Hime Shima, but the middle channel is recommended. If, however, it is decided that the eastern channel is to be used steer a mid-channel course, taking care to avoid Maye Sone. To clear Hime Shima Sone do not alter course southwestward until Taka Shima Lighthouse bears more than 274°

KARATSU ($33^{\circ}27' N.$, $129^{\circ}58' E.$, *H. O. Chart 2305*) stretches along the shore of the harbor from the eastern side of the mouth of the Matsuura Kawa to the vicinity of the harbor works. That part eastward of the river is known as Mizushima, and the district near the docks is called Myoken. Karatsu is an open port (see page 20) and a first port of entry. The city had a population of about 30,000 in 1935.

Wharves.—There are a number of wharves at the artificial harbor at Myoken (See *H. O. Chart 1966*) one of which has 360 feet of berthing space at its outer

end that has been dredged to a depth of 24 feet, and 525 feet at its inner end, dredged to a depth of 15 feet. There is one other berth with a depth of 15 feet alongside, which can accommodate a small vessel; the depths at the remaining berths are sufficient only for boats. The boat basins at the mouth of the Matsuura Kawa and on the southeastern side of O Shima have already been mentioned; another is under construction (1938) at Tobo, about $1\frac{1}{4}$ miles north-westward of Myoken.

One small vessel used as a tug and a large number of coal lighters are available at Karatsu.

Repairs on a moderate scale can be effected.

Supplies.—Coal bunkers, available in almost unlimited quantities, are taken from lighters at a rate of 150 to 200 tons per hour.

Water of poor quality can be taken from tank boats at a rate of about 200 tons per day.

Communications.—Karatsu is connected to the Kyushu railroad system, and coal burning ships from many parts of the world call here for bunkers.

Quarantine.—Pratique is granted at Karatsu.

Eastern part of Karatsu Wan—Coast.—From Kushi Saki the shore of Karatsu Wan trends east-northeastward for about $4\frac{1}{4}$ miles to O Saki and is mostly sandy beach.

Ha Shima is a small densely wooded islet, 63 feet high, that lies on foul ground in a position about $1\frac{1}{2}$ miles northeastward of Kushi Saki and $\frac{1}{4}$ mile offshore.

Hai Saki, 140 feet high, lies about $1\frac{1}{2}$ miles east-northeastward of Ha Shima, and about midway between them and $\frac{1}{2}$ mile offshore is a rock with a depth of less than 6 feet.

From Hai Saki to O Saki, about $1\frac{1}{4}$ miles east-northeastward, the coast recedes to form a bight, on the eastern side of which stands the village of Fukaye. **Local storm signals** (see page 29) are shown at the village.

Funakoshi Ura is entered between O Saki and Sagino Kubi; about $1\frac{3}{8}$ miles north-northwestward. The entrance is about 1 mile wide between the 5-fathom curves, and from it the inlet extends eastward for about 2 miles. At about the middle of the northern side Tateishi Saki divides it into inner and outer parts, the former of which is shoal. Ata Se, a detached 5-fathom rocky patch, lies about 800 yards north-northwestward of O Saki, and Tsutsu Se, a detached reef with a least depth of $1\frac{1}{2}$ fathoms, lies about 1,600 yards west-southwestward of Sagino Kubi. The villages of Funakoshi and Kamuri are situated on the northern side of the outer part of the bay and on the eastern side of the inner part, respectively; **local storm signals** (see page 29) are displayed at both towns.

Sheltered anchorage can be had near the middle of the outer part of Funakoshi Ura, in depths of about 5 fathoms, when strong northerlies make it impossible to work cargo in Karatsu Ko. The inner part of the harbor is available to small craft only.

Vessels approaching Funakoshi Ura from the westward should keep Taka Shima Lighthouse astern on a bearing of 278° ; this will lead about 900 yards northward of Kashiwa Shima, about 1,200 yards southward of Hime Shima Sone, and 700 yards southward of Tsutsu

Se. When this last position is reached course should be shaped for the anchorage.

Vessels entering from Iki Suido should keep the northern extremity of Ogawa Shima in range 295° astern with the northern extremity of Kakara Shima to pass about 800 yards southward of Hime Shima Sone. When Taka Shima Lighthouse bears 278° proceed as directed in the preceding paragraph.

Shinmachi Ura is the northernmost of the coves on the eastern side of Karatsu Wan and is entered between Sagino Kubi and Nobe Saki, $1\frac{3}{8}$ miles northwestward. The depths are shoal for some distance from the head of the cove, making it suitable for small craft only. Okino Se, a detached $4\frac{3}{4}$ -fathom rocky patch, lies in the approach to Shinmachi Ura, almost $\frac{3}{4}$ mile northwestward of Tsutsu Se. Hira Se, 1 foot high, lies about $\frac{1}{4}$ mile off the southeastern side of the entrance, and shoal water extends southeastward from Nobe Saki for almost $\frac{1}{2}$ mile.

Hotoke Saki, the northeastern entrance point of Karatsu Wan, lies about 1 mile northwestward of Nobe Saki, and the coast between is fringed with reefs to a distance of about $\frac{1}{2}$ mile. No Se, 1 foot high, is the outermost of these dangers. Tateishi Yama, 682 feet high, is a conspicuous reddish-brown hill that rises above Hotoke Saki.

Hotoke Saki to Nishinoura Misaki—Coast—Off-lying dangers (*H. O. Chart 2475*).—From Hotoke Saki the coast trends in a general northeasterly direction for about 8 miles to Nishinoura Misaki and is largely formed by two crescent-shaped bights, separated by Katsuseki Saki.

This stretch of coast is backed by detached hills covered with a thick growth of pines. The most conspicuous is Kaya Yama, 1,243 feet high, which rises close to the head of Funakoshi Ura. When seen from the eastward or westward this hill appears as a sharp peak, but from the northward its densely wooded summit has the appearance of being flat.

Oto Saki, about $1\frac{1}{4}$ miles northeastward of Hotoke Saki, has a cliffy extremity consisting of square columns of black rock; it is surmounted by a solitary pine.

Katsuseki (**Kasseki**) Saki lies about 3 miles northeastward of Oto Saki, and in the bay between them, about $\frac{5}{8}$ mile offshore, is Kobi Shima, a rocky 27-foot islet. Aka Se, about 1,400 yards westward of the islet, is a detached 3-fathom rocky patch. In the northeastern end of the bay is the small fishing harbor of Nogita Ura. **Local storm signals** (see page 29) are shown at Nogita, and a **submarine cable** is landed here; the landing place is marked by **beacons**.

Today Se consists of several groups of rocks, the highest being 6 feet. They lie about $2\frac{1}{2}$ miles northwestward of Katsuseki Saki, and

from them a shoal extends southward for about 200 yards. Konigami Se, a detached rock with a depth of $1\frac{1}{2}$ fathoms, lies about 1,200 yards southwestward of Today Se, and a fishing reef, with a depth of 18 fathoms, is charted 3 miles northwestward of the same spot.

Nagama Sho, which dries 2 feet, lies about 3 miles north-northeastward of Today Se, and from it a reef extends southward for about 600 yards. Nakano Se, about 1,400 south-southeastward of Nagama Sho, has a least depth of $\frac{1}{2}$ fathom, and from it a reef extends south-southeastward for about $\frac{1}{2}$ mile, with 800 yards of its length covered by depths of less than $5\frac{1}{2}$ fathoms. Ko Nagama Sho, almost $1\frac{1}{2}$ miles eastward of Nakano Se, is a rocky patch with a depth of $6\frac{3}{4}$ fathoms.

Nishinoura Ko ($33^{\circ}39' N.$, $130^{\circ}12' E.$, *H. O. Chart 2310*), about 1 mile southward of Nishinoura Misaki, is a small harbor, protected by a breakwater extending southward from its northern entrance point.

FUKUOKA WAN AND APPROACHES (*H. O. Chart 2310*)—**General remarks.**—Fukuoka Wan is a comparatively large bay, about 10 miles long from west to east, which is entered between Nishinoura Misaki and Myojin Hana, about $4\frac{1}{4}$ miles east-northeastward. This entrance is divided into three channels by a number of islets and dangers, but only the easternmost is recommended for ocean-going vessels. The bay is divided into eastern and western parts by Nokono Shima, an island that lies midway between the northern and southern shores of the bay, about $3\frac{1}{2}$ miles eastward of its western end. The eastern portion is known as Hakata Ko and is the site of nearly all of the port facilities, most of which are located near the mouth of the Naka Kawa in the southeastern part of the bay. The shores of the bay are for the most part low and sandy.

Depths.—In the western part of the bay the depths are sufficient to accommodate vessels of any draft, with a maximum of 12 fathoms, but in Hakata Ko the depths are less than 5 fathoms except for a limited area northeastward of Nokono Shima.

Landmarks.—O Take, 196 feet high to the tops of the trees, is a conspicuous hill that rises from the low sandy peninsula that forms the northern side of Hakata Ko, in a position 2 miles northeastward of the northern extremity of Nokono Shima.

On the eastern side of Hakata Ko, close northward of the mouth of the Najima Kawa, stand some tall white chimneys and some radio towers; all are conspicuous.

Abura Yama (see *H. O. Chart 2475*) stands 7 miles south-southeastward of the summit of Nokono Shima and forms a good mark.

Bishamon Take ($33^{\circ}37' N.$, $130^{\circ}16' E.$, *H. O. Chart 2310*), 2 miles west-southwestward of the summit of Nokono Shima, is a useful mark for vessels entering Imatsu Wan.

Islets and dangers in the approach and entrance to Fukuoka Wan.—Genkai Chima, about $1\frac{1}{2}$ miles northeastward of Nishinoura (Nishiura) Misaki, is a cliffy-sided island with a basin and settlement at its southern end.

Hashira Shima, 240 feet high, is a pinnacle islet that lies about 600 yards northwestward of the northwestern extremity of Genkai Shima. Ino Se, a detached shoal with a least depth of $5\frac{1}{4}$ fathoms, lies about 1 mile northward of Hashira Shima.

A number of rocks, both above and below water, lie within 700 yards of the northern side of Genkai Shima, which should not be approached closer than $\frac{1}{2}$ mile.

From the southern end of Genkai Shima shoal water, with depths of less than 5 fathoms, extends south-southwestward toward the coast of the mainland, restricting the channel between the 5-fathom curves to a width of less than $\frac{1}{4}$ mile. On the western side of this shoal area, about midway between Genkai Shima and Nishinoura Misaki, are two rocky islets, Kotsukue Shima and Otsukuye Shima. For a distance of $\frac{1}{4}$ mile eastward and southeastward of these islets the bottom is studded with rocks, only one of which is above water. About 900 yards southeastward of Kotsukue Shima, the southwestern islet, is a detached rocky patch, with a depth of $2\frac{3}{4}$ fathoms. A submarine cable is laid from Genkai Shima to the mainland.

Genkai Shima Light ($33^{\circ}42' N.$, $130^{\circ}14' E.$, *H. O. Chart 2310*) is shown from a white cylindrical concrete tower, 36 feet high, located on the northeastern side of the island. (See Light List.)

Shiga Shima, on the eastern side of the entrance to Fukuoka Wan, lies with Myojin Hana, its northwestern extremity, about $2\frac{5}{8}$ miles westward of Genkai Shima. It is a well-wooded island, and its southeastern extremity is connected to the sandy isthmus that forms the northern side of Hakata Ko by a narrow neck of sand, known as Michikire. A boat channel, which is spanned by an overhead cable, has been cut through Michikire; it is occasionally dredged, making it available for small craft even at low water.

From Myojin Hana a shoal spit extends northwestward for about $1\frac{1}{8}$ miles. There are a number of drying rocks on this spit, and a short distance within its extremity is Shitaye Sone, with a depth of 6 feet. About $\frac{5}{8}$ mile northward of Shitaye Sone is Kittateawase, a 4-fathom rock.

Local storm signals (see page 29) are shown from the town at the southeastern extremity of Shiga Shima.

Lifesaving.—A line-throwing apparatus and a power lifeboat are maintained at Shiga Shima.

Entrance channels.—The channel between Genkai Shima and Shiga Shima has a least width of more than $1\frac{1}{2}$ miles between the

5-fathom curves and is free from dangers in the fairway. It is the channel used by ocean-going vessels.

The two channels between Genkai Shima and Nishinoura Misaki should be used only by vessels with local knowledge. The northern of these two channels has a least charted depth of $3\frac{1}{4}$ fathoms.

Western part of Fukuoka Wan.—This part of the bay is protected from westerly winds, but those from the northward send in a heavy sea. The middle of this area is free from dangers, but the western side of Nokono Shima is foul to a distance of about $\frac{1}{2}$ mile, and a detached $1\frac{1}{2}$ -fathom patch, named O Se, lies about $\frac{1}{4}$ mile offshore in the northwestern part of the bay. During northerly winds sheltered anchorage can be found in the lee of Shiga Shima, and off the village of Miyaura (Miyanoura), in the western part of the bay, sheltered anchorage is afforded during westerlies. **Local storm signals** (see page 29) are shown at this village.

Nokono Shima, almost 2 miles long from north to south, is well wooded and about 700 feet high. The channel separating it from Shiga Shima and Michikire, to the northward, has a least width of about $1\frac{1}{4}$ miles, and the fairway is more than $\frac{3}{4}$ mile wide between the 5-fathom curves. On its southern and southwestern sides the channel separating it from the mainland is only $\frac{3}{4}$ mile wide and has a least charted depth of $2\frac{1}{2}$ fathoms in the fairway.

Ara Saki, the northern extremity of the island, is fairly steep-to.

Zo Se, 51 feet high, is a conspicuous rock that lies 700 yards off the western side of the island and $\frac{3}{4}$ mile southwestward of Ara Saki. Aino Se, about 700 yards south-southwestward of Zo Se, is a $5\frac{3}{4}$ -fathom rock.

Imatsu Wan is a comparatively shallow indentation, in the southern shore of Fukuoka Wan, which lies southward and southwestward of Nokono Shima. Its northern entrance, between the southwestern side of Nokono Shima and the extremity of the peninsula dominated by Bishamon Take, is narrowed to about $\frac{1}{2}$ mile by the dangers fringing the shore on either side.

Goyama (Miyama) Dashi, a 2-fathom rock, lies on the eastern side of the entrance, in a position about $\frac{5}{8}$ mile offshore and about $\frac{1}{2}$ mile southward of Aino Se. Takara Shima is an islet on the western side of the entrance, and from it Jinorukame, a shoal with a least depth of $1\frac{1}{4}$ fathoms, extends 350 yards farther eastward.

Jokuan Se, a 1-fathom rock, lies almost 1 mile southward of Jinorukame, and Kumo Se, a group of exposed and underwater rocks, lies about 400 yards eastward of Jokuan Se.

On the western side of Imatsu Wan is Imatsu Ko, an artificial harbor for small craft.

Hakata Ko, an open port (see page 20), is the name given that part of Fukuoka Wan lying to the eastward of Nokono Shima; the harbor

limits are indicated by dashed lines on the chart. The harbor is nearly landlocked, but notwithstanding this there are times, with strong winds from the northwest quadrant, when it is impossible to work cargo. Practically all of the port facilities are located in the southeastern part of the bay, where an artificial harbor is under construction. As previously stated the depths in Hakata Ko are shoal.

The artificial harbor in the southeastern part of Hakata Ko is protected by breakwaters. They form a semicircular barrier that encloses a water area with an approximate radius of $\frac{3}{4}$ mile; the central part of this area has been dredged, and a depth of 24 feet is charted in the approach to the wharf used by ocean-going vessels. The western breakwater extends first northward and then north-northeastward for almost $\frac{3}{4}$ mile from a position $1\frac{1}{4}$ miles westward of the mouth of the Naka Kawa. This breakwater is being extended southward to the shore (1941). About 200 yards northeastward of its northern end another breakwater is under construction (1941), which will extend for almost 1 mile east-northeastward. In addition to these two main breakwaters a secondary breakwater, which dries 1 foot, extends parallel to the eastern shore of the bay for about $\frac{5}{8}$ mile. It is situated about $\frac{1}{2}$ mile offshore, with its midpoint abreast of and about $\frac{1}{4}$ mile from the northeastern end of the breakwater under construction. Close northeastward of the mouth of the Naka Kawa is a boat basin, and immediately northward of this basin is a wharf for ocean-going vessels.

An approach channel, with a width of 175 yards and depths of 24 to $25\frac{1}{2}$ feet, is being dredged (1938) for about 1 mile northwestward of the entrance between the two main breakwaters; the chart, however, shows a depth of $3\frac{1}{4}$ fathoms.

Additional harbor improvements.—There are boat basins in a number of other places in Hakata Ko, and along its eastern side, for a distance of more than 2 miles north-northeastward of the main wharf, extensive land reclamation is in progress (1938). This reclamation project is protected from the action of the sea by the secondary breakwater previously described and by an interrupted breakwater lying parallel to it and between it and the shore.

Lights.—A light is shown from a red square concrete structure, 30 feet high, located at the northern end of the western breakwater.

An aviation light is shown from an iron framework structure, located $\frac{3}{8}$ mile southward of the mouth of the Naka Kawa. (See Light List.)

A light is shown from the head of a pier close southwestward of the basin.

In addition to these lights a number of lights mark the breakwater that dries 1 foot and the interrupted breakwater that lies parallel to and inshore of it.

Buoys.—Six light buoys mark the approach channel being dredged to the artificial harbor and the dredged area within the breakwaters. Buoys 1, 3, and 5, on the northeastern side of the fairway, are painted black and each shows a flashing white light; buoys 2, 4, and 6, on the southwestern side of the fairway and the dredged area within the breakwaters, are painted red, and each shows a flashing red light.

At Saitozaki, on the northern side of Hakata Ko, there are a number of oil tanks, and lighter piers equipped with belt conveyors for the loading of coal. Vessels discharge or take oil at moorings by means of a floating pipe line. Several mooring buoys are laid in the offing.

Anchorage, limited by draft, can be had practically anywhere in Hakata Ko, but a position southwestward of Saito Saki is recommended during strong northerly winds and one off the eastern side of Nokono Shima when strong westerlies prevail. Deep-draft vessels are restricted to the area northeastward of Nokono Shima. Several mooring buoys are laid in the southwestern part of Hakata Ko, off Meihama, and there are a number in the dredged area within the breakwaters.

Anchorage is prohibited in the proximity of the harbor works under construction.

Regulations.—In addition to the regulations for open ports, local regulations are in force. The following are extracts from them:

Art. 2. Hakata Ko is divided into an inner and outer harbor.

Art. 4. The fairways are to be left clear.

Art. 5. In the inner harbor the vessels are to reduce speed and are not to proceed abreast or overtake.

Art. 8. No vessel is to sound her siren or steam whistle or exhibit signal lights contrary to the regulations without due cause.

Art. 10. Vessels not secured to mooring buoys, piers, or sea walls are not to lie at single anchor in the inner harbor, even though clear of the fairway.

Art. 11. No vessel is to secure alongside the protecting wall of the inner harbor for a distance of about 130 feet westward of the end of the jetty on the western side of the entrance.

Art. 17. Vessels are not to load or discharge explosives without informing the police. Vessels laden with explosives are not to secure or work cargo except in places allotted by the police.

Local storm signals (see page 29) are shown at the meteorological observatory, about $\frac{3}{4}$ mile southward of the mouth of the Naka Kawa, and also on the eastern side of the entrance to the Hakata boat basin.

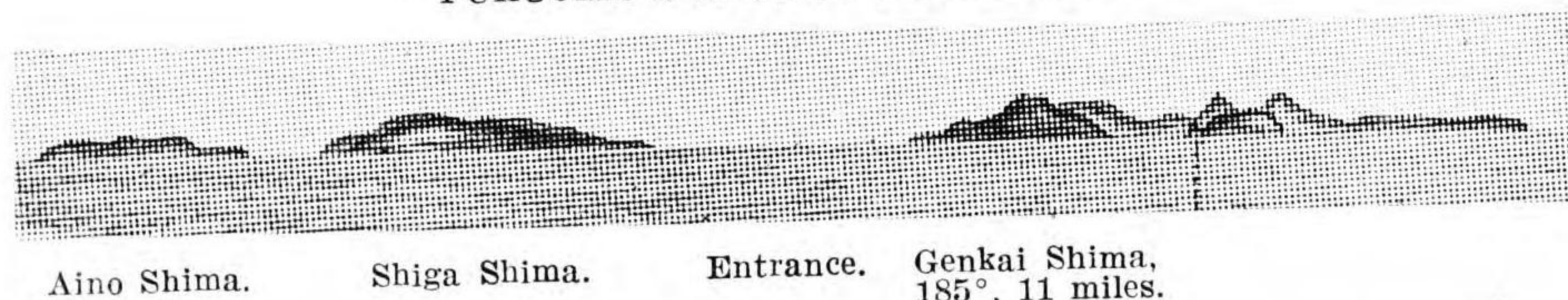
Lifesaving.—Lifeboats, both power and pulling, and line-throwing apparatus are maintained at Hakata Ko.

Tidal currents.—The flood sets southward in the entrance to Fukuoka Wan and southeastward in the vicinity of Nokono Shima, and the ebb sets in nearly opposite directions. The tide turns within 1 hour before high and low water, and both currents have a rate of about 1 knot.

Pilots.—It is reported that pilots are available.

Directions.—Pass eastward of Genkai Shima and enter with the summit of Nokono Shima in range 153° with the northern peak of Abura Yama; this range leads clear of all dangers in the approach and entrance to Fukuoka Wan. When the southern extremity of Shiga Shima bears 85° steer a mid-channel course between that island and Nokono Shima and proceed to the desired berth.

FUKUOKA WAN FROM NORTHWARD

Aino Shima. Shiga Shima. Entrance. Genkai Shima, 185° , 11 miles.

HAKATA ($33^\circ 36' N.$, $130^\circ 24' E.$, *H. O. Chart 2310*), strictly speaking, comprises the area fronted by the Hakata boat basin and the main cargo wharf, but, more broadly, it extends along the southern and eastern shores of Hakata Ko from the harbor limit to the mouth of the Najima Kawa, about $2\frac{1}{4}$ miles north-northeastward of the Hakata boat basin. Hakata is an open port (see page 20), maintains a customhouse, and had a population of about 291,000 in 1935.

Wharves.—The wharf immediately northward of the Hakata boat basin is the only one capable of accommodating ocean-going vessels. It has 1,312 feet of berthing space with a depth of $25\frac{1}{2}$ feet alongside. There are a large number of lighters available for the loading of coal.

Repairs of a minor nature can be effected, and there is a drydock for the accommodation of shallow-draft vessels; for dimensions see appendix II, page 638.

Supplies.—The supply of bunker coal is practically unlimited, and fuel oil is available at Saitozaki. Water is taken from tank boats at a maximum rate of about 70 tons per hour. Fresh provisions are plentiful.

Communications.—Hakata is connected to the general railroad and telegraph systems. There are two airports, one a seaplane base for public use, and a radio station.

FUKUOKA WAN TO KANENO MISAKI ($33^\circ 53' N.$, $130^\circ 32' E.$, *H. O. Chart 2475*)—**Coast.**—From Michikire to Tsuyasaki Hana, about 10 miles northeastward, the coast is mostly low and sandy, with rolling sandhills in the immediate background. About midway of this stretch is Isozaki Hana, a salient promontory, on the eastern side of which is the small fishing harbor of Shingu Ko. The most conspicuous landmark is Tachibana Yama, a hill with three peaks, which lies about $3\frac{1}{4}$ miles southeastward of Isozaki Hana.

Fukuma Ko, about $3\frac{3}{4}$ miles northeastward of Shingu Ko, has a pier protected by a breakwater. In 1935 the town of Fukuma had a population of about 3,900.

Tsuyasaki Hana is the southern extremity of a small peninsula, and on its eastern side is Tsuyasaki Ko, a fishing port improved by a breakwater. The town of Tsuyasaki lies to the eastward of the root of the breakwater and had a population of about 6,200 in 1935. **Local storm signals** (see page 29) are shown here, and a **power lifeboat** is maintained.

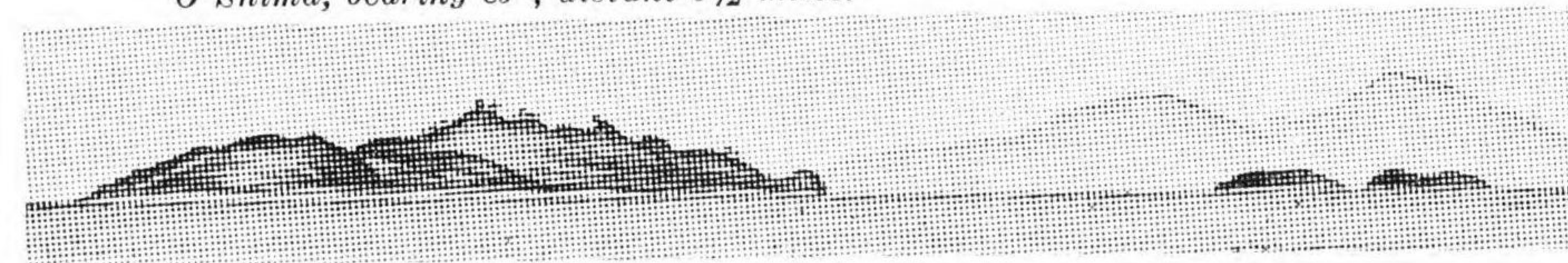
Tateno Misaki, about 2 miles northward of Tsuyasaki Hana, is the northern extremity of the small peninsula mentioned in the preceding paragraph. Close off the extremity of this point is a reddish islet, 42 feet high, with a conspicuous solitary tree on its summit.

From Tateno Misaki the coast curves north-northeastward for almost 3 miles to Kusa Saki (Kusazaki Hana), the southeastern entrance point of Konominato Ura.

Off-lying islets and dangers.—Aino Shima, a low flat wooded islet, lies about 3 miles northwestward of Isozaki Hana. Its summit rises near the western extremity, and its northwestern side drops sheer into the sea. Hanaguri Se, 72 feet high, is a rock that lies close off the eastern extremity of the island. There is a bight on the southern side of Aino Shima, in which vessels with local knowledge can obtain temporary anchorage, but the depths are considerable.

Kurinokami Sho is a steep-to patch of rocks that lies about $5\frac{1}{4}$ miles northwestward of Aino Shima; several of the rocks dry from 1 to 5 feet.

O Shima ($33^\circ 55' N.$, $130^\circ 25' E.$, *Plan on H. O. Chart 2475*), about 3 miles northwestward of Kusa Saki, is surmounted by a conspicuous clump of trees and forms a good mark for vessels approaching Shimonoseki Kaikyō from the westward.

O Shima, bearing 85° , distant $6\frac{1}{2}$ miles.

O Shima from the westward.

The western coast of the island is rocky, but there are no off-lying dangers at a distance of more than 600 yards offshore. When the tidal currents are opposed by the wind a dangerous sea makes up off the northwestern extremity of the island.

Okino Se, a 3-foot rocky patch, lies about $\frac{5}{8}$ mile northeastward of the northeastern extremity of the island.

The southeastern side of O Shima forms the northwestern side of Kurara Seto and is foul to a distance of 1 mile in places. The outermost of these dangers is a reef named Onoma Se, which has a least depth of 3 feet.

O Shima Light is shown from a white square concrete tower, 36 feet high, located on the northwestern extremity of the island. (See Light List.)

Konominato Ura, entered between Kusa Saki and Kaneno Misaki, about 3 miles northeastward, is a fairly well sheltered bay of adequate depth, but its approaches are so obstructed and the holding ground is so poor that it should be avoided except in an emergency.

Katsu Shima, a 321-foot islet, lies about 400 yards off Kusa Saki. A chain of rocky patches extends northward from the northern extremity of Katsu Shima for more than 1 mile, greatly restricting the fairway of Kurara Seto at this point. The northernmost of these dangers is named Ichino Se, which has two heads, with respective depths of 6 and 2 feet. A dangerous wreck is charted about $\frac{7}{8}$ mile northeastward of Ichino Se.

Kaneno Misaki is a conspicuous salient point with a rounded and thickly wooded hill at its extremity. In the range of hills that extends southeastward from this point are two comparatively high peaks, one near the coast and the other about 2 miles farther inland.

Jino Shima, an islet with two distinct summits, lies about $\frac{3}{4}$ mile northwestward of Kaneno Misaki. Both hills are surmounted by thickets, and Tomi Yama, the southern, rises to a height of 613 feet. From the southeastern extremity of this island a shoal gravel spit extends south-southeastward almost to the mainland. This spit is usually marked by tide rips and broken water. Foul ground projects from the northwestern extremity of the island for about $\frac{1}{4}$ mile, and about $\frac{5}{8}$ mile northwestward of this point lies Kurara Se, a 65-foot islet, from which foul ground extends about 300 yards farther northwestward.

Kanesaki and Konominato are small fishing ports located on the northeastern and southwestern sides, respectively, of the bay. Each of these harbors has improvements for the protection of small craft, and local storm signals (see page 29) are displayed at each village.

Kurara Seto is the name given to the channel leading between O Shima, on the one hand, and Jino Shima and the mainland, on the other. This passage is not recommended, as in addition to the dangers mentioned in conjunction with O Shima and Konominato Ura there is a $5\frac{1}{2}$ -fathom rocky patch almost in the middle of the fairway, at about 1,200 yards southward of Onoma Se, and when the north-going tidal current is opposed by strong northeasterly winds a turbulent sea is set up. A submarine cable, indicated on the chart, is laid across Kurara Seto from Konominato to O Shima.

Tidal currents.—The north-going or flood current runs from about 4 hours after low water until about 4 hours after high water, and the south-going current for the remainder of the cycle. The flood attains a velocity of $2\frac{3}{4}$ knots.

KANENO MISAKI TO MYOKEN SAKI—Coast.—Hatsu Saki lies about 2 miles eastward of Kaneno Misaki, and the coast between them consists of high cliffs of volcanic rock.

Hatsushiro Se, about $2\frac{1}{4}$ miles northward of Hatsu Saki, is a detached rocky patch with a least depth of 4 feet. The conspicuous clump of trees on the summit of O Shima bearing less than 254° and open northward of the northern extremity of Jino Shima, leads northward of this danger.

From Hatsu Saki the coast trends for about 5 miles eastward to the mouth of the Onga Kawa; this stretch consists of low sandy beach, in back of which the hills rise to an elevation of about 1,000 feet.

Ashiya Ko is the name given to the port that lies at the entrance to the Onga Kawa. It comprises both the water area off the mouth of the river and the river entrance itself. The river mouth occasionally changes, but is generally about 200 yards wide, and depths of $4\frac{1}{4}$ to $10\frac{1}{2}$ feet are maintained. The harbor is somewhat sheltered to the northeastward by two small islets, named Doyama Shima, and the reef that joins them to the mainland. The town of Ashiya lies on the western bank of the river near its mouth and had a population of about 6,000 in 1935. Local storm signals (see page 29) are displayed here.

Kario Hana, a salient point, lies about $\frac{3}{4}$ mile northward of the mouth of the Onga Kawa, and from its extremity foul ground, with a depth of $2\frac{3}{4}$ fathoms at its outer end, projects for about $\frac{1}{2}$ mile northwestward. A rock, with a depth of 3 feet, lies almost $\frac{1}{2}$ mile southwestward of the point.

Myoken Saki lies on the southern side of the approach to Shimonoseki Kaikyo, in a position about $1\frac{1}{2}$ miles northeastward of Kario Hana. It rises to a height of almost 100 feet, and its upper part consists of a conspicuous brown cliff. Me Sone, with a least depth of 1 fathom, lies about $\frac{1}{4}$ mile northwestward of the point, and is about 800 yards long, in a north-south direction. About 1 mile southwestward of Me Sone is Naka Sone, with a least depth of $3\frac{1}{2}$ fathoms, rock, and midway between these two dangers is a $4\frac{1}{2}$ -fathom patch with a $4\frac{3}{4}$ -fathom rock about 600 yards southward of it.

Hibiki Nada, the sea area lying off the stretch of coast just described, is the name given to the southeasternmost part of the Sea of Japan, in the western approach to Shimonoseki Kaikyo.

CHAPTER VIII

TSUSHIMA

TSUSHIMA ($34^{\circ}20' N.$, $129^{\circ}20' E.$, *H. O. Chart 2574*) consists of two large and several smaller islands situated in Tsushima Kaikyo (Tsushima Strait), between the northwest coast of Kyushu and the southern end of Chosen. For a description of Tsushima Kaikyo see *H. O. Pub. 122, Sailing Directions for Siberia and Chosen*.

The islands have a length of about 40 miles in a north-south direction, and a greatest width of about 10 miles. Rocky shoals are scattered within about 1.5 miles off the northern and southern extremities of the group, but elsewhere there are no dangers beyond a distance of about 1 mile offshore.

The two main islands, namely, Shimono Shima and Kamino Shima, are separated by Aso Wan (Tsushima Sound), which is in general deep, and has a width of about 2 miles at its western entrance. The eastern entrance of this inlet is a canal which dries at lowest low water, and is only about 50 feet wide at its narrowest part. These two islands are rugged, with numerous peaks, the southernmost and highest island, Shimono Shima, attaining an elevation of 2,168 feet at Yatate Yama, its densely wooded summit. The coasts of both islands are tortuous.

Tsushima has rocky, arid soil, and water is scarce. The population numbered about 56,000 in 1935, and fishing is the chief occupation.

Ocean current.—A branch of the Kuroshio takes a northeasterly direction from the area westward of Goto Retto, with a velocity of $\frac{1}{2}$ to 1 knot, and impinges on the southern end of Tsushima. It then divides into two parts and sets through the eastern and western channels of Tsushima Kaikyo, entering the Japan Sea. During the summer along the western coast of Tsushima it gradually increases in velocity when north of Go Saki, and may attain a velocity exceeding 2 knots near Sao Saki and Mitsu Shima, but the average velocity is about 1 knot. In the eastern channel the current is strongest southward of Ko Saki where after continuous southwesterly winds it may attain a velocity exceeding 2 knots. (See pages 55 and 57.)

Tidal currents.—Near the east and west coasts of Tsushima the flood tidal current flows in a general southerly direction and the ebb current sets northward, but the south-going current is not felt more than 5 miles offshore where the ocean current predominates. Within

from 2 to 3 miles off the west coast the ebb current, combining with the ocean current, attains a velocity which may exceed 3 knots in the vicinity of Sao Saki, and tide rips occur during northerly winds.

Along the east coast, in the extreme southeastern part between Ko Saki and Naiin Shima, the velocities are from $1\frac{1}{2}$ to $2\frac{3}{4}$ knots. At the entrance to Saga (Saka) Wan both the flood and ebb currents are weak, not exceeding about $\frac{3}{4}$ knot, and off the entrance to Oshika Wan there is a maximum velocity of about $1\frac{1}{4}$ knots. Near Kin Saki the maximum is about $1\frac{1}{2}$ knots.

The set of the flood current along the south side of the islands is westerly and the ebb current is easterly, the charted velocities being up to 3 knots. Near the chain of shoals off the northern end of the islands the flood current sets generally westward or southward, in accordance with the contour of the area. The ebb current in this area sets in an easterly or northerly direction, combining with the ocean current, and may attain a velocity of about 3 knots.

Winds.—Northerly or northeasterly winds prevail during September and October, and in the former month their strong velocity may hinder navigation near the east coast of Tsushima. From November to around March, strong northerly, northwesterly or westerly winds raise heavy seas off the west and south coasts of the islands.

SOUTHERN SIDE OF SHIMONO SHIMA (*H. O. Chart 2574*).—**Ko Saki**, the southern point of Tsushima, is the extremity of a small peninsula which has a pointed, thickly wooded summit, 763 feet high. The point is cliffy on both sides, and Hoshino Ko Shima, a rocky islet of peculiar shape, lies close eastward of it.



Ko Saki Light.

peninsula, 303 feet high. O Se, a reef that dries, extends about 1,400 yards south-southwestward from this point, and on the reef is Kono Se, a rock 12 feet high.

Komatsu Se, with $4\frac{1}{4}$ fathoms of water over it, lies about 1,600 yards southwestward of the lighthouse on the reef.

Ko Saki Light ($34^{\circ}05' N.$, $129^{\circ}13' E.$) is shown from a white octagonal concrete tower, 36 feet high, situated on Ko Saki. (See Light List.)

Signal station.—Vessels can communicate, by day only, with a signal station at Ko Saki, using the International Code.

Tsutsu Saki, about 2.7 miles northwestward of Ko Saki, is the extremity of another small

Tsutsu Saki Light is shown from a white circular concrete tower, 69 feet high, situated near the outer end of the reef extending from Tsutsu Saki. (See Light List.)

Tsutsu Wan, a small bay, is entered between Ko Saki and Tsutsu Saki. During southerly winds heavy seas run into the bay, but with northerly or northwesterly winds temporary anchorage is afforded off the village of Tsutsu.

Local storm signals are shown at the northern side of Tsutsu Wan. (See page 29.)

Submarine cables.—Two submarine cables, the tracks of which are indicated on the chart, are laid from the head of the inlet on the northeastern side of Tsutsu Wan.

WESTERN SIDE OF SHIMONO SHIMA (*H. O. Chart 2574*).—**Coast.**—From Tsutsu Saki the west coast of Shimono Shima trends in a northerly direction for about 14 miles to Go Saki, the southern entrance point of Aso Wan. It is fairly straight, the largest indentation being a bight about 6 miles southward of Go Saki, and the 10-fathom curve lies within about $\frac{1}{2}$ mile offshore.

A submarine cable, the track of which is indicated on the chart, is laid from the head of the bight.

ASO WAN (TSUSHIMA SOUND) ($34^{\circ}21' N.$, $129^{\circ}14' E.$, *H. O. Chart 646*) is entered between Go Saki and Karasu Saki, which latter point lies about 2 miles north-northeastward of the former. (See view on *H. O. Chart 646*.) This large, deep inlet resembles a sound in that it separates the two main islands of Tsushima, its extreme eastern end, known as Kusubo Seto, being a very narrow channel which leads to Miura Wan, an inlet on the east coast. Ofunakoshi Seto, the eastern entrance to Aso Wan, opens southward of Kusubo Seto, and consists of a canal about 300 yards long, 50 feet wide at its narrowest part, and about 6 feet in depth at high water, affording passage to small craft only. The shores of Aso Wan are deeply indented by numerous arms of irregular shape, most of which have deep water.

Shiro Take, a peak 1,711 feet high, rises about $4\frac{1}{2}$ miles south-southeastward of Go Saki, and is conspicuous.

Three submarine cables, the tracks of which are indicated on the chart, are laid from the shore close southeastward of Go Saki.

Aso Wan is included within one of the fortified areas of Tsushima.

Entrance—Depths—Dangers.—Senba Se, a rock 1 foot high, is situated about 400 yards northward of Go Saki, and about 600 yards southward of Karasu Saki is Ushi Shima, a small islet from which a reef extends about 400 yards farther southward. Oguchi, the western entrance to Aso Wan, lies between these dangers and has an

unencumbered navigable width of about 1.2 miles, with depths from 13 to 41 fathoms. Abreast of Utsuno Saki, a point on the southern side of the entrance, the width is reduced somewhat by Okino Karakashi, a 2½-fathom shoal about ½ mile northeastward of the point, and vessels should keep in mid-channel. Within the entrance, the main area of the inlet is about 3 miles long, with charted depths from 10 to 42 fathoms, but on its southern side, near the entrance to Ozaki Wan (Imaharu Bay) are several dangers.

Southern shore.—Ozaki Wan (Imaharu Bay), an inlet about 2 miles in extent, opens immediately eastward of Utsuno Saki, and has depths from 9 to 32 fathoms, being in general unobstructed and deep. Close off its entrance are several dangers, the westernmost of which, Suki Se (Strata Rock), 12 feet high, lies about 900 yards eastward of Utsuno Saki, with a 1¾-fathom patch about 300 yards northward of it. About ¾ mile farther eastward is Karakashi, over which is a depth of 3¾ fathoms, and about 500 yards north-northwestward of Imo Saki, the western entrance point, is Imosaki Se, with a depth of 2¾ fathoms.

Manga Shima (Flat Island), an islet 44 feet high, lies in the middle of the entrance, with Naka Sone, a rock covered by 3¾ fathoms, situated about 1,200 yards southwestward of its summit, and there are patches northward and westward of this rock. Naka Sone and the shoal northward of it are marked by red buoys.

Okino Shima (Mioban Shima), a wooded islet, lies on the eastern side of Ozaki Wan, about 1 mile east-southeastward of Manga Shima, and in the fairway of the entrance to Mikata Ura (Mussel Cove) and Kurose Wan (Oyster Sound). Vessels should pass to the northeastward of it.

Anchorage.—To avoid uneven bottom and shoals, anchorage should be picked up to the eastward of a line drawn through Manga Shima in a northeast and opposite direction. Fronting on the town of Ozaki, and also off the southern side of the inlet, shelter is afforded to small vessels except during strong northerly winds when a considerable sea runs in.

Southern shore (continued).—Mikata Ura, a cove on the eastern side of Ozaki Wan, extends about 1.2 miles southward, with charted depths from 11 to 23 fathoms. The town of Mikata lies at its head.

Jo Yama, a densely wooded hill with a conspicuous reddish cliff on its western slope, rises near the extremity of the promontory forming the eastern side of the cove.

Kurose Wan, situated next eastward of Mikata Ura, indents the shore for about 2 miles in a southerly direction, and is from 5 to 23 fathoms in depth. This inlet has a very restricted entrance, but is reported to be available to small steamers. On its eastern side is the town of Kurose.

Imosaki Peninsula projects northwestward, on the eastern side of Kurose Wan, its finger-shaped northern extremity, Imo Saki, forming the eastern entrance point of Ozaki Wan. Imo Saki is sparsely wooded with pine trees and its reddish cliffs are visible from westward.

Takeshiki Ko (South East Inlet) is entered in depths around 27 fathoms, through a passage about 300 yards wide at its narrowest part, between the northeastern side of Imosaki Peninsula and the western extremity of Shimayama Shima, an irregularly shaped island. Within Takeshiki Ko are several islets and shoals, but in general the water is deep.

The inlet extends along the southwestern side of Shimayama Shima for about 2 miles, and then branches into two arms, southward and eastward. The eastern extremity of the eastern arm leads to the sea, to which it is joined by Ofunakoshi, a canal previously described.

Local storm signals are shown at Takeshiki, a town on the western side of the southern arm of Takeshiki Ko. (See page 29.)

Northern shore.—Nii Ko (Posadnik Inlet) indents the middle of the northern shore of Aso Wan for about 2 miles, being entered eastward of Tan Saki, through a width of about 1,400 yards. It has charted depths from 6 to 31 fathoms, and in its center anchorage can be had in a depth of about 16 fathoms. The inlet is much indented, and is fringed with several villages, including Kaiguchi, Sabo, Umugi, Nii, Sashiga and Saga.

Nobu Ko (North East Inlet) which is entered between the eastern entrance point of Nii Ko and a promontory about 600 yards south-southwestward, is also deep and much indented.

Because of numerous islets and shoals, this inlet is only suitable as an anchorage for small vessels. The villages of Kaifuna, Itose, Nobu and Oyama lie along its shores.

Tides.—The mean high-water interval at Mikata Ura, in Aso Wan, is 8h. 50m.; mean range of tide 4.4 feet, spring range 6.5 feet.

WESTERN SIDE OF KAMINO SHIMA (H. O. Chart 2574)—**Coast.**—From Karasu Saki the west coast of Kamino Shima trends about 2½ miles east-northeastward, and thence about 2½ miles northward to the southernmost of three densely wooded islets which form Tsuna Shima. These islets lie in a chain, being joined by rocky ledges, and extend about 1,600 yards northward. Ko Shima, the northernmost and largest islet, 206 feet high, is cliffy on its western side, and can easily be made out. Between these islets and the shore is a channel with an average width of about 400 yards, which is available to small vessels and leads to Tsuna Wan from northward.

Tsuna Wan, a small inlet, indents the coast for about 1,000 yards, near the southern end of the channel on the eastern side of Tsuna

Shima. Drying rocks extend near its southern entrance point, but there is deep water in the middle of the inlet, and small vessels can enter without difficulty. During the summer it is used as a fishing base, and offshore at various places are fish-spotting stations.

Mine Wan, somewhat larger than Tsuna Wan, is entered in a depth of about 25 fathoms between Kurumagono Hana, a point about 1 mile northeastward of Ko Shina, and Shin Saki, a low, black, cliffy point about 600 yards farther northeastward. Off both entrance points are rocks that dry, but the entrance has a navigable width of about 400 yards, being free from dangers in mid-channel. The inlet has two arms which branch northeastward and southward, respectively, with charted depths from 4 to 24 fathoms and good shelter for small vessels. The northeastern arm is about $1\frac{1}{2}$ miles in length.

Omae Saki, a headland about $1\frac{1}{4}$ miles north-northwestward of Shin Saki, has a summit 336 feet high and about $\frac{1}{2}$ mile south-southeastward of it is Hori Yama, a hill surmounted by two pine trees. These two hills are easily made out from southward.

From Omae Saki, the coast takes a north-northeasterly direction for about 4 miles to To Saki, the extremity of a promontory projecting northward. On the western side of the promontory, are conspicuous cliffs, and directly above them is a hill, 678 feet high, which has a cultivated area and can easily be identified. Myo Se, a rock that dries 5 feet, lies at the extremity of a reef which extends from To Saki for about 480 yards north-northwestward.

Nita Wan—Dangers—Beacon ($34^{\circ}32' N.$, $129^{\circ}18' E.$, *H. O. Chart 2574*).—Nita Wan is a small, deep bay between To Saki and Ina Saki, a conspicuous headland about 2 miles north-northwestward. Above Ina Saki are hills covered with grass and trees, the summit of which, Tomi Yama, is 492 feet high. This headland is foul for a short distance southwestward and southward, but the 10-fathom curve lies off about 600 yards in the same directions.

Setori Se, a rock covered by $5\frac{3}{4}$ fathoms, lies north-northeastward of To Saki, in a position about 520 yards northeastward of Myo Se.

Shakushi Se, a pointed above-water rock, is situated about 1 mile southeastward of Ina Saki, and lies near the center of a reef that dries in places. This reef extends from the rock for about 600 yards toward the entrance to the bay, and nearly to the mainland east-northeastward. At the southwestern edge of the reef is a rock just above water.

Mitsu Se, a rocky patch, is nearly midway between Shakushi Se and Tsurugi Saki. The latter, about 1 mile northeastward of To Saki, is the northwestern extremity of a promontory on the southern side of the bay. The largest rock of Mitsu Se is at its northeastern end, and dries 4 feet. In the middle of Mitsu Se, above a drying rock, is a white beacon with a drum-shaped top mark.

A reef, which dries in places, extends southwestward from Mitsu Se to a distance about 260 yards from the largest rock of the patch. Yahiro Se, a detached shoal covered by $5\frac{1}{4}$ fathoms, is about 600 yards eastward of the same rock.

There is deep water between Mitsu Se and Tsurugi Saki.

Shishimi Ko, the narrow southern inlet of Nita Wan, with a general width of about 200 yards, is entered through the deep channel leading between Myo Se and Setori Se, and has charted depths from $4\frac{1}{4}$ to 17 fathoms. A low tongue of land projects at the head of this inlet for about 400 yards northward, dividing it into two arms. Except for a $4\frac{1}{4}$ -fathom patch in nearly the center of its eastern arm, the inlet is deep, with mud bottom, affording sheltered anchorage to small vessels. The villages of Shishimi and Kuhara lie at the heads of the eastern and western arms, respectively.

Nita Uchi, which is entered northeastward of Tsurugi Saki, has at its narrowest part a width of only about 200 yards between the shore banks. Its water is for the most part exceedingly deep, ranging from 24 fathoms at the entrance to $4\frac{1}{4}$ fathoms at the head. During spring and summer, after heavy rains, there are floods in the river at its head, and vessels at anchor should exercise caution.

Coast (*H. O. Chart 2574*).—The coast of Kamino Shima trends from Ina Saki for about 5.8 miles north-northeastward to Sao Saki, the northwestern point of Tsushima, which is 285 feet high and has cliffs on its western side.

About 1,000 yards east-northeastward of Sao Saki is Uose Hana, a point 167 feet high, which has a grassy summit but is in general wooded and conspicuous. The depths are uneven in the vicinity of this point, and foul ground extends about 600 yards northward. A detached 4-fathom shoal is north-northeastward of the point, close within the 10-fathom curve which lies off about 1,000 yards in that direction.

Off Uose Hana, the flood tidal current is west-going, and the ebb current is east-going, a velocity of about 2 knots being attained. Tide rips occur off the point with winds between west and north.

Myojo Saki, a point about 400 yards southeastward of Uose Hana, has a black rock at its extremity, and is the western entrance point of Sago Wan.

Sago Wan, an inlet with beaches of sand at its head, is entered eastward of Myojo Saki, between that point and Shoboin Dashi, a $2\frac{1}{4}$ -fathom rock situated on the end of a reef extending from the eastern side of the entrance. To avoid this rock, vessels should keep somewhat over toward Myojo Saki. Its charted depths are from 2 to 7 fathoms, and except during northerly winds, which raise a rough sea, anchorage can be had by small vessels.

The village of Minato lies on the western side of its head at the mouth of Sago Kawa, the largest river in Tsushima.

On the western side of Sago Wan are four posts, marking the landing place of a **submarine cable** which is laid through the middle of the entrance.

Senbyomaki Yama, a grassy hill, 949 feet high, rises about 1 mile east-southeastward of Myojo Saki.

Toroku Saki, a point about 2 miles eastward of Myojo Saki, is surmounted by a hill which slopes steeply on its western side. The point is foul within about 400 yards westward, and to a short distance northward and eastward.

Sasuna Ko ($34^{\circ}39' N.$, $129^{\circ}23' E.$, *H. O. Chart 2574*)—**Entrance—Depths—Dangers.**—Sasuna Ko is entered between Toroku Saki, its western entrance point, and Tateba Saki, a point about 800 yards eastward. The latter point has a densely wooded summit, and is backed by a sharp conspicuous peak, above which are pine trees. Shoal water, with depths less than 5 fathoms, extends from Tateba Saki for nearly 250 yards northwestward and westward, the narrowest width between the 5-fathom curves off the two points being about 500 yards.

The inlet indents the coast about 1 mile southeastward, becoming increasingly narrow, and the depths decrease gradually from the 10-fathom curve at the entrance to from $3\frac{1}{2}$ to $5\frac{1}{4}$ fathoms at its head. From Mukaibanseno Hana, the salient point about 200 yards south-southeastward of Tateba Saki, a ledge, on which are several above-water rocks, projects southwestward for about 150 yards, and Naka Se, a $2\frac{3}{4}$ -fathom shoal, lies about 200 yards southward of Mukaibanseno Hana.

Intsuki Se, a narrow reef about 100 yards long in a northwest and opposite direction, the northwestern end of which is situated about 700 yards southeastward of Mukaibanseno Hana, and about 165 yards off the northern shore, has a least depth of less than 3 feet. Shoal water, with depths of $5\frac{1}{4}$ fathoms and less, extends about 70 yards southward from the southeastern end of this reef, to a position about midway between the northern and southern shores.

The above mentioned dangers, and others eastward of Intsuki Se, lie very close to the fairway, requiring that caution be exercised.

Local storm signals are shown at the head of the inlet.

Sasuna.—Sasuna, a small town at the head of Sasuna Ko, had a population, in 1930, of 3,400. There is regular steamship communication with other ports in Tsushima, and with Japan. Marine products are exported. In 1938, an area fronting on the town was being reclaimed.

Okawachi Wan (Okochi Wan)—**Entrance—Depths—Dangers.**—Okawachi Wan, a narrow inlet extending in an easterly direction for about $1\frac{1}{2}$ miles, indents the coast between Sabaga Saki, a precipitous point about $2\frac{1}{4}$ miles northeastward of Tateba Saki, and Shirahama Saki, a lower point about 1,400 yards northeastward of Sabaga Saki.

Rocks extend from Sabaga Saki for about 160 yards northeastward, and the coast for nearly $\frac{1}{2}$ mile southward of Shirahama Saki is mostly foul.

The middle of the narrow entrance channel is about 300 yards northeastward of Sabaga Saki, and about 150 yards southward of the shoal water southward of Shirahama Saki, the charted depths in mid-channel being from 17 to 20 fathoms.

Korei Yama, a very conspicuous peak, 642 feet high, rises about $1\frac{1}{4}$ miles east-southeastward of Shirahama Saki.

At the entrance to Okawachi Wan the **flood tidal current** is southerly and the **ebb current** is northerly. The velocity at springs is about 1 knot.

At the inner part of the inlet, eastward of a salient point on the northern shore close within the entrance, the width is from about 200 to 300 yards, and the water continues to be very deep, but the holding ground is mainly mud, affording safe anchorage to small vessels.

Several dangers, covered by depths from 2 to $6\frac{1}{4}$ fathoms, make caution necessary when anchoring.

On the northern shore are four posts, marking the landing place of a **submarine cable** which is laid through the middle of the entrance channel.

The villages of Oura and Kawachi lie at the head of Okawachi Wan.

NORTHERN SIDE OF KAMINO SHIMA (*H. O. Chart 2574*)—**Coast.**—About $\frac{3}{4}$ mile northeastward of Shirahama Saki is Oni Saki, a low, flat point grown with trees. Rocks fringe the point, but about 200 yards offshore there are depths of 10 fathoms.

Wani Ura indents the coast about 1,400 yards between Oni Saki and Maru Saki, the northern extremity of Tsushima, which lies about $1\frac{1}{2}$ miles east-northeastward. This bight is entered between Oni Saki and the southwestern end of Uni Shima, a small wooded island northeastward of Oni Saki, through a width of about 1,000 yards, and in charted depths from 10 to 26 fathoms. The passage between Uni Shima and Maru Saki is foul, except for two very narrow and tortuous channels which should not be attempted.

Korei Yama, previously mentioned, rises close southward of Wani Ura, and affords the best landmark at the northern end of Tsushima.

The charted depths within the bight are from 3 to 20 fathoms, and when heavy seas run in shelter can be had on the southern side of Uni Shima.

During summer and autumn, large fishing nets are laid across the bight, causing hindrance to navigation.

A **submarine cable** is laid from a position northward of Waniura, a village at the head of the bight, and extends to the southern shore of Uni Shima.

Extensive reefs, on which are numerous rocks and islets, lie northward of Wani Ura and Maru Saki, and vessels rounding the northern extremity of Tsushima should give them a wide berth. These dangers are described below.

Otedo Ura, an inlet on the eastern side of Maru Saki, is entered from eastward, because of the shoals mentioned in the preceding paragraph, and indents the coast for about 1,200 yards. This inlet is very restricted by reefs and detached rocks, and at its head are two coves, divided by a small peninsula. The village of Otedo lies at the head of the western cove.

Saichose Saki, about $\frac{1}{2}$ mile east-southeastward of Maru Saki, consists of a low, flat, wooded point, and is the extremity of the peninsula on the eastern side of Otedo Ura. A reef, on which are two islets, extends from it for about 700 yards northward.

About $\frac{1}{4}$ mile farther east-southeastward is Naga Saki, a point surmounted by a conspicuous hill sparsely grown with pine trees. It appears as an islet, being joined to the peninsula southward of it by rocks that cover at high water. Naga Saki is foul for about $\frac{1}{2}$ mile northward, and there are detached shoals within nearly 1 mile northeastward of it. These dangers should be given a good berth by vessels proceeding from eastward to Toyo Ura.

Toyo Ura, an inlet less restricted than Otedo Ura, indents the coast for about 1,000 yards, and is backed by low, wooded hills.

The depths within it are from 5 to 8 fathoms, with mud bottom and good holding ground. Heavy seas run in during strong northerly winds.

On the southwestern side of the inlet is a shrine, the white gateway of which is conspicuous, and a good mark is also afforded by Ko Shima, a thickly wooded islet situated close to the western shore.

There are numerous houses at Toyo, a village at the head of the inlet.

Between Naga Saki and Atsu Saki, a point about 1 mile east-southeastward, the coast is indented, and is fringed with foul ground in places.

Mitsu Shima, situated about 1 mile northward of Maru Saki, near the middle of the reefs described below, consists of three islets lying close together and joined by shoals.

Mitsu Shima Light ($34^{\circ}44' N.$, $129^{\circ}27' E.$, *H. O. Chart 2574*) is shown from a square wooden tower, 22 feet high, painted in black and white horizontal bands, situated on O Shima, the westernmost and largest islet of Mitsu Shima. (See Light List.)

Islets and dangers off the north coast of Tsushima.—A large foul area, with numerous islets, reefs and rocks, lies off the north coast of Tsushima. During bad weather, the sea breaks over the whole area, it being impossible to make out the channels. Even

small vessels with local knowledge should attempt passage only in calm weather and at low water, when landmarks can be identified.

Kita Se, consisting of a number of above-water rocks, lies with its seaward extremity about 1,000 yards north-northeastward of Mitsu Shima Light. These rocks are low, and are difficult to make out from a distance.

Karasaki Se, situated about $\frac{3}{4}$ mile east-northeastward of Mitsu Shima Light, is a group of low, above-water rocks which are joined by shoals that dry. A reef extends from these rocks west-southwestward, joining them to Mitsu Shima. Other rocks lie about 300 yards southward of this group.

About 1,600 yards west-southwestward of Mitsu Shima Light is O Shima, a rocky islet on the middle part of a reef which extends about 1,600 yards in a northeast and opposite direction. The seaward extremity of this reef is about $1\frac{1}{4}$ miles southwestward of Mitsu Shima Light. A channel, with irregular depths, leads through the shoal area between this reef and Mitsu Shima.

Hadaka Shima, another rocky islet, is nearly 1 mile southward of Mitsu Shima Light, on a ledge that extends northward from the eastern end of Uni Shima. A reef extends from the vicinity of the ledge in a northerly direction to Mitsu Shima, and is intersected by three channels, of which the middle one has a width of about 200 yards.

Igai Se, a danger covered by a depth of $\frac{3}{4}$ fathom, lies northward of Maru Saki, in a position about 600 yards eastward of Hadaka Shima.

Vessels rounding Mitsu Shima Lighthouse should give a wide berth to Kita Se, and to the eastern and western extremities of the foul ground on either side of Mitsu Shima.

Tidal currents.—Off Wani Ura and Mitsu Shima, heavy tide rips occur when north-going tidal currents are opposed by fairly strong northerly winds, and sometimes exceed 4 knots in velocity near Mitsu Shima Lighthouse. In the channels leading through the foul ground between Mitsu Shima and Uni Shima, north-northwesterly flood tidal currents, with a velocity of about $3\frac{1}{2}$ knots, and easterly ebb currents, with a velocity of about $1\frac{1}{2}$ knots, may be experienced. In the channel on the western side of Mitsu Shima, there may be northerly ebb currents with a velocity of about $2\frac{1}{2}$ knots, and tide races may occur. Between Karasaki Se and Toyo Ura there is an eddy, the direction of which is uncertain.

EASTERN SIDE OF KAMINO SHIMA—Coast.—Izumi Ura ($34^{\circ}42' N.$, $129^{\circ}30' E.$, *H. O. Chart 2578*), a small bay, is entered between Atsu Saki and Shita Saki. This latter point, about 1,800 yards southeastward of the former, is the northeastern extremity of

a peninsula joined to the mainland by a narrow neck of land, and has a flat top surmounted by pine trees. A reef, on which are sunken rocks, extends from it about 450 yards eastward.

The bay narrows close within the entrance, with depths which gradually decrease from around 15 fathoms, and its shores are fringed with reefs, but small vessels can find sheltered anchorage in depths from $5\frac{1}{4}$ to 9 fathoms, mud, fronting on the village of Izumi at its head.

Shiko Shima, a flat, densely wooded islet, 105 feet high, lies in the middle of the bay, and from seaward appears to be part of the mainland, owing to the high land behind it.

Vessels proceeding to the anchorage must pass northwestward of the islet, keeping in mid-channel.

Miuda Ura, the entrance to which lies between Shita Saki and Tono Saki, a salient point about 1,700 yards farther southward, is unsuitable as an anchorage because of the reefs fringing its shores. From Tono Saki a reef extends about 700 yards northeastward.

Hidakatsu Ko (Nishitomari Wan) (*H. O. Chart 2578*).—This inlet, which indents the coast more than 1 mile, is entered northward of Jodono Saki, a point about $1\frac{1}{2}$ miles south-southwestward of Tono Saki, in depths from 11 to 20 fathoms. Its inner part is about 1,200 yards in length, and has, in its main area, a width of about 300 to 450 yards between the shore banks.

Entrance—Depths—Dangers.—The entrance to the inner part of Hidakatsu Ko does not exceed 200 yards in navigable width, and lies between Ikazuchi Saki, a salient point on the northern side of the inlet, about $1\frac{1}{4}$ miles southwestward of Tono Saki, and a rocky islet situated about 300 yards southwestward of the point. It has charted depths from $6\frac{3}{4}$ to 8 fathoms.

Gongen Yama, a thickly wooded hill about $\frac{1}{2}$ mile north-northwestward of Ikazuchi Saki, is 640 feet high, and Tomi Yama, about 400 yards northeastward of Gongen Yama, has a height of 620 feet.

On the northern side of the fairway, a reef, in the center of which is Ko Shima, an islet 69 feet high, extends from Ikazuchi Saki for about 1,200 yards east-northeastward, and Kajikake, a danger on the southern extremity of this reef, lies about 240 yards eastward of the edge of the bank fringing Ikazuchi Saki within about 100 yards.

Two reefs, the outer extremities of which lie respectively close northwestward and southeastward of the rocky islet southwestward of Ikazuchi Saki, are on the southern side of the fairway. Within the inlet, westward of these entrance dangers, the 5-fathom curve lies less than 200 yards offshore.

Lights.—A light is shown from a pole, 23 feet high, situated near the extremity of Ikazuchi Saki.

Two range lights are shown from poles at the head of Hidakatsu Ko. These lights, bearing 298° , lead through the fairway southward of Ikazuchi Saki. (See Light List.)

Anchorage.—The recommended anchorage within the inner part of Hidakatsu Ko is in depths from 9 to 10 fathoms, mud, about 300 yards west-northwestward of Ikazuchi Saki. This anchorage is sheltered at all times.

Local storm signals are shown near Hidakatsu, in a position southwestward of the range lights. (See page 29.)

Hidakatsu.—The town of Hidakatsu lies on the northwestern side of Hidakatsu Ura, the western cove at the head of Hidakatsu Ko, and in 1930 had a population of about 4,600. There is regular steamship communication with other ports in Tsushima, and with Japan. Fishery products are the principal exports.

Coast (*H. O. Chart 2574*).—From Jodono Saki the coast trends south-southwestward for about $\frac{3}{4}$ mile to Shinaki Shima, a conspicuous wooded islet, which has reefs on its seaward side and should not be approached. This islet lies close off the northern entrance point of Tsuwahara Wan, a small bight affording temporary anchorage to small vessels, except during easterly winds.

A 3-fathom shoal is situated about 900 yards eastward of the promontory separating Tsuwahara Wan and Shushi Wan. This danger is in a position about 1,400 yards southward of Shinaki Shima.

Shushi Wan, which indents the coast to a distance of 2 miles, is a narrow inlet available to small vessels, and has charted depths from 6 to 20 fathoms.

Kochibo Shima, a small islet surmounted by a solitary pine tree, lies close southeastward of the extremity of the promontory on the northern side of Shushi Wan, and from this islet a reef extends about 1,200 yards southeastward, across the northern side of the entrance to the inlet.

The southern entrance point of Shushi Wan lies about 2 miles southward of Shinaki Shima and $1\frac{1}{2}$ miles southward of Kochibo Shima. On a reef close northward of the point is Zeni Shima, consisting of two islets, the outermost of which is surmounted by a solitary pine tree, and the extremity of the reef, about 200 yards northeastward of this islet, lies about $\frac{1}{2}$ mile south-southwestward of the $4\frac{1}{4}$ -fathom shoal on the extremity of the reef extending from Kochibo Shima.

The entrance depth between these two reefs is from 12 to 21 fathoms.

Abreast of Aka Saki, a salient point on the southern side of the inlet, about 1,200 yards northwestward of Zeni Shima, the navigable width of the channel is reduced to about 650 yards by reefs, one of which extends about 200 yards northward from the point.

A peninsula projects for about 1 mile at the head of the inlet, dividing it into northern and southern arms, namely Hamakusu Ura and Shushi Ura, both of which have dangers in or near the fairways.

The village of Shushi is situated at the head of a cove on the southern side of Shushi Ura.

Coast.—Between the southern entrance point of Shushi Wan and Kin Saki a small, wooded point about $2\frac{1}{4}$ miles southward, the coast is indented, and is fringed by a coastal reef which extends in places to a distance of about $\frac{1}{4}$ mile offshore. There appear to be no dangers outside the 10-fathom curve which is in general about 800 yards from the shore.

Eboshi Saki ($34^{\circ}33' N.$, $129^{\circ}28' E.$), the southern extremity of the promontory which terminates eastward in Kin Saki, is a rocky point that rises steeply to a dark, densely wooded hill, 242 feet high.

Kin Wan, a small bay, lies between Eboshi Saki, its northern entrance point, and Asagi Saki, a low, rocky point about $\frac{1}{2}$ mile southwestward. It indents the coast for about 1,200 yards, and has charted depths from 4 to 9 fathoms.

A black, above-water rock, from which a shoal extends about 300 yards southeastward, lies close off Eboshi Saki, and another black rock rises slightly above water near the eastern extremity of Asagi Saki.

The fairway leads through the middle of the entrance, and is reduced by these dangers to a width of about 600 yards.

Except during easterly winds, Kin Wan is suitable as an anchorage for small vessels.

At the village of Kin, near the head of the bay, local storm signals are shown. (See page 29.)

In the vicinity of Kin Saki, the flood tidal current is southerly, and the ebb current is northerly, the maximum velocity being about $1\frac{1}{2}$ knots.

Coast.—Thickly wooded hills rise abruptly from the coast which trends southwestward from Kin Wan for about 2 miles to Oshika Wan.

A small indentation, of which Ashimi Wan and Hitoe Wan are the respective northeastern and southwestern inlets, is entered about $1\frac{1}{4}$ miles southwestward of Kin Wan. Both inlets are shallow, and are available only to boats.

Ori Se, which dries 2 feet, lies about 300 yards offshore, in a position about 800 yards northeastward of the northeastern entrance point of Ashimi Wan, and close off this point is Hira Se, a rock 22 feet high.

Oshika Wan (*H. O. Chart 2574*), about 1 mile southwestward of Hitoe Wan, is a bight somewhat over $\frac{1}{4}$ mile in extent, with charted depths from 4 to 7 fathoms. Its entrance is about 700 yards wide, but an islet, situated near its northeastern entrance point, and a reef,

extending about 300 yards from its southwestern entrance point, reduce the width of the entrance to about 300 yards in the fairway.

A patch, on which is a rock awash, lies nearly in the middle of Oshika Wan, and restricts the anchorage considerably. Vessels should pass northward of this danger.

The village of Oshika lies near the western shore of the bight. When there are heavy seas along the coast, landings should be made at a cove northeastward of the village.

Coast.—From Oshika Wan, ranges of hills, densely wooded, continue southwestward along the coast for about 4 miles to Saga Wan, a small bay, and this area is indented by several small inlets and bights which can be entered only by small craft.

Saga Wan (Saka Wan), a small bay, is entered between Okaigo Hana, its northern entrance point, and Chi Saki, a low, conspicuous point about 1 mile southward. It has charted depths from 4 to 12 fathoms.

A reef lies close off the middle of the entrance, and when entering vessels should keep somewhat over toward Okaigo Hana.

Several dangers fringe the shores of the bay to a considerable distance, and it is suitable only for small vessels, which must anchor at its head when heavy seas are raised by easterly winds.

Saga, a village at the head of the bay, lies between two rivers, the eastern of which may be entered by small craft at high water.

At the entrance to Saga Wan, the flood tidal current is south-going, and the ebb current flows in an opposite direction. Both currents are weak, with velocities not exceeding 0.8 knot.

Yokoura Wan, a large inlet with two arms, lies next southward of Saga Wan, being separated from that bay by a peninsula which extends southeastward. Its entrance is about 1 mile wide, with deep water in the fairway, and its charted depths are from 5 to 21 fathoms. Yoko Ura, the southernmost and largest arm, extends to a distance of about $2\frac{1}{2}$ miles from the entrance, and has a greatest width, in its middle part, of about $\frac{3}{4}$ mile.

Nagasaki Hana (Naga Saki), the southeastern entrance point of the inlet, is backed by a rounded, grassy hill which is conspicuous from northward or southward. Zeni Shima, a detached islet, lies off the end of the promontory on the northern side of the entrance.

A $4\frac{3}{4}$ -fathom rock lies on the northern side of the entrance fairway, about 1,200 yards northward of Nagasaki Hana, and close westward of this rock are other shoals, one of which is covered by $3\frac{1}{4}$ fathoms. On the southern side of the fairway, a rocky ledge projects a short distance from Nagasaki Hana, and a rock, over which is a depth of less than 1 fathom, is about 400 yards west-northwestward of the same point. These dangers reduce the navigable width of the entrance to about 800 yards.

Coast.—Between Nagasaki Hana and Aka Shima, an island about 3 miles southward, islets and rocks lie off the coast to a distance of about $\frac{1}{2}$ mile in places, and from the eastern side of Aka Shima a chain of islets and rocks extends about 800 yards in a southeasterly direction.

Oki Shima, an island lying close offshore, near the southwestern side of Aka Shima, is 424 feet high, and about 1 mile southward of Oki Shima is Kuro Shima, an island about 1.3 miles in length. The eastern extremity of Kuro Shima has a pointed summit, 450 feet high, and is very conspicuous.

Miura Wan, an inlet joined to Aso Wan by Kusubo Seto (see page 619), is entered between the southeastern end of Kuro Shima and Orise Hana (Shimomi Saki), a salient point about $1\frac{1}{4}$ miles southwestward. It has charted depths from 7 to 18 fathoms, and within the entrance is an area about 1 mile in extent which leads to two arms, situated northward and southwestward, with general widths of about $\frac{1}{2}$ mile.

The shores of Miura Wan are for the most part nearly steep-to, but in places there are dangers within about 600 yards offshore.

Local storm signals are shown at Kamoise (Kamoize), a village near the head of the northern arm. (See page 29.)

Kusubo Seto leads from the head of the southwestern arm, and at this place is the village of Kusubo (Kasubo).

EASTERN SIDE OF SHIMONO SHIMA (*H. O. Chart 2574*)—**Coast.**—From Miura Wan, the coast of Shimono Shima trends southwestward for about $2\frac{1}{2}$ miles to Tsunakake Saki, a cliffy point with a black, pillar-shaped rock situated close off its extremity. There are depths around 10 fathoms at a distance of about 200 yards from the rock.

Kechi Wan ($34^{\circ}16' N.$, $129^{\circ}21' E.$), a relatively wide and deep bay, is entered between Tsunakake Saki and Okaji Saki, a high, conspicuous point faced with cliffs, situated about 3 miles southwestward. The bay indents the coast about $1\frac{1}{2}$ miles, and has charted depths of from $3\frac{1}{2}$ to 22 fathoms.

The entrance is free from dangers, except for the black rock close off Tsunakake Saki, and a detached rock, marked by breakers in a heavy sea, which lies about 460 yards northward of the extremity of Okaji Saki.

Ofunakoshi (see page 619), which leads to the eastern part of Aso Wan, is situated on the northeastern side of the bay.

The shores of Kechi Wan are cliffy, and are indented by several inlets in which small vessels can anchor. The central part of the bay is unobstructed, and there are no off-lying dangers on its northern side, which is nearly steep-to, but rocks, reefs and islets fringe the

western shore in places. During strong easterly or southerly winds, heavy seas may be experienced in the bay.

Between Tsunakake Saki and Ota Saki, a point about $1\frac{1}{4}$ miles westward, there is shelter from northerly winds in depths from $4\frac{1}{2}$ to 10 fathoms, in a position about 200 yards offshore.

The village of Kechi lies near the head of Ota Ura, an inlet on the northern side of Kechi Wan.

Three **submarine cables**, the tracks of which are indicated on the chart, are laid from Ota Ura.

Local storm signals are shown at Kechi. (See page 29.)

Tidal currents.—There are strong tidal currents near Okaji Saki, and tide rips occur during strong northeasterly winds.

Azu Ko (*H. O. Chart 2150*), an inlet about $\frac{1}{2}$ mile in extent, is entered southward of Magari Saki, the southern extremity of which point is a little more than 1 mile southwestward of Okaji Saki. The eastern extremity of Tsurumo Saki, the southern entrance point of the inlet, is about 700 yards southward of Magari Saki.

The charted depths in its entrance are from 11 to 16 fathoms, and there are from 6 to 10 fathoms in the central part of the inlet.

From Magari Saki, a reef extends southward for about 250 yards, and a detached shoal, extending about 300 yards in a northwest and opposite direction, lies off Tsurumo Saki within about 300 yards east-northeastward and about 250 yards north-northeastward of the eastern extremity of the point. These dangers reduce the navigable width of the entrance to about 200 yards.

Shelter is available to small vessels, even during southeasterly winds, midway between Magari, a village on the eastern shore of the inlet, and a thickly wooded islet which fronts on the northwestern shore.

Izuhara Ko ($34^{\circ}11' N.$, $129^{\circ}18' E.$, *H. O. Chart 2150*)—**Entrance—Depths—Landmarks.**—This harbor, which is open to foreign trade (see page 20), indents the coast about $\frac{1}{2}$ mile with a general width of about 800 yards, between Yara Saki, a point about 1 mile southward of Tsurumo Saki, and Torā Saki, a point about 850 yards farther southward.

The charted depths in its entrance are from 8 to 14 fathoms, and in the central part of the harbor are from 6 to 8 fathoms, sand bottom. The shores of the harbor are in general fringed with shallow water, which extends to a considerable distance at the heads of its northern and southwestern inlets.

The 10-fathom curve lies within about 200 yards eastward and southward of Yara Saki, which is nearly steep-to, and the northern side of the entrance is free from off-lying dangers. On the southern side of the entrance is a rocky ledge, the northern extremity of which,

covered by depths less than 1 fathom, lies about 600 yards southward of the light on Yara Saki.

Ichinomaru Yama, a hill 686 feet high, rises about $1\frac{1}{4}$ miles northward of Yara Saki, and about 1,300 yards southward of this hill is Kakuyoku San, 622 feet high. Marukuma Yama (Mashida Yama), a hill with a wooded summit, attains an elevation of 902 feet, about $1\frac{1}{4}$ miles to the westward of Tora Saki.

Lights.—A light is shown from a white wooden staff, 22 feet high, situated on Yara Saki.

Two range lights are shown from white wooden posts at the head of Izuhara Ko, the front light being about 1,100 yards west-northward of Yara Saki Light. These range lights, bearing 313° , lead through the entrance fairway. (See Light List.)

Submarine cables—Prohibited anchorage.—Two submarine cables, the tracks of which are indicated on the chart, are laid along the northeastern side of the harbor, and are marked by two white conical buoys with triangular top marks.

Anchorage is prohibited northeastward of a line established by these buoys in range.

Anchorage.—Anchorage can be had in depths around $6\frac{1}{4}$ fathoms, sand and mud bottom, with Yara Saki Light bearing 82° , distant about 650 yards. Small vessels can proceed farther inshore, and pick up anchorage northeastward of Shigano Hana, the western entrance point of the northern inlet. Shelter is afforded, except during easterly winds.

Inner Harbor.—Small vessels can moor alongside a breakwater within the northern inlet, in depths from $10\frac{1}{2}$ to 24 feet. A mooring buoy is anchored off the head of this breakwater.

At the head of the same inlet is a basin for small craft, with depths of about 2 feet.

Local storm signals are shown from the meteorological observatory at the town of Izuhara. (See page 29.)

Winds.—Northerly winds prevail throughout the year, and blow down from the high hills surrounding the harbor. These winds do not affect the anchorage.

Directions.—Vessels approaching Izuhara Ko from eastward should make good a course with Marukuma Yama bearing 274° . When the southwestern point of Shigano Hana is brought in range with the summit of Kakuyoku San, bearing 299° , the anchorage in the middle of the harbor may be steered for on this bearing.

The white posts of the Izuhara Ko range lights are not clearly visible, being partially obscured by trees, and vessels entering the harbor by day, from southeastward, should keep Ichinomaru Yama bearing less than 330° , so as to pass northeastward of the danger on the southern side of the entrance. Care should be taken to keep northward of a

line established by Utsuzuri Saki, a salient point at the middle of the southern shore of the harbor, in range with the wooded summit of Marukuma Yama, bearing 279° .

IZUHARA.—This town, situated at the head of the northern inlet, is the capital of Tsushima, and in 1935 had a population of about 9,400. Its facilities include a customhouse and a meteorological observatory.

Fish is plentiful, but meat and vegetables are scarce. Good drinking water is obtainable, and can be supplied by water boat.

The chief exports are fishery products, and the chief imports, salt and rice.

Numerous small steamers and sailing vessels call at the port, and there is regular steamer communication with other ports in Tsushima, and with Korea and Japan. The towns of Kechi and Takeshiki can be reached by automobile. Izuhara is connected with the Japanese telegraph system.

Coast (H. O. Chart 2574).—Agami Saki (Tatsuno Saki), about $3\frac{1}{2}$ miles southward of Izuhara Ko, is a densely wooded headland, 444 feet high, and is conspicuous from northeastward or southwestward. Agami Wan indents the coast on the northern side of the headland, and during westerly winds small vessels can shelter within this inlet.

Next southwestward of Agami Saki is Kuwa Wan, an inlet somewhat larger and better protected than Agami Wan, and in which the charted depths are from $4\frac{3}{4}$ to 14 fathoms.

Naiin Shima, a thickly wooded islet, 532 feet high, lies about $2\frac{3}{4}$ miles southwestward of Agami Saki. A reef joins this islet to the point northward of it.

Naiin Wan, which is entered on the western side of Naiin Shima, is a narrow inlet about 1 mile in length in a north-south direction, with a general width of about 600 yards. It has charted depths from $2\frac{3}{4}$ to 15 fathoms, over sand bottom.

This inlet is suitable only for small vessels, and during easterly or southerly winds it is unsafe. The villages of Yora Naiin and Tsutsu Naiin lie on the respective eastern and western sides of a river at its head.

Ikarikuma Yama, a sharp, conspicuous peak, thickly grown with trees and dark in color, rises about $\frac{1}{2}$ mile northeastward of the head of Naiin Wan.

APPENDIX I

List of principal ports, giving depths below chart datum level in the channels of approach and at the anchorage, with the rise of the tides

Port	Depth below chart datum level		Rise of tide		Remarks
	In channel of approach	In anchorage	Springs	Neaps	
Hakata Ko.....	<i>Fathoms</i> 6¾ 3¾	<i>Fathoms</i> 5 to 10 2¾ to 4½	<i>Feet</i> 6.56	<i>Feet</i> 4.59	Outer anchorage. Inner harbor. 25½ feet alongside quay.
Hiroshima Ko.....	Deep	5½ to 7	11.15	8.53	Outer anchorage. Inner (artificial) harbor being dredged to depths of 6½ to 28 feet.
Hososhima Ko.....	Deep 5	7 to 8 2¾ to 4½	5.91	4.59	Outer anchorage. Inner harbor.
Kagoshima Ko.....	Deep 6	10 to 25 3 to 4¾	9.19	6.89	Outer anchorage. Inner harbor. 24 feet alongside quay.
Kobe Ko.....	Deep 6¾	6 to 7 4½ to 7	4.59	3.61	Outer anchorage. Inner harbor. 27 to 39 feet alongside wharves for overseas vessels.
Miike Ko.....	4	6	16.40	12.14	In northern part of inner harbor. Depth of 28 feet below mean sea level in wet dock.
Moji Ko.....	4½ from eastward; 5½ from westward.	5 to 6	7.55	5.58	32.8 feet alongside quay.
Nagasaki Ko.....	15	3½ to 15	9.51	7.22	Inner harbor. 20½ feet alongside quay.
Osaka Ko.....	Deep 27 feet	4 to 7 26 to 33 feet	4.59	3.61	Outer anchorage. Inner harbor. Maximum depth alongside wharves, 32 feet.
Shimonoseki Ko.....	4½ from eastward; 5½ from westward.	4 to 8	8.20	6.23	23½ feet alongside quay.
Wakamatsu Ko.....	3¾	3¾ to 5	4.25	3.25	Inner harbor. 19½ to 31 feet alongside quays.

STATION: MIYAZAKI, KYUSHU

Position: Latitude, 31°55' N.; Longitude, 131°26' E. Altitude, 28 feet

Month	Air Temperature—° F.					Relative humidity (%)	Cloud Amount (0-10)	Rainfall			Wind			Average Number of Days with Fog	Average Number of Days with Gales	Average Number of Days with Thunderstorms	Average Number of Days with Snow
	Mean			Extreme				Average Amount (Inches)	Number of Rainy Days	Maximum in 24 Hours (Inches)	Mean Velocity (Knots)	Maximum Velocity (Knots)	Mean Direction				
	Monthly	Maximum	Minimum	Maximum	Minimum												
Jan.....	44.4	54.7	34.9	76.1	18.5	72	4.2	2.85	9	4.32	5.2	37.3	N 69 W	0.2			0.1
Feb.....	45.5	55.0	36.1	75.0	20.1	71	5.1	4.29	9	5.84	5.4	29.9	N 63 W	0.3			0.3
Mar.....	51.4	60.4	42.3	79.5	24.6	75	5.9	7.50	14	9.15	5.2	34.4	N 52 W	0.2			0.1
Apr.....	59.7	68.2	50.7	88.2	29.3	78	6.7	9.03	15	6.28	4.9	31.9	N 27 W	0.5			0
May.....	66.2	74.3	57.9	90.3	37.6	80	6.9	9.54	14	7.41	4.9	28.2	N 2 E	0.7			0
June.....	72.3	79.0	65.8	92.7	48.6	84	8.0	15.56	18	11.24	4.5	45.3	S 89 W	0.9			0
July.....	78.6	85.5	72.3	97.3	60.8	85	6.6	11.97	17	7.81	4.9	39.2	S 6 E	1.5			0
Aug.....	79.9	87.1	73.2	99.9	61.5	84	5.8	11.36	16	12.66	4.9	50.1	N 78 E	0.8			0
Sept.....	74.8	82.4	68.0	95.2	50.5	84	6.5	11.70	16	19.30	4.3	59.6	N 8 E	0.8			0
Oct.....	64.9	74.1	56.7	88.9	36.7	81	5.8	8.73	13	12.47	4.1	53.0	N 20 W	0.2			0
Nov.....	55.9	66.0	46.4	81.7	27.1	79	4.8	5.06	9	9.17	4.3	29.9	N 55 W	0.1			0
Dec.....	47.1	57.9	37.4	77.0	19.0	74	3.9	2.78	8	5.63	4.9	33.2	N 70 W	0.3			0.1
MEAN.....	61.7	70.4	53.5	x x x	x x x	79	5.9	x x x	x x	x x x	4.9	x x x	N 52 W	x x x	x x x	x x x	x x x
TOTAL.....	x x x	x x x	x x x	x x x	x x x	x x	x x	x x x	x x	100.37	158	x x x	x x x	x x x	6.5		0.6
EXTREME.....	x x x	x x x	x x x	99.9	18.5	x x	x x	x x x	x x	19.30	x x x	59.6	x x x	x x x	x x x	x x x	x x x
No. of Years.....	30	30	30	44	44	30	30	30	30	44	30	44	40	30			30

Authority: The Climate of Japan. T. Okada.
Bulletin of the Central Meteorological Observatory, Tokyo, 1931.

1 Calculated by frequency.

STATION: NAZE, AMAMI O SHIMA, NANSEIS

Position: Latitude, 28°23' N.; Longitude, 129°30' E. Altitude, 14 feet

Month	Air Temperature—° F.					Relative humidity (%)	Cloud Amount (0-10)	Rainfall			Wind			Average Number of Days with Fog	Average Number of Days with Gales	Average Number of Days with Thunderstorms	Average Number of Days with Snow	
	Mean			Extreme				Average Amount (Inches)	Number of Rainy Days	Maximum in 24 Hours (Inches)	Mean Velocity (Knots)	Maximum Velocity (Knots)	Mean Direction					
	Monthly	Maximum	Minimum	Maximum	Minimum													
Jan.....	57.7	63.7	52.2	79.5	40.3	73	8.1	7.88	23	4.47	8.0	31.1	N 7 E	0		0	0	
Feb.....	57.6	63.1	52.2	79.7	37.6	73	8.5	8.29	21	5.34	8.2	30.1	N 4 E	0		0	Trace	
Mar.....	61.2	67.3	55.4	82.8	40.5	73	8.1	8.30	20	5.18	7.4	29.7	N 31 E	0		0.8	0	
Apr.....	66.9	73.2	61.0	86.7	43.9	76	8.0	10.27	19	8.29	6.2	24.3	S 44 E	0		1.0	0	
May.....	71.2	78.3	65.3	92.7	4.89	78	8.1	12.59	19	21.54	5.1	31.3	S 28 E	0		1.4		
June.....	77.5	84.0	72.1	95.9	57.0	80	8.2	16.02	20	14.38	4.9	36.9	S 5 E	0		1.2	0	
July.....	81.3	88.2	75.6	95.9	65.8	79	6.9	9.67	18	8.88	4.9	46.0	S 17 E	0		1.4	0	
Aug.....	81.5	88.2	75.9	95.0	67.6	80	6.7	13.08	20	16.02	5.4	58.9	S 34 E	0		1.2	0	
Sept.....	78.8	85.6	73.4	93.7	59.5	80	6.6	10.59	20	8.40	5.6	51.9	S 50 E	0		1.2	0	
Oct.....	72.9	79.5	67.1	90.3	53.8	76	7.2	12.06	19	9.48	6.4	57.3	N 55 E	0		0.4	0	
Nov.....	66.7	72.9	61.2	87.8	46.8	73	7.8	9.09	17	16.59	7.2	47.2	N 31 E	0		1.0	0	
Dec.....	60.6	66.6	55.0	80.8	43.8	72	7.9	6.93	21	6.00	7.8	30.9	N 8 E	0		0.2	0	
MEAN.....	69.5	75.9	63.9	x x x	x x x	76	7.7	x x x	x x	x x x	6.4	x x x	S 70 E	x x x	x x x	x x x	x x x	
TOTAL.....	x x x	x x x	x x x	x x x	x x x	x x	x x	x x x	x x	134.77	237	x x x	x x x	x x x	0		9.8	0
EXTREME.....	x x x	x x x	x x x	95.9	37.6	x x	x x	x x x	x x	21.54	x x x	58.9	x x x	x x x	x x x	x x x	x x x	
No. of Years.....	30	30	30	33	33	30	30	30	30	33	32	32	29	30		5	30	

Authority: The Climate of Japan. T. Okada.
Bulletin of the Central Meteorological Observatory, Tokyo, 1931.

1 Calculated by frequency.

OCEAN AREA
GREENWICH NOON OBSERVATIONS

Years covered: 1879-1933

Position: Latitude, 30°-35° N.; Longitude, 130°-135° E.

Month	Number of Observations Surveyed	WIND										WEATHER										Mean Cloud Amount (0-10)	Average Air Temperature	Average Sea Surface Temperature			
		Mean Velocity (Knots)	Percentages of Observations From—										Percentages of Observations Recording														
			N	NE	E	SE	S	SW	W	NW	Calm	Haze	Mist	Fog	Drizzle	Rain	Snow	Showers	Thunderstorms	Heavy Squalls	Light to Moderate Squalls				Gales (Force 8 or Over)	Exceptional Visibility	
January	691	11.6	17	15	5	3	2	5	14	36	3	2	1	1	5	1	2	*	*	6	2	6	5.0	50	58		
February	511	13.0	22	16	5	4	2	5	16	28	2	4	1	0	10	1	3	*	*	6	2	5	5.6	50	58		
March	661	11.6	17	17	9	6	4	8	15	21	3	3	3	0	2	12	*	2	*	5	4	7	5.3	55	59		
April	635	9.7	12	18	12	11	8	11	12	13	3	7	6	1	2	9	*	2	*	2	3	5	5.6	61	62		
May	737	8.0	10	15	12	11	11	13	12	9	7	7	5	1	2	7	0	2	*	0	1	5	5.4	66	66		
June	634	7.2	9	16	12	11	11	17	10	6	8	6	6	1	2	15	0	3	1	0	3	1	4	6.4	72	71	
July	667	6.8	5	13	12	12	15	19	12	5	7	6	4	1	1	9	0	3	1	*	2	1	9	5.0	79	77	
August	605	7.6	7	21	17	11	10	16	7	4	7	4	1	0	*	5	0	4	2	*	3	1	6	4.6	81	80	
September	701	8.9	13	28	13	10	8	10	6	8	4	3	2	*	2	9	*	3	2	*	4	2	6	5.4	78	78	
October	603	9.7	19	33	10	7	3	4	6	16	2	2	1	*	1	9	0	2	2	*	2	1	6	4.9	70	73	
November	568	10.2	21	18	8	6	4	5	12	24	2	2	1	*	1	7	0	2	1	0	4	1	7	4.8	62	68	
December	581	11.6	18	14	5	3	2	5	16	36	1	2	1	*	1	6	*	3	1	*	5	3	7	4.9	55	63	
MEANS	x x x	10.0	14	19	10	8	7	10	11	17	4	4	3	*	1	9	*	3	1	*	4	2	6	5.2	65	68	
TOTALS	7,597	x x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x x	x x x	x x x

*Less than 0.5 percent. Compiled by U. S. WEATHER BUREAU.

OCEAN AREA

GREENWICH NOON OBSERVATIONS

Years covered: 1873-1933

Position: Latitude, 30°-35° N.; Longitude, 125°-130° E.

Month	Number of Observations Surveyed	WIND										WEATHER										Mean Cloud Amount (0-10)	Average Air Temperature	Average Sea Surface Temperature		
		Mean Velocity (Knots)	Percentages of Observations From—										Percentages of Observations Recording													
			N	NE	E	SE	S	SW	W	NW	Calm	Haze	Mist	Fog	Drizzle	Rain	Snow	Showers	Thunderstorms	Heavy Squalls	Light to Moderate Squalls				Gales (Force 8 or Over)	Exceptional Visibility
January	767	12.0	26	14	5	3	3	3	9	36	1	2	2	*	1	5	2	3	*	*	6	3	6	6.1	49	58
February	728	13.0	26	15	4	4	2	2	7	39	1	3	2	1	1	8	2	4	*	*	9	4	4	6.8	49	56
March	793	11.6	22	15	6	6	4	7	9	29	2	5	2	1	2	10	1	2	1	1	3	2	5	5.9	53	57
April	841	10.2	16	20	8	8	7	9	11	17	4	9	6	4	2	13	*	1	1	*	3	2	5	5.7	59	60
May	956	8.0	12	17	10	12	9	10	10	16	4	7	6	3	2	9	0	1	0	*	2	1	4	5.7	65	64
June	855	7.6	12	15	11	13	14	12	8	9	6	8	6	7	3	14	*	3	1	*	2	1	4	6.8	71	70
July	922	8.4	5	14	9	14	25	20	5	4	4	5	3	5	1	7	0	2	1	*	2	1	7	5.3	78	76
August	884	8.4	8	19	11	15	14	15	6	7	5	5	1	*	*	4	0	1	2	*	4	2	6	4.4	81	80
September	955	10.6	23	30	9	6	6	6	7	11	2	2	2	1	1	6	0	3	*	1	3	2	6	5.3	76	77
October	822	11.6	30	30	8	3	3	3	6	15	2	1	2	0	1	5	0	2	*	*	2	2	5	5.2	68	72
November	772	11.1	28	15	6	4	3	4	9	28	3	1	1	0	1	6	0	3	1	1	6	1	7	5.2	60	66
December	739	12.5	27	14	3	3	2	3	7	39	2	2	1	*	1	7	1	3	*	0	7	3	8	6.0	53	62
MEANS	x x x	10.4	20	18	7	7	8	8	8	21	3	4	3	2	1	8	0.5	2	1	*	4	2	6	5.7	64	66
TOTALS	10,034	x x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x x	x x x	x x x

*Less than 0.5 percent. Compiled by U. S. WEATHER BUREAU.

OCEAN AREA
GREENWICH NOON OBSERVATIONS

Years covered: 1879-1933

Position: Latitude, 25°-30° N.; Longitude, 130°-135° E.

Month	Number of Observations Surveyed	WIND										WEATHER										Mean Cloud Amount (0-10)	Average Air Temperature	Average Sea Surface Temperature		
		Mean Velocity (Knots)	Percentages of Observations From—										Percentages of Observations Recording													
			N	E	E	SE	S	SW	W	NW	Calm	Haze	Mist	Fog	Drizzle	Rain	Snow	Showers	Thunderstorms	Heavy Squalls	Light to Moderate Squalls				Gales (Force 8 or Over)	Exceptional Visibility
January.....	177	13.5	20	17	9	5	7	5	8	28	1	2	1	0	2	7	0	7	3	1	12	3	9	5.3	65	70
February.....	146	13.0	23	16	11	10	3	3	8	24	2	2	1	0	3	7	0	3	1	1	10	6	11	5.5	62	68
March.....	168	11.6	17	20	10	9	8	13	7	13	3	4	2	0	2	9	0	3	1	0	7	1	7	5.2	64	68
April.....	149	10.2	8	19	23	10	11	10	5	13	1	8	3	0	3	8	0	4	3	1	2	0	9	5.2	69	70
May.....	144	11.1	15	11	16	15	14	12	7	9	1	6	2	1	1	6	0	3	1	0	5	2	5	5.5	70	72
June.....	202	9.7	7	16	17	12	19	19	5	5	0	2	1	0	2	11	0	2	1	0	2	2	4	5.0	77	77
July.....	119	11.6	3	5	19	18	20	17	7	8	3	10	1	0	0	6	0	6	4	0	11	3	4	3.8	82	81
August.....	140	13.0	7	15	20	19	13	15	5	4	2	2	1	0	0	5	0	4	4	0	5	10	8	4.1	83	82
September.....	143	11.1	16	25	14	13	12	5	4	8	3	5	0	0	1	6	0	3	3	0	7	5	9	4.3	81	82
October.....	156	10.6	23	32	11	6	4	5	2	14	3	3	1	0	1	5	1	5	2	0	3	1	8	5.5	77	78
November.....	132	13.0	21	40	7	5	1	3	4	15	4	1	1	0	1	2	0	4	1	1	3	3	7	5.2	72	75
December.....	189	13.0	31	13	11	5	3	3	3	31	0	1	1	0	3	6	0	2	1	2	7	4	6	5.3	66	71
MEANS.....	x x x	11.7	16	19	14	11	10	9	5	14	2	4	1	*	2	6	*	4	2	0.5	6	3	7	5.0	72	75
TOTALS.....	1,865	x x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x x	x x x	x x x

*Less than 0.5 percent. Compiled by U. S. WEATHER BUREAU.

APPENDIX III

OCEAN AREA
GREENWICH NOON OBSERVATIONS

Years covered: 1873-1933

Position: Latitude, 25°-30° N.; Longitude, 125°-130° E.

Month	Number of Observations Surveyed	WIND										WEATHER										Mean Cloud Amount (0-10)	Average Air Temperature	Average Sea Surface Temperature		
		Mean Velocity (Knots)	Percentages of Observations From—										Percentages of Observations Recording													
			N	NE	E	SE	S	SW	W	NW	Calm	Haze	Mist	Fog	Drizzle	Rain	Snow	Showers	Thunderstorms	Heavy Squalls	Light to Moderate Squalls				Gales (Force 8 or Over)	Exceptional Visibility
January.....	282	16.5	45	19	8	3	1	2	3	18	1	1	1	0	4	8	0	6	*	*	8	7	6	6.3	59	67
February.....	248	16.5	42	13	3	5	3	2	2	30	0	3	1	*	4	7	1	6	*	*	10	8	4	6.3	57	65
March.....	273	13.5	27	21	8	8	4	5	4	19	1	4	3	1	1	9	0	3	*	0	5	4	3	6.4	61	65
April.....	259	10.2	24	20	11	10	11	5	3	13	3	6	5	2	2	9	0	5	2	*	5	*	7	6.5	67	69
May.....	251	10.6	15	20	14	19	10	5	6	9	2	4	2	1	3	12	0	4	4	0	4	1	6	6.5	72	72
June.....	263	10.2	4	14	15	19	20	18	4	4	2	6	3	2	3	13	0	4	1	*	5	2	6	6.5	77	77
July.....	255	10.2	3	7	26	19	19	16	4	3	3	4	*	1	2	4	*	3	2	0	5	3	9	4.6	82	81
August.....	296	11.6	3	18	24	18	13	12	3	7	2	3	1	0	*	7	0	4	2	*	8	6	5	4.4	83	82
September.....	258	11.1	16	32	14	14	6	3	3	8	4	2	*	0	1	6	*	5	2	0	5	*	8	5.2	75	76
October.....	220	12.0	31	38	10	4	4	2	2	6	3	4	3	0	*	2	0	4	1	0	5	*	8	5.2	75	76
November.....	231	15.0	36	29	10	3	1	2	4	15	0	2	1	0	2	6	0	1	0	0	6	6	3	6.3	68	73
December.....	240	15.0	38	21	9	3	3	2	2	21	1	2	2	*	1	11	1	3	1	*	10	4	5	6.1	62	69
MEANS.....	x x x	12.7	24	21	13	10	8	6	3	13	2	3	2	1	2	8	*	4	1	*	6	4	5	5.8	70	74
TOTALS.....	3,076	x x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x x	x x x	x x x

*Less than 0.5 percent. Compiled by U. S. WEATHER BUREAU.

APPENDIX III

OCEAN AREA
GREENWICH NOON OBSERVATIONS

Years covered: 1881-1933

Position: Latitude, 20°-25° N.; Longitude, 130°-135° E.

Month	Number of Observations Surveyed	WIND										WEATHER													Mean Cloud Amount (0-10)	Average Air Temperature	Average Sea Surface Temperature	
		Mean Velocity (Knots)	Percentages of Observations From—										Percentages of Observations Recording															
			N	NE	E	SE	S	SW	W	NW	Calm	Haze	Mist	Fog	Drizzle	Rain	Snow	Showers	Thunderstorms	Heavy Squalls	Light to Moderate Squalls	Gales (Force 8 or Over)	Exceptional Visibility					
January	118	13.5	16	44	19	4	3	4	3	7	0	1	1	0	2	7	0	4	0	1	8	1	12	5.0	72	74		
February	87	11.1	25	29	21	6	6	3	4	5	1	0	0	0	0	4	0	1	0	0	1	0	9	5.4	71	74		
March	80	10.2	19	37	15	9	4	5	4	6	1	1	0	0	3	4	0	0	1	0	4	0	13	4.2	72	73		
April	77	8.9	7	35	23	15	10	6	1	2	1	3	3	0	1	0	0	1	0	0	3	3	7	4.0	76	76		
May	106	8.9	8	12	16	5	15	23	9	5	7	2	1	0	0	1	0	0	1	0	3	0	10	4.0	82	82		
June	88	7.6	5	3	14	20	16	33	4	2	3	0	0	0	1	7	0	0	3	1	0	4	6	13	4.4	83	83	
July	75	10.2	6	15	25	10	21	11	7	2	3	3	1	0	3	4	0	3	1	0	4	2	15	4.4	82	83		
August	68	9.3	8	15	24	13	10	12	9	6	3	0	0	0	3	1	0	3	6	0	2	5	5	3.8	82	82		
September	93	10.6	7	18	19	19	14	8	3	8	4	6	0	0	0	5	0	3	6	0	2	4	11	4.3	80	81		
October	87	12.0	24	39	22	10	0	1	1	2	1	2	0	0	0	0	0	6	3	0	16	4	6	5.3	78	78		
November	88	14.5	22	54	16	0	2	2	0	4	0	1	0	0	1	2	0	2	1	1	4	2	6	5.6	74	77		
December	102	14.0	16	54	21	2	2	1	1	3	0	0	1	0	5	12	0	7	1	2	6	4	9	4.6	78	79		
MEANS	x x x	10.9	14	30	20	9	8	9	4	4	2	2	1	0	2	5	0	4	2	*	5	2	10	x x x	x x x	x x x		
TOTALS	1,069	x x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x x	x x x	x x x		

*Less than 0.5 percent. Compiled by U. S. WEATHER BUREAU.

OCEAN AREA
GREENWICH NOON OBSERVATIONS

Years covered: 1879-1933

Position: Latitude, 20°-25° N.; Longitude, 125°-130° E.

Month	Number of Observations Surveyed	WIND										WEATHER													Mean Cloud Amount (0-10)	Average Air Temperature	Average Sea Surface Temperature	
		Mean Velocity (Knots)	Percentages of Observations From—										Percentages of Observations Recording															
			N	NE	E	SE	S	SW	W	NW	Calm	Haze	Mist	Fog	Drizzle	Rain	Snow	Showers	Thunderstorms	Heavy Squalls	Light to Moderate Squalls	Gales (Force 8 or Over)	Exceptional Visibility					
January	138	12.5	23	46	12	3	6	2	2	4	2	1	1	1	1	7	0	5	0	0	2	1	13	5.9	70	73		
February	153	14.5	37	30	14	7	1	3	0	7	1	1	0	0	2	6	0	7	1	0	10	2	12	5.9	69	73		
March	129	12.0	19	29	23	10	7	3	2	6	1	2	2	0	1	2	0	3	0	1	2	1	8	5.8	71	73		
April	130	8.9	9	33	19	18	12	3	2	2	2	5	5	1	4	2	0	2	2	1	2	0	9	5.2	75	76		
May	130	9.3	8	15	19	12	19	18	2	4	3	2	1	1	2	5	0	6	5	0	3	1	8	4.2	80	79		
June	130	10.6	2	11	11	20	30	19	5	0	2	4	1	0	1	6	0	6	4	0	4	5	9	5.2	82	81		
July	132	11.1	1	14	15	25	20	12	4	8	1	1	1	0	0	6	0	7	6	0	7	5	9	5.3	84	83		
August	134	12.0	7	16	12	18	18	15	6	5	3	4	1	0	1	5	0	8	2	1	8	3	8	4.9	83	83		
September	107	13.5	11	24	16	16	16	6	5	6	0	4	0	0	0	10	0	7	7	0	7	10	7	4.7	82	82		
October	129	14.0	18	33	14	8	9	3	3	5	2	2	1	0	2	8	0	10	1	2	15	9	11	4.4	79	80		
November	130	13.5	12	57	15	5	3	3	1	4	0	3	1	0	1	5	0	7	0	0	5	2	6	5.5	76	77		
December	117	15.0	26	52	16	2	0	0	0	3	1	2	2	0	1	8	0	3	0	1	5	3	9	5.7	72	75		
MEANS	x x x	12.2	14	30	16	12	12	7	3	4	2	3	1	*	1	6	0	6	2	0.5	6	4	9	x x x	x x x	x x x		
TOTALS	1,559	x x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x x	x x x	x x x		

*Less than 0.5 percent. Compiled by U. S. WEATHER BUREAU.

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129	West Indies. Vol. II. The Lesser Antilles and the coast of Venezuela.
130	East coasts of Central America and Mexico, including north coast of Colombia.
172	South America. Vol. I (East Coast). From the Orinoco River to and including the Rio de la Plata.
173	South America. Vol. II (Southern part). From the Rio de la Plata on the east coast to Golfo Corcovado on the west coast, including the islands north of 60° south.
174	South America. Vol. III (West Coast). Golfo Corcovado to the Gulf of Panama, including off-lying islands.
84	West Coasts of Mexico and Central America. From the United States to Colombia, including the Gulfs of California and Panama.
175	British Columbia. Vol. I. The coast of British Columbia from Strait of Juan de Fuca to Cape Caution, including Vancouver Island and the inland passages.
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EUROPE	
144	South coast of England, from the Scilly Islands to North Foreland.
145	West coast of England and Wales, from the Scilly Isles to Mull of Galloway.
146	Ireland.
147	British Islands Pilot. Vol. IV. The western coast of Scotland from Mull of Galloway to Rud'h Re', and off-lying islands.
148	British Islands Pilot. Vol. V. The western coast of Scotland from Rud'h Re' to Cape Wrath, and the Hebrides Isles.
149	British Islands Pilot. Vol. VI. Faroe, Shetland, and Orkney Islands, and north and east coasts of Scotland from Cape Wrath to Fife Ness.
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140	Southwest and south coasts of Norway. Lindesnes to Bergen, Lindesnes to Oslo Fjord, and the coast of Sweden to the Kattegat.
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158	Persian Gulf, including the Gulf of Oman and the Mekran coast.
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168	Australia. Vol. II. South and east coasts of Australia from Cape Northumberland to Port Jackson, including Bass Strait and Tasmania.
169	Australia Pilot. Vol. III. East coast of Australia from Port Jackson to Cape York, including the islands in the Coral Sea, Torres Strait, and the inner route.
170	Australia. Vol. IV. North, northwest, and west coasts of Australia from the western approach to Torres Strait to Cape Leeuwin.
171	New Zealand Pilot, including Kermadec Islands, Chatham Islands, and the off-lying islands southeastward and southward of New Zealand.

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Branch Hydrographic Offices are established at the places named below. These offices do not sell publications, but issue the Pilot Charts, Hydrographic Bulletins, Daily Memorandum, Notice to Mariners, Notice to Aviators, and reprints to cooperative observers. They are supplied with the latest information and publications pertaining to navigation, and masters and officers of vessels are cordially invited to visit them and consult freely the officers in charge.

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NOTE.—By authority of the Governor of the Panama Canal, some of the duties of branch hydrographic offices are performed by the captain of the port at Cristobal and the captain of the port at Balboa. Reference charts and Sailing Directions may be consulted at these offices and shipmasters may receive the Pilot Charts, Notice to Mariners, and Hydrographic Bulletin in return for marine and meteorological data reports. Observer's blanks and comparison of navigational instruments may be obtained at the same time.

With a desire to render the best service possible to mariners, the Commandant of the United States Coast Guard has kindly consented to assist the Hydrographic Office in its service by having several of the Coast Guard stations in important ports where branch hydrographic offices are not available, perform some of the duties of branch offices.

The stations so far designated to serve in this capacity are:

PORTLAND, MAINE.—Commanding officer, United States Coast Guard cutter *Guthrie*, customhouse.

CHARLESTON, S. C.—Captain of the port, Customhouse Wharf.

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