on a more rugged and massive scale than is the terrain of Kupreanof Peninsula. Snow and ice fields fill the upper plateaus. A small volcanic vent in the high country above Ramsey Bay often sends out a cloud of vapor. The steep terrain surrounding the fluted shafts of Mount Stepo is rick in beauty and grandeur.

Stepovak Bay is much traveled by fishing craft during the salmon season, and gill nets are laid out from many of the rocky points. Brown bear, wolverines, and foxes track the shores, and there are trappers' cabins in several of the tributary bays.

In the central part of Stepovak Bay, the bottom is regular, with depths ranging from 40 fathoms in the northern part to 90 fathoms in the southern part. Near the eastern shore the depths vary from 20 to 40 fatboms. North of Pad Island the bottom is rough, and there are several submerged pinnacles. On the west side of the bay, reefs and submerged shelves make off from many of the headlands. Some of these reefs bare for a few hundred yards offshore, then continue as submerged shelves with depths of 10 to 20 fathoms extending several miles off these points.

The bottom in most of the bays is a sticky dark-green mud, in depths of 15 to 20 fathoms.

Kupreanof Peninsula partly protects this bay from the southeasterly swell common along this coast during the summer. The bays and coves on the western side of Stepovak Bay are more exposed to the southeasterly swell. These bays are also subject to violent winds and downdrafts during northwesterly weather. For this reason the bays on the east shore offer more protected anchorages than do those on the west shore.

Bluff Point, the southernmost feature on the east shore of Stepovak Bay, is a sharp narrow promontory about feet high. It bristles with a descending series of jecting nobs and points.

Boulder Bay, north of Bluff Point, the southernmost bay the east side of Stepovak Bay, offers good anchorage is somewhat exposed to southern swells. The bottom ery even, sloping gradually from 20 fathoms at the ance to 15 fathoms near the anchorage. The bottom black gritty mud. The anchoring depth and swinging n make Boulder Bay suitable for medium-draft vessels.

Cub Point, on the northern side of Boulder Bay, is a d-topped, rounding headland about 900 feet high. as almost perpendicular faces which are strongly ed with inclined bands of light and dark stratified A patch of white rock halfway up the outer face of Point makes an identifying landmark.

Bay, on the north side of Cub Point, is the largest ary on the east side of Stepovak Bay. Vessels of ize can find protected anchorage in Fox Bay except g very strong westerly winds. An islet 90 feet high southeastern part of the bay is a good leading mark ssels entering. The entering course is **090°** for the when 1 mile from the islet, and with a low gravel that begins near the inner end of a grass-topped abeam to starboard, change course to **065°** and d to anchorage in 15 to 18 fathoms, or less if de- in the large cove at the head of the bay.

The cove on the southeast side of Fox Bay is the most protected anchorage for small craft in Stepovak Bay. Enter Fox Bay as in the preceding paragraph and when 1 mile from the islet change course from **090°** and steer **108°** for 0.9 mile to a position where the islet is 0.3 mile on the port beam; thence **135°** for 0.6 mile to anchorage in 8 or 9 fathoms, sticky mud bottom. Fresh water can be obtained from a waterfall on the southeast side of the cove.

The northern part of Fox Bay should be avoided by strangers. A reef 750 yards long and 300 yards wide is awash at lower low water 1 mile south-southeast of the headland on the north side of the entrance.

Dome Point, the north entrance headland of Fox Bay, is precipitous with a somewhat level grass top. A large yellow scar on the eroded face identifies this headland.

Island Bay, located north of Fox Bay, is large and open. Its shores are indented by several coves. An islet 32 feet high is in the inner part of the bay and makes a good leading mark for vessels entering the bay. In entering Island Bay vessels should keep at least 0.5 mile offshore. An extensive submerged ledge makes off from the cove 0.8 mile west-southwest of the islet. This must be avoided when approaching the anchorage.

Anchorage west-southwest of the 32-foot islet is in 17 to 20 fathoms, mud bottom. Fishing craft sometimes anchor east of the islet in 3 to 6 fathoms, blue mud bottom. A submerged ledge makes off from the east end of the islet, and a shoal 4 feet deep is near the bay's north shore northwest of the islet.

Stonehouse Cove, 1 mile inside the north entrance point of Island Bay, is a small cove. A long reef extending halfway across the entrance breaks the sea in this cove which has a very smooth, white sand bottom that bares at extreme low tides. The cove is used by fishermen to careen their craft.

Pad Island is located off the north approach to Island Bay. It is a low, flat, grass-covered island about 0.5 mile long and 0.2 mile wide. A narrow channel separates the island from the main shore. Kelp patches and foul ground extend northward from Pad Island. A pinnacle, covered three-quarter fathom, is 0.9 mile south by west of the island and another pinnacle, covered 1½ fathoms, is 0.4 mile north-northeastward of the island. A large shoal with a least depth of 4¾ fathoms is 1.3 miles northward of Pad Island.

The shore from Pad Island northward consists of rugged cliffs. Two striking rock formations are located 1.5 miles north of Pad Island. One is a chimneylike column 120 feet high projecting from the cliff slopes. The other is a spikelike rock 400 feet high projecting above the cliff line. This spike is noticeable from a distance.

The small cove in the northeastern corner of Stepovak Bay is rimmed with rocks and reefs except at its head where there is a sandspit and a lagoon. Depths are 4 to 8 fathoms, mud bottom, at the entrance and decrease gradually toward the head.

Along the north shore of Stepovak Bay is **Stepanof Flats,** a 5-mile stretch of broad sand beach. Behind the beach are grass-covered sand dunes and beyond are exten-

sive flats of tundra. Two streams flow out of these flats, often bringing silt which discolors the sea for large areas around their mouths.

Gull Rocks, just offshore from Stepanof Flats and about midway along the northern shore of Stepovak Bay, are two bare rocks joined by reefs; the southerly rock is about 19 feet high and the northerly one about 4 feet high. From southward they appear light colored against the dark background of the hills. The water is shallow between the rocks and the shore.

Louies Corner is at the west end of Stepanof Flats. Hills and a rocky headland lie west of Louies Corner. Behind Louies Corner is a detached cone-shaped hill 745 feet high which shows distinctly from the south end of the bay. An anchorage with 17 to 20 fathoms, mud bottom, is 1.3 miles west of Gull Rocks; it is exposed to southerly weather.

Ramsey Bay, at the north end of the west shore of Stepovak Bay, is fairly open and exposed, and in the central part of the bay the depths are too great for anchoring. A broad sand beach stretches for several miles around the north and northwest shores of Ramsey Bay. At the east end of this beach is **Bales Landing.** Small vessels can anchor in 5 to 10 fathoms, green mud bottom, 0.3 mile south of the landing; the anchorage is exposed to southerly weather.

West of Bales Landing two streams form deltas off the sand beach. On these deltas sandbars and sandflats bare at low water for more than 0.5 miles offshore from the high-water line.

From Ramsey Bay southward to Dent Point, the shore is steep and rocky. At the Ramsey Bay end of this stretch is a rocky headland; reef and rocks, which uncover 1 to 4 feet, extend 0.2 mile southeastward from the headland.

Dent Point, between Ramsey Bay and Grub Gulch, is broad and rounding, backed by steep cliffs, and fringed with reefs. Two conspicuous rocks, 19 and 36 feet high, are joined at low water with the southernmost tip of the point. A rock, covered 2 feet, is 0.3 mile offshore, 1.1 miles northeast of the same tip. Vessels should keep at least 0.5 mile off this shore.

Grub Gulch is marked by two grass-covered islets and several low, bare rocks and reefs. The bottom near the entrance is very broken, but a channel with 12 fathoms or more can be carried to the head of the bay by favoring the west shore well away from the vicinity of the islets. The anchorage at the head of Grub Gulch is deep, 20 to 23 fathoms, mud bottom; swinging room is limited. At the northeast end of the beach at the head of the bay, the mouth of a stream is surrounded by sandflats which bare at low tide. In anchoring, a vessel should favor the southwest end of the beach.

The outer part of Grub Gulch is not suitable for anchorage because the average depth is about 45 fathoms, and there is little or no swinging room in the shoaler depths near shore.

Red Hill, a sharp, steep, red-hued mountain 2,343 feet high, is on the point between Grub Gulch and Clark Bay. A reef extends 0.3 mile south-southeastward from the outer end of the point to a conspicuous pinnacle rock 20 feet high.

Clark Bay is a large open bight backed by two valleys. A grass-covered islet is near the east shore of the bay. It is reported that small fishing craft anchor northwest of this islet in 6 or 7 fathoms, finding some lee from southeasterly storms.

Near the west end of the east bight of Clark Bay are two pinnacle rocks. Between these pinnacles and the west shore the bottom is foul. The west bight of Clark Bay is called **Little Norway.** Anchorage off the sand beach is in 15 fathoms, mud bottom. During northeasterly storms the winds draw down across this bight with terrific force.

The west shore of Clark Bay consists of a rocky bluff line. A conspicuous waterfall is about 1 mile north of the entrance to the bay. An odd-shaped, slender, pinnacle rock is about 0.2 mile south of the waterfall.

Waterfall Point is a broad, rounding headland and ridge separating Clark Bay and Orzinski Bay. A waterfall, visible for many miles, marks the south tip of this point. This waterfall, viewed in profile, appears to spout its stream clear of the bluff line. Reefs and rock ledges make off Waterfall Point for 0.5 mile and a 3¾-fathom shoal area is 1 mile east of the point; clear the point by at least 1.5 miles.

Orzinski Bay has steep slopes along most of its shores, but there are grassflats and a lagoon at the head. It is shoaler than the adjacent bays but seems to have better protection at times from northwesterly storms. A shoal that extends 0.5 mile off the northern shore has depths of 7 feet or less. The bay must be navigated with caution; the best water is found by favoring the north side of the entrance, then heading for the middle of the bight in the south shore and strongly favoring the south shore to the head. The bottom rises rather abruptly but anchorage is possible in 10 to 20 fathoms, mud bottom, about 0.2 mile from the head; the anchorage has good holding ground but is exposed to southeasterly weather.

An alternative anchorage which offers some protection from southeasterly weather is found off the midbight in the south shore, 0.8 mile west-northwest of Elephant Point. Anchor in 13 fathoms, mud bottom. Two abandoned buildings are at the head of Orzinski Bay. One is near the mouth of the stream and the other is farther upstream at the base of a hillside.

Elephant Point, on the south side of the entrance to Orzinski Bay, is a sharp-ridged promontory, 655 feet high, bound by sheer cliffs having striking bands of stratified rock. The cliffs at the outer extremity of Elephant Point are deeply undercut. A ledge that uncovers, extends for 0.5 mile east-northeast to southeast from the point. Shoal indications extend 1.5 miles east-southeast of the point; vessels should clear the point by at least 1.5 miles.

American Bay is open and exposed in its outer part, but narrows into a long fiord which is fairly well protected from the outside swell. This inner bay is surrounded by tremendously high peaks of a striking and rugged appearance. In the outer bay a pinnacle, covered 4¼ fathoms, is 0.6 mile southwest of Elephant Point, and

another pinnacle covered 4¾ fathoms, is 0.3 mile southwest of the rocky point 2 miles along the north shore from Elephant Point. A sandspit projects from the northeast shore and a gravel spit from the southwest shore 2.5 and 3.5 miles from the entrance.

The valley at the head of American Bay shows considerable evidence of glacial deposit. There are shoals and low-water sandflats off the mouth of the stream that flows from the valley. Depths in the inner bay are 20 to 30 fathoms, and the bottom rises steeply except off the flats at the head. Anchorage is possible for small craft in 8 to 10 fathoms, mud bottom, near the head of the bay; other anchorage is not recommended because of the depths and limited swinging room.

Blunt Point, on the south side of the entrance to American Bay, is a broad cape with grass-covered slopes above a shoreline of eroded bluffs. Reefs make off Blunt Point and vessels should stay well clear of it.

Wind Bound Bay is a small cove 1 mile west of Blunt Point. Inside the cove is a small valley surrounded by high mountains. It is reported that small fishing craft anchor off the mouth of the creek in 3 fathoms.

Chart 8700.—Chichagof Bay, 3 miles westward of Blunt Point, is used as an anchorage by small fishing craft. A reef extends off the northerly side of the bay and a 2¾-fathom shoal is 0.3 mile off the northern entrance point. A reef fringes the bold headland separating Chichagof Bay and West Cove to the southward. A shoal area with depths increasing to 4½ fathoms extends 0.5 mile southeastward from the headland; the outer extremity is marked by kelp. Depths decrease from 10 fathoms at the entrance to 5 fathoms 0.4 mile from the beach at the head of the bay. The anchorage in the upper part of the bay is sheltered except from the southeastward; the bottom is hard sand.

West Cove is small and fringed on both sides with covered rock ledges. A ledge extending almost 0.5 mile northeastward from the southwest point of the cove has pinnacles that bare at various stages of the tide; a 4-fathom shoal is 0.7 mile southeastward of the point.

Dorenoi Bay, 7.5 miles southwestward of Blunt Point, is open and exposed to the east and southeast, and subject to strong winds through low ground to the northwest. The sides of the bay are mountainous and rock ledges border the shores. At the head of the bay is a long stretch of sand beach. The bottom near the entrance is extremely irregular; depths vary from 20 to over 70 fathoms. Anchoring in midchannel, a good anchorage is at the head in 5 to 10 fathoms. The holding ground is good.

Shumshaw Point, at the base of a rugged mountain, marks the south entrance of Dorenoi Bay. The deeply eroded gray-buff cliffs are conspicuous for many miles. Black rocks and reefs make off the point.

San Diego Bay is the open bight north of a string of islands and rocks between Guillemot Island and the mainland. A low yellow cliff marks the north side of the bay. San Diego Bay is much used during the salmon fishing season as an anchorage and as a fish transfer point. The channel north of Guillemot Island is deep and clear. Smaller vessels may carry 4 fathoms through the passage between the west end of the island and a conspicuous pinnacle rock that is midway of the distance to the mainland shore.

Guillemot Island is about 1.6 miles long, 0.3 mile wide, and 624 feet high. It has bold precipitous cliffs on the north side and low bluffs on the south side. Above the low bluffs the grass-covered ground slopes evenly upward to the top of the cliffs on the north side. A neck of land extends off the south side of the island to a rocky, round, and steep-sided headland. On the east shore, between this round headland and the cliffs to the north, is a bight with a sandy beach.

Off the southwest end of the island is a flat and sandspit. A fisherman's cabin is on this flat. Smaller craft often anchor on the south side of the island in the bight east of the sandspit, in 1 to 5 fathoms. Northwesterly and northeasterly weather causes strong winds to sweep down the grassy slopes, so this anchorage should be used with caution.

The water is fairly deep off the north and south sides of the island, but a ledge covered 6½ fathoms lies a mile east of its east end.

South of Guillemot Island the coast is bold and precipitous, except for two stretches of low sand beach bordering valleys which break through from the interior. Rocks and reefs fringe the bases of the cliffs. A pinnacle, 40 feet high, is off a point 3 miles southwest of Guillemot Island.

Lumber Bay (known locally as **Rough Beach**) is on the eastern face of Swedania Point, 2 miles northeastward of its southwest end, and consists of a shallow bight at the entrance of a valley; the beach is a dike of cobbles thrown up by the sea, and is capped by a great windrow of driftwood.

Swedania Point is the seaward end of a ridge 1,300 feet high; at the extremity are rugged cliffs, and on the southwestern side is a gravel spit at the foot of the cliffs. The profile and end slope are striking and unusual, resembling in magnified outline the end of an artificial earthwork or bunker, back of which the mountain rises steeply. Strong williwaws blow on the lee side off the eastern face. One mile east of Swedania Point a group of rocks, bare at low water, extends southward.

Bulboa Bay (known locally as **Portage Bay**) offers good shelter on the eastern side about 5 miles from Swedania Point in a small bight with a low gravel point south of it at the mouth of a large ravine containing a stream. The midchannel into the north arm is deep. When the coal mine at Herendeen Bay, on the other side of the Alaska Peninsula, was in operation, supplies were landed here and carried across the trail by pack train, a distance of about 15 miles. The highest point on the trail, less than 600 feet, is near the south side of the peninsula. This portage is still used frequently.

On the west shore of Balboa Bay a reef extends 600 yards off the entrance point and then fringes the shore to the northward at a distance of 200 to 600 yards offshore. Outside the reef the water deepens rapidly to the middle of the bay.

Albatross Anchorage, near the head of the north arm of Balboa Bay, is a secure harbor with depths of 8 to 2 fathoms. **Reef Point** is on the east side of the entrance to the harbor; a reef extends almost 0.1 mile off the point. The best anchorage is in midchannel, 0.6 mile north of Reef Point, and west of **Ballast Island,** in 5 to 8 fathoms. Small craft may anchor in the bight on the west side opposite Ballast Island in 8 to 12 feet and secure better protection; avoid a ledge which uncovers about 4 feet in the northern part of the bight.

Lefthand Bay (known locally as **Left Arm**), on the west side of Balboa Bay, is well protected and a good anchorage, mud bottom, for any size vessel. Shoals extend about 500 yards off the north and south shores at the entrance, and about 200 to 300 yards off the shores inside the bay. Midchannel depths are 30 fathoms at the entrance, shoaling gradually toward the sand beach at the head of the bay. **Kagayan Flats,** between Lefthand Bay and Beaver Bay, are low and marshy.

Cape Aliaksin, separating Balboa Bay and Beaver Bay, has no distinctive form; it is of a rounded outline and a low rounded profile. There is lowland for some distance from the shore all around the cape. The summit, 2,073 feet high, is broad and flat. There is shoal water near shore all around and a rock awash about 0.3 mile off the southwest side. A reef extends 600 yards off the cape in a southeasterly direction. The cape is difficult to identify from westward.

Chart 8859.—Shumagin Islands, comprising 15 sizable islands and many islets and rocks, extend for a distance of 60 miles from the coast of the Alaska Peninsula from which the group is separated by Unga Strait.

The inside passage along the Alaska Peninsula in the vicinity of the Shumagin Islands is through Gorman, Korovin, and Unga Straits, and northward of Jude Island.

In general, the Shumagin Islands are bold and mountainous, and the shores are broken in many places by inlets that afford good anchorages. The shores are rockbound close-to. Fishing stations and camps are scattered throughout the group, and good fishing banks are off the islands. Fox and cattle raising are carried on to some extent.

Weather.—The prevailing winds in summer are southwesterly. This wind brings in a sea fog which lasts as long as the wind prevails, and usually covers Unga and Popof Islands, the southwesterly section of Nagai Island, the southwesterly shores of Big and Little Koniuji Islands and Simeonof Island. In Popof Strait and Humboldt Harbor, the lay of the land thins the fog to mist through which the shores are visible and often these waters are in a clear pocket when the fog around is heavy. The southwesterly wind also produces a moderate swell and choppy sea on the southwestern side of the islands. While this condition prevails on the southwesterly side of the group, it is generally clear on the opposite side, with light breezes, smooth sea, and no swell. A landfall for the Sbumagins, in summer, should therefore be made to northeastward, and the most unmistakable point is Castle Rock. A northerly breeze dries and clears the islands to crystal clearness.

Chart 8700.—Unga Strait, separating the Shumagin Islands from the Alaska Peninsula, has a narrowest width of 2.7 miles between the north end of Unga Island and Cape Aliaksin and depths of 16 fatboms or more. Either shore of the strait should be cleared by at least 1 mile. The current generally sets westward; see Tidal Current Tables for predictions.

Unga Spit Light (55°24.5′ N., 160°43.5′ W.), 40 feet above the water, is shown from a small white house on skeleton tower on tbe north end of Unga Island.

Chart 8851.—Simeonof Island, the most easterly of tbe Shumagin Islands, is about 4 miles long and 3.5 miles wide. It is composed of two clusters of hills, the southeastern and higher ones being about 1,400 feet. These hills are separated by a low plateau which is nearly cut in two by a very irregularly shaped inlet known as Simeonof Harbor.

The coast of the island is fringed with reefs and shoals. Those on the south and southwest sides are variously reported to extend from 3 to 7 miles offshore; those on the east side, 3 miles; and those off the other shores, 0.5 mile. A rock on which the sea breaks at low water has been reported halfway between Simeonof and Chernahura Islands.

Simeonof Harbor makes in from the western side of the island. A reef extends about 0.5 mile westward from the north point of the entrance to the harbor. Off the south point of the entrance is a low, flat, rocky island fringed with reefs. Thick kelp beds are parallel to the reefs on either side of the harbor entrance. The harbor is protected from all winds, the entrance is tortuous, with reefs on either side; the shores are rocky and the water very shoal. The inner anchorage is in 2½ fathoms, with not over 2 fathoms at the lowest tide; the bottom is smooth gravel. Anchorage, exposed to westerly winds, may be had in the outer part of the harbor, in about 4 fathoms, about 0.5 mile inside the entrance.

Twelve Fathom Strait, separating Simeonof and Little Koniuji Islands, is 2.2 miles wide and has depths of 10 to 20 fathoms except for a 6-fathom shoal area near the middle. A few kelp patches are on the Simeonof Island side.

Little Koniuji Island is very irregular in shape, consisting of three parts, 1,200 to over 1,600 feet high, connected by raised sand beaches. The southern end terminates in a high rocky pointed cape, with a reef marked by a breaker extending about 0.3 mile southwestward from it. The eastern coast is indented by two coves, and there is a large harbor on the western side.

Sandy Cove is on the eastern side of Little Koniuji Island. It is about 1 mile wide at the entrance and 1.5 miles long. On its western shore are prominent granite cliffs. The cove affords good anchorage in its southerly bight in about 10 fathoms, sheltered from all but southeasterly weather. Excellent anchorage was reported 1.1

miles 155° from **Entrance Point** in sand bottom; this anchorage affords good protection against weather from the southwest.

Atkins Island is about 1.5 miles long and about 0.6 mile wide, and is connected to the northeast headland of Little Koniuji Island by a shoal. The island rises to 800 feet at its southeastern end. Anchorage is reported southward of the island.

Northwest Harbor, a bight in the northern side of Little Koniuji Island, southward of Herendeen Island, may be entered from either side. It affords fair anchorage and protection from all but northeast winds, in 5 to 10 fathoms. The harbor is about 0.5 mile wide. An abandoned fishing station is here.

Herendeen Island is triangular shaped, about 0.9 mile long and 0.5 mile wide. An islet is off the western end.

Northeast Harbor, the large bay in the western side of Little Koniuji Island, has two bights and is approximately 4.5 miles long. The southeast bight of the harbor is somewhat open to westerly winds and the holding ground is rocky and poor. The extreme southeast end of the harbor is more protected and is a favorite refuge for fishermen, though the bottom, being alternately patches of rock and sand, is not good holding ground. At the head of a small well-protected boat harbor are several houses.

Chart 8859.—Chernabura Island, is the most southerly of the Shumagins, is high and mountainous, and there are breaks in its profile, the highest part being at the east end. A rocky islet, apparently connected with the island by a bar, lies off its northern end. On the side are three small bays; the middle one is reported to afford anchorage in westerly winds.

Bird Island lies about 4 miles westward of Chernabura is more irregular than that island, but several of its are nearly as high. Passing well southward, Bird appears as four principal peaks connected by low . Almost its entire southeast side is a series of A rock above water lies a short distance off its rn end.

anchorage is reported in the bight on the east side d Island, just inside **Point Welcome,** in 5 to 12 s. The wreck of a schooner is at the head of the Temporary anchorage, exposed to all but winds he southeast quadrant, may be had in the bight northwestern side of the island in about 12 fa- and bottom, southwestward of the reef making out mile in a northwesterly direction off the north- nt of the island. Rocks are 0.5 mile offshore in rly direction from the southerly point of this d a shoal about 1 mile in a northwesterly direc- the southwest point of the island. Sunken rocks d about 0.5 mile off the northern shore of the ght on the eastern side of the island.

Strait, between Bird and Chernabura Islands, is ave depths between 20 and 35 fathoms, sandy

oniuji Island, the northern and largest of the group of the Shumagin Islands, is about 13 miles and about 6 miles in width at its widest or southern end. The island is rugged and very mountainous, with a well-defined central ridge and spurs projecting toward the points. The coast is broken by many inlets and the points are rockbound close inshore. The highest peaks are frequently mist covered. **Cape Thompson,** its northern point, is comparatively low, and its southwestern end terminates in a long narrow point with a high connecting ridge which resembles an island from some points of view.

Flying Eagle Harbor, on the east side of the island, 6 miles southward of Cape Thompson, offers well-protected anchorage for small vessels, especially in southerly gales, in 7 to 10 fathoms.

Chart 8851.—Hall Island, about 0.9 mile long and 0.4 mile wide, lies about 1 mile off the eastern shore of Big Koniuji Island. There are two bare rocks close to the southeast face of the east end of the island, and a reef extends about 0.3 mile southwestward from the southwest point.

Murre Rocks are a group of three islets about 0.6 mile northwestward from Hall Island. A rocky ledge extends about 0.3 mile southwestward from the southern islet.

Yukon Harbor is southwestward of Hall Island. A rocky ledge covered with kelp lies close around the eastern entrance point, and rocks are close to the western point. Anchorage, protected from westerly weather, may be had in the center of the harbor, in about 7 fathoms, but the holding ground is poor.

Koniuji Strait, between Big and Little Koniuji Islands, is about 1.5 miles wide. Soundings of 16 to 28 fathoms are reported.

Chart 8859.—Four prominent bights are on the west side of Big Koniuji Island. They are open and easy of access and their shores are clear, except close-to. Anchorage in 24 to 26 fathoms may be had near the head of the bight 146° from Peninsula Island which is 3.5 miles northward from Spectacle Island. In approaching the anchorage it is necessary to keep northward of midchannel to avoid a shoal extending 300 yards off the south shore about 0.5 mile from the head of the bight.

The other bights do not offer anchorage on account of the great depth of water. Anchorage for very small craft may be found in any of these bights, close inshore, and in the numerous indentations and small coves. The winds draw through the divides into the bights and the williwaws are very strong.

Two bays indent the south coast of Big Koniuji Island; the reported depth in the westerly one is too great for anchorage, but in the easterly large bay vessels have anchored in 16 fathoms, poor holding ground of hard bottom, with protection from northerly and westerly winds.

A 3-fathom shoal extends from the south end of the island.

Castle Rock, lying about 1.5 miles northward of Cape Thompson, the north point of Big Koniuji Island, is rugged and serrated, and its highest peak is 825 feet. It makes an excellent landmark. A 3-fathom shoal extends about 0.8 mile off its southern end.

The bottom between Big Koniuji and Castle Rock is said to be even, averaging 28 fathoms.

East Nagai Strait separates Nagai and Big Koniuji of the Shumagin group, and has an average width of 6 miles. Peninsula, Spectacle, Bendel, and Turner Islands lie in a general north-northeasterly and south-southwesterly direction in this passage, and the waters between this chain of islands and Nagai on one side and Big Koniuji on the other are deep and clear and midchannel courses may be safely steered.

Peninsula Island, 3.5 miles northward from Spectacle Island and the most northerly island in East Nagai Strait, has a length of 1.5 miles and a width of 0.8 mile. It has a central peak 1,190 feet high. The shore is rugged, steep, and rockbound. A long boulder spit extends off the southeast end. The northeast end should not be approached closer than 0.3 mile and the southeast end no closer than 0.5 mile. Exposed anchorage may be found on the tail of the shoal extending off the southeast point, in 5½ to 12 fathoms, 0.5 mile from the narrow point.

Spectacle Island is 2.5 miles long and 1.5 miles wide at its southern part. It is rockbound and has steep cliffs on the north, east, and south sides. The northern part is distinguished by two peaks over 900 feet high and the southern part reaches 1,240 feet. In general, the island may be approached within 0.2 mile.

Anchorages, under favorable conditions, for small craft are in the large bight on the east side of Spectacle Island in 6 to 9 fathoms, in the bight on the west side in 4 to 5 fathoms, and in the small cove in the south side in 3 fathoms. The bights on the eastern and western sides are open and easy of access. The entrance to the small cove on the southern side is about 70 yards across with foul ground on either side for a distance of about 0.1 mile inside the entrance.

The passage between Peninsula and Spectacle Islands is about 3.5 miles wide and is deep and free from dangers.

Bendel Island lies in a southwesterly direction from Spectacle Island and is separated from it by a passage 0.6 mile wide. It is about 2 miles in diameter and 1,250 feet high. The eastern end terminates in a narrow neck. There are high bluffs on the southern side and sloping valleys on the others. The coastline is rocky, with kelp, and the depths around the island are irregular. A flat extends off the southwest side for a distance of about 1 mile with depths of 4¼ to 10 fathoms and with several shoaler spots. Depths of 7 to 8 fathoms are also found off the northwest and southeast sides. Exposed anchorages for small boats may be found in the bights and on the flats.

The passage between Spectacle and Bendel Islands is 0.6 mile wide and a midchannel course leads through 21 to 11 fathoms.

Turner Island, 1,180 feet high, is separated from Bendel Island by a passage from 0.8 to 1.5 miles wide. The island is 2.8 miles long and about 0.9 mile wide. Its shore is rockbound and the southeast coast is very foul for about 0.5 mile offshore. There is a low flat on the northwest end with a 400-foot knoll on the point. The bluffs on the north, southeast, and south sides vary in height from 400 to 800 feet.

The passage between Bendel and Turner Islands is deep at both entrances and shoals gradually to 4¼ fathoms, in its narrowest part, about midchannel off the southwest point of Bendel Island. Dense kelp grows on this shoal and small craft find difficulty in passing through. This passage is not recommended for large vessels.

The **Twins** consist of three small islands, the highest of which is about 410 feet. Their sides are precipitous and bare. As no breakers were seen about them in heavy weather, it is presumed there are no outlying dangers.

Near Island, in the southern approach to East Nagai Strait near Nagai Island, is about 1.4 miles long and 1,280 feet high, with precipitous, rocky sides. The island is easily recognized by a regular serration, which cuts its crest into five little peaks. There are rocks close to the shore.

Charts 8859, 8700—Nagai Island, in the center of the Shumagin Group, is approximately 29 miles long, 9 miles wide, and near the center reaches an elevation of 1,831 feet in a group of confused ridges. Its coast is irregular and indented by numerous inlets, several of which extend nearly through the island and have low, narrow isthmuses at the head. The island is mountainous and its shores are rockbound.

Cape Wedge, the northern end of the island, is a pointed headland with a rounded, sloping hill 749 feet high. The north end of the cape terminates in a double point, 262 and 316 feet high and a rocky bluff 150 feet high between. Its shores are rocky and forbidding; dangers are within 0.3 mile of the shore; the cape should be cleared by at least 1 mile.

Cape Wedge Light (55°17.5′ N., 159°52.8′ W.), 60 feet above the water, is shown from a small white house on the north end of the cape.

Mountain Point, the southerly end of Nagai Island, is narrow and about 500 feet high. There are rocks surrounding the point at a distance of about 0.5 mile and a covered rock about 1 mile offshore in a south-southwesterly direction.

Chart 8700.—Pirate Shake is a local name for the low, 65-yard-wide neck of Nagai Island, 4 miles southward of Cape Wedge. The cove on the east side of the neck is a good anchorage but is exposed to winds from about east-northeast to east-southeast. The outer points at the entrance are surrounded by reefs, and an 8-foot-high rock is in the middle of the entrance. The better entrance is north of the rock, heading for an islet, 40 feet high, on the north side of the cove, on a **286°** course. Pass 300 to 500 yards southward of the islet, and anchor in the middle of the cove west-southwestward of the islet, in about 7 fathoms, soft bottom in places. Anchorage can also be selected in the entrance of the cove just northeastward of the islet, in 7 to 8 fathoms, bottom generally rocky, taking care, however, to avoid the reef which ex-

tends about 0.4 mile from the northeasterly shore of the cove. The flat islet, 40 feet high on the north side of the cove, and a 25-foot-high rock off the outer point on the south side of the cove are good marks for the entrance.

Northeast Bight, on the east side of Nagai Island, about 6 miles southward of Capo Wedge, is 1.3 miles wide, open, deep, and free from dangers except close to shore. The main body of the bight is too deep for anchorage, but a vessel may anchor in the two coves at the head in about 20 fathoms.

Chart 8851.—Mist Harbor, a landlocked basin about 1 mile long and 0.4 mile wide, is on the east side of Nagai Island, 10 miles southward of Cape Wedge, and northwestward from Bendel Island. The depths in the middle of the basin are 27 to 35 fathoms, but small craft can find secure anchorage in the cove on the south side of the west end of the harbor, in 6 to 7 fathoms. The south side of the harbor is formed by a long spit; the 200-yard-wide entrance is around the west end of the spit and necessitates a sharp turn in entering. A midchannel course should be followed through the entrance, and also when entering the cove at the west end of the harbor to the anchorage. A flat fills the easterly end of the harbor; otherwise there are no dangers away from the shores.

A fishing camp is usually located on the cove at the west end of Mist Harbor and small temporary wharves may be found. Water may be had from small streams on the northeasterly side of the harbor. Strong williwaws draw down from the high mountains at times. A low neck of land, about 150 yards wide, separates the west end of the harbor from the head of Northeast Bight.

Chart 8859.—East Bight on the east coast of Nagai Island, 3 miles southward of the entrance to Mist Harbor, is about 3.2 miles long and 2 miles wide. It is deep, open northeastward, and the shores are clear except close-to. Anchorage for moderate-sized vessels may be found on the shelf on the northeast side in 15 to 20 fathoms, about 1 mile inside the north entrance point and about 0.4 mile offshore.

The two west arms do not afford good anchorage on account of the depth, about 29 fathoms. A 7-fathom spot, surrounded by deep water, is in the northerly of the two arms, 650 yards off the west shore and about 0.9 miles from the head of the arm.

The entrance to the south arm is restricted to about 450 yards by a shoal extending 900 yards in a northerly direction off its south entrance point. In entering, favor the west shore at a distance of 0.1 to 0.2 mile. Small boats find good protected anchorage behind the hook at the south entrance point, in 9 to 15 fathoms. After passing through the entrance to the arm, bend 180° to pass about 100 yards westward of the west end of the hook. When abreast of the end of the hook, round into the wind and select anchorage about its center.

Green Bay, on the eastern side of Nagai Island opposite Turner Island, affords good anchorage in 4 to 10 fathoms, sandy bottom. The bight is open and easy of access but is exposed to easterly winds. The western shore is low and is distinguished by white sand dunes. A bold headland about 100 feet high projects from the south side. There are several open bights on the east coast of the island between Larsen Bay and Mountain Point.

John Island, off the west side of Nagai Island about 8 miles northward of Mountain Point, is 580 feet high. South of John Island, Nagai Island consists of two clusters of rocky hills, 1,611 and 1,140 feet high, joined by low isthmuses.

The southern isthmus is called **Saddlers Mistake,** due to a vessel attempting at night to pass between the adjacent high parts of the island.

Chart 8700.—Falmouth Harbor, on the west side of Nagai Island, about 6 miles northward of John Island, affords a secure, though limited, anchorage for a small vessel in the basin behind the spit at its head, in 7 to 8 fathoms, sandy bottom. The entrance to the basin is not over 300 yards wide, has a depth of 6 fathoms, and contains no known dangers. The basin is 0.5 mile wide and its north side is a broad sandflat, which drops suddenly to 4 fathoms.

A reef extends 0.3 mile southwestward from the southern entrance point of Falmouth Harbor; and a rock, bare at low water and marked by a breaker and kelp, lies 0.8 mile from that point in the same direction.

The southern shore of the harbor is low, rising steeply to the interior hills. **Cape Horn,** a low point, with a rock close off it, lies about halfway up the bay on this shore.

The northern entrance point rises some 500 feet in a perpendicular cliff. The shore is rocky and bold. A rock, 5 feet high, is 0.3 mile offshore and 1.2 miles northwestward from this point.

Wooly Head, on the west side of Nagai Island between Falmouth and Eagle Harbors, is a promontory 1,168 feet high; there are rocks 0.2 mile from shore all around its face, some of them awash and others forming towers and pinnacles 50 feet high. A vessel may pass 0.4 mile off in 20 fathoms. Violent williwaws are frequent here.

Eagle Harbor, about 1.2 to 1.5 miles wide, has depths of 15 to 23 fathoms, with no outlying dangers except near the spits which lie 1.5 miles from the head of the harbor. In passing between the spits, favor the one on the southwest shore. There is good anchorage anywhere in the head of the harbor above the spits in 14 to 18 fathoms, soft bottom. Small craft can anchor in the lagoon behind the north spit in 6 fathoms.

A fishing station with a large warehouse and boat wharf is on the southern side of Eagle Harbor 1.3 miles inside the entrance, and a small abandoned fish station and boat wharf are on the north shore 1.8 miles inside the entrance.

Sanborn Harbor is on the west side of Nagai Island about 10 miles from Cape Wedge. The pinnacle rock 103 feet high off **East Head,** the northern entrance point, and two waterfalls on the west face of the south entrance point, are conspicuous landmarks. The harbor is 5 miles

long and has good anchorage at its head. To secure good shelter, a vessel should pass between **Macks Head** and **Granite Point,** and then anchor as desired, avoiding only the upper half of the northeast arm, which is shoal. There are no outlying dangers anywhere in Sanborn Harbor.

A fishing station is in a small exposed bay on the north side of Sanborn Harbor, 2.3 miles southeastward of East Head; it has a warehouse and a boat-wharf, dry at low water.

Caton Cove is on the north side of Sanborn Harbor, 3.5 miles southeastward of East Head; there is shelter in **The Kitchen** for light craft back of the sandspit. The channel, close to the spit, until through the narrowest part of the entrance, has a least width of 100 feet and a least depth of 10 feet.

Porpoise Harbor, about 3 miles northward of Sanborn Harbor, affords no useful anchorage because of its great depth.

The bight about 2.5 miles northward of Porpoise Harbor has temporary anchorage in 8 to 15 fathoms, giving the shore a berth of over 300 yards. **Porpoise Rocks** are a small cluster 10 feet high, with deep water close-to, lying 0.8 mile from the north shore in the approach to the bay.

The narrow bight west of Pirate Shake, described previously, affords anchorage for small craft about 0.3 mile inside the entrance and about on the middle line of the cove, in 4 to 6 fathoms, rocky bottom. The bight is exposed to westerly winds and its eastern half is foul and shoal to the head.

West Nagai Strait, between Nagai and Andronica Islands of the Shumagin group, is 3.3 miles wide at its narrowest point between Porpoise Rocks and The Haystacks, with depths from 25 to 40 fathoms and no outlying dangers. A vessel should pass eastward and southward of The Haystacks and on these sides may approach as close as 0.3 mile in 25 fathoms.

The currents in West Nagai Strait set with the wind and reach a velocity of 1.5 to 2 knots in strong winds. Under ordinary conditions the prevailing set of the current is said to be southwestward in this vicinity.

The Haystacks are a formidable appearing group of four islets 265 to 293 feet high, and a broken chain of rocks runs through them. Broken ground on which the least depth found is 9 fathoms lies 1.3 miles southwestward from the southwesterly bare rocks. A rock called **The Whaleback,** 1 mile west of The Haystacks, is 22 feet high, and 300 yards south-southwestward of it is a covered rock. Temporary anchorage in 20 fathoms or less can be had in the bight eastward of The Haystacks. A landing can be made on the boulder beach.

The soundings indicate clear passage between Andronica and The Haystacks, between The Whaleback and The Haystacks, and between the north Haystack and the rest of the group, but none of these passages are recommended.

Andronica Island, one of the Shumagin Group, lies westward from the north end of Nagai Island. The island is 2 by 3 miles in extent and 1,175 feet high. It is bordered by rocks to a distance of 0.2 mile from the shore, and vessels should give the shore of the island a berth of 0.5 mile. A flat islet 22 feet high extends 0.4 mile off the southeast point toward The Haystacks.

Andronica Island Light (55°20.9′ N., 160°03.6′ W.), 115 feet above the water, is shown from a small white house on the northeastern point of the island. Eastward of the point is a prominent, conical-shaped rock, 280 feet high, which is useful during low visibility in identifying the north point of the island to assure passage through the desired strait. The light is obscured by the rock.

A rock awash at low water 0.4 mile westward of the north point and 0.4 mile offshore, is the farthest outlying danger in the approach to Gorman Strait.

A bare rock 5 feet high is 0.2 mile off the western point of Andronica Island.

Temporary anchorage may be found 0.5 mile from shore in the bight on the northeast side of Andronica, off the sand beach near the northern point, in 20 fathoms. Small vessels can anchor closer to shore in this bight and also in the bight on the southwest side of the island, and landing can usually be made in one of these bights.

Gorman Strait between Andronica and Korovin Islands, is clear if the shores are given a berth of 0.5 mile. Deepest draft vessels should also use caution passing the 7-fathom shoal 0.9 mile southeast of Cape Devine.

The currents in Gorman Strait set with the wind and reach a velocity of 1.5 to 2 knots in strong winds. Under ordinary conditions the prevailing set of the current is said to be southwestward in this vicinity.

Korovin Island in the north-central part of the Shumagin group, has two summits, separated by low land and marsh extending from Korovin Bay to Grosvold Bay. The eastern part of this island rises to 1,209 feet, and the western part to 1,816 feet near its southern end.

Cape Devine, marking the northwest side of Gorman Strait, is a gray headland 885 feet high joined to the remainder of Korovin Island by a low neck. The shore is fringed with rocks, and a rock awash at low water is 400 yards off the south side of the cape. A pinnacle rock, 65 feet high, is 1.5 miles northward of Cape Devine, and a 5-fathom shoal 0.4 mile northeastward of the pinnacle, off the eastern side of Korovin Island. A 10-fathom bank extends 0.8 mile southward from the cape.

Korovin Bay, the western bight on the south side of Korovin Island, affords fair shelter in northerly weather, but the holding ground is poor. Anchorage may also be had for smaller vessels in the eastern bight. Both bights are free of danger except for numerous reefs near shore.

Scotland Point, the northeast end of Korovin Island, is distinguished by the large pyramid-shaped rock 100 yards off the point. A 10-fathom shoal is 1.8 miles northwest of the point.

Grosvold Bay, 2 miles westward of Scotland Point, may be used as an anchorage for small craft. The entrance is foul on both sides but safe in the middle; inside the bay foul ground is along the shores. The 623-foot peak of the bold rocky headland on the west side of the entrance to the bay and a waterfall westward of the headland are prominent.

The bay between Scotland Point and Grosvold Bay is not recommended for anchorage.

Henderson Island, 0.2 mile off the west end of Korovin Island, is small and 58 feet high. From westward it is hard to distinguish from Korovin Island until close-to. Rocks extend 0.1 mile off the west end of Henderson Island and shoals, covered 8 fathoms and less, extend up to a mile around the island, except on the east side where a reef extends to Korovin Island.

Korovin Strait, between Korovin and Popof Islands, has a least width of 2 miles and is free of dangers. The bottom is rough with depths of 25 to over 100 fathoms.

Karpa Island, 4 miles northeastward from Korovin Island, is 0.7 mile by 1.3 miles in extent and 1,373 feet high. The island is grass-covered with a smooth profile; a remarkable cliff 900 feet high is at the northeast point. The island may be ascended only from the southwest point; 70 yards off this point is a pinnacle rock 50 feet high. A reef extends 140 yards off the southeast point and a narrow kelp field is along the south and southeast sides of the island; otherwise there are no outlying dangers.

Popof Island, close eastward of Unga Island in the Shumagin Group, is irregular and rough in shape, with many hills over 1,000 feet high. The highest point, 1,550 feet, is a short distance northeast of the center of the island. The shores are generally rocky and steep and have many ledges, covered with kelp, extending 200 to 300 yards offshore.

The north and east shores of Popof Island have no outlying dangers, but the shore should be given a berth of about 0.5 mile. Between Andronica and Popof Islands the water is deep and clear. Temporary anchorage may be found 0.3 mile off the north shore of Popof Island anywhere west of Pirate Cove in 10 to 20 fathoms.

Pirate Cove, 4.5 miles east-northeastward of East Head, is formerly an important cod-fishing station but has been abandoned for many years.

Pirate Cove Light (55°21.8′ N., 160°21.6′ W.), 85 feet above the water, is shown from a small white house on the bluff at the north side of the entrance to the cove.

Marsh Island, 0.4 mile off the northeast part of Popof Island, is 0.2 mile in extent and 310 feet high, with its highest height near its north end. It is grass covered, with reddish cliffs showing westward and grassy slopes on the other side. There are 30 fathoms and more 200 yards from it all around, and the passage between it and Popof Island is clear. The island can be passed fairly close and is a useful mark for making Gorman Strait in clear weather.

Pirate Harbor is on the east side of the north end of Popof Island, and is about 1.2 miles long in a southeasterly direction. It affords well-sheltered anchorage for small vessels in all weather except easterly and southeasterly. Depths range from 15 fathoms at the entrance to 5¼ fathoms near the edge of the flat which extends 0.3 mile from the head. The harbor has a clear width of about 400 yards; foul ground extends over 100 yards in places from the shores, and a reef extends about 250 yards northward from the point on the south side of the entrance of the narrow part of the harbor. The north point of the entrance is a sheer cliff about 150 feet high. The only directions necessary are to keep in midharbor.

Popof Head, 980 feet high, is connected to the southeast part of Popof Island by an isthmus. It is a high precipitous headland with a steep talus. Depths of 20 fathoms are within 200 yards of the head, but vessels should give this headland a berth of 0.5 mile, although in fog it might be approached more closely.

Two large bights, with sand beaches, the westerly one known as **Red Cove,** are on the south side of Popof Island. Both of the bights furnish anchorage in northerly weather, in 8 to 10 fathoms, sandy bottom. Landing with keel boats is difficult on account of considerable surf and shoal water near the shore. The point separating the bights is a narrow, rocky projection fringed with foul ground for 300 yards; rocks awash at low water lie 600 yards from shore and 0.4 and 0.7 mile westward of the point.

Popof Strait, between Popof and Unga Islands of the Shumagin Group, is constricted in the northern part by rocky ledges, but fans out in the southern part into a deep and wide passage.

Egg Island, in the middle of the southern part of Popof Strait, is small, 165 feet high, and grassy on top. **Little Egg Island,** close westward, is 25 feet high and grassy topped. There are some detached rocks about the islands; vessels should not approach closer than 0.3 mile.

Sand Point, at the west end of Popof Island, is a flat 0.4-mile long sandspit that marks a turning point to the narrow northern part of Popof Strait. Its south shore is fringed close-to by rocky ledges and its north shore has sandy bottom. A shoal shelves off about 150 yards westward from the point and then drops off abruptly to deep water; clear the point by 0.3 mile. **Sand Point Light (55°19.3′ N., 160°31.6′ W.),** 20 feet above the water, is shown from a small white house on the end of the point.

Range Island, in the northern part of Popof Strait, is small and 30 feet high. Foul ground surrounds the island; vessels should not pass between it and Popof Island. **Range Island Light (55°21.4′ N., 160°30.3′ W.),** 50 feet above the water, is shown from a small white house on the northern point of the island.

East Head, on the east side of the north entrance to Popof Strait, has foul ground and kelp for 0.3 mile off its west side extending southward to Range Island. The radio towers 0.3 mile southward of the point are prominent from eastward.

West Head, a projecting point of Unga Island on the west side of the north entrance to Popof Strait, is a 40-foot-high black cliff; 0.5 mile south of it are cliffs 300 feet high. The land westward of the head is higher but is broken by numerous valleys. A depth of 10 fathoms is 300 yards off West Head, but as Popof Strait is approached a rocky shoal of 3¼ fathoms lies 0.4 mile offshore.

A depth of 6 fathoms can be taken through the narrow channel marked by lights and buoys in the northern part of Popof Strait, thence depths of 20 to over 80 fathoms through the open passage east of Egg Island in the southern part.

In addition to the dangerous reefs in the northern part of Popof Strait marked by buoys, the following dangers must be avoided: a 5-fathom rocky shoal 4 miles southward of Egg Island and 0.5 mile off the Unga Island shore; a 1¼-fathom pinnacle rock 3 miles southeastward of Egg Island; a 5¾-fathom spot 0.5 mile 013° from Sand Point Light; **Caton Shoal,** 0.6 mile north of Sand Point, with a 3-fathom spot; **Unga Reef,** 0.8 mile north of Sand Point, with 1¾-fathom spots; and reefs covered 2¾ and 3¼ fathoms on both sides of the north entrance to Popof Strait.

The current velocity is about 0.5 knot in the northern part of Popof Strait and sets northward on the flood and southward on the ebb. See Tidal Current Tables for predictions.

Humboldt Harbor, on the east side of Popof Strait 1.3 miles northeastward of Sand Point, is an excellent shelter with good holding ground. Sometimes a second anchor is needed to prevent dragging during strong southwesterly winds. Vessels can anchor in about 10 fathoms 0.3 mile offshore with Sand Point Light bearing 220° and Range Island Light bearing 005°.

Sand Point (1960 population 254; P.O.), on the north side of Humboldt Harbor, is a fishing port. The westernmost wharf at the village is owned by the Aleutian Cold Storage Company; frontage is 180 feet with a depth of 24 feet alongside. A machine shop at the plant can make minor repairs to small craft.

The oil dock, the easternmost and smaller of the two wharves, has a frontage of 60 feet with a depth of 15 feet alongside.

Sand Point is a **customs** port of entry. The port is only open during the halibut fishing season.

Gasoline, kerosene, lubricating oil, diesel oil, and fresh water are available in sufficient quantity to supply fishing craft operating in the area and local needs. A general store handles fresh and dry stores, and marine hardware.

A small steamer from Seward makes regular calls on mail contract. Nonscheduled vessels from Seattle call occasionally during the fishing seasons. Mail and passenger service by air usually is available weekly from May to September. Radiotelephone and radiotelegraph service is maintained with the Alaska Communication System.

A municipal airport and a wharf of the Sand Point Cannery owned by the New England Fish Company are on the north side of the spit at Sand Point, 1.2 miles southwestward of Sand Point village.

Unga Island, the largest and most important of the Shumagin Group, has several large indentations, among which are Baralof Bay and Delarof Harbor on the east side and Zachary Bay on the north. It is quite mountainous, especially the eastern half. The western half is comparatively low, that part west of Zachary Bay having somewhat rolling topography. The highest mountains are just south of Zachary Bay, a 2,270-foot peak being the highest. In general, the shoreline is rocky and precipitous. The south and west coasts are particularly foul. Near the west end of the north shore is a 3-mile-long sand beach with sand dunes immediately behind.

The east coast of Unga Island should be cleared by 1 mile to avoid the several offshore dangers, particularly the 5-fathom shoal 0.7 mile offshore and the 1-fathom rock 0.4 mile offshore between Baralof Bay and Delarof Harbor.

Northward of Baralof Bay the shore is mostly foul. A few settlers live along the coast. A fishing station is in the bight west of **Hardscratch Point,** 3.3 miles southward of Sand Point.

Baralof Bay, 5 miles southward of Sand Point, is a good anchorage except in heavy easterly weather. **Baralof Bay Light (55°14.5′ N., 160°32.0′ W.),** 60 feet above the water, is shown from a white house on the northern entrance point.

Favor the north side in entering Baralof Bay and anchor in the middle in 16 to 18 fathoms, sticky bottom. Small vessels can anchor nearer the head in not less than 6 fathoms; fair holding ground. A small rocky shoal, covered 3 fathoms, surrounded by sandy bottom is in the middle 0.5 mile from the head of the bay. A sandy shoal extends 0.3 mile off the south side of the bay entrance.

A salmon cannery is on the north side of Baralof Bay 0.5 mile inside the entrance. The cannery does not open up until nearly abreast of it. The cannery wharf has a 190-foot frontage with a depth of 27 feet alongside; fresh water available during the summer is piped to it. The cannery has a small machine shop and stores diesel oil, fuel oil, and gasoline for its own use. An oil wharf on the northwest side of the cannery wharf has a least depth of about 3 feet along its face.

Small amounts of fuel oil and gasoline can usually be obtained from the general store in emergencies. Vessels of the Pacific American Fisheries sailing from Bellingham, Washington, make regular calls. Radiotelephone and radiotelegraph service is maintained with the Alaska Communication System.

The codfishing station has a wharf across Baralof Bay from the cannery. A trail leads overland to Unga.

Kelly Rock, 3 miles southeastward of Baralof Bay, is a small, flat-topped, grassy islet 65 feet high 200 yards offshore; kelp grows between the rock and the shore.

Delarof Harbor, 9 miles southward of Sand Point, is only sheltered during northwesterly weather and the holding ground is poor. The harbor is not recommended as an anchorage. Depths decrease from 15 fathoms in the entrance to 5 fathoms about 300 yards from the inner harbor entrance; it is not safe to anchor in less than about 6 fathoms.

Rocks and islets obstruct the entrance to Delarof Harbor. **Halfway Rock,** 0.2 mile offshore on the north side, is 70 feet high. **Cross Island,** 0.8 mile westward of Halfway Rock, is 265 feet high; a 1¾-fathom shoal extends over 100 yards southward of the island. **Elephant Rock,** the south entrance point, is a narrow projecting rocky

mass 155 feet high. The base of the rock has been hollowed out by sea action and from northward resembles an elephant. A reef extends northward for 300 yards from the point to a 40-foot-high rock. Dangerous **Blind Breaker,** 2 miles northeastward of Elephant Rock, uncovers at extreme low water; depths of 12 to 14 fathoms surround the rock which is marked on the north side by a buoy. The western part of the outer harbor has depths of 3¼ fathoms and less.

A 2¾-fathom, narrow, constricted passage leads from the outer harbor to the shoal inner harbor that has depths of less than 1 fathom. A large reef on the south side of the entrance to the inner harbor uncovers at extreme low water. **Flagstaff Hill,** on the north side of the narrow passage, is a rounded 81-foot-high island surmounted by a flagpole.

Unga (1960 population 43), back of Flagstaff Hill, consists of a fishing station, several stores, a school, church, and several houses. It is the center of a codfishing industry. The anchorage off Unga is not recommended except under most favorable weather conditions.

The wharf at Unga is suitable only for small craft at high tide; cargo is lightered ashore from the outer harbor. A ledge, which uncovers, extends 400 yards southward from the wharf.

The south coast of Unga Island should be approached with caution. There is no shelter or protection, and often a southeast storm comes on suddenly, making it a bad lee shore. It is a poor landfall when approaching from seaward in unfavorable weather, and the currents cannot be foretold. Dangers along the south coast are within 0.5 mile of the shore.

Unga Cape, the southeast point of Unga Island, is a bare, gray, rugged cliff 855 feet high. A wall-like slab of rock 500 feet high, connected to the cape by a narrow bar, is just south of the cliff and perpendicular to it. At the foot of the cliff are ledges. A vessel may pass 0.5 mile off in 25 fathoms.

Sealion Rocks, 3 miles south-southeastward of Unga Cape, are 0.2 mile in extent, 130 feet high, flat topped and grassy. A breaker extends 0.4 mile northeastward of them. A vessel may pass 0.5 mile off in 26 to 32 fathoms but should give them a greater berth. Between Sealion Rocks and Unga Cape is a clear width of 2.5 miles, with depths from 20 to 30 fathoms and no outlying dangers.

Scheredin Bay, a large open bight in the south shore of Unga Island, is 3 miles across and 2 miles in depth. The shore is a sand and pebble beach, behind which is a bluff 7 feet above high water. A vessel may approach to within ½ mile off the sand beach in 8 fathoms. Anchorage is unsatisfactory only in northerly weather.

Chart 8704.—Acheredin Point, the southwest end of Unga Island, is a black mountain 1,402 feet high, with exceedingly rough surface and serrated profile. At the end of the point is a separate hill 500 feet high. The 20-fathom curve is within 0.3 mile of the south end of the point. There are numerous rocks and pinnacles around the point, particularly along the southeast and east shores; the most prominent is 50 feet high and about 0.7 mile eastward of the point. A sharp pinnacle also forms the southern tip of the point.

Sombrero Point is the first prominent headland 5.5 miles northward of Acheredin Point. The 1,055-foot peak on the headland resembles a sombrero from most directions to seaward. The waters fringing the point are mostly foul for 600 yards offshore.

Bay Point, 12.2 miles north of Acheredin Point, is a rounded rocky headland 315 feet high; it is a good landmark all around and shows over the land in Unga Strait. The low sandy neck that joins the point to the mainland encloses a shallow lagoon which can be entered from northward. The sea bottom is steep-to west of Bay Point; the 10-fathom curve is less than 200 yards from shore. Anchorage, with satisfactory protection from easterly weather, is available in 7 to 19 fathoms north and northwest of Bay Point and 10 to 15 fathoms in the large open bight southward of the point. Foul areas extend 0.5 to 0.8 mile off the west shore of Unga Island northward of Bay Point.

The 16-mile-wide area between Unga Island and Wosnesenski Island is full of broken ground and islets. **Kennoys Island,** 10 miles west by north of Acheredin Point, consists of several small islets. **Jude Island,** 13 miles northwestward of Acheredin Point, is 150 feet high and less than 0.3 mile across. It is rounded, grassy on top, and rocky at the shore. **Omega Island,** 5 miles west by south of Jude Island, is 90 feet high.

Pinnacle rocks, covered 3 to 8 fathoms, extend as much as 3.5 miles off Sombrero Point. A rock, covered 2 feet that breaks in moderate swell, is 2.3 miles east-northeast of Jude Island; a ridge with several 3- to 10-fathom spots extends about 2 miles north-northeast and south-southwest of the rock. The area westward of a line between Kennoys Island and Jude Island to Wosnesenski Island has many rocks covered 1 to 10 fathoms. A rock awash is 1.4 miles westward of Omega Island.

Chart 8700.—Unga Spit Light (55°24.5′ N., 160°43.5′ W.), 40 feet above the water, is shown from a small white house on a skeleton tower at the north end of Unga Island. Depths of 10 fathoms or more are 0.3 mile north of the spit, but depths of less than 10 fathoms extend over 1.5 miles eastward and westward of the spit. Temporary anchorage can be had west of Unga Spit during favorable weather.

Gull Island, 3 miles eastward of Unga Spit, is a flat-topped, grassy islet 37 feet high and 80 yards across with deep water within 200 yards.

Zachary Bay, on the north side of Unga Island, is open and easily entered. Anchorage is available in the outer part of the bay in 10 to 20 fathoms, sticky bottom, but the area is exposed to northerly and northeasterly winds.

Dangers extend off both shores at the entrance to Zachary Bay. A kelp-marked ledge that uncovers, extends 0.6 mile northeastward from the west side. **Weedy Shoals,** two small reefs 0.2 mile off the eastern shore halfway from the entrance to **North Head,** show well at

low water. The lower part of the bay is constricted by shoals extending from both sides; the head of the bay is shoal.

A better anchorage in Zachary Bay is 0.5 to 1 mile southwestward of **Round Island** in 6 to 12 fathoms, sticky bottom. The narrow channel to the anchorage passes 500 yards westward of North Head and 200 yards westward of Round Island.

Coal Harbor, indenting the east shore of Zachary Bay, is the best anchorage for small vessels. Anchor in about 6 fathoms 0.5 mile southeastward of Round Island, sticky bottom. Enter in midchannel northward of Round Island, then follow the shore at a distance of 300 yards. Avoid the sandspit, covered 1 foot, extending 0.3 mile southeastward from Round Island. The head of the harbor is shoal.

Chart 8704.—Beaver Bay, across Unga Strait from Unga Island and west of Cape Aliaksin, is open to the south but is free of offshore dangers. An exposed anchorage is in the upper part of the bay in 5 to 25 fathoms; there is little protection from the northerly winds that tend to draw down over the mountains and through the valleys into the bay with intensified force. Dangers are within 0.4 mile of the east shore and 1 mile of the west shore of the bay; the head of the bay shoals gradually.

Foul ground with considerable kelp is within the 10-fathom curve which extends from 0.4 to 2.5 miles offshore between Beaver Bay and Pavlof Bay; relatively shallow water is along the shore. A shoal spot, covered 7¼ fathoms, is 2.5 miles southeast by south of Seal Cape Light.

Seal Cape Light (55°21.0′ N., 161°15.2′ W.), 75 feet above the water, is shown from a small white house on a small island 3 miles east of **Seal Cape.** A hog-backed mountain is 0.8 mile northeastward of the light. A rock, covered 2 fathoms, is 0.6 mile offshore 0.8 mile eastward of the light; a ledge and broken ground extend to the shore.

Seal Cape has a flat-topped mound 100 feet high at the outer end and is joined to the mainland by a low neck of land; it is difficult to recognize. **Moses Rocks,** 3 miles westward of Seal Cape Light, are two breakers 0.3 mile apart. A 10-fathom depth, irregular bottom, was found 1.2 miles southward of Seal Cape; the area was not developed by further soundings.

Coal Bay, westward of Seal Cape, is a good shelter for small vessels in northeasterly weather. However, only a small part of the bay has been surveyed; vessels should not enter without local knowledge.

Cape Tolstoi, 8 miles westward of Seal Cape Light at the eastern entrance to Pavlof Bay, is high and bold with eroded bluffs from 200 to 600 feet high. The cape is marked by two peaks which are separated by a deep, narrow valley. Two prominent pinnacle rocks abut the west face of the cape. The shore around the cape is foul, but depths of 10 fathoms or more are within 0.5 mile of the cape. A small, flat, 20-foot-high, rocky island along the outside coast, 1 mile eastward of the cape, connects with the mainland at low water by a reef awash.

Pavlof Bay, on the southeast coast of the Alaska Peninsula 25 miles west of Unga Island, is open but leads to Canoe Bay, a landlocked arm. The only activity in the bay area is the operation of some fish traps during salmon season. Several cabins along the shores are occupied by fur trappers during the winter.

Dangerous rocks and small islands lie in the entrance to Pavlof Bay. The east shore is bold and strewn with rocks and reefs; the interior is mountainous. The north shore consists of reddish eroded bluffs 30 to 70 feet high giving way to a sand and ash beach near the entrance to Canoe Bay. The west shore is comparatively low with rolling grassland in the interior.

Northwest winds sweep out of Pavlof Bay with great force in the early spring and fall. The prevailing winds in summer are southeast to southwest, and they draw up the bay with considerable force causing at times a heavy sea in the upper part of the bay. Fog is more prevalent in the entrance than in the upper part of the bay.

In northerly weather, anchorage may be selected at any place in the northern part of Pavlof Bay. The bottom consists of mud and ashes, and has good holding qualities. In southeasterly weather, good protection may be had just northwest of Cape Tolstoi, in 15 fathoms, sticky mud bottom. In westerly weather, anchorage may be found near the western shore about 2 miles south of Ivan Island.

Flat Island, in midentrance to Pavlof Bay, is 62 feet high, flat topped, and has precipitous shores. A detached reef that uncovers, extends 0.5 mile south of the island. Detached reefs extend 0.3 mile northward and 0.2 mile westward of it, but the east side is clear with deep water 0.3 mile off the island. Irregular bottom, covered 11 to over 20 fathoms, extends 3 miles southward from Flat Island. Although volcanic ash bottom is indicated, the banks are probably of rock structure and may have less water over them; vessels are cautioned to avoid the area.

Black Rock, 1.3 miles off the west entrance shore 4 miles southwestward of Flat Island, is 15 feet high and surrounded by deep water.

Lump Island, 1 mile north-northwestward of Flat Island, is 45 feet high, small, and rocky. A 20-foot-high detached rock is connected to the south side of the island by a reef that uncovers.

A dangerous shoal, covered 7 feet, is 0.7 mile eastward of Lump Island. Kelp marking the shoal may be drawn under by strong tidal currents.

Black Point, forming the western entrance to Pavlof Bay westward of Lump Island, is low and indefinite; it is composed of black cinders and ashes.

Settlement Point, 7.5 miles northward of Cape Tolstoi, is a low narrow tableland. The 208-foot-high hill just back of the point is prominent. Shelter for small craft may be had on either side of the point in all except southwest winds. A dangerous reef that uncovers about 4 feet is 0.2 mile southward of the point. A 2¾-fathom patch is 1.2 miles northward of the point.

Gull Island, 4.5 miles westward of Settlement Point, is a bird rookery; a reef extends 0.2 mile westward of the island.

A bank between Settlement Point and Gull Island has a least surveyed depth of 12 fathoms; due to the irregular bottom, there may be lesser depths.

Ivan Island, 1.5 miles northwestward of Gull Island, is the largest in Pavlof Bay. It is 200 feet high and flat topped with vertical cliffs rising abruptly from the water. On the eastern side is a shallow basin for launches; about 6 feet can be carried through the two entrances at high water. Shoal water with scattered kelp is between Ivan Island and the mainland.

Round Island, over 2 miles northeastward of Ivan Island, is 90 feet high, small, and round topped. Two 25-foot-high rocky islets are northeastward of the island.

There is considerable foul ground with depths less than 1 fathom extending as much as 2 miles from the west shore of Pavlof Bay from Gull Island to and including the north side.

Canoe Bay joins Pavlof Bay at the northeastern end by a 175-yard-wide channel between 50-foot-high rocky entrance points. The controlling depth is 23 feet between deep water in both bays, but care is necessary to avoid several shoal spots of less than 3 fathoms and a 1¼-fathom rock 0.7 mile eastward of the south entrance point. The current velocity is estimated at 5 to 7 knots in the entrance; slack water occurs at about the time of high and low water in Canoe Bay.

A mountainous ridge which culminates in a remarkable volcano with an extinct circular-shaped crater borders the north side of Canoe Bay. **Cone Peak,** on the south side of Canoe Bay, is 1,280 feet high and prominent from Pavlof Bay.

Northwesterly winds do not blow strongly in Canoe Bay, but it is reported that northeasterly winds of winter sweep down the bay with great violence.

Anchorage in Canoe Bay may be selected just inside the entrance in 4 to 10 fathoms, hard bottom, or in the eastern part in 23 fathoms, sticky bottom.

Chart 8703.—On the southerly side of Alaska Peninsula from Pavlof Bay to Arch Point is a long, low, sandy beach. The ground back of the beach rises gradually to the three peaks of Pavlof Volcano.

Arch Point, at the northern entrance to Volcano Bay, is moderately low with cliffs about 100 feet high; it is joined by a low neck to the high land farther back. The cliffs are undercut in several places forming caves and arches. The rock is black near the water, changing to light brown above with grassy land back of it. Deep water extends to the south side of the point.

A flat-bottom area makes out from the shore about 2 miles northeastward from Arch Point, affording good anchorage in 14 to 15 fathoms on the outer part of the flat area. The anchorage is useful for vessels waiting for the weather to clear before attempting the passage along the islands.

Arch Point Light (55°12.4′ N., 161°54.3′ W.), 105 feet above the water, is shown from a small white house on the southeast part of the point.

An area of broken ground is between Arch Point and Dolgoi Island. A 1¾-fathom rock, 1.5 miles southeastward of the light is marked by a buoy. A 5¾-fathom spot is 0.8 mile northwestward of the rock and broken ground with a least found depth of 6¼ fathoms extends 0.5 mile eastward from the rock.

Local magnetic disturbance exists near Arch Point; it is 10° greater (easterly) than the normal magnetic variation.

Volcano Bay is free from rocks and shoals, except near the shores which should be given a berth of 0.4 mile. The shoaling is abrupt from about 30 fathoms to the flats at the north side of the bay. Good anchorage and shelter from all except southeast winds may be had near its head in 10 fathoms, sticky bottom. Shelter for small craft from southeasterly wind may be had in 2 fathoms behind the sandspit which makes out from the southerly side of the northwest part of the bay. Fresh water may be had here. Rocks and ledges extend 500 to 700 yards offshore between this spit and Bear Bay.

Bear Bay is a small inlet which affords fair anchorage in the middle of its entrance. The inner part of the bay can be entered only by pulling boats.

Charts 8703, 8704.—Pavlof Islands, consisting of seven, extend for over 15 miles from Alaska Peninsula coast south of Pavlof Bay. Most of the water area inside the outer perimeter of Wosnesenski, Ukolnoi, Poperechnoi, and Dolgoi Islands has not been surveyed and should be avoided; many covered and uncovered rocks, ledges, and breakers are in the area.

Wosnesenski Island, the easternmost of the Pavlof group, has a 1,200-foot, rocky, flat-topped peak near the eastern side. Most of the shore around the island is foul. Small vessels can anchor in the bight on the north shore or in the small bay with sand bottom on the northeast side of the island. Dangerous rocks covered less than 10 fathoms extend 3 miles north of the island. A rock awash at low water is 1.2 miles north of the northeast end of the island.

Ukolnoi Island, 5 miles westward of Wosnesenski Island, is high and mountainous; it is steep and bold at the northwest point. **Ukolnoi Island Light (55°14.7′ N., 161°39.5′ W.),** 35 feet above the water, is shown from a small white house on the northwestern point of the island. The north shore should be cleared by more than 1 mile to avoid the broken ground off the island.

Poperechnoi Island, 8 miles southwestward of Wosnesenski Island, has rugged cliffs 1,200 feet high along its northeast shore and a 1,800-foot peak in the northern part. Foul ground surrounds the island.

Dolgoi Island, 9.7 miles across and grass covered, is divided into two mountain masses by Dolgoi Harbor and the lowland at its head. The greatest height at the east and west ends of the island are 1,450 and 1,510 feet, respectively. The shore is generally abrupt and high. The north point of the island is an overhanging cliff. The south part of the island is particularly bold, the

cliffs being several hundred feet high. At the middle of the southeast side is a headland with a cliff over 900 feet high.

Dolgoi Cape, the south point of Dolgoi Island, is marked by several large detached rocks a few yards off the shoreline.

The area from 5 miles southeastward of Poperechnoi Island to 5 miles southwestward of Dolgoi Cape is full of dangerous rocks and islets; extreme caution is necessary.

Dolgoi Harbor (chart 8851) is well protected and provides excellent shelter from violent williwaws; however, the bottom is volcanic ash with poor holding ground. Two islets are on the west side of the entrance and two larger islands are inside the harbor.

To enter Dolgoi Harbor, steer **020°** for the highest point (500 feet) of the ridge at the head of the harbor showing westward of the two islands in the harbor, and pass 200 yards or more eastward of the outer one of the two islets on the west side of the entrance. Pass westward of the first island within the harbor, favoring if anything the side nearest this small island.

The deeper passage then leads between the two islands in Dolgoi Harbor, taking care to give the north end of the south island a berth of over 150 yards, and the southeast end of the north island a berth of over 300 yards; the best course through is about **109°**. Or, vessels can take the passage west of the upper island, which has a depth of about 4 fathoms, by keeping the island at a distance of about 200 yards. This channel obviates the turn between the two islands, which is somewhat difficult for long ships, especially during southeast winds.

Anchorage in Dolgoi Harbor can be selected anywhere above the islands in 7 to 10 fathoms, mud bottom. The best anchorage is reported to be 1.5 miles northward of the northerly of the two large islands inside the harbor.

Dolgoi Harbor is easily approached with the aid of the chart, passing on either side of Goloi Island. The principal outlying dangers in the approach are a rock covered 1 foot 1 mile westward of **Entrance Island** and a rock covered 1 foot 1.5 miles south by east of the island.

Bluff Point is a rocky headland forming the northwest end of Dolgoi Island. It rises abruptly to 50 feet, with a gentle grassy slope to the eastward.

Goloi Island, within the western limit of the Pavlof group, is 970 feet high and the sides are generally abrupt except at the two sandspits, one at the west end and the other at the middle of the northeast side of the island. **Goloi Sandspit Light (55°06.7′ N., 161°55.4′ W.),** 15 feet above the water, is shown from a small white house on point of spit.

The sandspit making out from **Moss Cape,** 1 mile northwestward of Goloi Sandspit Light, is marked by a daybeacon; a buoy marks the outer limit of the shoal extending southeastward from the cape. When on southerly courses approaching the passage between Moss Cape and Goloi Island, use care not to mistake a pinnacle rock, lying midway of the east shore of Inner Iliasik Island and skylined in the low center of the island, for the light on Goloi Island. Also, use care in passage to avoid foul ground making out from either side.

Iliasik Islands are each about 2.7 miles long and 0.7 mile wide. They are both high and have cliffs at the water. Viewed from a distance westward, they appear as three islands, as **Inner Iliasik Island** is nearly divided by a low neck of land into parts about 800 feet high. The high north end of **Outer Iliasik Island** is also separated by low ground from the rest of the island. Ledges and kelp extend about 200 yards from the east side and about 0.3 mile from the west side and southeast end of Inner Iliasik. Outer Iliasik is surrounded by ledges and kelp to a distance of 0.3 mile in places; bare rocks and foul ground extend 0.5 mile west-southwestward from the west end of the island.

Iliasik Island Light (55°02.3′ N., 161°56.3′ W.), 95 feet above the water, is shown from a small white house on the south end of Inner Iliasik Island. A buoy is 0.3 mile off the northwestern extremity of Outer Iliasik Island in range with the light. A house is on the northwestern slope of the inner island.

Caution should be used in making the passage between the Iliasik Islands because of reefs which make out from each island, constricting the navigable channel to a width of 0.6 mile. Growing kelp has been seen midway between the islands in the middle of the summer.

From the north point of Inner Iliasik Island a reef extends to the mainland. Just east of the mainland end of the reef and close to the shore is a large boulder which is easily recognized. There is little depth on the reef near the island, and about 8 feet on the greater part of it. Near the mainland a depth of 11 to 12 feet can be taken across the reef by passing 100 to 300 yards off the large boulder on a course parallel to the shore. The passage is used by local fishing vessels of about 6 feet or less draft and is not recommended for any but light-draft vessels; the tendency is to cross too far from the large boulder.

Sarana Island, 270 feet high, is a rocky island off the southern point of Outer Iliasik Island. The island is fringed with reefs and should be avoided. The passage between it and the Outer Iliasik is foul. A reef, bare at low water, is 1 mile eastward of Sarana Island, and an extensive reef with occasional bare rocky islets extends to the southward from the south point of Outer Iliasik Island.

A rock covered one quarter fathom lies about midway between the south end of Outer Iliasik Island and Deer Island. Vessels should keep well to the northward of this rock, as the area to the southward is foul.

Chart 8703.—Belkofski Point is the first point on the Alaska Peninsula westward of the Iliasiks. It is marked by **Belkofski Light (55°04.4′ N., 162°03.1′ W.),** 40 feet above the water and shown from a small white house. A reef extends 600 yards to the southwestward from this point, and the shore for 0.5 mile on either side is fringed by a reef extending from 100 to 200 yards offshore. In view of the broken and uneven bottom here, the cape

should be rounded at a distance of not less than 0.8 mile.

Belkofski (1960 population 57), a native settlement on the eastern side of Belkofski Point, has a prominent church. Vessels anchor off the village in 10 fathoms and land supplies on the sand and boulder beach unless southerly weather makes the surf too heavy.

The mail steamer from Seward makes regular stops. In the summer the village is nearly deserted because most of the natives work in nearby salmon canneries. Radiotelegraph communication is maintained with the Alaska Communication System.

Belkofski Bay is deep and free from hidden dangers, except for reefs and ledges near the shore.

Local Magnetic Disturbance.—Difference of as much as 5° from the normal variation has been observed on the east coast of Belkofski Bay.

Kitchen Anchorage, on the east side of Belkofski Bay, is easy to reach and affords good shelter in all except northwesterly winds. In strong southerly weather, the williwaws become frequent and violent. The bottom is soft volcanic mud and its holding quality is good. A large fresh-water stream flows into the head of the harbor and a fish trap is located at about the middle of the southern shore. From the northern entrance point of Kitchen Anchorage, for a mile to the entrance to the outer portion of Captain Harbor, the shore is a steep-to-cliff, and may be approached within 200 yards.

Captain Harbor is the indentation at the extreme northeastern end of Belkofski Bay. It extends for nearly 2 miles in a northerly direction with an average width of 0.4 mile, and is divided into an outer and inner anchorage by a shingle spit extending from the western shore. The outer portion is narrowed to a width of 300 to 450 yards between the 3-fathom curves, and the anchorage is in 10 fathoms in the center with the eastern end of the shingle spit bearing 033°, distant 600 yards. The holding ground is poor, being soft volcanic ash over a hard substratum. The northern shore of the outer anchorage is a low cliff, with shoal water extending 300 yards offshore in places.

The outer portion of the harbor has general depths of 8 to 12 fathoms and 10 fathoms can be carried into it. At the entrance, a slight bar extends off the north side with a shoalest sounding of 7½ fathoms near the middle of the entrance. Depths of 4 to 8 fathoms prevail over most of the inner part and the 3-fathom curve carries practically to the head of the bay, affording good shelter for small boats.

The western entrance is formed by two low sand-and-gravel islets, with flats extending 250 yards to the eastward and similar flats extending 400 to 600 yards off the mile stretch of beach to the westward.

The entrance to the inner basin is about 350 yards wide, with 9 fathoms in midchannel. The inner anchorage, entirely landlocked, is a secure anchorage for small craft in 7 fathoms, mud bottom, with the end of the shingle spit bearing 185°, distant about 600 yards. This is the best small-boat harbor along this section.

To enter Captain Harbor, round the prominent point at the southern entrance to Kitchen Anchorage at a distance of 0.5 mile, and steer **030°** to a point 250 yards off the southeastern entrance to Captain Harbor. Then steer **054°** and anchor. To enter the inner harbor, continue on the **054°** course until midway between the end of the shingle spit and the opposite shore; round the spit and steer **003°** for a small stream. Anchor as indicated in previous paragraphs.

Indian Head is a very noticeable promontory about 200 feet high, projecting 0.5 mile into Belkofski Bay on its western shore. It is distinguished by several pinnacles near the outer end; a reef extends 250 yards off the point.

The bight north of Indian Head is of even bottom, with the 3-fathom curve about 600 yards offshore. Vessels of any size will find excellent shelter from all except southerly winds in this bight. Anchorage can be had in 10 to 20 fathoms, sticky bottom. In the severe northerly winds, anchorage can usually be found in some section free from the wind. The survey ship found this anchorage by far the best in this section except for southerly weather, and the Fox Island Anchorage, described later in this chapter, the best for southerly winds.

Slavna Point is the high rocky point on the western side of the entrance to Belkofski Bay, 1.6 miles southward of Indian Head. It is steep-to, with depths of 8 fathoms 200 yards off the point.

Bold Cape, on the Alaska Peninsula opposite Deer Island, is a rugged headland faced with vertical cliffs, above which the mountain rises in steep rock-strewn slopes. Several prominent boulders stand a few yards offshore.

King Cove, westward of Bold Cape, reaches inland between high ridges which rise from the shore on either side of the cove. The outer bay is deep and free from dangers except those close to shore. Vessels may anchor in 16 fathoms 0.5 mile off the wharf and about midway between two shores. The anchorage is subject to violent williwaws which are apt to sweep across the bay from all points of the compass, but the holding ground is excellent.

Morgan Point Light (55°02.5′ N., 162°20.0′ W.), 120 feet above the water, is shown from a small white house on the west side of the entrance to King Cove. The shoal areas extending eastward from Morgan Point and from the western shore inside the cove are rocky and marked by kelp. Near the head and on both sides of the cove a line of piles or dolphins mark the offshore limits of the shoal areas. The bar across the mouth of the cove, 0.5 mile inside Morgan Point, has depths of 11 and 12 fathoms, with sand bottom overlaying a harder stratum.

Anchorage in the outer part of King Cove is in 13 to 15 fathoms, very good holding ground. Anchorage in the deeper upper part is in 16 to 21 fathoms, mud bottom mixed with volcanic ash.

King Cove (1960 population 290; P.O.) has a wharf and salmon cannery. The southern and main side of the wharf consists of two faces with a small basin between them. Vessels of considerable size (4,800 gross tons) can lie across the two faces of the wharf. In going along-

side either of the southern faces of the wharf, vessels should make a starboard landing on the ebb and a port landing on the flood. The ebb sets out of the lagoon at the head in a southeasterly direction with considerable strength, such that a port side landing with an ebb current is almost impossible, whereas a starboard landing should be made easily. It may be necessary to use a bower anchor for going alongside and hauling off with a southerly wind.

Fresh water is not always available for vessels as the supply is limited. Radiotelephone and radiotelegraph communications are maintained by the cannery with the Alaska Communication System.

The cannery company maintains a slipway for hauling out their own boats; this is available during the cannery season for emergency repairs. Vessels up to about 100 feet in length can be hauled out. A good machine shop is operated in connection with the cannery, and carpenters are usually available. A small amount of coal and gasoline is kept on hand and might be available in emergencies.

From April to September, vessels of the Pacific American Fisheries, sailing from Bellingham, Washington, make regular calls, and the monthly mail steamer from Seward makes regular calls.

To enter King Cove, steer for the wharf on a midchannel course. On the ebb, a strong current parallel with the shore sets eastward along the face of the dock. This current is caused by the discharge of water from the lagoon.

King Cove Lagoon is back of the long spit on which the cannery is located. This spit is slightly overlapped by a rounding spit extending from the western side. Between the spits, just westward of the shipyard, is the narrow entrance to the lagoon. The lagoon extends in a north-northeasterly direction for nearly 2 miles with depths of from 5 to 8 fathoms over most of the area. A basin is formed by the rounding spit at the southern end of the lagoon with depths of 5 to 7 fathoms, where the floating equipment of the cannery is usually moored. An extensive shoal separates this basin from the deep water in the northern section.

The channel from King Cove into the basin has a controlling depth of about 4 feet. Inside the basin the depths vary from 1 to 7 fathoms, with mud bottom in the deeper areas, and sand and gravel in the others. The maximum ebb current is about 4 knots, with flood current somewhat less. Current eddies and swirls through the basin cause small boats to swing at anchor. The holding ground is poor, probably due to the motion given anchored vessels by the current. Swinging room is limited. Apparently little or no channel exists from the basin into the lagoon. Vessels drawing as much as 5 feet have been taken into King Cove Lagoon at high water slack by employees of the cannery.

Small craft can be beached on the sandspit forming the northern shore of the entrance to the lagoon. The beach slopes evenly and is smooth.

Owing to the extensive flats which block the entrance to the upper basin of the lagoon, the plane of low water in that part of the lagoon is about 2 feet higher than the corresponding plane in the cove, and there is a considerable lag in the times of high and low water.

Deer Island, near the coast of the Alaska Peninsula westward of the Pavlof Islands, is separated from the Peninsula by Deer Passage. The passage is a part of the inside route along the Alaska Peninsula. The island has many high conical peaks of about the same height, making it difficult to identify most of them.

Stag Point, at the north end of Deer Island, is a short sandspit, except for which the shore is rocky and steep. Back of the point is a high sugarloaf peak. The point may be recognized by a steep, high, triangular-shaped bluff at the end of a shoulder of the peak which is conspicuous in the otherwise sloping sides. **West Cape** is a ridge of bare rock ending in sheer faces at the western extremity and at the two sides. **Fawn Point** is the southern cape.

Approaching Deer Island from westward, Fox Island shows up low and irregular and is not very distinct until some time after passing Umga Island, distant 14 miles, unless the weather is exceptionally clear. West Cape of Deer Island shows as a flat-topped sugarloaf, appearing as a detached island, but later is recognized as a part of Deer Island, while at the same time Stag Point shows as a high sugarloaf beyond West Cape. Southward of West Cape are two barren craterlike peaks, which form an excellent landmark.

Fox Island Light (54°57.4′ N., 162°26.0′ W.), 40 feet above the water, is shown from a small red house on the northwestern point of **Fox Island**. Just back of the light is a prominent knob which is separated from the rest of the island by a low neck of land. The southeastern part of the island is high and nearly flat topped.

Fox Island Anchorage, on the east side of Fox Island, offers good anchorage in 10 to 16 fathoms, soft bottom, well sheltered from the wind and sea from northeastward to southwestward.

The passage between Fox Island and Deer Island is clear except for a rock, covered 3 fathoms, about midway between Fox Island and West Cape. In leaving the anchorage through this passage, round the southern end of Fox Island at a distance of 400 yards and lay a course westward until the lighted whistle buoy about 2.5 miles southward of Thin Point bears about 228°, and Fox Island Light about 068°.

A rock, covered 3 fathoms and buoyed, is 1 mile west of West Cape. The southwest side of Deer Island is very foul.

Eastward of Deer Island the flood current sets northward and the ebb southward. North of Fox Island the flood current sets northeastward and the ebb southwestward. The tidal currents here are weak.

Deer Passage, between Deer Island and Alaska Peninsula, is well marked and a depth of 9 fathoms can be carried through by following the inside route described in chapter 3. Exercise caution to avoid the dangers on both sides of the passage.

Cold Bay, indenting the Alaska Peninsula northward

of Deer Island, is large and can be entered by deep draft vessels. An aero radio range and an aero light are on the west side of the bay.

Vodapoini Point, at the eastern entrance to Cold Bay, is low and flat topped with high mountains behind it extending to Lenard Harbor; the shore to Cold Bay is rocky and bold.

Local Magnetic Disturbance.—Difference of as much as 14° from the normal variation has been observed near Vodapoini Point.

Prominent **Bear Rock,** 300 yards offshore and 2 miles northwestward from Vodapoini Point, is 25 feet high, black, and jagged.

Kaslokan Point Light (55°06.4′ N., 162°31.5′ W.), 14 feet above the water, is shown from a small white house on the end of a low sand and gravel spit covered with grass. **Kelp Point,** 0.7 mile northward of the light, is low and rocky.

A reef marked by heavy kelp extends almost across the entrance to Cold Bay near Kaslokan Point. A buoyed 10-fathom natural channel passes through this area near the east shore to deeper water in the bay. The foul area with depths of 2 to 5 fathoms west of the buoyed channel should be avoided. During large tides, the current velocity in the channel may reach 4 knots; with an adverse wind, tide rips make it dangerous for small boats.

The northern shore of Cold Bay has many boulders. The western shore consists of low bluffs and sand beaches strewn with boulders, backed by rolling tundra.

Lenard Harbor is a small but well-protected harbor formed by an arm of Cold Bay. The anchorage is in to 22 fathoms and is protected from all seas. It has d holding bottom, but during stormy weather it is subto the usual williwaws common in this section, and ng southeasterly weather the wind may funnel gh with terrific force. An extensive reef, which is sh at ordinary high water, lies 0.3 mile off the southshore of Lenard Harbor. This reef constricts the ange near its head to an effective width of about 0.4 The water shoals abruptly to the mud flats at its and to the reef. A fine stream of water flows into d Harbor from its northern shore.

arof Lagoon, at the head of Cold Bay, is large and lar in shape. While it consists mostly of mudflats, be entered at high tide by small launches; with knowledge such boats may be taken to the cabin on rth shore of the lagooon. Just inside the western ce is a cabin and a small area of deep water.

Point Light (55°11.6′ N., 162°38.6′ W.), 48 ove the water, is shown from a small white house spit on the west shore of Cold Bay. In southeastweather good protection with excellent holding may be had behind Delta Point. In northerly comfortable anchorage may be selected any the upper bay with mud bottom and good holding

Bay forms a natural draw through which strong sweep in or out. Often when there is little wind elsewhere, a strong wind blows out of the bay. Winter brings extremely strong winds.

See appendix for **Cold Bay Climatological Table.**

A pier in fair condition, 2 miles northwestward of Delta Point Light, has an 850-foot face with depths of 30 to 33 feet alongside.

An airstrip at the abandoned airbase at Cold Bay is used by commercial aircraft. Radiotelegraph and radiotelephone communications are maintained with the Alaska Communication System.

Chart 8701.—Thin Point, forming the western entrance to Cold Bay, is a low, grassy, gently rolling point. The extremity is a yellow eroded bluff with reefs, bare at low water, extending from its southwest and southeast points. Shoal water extends 1.3 miles southward from the point.

Telegraph Hill, 375 feet high, is about 2.5 miles northwestward from Thin Point. It is a grassy, symmetrical, dome-shaped hill which stands out conspicuously as the only high ground near the point. It is a valuable landmark, for it is often visible when the higher hills are in the clouds.

Frosty Peak is the sharp rocky summit of a snow- and ice-covered mountainous mass between Cold Bay and Morzhovoi Bay. It is 5,784 feet high and prominent from seaward, although its snowcapped summit is seldom visible through the low-hanging clouds.

Walrus Peak, the southerly of two 10 miles westward of Thin Point, is a ragged 2,027-foot summit which is prominent when clear. Other peaks blend into the general mountain mass.

Thinpoint Cove lies westward of Thin Point. The eastern part of the cove is foul and should be avoided. Numerous kelp-marked reefs extend into the bay for a distance of 2.3 miles westward from Thin Point. The western half of the cove is clear except for reefs fringing the shore. At the head of the cove a series of shallow lagoons extend for several miles in a northerly direction and are connected with Thinpoint Cove by a small stream. The lagoons can be entered by small launches at high tide. The cove affords excellent shelter for small craft in northerly weather, but care should be exercised in entering to avoid the reefs to the south and west of Thin Point.

The coast from Thinpoint Cove to Morzhovoi Bay is rather rocky, with an occasional sand beach and grassy bluffs rising from the water. The shore is fairly steep-to, and the shore reef, extending 200 to 500 yards offshore, is heavily marked by kelp.

Sandy Cove is a small bay 2.3 miles eastward of Cape Tachilni. The head of the cove, which is at the foot of a deep valley making through the mountains, is clear. The eastern entrance point is steep-to. A reef extends nearly 0.5 mile in a southerly direction from the western entrance point. Good shelter in northerly weather is afforded small craft.

Sozavarika Island, low and grassy, lies 6 miles southward from Thin Point and 3.5 miles southwestward from Deer Island. The island is composed of shells deposited

on rock; it may be approached close-to on its northwestern side. Between this island and Deer Island are many rocks and reefs.

Umga Island, about midway between Deer Island and Cape Pankof, is a small, grass-covered, rocky island about 250 feet high. It is surrounded by deep water. The route from Deer Passage to Cape Pankof passes northward of Sozavarika and Umga Islands. **Umga Island Light (54°48.2′ N., 162°43.5′ W.),** 258 feet above the water, is shown from a small white house on the summit of the island.

Rush Rock, covered 5 feet, lies 1.5 miles east-northeastward from Umga Island. It is nearly on range with the south side of Umga Island and Cape Pankof. This reef is of small extent and breaks only with a heavy swell.

Amagat Island, off the entrance to Morzhovoi Bay, is high and bold, and shows as two parts; the southeast part is 1,065 feet high and has a dome-shaped peak, while the other part is 600 feet high, broader and flat topped. The island is the nesting place for many birds. A fair anchorage may be had in 16 fathoms just northeast of the island. Between the island and Cape Tachilni is a deep-water passage.

A shoal spot of small extent and covered 5¼ fathoms, is 1.7 miles south-southwestward from Amagat Island. Deep draft vessels should avoid this spot.

Kenmore Head, forming the western entrance to Morzhovoi Bay, shows prominently from the usual coasting track. There is a small summit just west of the point which drops off with a vertical cliff to the water.

Cape Tachilni, forming the eastern side of the entrance to Morzhovoi Bay, is an indefinite rounding point with grassy bluffs.

Egg Island, 325 feet high, is a rocky precipitous island with a fairly definite summit. Shoal water covered with kelp extends from the island to the mainland. The south side of the island affords temporary anchorage for small vessels while waiting for the northwest winds to moderate before crossing Morzhovoi Bay.

Morzhovoi Bay is the last bay indenting the coast of the Alaska Peninsula; it is about 15 miles eastward of Isanotski Strait. The broad, deep entrance has no known dangers except a rock with 12 feet over it, 400 yards eastward of Kenmore Head. The land bordering the entrance is very mountainous, giving way to rolling tundra at the head of the bay. The bay forms a natural draw for the wind which sweeps in and out with great violence.

Littlejohn Lagoon, north of **Reynolds Head,** is marked by a grassy islet off its entrance. The lagoon offers excellent protection in all weather, but can be entered only by small craft. About 5 feet can be carried through the crooked channel leading through the entrance, but once inside, there are depths of 4 fathoms, sticky mud bottom. Mooring dolphins may be near the entrance. Littlejohn Lagoon is occasionally used as a refuge for piledrivers and tenders used in driving fish traps in various parts of the bay.

Big Lagoon is the large irregular lagoon at the head of the bay. It has no entrance channel and is full of mudflats.

Middle Lagoon leads to a large lake which is a spawning place for a large run of salmon. At the eastern entrance point is a cabin. The lagoon has no channel, and with a southerly wind, breakers extend across the entrance. During the autumn months great flocks of wild geese frequent the lagoon. From Middle Lagoon it is about 7 miles by the easiest route to the Bering Sea shore.

Boiler Point, on the southwestern side of Morzhovoi Bay, marks the end of the mountain ridge extending from the entrance. In the cove just northwest of the point is a good anchorage, protected from all except northeast winds, with mud bottom.

In northerly weather good anchorage with mud bottom may be had at any place along the northern shores. In southwesterly weather the cove near Boiler Point offers good protection, while in easterly weather fair anchorage may be had off Littlejohn Lagoon. Indifferent anchorage may be had in the cove just northwest of Kenmore Head.

From Kenmore Head to Kabuch Point the shores are bold and mountainous, with deep water extending close-to. Ikatan Bay and Isanotski Strait separate Unimak Island from the Alaska Peninsula. Isanotski Strait, known locally as False Pass, is in general use for fishing boats and other craft of less than 10-foot draft when bound for Bering Sea points. Vessels up to 419 feet in length have entered the strait and docked at the False Pass cannery which is on the Unimak side, 3.5 miles within the entrance. The region is approached by steamers from the inside route along the Alaska Peninsula through Deer Passage, from seaward through the passage between Sanak Island and Hague Rock, and from the westward through the passage between Cape Pankof and Sanak Island.

Ikatan Bay, on the north side of the Ikatan Peninsula, is deep and free from dangers except for the area north of Sankin Island. An abandoned cannery at the southwest corner of the bay has a wharf which is unsafe. The larger buildings have been demolished.

Ikatan Point, the north end of Ikatan Peninsula, is bold and rocky. There is indifferent anchorage just west of the point, but vessels are apt to drag off into deep water.

Sankin Island, lying 1 mile from the north shore of Ikatan Bay, is high and rocky. In the passage between the island and the mainland is a reef awash at low water. For several years, during the early part of the fishing season, two or three floating salmon canneries have operated from the anchorage just west of Sankin Island. After the middle of July, they usually move to the Bristol Bay region.

The southwest side of Ikatan Bay is separated from Otter Cove by a sandy isthmus 20 to 30 feet high; a shifting river enters the bay at the middle of this lowland and the flat off its mouth drops off abruptly to deep water. Along this shore are several fish traps.

Isanotski Strait (False Pass) between the end of the Alaskan Peninsula and Unimak Island, has its southerly entrance at the northwest end of Ikatan Bay.

Kabuch Point Light (54°49.0′ N., 163°21.6′ W.), 15 feet above the water, is shown from a small white house on the spit off high and rocky **Kabuch Point** at the eastern entrance to Isanotski Strait. A reef which uncovers

makes off a short distance from the point. The western side of the entrance is a low sand beach.

Whirl Point, on the Unimak side about 1 mile within the southern entrance to Isanotski Strait, is bold. A reef which uncovers makes off a short distance from the point, then drops abruptly to deep water. At high water the end of this reef is made evident by the swirls of the current.

A salmon cannery is located on the Unimak Island side at **False Pass** (1960 population 41; P.O.), 3.5 miles northward of the southern entrance to Isanotski Strait. The wharf has a 225-foot face and a depth of about 26 feet alongside. A general store is maintained the year-round. The monthly mail steamer from Seward calls on both the outward and homeward trips; a mail plane calls weekly. The cannery maintains radiotelephone and radiotelegraph communications with the Alaska Communication System. Limited supplies of gasoline, distillate, and fuel oil are usually obtainable. A plentiful supply of excellent water is piped to the dock. There is also a small oil dock with shallow water along its face. The ebb current (flowing southward) sets toward the low flat point just south of the cannery, and with such a current care must be taken to avoid being set onto this point on leaving the wharf. Due to the strong currents and changeable eddies, this wharf must always be approached with caution. Often it will be slack water at the face of the wharf with a strong current running a hundred feet out in the stream.

Routes, Ikatan Bay to False Pass.—In entering Isanotski Strait from Ikatan Bay the Unimak side should be favored to avoid the reef off Kabuch Point. Follow the Unimak shore until almost up to Whirl Point; this shore drops off abruptly and can be passed close-to. Off Whirl Point, the tidal current may attain a strength of 7 knots when a tidal current of 4 knots is predicted off the wharf of False Pass Cannery. The reef making off Whirl Point when covered is generally made evident by swirls of current. During the ebb current this reef deflects a violent current directly against the axis of the pass, tending to turn a northbound vessel toward the eastern shore of the strait. Careful steering is required to offset the effect of this current.

After rounding the reef at Whirl Point stand directly for the cannery, taking care to avoid being set too near either shore; avoid the 3-foot ledge extending southwestward from the point 0.4 mile southward of **Nichols Point.** A range consisting of the end of the wharf and some mark on shore back of the wharf would be helpful along the reach from the turn at Whirl Point direct to the wharf. If unable to go alongside, a temporary anchorage may be had in the cove just northward of the dock.

A vessel must be able to make 11 knots to be able to stem the maximum current. Large vessels should enter only at slack water.

Currents.—Daily predictions for currents at Isanotski Strait (False Pass Cannery) are given in the Tidal Current Tables.

Routes, False Pass to Bering Sea.—From 5 miles north of the cannery at False Pass the depths gradually shoal to Chunak Point, where the limiting depths are 7 to 9 feet. From abreast the cannery the Unimak shore should be followed at a distance of about 0.5 mile until abeam of **Rocky Point.** Just before reaching this point a cabin will be seen in a little cove on the Unimak shore. From Rocky Point head for a prominent sand dune at the root of the long spit, of which Chunak Point is the outer end. Continue this course until the end of **Chunak Point** comes in range with the westerly end of the spit of **Cape Krenitzin.** Keep this range until near Chunak Point, then round the point at a distance of about 200 yards from the grass line. The channel diverges slowly from the shore until it is 0.5 mile offshore when abeam of the prominent sand dune. The channel passes between two shoals that are usually breaking and deepens gradually to the open sea.

Recent surveys show there is another route possible, from about 1 mile west of the north end of **Traders Head** to a mile southeast of Chunak Point, from where one arm extends to the point 200 yards off Chunak Point, mentioned above, and a deeper channel extends toward the center of Cape Krenitzin to 0.2 mile offshore. The latter channel then passes between shoals on course **330°**, and deepens gradually to the open sea. All channels must be used with extreme caution because the shoal bars at the edges of deep water shift frequently.

Vessels passing northward through Isanotski Strait should call at the cannery to obtain further information concerning the Bering Sea entrance.

Tides.—The tides at False Pass are somewhat irregular and become diurnal at the time of the moon's maximum declination. The diurnal range of the tide is 4.1 feet.

Ice.—As a usual thing, the strait is open to navigation throughout the winter, but during the winter 1923–24 the pass was entirely blocked with ice and the mail steamer could not get beyond Sankin Island. At this time drift ice extended from Cape Pankof to Sanak Island, a very unusual condition.

Traders Cove on the eastern side of Isanotski Strait, is a good anchorage. A small native village known as **Morzhovoi** has a church. The village is deserted during the summer when the inhabitants are employed in the canneries.

It has been reported that during northeasterly gales, the wind in the locality of Traders Cove is deflected to such an extent as to blow in an opposite direction.

Bechevin Bay, which is an enlargement of the northern end of Isanotski Strait, is shoal and full of sand and mud flats. Blind channels lead northerly from Traders Head to the east and west of **Isanotski Islands,** but terminate in shoals in the northern part of the bay.

Hotsprings Bay, a large bight in the southeast corner of Bechevin Bay, is a fair anchorage sometimes used by fishermen. A small reef, awash, is in the entrance, about 0.4 mile northeast of the north end of Traders Head, but good water lies on either side of the reef. The bottom is generally black mud and moss.

St. Catherine Cove is the western bight in the northern end of the strait. In former years there was a channel leading into the cove affording anchorage for small schooners, but it has shoaled and the cove is nearly bare at low water.

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Amagat Island, off the entrance to Morzhovoi Bay, is high and bold, and shows as two parts; the southeast part is 1,065 feet high and has a dome-shaped peak, while the other part is 660 feet high, broader and flat topped. The island is the nesting place for many birds. A fair anchorage may be had in 16 fathoms just northeast of the island. Between the island and Cape Tachilni is a deep-water passage.

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Ikatan Bay, on the north side of the Ikatan Peninsula, is deep and free from dangers except for the area north of Sankin Island. An abandoned cannery at the southwest corner of the bay has a wharf which is unsafe. The larger buildings have been demolished.

Ikatan Point, the north end of Ikatan Peninsula, is bold and rocky. There is indifferent anchorage just west of the point, but vessels are apt to drag off into deep water.

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The southwest side of Ikatan Bay is separated from Otter Cove by a sandy isthmus 20 to 30 feet high; a shifting river enters the bay at the middle of this lowland and the flat off its mouth drops off abruptly to deep water. Along this shore are several fish traps.

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Kabuch Point Light (54°49.0′ N., 163°21.6′ W.), 15 feet above the water, is shown from a small white house on the spit off high and rocky **Kabuch Point** at the eastern entrance to Isanotski Strait. A reef which uncovers

makes off a short distance from the point. The western side of the entrance is a low sand beach.

Whirl Point, on the Unimak side about 1 mile within the southern entrance to Isanotski Strait, is bold. A reef which uncovers makes off a short distance from the point, then drops abruptly to deep water. At high water the end of this reef is made evident by the swirls of the current.

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Routes, Ikatan Bay to False Pass.—In entering Isanotski Strait from Ikatan Bay the Unimak side should be favored to avoid the reef off Kubuch Point. Follow the Unimak shore until almost up to Whirl Point; this shore drops off abruptly and can be passed close-to. Off Whirl Point, the tidal current may attain a strength of 7 knots when a tidal current of 4 knots is predicted off the wharf at False Pass Cannery. The reef making off Whirl Point when covered is generally made evident by swirls of current. During the ebb current this reef deflects a violent current directly against the axis of the pass, tending to turn a northbound vessel toward the eastern shore of the strait. Careful steering is required to offset the effect of the current.

After rounding the reef at Whirl Point stand directly for the cannery, taking care to avoid being set too near the shore; avoid the 3-foot ledge extending southwestward from the point 0.4 mile southward of **Nichols Point.** A range consisting of the end of the wharf and some mark ashore back of the wharf would be helpful along the course from the turn at Whirl Point direct to the wharf. If unable to go alongside, a temporary anchorage may be had in the cove just northward of the dock.

A vessel must be able to make 11 knots to be able to stem the maximum current. Large vessels should enter only at high water.

Currents.—Daily predictions for currents at Isanotski Strait (False Pass Cannery) are given in the Tidal Current Tables.

Isanotski Strait, False Pass to Bering Sea.—From 5 miles north of the cannery at False Pass the depths gradually shoal to **Nichols Point,** where the limiting depths are 7 to 9 feet. From abreast the cannery the Unimak shore should be followed at a distance of about 0.5 mile until abeam of **Rocky Point.** Just before reaching this point a cabin will be seen in a little cove on the Unimak shore. From Rocky Point head for a prominent sand dune at the root of the long spit, of which Chunak Point is the outer end. Continue this course until the end of **Chunak Point** comes in range with the westerly end of the spit of **Cape Krenitzin.** Keep this range until near Chunak Point, then round the point at a distance of about 200 yards from the grass line. The channel diverges slowly from the shore until it is 0.5 mile offshore when abeam of the prominent sand dune. The channel passes between two shoals that are usually breaking and deepens gradually to the open sea.

Recent surveys show there is another route possible, from about 1 mile west of the north end of **Traders Head** to a mile southeast of Chunak Point, from where one arm extends to the point 200 yards off Chunak Point, mentioned above, and a deeper channel extends toward the center of Cape Krenitzin to 0.2 mile offshore. The latter channel then passes between shoals on course **330°**, and deepens gradually to the open sea. All channels must be used with extreme caution because the shoal bars at the edges of deep water shift frequently.

Vessels passing northward through Isanotski Strait should call at the cannery to obtain further information concerning the Bering Sea entrance.

Tides.—The tides at False Pass are somewhat irregular and become diurnal at the time of the moon's maximum declination. The diurnal range of the tide is 4.1 feet.

Ice.—As a usual thing, the strait is open to navigation throughout the winter, but during the winter 1923–24 the pass was entirely blocked with ice and the mail steamer could not get beyond Sankin Island. At this time drift ice extended from Cape Pankof to Sanak Island, a very unusual condition.

Traders Cove on the eastern side of Isanotski Strait, is a good anchorage. A small native village known as **Morzhovoi** has a church. The village is deserted during the summer when the inhabitants are employed in the canneries.

It has been reported that during northeasterly gales, the wind in the locality of Traders Cove is deflected to such an extent as to blow in an opposite direction.

Bechevin Bay, which is an enlargement of the northern end of Isanotski Strait, is shoal and full of sand and mud flats. Blind channels lead northerly from Traders Head to the east and west of **Isanotski Islands,** but terminate in shoals in the northern part of the bay.

Hotsprings Bay, a large bight in the southeast corner of Bechevin Bay, is a fair anchorage sometimes used by fishermen. A small reef, awash, is in the entrance, about 0.4 mile northeast of the north end of Traders Head, but good water lies on either side of the reef. The bottom is generally black mud and moss.

St. Catherine Cove is the western bight in the northern end of the strait. In former years there was a channel leading into the cove affording anchorage for small schooners, but it has shoaled and the cove is nearly bare at low water.

About 2.7 miles northwestward from Rocky Point and 0.5 mile offshore is a reef bare at extreme low water. Several local boats have struck this reef.

Ikatan Peninsula, the southeastern extremity of Unimak Island and southward of the end of the Alaska Peninsula, is about 10 miles long and is composed of several mountain masses separated by low depressions. The wind blows through the low depressions of the land with great force. The south shore of the peninsula has rocks and breakers.

Cape Pankof, the eastern end of Ikatan Peninsula, is a sheer rocky headland consisting of a single 1,243-foot peak dropping immediately to a bluff which forms the southeast side of the cape.

The slope of the top of the bluff descends gradually from the peak to the northward, whereas to the southward the descent is broken in the form of vast steps. From the southward, the peak has a sharp outline and an abrupt rise from the sea.

Cape Pankof Light (54°39.6′ N., 163°03.7′ W.), 82 feet above the water, is shown from a small white house on rocks off the southernmost part of bluff.

Another prominent headland, 1,070 feet high, rises precipitously from the bluffs on the south shore of Ikatan Peninsula, 1.5 miles westward of the southern extremity of Cape Pankof. The mountain masses of the two headlands are separated by a low depression 0.8 mile westward of the cape. The bluffs are rust and gray in color. The slopes are grass-covered in the summer with frequent bare spots. On the higher bluffs is evidence of recent small rockslides.

A shoal with a least depth of 7 fathoms has been reported 2.7 miles 022° from the light. A depth of 7½ fathoms is about 10 miles southwestward of Cape Pankof in 54°31.5′ N., 163°14′ W. This shoal, about 350 yards across, is surrounded by depths of 25 to 30 fathoms (see chart 8860).

A sunken rock which breaks with a light swell during low stages of the tide is about 1 mile westward from Cape Pankof Light and about 300 yards offshore. Another offshore danger is off the eastern point of the entrance to West Anchor Cove.

Pankof Breaker is a sharp pinnacle rock with ¾ fathom over it, lying a little over 2 miles 053° from the southeast point of the entrance to East Anchor Cove. During the summer the rock seldom breaks. There are 12 to 14 fathoms close to the rock. A buoy is 400 yards east of the breaker.

East Anchor Cove, on the north side of Cape Pankof, is a good anchorage except for winds from the north to southeast, through east. The cove is large and easily entered; the only danger in the approach is Pankof Breaker. Just inside the southeast entrance point is a fishtrap. Anchorage may be selected as desired in 7 to 10 fathoms.

Westdahl Rock, covered 3 fathoms, lies 7.9 miles 104° from Cape Pankof Light. It is a rocky patch of small extent. A lighted whistle buoy is 1 mile southwest of the rock.

Bird Island, about 0.5 mile in extent, is the most prominent landmark between Capes Pankof and Aksit. From the south, the island appears as a single elevated rocky mass, rounded but somewhat ragged in outline; the highest point, 775 feet, is a knob readily identified. Steep sides, fringing rocks, and breakers make a landing very difficult. The only practical landing place is on the north tip which has a steep beach of rather coarse gravel.

A bar consisting of a sunken reef connects Bird Island with the western point of the entrance to Dora Harbor. The greatest depth is 5¼ fathoms, and passage is not recommended. This bar depth is on the line passing through the 1,760-foot peak 1.6 miles northward of Cape Aksit and the summit on the western point of the entrance to West Anchor Cove. The line crosses the bar a little more than halfway from the point (on the north) to Bird Island. A sunken rock on the bar is a little less than halfway from the point to the island. The rock does not break in ordinary weather.

West Anchor Cove, the largest indentation on the south side of Ikatan Peninsula, affords indifferent anchorage. Anchorage in East Anchor Cove is preferable. The anchorage for all but small craft is confined to the open part of West Anchor Cove, which is exposed to southerly and southwesterly weather, always accompanied by heavy ocean swells. The bottom in West Anchor Cove is fine, dark, gray sand, which is good holding ground. The entrance is wide and clear, but rocky reefs extend from the points on either side. A narrow shelf of rocks extends along the shore at the eastern point of the entrance, the outer edge of which shows at half tide and probably breaks all the time. A rock covered 2½ fathoms is off this ledge, 0.5 mile southwesterly from the point. This is the outermost danger in the approach from the eastward.

A prominent flat rock, 4 feet high, is 0.5 mile off the round point on the eastern side of West Anchor Cove and about the same distance inside the entrance. This feature marks the western limit of the dangers on the eastern side of the cove and has been found useful for making the anchorage in thick weather. A detached shoal of 2¾ fathoms lies in the middle of the inner part of the cove about 1.2 miles from the head. The shoal marks the upper limit of anchorage for all but small craft. Rocky ledges extend from the north and south shores but not over 300 yards. A prominent rock, 46 feet high, lies close off the eastern shore, about 1.2 miles northeastward of the eastern entrance point.

The bight between West Anchor Cove and Dora Harbor is small and exposed. Rocky reefs extend about 400 yards from the shore off the entrance points. A prominent rock 32 feet high lies 330 yards off the west side of the headland at the east end of the bight. A prominent rounded rocky hill, 789 feet high, dominates the headland.

Dora Harbor, on the south side of Ikatan Peninsula, provides the only good anchorage with protection from all winds and sea on the south side of Unimak Island, but the harbor is limited to small vessels. The entire shore is fringed with ledges, partly bare at low water, to a dis-

tance of about 300 yards. The reef extending 0.3 mile westward from the eastern point of the entrance and that projecting from the western point toward Bird Island afford protection from ordinary southerly and westerly swells at the outer anchorage, but a heavy swell from southward is uncomfortable. The outer anchorage, however, is seldom used.

Low tableland terminates in bluffs at the shores on both the eastern side of Dora Harbor and the middle point of the western side.

The inner harbor of Dora Harbor is a slight expansion at the head with depths of 9 to 15 feet in the middle. A heavy swell from the southward will cause this anchorage also to be uncomfortable.

In entering Dora Harbor care should be taken to avoid a rock awash at low water lying 0.3 mile 220° from the eastern point at the entrance. The rock is detached and 200 yards from the edge of the shore reef. In calm weather, when the rock is covered, a light swell may not cause a breaker. Favor the western side in the entrance to avoid the reef extending about 0.3 mile westward from the point on the east side of the entrance, and then steer midharbor courses to the inner harbor, where anchorage with somewhat restricted swinging room is afforded vessels of 7 feet or less draft. Care must be taken to hold the midharbor course in entering the inner harbor in order to avoid reefs that make out 325 yards from the points on each side.

Otter Cove is an open bight between Ikatan Peninsula and Cape Aksit. The shores on both sides are characterized by high bare rocky cliffs. The sand beach forming the head is bordered by a series of grass-covered dunes. Higher dunes in the form of ridges are farther inland.

Otter Cove is exposed to southerly winds and ocean swells, and always has a heavy surf. Northerly winds blow with great violence over the low isthmus separating it from Ikatan Bay. The only safe boat landing is in the northeastern corner of the cove. Two rocks, close together which uncover 1 foot, lie over 0.5 mile from the shore of Ikatan Peninsula and 3.5 miles northwestward of Bird Island.

A story has been handed down among the natives that a channel once existed between Otter Cove and Ikatan Bay and that Russian vessels once sailed through.

Cape Aksit, the western point of Otter Cove, is bold and rugged.

Cape Lazaref and the south coast of Unimak Island are described in chapter 7.

8860, 8705.—Sanak Islands, the southwesternmost group of islands along the Alaska Peninsula, cover about 20 miles long and 10 miles wide. The group consists of two large islands, Sanak and Caton, and numerous small islands and rocks; all are bare of trees.

Sanak Peak, part of the mountain mass at the northeastern end of **Sanak** Island, is 1,740 feet high and a prominent landfall. A 787-foot peak, 1.5 miles to the northeastward, is often visible when Sanak Peak is obscured by haze. The ridge rises to more than 200 feet on the eastern part of the mountain mass, but most of the remaining land area in the group is low in comparison, being over 100 feet high on the northern side, decreasing to less than 40 feet high among the southern islands and rocks.

Anchorage at Sanak Islands is suitable for small or moderate-sized vessels. Caton Harbor affords the only shelter from all winds.

Dangers along the north side of Sanak Islands are within 0.5 mile of the shore, except **Crowley Rock,** 1.5 miles offshore 348° from Sanak Peak. This rock has several small pinnacles with a least depth of ½ fathom over them. The rock is not always marked by kelp and only breaks in a disturbed sea; it occasionally shows a prominent slick.

Foul ground of numerous reefs, islands, islets, shoals, and covered and uncovered rocks extends almost 6 miles southward and over 12 miles westward of Sanak Islands; heavy breakers extend a considerable distance offshore. **Aleks Rock,** 16.7 miles 241° from Sanak Peak, is covered 1½ fathoms and is the farthest outlying known rock southwestward of Sanak Islands. A 7½-fathom pinnacle is 4 miles north of the rock.

The harbors on the south side of the Sanak Islands, except possibly Peterson Bay, should not be approached without local knowledge.

Caton Island, at the east end of the Sanak group, is rolling and grass covered. Most of the beaches are composed of rocky ledges, or boulders and gravel. Steep and prominent bluffs are on the northwest point. The low eastern side and the southern side of the island are fringed with rocky ledges up to 1 mile offshore.

Whale Bay, on the northeast side of Caton Island, is extremely shoal.

Temporary anchorage in southerly winds can be had west of Caton Island and south of **Lida Island.** Approaching the anchorage from eastward, stand in near the visible rocks off the east end of Lida Island, taking care to avoid the partially covered reef, nearly 0.5 mile eastward of Lida Island, which extends in a northerly direction from Caton Island. Anchor about 0.4 mile from Caton Island, and 0.3 to 0.5 mile southward of Lida Island, in 6 to 7 fathoms, sandy bottom. Care should be taken not to approach the south side of the anchorage.

If the anchorage south of Lida Island is approached from westward, steer for the southwestern side of Caton Island on 144°, passing about 0.5 mile southward of Lida Island, and leaving a rock awash, 0.5 mile northward from Wanda Island, about 0.4 mile on the starboard hand, and anchor as directed above. The western end of Lida Island should not be approached closer than 0.5 mile.

Caton Harbor, on the west side of Caton Island, is large and affords anchorage in 2 to 3 fathoms, sandy bottom; it is protected on the south by **Elma Island** and on the northwest by the islands and reefs between Caton Island and Sanak Island. The harbor is protected from all swells, and schooners of considerable size have wintered here. These waters provide the best all-weather anchorage for small vessels in the Sanak Islands. Fresh water in small quantities may be obtained.

Princess Rock, off the west end of the islet in the center of Caton Harbor, is the most prominent feature in the

vicinity. It is high and grassy on top; extensive reefs surround the rock.

The best entrance to Caton Harbor is from the northward through a narrow channel close to the west end of Caton Island. Proceed as directed for entering the anchorage south of Lida Island from westward, and when well past the rock awash, 0.5 mile north of **Wanda Island,** bring the south side of the rock awash in range with Northeast Point astern, and stand in, keeping the range astern, course **125°**, until close to Caton Island. Then keep the bare rocks and kelp projecting from Caton Island close aboard on the port hand, but do not approach the kelp on the starboard hand; the least depth in the narrowest part of the passage is 4½ fathoms, shoaling inside to 3 fathoms. When past the rocks on the port hand, steer **193°** for about 0.5 mile, and anchor in about 3 fathoms with Princess Rock in line with Sanak Mountain, bearing 294°. This anchorage is about 0.5 mile from Caton Island, and the same distance from the nearest reef on the western side. Anchorage, with probably better shelter from northeast gales, can be made off the sand beach on Caton Island, just inside the narrow entrance.

To enter Caton Harbor from the south through **Devils Pass,** westward from Elma Island, or through **Southeast Pass,** eastward of Elma Island, requires local knowledge to avoid the reefs and breakers. These passes should not be attempted by a stranger. Surveys indicate a controlling depth of 1¼ fathoms in the approach to Devils Pass with deeper water through the narrow part of the pass. Tide rips in Devils Pass are at times dangerous to small craft.

Sanak Island, largest of the Sanak group, has rocks and reefs along its shores and is indented by several harbors that can be used by small vessels. The westernmost breakers of the rocks, which form a continuous barrier from the western side of the island, are 2 miles offshore, or 1 mile westward from the northwesterumost bare rocks of the barrier. Cattle are raised on the island.

Finneys Bay, at the northeast end of Sanak Island, is obstructed by rocks; steep and prominent rocky bluffs lie northwestward of the bay.

Northeast Harbor (chart 8841), on the northeastern side of Sanak Island, affords temporary anchorage about 0.2 mile south-southeastward from 100-foot high **Northeast Point,** in 13 fathoms. **Eagle Rock,** near the middle of the harbor, is 58 feet high and surrounded by a ledge which uncovers and a reef that connects it with the head of the harbor. A reef which uncovers extends along the northern side of the harbor; a 24-foot-high rock is 0.4 mile westward of Northeast Point. Small vessels may anchor between Northeast Point and Eagle Rock, with Cherni Island, 13 miles northeastward, just open of Northeast Point, in 6 to 9 fathoms, sandy bottom. The harbor is exposed to easterly winds. Water can be obtained.

Johnson Bay, 1.5 miles west of Northeast Point, has an inner harbor for small craft, where there is a fishing station. Vessels may anchor just inside the entrance to the bay, favoring the east side, in 9 fathoms, with protection from southerly and westerly winds. Rocks are close to the west entrance point.

Unimak Cove, 2.5 miles west of Northwest Point, is an unimportant open bight.

Pavlof Harbor (also name of small village, 1960 population 77; P.O.), 4 miles west of Northeast Point, is reported to be a good place for small craft, but local knowledge is required to enter because of the reefs at the entrance. **Pavlof Harbor Light (54°27.7′ N., 162°41.3′ W.),** 56 feet above the water, is shown from a white skeleton tower on the eastern entrance point. The controlling depth is 6 feet to the fishing station near the head of the harbor.

Murphys Cove, 7 miles west of Northeast Point, is protected by a reef and affords shelter for boats of local fishermen.

Sanak Harbor (chart 8841), at the northwest end of Sanak Island, affords restricted anchorage for small vessels with protection from southerly and westerly weather, but is exposed to winds from northwest to east, and a swell makes in with strong westerly winds. **Sanak,** a small cod fishing center at the southeast corner of the harbor, has a boat landing where water can be obtained. There is a store; mail is received from Pavlof Harbor. Temporary anchorage may be had about 0.2 mile northeast of **Point Petrof,** in 10 fathoms. The diurnal range of tide is 6.6 feet.

Approaching Sanak Harbor from northward, steer for the 787-foot peak of Sanak Mountain on any course between **140°** and **176°**, taking care to avoid Westdahl Rock. When off the entrance, steer **193°** for the middle of the entrance and anchor in midchannel in 3 to 4 fathoms. The covered rocks off the entrance points are marked by kelp. Take care to avoid the 2¾-fathom spot, 0.2 mile northward of the eastern entrance point, and a rock, covered 7 feet, 200 yards off the eastern shore 300 yards inside the entrance.

A light on the eastern side of **Clifford Island,** on the south side of Sanak Island, affords anchorage for small craft in 2½ fathoms, rocky bottom. Local knowledge is necessary to reach the anchorage because of the numerous rocks and reefs on the south side of Sanak Island.

Peterson Bay (chart 8841), on the southeastern side of Sanak Island, is well protected from all but southeast winds, especially for small vessels of 12 feet or less draft which can anchor well inside the bay. It is reported that during northeast winter gales a heavy swell makes into the bay. In the widest part of the bay near the head are depths of 2 to 2¼ fathoms. A 1¼-fathom spot is in midchannel about 0.5 mile inside the south entrance point. Another shoal of 1¾ fathoms, marked by heavy kelp, lies about 350 yards off the south shore and about 0.2 mile inside the south entrance point. The diurnal range of tide is 6.2 feet.

In approaching Peterson Bay from eastward, give the east and southeast sides of Caton Island a berth of about 2 miles to clear the reefs and the breakers which extend more than 1 mile offshore, and steer **262°**, passing 1 mile southward of **Umla Island** and **Telemitz Island.** When

Telemitz Island is abeam, bring the tangent of the north side of Peterson Bay in line with the slight saddle between Sanak Peak and the eastern shoulder of Sanak Mountain, and run in on this range, course **318°**. When the south point of the bay is about 0.7 mile distant, haul northward a little so as to bring the north side of the bay in line with the extreme southwest tangent of Sanak Mountain, and run in on this range, course **311°**, until the south point at the entrance bears 177°. Then steer **294°** for the middle of the bay but avoid the 1¼-fathom spot southward of the course, and select anchorage according to draft.

Charts 8705, 8859.—Sandman Reefs, a large area of foul ground with numerous islands, islets, and rocks, extend from the Pavlof Islands and Deer Island on the north almost to the Sanak Islands on the southwest. This area has not been completely surveyed and should be avoided.

Hague Rock, at the southerly end of Sandman Reefs, is 47 feet high, rocky, and grass covered, with deep water close to the south side. A reef extends over 1 mile northwesterly from the rock. **Hague Rock Light (54°33.2′ N., 162°24.1′ W.),** 60 feet above the water, is shown from a small white house.

The wide and clear passage between Hague Rock and Sanak Islands is used by large vessels going between the Pacific Ocean and Ikatan Bay.

Cherni Island, 5 miles northward of Hague Rock Light, is grass covered, and shows as rolling land in the northern portion, gradually rising to two prominent 162-foot sharp hills near the southern end. The southwest side of the island is a bare rock cliff, rising to 90 feet. There is a good small boat anchorage at the north end of the island; strong northerly winds here only cause small swells at high tide. The anchorage can be approached only from the north with local knowledge. Cattle are reported on the island.

7. ALEUTIAN ISLANDS

Charts 8802, 9102.—Aleutian Islands, extending in a 900-mile arc from Unimak Island to Attu Island, are a westward continuation of the Alaska Peninsula and form the southern limit of the Bering Sea. The most important groups of islands in the chain are Fox Islands, Islands of the Four Mountains, Andreanof Islands, Rat Islands, and Near Islands.

Most of the islands are mountainous; the coasts are bluff and exposed; the shores are bold, with many off-lying islets, rocks and reefs; the beaches are rocky and narrow; and the water is usually deep close to shore. As a rule, seabottom features are similar to those of the adjacent land.

Anchorages.—Most of the larger islands in the Aleutians provide some sheltered anchorages as mentioned in the text for the individual places. The better known harbors are: Akutan Harbor on Akutan Island, Dutch Harbor on Unalaska Island, Nazan Bay on Atka Island, Kuluk Bay on Adak Island, Constantine Harbor on Amchitka Island, Kiska Harbor on Kiska Island, and Massacre Bay on Attu Island.

Dangers.—Nearly all beaches in the Aleutian Islands present natural obstacles to landing. The shores are generally precipitous; the breakers are heavy and in many cases the approaches are filled with jagged rocks and kelp beds which are unusually abundant in the Aleutians; in winter, the kelp disappears entirely. Sand beaches are rare; usually being found only at the heads of bays; and in no case does a beach extend more than 50 yards inland from the high-water line.

When heavy swells and seas are encountered along a beach, a landing in a small boat should not be attempted as there are strong and dangerous undertows accompanied by variable currents. In addition to the lack of surveys, navigation in this region is made difficult by the prevailing thick weather and further by the lack of knowledge of the currents which attain considerable velocity at times.

Currents.—Southward of latitude 50° N. is an eastward drift across the Pacific. An eddy, accompanying this flow, sets westward along the south shore of the Alaska Peninsula and the Aleutian Islands and then drifts through the passes into the Bering Sea. These currents form a part of the general circulation of the North Pacific Ocean.

Through the Aleutian Islands passes, the velocities of the currents caused by tidal and wind effects are large enough to mask the continual northward drift through the passes.

In the past, numerous reports have been received to the effect that the flood currents flowing into the Bering Sea are very much stronger than the ebb currents. These reports have been largely discounted by observations in a number of the passages which in general reveal equally strong ebb currents flowing through the passes from the Bering Sea. It is believed that on account of the large diurnal inequality in the current of this region, mariners have been deceived by the long periods of flood current that occur near the times of the moon's maximum declination.

Currents are highly complex, making generalizations impossible. They set counter to general trends in many places along shores, even within major passes. Whirls and eddies in wide distribution further complicate the problem.

All passages in the Aleutian Islands have strong currents. In the narrow Akun Strait, the current is reported to reach a velocity of 12 knots. Because of the scarcity of reliable observations, definite current predictions can be made for only a few of the passes. Current predictions for some of the more important passes may be obtained from the **Tidal Current Tables.** The effect of the tidal currents has often been felt offshore at a considerable distance from the passes, resulting in unexpected sets. Mariners should guard against such coutingency. In the region of the Aleutian Islands the navigator must heed the currents carefully; a vessel is in more danger there from that cause than from any other, except the lack of surveys. In bad weather, the currents cause much heavier seas, and this effect has been noticed as much as 20 miles off the passes.

In general, tide rips occur to the southward of the passes on the ebb and to the northward on the flood, furnishing a rough means of determining the set of the current, although local tide rips may be caused by detached banks.

Tide rips even well off the entrances may appear as broken, choppy seas, with a few steep, short swells near the edge. In rough weather, the effect is to make the seas higher and steeper. The tide rips are much more noticeable during periods of tropic tides. Whirls are more likely to occur in the passes near the times of slack water.

A characteristic of the currents in the vicinity of the Fox Islands Passes is the sudden change from slack to strength of flood. A change from slack to almost 2 knots in 10 minutes has been noted, and in many cases the maximum flood occurs within 1½ hours after slack. It is therefore probable that the worst tide rips occur at the first of the flood, and under exceptional combinations of weather and tropic tides an effect resembling a bore may be caused in the narrower passes.

In Unimak Pass the current is probably strongest between Scotch Cap Light and Ugamak Island, where at

strength of flood or ebb the velocity averages about 3 knots, but the maximum may exceed this figure considerably during tropic tides when 6 knots during the flood and 6.5 knots during the ebb are to be expected.

The current has a large diurnal constituent which at times of tropic tides may cause the current to set continuously in a flood direction for as much as 18 hours.

The set of the flood in Unimak Pass averages about 300°. A vessel proceeding from Unimak Pass toward Avatanak Strait will experience a set when off Ugamak Strait and off Derbin Strait. When crossing the deep, usually marked by tide rips, northward of Derbin Strait, a strong set in the direction of the axis of the deep is often experienced. Only weak currents are noted along the shore of Tigalda Island, but farther to the northward strong ebb currents, setting toward Avatanak Strait, have been encountered.

Tide rips occur off the eastern end of Ugamak Island and in places where there is a sudden change of depth.

Instances have been reported of vessels, hove-to-north of Unimak Pass and waiting for clear weather, being carried through the pass by the current and finding themselves on the opposite side when the fog lifted.

In Akutan Pass the currents have an average velocity at strength of about 5.5 knots; however, velocities of 9 knots may occur.

The tide rips in Akutan Pass are strong during the periods of largest tides. With a heavy northwest wind, the rips are menacing in the vicinity of the 15-fathom spot just south of Cape Morgan. They are confused and make a vessel very uncomfortable; they are dangerous for small craft. However, the strongest rips are not generally found in the middle of the pass. With a current setting northward, the rips will be strongest in the northern entrance, and with a current setting southward, the strongest rips will be found at the southern entrance to the pass. When the current setting north is opposed by a strong northerly wind, the tide rips in the northern entrance to the pass are dangerous, and it is advisable not to use this pass in a gale. Under ordinary conditions, when there are no strong winds, this pass can be used by full-powered steamers at any stage of the current, but sailing vessels should not use it except at or near slack water. It is said that the most dangerous rips occur at the north entrance to the pass.

In Unalga Pass, northeastward of Fisherman Point near the center of the pass, the average tidal current at strength is about 6 knots. At times of tropic tides, current velocities may reach 9 knots. The maximum velocity occurs in a short stretch between Fisherman Point and Unalga Island, and the strongest current can be avoided by favoring the Unalga Island shore. The current along the south side of Unalga Island will rarely exceed 2 knots.

The tide rips in Unalga Pass accompanying a flood current are most pronounced northeastward of Erskine Point. With an ebb current the most pronounced tide rips occur off Brundage Head. During the periods of tropic tides, however, tide rips may occur throughout the length of the pass. Small boats can avoid the tide rips by keeping close to the Unalga Island shore.

Treacherous seas caused by wind or ocean swell opposing the current may be encountered in the narrow part of Unalga Pass. When tide rips are heaviest in Akutan and Unalga Passes, the water is broken into heavy choppy seas which board a vessel and make it difficult to control the steering. Tide rips are dangerous for small vessels even if there is no wind or sea.

Additional information on currents will be found elsewhere in the text under their respective localities.

Tides.—General tide information in the Aleutian chain is contained in the Tide Tables.

Local magnetic disturbance.—Differences have been found in many areas in the vicinity of the Aleutian Islands. On land, differences from normal variations of as much as 8° have been observed, with 3° and 4° rather common. Unusual disturbances have been observed on the northwest coast of Tigalda Island east of Kelp Bay; on the south shore of Akun Bay; on Cape Alak, Unalaska Island; in Nazan Bay, Atka Island; on Yunaska Island; and on Amutka Island.

Weather.—The weather of the Aleutians is characterized by persistently overcast skies, high winds, and violent storms. No other area in the world is recognized as having worse weather in general than that which the Aleutian Islands experience. The weather is extremely local, conditions of fog, low ceiling, and clear weather often being encountered in a distance of 20 miles. Clear weather over large areas is seldom encountered. It is an important characteristic of the weather in the Aleutians that the northern shores of the islands have far better weather generally and much less fog than the southern shores.

The winter temperatures over the Aleutians are moderated by the warm waters of the Japan Current system, and the islands are, therefore, usually free from ice which would interfere with navigation.

Fox Islands and the Islands of Four Mountains.—Winds in this part of the Aleutians are greatly influenced by local topography. On Unimak Island the prevailing winds are southeasterly in midwinter and generally from westerly and northwesterly directions during the other months of the year. Violent williwaws with velocities up to 65 knots have occurred at Dutch Harbor.

Chernofski, on the north side of Unalaska Island near the west end, has southeasterly winds from November through February and again in June, and northwesterly winds the other 7 months of the year. Williwaws are common at Chernofski, and although gales frequently blow from north, northeast and east in winter, March is the month of highest average velocities. At the northeast end of Umnak Island, the prevailing winds are generally from southwesterly and northerly directions, with a maximum of 74 knots. The Greenwich noon ship observations in this part of the Aleutians indicate that high winds are frequent and that the most gales occur in fall and winter. About 11 percent of all such observations in these two seasons record gales higher than Beaufort force 7, and more than half of these gales are stronger than force 8. The percentage of gales in spring is about half as large, and in midsummer gales of force 8 occur occa-

sionally, but no gales stronger than force 8 have been reported.

Precipitation averages about 50 inches per year over this part of the Aleutians, with 46 inches on Umnak Island and 57 inches at Dutch Harbor. October is the rainiest month on Unalaska Island. Snowfall varies from an annual total of 28 inches at Scotch Cap to 77 inches on Umnak.

The annual mean temperature averages 40° F. at Dutch Harbor and Scotch Cap. The highest temperature recorded in the area was 80° F. on several occasions at Dutch Harbor, and the lowest was 5° F. in January at the same station. August is ordinarily the warmest month and January the coldest. Air temperatures are slightly higher than water temperatures in summer, and somewhat lower in winter.

There is a large amount of fog over this part of the Aleutians, with a decided maximum of occurrence in midsummer. Scotch Cap averages fog 11 percent of the whole year, the maximum reaching 32 percent in midsummer. Fog occurs less than 1 percent of the time at this station during December and January. Dutch Harbor reports fog on an average of 6 percent of the year, with a maximum of 19 percent in June. At Chernofski Harbor fog occurs about 50 percent of the time in midsummer and about 15 percent of the rest of the year. Conditions on Umnak Island illustrate the extreme variability of fog occurrence. On the northeastern tip of this island, fog occurs about 16 percent of the time. Along this tip a range of mountains with elevations up to 2,000 feet extends east and west, with Berry Field to the north and Fort Glenn to the south. In summer with south or southwest winds, fog often covers Fort Glenn while Berry Field remains open, but with northerly winds during the same season Fort Glenn is clear of fog while Berry Field is closed in. Dense fog is reported on Seguam Island at about 9 percent of all observations in June.

The area has overcast skies a considerable part of the time, with clouds frequently low enough to obscure the higher mountain peaks. At Dutch Harbor the skies average nearly 80 percent cloud cover, while over Chernofski Harbor the skies are about 90 percent cloud covered in summer and 70 percent in winter.

Andreanof Islands.—Winds over this part of the Aleutians are most frequently from the north or northwest during late fall, winter, and early spring; and from southeast, south, or southwest during the rest of the year. Topography has considerable effect on the local wind directions, however. At Atka, for example, the prevailing winds are northwesterly throughout the year. At Adak the winds are southwesterly in summer and early fall with an average velocity of 13 knots. They are generally from a northerly direction during the rest of the year, except that southwesterly winds are most frequent in February and westerly winds in April. A maximum velocity of 104 knots has been recorded at Adak. The ship observations made at Greenwich noon over these ocean areas show that about 20 percent of the fall, winter, and spring winds have velocities greater than force 6. About half of these gales are force 7 and about one-fifth of them are force 9 or higher.

Precipitation amounts are variable, with windward stations in general getting considerably more rainfall than stations in leeward locations. Adak has an average annual precipitation of 17 inches and Atka has 53 inches. November is the month of heaviest rainfall. The annual total snowfall averages 50 inches.

The mean annual temperature of this part of the Aleutians is about 40° F., with an extreme maximum of 69° F. at Adak in July and a corresponding extreme low temperature of 12° F. at the same station in February. Water temperatures average 1° to 2° F. higher than air temperatures in fall and winter, and the water is slightly cooler than the air in summer.

There is considerable fog over this part of the Aleutians, especially in the summer. Fog is most likely to occur with winds from southerly or southeasterly directions and least likely with winds from the north. An average of 21 percent of all Greenwich noon ship observations in this area reported fog during mid-summer.

In the Delarof group, it was noted that during the month of August 1952 fog and low ceilings appeared to be more prevalent on the west side of Amatignak Island, the most southerly island of the Aleutians, than in other parts of the area.

Completely overcast skies are to be expected about 25 percent of the time in summer, with somewhat less cloudiness in winter and spring. Entirely clear days are rare, the skies usually clearing for only a few hours.

Rat Islands and Near Islands.—The winds over the outer Aleutians are strong and quite variable. Northeasterly winds tend to prevail during the three winter months, except that westerly winds are recorded more frequently at Kiska during January and February. Prevailing wind directions are not well defined. The average wind velocity at Attu is 10.4 knots and a maximum velocity of 91 knots has been observed in February. It is known that extremely violent and dangerous williwaws are liable to blow from any one of several directions at Attu. The Greenwich noon ship observations indicate that about 20 percent of all observations during the fall, winter, and spring months record winds with velocities of Beaufort force 7 or higher, and about one-fourth of these gales have velocities greater than force 8.

The rainfall records, like other meteorological data for the area, are meager. The highest annual amount of precipitation is 76 inches at Attu. Fall is the rainiest season. There is considerable snowfall in the area.

The mean temperature for the year is 39° F. in this section, with temperatures ranging upward to a maximum of 70° F. in August at Attu, and downward to a minimum of 10° F. in February at the same station. In winter the water temperatures average about 3° F. higher than the air temperatures; the water is only about 1° warmer than the air in spring and fall, and is about 1° cooler than the air in summer.

Fog occurs over the outer Aleutians from 40 to 50 percent of the days in midsummer, but occurs infrequently

in midwinter. Attu has dense fog on about 10 percent of the observations made in July and August, but has but little fog, all of it light in midwinter. Most of the heavy summer fogs of this area appear to originate to the east and south of Kamchatka Peninsula, and to move into the island area during periods of westerly winds. In the outer Aleutians fog was reported on about 25 percent of the Greenwich noon ship observations in summer, but fog occurred much less frequently at this hour in spring and fall, and occurred but rarely in midwinter.

No thunderstorms have been reported in this part of the Aleutians. There is a large amount of cloudiness, with the area completely overcast, usually with low clouds, from 80 to 90 percent of the time in midsummer. Skies rarely clear entirely for a whole day, but strong winds, usually from the northwest, sometimes clear the skies for as much as 8 to 10 hours.

The Aleutian Trench begins off Cape St. Elias in the Gulf of Alaska and parallels the Alaska Peninsula and the Aleutian Islands for more than 2,200 miles. The axis of the trench is 60 to 90 miles south of the Aleutians, and depths range from 2,400 fathoms in the eastern part to more than 4,000 fathoms in the western part.

Chart 8860.—Unimak Island, the first of the Aleutian Island chain, is separated from the end of the Alaska Peninsula by narrow Isanotski Strait (also called False Pass). This pass is practically closed by shoals at its entrance from the Bering Sea. Unimak Island is about 60 miles long and 23 miles wide; it is extremely mountainous, bare of trees and generally grass covered.

Unimak Island is one of the group known as the Fox Islands, the others being Unalaska and Umnak and their associated islands. The Krenitzin Islands, a part of the Fox Islands group, are between Unimak and Unalaska Islands. All these islands are bare of trees and are generally grass covered. They are frequented by many birds, and immense flocks are frequently encountered in the vicinity.

The higher peaks on Unimak Island are excellent landmarks if they can be seen, but in summer they are usually obscured by fogs or low-lying clouds. The lower hills and islands and objects near the sea level are generally the only landmarks available.

Shishaldin Volcano, 9,372 feet high, near the center of Unimak Island, is cone shaped and very regular in outline with faint wreaths of smoke and vapor drifting at times from its summit. It is for the most part snowclad, except where the rocky cliffs and projections afford no lodgment.

Isanotski Peaks are eastward of Shishaldin. They are snowclad and have a broken or castellated double summit, the highest point rising to 8,135 feet. The summit is bare and looks as though it were composed of great vertical masses. This mountain is known locally as **Ragged Top.**

Roundtop Mountain is a rounded summit 6,140 feet high surrounded by snowfields.

Pogromni Volcano, about 9 miles from the western end of Unimak Island, is 6,520 feet high and is a snowclad, conical peak with vertical ridges cropping through the snow. Pogromni is a guiding landmark in clear weather for making Unimak Pass both from southward and from the Bering Sea.

The south coast of Unimak Island has cliffs in places, with lower land and sand beaches, between, and is backed by the high mountain masses of the central part of the island. The coast is fairly regular, with no indentations of any extent, and there are no harbors nor sheltered anchorages westward of Ikatan Peninsula. The coast is exposed to the ocean swell and there is generally a heavy surf, which makes landing dangerous. The 10-fathom curve is less than 0.8 mile from the beach in most places, and there are no known outlying dangers.

Chart 8701.—Cape Lazaref, about 800 feet high, on the south coast of Unimak Island, is the southwesternmost of three high cliffs, with sand beaches between them. The northeastern cliff of the series is at **Cape Aksit.** From the sharp point of the cape, **Lazaref Reef** extends 1 mile southward. On this reef are **North** and **South Pinnacle Rocks,** about 100 feet high. Anchorage, with fairly good protection from westerly winds, can be had northeastward of this reef, about 0.5 mile southward of a group of rocks lying 0.4 mile off the eastern side of the cape, in 10 fathoms, sandy bottom. **Rock Island,** small and 112 feet high, is 1.5 miles westward from the cape and 0.4 mile from the beach.

Chart 8860.—From Cape Lazaref the coast trends westward, curving gradually westward and southward, for about 30 miles to form **Unimak Bight,** broad and open, and having a sandy beach. This sand beach is broken by a lava bed 8.5 miles westward of Cape Lazaref, and by three conical hills, the southernmost formed into several columns and reaching the water to make a small projection, **Cape Rukavitsie,** 15 miles westward of Cape Lazaref.

At the southern end of the sand beach is a broad valley; the south point is a sharp steep-sided projection, about 350 feet high, which forms **Promontory Cove,** small, and open to northward. The cove is reported to afford anchorage with protection from southerly winds but not from the swell. The bottom is sandy, and shoaling toward the beach is gradual.

Cape Lutke, the southwestern headland of Unimak Bight, is a cliff 610 feet high, joined by a lower ridge to the higher land farther back. At this point the coast changes direction to southwestward and then westward for 13 miles to Seal Cape.

Seal Cape, on the north side of Unimak Pass in entering from the Pacific, is not particularly noticeable, but the locality is well marked by Arch Point, Promontory Hill, and Scotch Cap. The coast is bold and can be approached close enough (0.3 to 0.5 mile) in moderately thick weather to be seen and followed.

Arch Point, 3 miles northeastward of Seal Cape, is a rocky projection 172 feet high with an arch through the

point near its extremity. The arch is visible only from onshore or close to shore. A small sand beach on the west side of Arch Point is well protected from any weather, except from the south, by the point itself and by a projecting ledge. The heavy surf, which generally prevails along most of this coast, is reported to be absent on this beach. Small boats could probably land here in an emergency.

Promontory Hill, 5 miles northeast from Seal Cape, is a short ridge, about 1,100 feet high, having a northwest and southeast direction, and detached from the interior high land. Its outlines are smoothly rounded and it has a slight saddle, the whole having a bare, brown appearance. It is isolated and prominent, and together with Scotch Cap is a good landmark for the eastern entrance to Unimak Pass. Approaching Unimak Pass from the east and southeast, Promontory Hill can often be seen when other landmarks are fog covered.

From Seal Cape around to Cape Sarichef, a distance of 10 miles, the coast of Unimak Island has a number of projecting points, is low in appearance, and slopes gradually upward to the high land of the island. Between Seal Cape and Sennett Point, the 10-fathom curve is from 0.3 to 0.7 mile offshore. The 20-fathom curve is close inshore in places and is irregular. A study of the chart will show that great care is required in navigating on soundings alone around the western end of Unimak Island which is a region of strong currents. There are no dangers if the coast is given a berth of 0.5 mile.

Along this part of the coast there are several prominent hills. **Red Hill,** a very distinctive formation, is near Cape Sarichef. This isolated hill, 798 feet high, is closer to the shore than the other peaks in the vicinity and is easily recognized by its reddish hue. It is prominent from the north, northeast, and west, and is often clear when higher peaks are obscured by fog or clouds.

Scotch Cap, 420 feet high, is a precipitous cliff of rock which extends along the beach nearly a mile. Back of the cliff the land slopes downward for nearly a mile, then rises uniformly to the higher land of the island. Scotch Cap can be seen many miles in clear weather and is unmistakable.

Scotch Cap Pinnacle, a rock 172 feet high, is 50 yards seaward from the cliff.

Scotch Cap Light (54°24′ N., 164°45′ W.), 116 feet above the water, is shown from atop a white flat-roofed rectangular building about 1.7 miles eastward of Scotch Cap. A radiobeacon and fog signal are at the station.

Sennett Point, midway between Scotch Cap and Cape Sarichef, is a low, flat, grass-covered bluff with a bold rocky coastline. Many detached rocks are near the surf-worn ledges which extend offshore from the base of the bluff.

About 1 mile north of Sennett Point a reef makes out 0.2 mile from shore; the rocks at the outer end of the reef are 3 feet high. The bight between the reef and Sennett Point offers the best shelter and has the best holding ground in this locality. Anchorage inside the 10-fathom curve is usually free from current, no matter how strong it may be running in Unimak Pass. In 1938 a survey ship rode out several southeast gales at this anchorage.

A good landing is just north of Sennett Point. It is a small protected beach between the rocky ledges of the point and a group of inshore rocks, the highest of which is 13 feet. In southerly weather, this is the best small-boat landing on the west coast of Unimak Island. Mail and supplies for both Scotch Cap and Cape Sarichef Lights are landed on this beach when landings cannot be made at either light. A small cabin on the shore is kept in repair by the U.S. Coast Guard, and is equipped with stove fuel and a few necessary supplies. In northerly weather landings are made in the bight south of Sennett Point.

About 2 miles south of Cape Sarichef Light is a small, rocky beach, which is well protected by rocks and ledges and could be used as an emergency landing in rough weather. The beach is at the south edge of the black lava flow from a prominent, extinct volcano, 1,240 feet high and 3 miles inland.

Cape Sarichef is a steep, grassy bluff about 175 feet high; back of it is a tableland, then a gradual slope upward to Pogromni Volcano. The black lava flow extends northward along the coast to within 0.5 mile of the light. At **Sealion Point,** 1.5 miles south of the light, is a flat rock, 35 feet high, which is prominent from seaward.

A shoal area extends westward from Cape Sarichef for about 3 miles. Depths on the shoal are 7½ to 15 fathoms; the bottom is mainly gravel, with some rocky patches. The shoal appears to be a submerged extension of the lava flow on the coast. Ships should avoid crossing it because of the heavy tide rips, overfalls, and eddies; the current reaches a velocity of 4 to 6 knots. During favorable weather and sea, passage may be made inside the rocky patches by following the shore at a distance of 0.5 mile.

Cape Sarichef Light (54°36′ N., 164°56′ W.), 177 feet above the water, is shown from atop a white rectangular building with flat roof. A radiobeacon and fog signal are at the station. Several large buildings are on the reservation. In very smooth weather, supplies and mail are landed in the small cove directly below the light. Small boats come alongside the ledge, and a boom on shore is used to unload them.

Unimak Pass is the first ship passage southwest of the Alaska Peninsula into the Bering Sea. It is about 10 miles wide between the southwest end of Unimak Island and Ugamak Island, which is one of the smaller islands of the Krenitzin Group.

Unimak Pass is the widest of the Fox Islands Passes and the most generally used by deep-draft vessels. Unalga and Akutan Passes, 50 miles farther to the westward, are convenient under certain conditions if bound for Dutch Harbor, but Unimak Pass is the only one of the three that is lighted.

Besides being a gateway to the Bering Sea, Unimak Pass is also used by some vessels to effect a shorter and better weather route across the North Pacific Ocean. The route westward via the Bering Sea avoids the prevailing head winds and heavy seas that are encountered south of the Aleutians.

Unimak Pass is free from outlying dangers, but the currents and prevailing thick weather make it necessary to exercise unusual care in approaching the pass, especially

from southward. The Krenitzin Islands furnish considerable protection from southerly and southwesterly weather, but during easterly or northerly weather the seas in Unimak Pass are accentuated by the current. A northeaster will also augment the prevailing southwesterly current along the Alaska Peninsula. Current predictions for Unimak Pass may be obtained from the Tidal Current Tables.

Southeastward of Unimak Pass is **Davidson Bank,** on which the depths vary between 35 and 50 fathoms; the seaward edge of the bank drops off sharply into deep water. At times there is a marked change in the color of the water from blue to green when coming from deep water onto the bank. The current runs westerly with an average velocity of about 0.2 knot; with an easterly wind it reaches a velocity of more than 1 knot along the 100-fathom curve. Tide rips are of frequent occurrence.

A vessel should be sure of its position before attempting to enter Unimak Pass, and in thick weather should not attempt the other passes.

Approaching Unimak Pass from the east, care must be taken to avoid Sanak Reef and Aleks Rock. A good rule is to stay on, or south of 54° N. and make 163° W., while still outside the 100-fathom curve; then stand west-northwest across Davidson Bank for a position about 3 miles south of Scotch Cap Light.

If the weather is very clear, the mountains of Unimak Island can be seen and recognized, but under ordinary conditions the first land sighted will be Promontory Hill, Ugamak Island, or Tigalda Island. From a distance Tigalda Island will appear as a number of small islands, but closer to, it is one island with six distinct peaks or short ridges. Some navigators prefer to stand westward on 54° N. beyond 164° W. so as to sight Tigalda or Ugamak Islands; these islands often show when Unimak Island is fogged in.

The comparatively low land in the depression on the middle part of Avatanak Island is often clear when no other land is showing, especially in northerly weather. The grotesque irregularities of the topography make it easy to identify the locality. If approaching from the southward, this stretch probably offers the best chance for identification of surroundings, especially since it is easy of approach and comparatively free from current.

Chart 8720.—Ugamak Island is the easternmost of the Krenitzin Islands, which extend from Unimak Pass to Akutan Pass. The island has a sharp peak, 1,042 feet high, at the eastern end; when viewed from the southeastward, several pinnacles protrude from the side of this peak, giving it an extremely rugged appearance. Near the middle of the island is a knob 905 feet high. The island is mainly tundra covered. The shore is backed by 500 to 1,000 feet high. Off the southeast point of the island is a conical pinnacle, 310 feet high, which is separated from the island by a narrow gorge 10 to 15 yards wide. About 0.3 mile off the southeast end are two rocks awash, generally marked by breakers. Twin grassy islets, the northern of which is 127 feet high, are 0.6 mile southeast of the east point of **Ugamak Bay,** a cove on the south side of Ugamak Island. The islets are separated by a deep gorge and appear as one; the collective name of **Round Island** is applied to them.

Strong currents sweep around the east end of Ugamak Island and heavy tide rips occur. It is advisable to give this end of the island a berth of about 2 miles.

Local magnetic disturbance.—Differences of as much as 5° from the normal variation have been observed on Tigalda Island and as much as 3° between Akutan and Rootok Islands.

Aiktak Island, 556 feet high, is southward of the western part of Ugamak Island; the two islands are separated by a pass 0.5 mile wide and 6 to 10 fathoms deep. Small vessels use this pass for temporary anchorage, but moderately strong currents make the anchorage unfavorable. On the south side of Aiktak Island are sheer bluffs, the tops of which approach the highest parts of the island. The islet off the northeast end is grass covered and less than 100 feet high.

Temporary anchorage in northerly weather may be found in Ugamak Bay in 16 fathoms about 0.5 mile from shore. In southerly weather, some shelter may be found on the north side of Ugamak Island in a small bight 1.5 miles from the east end; depths are 16 to 20 fathoms, 0.3 mile from shore.

Ugamak Strait has a width of 3 miles between Ugamak and Aiktak Islands on the north and Kaligagan Island on the south. A detached shoal, covered 10 fathoms, lies in the middle of the northwestern entrance to the strait. Heavy rips and swirls occur in this area at certain stages of the tide. Passage of Ugamak Strait has been made on a **283°** course, heading approximately for Billings Head on Akun Island; this course passes about 1.3 miles northward of the northernmost rock off Tigalda Island. Allowance must be made for the current which sets across this course. The velocity of the current is 3.8 knots; velocities greater than 6 knots have been observed. Current predictions for Ugamak Strait may be obtained from the Tidal Current Tables.

Tigalda Island, on the south side of Ugamak Strait, is 11 miles long in an east-west direction and 3 miles wide. It has six mountain ridges, 1,000 to 1,600 feet high, which trend northwest and are separated by low valleys. The western end of the island is comparatively low. Grass and tundra cover the island.

Kaligagan Island, lying in Ugamak Strait 0.8 mile off the northeast end of Tigalda Island, is 0.8 mile long and 478 feet high. A large number of bare rocks or islets extend 2.5 miles westward and northwestward of Kaligagan Island. The northernmost is the highest (63 feet) and lies about 1.8 miles north of the Tigalda Island shore. Passages between groups of these rocks are deep and safe for small craft.

Proceeding to Tigalda Bay from among the islets, care should be taken to avoid a group of rocks awash extending 270 yards off the north side of the entrance point of the bay. These rocks are marked by thick kelp. Currents in the passage between Kaligagan and Tigalda Islands are approximately as strong as in the main passage of Ugamak Strait and currents are present among the groups of islets.

Tigalda Bay, on the north side of Tigalda Island, 3 miles from its eastern end, is sheltered from all except northwest winds. The bay is about 0.6 mile wide and 1.5 miles long in an east-west direction, and has depths of 8 to 10 fathoms, rocky bottom. On account of the poor holding bottom, the anchorage is not secure in strong winds. An anchorage off the entrance to the bay in 12 to 15 fathoms, gravel bottom, is preferred, and furnishes just as good shelter in southerly and easterly weather. The diurnal range of tide is 3.3 feet.

The small bay just east of Tigalda Bay is not recommended as an anchorage for small craft because the swell making in from the north or west is not broken up by the group of islets.

Welcome Bay, just west of Tigalda Bay, is an open bay 0.8 mile wide. At the head, a narrow passage leads to a lagoon largely bare at extreme low water. The passage at its narrowest part is 90 yards wide and 2½ fathoms deep. The bay anchorage is in 15 fathoms, sand and gravel bottom, 0.4 mile from shore. An anchorage for small craft is in 4 to 6 fathoms, sand bottom, at the entrance to the passage.

Kelp Bay, on the north side of Tigalda Island and 2 miles from the western end, provides temporary anchorage in southerly weather. The entrance is constricted by a reef extending 0.3 mile from the west entrance point. The point to the eastward of the bay is marked by several offlying rocks, the outermost showing 9 feet. On account of a shoal area extending 0.8 mile northward of the point, large vessels should pass at a distance of not less than 1 mile. Anchorage is found in the center of Kelp Bay in 7 to 10 fathoms just inside the entrance.

A small bay 2 miles east of Kelp Bay provides anchorage for small craft in southerly weather. Care should be taken to avoid covered rocks 170 yards off the east entrance point and others 150 yards offshore on the west side. Anchorage in 7 fathoms is found 0.3 mile from the head of the bay.

At the western end of the south shore of Tigalda Island is a pinnacle rock, 165 feet high, and about 100 yards offshore, which shows prominently in a southeast and northwest direction. The point about 3 miles eastward of the west end is marked by **Derbin Island,** about 0.4 mile long and 206 feet high, lying close to the shore. Eastward of this point the south shore of Tigalda Island consists of high cliffs intersected by low valleys. About 2.5 miles eastward of Derbin Island are two round bare rocks, 85 and 27 feet high, about 0.4 mile from the shore. The section of the coast abreast of the rocks is a steep rocky bluff rising to a 1,682-foot peak. About 2.5 miles eastward of the two rounded rocks is a 191-foot pinnacle near the shore. An arch through the pinnacle rock gives it the appearance of a huge chair.

Derbin Bay, the bight east of Derbin Island, provides temporary anchorage in northerly weather. The recommended anchorage is in 16 to 18 fathoms, 0.5 mile from shore and 0.8 mile from Derbin Island. The eastern shore of the bight is foul, with a covered rock 300 yards southwestward of a 134-foot rocky islet. Small craft should favor the western shore of the bight in running to anchorage in 7 to 10 fathoms, 0.4 mile from the head of the bight.

A small identation, 0.3 mile long and 0.1 mile wide, is 1 mile southwest of the eastern extremity of Tigalda Island. Rocky bottom and rocks awash along the shores make this anchorage acceptable only in case of an emergency. The depths range from 5 to 7 fathoms. A low pass extends in a northwesterly direction across the island to Tigalda Bay.

Derbin Strait, separating Tigalda and Avatanak Islands, is a little over a mile wide. No known dangers are more than 0.3 mile from shore. A safe course through the strait is **326°** in midchannel, with Billings Head of Akun Island ahead. On the eastern side of the southern entrance is Derbin Island; on the western side is a bare rock, 30 feet high and 400 yards off Avatanak Island.

A reef awash at half tide extends 330 yards westward from the 165-foot pinnacle rock about midway on the eastern side of Derbin Strait. On the west side of the north entrance is a bare rock 2 feet high, 400 yards off the northeastern point of Avatanak Island.

Tidal currents in Derbin Strait average about 5.5 knots, although velocities of almost 8 knots have been observed. The flood sets northwestward and the ebb southeastward. In midchannel, with wind and current opposing, the strait becomes exceedingly rough. A swell from southwestward to southeastward makes into the strait and is accentuated by the current. There are numerous eddies and cross currents near the shore. The ebb current causes tide rips a considerable distance offshore, especially on spring tides. Small boats should avoid Derbin Strait except under favorable conditions. Current predictions for Derbin Strait are contained in the Tidal Current Tables.

Avatanak Island is 9 miles long and 3 miles wide at its eastern end, but the western half of the island averages less than 0.8 mile in width. The middle of the island is a depression less than 100 feet high, the sides of which slope gently upward to 1,635 and 1,276 feet on the east and west ends, respectively. The lowland of the depression is often clear when no other land is showing especially in northerly weather. There are many grotesque irregularities in the topography.

Avatanak Point, the south end of the island, is sharp and bold and has a ragged chain of rocks and rocks awash extending over 0.3 mile in a southerly direction. The southernmost of these is a symmetrical oval rock 6 feet high.

Two pinnacle rocks lie west of the western extremity of the island; the highest and outermost is 200 yards offshore and 60 feet high.

Near the center of the island on the southern side is **Chimney Cove,** which affords temporary protection to small craft from northerly weather. It is exposed to the ocean swell. The cove is marked by a vertical chimney-shaped slab of rock, over 200 feet high, which projects from the ground surface on the west point of the cove. The rock also shows in Avatanak Strait over the low-lying middle ground. Larger vessels may find temporary

anchorage in 15 to 20 fathoms southward of this rock, well clear of any currents.

Rootok Strait, separating Avatanak Island from Rootok Island, is a little more than 1 mile wide, but the clear channel is reduced to about 0.5 mile by a reef extending from the east side and by rocks extending from the west side. The reef, composed of separate rocks and heavily fringed with kelp, is bare at various stages of the tide, and extends 525 yards in a southwesterly direction from the highest of the two pinnacle rocks off the western extremity of Avatanak Island. The rocks on the west side extend 250 yards from the Rootok Island shore. Depths less than 10 fathoms extend almost 0.5 mile northward and northeastward from the northeast point of Rootok Island.

A detached shoal covered 3½ fathoms is near the middle of the southern entrance, about 1 mile northeastward of the east end of Rootok Island.

A flat-topped rock about 20 feet high lies just off the east end of Rootok Island and other rocks extend 400 yards from the rock into the strait.

In the bight indenting the eastern shore of Rootok Island, a rock awash at low tides is about 500 yards from the shore. Several pinnacle rocks fringe the southern shore of this bight.

To make the passage through Rootok Strait, steer **298°** for the north end of Rootok Island, leaving the east end of the island 0.6 mile to port; when the west end of Avatanak Island is abeam, change course to **331°** and pass in midchannel between the bare rocks off Avatanak Island and those close to the north end of Rootok Island.

The currents in Rootok Strait have an estimated maximum velocity of 4 knots. Tide rips and whirls occur off the northern entrance, but, as this area is sheltered from winds from most directions, they are mild compared to the rips that occur in other passes.

Rootok Island, the westernmost island on the southern side of Avatanak Strait, is 3 miles by 2.2 miles in extent. The island's most prominent features are the twin peaks, 1,545 and 1,532 feet high and 600 yards apart in an east-west direction. The southern side of the island is a continuous cliff broken only by a small valley slightly eastward of the twin peaks. A flat-topped rock about 20 feet high lies off the east point of Rootok Island. The island is fringed with rocks and kelp and affords no secure anchorage. It is used as a fox farm, the buildings being in the southern valley of the bight on the eastern side.

Akun Island, 23 miles southwestward of Unimak Island, is the northernmost island of the Krenitzin Group. It is about 12 miles long, and very irregular in shape, being nearly divided by Akun Bay and Lost Harbor and a low depression joining them. The island is high and rugged, particularly its northern part, which reaches an elevation of 2,685 feet at **Mount Gilbert,** an extinct crater on the north side of Lost Harbor.

Avatanak Strait is a broad passage separating Avatanak and Rootok Islands from Akun Island. The strait has a general northeast-southwest direction and is 3 miles wide at its narrowest part. There are no hidden dangers over 0.3 mile from shore and navigation is not difficult in clear weather. It is reported that strong northwesterly winds draw heavily through Akun Strait into the west end of Avatanak Strait.

Currents with a velocity of 6.5 knots have been observed in Avatanak Strait; but average strengths of flood and ebb are about 4 knots and 3.5 knots, respectively. The ebb sets to the westward, and the strength of the current is felt well to the westward of Rootok Island; but to the eastward of the strait along the north side of Tigalda Island the currents are weak. Current predictions for Avatanak Strait may be obtained from the Tidal Current Tables.

Tide rips and swirls occur in the narrowest part, off the entrance to Akun Strait, and among the islands off the south shore of Akun Island. A pronounced set is often experienced when crossing the narrow depression abreast of Derbin Strait, and light tide rips occur there.

Basalt Rock, in Avatanak Strait and 1 mile north of Avatanak Island, is a symmetrically rounded rock 50 feet high; it is steep-to and the channel inside is clear, with depths of 10 to 20 fathoms.

Jackass Point, the southern extremity of Akun Island, terminates in a chain of irregularly shaped rocky islets, the highest of which is 80 feet. Tall and conspicuous **Pinnacle Rock,** 145 feet high, is 0.5 mile west of Jackass Point and 0.3 mile offshore.

Easy Cove, at the south end of Akun Island, is 0.4 mile wide and about the same in depth. Small vessels may find temporary shelter from northerly winds in 8 to 10 fathoms.

Poa Island, about 2.5 miles northeastward of Jackass Point, is steep sided, about 0.6 mile long in an east-west direction, and 305 feet high.

Tangik Island, about 1 mile northeastward of Poa Island, is about 0.4 mile long and 220 feet high at its eastern end. It is surrounded by rocks, and a reef extends about 350 yards southwestward from its southwest end. The channel between Tangik and Poa Islands is clear except for reefs close to the south side of Tangik Island, which should be given a berth of at least 0.3 mile.

Trident Bay, westward of Tangik and Poa Islands, is about 0.8 mile wide and 1 mile in depth. The entrance is constricted to less than 0.5 mile by an islet, 82 feet high, on the north side and a chain of rocks, terminating in a flat-topped rock 32 feet high, on the south side. Three small coves indent the shore at the head of the bay. A rock awash at low water is about 225 yards off the point between the middle and southerly coves. The heads of the coves are shoal.

Anchorage can be found in the middle of Trident Bay in 20 fathoms, with good protection from all directions but the southeast; however, the islands off the entrance provide some protection from this direction. With a southwesterly swell, small boats find better protection at the entrance to the western cove in 2 to 6 fathoms. The survey ship found this bay the best sheltered in the vicinity, and had sufficient swinging room.

To enter Trident Bay from southward, steer **350°,** heading for the west tangent of the islet at the north entrance

point. Pass midway between Poa Island and the land to the westward. When the outermost flat-topped rock is abeam to port, swing sharply to **300°**, heading for the sand beach in the middle cove with the south tangent of Poa Island directly astern. In making this turn, favor the flat-topped rock which is steep-to, as the currents eddying around the entrance to the bay have a tendency to keep the ship's head from coming around. A bank of 8 fathoms extends across the entrance channel.

Cross Bay is an indentation about 1 mile wide on the southeast side of Akun Island and to the northward of Tangik Island. Rocks extend about 300 yards off its middle point. The channel north of Tangik Island is clear, but the channel west of the island with 4 fathoms or less should be avoided.

Round Head, the southeastern point of the peninsula extending east from Akun Island, is a rounded steep-sided headland 485 feet high; a pinnacle 52 feet high is 200 yards off the point. From Round Head the shore of Akun Island trends westward for 3 miles and is less rugged. It then turns to the southward for 1.5 miles to **Cross Point** forming an indentation known as **Seredka Bay.** Anchorage with good shelter from northerly and westerly winds can be found in 10 to 20 fathoms about 0.4 mile from the shore. The northeast side of Cross Point is fringed with rocks and kelp.

Tanginak Island, of small extent but 295 feet high, is 2.2 miles off the east end of Akun Island. Although it appears to be one rounded island, it is in reality two islets separated by a narrow passage. The passage between Tanginak and Akun Islands is deep, but strong currents sweep through it, accompanied by tide rips and swirls.

About 4.8 miles northward of Tanginak Island and in the approach to Akun Bay is **Fathometer Reef,** a 3¼-fathom rocky shoal, which is about 0.3 mile in diameter and is surrounded by depths of over 30 fathoms. Heavy tide rips and swirls occur in the vicinity except at slack water. Vessels should keep well clear of the reef, as no kelp has been reported on it and breakers may not be distinguishable from the tide rips.

Akun Bay is the broad indentation in the northeast side of Akun Island; it affords anchorage at its head except with winds from the southeast to northwest, but heavy williwaws are experienced with offshore winds. There are no known dangers in the bay except close to shore. At its head, where the bay is 2.5 miles wide, there are two large bights; the north bight is known as **Helianthus Cove.** Anchorage may be made in either of the bights, about 0.5 mile from shore, in 10 to 15 fathoms. Small vessels can find fairly good shelter from all directions in the southern part of Helianthus Cove. Both bights have fresh-water lakes at the head; the lakes are about 10 feet above high water. A very low depression extends across the island from Helianthus Cove to Lost Harbor.

A long peninsula extends eastward from the middle of Akun Island; off the northern point at the outer end of the peninsula is a twin pinnacle, 230 feet high, which marks the southeastern limit of Akun Bay. A gully indents the cliff at the most easterly point of the peninsula.

The northern ends of Akun Island are **Billings Head** and **Akun Head,** 4 miles to the westward. These massive heads, separated by Little Bay, both have precipitous faces. Akun Head has a flat top 1,632 feet high. The bluffs on its northern and western sides are marked by rust-colored stratification. Billings Head rises to 1,690 feet.

Billings Head Light (54°18′ N., 165°31′ W.), 210 feet above the water, is shown from a small white house with red stripes on the north side of the head.

Little Bay indents the northern end of Akun Island. A spit makes out from the western shore. The area south of the spit is closed by a rocky bar and only boats drawing a few feet can enter. Anchorage outside of the spit may be had in 8 to 10 fathoms, sandy bottom.

Chart 9005.—Akun Strait, between Akun and Akutan Islands, is about 1 mile at its narrowest part, but the navigable channel is reduced to 400 yards by reefs extending from the eastern shore and by Race Rocks on the west. **Race Rocks,** a flat rocky islet 25 feet high and some smaller bare rocks, are near the northern end of the strait and 0.3 mile from its western shore. **Akun Strait Light (54°08′ N., 165°40′ W.),** 46 feet above the water, is shown from May 1 to September 30 from a skeleton tower on Race Rocks.

Shoal water and heavy kelp surround Race Rocks for a distance of about 250 yards; **Swirl Rock,** awash at half tide, lies 250 yards northward of the light and is conspicuous by the heavy overfall and swirls. The main channel is to the east and north of Race Rocks and Swirl Rock and has a least depth of 4½ fathoms. The channel to the westward of Race Rocks has a least depth of 2 fathoms and is subject to currents which are just as strong as in the main channel.

With northwesterly winds in the summer, a bank of fog frequently streaks through Akun Strait, but under such circumstances, vessels navigating Avatanak Pass will usually sight the south shore of Akutan Island.

Currents in Akun Strait attain an estimated velocity of 12 knots in the narrowest part, setting northward with the flood. The slack period is very short. Tide rips, swirls, and overfalls occur, and with a northerly wind or swell are extremely heavy. By skirting the kelp off Race Rocks and passing within 100 yards to the northward of Swirl Rock, local vessels are able to keep out of the strength of the current.

Green Bight, indenting the southeastern shore of Akutan Island at the entrance to Akun Strait, offers temporary anchorage in 6 to 8 fathoms 0.4 mile from shore. It is convenient while waiting for slack water to pass through the strait.

The western or Akutan Island shore of Akun Strait is low, except in the middle where a rounded peak 650 feet high forms a steep cliff on the northern point of Green Bight. Shoal water marked by heavy kelp extends about 500 yards eastward from this point.

From the low point with an arch, 1.6 miles westward from Jackass Point, the eastern shore of Akun Strait extends northwestward for about 2 miles to a point with a

flat grassy islet, 80 feet high, close by. Shoal water marked by heavy kelp fringes this shore. A rounded rock, 10 feet high, is 650 yards northwestward from the arch. A group of rocks, bare at low water, lie about 500 yards northwestward of the rounded rock and about the same distance off the eastern shore of the strait.

The western end of the flat grassy islet can be approached to within 250 yards on the west, but shoal water marked by heavy kelp extends about 700 yards southward. A flat islet, 200 feet high, is 0.4 mile northward of the grassy islet; the passage between the two islets is obstructed and foul.

Akutan Bay opens into the Bering Sea between Akun Head and North Head. This approach from the Bering Sea is used to reach Akutan Harbor and other arms of the bay. Akun Strait, previously described, connects Akutan Bay with Avatanak Strait and the Pacific, but it is comparatively shoal and contracted, and is not recommended.

Akutan Harbor opens into Akutan Bay on the north side of the peninsula which juts into Akun Strait from Akutan Island; the preferred approach to the harbor is from northward through Akutan Bay. The harbor is 4 miles long and from 0.5 to 1.8 miles wide; there are no known dangers over 300 yards from shore. From the head of the harbor, a trail leads inland to the hot springs.

Akutan Point, on the north side of the entrance to Akutan Harbor, is a grassy hummock 175 feet high, which is connected with the island proper by a low, grassy neck. **Akutan Harbor Light (54°09′ N., 165°44′ W.),** 165 feet above the water, is shown from a small white house on the outer end of the point.

Akutan (1960 population 107; P.O.) is on the north side of the harbor 2 miles west of the light. On the opposite side of the harbor a mile farther west is a former whaling station; the wharf has ample depths along the northwest face for coasting vessels; the east face can accommodate only small boats.

A recommended anchorage is about 300 yards off the village in 22 fathoms. Vessels can also anchor in the broad bight in the south shore in 15 fathoms, with the light on Akutan Point bearing 017°. The bottom at both anchorages is very sticky. The harbor is well sheltered from all except easterly winds, but heavy williwaws are encountered during gales.

Surf Bay, on the Akun Island side of Akutan Bay and just northward of Akun Strait, is an open bight exposed to the westward and northward. A group of rocky islets, the highest, 64 feet, lies in the middle of the bay about 1 mile from shore. A group of rocks, awash at low water, lies 0.3 mile northward of the islets, and irregular bottom, with least depth of 2¼ fathoms, is found 0.3 mile northwest of the rocks. The channel southward of the islets is clear and anchorage can be found in 10 fathoms, 0.4 mile from shore, with good shelter in southerly and easterly weather. On the east side of Surf Bay is a sand beach about 1 mile long.

Coal Harbor, 3 miles north of Surf Bay, affords fairly good shelter, although in northwest weather considerable swell rolls in from Akutan Bay. The north side of the harbor has gently sloping sand bottom, with depths of 6 fathoms or more 0.4 mile from shore. A prominent stack and buildings mark the remains of a former sulphur mine on the north shore.

Sandy Cove is a small bight about 3 miles northwestward of Akutan Point. Small craft can anchor in the center of the bay in about 5 fathoms, sandy bottom. The cove is exposed to the northeast.

Hot Springs Bay is a wide indentation in Akutan Island opening into Akutan Bay. The point on the northwest side of the entrance is a high, rock cliff; **Ridge Point,** on the east side of the entrance, is a narrow ridge about 350 feet high, which has bare rock cliffs on its west side, but slopes rapidly on its east side into a grassy valley and sandy cove. At the head of the bay are three bights; a stream drains into the middle bight from the hot springs 0.5 mile inland.

A rock, covered 2¼ fathoms, is 0.5 mile from the southeastern shore 1.5 miles inside Hot Springs Bay from Ridge Point. There are no other known dangers in the bay. Anchorage in southerly and westerly weather can be found in the western part of the bay 0.5 mile from shore, in 14 to 16 fathoms, sandy bottom.

Chart 8720.—Akutan Island, largest of the Krenitzin Group, lies about 9 miles northeastward from Unalaska Island and is separated from the latter by Akutan and Unalga Passes.

The shore of Akutan Island bordering on Akutan Bay and Akun Strait is described in connection with those bodies of water.

Akutan Peak, 4,244 feet high, rises about 600 feet on the south rim of a crater, about 1.2 miles in diameter, to form a sharp summit. It is the highest peak between Unimak and Unalaska Islands.

North Head, the northern end of Akutan Island, is a high bold cliff, with a large, deep grassy valley in the otherwise high shore on its east side. About 2 miles southwestward of the cape, a narrow, grassy valley separates the high ridge behind North Head from another high ridge; the western side of the valley is a bluff. **North Head Light (54°13′ N., 165°59′ W.),** 60 feet above the water, is shown from a small white house on the point 1.5 miles west of the head.

Open Bight is an indentation just east of North Head. No depths greater than 10 fathoms are found in the bight. It is exposed to northerly swell from the Bering Sea and is not recommended as an anchorage.

A rock awash lies about 250 yards off the rounded point just eastward of Open Bight; a covered rock is inshore from the rock awash.

Lava Point, 6 miles southwestward of North Head, is a fairly flat lava bed varying in elevation from 150 feet along the shore to 300 feet at the base of the hill back of it. The cliffs all around the point are nearly vertical except in places where they are broken off. Numerous tunnels are under the cliffs. The northwest face of the hill back of the point is concave and very steep.

At the end of Lava Point is a flat rock having the same height as the point and slightly detached from it. In foggy

weather low points will sometimes be seen below the fog, and the lava flow terminating in Lava Point often enables the navigator to identify this point. Due to the similarity of the headlands along these islands, this area is one where the navigator has unusual difficulty in identifying landmarks.

Lava Bight, just southward of Lava Point, provides temporary anchorage in southerly and easterly weather. On the south shore of the bight are several waterfalls, including a large one to the eastward of a group of small ones. The anchorage is in 12 to 15 fathoms, sandy bottom, 0.5 mile from shore, with the large waterfall bearing 160°.

A large circular reef lies off the west coast of Akutan Island between Lava Bight and Reef Point; the outer edge of the reef is about 0.9 mile from the shore. The reef is marked by heavy kelp and is studded with numerous rocks which uncover 3 feet. The western part of North Head open at Lava Point is a good range to clear this reef in passing to the northward of it. Between the reef and the shore is a passage which has a least depth of 2¾ fathoms and is clear of kelp; small boats use the passage to avoid the disturbed water outside.

Reef Bight, on the south side of the reef, is not recommended for anchorage on account of poor holding ground.

Reef Point, the western extremity of Akutan Island, is steep and rocky and reaches a height of 500 feet. A low rock 150 yards off the point has the appearance of a stranded freighter when seen from the northward or southward.

Currents.—Flood currents with an estimated velocity of 2 knots set along the west shore of Akutan Island as far north as Reef Point. Near Lava Point an ebb current of 1 knot has been observed. Off North Head, currents are weak. A north wind blowing against a flood current produces tide rips as far north as Lava Point.

The south shore of Akutan Island between Green Bight and Sarana Bay is a steep rocky bluff with numerous boulders extending about 200 yards offshore. A rectangular-shaped rock 75 feet high lies 225 yards offshore, about 1 mile southwestward from the south end of Green Bight. Numerous waterfalls are visible along this shore in rainy weather.

Talus Point, on the east side of the entrance to Sarana Bay, is the end of a rocky ridge, about 1,700 feet high, which has several massive pinnacles split from the top. It is more easily distinguished from offshore than Battery Point.

Sarana Bay, lying between Talus Point and Battery Point, is 4 miles wide at its entrance, but narrows rapidly to an inner cove about 1 mile wide and 0.7 mile in depth. **Vulcan Point,** on the east side of the entrance to the inner cove, is marked by a flat-topped rock 45 feet high; a reef extends 450 yards southeastward from the rock. Anchorage in 5 to 10 fathoms can be found in the inner cove, but the shore should not be approached closer than about 450 yards. The bay is wide open to the southward and in a southerly swell is very uncomfortable.

Battery Point, the southernmost headland of Akutan Island, is marked by a peak with a distinctively shaped conical top resembling a liberty cap; it is faced by steep, high cliffs. Large vessels should give Battery Point a berth of 1.5 miles to avoid a 7-fathom shoal 1.3 miles offshore in a southeast direction; swirls and tide rips mark the shoal. A 3¾-fathom shoal, marked by kelp, is 0.4 mile off the southeast side of Battery Point, and a rock awash is 370 yards off the southwest side.

Broad Bight and Cascade Bight are the east and west bights, respectively, between Battery Point and Cape Morgan. This region can be used only for temporary anchorage in northerly weather. The heads of the two bights have beaches of sand and gravel and each is backed by a low, grassy valley. The bights are separated by a ridge terminating in a bold rocky headland with steep cliffs 800 feet high. Anchorage in Broad Bight can be found in 16 to 20 fathoms, sandy bottom, 0.8 mile from the beach and 1.1 miles 105° from the point of the headland; anchorage in Cascade Bight is in 14 to 16 fathoms, sandy bottom, 0.8 mile from the beach and 0.6 mile west of the same point.

About 1.3 miles southwestward of Cascade Bight is a group of rocky islets; one of them, 298 feet high, is 0.8 mile east of Cape Morgan. Close to these islets on the offshore side the depth is 14 fathoms.

Cape Morgan, the southwest end of Akutan Island, is a prominent headland with steep, high cliffs intersected by dikes of hard rock of characteristic color. **Triplet Rocks,** three pinnacles 8 to 15 feet high, are 600 yards off the cape. In navigating Akutan Pass, Triplet Rocks should be given a berth of over 0.5 mile.

Flat Bight is northward of a bold headland which forms the northwestern part of the Cape Morgan peninsula. At the headland, foul ground with thick kelp extends 0.5 mile offshore, and a covered rock lies near a rock awash 0.3 mile northward of the headland. The bight is bordered by a gravel beach 1 mile long, which in turn is backed by a low, grassy valley. Temporary anchorage in easterly weather can be found 0.6 mile from shore in 12 fathoms, sand bottom.

A large rock 2 feet high lies 1 mile southward of Reef Point and 400 yards from shore. A depth of 12 fathoms can be carried to the face of this rock. There is no kelp around it. Several other rocks lie inshore of this one, but they are inside the kelp line. A rock awash lies 0.8 mile farther to the southward and 250 yards from shore.

The shore between Reef Point and Flat Bight is an eroded bluff 300 to 600 feet high; when close by, a reddish outcrop is discernible.

Chart 9007.—Akutan Pass and Unalga Pass, on either side of Unalga Island, are ship passages, secondary to Unimak Pass, for entering the Bering Sea from the Pacific through the eastern part of the Aleutian Chain. Akutan Pass is 2.5 miles wide in its narrowest part between the Baby Islands on the southwest and Triplet Rocks off Cape Morgan. The depths in the pass are very irregular, but no hidden dangers have been found. Depths less than 10 fathoms extend about 0.4 mile southward from Triplet Rocks, and the tide rips there are in-

tensified, appearing as breakers. Small craft should avoid them. A narrow, crescent-shaped shoal with a least depth of 8 fathoms is 3.5 miles northwestward from Cape Morgan. The shoal can be detected by the swirls and tide rips marking it.

Akutan Pass is wider than Unalaga Pass, but the currents and tide rips are similar. However, the current is felt over a much greater distance, so that with an adverse current it has been found that better time can be made by using Unalaga Pass. On the larger tides, the flood creates such heavy tide rips northward of Unalaga Island, even in calm weather, that it is advisable to be prepared to take seas aboard. Tide rips 15 feet high have been observed. In approaching both Akutan Pass and Baby Pass, fewer rips will be encountered if courses are directed for the area southeastward of the Baby Islands and then swung over to either pass. This area is comparatively quiet on the ebb when both of the passes have heavy tide rips.

Akutan Pass, in the daytime and with clear weather and a fair current, furnishes a convenient route for vessels bound to or from Unalaska Bay. From eastward it is recommended that courses be steered to make land in the vicinity of Tigalda Island and Avatanak Island; then follow the south side of these islands until the course is shaped from Rootok Island to Cape Morgan. A midchannel course through the pass is recommended.

Remarks on currents in Akutan Pass will be found in the first part of this chapter. Current predictions may be obtained from the Tidal Current Tables.

Baby Islands, a group of six low islands in Akutan Pass and northward of the east end of Unalga Island, have numerous rocks among them. The islands are all tundra covered. On the westerly island is a large rookery and the ground is very pitted over almost the entire top. The southeastern island is used as a fox ranch. When seen apart from Unalga Island, the Baby Islands are prominent although they tend to blend together to appear as one island.

Strong currents sweep among the Baby Islands. The southern end of the passage between the two southeastern islands is blocked by a reef bare at low water, forming a small protected bay, but strong currents make it a rather uncomfortable anchorage for small boats.

Baby Pass, about 0.8 mile wide, separates Unalga Island from the Baby Islands. Ledges along the shore restrict the navigable width, but depths up to 20 fathoms will be found in midchannel. Less water is found at the north end of the pass.

On the Unalga shore of Baby Pass is a shallow cove in which small boats may get fair protection from southerly and westerly weather; however, a rock awash at low water lies a little southward of the middle of the cove. At the northern point of the cove is a group of bare rocks extending into Baby Pass. The outer rock, 12 feet high, is 200 yards from the point. Foul ground extends 400 yards into Baby Pass from the 0.8 mile stretch of shore westward of the cove.

Very heavy tide rips occur to the northwestward of the Baby Islands on the flood, and extend a considerable distance to the southeastward on the ebb; see remarks on tide rips in Akutan Pass. The flood and ebb current velocity is about 4 and 5 knots, respectively. Flood and ebb velocities of 5.5 and 7 knots occur at times of tropic tides. Current predictions for Baby Pass are contained in the Tidal Current Tables.

Unalga Island is separated from Unalaska Island by Unalga Pass. The island is low compared to the neighboring islands, the highest point being a rounded hill of 707 feet southwestward of the central point. The eastern end of Unalga Island is a flat-topped hill, 145 feet high.

Malga Bay, on the northwest side of Unalga Island, is about 0.6 mile in diameter and affords shelter in southerly weather. The eastern shore of the bay is a chain of jagged rocks and islets, the highest being 106 feet. Temporary anchorage in southerly weather can be found in the center of the bay in 11 fathoms.

On the north coast of Unalga Island, precipitous bluffs rise 100 to 200 feet, blending abruptly at the top into rolling, slightly rising, tundra-covered tableland. There is generally no beach, though a flat rock shelf, from 10 to 30 feet wide, extends from the bluffs to the water's edge. In places a few scattered boulders may be found on the shelf.

On the south shore of Unalga Island, a prominent cylindrical rock, 120 feet high, is 0.5 mile southward of the east end of the island and 375 yards offshore. A point terminating in a rounded knoll, 150 feet high, is 1.8 miles southwestward of the eastern extremity.

A large barn, about 1 mile southwestward of the east end of Unalga Island, is located on the side of a hill over 100 feet high, and is conspicuous from the southward. Several small houses are in the gully below the barn, but can be seen only when close-to.

Numerous boulders and rocks border the south shore of Unalga Island. A dangerous rock, covered 2¼ fathoms, is 700 yards off, midway of this shore.

Off the southwestern extremity of Unalga Island, a group of rocks extends about 200 yards into Unalga Pass, and a rock about 4 feet high near the outer end of the group is conspicuous while entering the pass. The 4-foot rock should be given a berth of 300 yards.

Unalga Pass, the narrowest of the three principally used passes in the eastern Aleutians, is about 1.3 miles wide in its narrowest part and, with the exception of rocks which make out a short distance from Unalaska and Unalga Islands, is free from dangers. The depths in Unalga Pass vary from 12 fathoms, in the middle of the narrowest part of the pass, to over 50 fathoms.

Under normal conditions the pass is not difficult to navigate as the current sets fair with the pass. In thick weather the shore of Unalga Island can be approached close enough to pick up an echo and followed through the pass. The soundings, especially in the southern approaches, furnish numerous characteristic depths to assist a vessel, equipped with echo sounding apparatus, to determine its position. For these reasons, coupled with the fact that this pass has been thoroughly surveyed, it is believed that it has distinct advantages over Akutan Pass for vessels going north, especially in thick weather. However, under exceptional circumstances, currents and tide rips

of unusual magnitude may be encountered; and treacherous seas, particularly in the narrow part of Unalga Pass, caused by wind opposing the current, often sweep a vessel without warning. These have caused severe damage and men have been washed overboard with resultant loss of life. There are temporary anchorages, easy of access, at either end of Unalga Pass where better conditions may be awaited.

Southward of Unalga Pass, a belt of deep water leading into Beaver Inlet makes the approach to the pass on echo soundings comparatively easy; the 50-fathom curve can be followed along the eastern limit of the deep, and the 100-fathom curve along the northern limit. In the outer reaches of Beaver Inlet it has been found possible to catch a glimpse of the shore during the summer fogs. For this reason and because of ease of access, it can be recommended as good practice in thick weather to make the slight detour into the inlet to check the vessel's position before entering Unalga Pass. The currents in the entrance to Beaver Inlet generally do not exceed 2 knots.

Current predictions for Unalga Pass are contained in the Tidal Current Tables.

Deep Bay, indenting Unalaska Island on the north side of the entrance to Beaver Inlet, is protected on the northeast by rocks awash and small islets which make offshore about 0.3 mile; the ledge continues, totally submerged, 0.3 mile farther and terminates in a kelp-marked ¾-fathom rocky shoal which breaks in southeasterly weather. A kelp-marked 1¼-fathom rocky shoal is 0.3 mile off the bluff point on the southwest side of the entrance. Temporary anchorage in northwest weather can be found at the entrance to the small cove in the northwestern corner of the bay, in 10 to 20 fathoms.

Beaver Inlet is described later in this chapter.

From the ledge marking the eastern part of Deep Bay, the shore extends northeastward for 2 miles to Brundage Head. This stretch of shore has numerous rocks and islets extending as much as 0.3 mile offshore, and strong currents are noticeable.

Brundage Head, on the west side of the southern entrance to Unalga Pass, has a knoll 192 feet high at its outer end. A pinnacle rock, 22 feet high and 300 yards eastward of the point, has deep water outside of it.

Fisherman Point, about 1 mile northwestward from Brundage Head, is 140 feet high. A reef, with several bare rocks about 15 feet high and marked by heavy kelp, extends over 400 yards northward from the point. The shore between Fisherman Point and Brundage Head is fringed with rocks, but none extend more than about 300 yards into the pass.

English Bay, on the west side of Fisherman Point, is a secure anchorage for small vessels. The western shore of the bay trends due south for about 2 miles to a low point, where it turns sharply westward for 0.9 mile to the head of an arm about 0.3 mile wide. The most secure anchorage is in this narrow arm, southwestward of the low point at the turn. The width of this anchorage between the 5-fathom curves is about 300 yards. Good anchorage with more swinging room can be found eastward of the low point in 8 to 10 fathoms, but a shoal area extending 400 yards off the shore northward of the point must be cleared.

In entering English Bay, account must be taken of the strong currents in Unalga Pass; follow a midchannel course, giving the western shore a berth of at least 0.3 mile, and when heading into the arm at the head of the bay favor the south shore slightly. Good holding ground in 12 to 20 fathoms will be found near the entrance.

From English Bay northward, the Unalaska shore of Unalga Pass is much higher.

Erskine Point, about 3 miles northwestward of Fisherman Point, is the northern extremity of a ridge 1,432 feet high. Along the shore from English Bay to Erskine Point are numerous rocks, but none are more than 250 yards off.

Lofty Mountain, 2,284 feet high and 2.5 miles southwestward from Erskine Point, is a symmetrically-shaped conical peak, the highest point in the vicinity. It is easily identified and, as it is often clear when surroundings are obscured, makes a valuable landmark.

Chart 8802.—Unalaska Island, one of the larger of the Fox Islands which form the eastern group of the Aleutian Island chain, is about 67 miles in length along the axis of the chain. The island is mountainous, and during the greater part of the year the higher elevations are covered with snow. The irregular coastline is broken by three long deep bays, Beaver Inlet, Unalaska Bay, and Makushin Bay, as well as by numerous smaller bays and coves. In general, the bays have deep water close to shore, sometimes too deep for convenient anchorage. Makushin Volcano, the highest point on the island, is near the northwestern side and about 25 miles from the eastern end of the island. In clear weather the volcano is a prominent landmark for vessels bound to Dutch Harbor, in Unalaska Bay.

Caution.—Unalaska Island is a **Naval Defensive Sea Area and Airspace Reservation,** and is closed to the public. No vessels or aircraft, except those authorized by the Secretary of the Navy, shall be navigated in or above the area within the 3-mile limit. In 1963, restrictions governing the airspace were suspended subject to reinstatement at any time when the purposes of national defense may require.

Chart 9007.—Kalekta Bay is a broad, open bay in the north end of Unalaska Island just east of Unalaska Bay. It has no known dangers over 400 yards from the shore, and there are a number of places where a vessel may anchor; but as this bay is open northward, English Bay and Dutch Harbor are recommended. A pinnacle rock is off Erskine Point, the eastern point at the entrance, somewhat similar to Priest Rock off Cape Kalekta, but the rock off Erskine Point is distinguished by a smaller one between it and the point. On the west side of Kalekta Bay, 1.8 miles in from Cape Kalekta, is a narrow pinnacle rock 45 feet high, 100 yards offshore.

On the west side of Kalekta Bay, 3 miles southward from Cape Kalekta, a gap cuts through to Constantine Bay in a west-southwesterly direction. This gap is filled by a lagoon not connected with either bay. A reef extends

400 yards offshore just south of this gap. Anchorage may be found in the south end of the bay 0.5 mile from shore in 12 to 20 fathoms, sandy bottom. Small craft may find anchorage in the center of the small bight 0.5 mile in diameter on the east side of the bay, 1 mile in from Erskine Point, in 5 fathoms, rocky bottom. The holding ground is poor and this bight is not recommended for anchorage except in emergency.

Unalaska Bay opens into the Bering Sea between Cape Kalekta and Cape Cheerful when on the north side of Unalaska Island. The bay has little commerce except for diesel oil and supplies for the local village of Unalaska. The shores of the bay are in general mountainous, with precipitous sea faces. Amaknak Island is near the southern end of the bay. Westward of the island the water is deep, but there is no good harbor in this part of the bay; eastward of the island are the important harbors and anchorages of Iliuliuk Bay, Dutch Harbor, and Ilinliuk Harbor. The channel to Ilinliuk Bay and Dutch Harbor is free from dangers, except along the shores. Iliuliuk Harbor is obstructed at its entrance by ledges, but with the aid of the buoys, it is not difficult to enter with a vessel under 250 feet in length.

Unalaska Bay is open to navigation at all seasons. It is reported that on two occasions the drift ice of Bering Sea entered Unalaska Bay, but such an occurrence is so rare that it need not be considered. Ice often forms in the sheltered coves and harbors in cold, calm weather, but it never attains any thickness or interferes with navigation.

Prominent features.—Makushin Volcano (chart 9024), 5,680 feet high, is the highest point on Unalaska Island. The volcano can generally be seen in clear weather. Table Top Mountain, 2,710 feet high, back of Cape Cheerful, and the crater of an extinct volcano with three points, the highest being 2,203 feet, west of Eider Point, are distinctive. Either peak may be used as a leading mark in approaching Cape Cheerful until close enough to distinguish the surrounding features; however, the crater west of Eider Point can be used only when it is not obstructed from view by the higher elevations northwestward of it. In getting close to the island, when the fog hangs over the land but leaves a clear space just along the water's edge, Winslow Island (chart 9024) forms a good mark. It is in a small bay about 2 miles westward of Cape Cheerful, and is a small, rounded island, regular in shape, and stands far enough from the land to be seen as not a part of the main island. Westward, under similar conditions, Koriga Point can be seen at times. The land slopes gradually to the point from Makushin Volcano, and ends in a small peak-like formation. From eastward the cape southeastward of Cape Cheerful is also useful as a mark, particularly in low visibility. Strangers, when in the vicinity and uncertain of the identity of the bay and its landmarks, should endeavor to pick out Ulakta Head. Rising into the bay, its flat top breaking off abruptly and sloping sides presents an appearance unlike any other in the vicinity, and shows up well against the background of mountains. When sighted, steer for it, leave it on the starboard hand, and follow around, keeping out of kelp.

Chelan Bank, the extensive 45-fathom bank extending about 7 miles northeastward from the vicinity of Cape Cheerful, may be found useful in fixing the position of a vessel by soundings. The bottom on the bank is composed of black sand and gravel; on the shelving areas the bottom is of gray sand and gravel up to about the 80-fathom depth. Chelan Bank, at its northeast end, almost makes a junction with a similar bank extending northward and westward from Cape Kalekta, the two banks practically enclosing Unalaska Bay. A light tide rip occurs along the outer edge of Chelan Bank.

Routes, Unalaska Bay.—When bound for the bay from any part of Bering Sea, it is recommended to shape the course for Cape Cheerful. In thick weather it is better to fall westward of Cape Cheerful and then round it than to fall to the eastward, with the possibility of being carried by currents into the dangerous regions of the passes.

Cape Kalekta is the headland at the eastern side of the entrance to Unalaska Bay. The headland has two summits 785 and 904 feet high, and a ridge, which sags to about 700 feet, connects the headland with the mountains to the southward. The rounded extremity of the cape is the base of the slope from the lesser summit. When viewed sidewise, this slope which forms the end of the headland is rounded in outline, rising precipitously at the water's edge and then bending gradually to meet the lesser summit.

The 904-foot summit is very close to the western side of the cape. It is predominant, being the highest point on the headland. Viewing the cape from either side, this summit has somewhat the shape of a crown. When off the extremity of the cape it appears as a sharp peak and the outline of a spur along the western descent becomes visible. This spur is composed of the massive protuberances, the most prominent of which takes the shape of a vertical shaft of rock rising above the level of the top of Priest Rock.

Cape Kalekta is rugged and precipitous at its extremity and particularly so on its western side. The headland rises almost vertically at the waterline with a few detached rocks including Priest Rock, but no beaches. The area about the extremity is foul and marked by kelp, and a dangerous ledge which uncovers 1 foot, usually marked by breakers, lies nearly 0.4 mile northward from the cape. The ledge is roughly in line with the pinnacle of Priest Rock and the western parts of the low islets northward of Priest Rock. Broken bottom extends about 200 yards farther out. The northern end of the cape should be given a berth of at least 1.2 miles to avoid being carried toward the dangers by strong currents. There are pronounced tide rips.

Priest Rock, close-to, off the northwest side of Cape Kalekta, is a pinnacle 204 feet high. It is one of the most important landmarks in making Unalaska. **Priest Rock Light (54°01′ N., 166°23′ W.),** 45 feet above the water, is shown from a white skeleton tower at the base of the rock off Cape Kalekta. Priest Rock should not be confused with the pinnacle rock off Erskine Point. Two low rocky islets of appreciable area are northward of Priest Rock.

The cascade southward of Cape Cheerful is visible off Cape Kalekta.

The point on the eastern shore of Unalaska Bay, about 1.4 miles southward of Priest Rock, presents a smooth, rounded profile and is grass covered. The shore on either side of the point has little or no irregularity. The land about the point rises somewhat abruptly at the shore to about 150 feet, then rounds to assume a more or less flat area. This area has a gentle slope toward the steeper slopes leading up to a series of jagged peaks 0.5 mile inland from the point. The peaks have no particular distinctiveness. The 10-fathom depth curve is almost 0.5 mile off the point and broken bottom with a 1½-fathom spot lies inside the curve.

Princess Head, on the east side of Unalaska Bay, about 1.9 miles from Priest Rock, is a wall-like rock formation extending out for 200 yards from the shore cliff of that locality. The outer 200-foot length forms the highest part or head of the feature. The head has a fairly level top about 200 feet high. The side facing the southwest presents the surface of a rough square, distinguished from the remainder of the rock formation by its lighter shade. Small knobs on the top of the head mark the upper corners of the square. The head is an important and distinctive landmark, especially when in close to the east shore of Unalaska Bay, in thick weather or when fog closes out the peaks. Two low detached rocks are off the end of Princess Head.

The rounded shore in the vicinity of Princess Head is the base of a mountain rising to a peak 1,729 feet high. The southern slope of this mountain descends gradually to the lagoon in a low gap which bisects Cape Kalekta peninsula. The point on the rounded shore is a spur from the base of the mountain. The spur parallels Princess Head and is 0.3 mile southwestward of it. A smaller projection from the shore is close northward of the point. A group of bare rocks lies off the point; about 100 yards off the outer one of this group is a rock that uncovers 2 feet.

Constantine Bay, on the east side of Unalaska Bay, has shoal and irregular depths, less than 10 fathoms, and its use as an anchorage, except by small craft under favorable conditions, is not recommended. The shore at the head of the bay is sandy. The southwest shore is fringed with rocky ledges. On the east side of the bay is a gap in the land extending east-northeasterly to Kalekta Bay. This gap is filled with a lagoon which is not connected with either bay.

The headland west of Constantine Bay is rugged and precipitous and the area near and around its extremity is foul with rocks and kelp. The bluffs along the 1.5-mile stretch of shore southward of the extremity, facing Unalaska Bay, are especially high. They are very rugged and have gray, rocky knobs and deep vertical scars, giving the appearance of vertical stratification. **Split Top Mountain** marks the south end of this formation; the bluffs rise to more than 1,600 feet near the peak.

Summer Bay, a wide opening in the eastern shore of Unalaska Bay, opposite Ulakta Head, is composed of several coves, the heads of which are low and sandy. **Morris Cove,** on the east side just northward of a prominent headland, has depths less than 4 fathoms, and the bottom is somewhat irregular. In the small cove between the southern cove and the headland, the depths decrease uniformly from 4 fathoms in midchannel to the sand shore at the head. The depths in the southern cove are shallow and irregular.

Chart 9008.—Second Priest Rock, a pinnacle 75 feet high, lies close to the north side of the headland between Summer and Iliuliuk Bays. The pinnacle stands on the reef bordering the shore of the headland. A dangerous rocky shoal extends 0.2 mile northward from the headland.

Ulakta Head, the north end of **Amaknak Island,** is about 900 feet high. It has a flat top, and in clear weather it is one of the best landmarks for fixing the position of Unalaska Bay. Looking into the bay, its flat top, breaking off abruptly to sloping sides, presents an appearance unlike any other in the vicinity, and shows up well against the background of mountains. From its northwest point a reef extends 0.1 mile, marked by **Needle Rock,** similar in appearance to Priest Rock, but not so large.

Ulakta Head Light (53°56′ N., 166°30′ W.), 61 feet above the water, is shown from a red skeleton tower on the reef bordering the northeast side of Ulatka Head. A pinnacle rock, 30 feet high, adjacent to the shore, is about 50 yards westward of the light. Another rock, 20 feet high, is 75 yards northwestward of the light.

Mount Ballyhoo, 1,634 feet high, dominates Amaknak Island.

Iliuliuk Bay has its northern entrance between Ulakta Head and Second Priest Rock. The entrance is marked by a lighted bell buoy. Northward of Spithead is a covered ridge extending across the bay with at least 7 to 8 fathoms near the middle of the bay; kelp has been seen on this ridge in about midchannel. South of this ridge the depths increase to 20 fathoms. There is anchorage almost anywhere in the bay. The usual anchorage is at the head in 14 to 16 fathoms, muddy bottom, where, even with northerly winds, the force of the sea does not seem to reach.

At the head of Iliuliuk Bay, behind the town of Unalaska, is a ravine or break in the mountains, which extends through to the water southward. This is sometimes useful as a guide in entering the bay. Buildings at Unalaska, on the lowland at the head of the bay, are prominent.

Spithead is the end of the long, low, sandspit which forms the eastern side of Dutch Harbor. **Spithead Light (53°54′ N., 166°31′ W.),** 38 feet above the water, is shown from a white slatted tripod with a small white house on the south end of the spit. Shoal water, less than 6 fathoms, marked prominently by kelp, extends 0.4 mile into Iliuliuk Bay from the middle part of the sandspit.

The west shore of Iliuliuk Bay south of the sandspit is fringed with rocks and should not be approached closer than 0.3 mile.

Rocky Point has a kelp-marked reef extending 400 yards toward Spithead; the outer limit is marked by a buoy. A rock, covered ⅗ fathom, is 250 yards northeast-

ward of the point. Along the east side of Rocky Point the reef is extensive; the 10-fathom curve, which marks the outer limit of broken bottom in this part of Iliuliuk Bay, roughly parallels the side of the point at a distance of nearly 400 yards.

Dutch Harbor, on the west side of Iliuliuk Bay, has its entrance between Spithead and Rocky Point. The water is deep close to the shores and in all parts of the harbor, except off Rocky Point. The entrance is about 0.5 mile wide and 16 to 18 fathoms deep.

Anchorage may be had throughout the harbor in 14 to 22 fathoms. Violent williwaws are experienced during gales, especially from the southwest, and the best shelter will be found under the high part of the island well northward of the entrance. Southwest gales practically have a clear sweep across the entrance because of the lowland westward. Vessels forced to lie at Dutch Harbor Fuel Pier during the early spring and fall will find it necessary to use chains and wire cables in addition to mooring lines during the severe gales.

Dutch Harbor Fuel Pier, 0.3 mile westward of Rocky Point, is T-shaped and has a loading face 334 feet long with depths of 30 to 35 feet alongside. Submerged piles, the remains of a previous structure, may exist close to the southeast end of the pier; this area should be avoided. Large vessels berthing at this pier should drop anchor well offshore and warp in to enable them to get away at once in case of a sudden onshore wind.

Ballyhoo Dock, opposite Spithead, is T-shaped and has a loading face 900 feet long and a depth alongside of 30 feet. Midway on the west side of the spit are the ruins of a former oil dock; submerged piles and dolphins may exist. At the northern end of the harbor is an L-shaped dock with a face 220 feet long and depths alongside of 32 feet. South of Rocky Point, and fronting on Iliuliuk Bay, are the ruins of another oil dock; submerged piles and broken dolphins may exist. All docks in Dutch Harbor are controlled by the U.S. Navy.

Dutch Harbor is the site of an inactive naval operating base which is under the control of a Security Force. The base is out of bounds to all personnel.

Supplies of gasoline, diesel oil, and stove oils are available in ample quantities at Dutch Harbor. The water requires special treatment for use in boilers.

Tides.—Daily tide predictions for Dutch Harbor are given in the Tide Tables. The diurnal range of tide is 3.7 feet. The tidal current in Dutch Harbor is inappreciable, and in Iliuliuk Harbor the velocity does not exceed 1 knot.

Unalaska (1960 population 218; P.O.) is on a low strip of land between the shore at the head of Iliuliuk Bay and a stream which empties into Iliuliuk Harbor. The wharf is at the western end of the strip of lowland. The north side of the wharf faces the passage connecting the bay and harbor and the west side faces the harbor. The channel approach to the passage is endangered by Iliuliuk Reef which lies off the town in Iliuliuk Bay.

Unalaska is the largest settlement in the Aleutian Islands. The original Russian settlement was known as Iliuliuk. The principal sources of income are trapping and seasonal employment in the Pribilof Islands. Unalaska has a public grade and high school. The Northern Commercial Co. operates a general store at which provisions are available in limited quantities. Fuel must be obtained at Dutch Harbor. There are no medical facilities.

The Alaska Communication System maintains a radio station at Unalaska. Passengers, freight, and mail for Unalaska and Dutch Harbor are handled by airplane from Anchorage.

Iliuliuk Reef, a ledge bare in places, extends 250 yards in an east and west direction. From the eastern dry rocks, a ledge covered 12 to 15 feet and marked by kelp extends 150 yards southward.

East Channel, a buoyed passage between Iliuliuk Bay and Harbor, has a controlling depth of about 22 feet. **South Channel,** a buoyed passage between Captains Bay and Iliuliuk Harbor, has a controlling depth of about 28 feet.

The channel northward of Iliuliuk Reef has a least depth of 17 feet, but it should not be attempted without local knowledge. On the north side of the channel at its eastern end, 200 yards northward of the east end of Iliuliuk Reef, is a depth of 1¼ fathoms off the end of a pointed reef extending from the shore. The channel is buoyed.

The Northern Commercial Co. wharf at Unalaska provides 265 feet of berthing space with depths of 22 to 30 feet along the westerly side, and 277 feet with depths of 23 to 32 feet along the northerly side. A spit makes out from the north shore of the passage northward of the wharf.

The Coast Guard reports that an eddy has been noted making against the eastern end of the wharf at Unalaska on the ebb but it is not dangerous. The currents setting in and out of the harbor generally follow the trend of the channels and do not exceed 1 knot in the main entrance channel.

Iliuliuk Harbor, the harbor for Unalaska, may be entered through East Channel from Iliuliuk Bay or through South Channel from Captains Bay. The latter channel carries the greater depth and is the most easily navigated during northerly weather. The distance through East Channel is shorter for vessels from Dutch Harbor or the Bering Sea but South Channel is nearer for vessels from Captains Bay. Iliuliuk Harbor is small but landlocked with good holding ground, and an average depth of 10 fathoms. There is sufficient room for backing and filling in turning a moderate-sized ship. Violent williwaws are experienced with southerly gales. Vessels under 200 feet in length have ridden out gales here, but the short scope of chain allowable usually causes the anchor to drag. On account of the limited swinging room, an anchorage in Dutch Harbor or Unalaska Bay is recommended during severe weather.

Expedition Island is in the southern part of Iliuliuk Harbor. On the island is a small grove of evergreens. The trees are from Sitka and were transplanted in 1805 by a Russian Orthodox priest. A similar grove is located

near the old Indian village of Amaknak. The trees are 25 feet in height and their number apparently has not increased.

Bailey Ledge, near midchannel at the southern end of the passage leading from Captains Bay to Iliulink Harbor, is of small extent, steep-to, and marked by a white daymark on a triangular base. Only a small amount of kelp marks this ledge, which uncovers 2 feet.

South Amaknak Rocks lie in a foul area extending from the southern extremity of Amaknak Island. The smaller 15-foot rock near the southerly edge of the foul ground is about 250 yards southeasterly of the larger 30-foot rock. A deep-water channel is indicated midway between this group of rocks and Bailey Ledge and also about 250 yards eastward of the eastern South Amaknak Rock, thence deep water may be carried to the southern entrance of Iliuliuk Harbor by favoring the eastern shore.

Chart 9006.—Captains Bay is the arm at the head of Unalaska Bay. Its entrance from Unalaska Bay direct is westward of Amaknak Island. The bay is also entered, as previously indicated, by passing eastward of Amaknak Island through Iliuliuk Harbor, and through the channel leading southward from the harbor.

The entrance to Captains Bay westward of Amaknak Island is marked by **Arch Rock,** 4 feet high, adjacent to the point 0.8 mile from the southern extremity of the island. Directly opposite Arch Rock is a bold point marking the western side of the entrance. A reef extends 220 yards channelward from the bold point, and from the reef a bar of 5 to 8 fathoms extends to a point nearly three-quarters of the distance across the entrance toward Arch Rock. Large vessels in entering should pass about 100 to 200 yards off Arch Rock as the deep-water channel will be found at those distances.

Anchorage may be had in 17 to 20 fathoms, even bottom of mud and sand, about 0.4 mile eastward of the northernmost island of the group at the head of Captains Bay. In approaching this anchorage favor the eastern shore to avoid **Swallow Reef** and the shoal to the southward, which lies northeastward and eastward of the northernmost island. A reef extends 150 yards from the eastern shore about abreast of Swallow Reef. Small craft may obtain secure shelter in 9 fathoms, sand and mud bottom, at **Port Levashef,** east of the most southerly of the larger islands.

Hog Island, 300 feet high, lies off the western side of Amaknak Island in Unalaska Bay. Foul ground extends nearly 0.5 mile northward of Hog Island. The reef extending 0.3 mile from the north point, a part of the foul ground, has numerous rock ledges jutting up from the rocky bottom. Clear passage exists between Hog Island and Amaknak Island. Favor Amaknak Island to avoid a 3¼-fathom shoal, which is 600 yards northeast of the south end of Hog Island. A large, thick kelp patch lies southward of Hog Island and should be avoided.

Nateekin Bay, on the southwest side of Unalaska Bay, affords good anchorage, except for northeasterly winds, for small craft in 3 to 4 fathoms, 490 yards east of the head of the middle bight of the northwest shore. A shoal area covered 1 fathom lies southeastward of this anchorage.

Chart 9007.—Broad Bay, a bight in the western shore of Unalaska Bay 2.5 miles southward of Elder Point, affords fair anchorage in 25 fathoms, sandy bottom, 0.5 mile offshore. The anchorage is exposed to northeasterly weather.

Wide Bay, 1.2 miles southwestward of Elder Point also affords fair anchorage in 25 fathoms, mud and sand bottom, 0.4 mile from the west head of the bight.

Makushin Valley, which borders on Broad Bay, is a flat, covered with grass, and about 15 feet above high water. A sizable stream courses through the valley. The shore along Broad Bay is composed of very coarse sand. A similar valley and shore are found at Wide Bay. The cascade just north of Broad Bay can be seen only in the restricted area to the southeast.

Elder Point is at the southern end of a rocky bluff-formation of great height which characterizes the coast for several miles along the western side of the entrance to Unalaska Bay. In places along this shore there are massive accumulations of loose rock and earth lying at the base of the bluffs, formed by slides. The bluffs are of horizontal strata and like those about Cape Cheerful have a distinct reddish hue. Elder Point is a comparatively low projection pointing southward, and from it a narrow reef extends in the same direction for 0.8 mile into Unalaska Bay. The reef uncovers 2 to 4 feet and usually breaks at high tide but not generally along its outer limit. Although deep water can be carried from seaward to the vicinity of the end of the reef, Elder Point should be given a berth of at least 1 mile when passing southward of it.

A 133-foot-high cascade, 1.5 miles northward of Elder Point, is the most distinguishable feature between the point and Cape Cheerful. It is an excellent landmark during a low-ceiling fog when only the lower part of the cascade can be seen. The bluff at the cascade has a remarkably smooth, stratified face, up to an elevation of about 100 feet, where it forms a distinct horizontal line directly above which the upper strata have very irregular surfaces and appear to overhang in places The cascade emerges from a slight depression at the top to form a comparatively narrow white waterfall to a sea level bench at the foot of the bluff. On either side of the cascade are rockslide and earthslide accumulations.

Chart 9024.—Cape Cheerful, on the north coast of Unalaska Island just westward of Unalaska Bay, consists of a main and secondary headland about 1 mile apart, the two headlands being separated by a low grassy valley emerging on the coast. The valley is flat at the base and resembles an amphitheater; it is called The Dry Dock.

The main headland is the westerly of the two and is adjacent to Reese Bay; it projects farther to seaward and is marked by a peak 1,808 feet high. The peak is close to the extremity of the headland and dominates the end of the cape from most directions of approach. It may, however, merge with the higher elevations back of the second-

ary headland or be shut out by them when the peak and higher elevations are on range.

Table Top Mountain, 2,710 feet high, is the highest summit back of Cape Cheerful, but there are several peaks to the eastward of it approaching this elevation. The western slope of this mountain descends to the deep valley extending inland from Reese Bay. The mountain has a wide flat top.

The bluffs about Cape Cheerful present a rugged and almost vertical appearance, and rise to 1,000 feet. They are of horizontal strata and have a distinct reddish hue. Large slides of loose rock at the waterline can be seen along the cape. The area outside the base of the bluffs, which is at or near the high-water line, is very rocky and strewn with boulders. Foul ground extends several hundred yards off the extremity of the secondary headland and its northeastern side. Depths of over 20 fathoms are found 0.5 mile off Cape Cheerful.

The currents apparently meet in the vicinity of Cape Cheerful, the flood setting northwestward from Unalga Pass and northeastward from Point Kadin, creating eddies which set toward the shore. In rough weather the seas are apparently accentuated in the vicinity of the cape and it is therefore advisable to give it a wide berth under such conditions.

Reese Bay, a cove between Cape Cheerful and Cape Wislow, is about 1 mile wide at the head, which consists of a low, narrow strip of sand with some marsh grass. It is about 1 mile in depth, but appears deeper on account of the pronounced valley or mountain gap extending inland from the coarse sand beach at the head of the cove. It is a long flat, covered with grass, partly filled by **McLees Lake,** and flanked by the side slopes of ridges which terminate at each cape. **Wislow Island,** lying in the middle of Reese Bay, although rocky, appears regularly rounded in shape. It is 121 feet high, and the top is grass covered. Wislow Island stands out prominently against the low background and is a good landmark during low visibility. Anchorage in 14 fathoms may be found 0.5 mile northeastward from Wislow Island, with some shelter from southeasterly weather. There are depths of 2 to 8 fathoms southward of Wislow Island, but no shelter in northerly weather, and the shape of the bay apparently concentrates the effect of any northerly swell, so that it breaks well off the shore at the head of the bay.

The channel westward of Wislow Island is blocked by a detached, rocky shoal, marked by kelp, with a depth of 1¼ fathoms, lying 350 yards westward from the south end of Wislow Island.

Cape Wislow, 2.5 miles westward of Cape Cheerful, is dominated by **Mount Marshall Reese,** 2,545 feet high. This peak is at the northern end of the long ridge which parallels the low valley extending inland from Wislow Bay. The land slopes gradually and evenly from Mount Marshall Reese to the end of Cape Wislow where it terminates in a bluff about 600 feet high.

Southwestward of Cape Wislow, about 1 and 3 miles, respectively, are two remarkable rocky cliffs about 2,000 feet high. They appear as equilateral triangles from the northwestward. A smaller triangular bluff, 560 feet high, lies between them. Several large waterfalls emerge from the gullies between these bluffs; the most prominent of the waterfalls is about 1.7 miles westward of Cape Wislow. Emerging from a V-shaped gully, the water makes a vertical drop of about 140 feet to the high-water line. Being a spray of white foamy water, it is visible against the dark rocky cliff for some distance, and makes a good landmark when viewed from the northeast.

Irishmans Hat, a square tower rock 85 feet high, lies about 0.2 mile offshore from the foot of the westerly cliff 3 miles southwestward of Cape Wislow. This rock can seldom be identified from any direction except northeastward where it shows clear of the land. Irishmans Hat is surrounded by a kelp-covered reef.

Driftwood Bay, just westward of Irishmans Hat and about 6 miles westward from Cape Cheerful, is an open bight, with a sand and gravel beach at its head. The lowland inshore from the bay is a large, swampy valley covered with marsh grass. The lowland to the southward, separating the mountainous mass of Makushin Volcano from the highland in the vicinity of Mount Marshall Reese, often can be recognized from offshore when the mountains are in clouds.

Anchorage with some shelter from southwesterly and southeasterly weather can be found in 11 fathoms 0.5 mile from the westerly shore, with Point Tebenkof bearing about 275°. The depths shoal rapidly towards the head of the bay, and depths of 3 fathoms and less are found 600 yards offshore near the southeastern part of the bay.

Point Tebenkof, the western point of Driftwood Bay, is probably the most readily identifiable of any of the points along this stretch of coast, especially from the southwestward. The point terminates in a grassy bluff 800 to 1,000 feet high which overlooks the points to the southwestward.

From Point Tebenkof the land rises gradually and evenly to a flat-topped peak or ridge 3,505 feet high, 2.8 miles inland. From the southwestward this ridge is seen on the skyline as a straight line slightly inclined to the horizon and terminating at the inshore end in a smoothly rounded peak which is a spur from the higher land about Makushin Volcano.

Red Cinder Dome, 1,874 feet high, is 1.1 miles south of Point Tebenkof and to the eastward of the ridge. This crater peak shows over the ridge to the westward as a flat-topped hump appearing as a part of this ridge. It is a useful landmark because it is often clear when all other peaks are obscured. It can be identified readily from northeastward as it shows clear over the lower land at the head of Driftwood Bay, while all other points and landmarks merge with the higher land in the background.

Point Tebenkof should be given a berth of at least 0.5 mile. A rock awash at high water is 200 yards offshore about 0.4 mile westward of the point, and a 2¼-fathom shoal, marked by heavy kelp, is 375 yards offshore, outside of the rock awash.

A large slide 1.3 miles westward of Point Tebenkof may be identified under certain conditions of light. The bare place has the shape of an enormous keyhole, about 600 feet high.

Bishop Point is a level tablelike projection, 254 feet high, about 3 miles southwestward from Point Tebenkof. It terminates in a pinnacle 102 feet high. A deep gorge extends 3.5 miles southward from the point. Cascades are visible in summer high up on the walls of this gorge.

Temporary anchorage in southerly weather may be found 0.4 mile from shore in about 16 fathoms 1 mile east-northeastward from Bishop Point or 0.5 mile west-southwestward from it.

Triple Falls, two large waterfalls, one of which is divided into two cascades about 100 feet high, are 1.6 miles southwestward from Bishop Point, and are visible to the northward and northeastward.

Koriga Point, 5 miles southwestward of Point Tebenkof, is about 140 feet high and is difficult to distinguish except from the southwestward. There are a number of rocky islets close to shore eastward and westward of the point. Deep water, 40 fathoms, is found within 0.3 mile of the point.

A round hill, 320 feet high, lying about 0.8 mile southwestward of Koriga Point, can be identified from the southwestward when it is clear of Point Tebenkof but is difficult to distinguish when seen against the higher land.

The shore southwestward of Koriga Point is composed of rocky bluffs 100 to 300 feet high. A small cove, with a sandy beach, 1.8 miles southwestward of the cape, has depths of less than 5 fathoms, and the eastern part of the cove is obstructed by rocks and kelp.

Point Kadin, 3 miles southwestward of Koriga Point, is an inconspicuous, rounding section of the northwest coast of Unalaska Island. A group of rocks 18 feet high lie 250 yards off the cape. About 0.4 mile southwestward is another group of rocks 7 feet high, 350 yards offshore from a waterfall about 60 feet high, visible only from the northward. Extending northwestward and westward more than 0.5 mile from these rocks is a rocky bank with depths from 5¼ to 8 fathoms, while depths of 11 fathoms are found about 1 mile westward. Tide rips occur in this vicinity, and in heavy weather the seas are perceptibly heavier. It is recommended that Point Kadin be given a wide berth, especially in bad weather.

Makushin Volcano, 6,680 feet high, is a flat-topped snow-covered mass with several jagged peaks of about the same elevation surrounding it. It can easily be identified when not covered by clouds. The westernmost of these jagged peaks is particularly sharp and distinct and has an elevation of 5,242 feet. A large glacier covers the entire top of the peak and extends down into the large valleys at its base. Faint clouds of vapor or steam from the northeastern end of the snow field may be visible.

Cape Kovrizhka, 5 miles southwestward of Point Kadin, is very prominent and easily distinguished by the dome-shaped rocky hill, 233 feet high, which forms its westernmost extremity. Numerous rocks are found around this cape, and it should be given a berth of 1 mile. Under certain combinations of wind and current comparatively heavy tide rips occur in the vicinity of the cape.

Round Top, about 1 mile inland at Cape Kovrizhka, is a massive, round-topped peak, 2,452 feet high, separated from the peaks surrounding Makushin Volcano and higher than any of the nearby peaks. It is a useful landmark.

On the north side of Cape Kovrizhka is a small open bay which affords a temporary anchorage during moderate southeast weather. Differences from normal magnetic variation of as much as 3° have been observed at the cape.

Chart 9023.—Volcano Bay, immediately south and east of Cape Kovrizhka, is small and open to the west and south, forming a fair anchorage for easterly weather. However, strong winds are to be expected, and with winds shifting to the south and west the bay becomes quite rough and dangerous for small craft.

Makushin Bay, indenting the western side of Unalaska Island, is 2.5 miles wide at the entrance and extends in an easterly direction for 5 miles to the entrance of Anderson, Cannery, and Portage Bays.

Makushin Point, on the north side of the entrance to Makushin Bay, rises to 762 feet and is grass covered. It is made prominent by a number of small knolls scattered over its top. Just north of the point there is a low valley which extends from Makushin Bay to Volcano Bay.

The abandoned village of **Makushin** is on the eastern side of Makushin Point. Fresh water is obtainable from a stream nearby.

The north side of the entrance to Makushin Bay is marked by **Rock Islet,** 104 feet high, lying 0.5 mile southwestward of Makushin Point, with several rocks between it and the point. There are no known dangers if the south shore is given a clearance of at least 0.3 mile. An abrupt shoal, with least depth of 16 fathoms is 1.2 miles southwestward from Rock Islet.

A prevailing current sets in a northerly direction off Makushin Bay. The combined effect of the currents, including tidal currents, and winds causes a very noticeable choppy sea with attending tide rips across the entrance of the bay.

Vessels have anchored in 15 fathoms, mud bottom, about 0.3 mile off the beach in the cove east of Makushin Point with **Priest Rock,** 80 feet high just south of the abandoned village, bearing 230°. This anchorage is good for westerly and northerly weather, but with southerly weather considerable swell makes in, and in easterly weather, it becomes quite rough.

Anderson Bay, the southern arm of Makushin Bay, affords several good anchorages of moderate size and at least one anchorage for one or more larger ships. A gravel spit, forming **Tarasof Point,** on the western side of the entrance, is a distinctive feature. The bay extends about 6 miles in a southeasterly direction and terminates in two arms, **Naginak Cove** on the west and **Udamak Cove** on the east, with wedge-shaped **Iksiak Point** between them. Four well-rounded, grass-covered islands lie in the eastern half of the bay. These islands are well apart from one another; **Peter Island,** the northernmost, is near **Anderson Point,** the eastern entrance point of the bay, and the southernmost is well inside the entrance to Udamak Cove.

Anchorage in Anderson Bay is in 20 fathoms, mud bot-

tom, in a bight between the second island from the north and the main shore. The anchorage in Naginak Cove is in 20 fathoms, mud bottom, northward of the narrow pass formed by two opposing points. The pass is about 1.2 miles from Iksiak Point, and is obstructed by a dangerous 1½-fathom shoal in midchannel. Anchorage in Udamak Cove is eastward of the fourth island in 22 fathoms, mud bottom, on a ridge extending from the middle of the island to the main eastern shore.

Cannery Bay, 1 mile to the eastward of Anderson Bay, extends about 3 miles in a southeast and easterly direction. Near the head and on the south side of the bay is an abandoned wharf and cannery. The only anchorage in the bay is at the eastern end, about 0.4 mile northeast of the abandoned cannery in 15 to 17 fathoms, soft bottom.

Portage Bay extends about 4 miles in an easterly direction from **Cannery Point.** Two shoals, with least depths of 5¾ and 6½ fathoms, are almost in midentrance. Indifferent anchorage for small vessels may be had in 19 fathoms, sticky bottom, midway between the north shore and the 1½-fathom shoal and rocks near the head of the bay.

A trail to Unalaska begins at the prominent valley about 1 mile from the head and on the north side of Portage Bay. The trip to Unalaska takes about 8 hours.

Cape Starichkof, forming the southern entrance point to Makushin Bay, is marked by an off-lying rock 27 feet high. Numerous rocks, covered and awash, are found along the shore in this vicinity, but are not known to extend more than 0.3 mile from the beach. The mountains rise abruptly from the beach in this vicinity to 1,600 feet.

Two miles southward of Cape Starichkof is a deep narrow valley, trending eastward. Convenient anchorage in southeast weather can be found 0.5 mile from shore off this valley in about 20 fathoms, with the center of the valley bearing about 110° and a conspicuous small 4-foot rock, 150 yards off the shore at the southern edge of the valley, bearing about 150°. Launches can find more shelter by anchoring closer to shore. A small bank with least depth of 6¼ fathoms is 450 yards westward of the rock previously mentioned.

Skan Bay, on the west side of Unalaska Island, has its northeastern entrance point at the ledge 2 miles southward of Cape Starichkof. It is 2 miles wide at the entrance and extends about 4 miles in a southeasterly direction.

A bank, with a least depth of 3¾ fathoms, lies in the bay entrance, 1.4 miles 205° from the point on the northeast side and 0.8 mile northward of the southwestern entrance point.

The two arms at the head of Skan Bay are separated by **Skan Point,** a high headland. The eastern arm is too deep for convenient anchorage. The entrance to the southern arm is about 0.4 mile wide and choked with heavy kelp, but has a least depth of about 5 fathoms in midchannel. This arm extends over a mile to the southward, has depths over 30 fathoms, and provides good shelter from all directions; but the depth is too great in that the length of anchor cable required would not allow sufficient swinging room.

The survey ship used an anchorage just inside the southwestern entrance point of Skan Bay, a little less than 0.5 mile from shore in 15 fathoms, where some shelter from westerly weather was found.

Chart 9022.—Spray Cape, about 3 miles westward of the southwestern entrance point of Skan Bay, is conspicuous from the northward. A small islet, about 80 feet high, lies close to shore off its northwestern side, and rocks covered at high water extend southwestward from this point.

The shore between Skan Bay and Spray Cape is fringed with pinnacle rocks and islets, and a bank, covered 6¾ fathoms at its outer edge, extends more than 0.5 mile offshore.

From Spray Cape the shore trends southward for 3.5 miles to the entrance of Pumicestone Bay. It is high and steep, fringed by rocks. An anchorage with good shelter in southeast weather can be found 0.4 mile from shore at the entrance to Pumicestone Bay in 20 fathoms off a small bight.

Pumicestone Bay, on the northwest side of the long westerly extension of Unalaska Island, is 1.5 miles wide at the entrance, but narrows rapidly to less than 0.5 mile. The bay extends about 7 miles in an easterly direction with an abrupt S-turn to the northward and eastward about 4 miles from the entrance. The turn is partially blocked by a small flat-topped island about 30 yards in extent and 30 feet high, leaving a clear channel 300 yards wide.

The north shore of Pumicestone Bay is formed by low, grass-covered hills. The shore is extremely rocky and rugged, the bluffs having a general elevation of 50 feet. The south shore is almost vertical and is characterized by many slides. The bay is divided by the turn into an outer and an inner bay. The inner bay is almost surrounded by high, precipitous mountains, except at the head where the mountains recede from the shore, leaving a narrow, flat grassland some 200 to 400 yards in width.

Two large streams flow into the bay, one on the northeast and the other at the southward side of the head of the bay. At the turn of Pumicestone Bay is a strip of shingle beach on the eastern side, backed by a narrow strip of grassland, which extends to the high bluffs in back of it. A conspicuous waterfall about 800 feet high is at the southern end of the beach.

The outer bay is very deep. The water shoals gradually from over 40 fathoms at the entrance to less than 30 fathoms at the turn. There is little shoal water suitable for anchorage, and no protection from westerly weather.

At the head, the inner bay widens forming a basin 0.5 mile in diameter where good anchorage may be found in 20 fathoms or less. The southeastern part of this basin shoals abruptly from 10 fathoms to less than 1 fathom.

Kashega Point, on the south side of the entrance to Pumicestone Bay, is 1,447 feet high and deep water is found close to its northern shore.

About 1.5 miles southward of Kashega Point is a bold rocky island about 80 feet high, 600 yards from shore. **McIver Bight,** about 1 mile in diameter, indents the shore eastward of this island. Good anchorage can be found in the center of the bay in about 10 fathoms with the island bearing west. The bay is exposed to the westward and northwestward, but small boats can find some shelter from westerly weather by anchoring closer to shore. The southeastern part of the bay has depths of 2 to 4 fathoms.

Kashega Bay is on the northwestern side of the long westerly extension of Unalaska Island and about 25 miles from Umnak Pass. At the southwestern side of the entrance is **Buck Island,** low and grassy. About 1.5 miles northwestward of Buck Island is a narrow rocky ledge extending northwestward about 0.4 mile on which are the two conspicuous **Kashega Pinnacles.** The outer one is about 95 feet high; the inner one about 35 feet high. These pinnacles are the most conspicuous landmarks in approaching the bay. About 0.3 mile northwestward of the higher pinnacle is a small rock 5 feet high.

The bay has a navigable entrance 0.5 mile wide and is about 1.5 miles long in a southeasterly direction. **Kashega,** a small village at the southeastern end, has a school, church, sheep-ranch buildings, and a few houses. The village shows seaward through a small angle and then is not visible until arriving well inside the bay. Neither a post office nor supplies are available. The anchorage in the bay is exposed to the northwestward and the holding bottom is reported none too good. In proceeding to the anchorage, favor the northern shore to avoid a kelp-marked 2¼-fathom shoal 250 yards from the southern shore and 0.5 mile northwestward of the village church; anchor in 6 fathoms with the church bearing about 165°.

The valley at the head of Kashega Bay leads to Kuliliak Bay on the Pacific Ocean side of Unalaska Island. It is approximately 4 miles long and 1 mile wide, extending in an east and west direction. The floor of this valley is covered with fresh water lagoons which are fed by small streams. The sides of the valley are bounded by high hills entirely covered with grass. The hills to the northward are rolling, while to the south they are steep with a jagged skyline. The streams which empty from the lagoons into Kashega Bay are shallow at their mouths. Local residents of Kashega village report that during heavy northwesterly weather the tide backs up into the lagoons. The shores of the lagoons are mostly rocky with very few stretches of sand beach.

Just westward of Kashega Bay is **Buck Bight.** It is clear, except near the head. The bight is open to the northward.

Sedanka Point, 175 feet high, is the western extremity of the ridge bordering the south side of Kashega Bay. A conspicuous rocky pinnacle, 43 feet high, is 1.5 miles northwestward of the point of the cape with a smaller pinnacle 200 yards to the southeastward. A long ledge extends toward the pinnacles from the point and a conspicuous flat-topped islet, 105 feet high, is 0.3 mile off the point.

Kismaliuk Bay is an irregular-shaped bay, extending roughly southeastward for 2 miles, then branching into two arms. The arms are separated by a low broad point from which a chain of bare rocky islets extends about 0.5 mile in a northwesterly direction. The outer islet is 20 feet high.

The northern arm is of little importance and affords little protection from northwesterly weather. The depth shoals gradually from 17 fathoms at the entrance.

The southern arm, protected by the chain of islets, affords excellent protection. The entrance channel is clear and about 500 yards wide, with a midchannel depth of 11 fathoms. The water shoals gradually to the head of the arm.

Alimuda Bay is the long bay immediately west of Kismaliuk Bay and separated from it by **Manning Point,** a bold, blunt, precipitous point of land from which an exposed rock ledge makes out some 400 yards in a northwesterly direction. The bay extends about 3.5 miles southeastward, with a width at the entrance of over 1.5 miles.

The water shoals gradually from 20 fathoms at the entrance to the gravel beach at the head. About 1 mile inside the entrance a low, flat, reef, with several exposed rocks, makes out some 300 yards from a point on the eastern shore. About 1 mile farther inside, shoal water, extending some 600 yards off the same shore, has a least depth of 1½ fathoms. A bar, covered 4¾ fathoms, extends southwestward across the bay about 0.7 mile from the head. Between this bar and the head of the bay, a depth of 8 fathoms is found, where small vessels can anchor. As this bar is exposed to all northerly and westerly weather, large swells rolling over it, often breaking there, reform to pile up in breakers at the head of the bay. This bay affords no real protection for any but small boats and then only in the extreme southeastern bend behind a small reef making out from the southeastern shore.

Wedge Point, a bold narrow ridge having remarkable serrations, separates Alimuda and Aspid Bays. **Aspid Bay** extends about 2.2 miles in a southerly direction and affords little protection from northerly and northwesterly weather. The depth at the entrance is about 15 fathoms; from there the water shoals gradually to the head of the bay. The bottom is good for anchoring in 9 to 10 fathoms.

Cape Aspid, on the north side of Unalaska Island about 15 miles from its western extremity at Umnak Pass, has a conical hilltop, 901 feet high, near its outer end. The shape of the hill, terminating in bluffs at the shore, is unlike any other land in the vicinity, as all the adjoining hills are flat topped with comparatively gentle slopes. The cape is a useful landmark from all directions except northward where the hill merges with the higher land to the southward. A ledge extends about 400 yards offshore, terminating in an islet about 24 feet high.

The wide bight southwestward of Cape Aspid affords shelter in easterly and southerly weather in 12 to 15 fathoms, 0.4 mile from shore. A 4¾-fathom spot, marked by kelp, lies 0.6 mile northeastward of Ram Point and about 0.4 mile from shore.

At some distance off the coast, between Capes Aspid and Spray, the currents vary in intensity from little or nothing off Spray Cape to about 1 knot off Cape Aspid. The

current generally sets eastward, the flood being stronger than the ebb. Farther inshore, at Cape Aspid, the currents are stronger and small tide rips appear at the turn of the current. These rips extend as far eastward as Sedanka Point.

Chart 9009.—Ram Point, 2.7 miles southwest of Cape Aspid, is a prominent wedge-shaped rock 240 feet high. Ledges, bare at low water, extend 0.2 mile offshore from the point. To the westward of the point there is a stretch of low land over which the masts of vessels anchored in Chernofski Harbor are visible from offshore.

Chernofski Point, the eastern entrance point of Chernofski Harbor, is the extremity of a narrow peninsula composed of several hills, the highest being 315 feet. The seaward face of the peninsula is rugged and broken and there are rocks extending seaward on the line of the ridge. **Chernofski Harbor Entrance Light (53°25′ N., 167°33′ W.),** 101 feet above the water, is shown from a small white house with red stripes on the end of the point. A deep, wide cleft across the middle of this peninsula may be identified when bearing southward of southeast.

Several small detached banks, covered 10 to 12 fathoms, surrounded by deeper water lie to the northward of Chernofski Point.

Chernofski Harbor is a small, land-locked harbor which in its inner part affords complete shelter from swell and from winds except williwaws. Depths are suitable for anchorage; bottom is mud. With heavy south and southeast winds the harbor experiences a strong sweep from the valleys at the head. The entrance between Chernofski Point and West Point is through a narrow canal formed by low promontories, about 4 miles southwestward of Cape Aspid.

The entrance to Chernofski Harbor is difficult as there are no conspicuous landmarks. From the entrance, the northeast tangent of Umnak Island (Cape Idak) bears 309°. Wedge-shaped Ram Point, about 1 mile eastward of Chernofski Point, may help to identify the locality. A shoal with a least depth of 5½ fathoms is almost in the middle of the entrance, about 900 yards southwestward of the light. A midchannel course should be followed into the harbor because of the projecting ledges extending on both sides. Anchorage can be had in the middle of Mutton Cove in 10 to 12 fathoms, mud bottom.

Fresh water can be obtained from a stream in the southern part of the bay. The head of the bay, at the southeastern end, is shallow and can be used only by small boats.

The north coast of Unalaska Island west of Chernofski Harbor is described in connection with Umnak Pass.

Chart 9018.—Sedanka Island, close to the eastern end of Unalaska Island on the Pacific side and separated from the latter island by narrow, deep Udagak Strait, appears as a part of Unalaska Island. The island is mountainous and covered with tundra. There are numerous peaks, separated by deep valleys, running northwestward, but none of the peaks are conspicuous from eastward. The highest peak, 2,130 feet, is in the southwestern part of the island. The outer coast is broken by bays and coves separated by bold, rocky headlands.

Cape Sedanka, the eastern point of the island, terminates in a knoll 375 feet high. Rocks and islets fringe the shore, but deep water is found at a distance of 400 yards. The coast on the southeast side of the cape is unusually steep and reaches an elevation of 1,209 feet.

Egg Island is 0.6 mile in diameter, 541 feet high, and lies about 1.5 miles northeastward from Cape Sedanka. It is a grassy island with a bluff rocky shore, and has numerous rocks and islets within 200 yards of the shore, but beyond this distance deep water is found all around the island.

Old Man Rocks, a group of four, two of which are prominent, are 0.9 mile northwestward of Egg Island. The two conspicuous rocks are 100 and 39 feet high. The group is surrounded by deep water at a distance of 200 yards.

Sedanka Pass separates Egg Island and Old Man Rocks from Sedanka Island. It is about 1.5 miles wide and has depths of 30 to 40 fathoms. The Sedanka Island shore should be given a berth of 0.5 mile. Strong currents with rips are experienced occasionally around Cape Sedanka and just south of Old Man Rocks.

The Signals are three rocks off the eastern coast of Sedanka Island. **Outer Signal,** 30 feet high, is 3.2 miles south of Egg Island and has a small rock, 10 feet high, 0.3 mile southeastward of it. Deep water is found close to these rocks. **Inner Signal** is 3 miles south of Cape Sedanka and 0.8 mile off the nearest Sedanka Island shore; it is 126 feet high and is surrounded by a shoal and reef area 0.4 mile in diameter. A bar, covered 7 to 8 fathoms reaches from this area to the nearest point of Sedanka Island. The passage between the Inner and Outer Signals is clear.

About 15 miles southeastward of Egg Island, after gradual shoaling from the 100-fathom curve to about 45 fathoms, the water deepens to over 60 fathoms, forming an underwater basin about 6 miles wide which leads northwestward into Beaver Inlet, furnishing an excellent pathway for vessels equipped with echo sounding apparatus. A crescent-shaped bank of rock formation within the basin of deep water and 2 miles eastward of Egg Island has general depths of 12 to 14 fathoms and a least depth of 9 fathoms on the western part of the bank. The 50-fathom curve surrounding the bank approximates a circle about 1.5 miles in diameter.

When navigating on soundings in thick weather this bank and the characteristic deep water afford an opportunity to check a vessel's position. The navigator in finding his way on soundings to the bank must guard against the mischance of nearing Egg Island; the shoaling of the depths in doing so may mislead him in assuming that he is approaching the bank. A definite knowledge from soundings taken regularly along the course from seaward is necessary to avoid this error.

From Cape Sedanka the shore on the Pacific side trends southwestward for 3 miles, then turns southeastward for 1 mile to a precipitous point, inclosing a small bight

where temporary anchorage in westerly weather can be found. A depth of 7 fathoms is 0.5 mile from shore in the southwestern part of the bight. The bottom of fine gray sand slopes gradually from the sand beach at the head of the bight to the 20-fathom curve 1 mile offshore. To enter the bight, pass midway between Outer Signal and Egg Island.

On the southeast side of Sedanka Island, east of Udagak Strait, are three bays separated by bold headlands; the largest bay is 4 miles northeast of the entrance to Udagak Strait and extends 2 miles inland in a northwesterly direction. Good anchorage may be found 0.5 mile from the head of the bay in 7 fathoms. This bay is protected from all except southeasterly weather. The two other bays, which are nearer Udagak Strait, afford protection from the north and west.

The south end of Sedanka Island is a double point. On the eastern prong is a conspicuous, sharp pinnacle rising about 100 feet from a flat ledge.

Udagak Strait, between Sedanka and Unalaska Islands, provides a direct passage from the Pacific Ocean to Beaver Inlet. Foul ground extends 300 yards from the western shore of the strait at the entrance, but a midchannel course clears this ground. The narrows at the halfway point in Udagak Strait have a width of 0.25 mile, and the channel is slightly over 0.1 mile wide in a depth over 10 fathoms.

The current velocity is about 2 knots on the flood and about 1 knot on the ebb. At the southern entrance of the strait and through the narrows the flood sets from the Pacific. For current predictions see the Tidal Current Tables.

The strait has good water throughout. However, in the narrows, which run east and west, the channel turns around a reef on the south side of the east end, and then in a reverse turn passes around a rocky shoal on the north side at the west end. The reef lies off the northeast side of a broad, gravel spit which forms the south side of the narrows. The reef is marked by kelp and rocks awash at three points. One or more of the rocks are generally visible. The rocky shoal has a least depth of 4 fathoms and extends 200 yards from the south side of a pointed, gravel spit which forms the west end of the north side of the narrows. The currents in the narrows necessitate caution as to their sheering effect on a vessel swinging to avoid the dangers. Anchorage in the south entrance of the strait is uncomfortable because of the current.

Udagak Bay, an indentation in the west shore of Udagak Strait, affords anchorage in 12 to 19 fathoms, sand and mud bottom, about 0.3 to 0.4 mile from the head of the bay. Small boats may anchor in 6 to 10 fathoms, mud bottom, farther toward the head. The bay affords good protection in any weather.

Light tide rips were frequently observed in the area off the mouth of Udagak Bay, sometimes extending well into the bay. These rips usually occurred when the wind was contrary to the current. Numerous swirls were also encountered in the same area at all times when the currents were more than 1 knot.

Beaver Inlet has its entrance between Brundage Head and Cape Sedanka and extends 17 miles southwestward into the east end of Unalaska Island. It has an average width of about 3 miles in its outer reaches, narrowing to about 1.6 miles near its head. The deep water in the bay extends eastward between Unalga and Egg Islands, making access to the inlet comparatively easy for a vessel equipped with echo sounding apparatus.

Currents in Beaver Inlet are negligible, and in the entrance between Egg and Unalga Islands will not ordinarily exceed 2 knots.

Local magnetic disturbance.—Differences of as much as 4° from the normal variation have been observed on Round Island and as much as 3° on the north shore of Erskine Bay.

From Cape Sedanka, the southeastern entrance point of Beaver Inlet, the shore trends northwestward for 1.6 miles to a point marked by a small natural arch and having a chain of rocky islets extending northward about 200 yards. Just westward of this point is an open bight, 1 mile wide and 0.4 mile in depth, which furnishes convenient temporary anchorage in southerly weather, well out of any swell. Anchor in the middle of the bight about 0.3 mile from shore, with Old Man Rocks showing between the rocky islets off the point to the eastward, in about 16 fathoms. Smaller boats can move farther into lesser depths near the western end of the bight.

Sisek Cove, about 4 miles southwestward from Old Man Rocks, is too deep for anchorage.

Udamat Bay makes into Sedanka Island from Beaver Inlet 5.5 miles southwestward from Old Man Rocks and just west of **Biorka,** a small native settlement having a conspicuous church. The bay is 1 mile wide to a point 0.8 mile from its head where it narrows to 0.3 mile. A low valley extends southeastward from the head of the bay to the outer coast. About 1.4 miles south of the eastern entrance point, a reef makes out 200 yards from the eastern shore. With this exception the shores are clear, and a depth of 20 fathoms will be found within 250 yards or less of the shore. If necessary to anchor in the bay, the best places are at the head of the bay or just north of the reef, mentioned above, in a small bight indenting the eastern shore, but there will be scant swinging room. A small rocky patch, covered 15 to 25 fathoms, is 0.4 mile northwestward from the same reef, and may offer anchorage with more swinging room.

Strait Bay, about 8 miles southwestward from Old Man Rocks, is 1.1 miles long, tapering from 1 mile wide at its entrance to 0.4 mile wide near the head. The bay is clear except for a 5½-fathom spot in the center. Anchorage may be had at the head of the bay in 20 fathoms about 250 yards from shore. A valley extends southward and eastward from its head and during a blow the wind is funneled into the bay through this valley.

Amugul Bay makes southward from Beaver Inlet about 3 miles southwestward of the entrance to Udagak Strait. **Round Island,** 136 feet high, marks the eastern side of Amugul Bay entrance. The bay affords fair anchorage for medium-sized craft in 22 fathoms, mud bottom, 0.2

mile from the head of the westerly bight. The southerly arm affords excellent anchorage for small craft in 10 fathoms, mud bottom, 0.1 mile from the head.

At the head of Beaver Inlet are four small bays; named in order, following the south shore around to the north shore, they are: **Tunaskan, Final, Kisselen,** and **Erskine Bays.** Temporary anchorage only can be found near the heads of these bays for medium-sized craft. The small bight on the southern side of Kisselen Bay affords excellent anchorage for small craft in 7 fathoms, mud bottom, 0.1 mile from the head. In approaching this anchorage, care should be taken to avoid a reef, which uncovers 1 foot, 160 yards southward of the southern island of a group of four. In Final Bay are heavy williwaws and a strong draw.

Dushkot Island lies along the north shore of Beaver Inlet near the head.

Uniktali Bay makes into the north shore of Beaver Inlet about 15 miles above its entrance. This bay is nearly 3 miles long in a westerly direction and 0.3 mile wide at its narrowest part near its head. An anchorage, practically landlocked, but limited to medium-sized vessels, may be found in 20 fathoms, muddy bottom, 0.5 mile from the head of Uniktali Bay. In entering, keep to midbay as far as the narrows, then favor the south shore to avoid a 6-fathom shoal which lies 200 yards off the north shore.

Small Bay, eastward of Uniktali Bay, affords good anchorage in 10 fathoms, 0.3 mile from the head.

Ugadaga Bay is an indentation in the north shore of Beaver Inlet 8 miles above the entrance. From the head of Ugadaga Bay a trail leads to Unalaska. Fair anchorage may be fonnd 0.4 mile from the head of the hay in 20 fathoms, even bottom.

Agamgik Bay, indenting the north shore of Beaver Inlet, 5.5 miles southwestward of its entrance, offers anchorage in good holding ground with fair shelter, except in severe southeasterly weather. The bay is 1.2 miles wide at the entrance. Opposite a small rocky peninsula jutting out from the western side about 1.4 miles from the western entrance point, the width is reduced to 0.4 mile. The anchorage is in this narrow portion in 16 to 20 fathoms. The bay is comparatively free from williwaws.

Eagle Rock, a large, flat-topped pinnacle 75 feet high, 225 yards off the rounded point on the east side of the entrance to Agamgik Bay. Off the western point of the entrance, covered rocks and rocks awash extend from 0.1 to 0.3 mile into the entrance. A rock, 6 feet high, is outside of this rocky area and 600 yards eastward of the point.

The north shore of Beaver Inlet extends eastward from the eastern entrance point of Agamgik Bay for about 8 miles to the western entrance point of Deep Bay, where it turns sharply to the northward and northwestward for 1.2 miles, forming the western shore of Deep Bay, which has been described earlier with Unalga Pass. About halfway between the two bays is a conspicuous waterfall, 350 feet high, with a pinnacle rock 46 feet high close to the westward of its base.

The gap between the mountains on either side of the southern part of Udagak Strait stands out in a measure, from a southeasterly direction, against a background of mountains on the west side of the northern end of the strait. The 1.5-mile stretch of shore forming the south entrance of the strait on the Unalaska Island side is at the base of a very steep side of a ridge, the summit of which is 1,020 feet high.

Mountain ridges just westward of Udagak Strait are normal to the trend of the outer coast, generally ending in deeply eroded cliffs. The mountains appear in confusion and can be identified only by a close study of the chart.

With the exception of Outer Signal, Inner Signal, the reef off Reef Point, and the rocks and ledges close to shore, the south coasts of Sedanka Island and Unalaska Island, as far west as Eagle Point, are free from outlying dangers.

Between Udagak Strait and Kayak Cape the valleys between the headlands have been partially filled with debris, forming a series of bights with shingle beaches at their heads. Behind these beaches are grassy flats and, in all but one case, lagoons. The headlands between the bights protrude from the generally high mountain mass. The valleys, with the exception of one which leads through a mountain pass to the head of one of the bays of Beaver Inlet, are in the form of amphitheaters. Numerous rocks and ledges lie within 50 to 100 yards from the shores and occasionally as far as 200 to 350 yards. The waters along the shoreline are generally foul with covered and bare boulders.

Hive Bay, about 5 miles southwestward of Udagak Strait, is the largest of these bights, its two arms affording good protection from northerly weather. The west arm of the bay affords good anchorage in 8 to 10 fathoms with generally good holding ground. A rock which uncovers 3 feet is on the westerly side of the entrance to the eastern arm of Hive Bay. The headland between the two arms is recessive and undistinguished. The headland west of Hive Bay is deeply eroded. It has sharp ridges and three closely spaced summits of nearly equal elevation, with successively lower spurs toward the point. The cliffs are marked by narrow dark strata rising toward the point. The west side of this headland has a very conspicuous boulder slide.

The bight just west of Hive Bay has a short stretch of shingle beach, behind which is a valley leading inland over gentle slopes to a mountain pass with an estimated elevation of 400 feet. Beyond the pass is Tanaskan Bay, an arm of Beaver Inlet. The headland forming the west side of this bight has a reddish cliff, particularly noticeable from the southwest.

Staraya Bay, north of Kayak Cape, is divided into two parts by a bold promontory on which the remnants of volcanic craters are easily seen. Near the outer end of the headland forming the eastern side of the northern arm of the bay is a natural rock bridge arching from the cliff and footing in the shallow water near the shore. This span is about 50 feet, and the height under the arch is about the same. Ledges extend about 200 yards offshore from the

outer end of this headland. The western arm of Staraya Bay is a bight which has a shingle beach of unusual length and height, 20 to 25 feet, and a large lagoon behind the beach. In the center of the mouth of this bight is a shoal area with a 1-fathom rock.

Kayak Cape is the first prominent point west of Udagak Strait. It is lower than points to the westward, bold at the extremity and its narrow ridge is marked by several prominent humps, 1,000 to 1,400 feet high. Both sides of the cape display a conspicuous black stratum about 400 feet high at the point of the cape. These strata may be seen when the overcast is not too low.

Chart 9019.—From Kayak Cape westward the shoreline trends to the southwest and is deeply indented by several large bays, affording various degrees of protection. Only two of these, Usof Bay and Blueberry Bay, are considered to give adequate protection from all kinds of weather. Three Island Bay and Raven Bay are landlocked at the head, giving excellent protection for small craft only.

Protection Bay, just west of Kayak Cape, extends about 2 miles inland. There is a slight hook to the westward at the head of the bay, giving some protection for small craft from the south. Rocks extend 500 yards southeastward off the point of the hook. This bay has the least shelter of any in the vicinity, but its depth is more convenient for anchoring.

Cape Yanaliuk, about 4 miles southwest of Kayak Cape, is easily identified by the mushroom-shaped rock just off the point. Altogether there are two small rock islets just off this point. The cape is narrow and precipitous except for a short distance on the southwest side, which is a grass-covered slope, topped and flanked at each end by rock cliffs. The cape has a markedly jagged appearance. A small bight on the east side of the cape extends 1 mile inland but affords no protection in bad weather.

Three Island Bay, west of Cape Yanaliuk, extends inland for about 5 miles in a north-northwesterly direction; it affords fair protection for small craft in any weather in 8 to 15 fathoms at the head of the bay, behind three small islands which give the bay its name. Deep water carries through to the head of the bay between the islands. Care must be exercised not to anchor too close to the rocks north of the eastern island, nor to the shoal water at the north end of the bay. Swinging room is restricted for vessels exceeding 100 feet in length, and the area affords only fair anchorage and protection for small craft. It is subject to violent williwaws, and in southerly weather a rather heavy swell from outside makes it uncomfortable. **Foam Cove,** 1 mile above the west entrance point, provides fair temporary anchorage near the mouth of a stream which shows conspicuously from the bay entrance.

Blueberry Bay, the next bay west of Three Island Bay, extends inland in a northwesterly direction for about 3 miles. A fairly sharp turn to the northward for about 1 mile makes the head of the bay landlocked and affords good shelter. The upper half of Blueberry Bay has a rugged shoreline characterized by narrow gravel and boulder beaches, or rocky shoreline with smooth rock slopes. Anchorage may be had in 15 to 20 fathoms in the middle of Blueberry Bay about 0.5 mile below the head in good holding bottom. The swinging room is entirely adequate for small craft and should suffice for ships of moderate size. Being entirely landlocked, there is almost entire freedom from swell. Winds are generally more moderate than in nearby localities and, as far as is known, never blow across the bay. Fresh water is available.

Whalebone Cape is characterized by a bare, rocky, 2,000-foot peak, which appears as a series of broken rust-colored cliffs from offshore. At the base of the mountain is a gray rockslide about 300 feet high. The foot of the slide extends to the high water line. The shore around the point of the cape is very rugged and broken, and dangerous for boat landings due to numerous rock islets, rocks awash, and covered rocks close inshore.

Usof Bay, just west of Whalebone Cape, extends inland about 8 miles in a north-northwesterly direction and affords good anchorage at the head in 20 fathoms, sand bottom. The width of the bay narrows to 0.5 mile about 5 miles from the entrance and a slight turn to the northward for about a mile makes the head of the bay landlocked. The general depth of the bay is over 60 fathoms. A small hanging glacier shows at the head of the bay over the west side of the narrows as seen from the entrance.

Good anchorage for small craft is found in **Johnson Cove,** at the mouth of a canyon on the west side about 5 miles in from the entrance, in 7 to 10 fathoms, mud bottom. The south arm of Johnson Cove should be avoided as it is shallow and filled with rocks. To the north of the canyon is a conspicuous cascade.

The shoreline of Usof Bay is rocky and precipitous except at the heads of several coves or bights which occur at irregular intervals. Thick, long grass covers the flats and ascends the mountains, in some cases covering the slopes as high as 2,000 feet. There are numerous rock islets offshore at short distances and irregular intervals. Kelp is general along the rocky shoreline. A strong westerly set of the current was noticed on the rising tide off the west side of the entrance to Usof Bay on August 14, 1939. This condition was noted by the survey party because it was generally taken for granted that the set is to the eastward on a rising tide. There is not sufficient proof that this condition exists on every rising tide.

Cape Prominence, the west entrance point of Usof Bay, is marked by a tall cylindrical pinnacle connected at its base with the main point; it shows conspicuously from south-southwest. A flat ledge makes off 200 to 300 yards, and may be mistaken for the ledges off Reef Point.

Another cylindrical rock is about 700 yards northward on the east side of the cape. It is not so noticeable, but is an aid in identifying Cape Prominence. Breakers extend for about 500 yards off the cape.

Open Bay is the bight between Cape Prominence and Reef Point. It has anchorage for large or small vessels in 20 to 5 fathoms with good holding ground and sufficient swinging room. It affords limited protection from the southwest and east, but none from the south and southeast.

Reef Point is easily identified by a conspicuous cathedral rock, 240 feet high, just off the southern extremity.