

INVERTEBRATES AND FISHES COLLECTED IN THE ALEUTIANS, 1936-38

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Introduction

In the expeditions to the Aleutian Islands conducted by the Fish and Wildlife Service from 1936 to 1938, chief emphasis was placed on investigations of birds and mammals. Limited studies were made of the lesser forms of animal life that inhabit the sub-arctic waters of the Northeast Pacific and the Bering Sea and that live on the shores and slopes of the islands. With relation to the birds and the mammals, the myriad lesser organisms may collectively be termed the "supporting fauna."

One must actually visit the northern seas to realize the abundance of small animal life in the water and along the shore—abundance not of kinds but of numbers. From the deck of a ship, it is often possible to see swarms of reddish microcrustaceans drifting along on the surface of the water in such profusion that they impart a reddish cast to the water. At night, the churn of the ship's propeller sometimes turns up a glowing wake as it brings countless bodies of luminescent organisms to the surface. These organisms are recovered in the stomachs and crops of auklets and petrels. Where the ocean currents cause an upwelling of water rich in plankton, shearwaters and fulmars flock to the scene and baleen whales soon appear. On one occasion, at Unimak Pass, it was estimated that the surface of the ocean for 15 square miles was covered with feeding shearwaters, each separated from its neighbor by 10 or 20 feet. If the carcass of a bird or fish, weighing about 5 pounds, is lowered to the bottom of the sea and hauled up on the following day, the bones usually will have been picked clean by small amphipod crustaceans.

On certain of the Aleutian beaches that are covered with flat, shingly rocks the size of a man's hand, it is possible to uncover as much as a half pint of amphipod crustaceans or sand fleas hiding beneath a single rock. Such organisms, on islands with ex-

tensive beaches, are often the main source of food of the blue fox. In certain quiet waters it is possible to look down from a row boat and see a green carpet of sea urchins covering the floor of the ocean. These animals make up the largest single item in the diet of the sea otter. More specific information on the food relations of Aleutian organisms will be presented, but some indication has here been given of the importance of the invertebrates and fishes in the teeming, complex fauna of the northern seas.

Specimens of invertebrates and fishes were collected at every opportunity, but the time made available for this phase of the work was very limited, therefore the collection is not complete. It includes, however, 255 species, or subspecies, of invertebrates and 48 species, or subspecies, of fishes, representing many of the forms that are encountered in the Aleutian area. Two new genera and six new species have been described to date on the basis of material in the collection, and many other species have had their ranges extended.

With the exceptions noted, all of the specimens collected by members of the Aleutian expeditions have been identified by staff members of the United States National Museum or by collaborating agencies. The indispensable help of the following persons is gratefully acknowledged: Paul Bartsch, S. S. Berry, H. B. Bigelow, Austin H. Clark, Wesley R. Coe, J. E. Cornwall, Irving Fox, Theodore C. Frye, C. T. Greene, David G. Hall, Melville H. Hatch, Trevor Kincaid, J. T. Lucker, J. O. Maloney, J. Percy Moore, E. W. Price, Harald A. Rehder, Clarence Shoemaker, Waldo L. Schmitt, Leonard P. Schultz, Alan Stone, William Randolph Taylor, Margaret E. Van Winkle, Arthur Welander, and C. B. Wilson.

In the following pages, notes are presented on the invertebrates and fishes that were most commonly observed or, because of some special relationship to the birds and mammals, attracted the attention of members of the 1936-38 party. Some of the conspicuous marine algae are also discussed briefly. There is no attempt in this report to list *all* of the species of organisms collected, because, in the first place, such an array would be only an approach to a complete check list of the organisms of the Aleutian Islands. In the second place, a complete list of the species collected in 1936-38 would serve no useful purpose, because the specimen records, field data, and (in most cases) the specimens are already in the hands of specialists who have published, or will publish, on any material of outstanding value. It is hoped that the present report will be of interest to future workers in the Aleutian Islands National Wildlife Refuge.

Marine Algae

Samples of the commoner seaweeds found in the Aleutian Islands were identified by T. C. Frye. The genus *Alaria* (the most abundant) is found in shoal water along the entire archipelago.

Its long, brown, leathery fronds are a nuisance in small-boat navigation. The thallus is 4 to 8 inches wide with a bladderlike midrib that is $\frac{1}{2}$ to 1 inch wide. This midrib remains floating after the sides of the thallus have decomposed and washed away. Masses of *Alaria* are seen floating detached at sea and piled on the beaches after the first of August.

Laminaria has a similar structure, but the fronds are wider (as much as 2 feet) and the plant has the general appearance of a slick leather apron.

Nereocystis, the common bull-whip kelp of the Pacific Coast, has a long, hollow, floating stem increasing in diameter to a bulb at the free end. Very common along the mainland, this plant is observed only rarely west of the Alaska Peninsula. At King Cove, east end of the Peninsula, *Nereocystis* is definitely the dominant kelp as compared with *Alaria* to the westward. *Nereocystis*, in all cases a single plant drifting at sea or washed up dead on the beach, was seen on the following Islands: Unalaska, East Semichi, Atka, Ogluiga, and Amchitka.

Fucus is common along the beach; locally it is called "popweed" from the sound made by the bursting of the bladders when they are trod upon (fig. 1).

The bright-green sheets of sea lettuce, *Ulva*, are on every beach.

Spongomorpha has the texture and appearance of coarse green moss and grows attached to rocks. On spray-covered rocks, the cylindrical floats of *Halosaccion* occur in clumps suggestive of the local name "dead man's fingers".

Cystophyllum is a brown seaweed that occasionally washes up on the beach. It has a mass of fine branches covered with small brown bladders, each of which is the size and shape of a grain of wheat.

Thalassiophyllum is easily distinguished by its wide brown fronds covered with holes like a colander.

A number of lime-secreting marine algae, locally called corals,

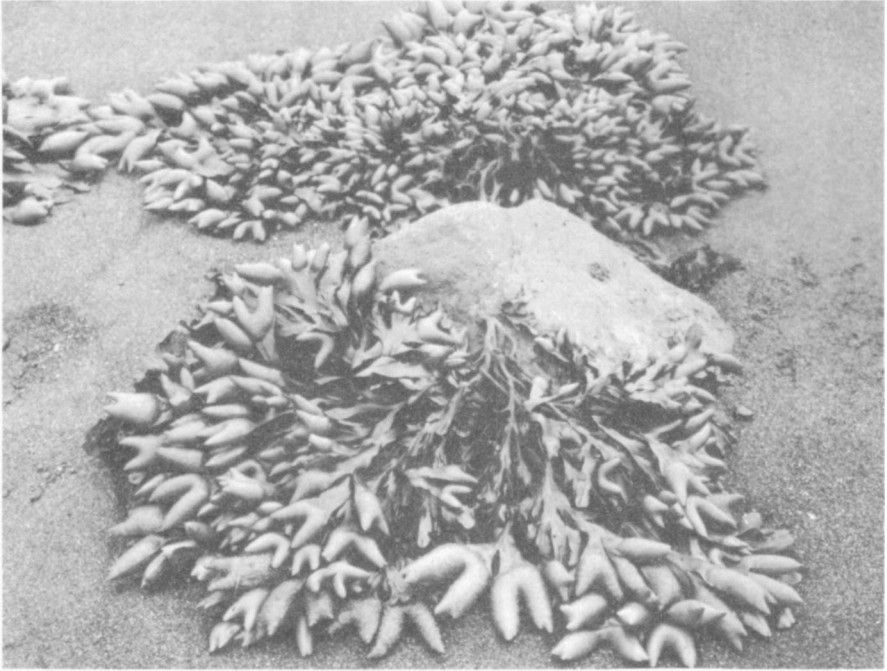


FIGURE 1.—*Fucus*, a brown seaweed common along the beaches of the Aleutian Islands. Rat Island, June 29, 1937.



FIGURE 2.—Calcareous algae of the *Lithothamnion* group commonly attach to the holdfasts of kelp and are stranded during storms. Ogliuga Island, August 4, 1937.

are conspicuous on the Aleutian beaches (fig. 2). Members of the *Lithothamnion* group form chalk-white crusts around the rhizoids of kelps, these crusts being later washed up on the beach in windrows. *Corallina* grows in branched tufts on the rocks, looks like an ornamental coral, and is wine colored to dirty white. Its stalks are commonly found attached to pebbles brought up by dredging.

A list, accompanied by brief field notes, of 40 species of marine algae collected in the Aleutian Islands has been published by Okamura (1933), who stated that "the Aleutian algae are almost equally dispersed westward to Japan, and eastward to California."

(The vascular plant *Zostera*, or eel grass, an important waterfowl food, was observed growing in a lagoon on Vsevidof Island, near Umnak Island, but it was not seen farther west.)

Marine Invertebrates

SPONGES

The vase sponge, *Esperiopsis quatsinoensis*, is common throughout the islands. It washes up on the beach and eventually bleaches out to a creamy-white color. In size and general shape, it resembles a flattened ice cream cone. A large specimen from Aiktak Island measured 28 centimeters from base to lip and was 30 centimeters wide.

COELENTERATES

HYDROIDS

Abietinaria filicula is a small hydroid about 5 centimeters long, resembling a feather. It is often washed up in tangles of seaweed.

Another hydroid, *Thuaria robusta*, has been collected in sea otter scats.

JELLYFISHES

The common crystal jellyfish of the West Coast (*Aequorea aequorea*) is observed almost daily after the first of July in the Aleutian Islands. It is a transparent, lens-shaped medusa that, at first glance, appears to have no organized structure, but closer scrutiny will show a delicate central manubrium and a fringe of fine tentacles. The body mass is firmer than that of the large red jellyfishes and may be turned over readily in the hand. A few specimens reach a diameter of 150 millimeters.

Aurelia aurita is transparent, but it has a conspicuous structure in the center—a set of four yellowish-brown gonads arranged like the leaves of a four-leafed clover. Of the two species, *Aequorea* appears much more frequently during the summer.

Cyanea capillata is one of the large, trailing, red jellyfishes frequently seen from July to September, especially in the calmer bays. The rim of the medusa is divided into eight pairs of short lobes, or a total of 16 lobes. Each lobe has a medial notch about

3 centimeters deep. Muscle fibrils can be seen extending into these lobes in bundles of 12 or more.

A number of small medusae were collected in plankton hauls, including *Aegina*, *Hybocodon*, *Mitrocoma?*, *Rathkea*, *Sarsia*, and *Stomotoca*.

FLATWORMS

A monogenetic fluke, *Entobdella hippoglossi*, was collected from the skin of a halibut (*Hippoglossus stenolepis*) off Nikolski, Umnak Island, on August 30, 1938. (See also Annelid Worms.)

ROUNDWORMS

Sperm whales (*Physeter catodon*) brought to the Akutan whaling station are, without exception, infested with intestinal worms. According to Coast Guard Inspector A. Van De Venter the baleen whales are commonly infested as well. *Anisakis physeteris* was collected from the intestine of sperm whales here (Scheffer 1939).

Contracecum clavatum is a thready white worm found in masses in the stomach of nearly every cod (*Gadus macrocephalus*) examined in Aleutian waters. A single specimen of *Cystidicola* sp. was also collected in the cod. *Porrocaecum decipiens* was found encysted in larval stage in the mesenteries of the cod.

An undetermined species (larval) of *Porrocaecum* was taken from the stomach of a sea otter.

NEMERTEAN WORMS

Paranemertes peregrina is a long, thready worm found in the tidal zone under rocks; it is colored dark brown to purple above and white to yellow below.

BRACHIOPODS

Three specimens of a single species, *Diestothyris frontalis*, were collected.

ANNELID WORMS

Two leeches from the skin of fishes were collected: *Ottoniobdella scorpii* is a cream-colored worm, 25–50 millimeters long, commonly found attached to the dorsal surface of the sculpin (*Hemilepidotus*). *Platybdella quadrioculata* was collected once, in the operculum of a cod (*Gadus macrocephalus*).

Many free-living worms doubtless are present in the sand and among the tide-pool rocks of the Aleutian beaches, but the collections of the present expedition have not been studied. A species

of *Nereis* was found in small numbers in blue-fox droppings on Attu Island.

A small, tan-colored earthworm was noticed on several occasions, well up in the grass of the islands.

ECHINODERMS

BRITTLE STARS

Gorgonocephala eucnemis var. *caryi*, the basket star, has five arms which branch and rebranch profusely toward the periphery into a tangled mass of tendrils. The terminal branches writhe slowly in the living specimen and are tan in color. Specimens were snagged occasionally on codfish hooks.

Ophiopholis aculeata is a small reddish species often streaked or mottled with lighter colors. It was collected on three islands.

Ophiura sarsii is grayish or tan. It was collected on three islands.

STARFISHES

Two specimens of *Aleutiaster schefferi*, a small stubby six-rayed starfish were taken; 1 on Attu Island and 1 on Amchitka, in both cases by dredging. They formed the basis of a new genus and species (Clark 1939). The family Ganeriidae, to which *Aleutiaster* was assigned, hitherto included 4 genera in the Antarctic and 2 in the West Indies. "It is especially interesting, therefore, to find a member of this family in the North Pacific." The topotype has a radius of only 5 millimeters.

Two species of *Henricia* were collected. *H. leviuscula*, taken only once, was noted as purple above and tan beneath. *H. sanguinolenta* form *tumida*, taken on five islands was noted as red. The latter is a slender, five-rayed "blood star" with a radius of about 20–30 millimeters. In a tide pool on Umnak Island it was associated with other starfishes of the same size, but with six-rays (*Leptasterias*).

The only large species of starfish in the Aleutian Islands, according to A. H. Clark, is *Asterias amurensis* (fig. 3). A specimen taken at Unalaska was wine-colored above, crossed by white channels and spots, and was light tan below. A pronounced light radial streak on the dorsal surface of each ray extended from a pentagonal hub at the center. The limp, floppy attitude of this starfish is quite different from the rigidity of the common mainland *Pisaster*.

Four species of *Leptasterias* were collected, *L. alaskensis* most

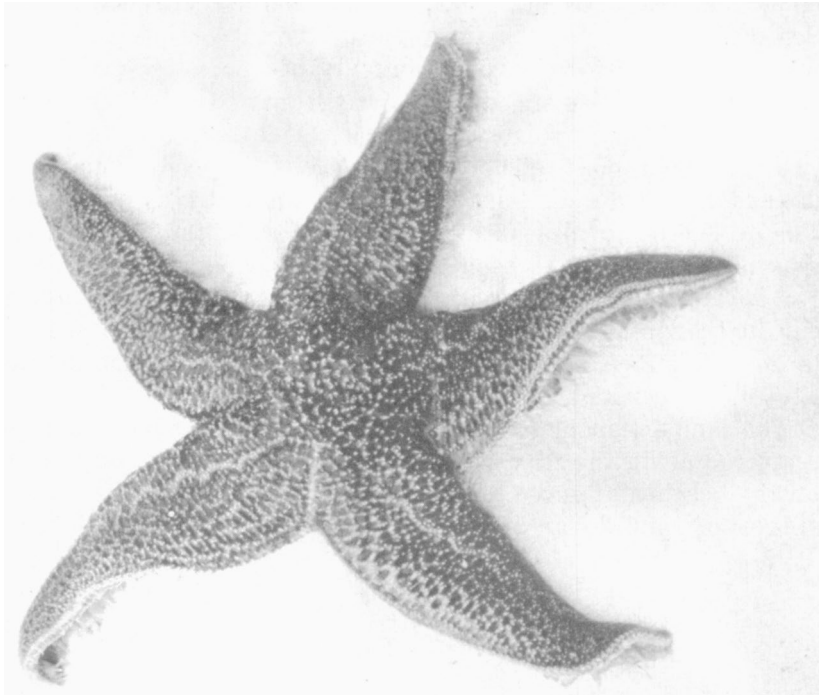


FIGURE 3.—The only large 5-rayed starfish of the Aleutian Islands, *Asterias amurensis*. This species is about 1 foot in diameter. Unalaska, August 18, 1937.

frequently (on six islands). These are slender, six-rayed starfishes, noted as dark green, gray, tan, or purplish red.

No other Pacific Coast form resembles the 20-rayed starfish, *Pycnopodia helianthoides* (fig. 4). Specimens were taken at King Cove, 35 miles east of Unimak Island, but not in the Aleutian Islands proper. No doubt it occurs at the east end, at least, of the chain.

SEA URCHINS

Strongylocentrotus dröbachiensis, the green sea urchin, is one of the most common inshore animals of the Aleutian Islands (fig. 5). In many places it is possible to look down from a boat through the clear water and see thousands of individuals side by side in a submarine garden of green. It occurs on rocky bottoms more frequently than on sand. Several specimens dredged from deep water (30 fathoms) off Sanak Island were a faded brown in color. Sea urchin spines are so predominant in the refuse heaps

of ancient Aleut villages that the middens are grayish in color. Sea urchins are eaten by the present-day natives. A small child was seen sucking the brown contents of one at Nikolski. The shell was cracked open and the orange part (gonad and liver) was eaten with the fingers. Sea urchins do not seem to be particularly palatable to fish. For example, in 20 cod stomachs examined at Chuginadak Island, only 1 small urchin was found. The occurrence of sea urchin remains in sea-otter, blue-fox, and sea-gull droppings has been mentioned elsewhere.

According to Clark, no other species of *Strongylocentrotus* occur in the Aleutians. A fisherman stated that he had seen the large purple *S. franciscanus* at Sitka, Alaska, but he had not seen it in the Aleutians.

The sand dollar, or sea biscuit, *Echinarachnius parma*, is thinly scattered along the Aleutians. Dead shells were seen or collected on the beaches of seven islands. Clark says that this is the only species of sand dollar in the Aleutians.

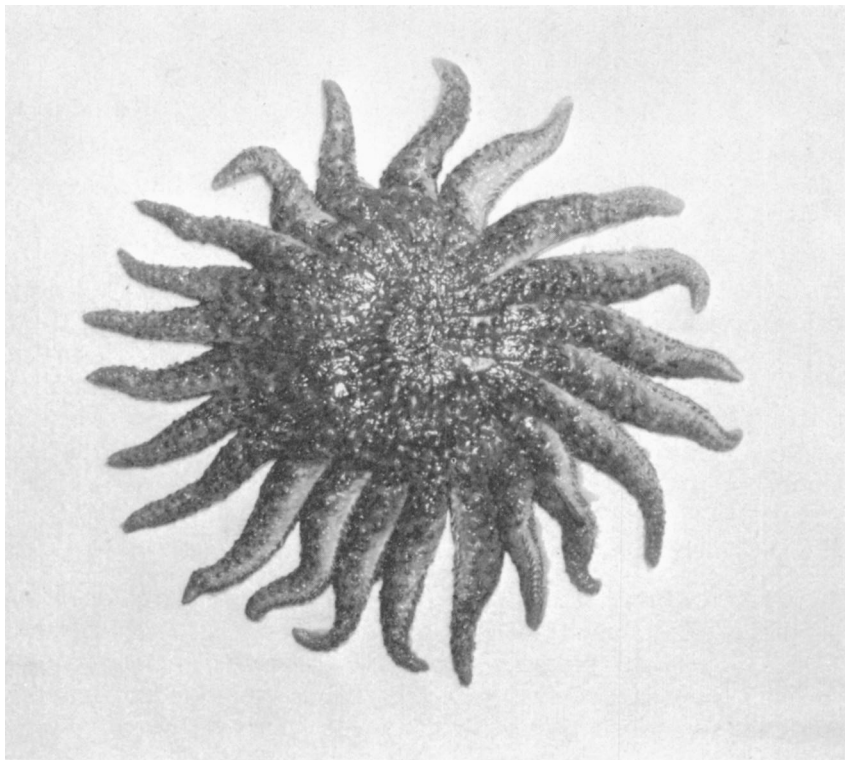


FIGURE 4.—Twenty-rayed starfish, *Pycnopodia helianthoides*. King Cove, September 9, 1938.

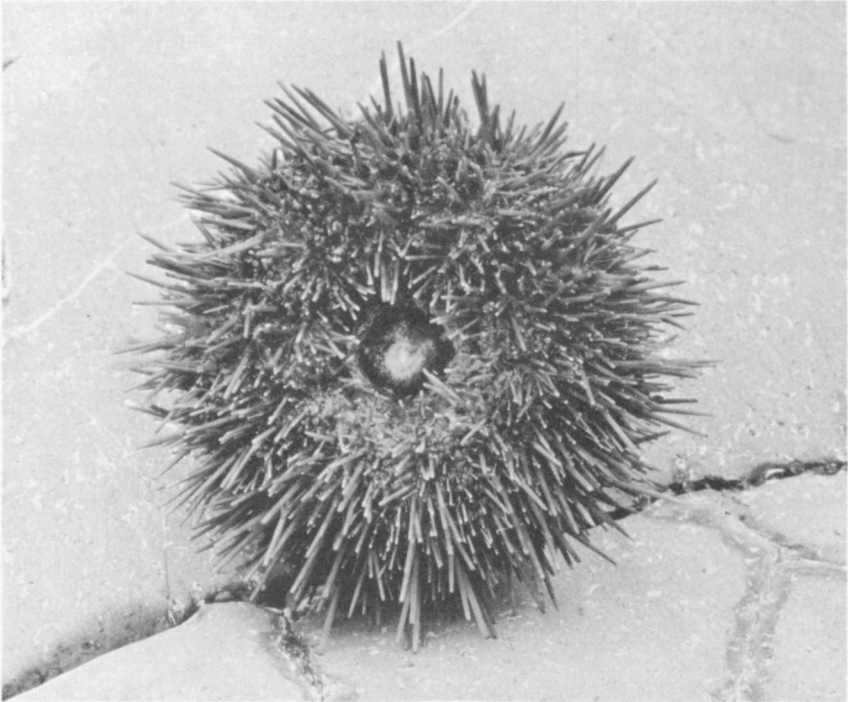


FIGURE 5.—Green sea urchin, *Strongylocentrotus dröbachiensis*, ventral or oral view. Rat Island, June 30, 1937.

SEA CUCUMBERS

The sea cucumber, *Cucumaria populifer*, was collected at Kiska Island and was observed at other places in the archipelago.

CRUSTACEANS

COPEPODS

Eighteen species of copepods were identified in marine-plankton collections. Concerning *Acartia pacifica*, Dr. Wilson states (in correspondence), that—

This species was established by Steuer in 1915 with figures of the fifth legs of the two sexes and a statement of the size but with no description. These are the first to be reported since that date and the species is much in need of a detailed description.

The predominant species, judging from the number of collections in which it appears, is *Eucalanus clongatus*.

Several parasitic copepods were collected, *Lepeophtheirus*

parviventris, on a cod at Tanaga Island, and *L. salmonis*, on a humpback salmon (*Oncorhynchus gorbuscha*), also at Tanaga Island.

A species of *Pennella* occasionally is recovered from whales at Akutan Island. Inspector Van De Venter at the whaling station said that no specimens were seen in 1938 and only one was seen in 1937.

BARNACLES

Ordinary rock barnacles are common throughout the Aleutians (fig. 6). *Balanus crenatus* was collected by dredge at Atka Island.

Two interesting species of barnacles attach to the skin of the humpback whale (*Megaptera novaeangliae*) in the North Pacific (Scheffer, 1939). *Coronula diadema* is a white, hard barnacle that attaches to the skin, and *Conchoderma auritum* is a fleshy, elongated species that attaches, in turn, to *Coronula* (fig. 7). A fisherman said that *Coronula* is also found, though rarely, on the lower jaw of the sperm whale (*Physeter catodon*) just below the teeth. Two employees of the whaling station said that they had seen barnacles only on the humpback.

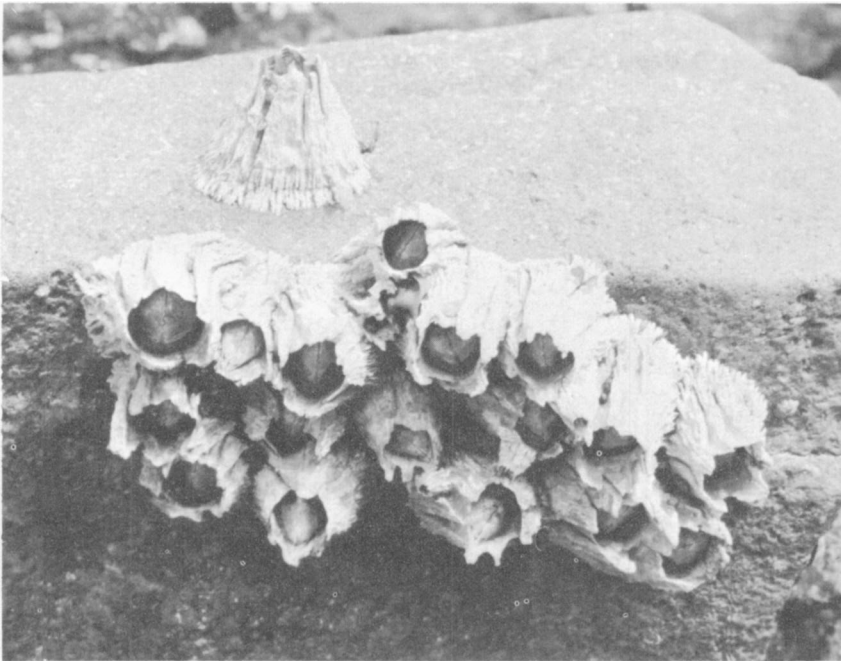


FIGURE 6.—Rock barnacles, *Balanus* sp., in tidal zone. Unalaska Island, July 10, 1937.



FIGURE 7.—Two species of barnacles collected from the skin of a humpback whale. The dark stalks of *Conchoderma auritum* attach to the white plates of *Coronula diadema*. Akutan Island, August 6, 1938.

Lepas, the goose barnacle, was collected at Otter Cove, Unimak Island, after a severe storm in September, 1937. Many tons of seaweeds were washed up on the beach, and *Lepas* was observed attached near the rhizoids of the brown kelp, *Nereocystis*. *Lepas* was not seen west of Unimak Island.

AMPHIPODS

Several genera of marine amphipods were collected: *Gammarus*, *Odius*, *Opisa*, *Orchestia*, *Orchestoidea*, and *Melita*.

Orchestia traskiana was the most commonly observed species living under the shelter of stranded seaweed or rocks throughout the Aleutians. The principal food of this crustacean seems to be decaying seaweed, of which there is a limitless supply; it also eats decaying fish, shellfish, sea birds, and mammals cast up from the sea. *Orchestia* is often found associated with the isopod *Lygia pallasi* and carabid beetles.

Beach fleas are of more than passing interest for, in spite of their small size, they may form the major item of food for the blue fox. As a general rule, on islands where sea birds are plentiful the fox droppings contain mostly feathers and few or no beach fleas. Where birds are not available, however, the droppings are characteristically whitish in color and are composed of the chitinous exoskeletons of beach fleas and isopods, together with traces of other beach organisms.

Paracyamus boopis (fig. 8) occurs on the skin of the humpback

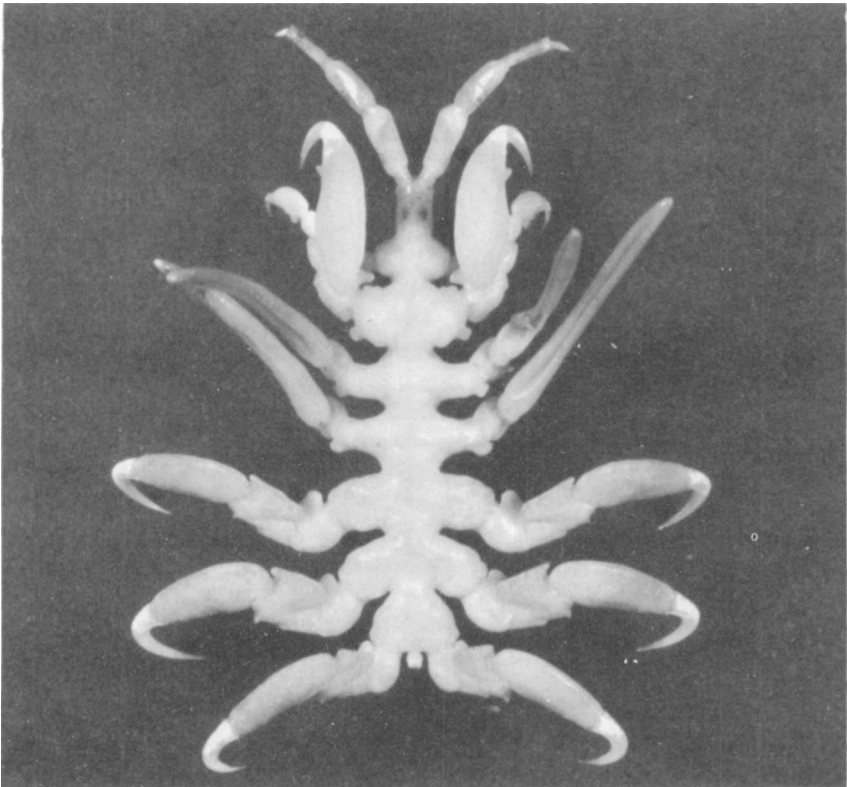


FIGURE 8.—Parasitic amphipod, *Paracyamus boopis*, from skin of humpback whale. Akutan Island, August 6, 1938.

whale (Scheffer 1939). Known at the Akutan whaling station as a "whale louse," this amphipod clings tenaciously to the skin of the whale around the genital opening and, to a certain extent, over the entire body. When pried loose, it immediately seizes the collector's fingers with sickle-shaped claws.

ISOPODS

The isopods or sea slaters commonly are found clinging to damp rocks in the tidal zone. A few species are parasitic on fish.

Exosphaeroma oregonensis is common throughout the islands, not only in the tidal zone but also in brackish pools some distance from the sea. In Nikolski Lake, on Umnak Island, this isopod was living in water that had, to the taste, no perceptible salt content. The animal curls up into a round ball when disturbed.

Idothea ochotensis, a large, dark species, was taken only once, in Chichagof Harbor, Attu Island.

Lygia pallasi is 1 of the 2 most common isopods; it is flat, lead-gray or blackish brown, with a broadly oval outline. It is found on, or under, damp stones, and it was found from the mainland to Attu Island. It has been taken from fox droppings.

Idothea wosnessenskii also is abundant. It is somewhat more slender than *Lygia* and occupies a similar habitat.

Mesidotea, *Munna*, and *Synidotea* were each collected once.

Rocinela belliceps is a flesh-colored isopod about 25 millimeters long, with a suffusion of reddish and brown, paler on the ventral side; eyes are black. It attaches to the body, fins, or operculum of the cod throughout the Aleutian Islands.

SHRIMPS

Shrimps of many species are found in dredge hauls or are recovered from the stomachs of cod, sculpins, and halibut. In the 1936-38 collections, *Argis*, *Crago*, *Pandalus*, *Spirontocaris*, *Lebbeus*, *Eualus*, and *Heptacarpus* are represented. *Crago alaskensis* and *Spirontocaris dalli* are represented from more collecting stations than any other species.

HERMIT CRABS

Six species of *Pagurus* are represented in the collections, of which *P. hirsutiussculus* is by far the most common. Hermit crabs are found everywhere along the beaches, in shells of periwinkles or larger molluscs.



FIGURE 9.—Common crab, *Cancer magister*, taken by trawling at a depth of 15–20 fathoms. Petersburg, Alaska, September 17, 1937.

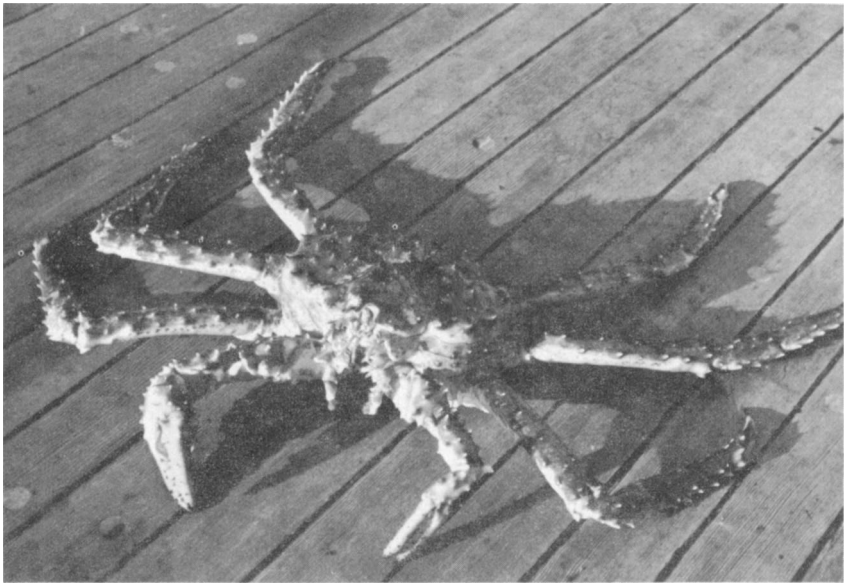


FIGURE 10.—King crab, *Paralithodes* sp., taken by trawling at a depth of 15–20 fathoms. Petersburg, Alaska, September 17, 1937.

ANOMURAN CRABS

Dermaturus mandti was taken at three localities, and *Oedignathus inermis* and *Placentron wosnessenskii* each at one locality.

OTHER CRABS

Cancer magister, the large edible crab of commercial importance on the Pacific coast, was taken as far west as Tanaga Island, and it probably occurs still farther west (fig. 9). *Cancer oregonensis* is distinguished from the preceding species by its hairy walking legs. *Chionoecetes*, *Erimacrus*, *Hyas*, *Oregonia*, *Paralithodes*, *Pugettia*, and *Telmessus* are also represented in the 1936-38 collection. *Paralithodes camtschatica* was taken for food in the Bay of Islands by the ship's crew (fig. 10). It is one of the huge king crabs for which the Japanese have fished in recent years in Aleutian waters. It seems to be restricted to certain localities or to certain water conditions, for it was not found in dredge hauls made at other stations along the islands.

MOLLUSKS

BIVALVES

The species of marine mollusks in the North Pacific are numbered by the hundreds. Only a few of the more conspicuous and more readily obtainable species are represented in the 1936-38 collections.

Bankia setacea, one of the shipworms or teredos, possibly may be present, although only the calcareous tubes in driftwood were collected (Unimak Island).

Three members of the family Cardiidae were collected. *Clinocardium nuttalli*, the giant cockle, is rather common and is used for food by the natives. In digging the mollusk, a two-tined potato fork bent like a hoe is raked through sand until it strikes a solid object. It is said that the flesh makes good chowder, comparable in sweetness to that of the razor clam.

Chlamys islandica, the scallop or pecten, was found in sea-otter droppings and on the beaches of Oogliuga and Vsevidof islands. Some shells are white, others are pinkish both inside and out.

Two species of *Liocyma* were collected, one of which was hitherto undescribed (Bartsch and Rehder 1939). *Liocyma* is a common small white clam about 25 millimeters long; oval with fine concentric rings; occasionally greenish when living. It was noted also on tideflats of the Alaska mainland.

Five species of *Macoma* were collected.

Two small mussels, *Musculus discors* and *M. vernicosus*, were collected. Each is about 10 to 15 millimeters long, and is reddish brown or tan. The latter has a shining, varnished surface.

The mud clam or gaper, *Mya truncata*, was collected once, at Unalaska.

The larger, abundant mussels are of two kinds. *Mytilus edulis*, the edible or blue mussel, is smooth and regular and is purplish blue to black in color with a bluish nacre (fig. 11). The umbo is apical, unlike that of the horse mussel. The edible mussel is used for food by the natives and is said to be best when there is a roll of snow-white fat on either side of the body. When yellow and lean, the flesh is unpalatable. *Volsella modiolus*, the horse mussel, can be distinguished from the former by its larger, thicker shell and by the presence of a brown periostracum. The umbo is never at the apex, and the nacre is gray. The horse mussel usually grows solitary or in clusters of a few, while the edible mussel may cover the rocks in an area many feet in diameter. Both attach to rocks by a thready byssus, but the horse mussel usually is partly buried in sand. (A third large mussel, *Mytilus californicus*, was collected only once—at a depth of 30 fathoms off Sanak Island.)



FIGURE 11.—Edible or blue mussels, *Mytilus edulis*, in tidal zone. Unalaska Island, July 10, 1937.

The rock oyster, or jingle, *Pododesmus macrochisma*, is fairly common throughout the Aleutian chain. It is especially abundant near the Peninsula. The rock oyster can not usually be collected between tide lines, but its empty shells are strewn along the beach where they have been cast up from shallow water. The oysters grow solitary or in clusters (seldom more than four), on rocks just below low tide and never are buried in the sand. The attached valve is perforated by a conspicuous hole. The oysters are eaten by natives who fry the reddish flesh in butter.

Protothaca staminea is a small cocklelike clam with concentric ridges more conspicuous than the radiating lines.

The butter clam, *Saxidomus giganteus*, has a thick white shell, glossy within and chalky outside, with the growth lines not pronounced. It is used as food by whites and natives.

The razor clam, *Siliqua patula*, was collected only at Atka and Unimak islands. The flesh is considered by local natives to have a finer taste than that of any other mollusk. It is difficult to gather any number of the clams, however, because they grow in fairly deep water, and the tides in the Aleutians do not fall low enough to expose the beds. It is possible to dig these light-shelled clams by backing a power boat up to the beach, throwing out two anchors astern, and letting the wash of the propeller lift the clams out of the sand. A native of Unalaska stated that they used to be abundant in front of the village.

Spisula polynyma is widespread among the islands. It is a rather large bivalve with brown periostracum and acute dorsal angle.

SNAILS AND SEA SLUGS

Five species of limpets, *Acmaea*, were collected (fig. 12). Limpets are very common throughout the Aleutian Islands, in pools or clinging to wet rocks above low tide. The only species found in sea-otter and blue-fox droppings was *A. digitalis*. *A. pelta* was collected most often (at 10 stations) and is the largest of the Aleutian limpets, reaching a diameter of 5 centimeters. *A. mitra* is a strongly peaked species. *A. scutum* was collected at seven stations.

An odd, tiny snail *Anabathron muriei* was described from specimens found in sea-otter droppings (Bartsch and Rehder, 1939).

Eight species of *Buccinum* were collected.

Fusitriton oregonensis was the only large, cornucopialike snail that was collected; it has a length of about 5 centimeters, and is

olive colored and hairy. *Beringius kennicotti* is similar in shape but is slightly smaller and is not hairy.

Three species of periwinkles, *Littorina*, were collected (fig. 13). The periwinkles are characteristic animals of the tidal zone. They are able to withstand drying for a long time, and they crawl well above the waterline to rocks and seaweed where they cling in clusters that often number in the hundreds. The periwinkle is edible, but the flesh is not particularly tasty. Picking out the small fragments of meat becomes tiresome, like eating sunflower seeds. *L. sitkana* was by far the most abundant species (at nine stations). On Amlia Island the empty shells of this species served as homes for small hermit crabs (*Pagurus hirsutiunculus*). The species was also found in sea-otter scats.

Five species of *Margarites* were collected, most of them smooth, globular, white snails.

Four species of *Nucella* were collected. *Nucella lamellosa* forms collarlike egg cases of cemented sand, often washed up on the beach.

A single sea slug, or nudibranch, *Diaulula sandiegensis*, was collected. Other species are reported from the Aleutians. *Diaulula* was taken by dredge from sandy bottoms at Attu and Tanaga.

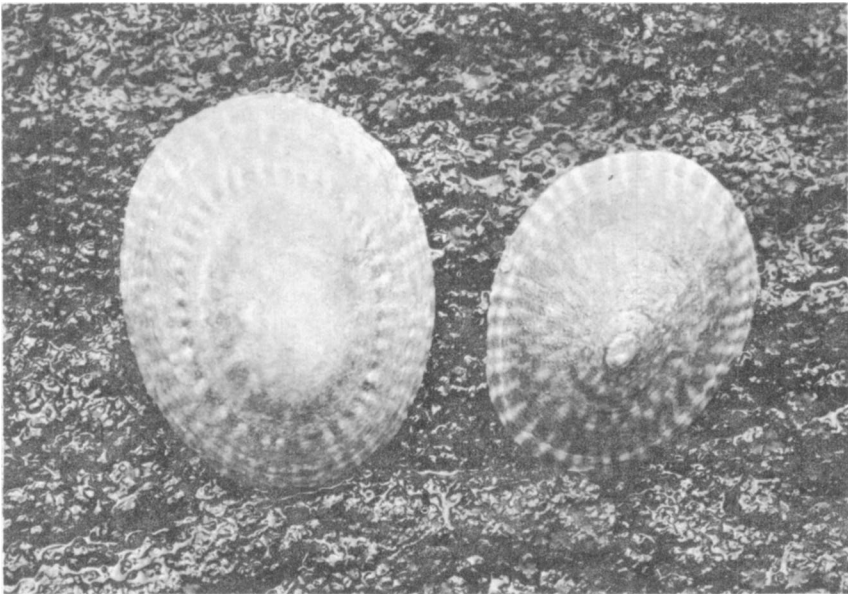


FIGURE 12.—Limpets, *Acmaea* sp., clinging to rocks in the tidal zone. Unalaska, July 10, 1937.



FIGURE 13.—Periwinkles, *Littorina* sp., clinging to rocks in the tidal zone. Unalaska, July 27, 1937.

CHITONS

Murie picked up a fragment of the giant chiton, *Amicula stelleri* on Amchitka Island. The species is brick red, as large as 10 by 20 centimeters, and has a leathery girdle completely covering the eight dorsal plates.

Katharina tunicata is fairly common. Many individuals were noted at Umnak Island in shallow tidal pools and at Amlia Island on a rocky, kelp-covered ledge. The body is black and leathery, with a row of eight plates down the back. Its local name "bidarka" is also applied to the skin boat of the Aleuts. The natives prepare the chiton for eating by boiling it in sea water for 10 minutes, then peeling off the skin, scales, and viscera and soaking in fresh water. The general color of the live chiton is dark brown with brown and tan plates.

Mopalia ciliata vosnessenskii is a small chiton about 25 millimeters long that is pink on the dorsal surface. Its fringed edges have given it the name of mossy or hairy chiton. It was collected at three stations.

Schizoplax brandti and *Tonicella ruber* were collected in sea-otter droppings, and, in addition, 24 specimens of *Schizoplax brandti* were collected on the rocks of Herbert Island.

DEVILFISHES

Two cephalopods were observed. A large devilfish, *Octopus apollyon*, was taken at Nikolski Village, Umnak Island, in a beach-seine drag for salmon. The water here was not more than 10 feet deep at the mouth of a small stream. The ship's cook fried a steak of white meat from the dome of the devilfish and we found it more tender than we anticipated. The natives usually boil the head steaks before frying, and they boil the tentacles before eating. S. Halvorsen, Coast Guard inspector at the Akutan whaling station, stated that the stomach of a sperm whale killed in 1937 contained 16 devilfish, presumably of this species. The natives are said to take good-sized specimens in Nazan Bay, Atka Island, although we were able to get only two small ones here.

A squid, *Rossia pacifica*, was found on the beach at Unimak Island after a storm in September. The color of the dead specimen was white, peppered with fine brown spots. Kenneth Newell, who is familiar with the "ink-fish" of Puget Sound said that he had never seen one in the Aleutian Islands. S. Halvorsen, however, reported that they were common in the stomachs of sperm whales brought into the Akutan whaling station. Possibly the species does not range much farther west than the Alaska Peninsula.

Fresh-Water Invertebrates

The Aleutian Islands are dotted with shallow pools. In only a few cases are the pools larger than 5 or 10 acres, and most of them are depressions only a few feet across. Standing on a hillside on Agattu Island, and looking over an expanse of about 2 by 5 miles, we estimated that there were 200 pools in sight.

In 1937, collections of fresh-water organisms were made in 24 lakes scattered along the Aleutian chain. Crustaceans were collected with a plankton net; mollusks and aquatic insects were collected by hand. (A discussion of the insects is presented later in the section devoted to land invertebrates.)

The pools and lakes may be classed loosely in three groups, according to their size and the amount of vascular plant life present, as follows:

Type 1: Small, clear pools (fig. 14). Shallow; vegetation absent



FIGURE 14.—A fresh-water pool of type 1 (small and clear). Attu Island, August 17, 1938.

or, if present, consisting of sparse patches of emergent *Hippuris* and *Carex*; bottom consisting of clean volcanic sand or occasional silt. This type is by far the most abundant. Many of the clean pools do not support plankton because they overflow and are flushed out by each rain. The water in type 1 pools usually is slightly tea-colored, like that of sphagnum bog pools on the mainland. We discovered that it was possible to determine whether a pool contained enough plankton to warrant taking a haul by looking for aquatic bugs and beetles. A pool highly productive of plankton is generally well populated with aquatic insects. The clear pools are characterized by the presence of *Diaptomus*, often in such numbers that a tow over a course of 300 feet may net a haul of 50 cubic centimeters of these red-bodied crustaceans. One such haul on Sanak Island consisted almost entirely of *Diaptomus shoshone* var. *wardi*, *D. ashlandi*, and *D. eiseni*. *Cyclops serrulatus* is also commonly present in type 1 pools.



FIGURE 15.—A fresh-water pool of type 2 (small and weedy). Atka Island, August 13, 1937.

Type 2: Small, weedy pools (fig. 15). Shallow depressions in the tundra, 50–100 feet in diameter, with oozy silt bottoms. This type is not common. Hultén (1937) concludes that the vegetation in Aleutian lakes is so sparse that real associations are hardly

formed: "The few aquatic plants, such as *Potamogeton perfoliatum*, *Myriophyllum spicatum*, *Sparganium hyperboreum*, and *Ranunculus tricophyllus*, *Hippuris vulgaris* and *Isoetes Braunii maritima*, usually occur single or in patches." We found that the dominant organism in plankton of type 2 pools is *Chydorus sphaericus*. Amphipods are usually present in the weeds.



FIGURE 16.—A fresh-water pool of type 3 (large and barren), about 0.2 x 1.5 miles. Semisopchnoi Island, August 23, 1938.

Type 3: Large, barren lakes (fig. 16). Scant vegetation around shore; clean sand and rubble bottom; windswept. The largest examples are about 2 miles long. Only about 10 of the 75 islands have lakes of this type. The temperature of the water in three lakes at least 1 mile long was measured in August and was found to be 56° F., 57° F., and 58° F. respectively. The plankton is uniformly sparse; in fact, hauls made in the lake at Unalaska Village in June and July were discarded for lack of a discernible catch. Again, in a lake measuring 1 by 2 miles, on Unimak Island, a haul was made in late August with negative results.

The surface temperature of fresh-water bodies in the Aleutian Islands fluctuates greatly from day to day because of the shallowness of the water and the open surroundings (see table, p. 390). The lowest temperature recorded was 44° F. on September 10;

cold wind was blowing at the time. The highest temperature recorded was 66° F. on July 22, after one of the rare days of full sunshine.

*Mean surface temperature of the water of Aleutian Island
pools and lakes, 1937-38*

Month	Number of observations	Mean temperature (°F.)
June.....	2	56.5
July.....	6	58.6
August.....	33	55.8
September.....	4	51.2
Mean.....	45	55.8

The fresh-water plankton crustaceans have been identified by Trevor Kincaid, of the University of Washington. His remarks on the material are as follows:

Very little is known regarding the fresh-water plankton of Alaska, and this is particularly true of the region including the Aleutian Islands which is practically a blank in so far as records are concerned.

The writer has been assembling plankton from various parts of Alaska with a view to determining the geographic distribution of the species occurring in the fresh water bodies in that territory, and to discovering what relation exists between the fauna of Asia and that of Alaska and of North America in general. It is becoming clear that this relationship is much closer than has been suspected.

In the genus of fresh-water copepods *Diaptomus* it has been supposed that no species was common to both continents, but we now find several species of this group ranging across Europe and Asia into Alaska, while at least one species having a wide range over western North America has been reported from a lake in Siberia.

The series of tows brought back by the expedition from the Aleutian Islands was regarded as particularly important since the archipelago forms a series of natural stepping stones extending from the Siberian region to the Alaskan Peninsula and southward, and as one might expect to find here the collection extends the known westerly range of several American species, and expands the easterly range of at least one Asiatic form.

Diaptomus ashlandi was originally described from Wisconsin and is known to be widely distributed over the northern portion of the Pacific Coast. It appears in tows taken on the islands of Sanak and Unalaska. *Diaptomus shoshone* var. *wardi* was first reported from Spokane, Washington and has since been reported from the Island of St. Paul in the Pribilofs. It appears in a tow taken on Sanak Island. *Diaptomus eiseni* was described from California, but has since appeared in collections taken at widely separated localities of the Pacific Coast. It has been reported from a lake in Siberia. A single specimen was found in a tow taken on Sanak Island. *Arctodiaptomus kurilensis* was recently described from the Kurile Islands by Kiefer. It appears in a tow taken on the islands Kanaga, Tanaga and Atka which lie near the middle of the Aleutian chain.

The cyclopoid copepods found in the collection are, as might be expected, species already known to be common to both continents, or as in the case of

Cyclops serrulatus, with a cosmopolitan distribution. The same is true of most of the Cladocera, the majority of which are common to Europe, Asia and America. However, even in the case of widely distributed forms it is interesting to determine their existence as part of the local fresh-water fauna."

Trevor Kincaid has recently (1953) published a report which mentions the 1937-38 Aleutian collection of plankton crustaceans.

CRUSTACEANS

CLADOCERANS

- Daphnia pulex* (de Geer)
- Daphnia longispina* (O. F. Müller)
- Bosmina obtusirostris* Sars
- Macrothrix hirsuticornis* Norman and Brady
- Alona rectangula* Sars
- Pleuroxus denticulatus* Birge
- Chydorus sphaericus* (O. F. Müller)
- Chydorus latus* Sars
- Alonella nana* (Baird)

COPEPODS

- Eurytemora affinis* Poppe
- Arctodiaptomus kurilensis* Kiefer
- Diaptomus ashlandi* Marsh
- Diaptomus shoshone* var. *wardi* Pearse
- Diaptomus eiseni* Lilljeborg
- Cyclops (Acanthocyclops) viridis* Jurine
- Cyclops (Cyclops) strenuus* Fischer
- Cyclops (Eucyclops) serrulatus* Fischer

OSTRACODS

- Cyclocypris* sp.

MOLLUSKS

Eleven species of mollusks were collected from fresh-water pools and lakes. All of them were small bivalves or snails found clinging to submerged vegetation or in the bottom mud; none were as large as the fresh-water mussels of the mainland. A full list of the species collected is as follows:

Fossaria truncatula, *Gyraulus deflectus*, *Menetus opercularius planulatus*, *Pisidium abditum?*, *Pisidium liljeborgi*, *Pisidium ovum?*, *Retinella binneyana pellucida*, *Sphaerium tenue*, *Stagnicola atkaensis* (9 out of 12 were infested with trematode rediae), *Stagnicola randolphi*, *Stagnicola yukonensis atlinensis*.

Land Invertebrates

MOLLUSKS

Two land snails and one slug were collected in the Aleutian Islands, all of them at Unalaska. *Haplotrema sportella* is a dark greenish-yellow snail collected in damp grass on a hillside, September 6, 1938. *Vespericola columbiana*, collected at the same time and place, is light horn-colored and is slightly more globular than *Haplotrema*. *Prophysaon andersoni* is a common slug around Unalaska Village.

BEETLES

As might be anticipated in a treeless, windblown region, the insect fauna is poor. The most commonly observed insects are small flies breeding under decaying seaweed along the beach, under damp stones, and in shallow pools. Pools also may contain bugs, caddisflies, true flies, and collembola. No butterflies were observed though a tan moth was not uncommon. Bumblebees were occasionally seen in the flower fields. No grasshoppers or crickets were noted.

Hatch (1938) has previously reported on a collection of 27 species of beetles taken on the islands in 1937. Of these 27 species, 8 had not apparently been recorded previously from the Aleutian Islands, and 11 had their distribution extended westward by the 1937 records. A discussion of the importance and habitat relations of certain of the species listed by Hatch follows.

Scaphionotus marginatus is a large, iridescent ground beetle that is known (elsewhere) to feed on snails. (Snails and slugs were collected on Unalaska Island.) Several species of *Nebria* were collected on the mouldering debris of Aleut middens.

Three species of *Hydroporus*, minute beetles about 3 millimeters long, are common in fresh-water pools. *Agabus* is an aquatic beetle about 6 millimeters long. *Ilybius* is an aquatic form about 8 millimeters long, dark in color, with four small orange spots on the wing covers. *Colymbetes* is the commonest large beetle (about 12 millimeters long) observed in fresh-water pools. A single specimen of a very large beetle, 30 millimeters long, was taken on Sanak Island, the first record of this *Dytiscus* from the islands. *Gyrinus*,

the whirligig beetle, apparently is present on all of the islands.

Of the carrion-feeding beetles, *Nebria*, a small brown form, is fairly common in rotting kelp. *Catops* is the smallest beetle (about 3 millimeters long) observed on the islands. Specimens of a large (25 millimeters) black staphylinid were collected under a decomposing sea lion at Attu Village.

Eurystethes, whose habitat is on rocks by the sea, was collected once on Amchitka Island and once on Ogluiga Island, both times in sea-otter droppings.

Several click beetles, *Ludius*, and weevils, *Lophalophus*, were collected. A click beetle, *Cryptohypnus littoralis* (not reported by Hatch), was found by Cecil Williams in droppings of a blue fox on Attu Island.

BIRD LICE

A small series of biting bird lice (Mallophaga) was collected from the slender-billed shearwater, *Puffinus tenuirostris*, at Rat Island and at Unimak Island. The following determinations were made by the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture:

Esthiopterum diversum, *Giebelia mirabilis*, *Ancistrona* sp., *Menopon* sp., and species of Analgesidae.

DIPTERA

The following species of true flies were identified in the 1936-38 collections:

Bibio variabilis, *Calliphora vomitoria*, *Chironomus hyperboreus*, *Cynomia hirta*, *Dilophus tibialis*, *Empis* sp., *Platychirus* sp., *Protophormis terranova*, *Scatophaga* sp., *Syrphus* sp.

SPIDERS

Only two kinds were commonly observed, *Pardosa* and *Cybaeus*, both of which were medium-sized, dark-bodied spiders collected on mats of damp lichens and low vegetation. A single specimen (female) of a huge, milk-white *Aranea* sp. was collected near its orb web on a low bush at Unalaska.

Cybaeus reticulatus was collected on eight islands. Members of this family (Agelenidae) spin sheet-like webs, usually in the form of a funnel with a tubular retreat.

Four wolf spiders (family Lycosidae) were collected. Members of this group do not spin webs and are commonly found running over damp fields. *Lycosa* sp. was taken once. *Pardosa tarsalis* was taken on six islands. *Pirata piratica* was taken once. The

latter species is said to live in the vicinity of water, upon which it runs freely, and beneath which it dives when alarmed. *Tarentula aquilonaris* was newly described by Fox (1940) from specimens taken on Attu Island.

A tick, whose identity is not known to us, apparently is abundant on Bogoslof Island at certain seasons. According to Morris (1937, p. 952),

The murre were pestered with a tick about the size and appearance of a small wood tick. These became especially numerous on the second week in August. As many as 100 were picked off the inner walls of the tent each day for a week. Several got on members of the party but only one tick drew blood.

We recall picking lead-gray ticks from the body of a bird killed somewhere at sea in the Aleutian Islands, but the specimens have been mislaid.

Fishes

Forty-eight species of fish were collected in the Aleutian Islands proper. These were identified by Dr. Leonard P. Schultz, and two of them were described by him as being new (1939). The following list, alphabetically arranged, includes remarks on the noteworthy species only. A few descriptive notes in quotation marks from Evermann and Goldsborough (1907) are included.

Alepisaurus ferox, the lancet fish, is a fearsome species with large, glassy eyes and an array of needle-sharp teeth. The only specimen taken was one that had been caught in a crevice of rock between tide levels on Amchitka Island, where it had been badly eroded. (Murie also saw a beach-worn specimen in 1936.) The body was about 2 feet long and scarcely larger in diameter than a broom handle. Schultz says that there is only one species of *Alepisaurus* in the North Pacific and that the usual length is 4 to 5 feet.

Ammodytes tobianus personatus is very common along the beaches and was often taken in large numbers with the seine; it is a bright silvery little fish that is called locally "needlefish". Evermann and Goldsborough (1907) say, "they quickly bury themselves in the sand when disturbed. . . more delicious little fish probably do not exist. They are usually prepared by rolling in fine cornmeal or cracker crumbs and frying in butter."

Aspicottus bison is one of the smaller sculpins reaching a length of about 10 inches. (See *Hemilepidotus*.)

Atheresthes stomias, one of the flounders, is called locally "turbot." It swims with its right side up.

Bathymaster signatus, a beautiful little fish, was taken once in the Bay of Waterfalls, Adak Island. It is reddish-brown with blue-green spots; also it has a blue line along base of ventral fin, a reddish line adjoining, and then another blue line near tips of fin rays.

Chiropsis decagrammus. Only small specimens of this greenling, or rock trout, were taken, at Unimak Island.

Clupea pallasii. Pedler, agent of the Alaska Commercial Co. at Unalaska, told us of the herring industry near Unlaska and Dutch Harbor. In 1938, the first run was from June 26 to July 27,

and the second run, much smaller, was from August 26 to September 6. The run varies greatly in size from year to year. In 1938, there were 165 tons of bloaters and 2,000 barrels (250 pounds to a barrel) of gibbed herring prepared at Dutch Harbor. The gibbed, or Scotch-cured, herring are cleaned and are salted only once. All herring are taken by gill nets near Dutch Harbor. Gibbed herring sold in Seattle for about \$15 a barrel.

Cyclopteridae, the members of which family are commonly known as lumpsuckers, are characterized by a round sucking disk on the ventral surface of the body. By this means they attach to rocks and sometimes to kelp in the region of wave action along-shore. They are able to attach or release themselves almost instantly. The only adult taken was found on the beach in poor condition. The larvae of *Elephantichthys copeianus?* were taken at two dredge stations. These were handsome little fish about 25 millimeters long, tan colored with pale-blue "spectacles" between the eyes.

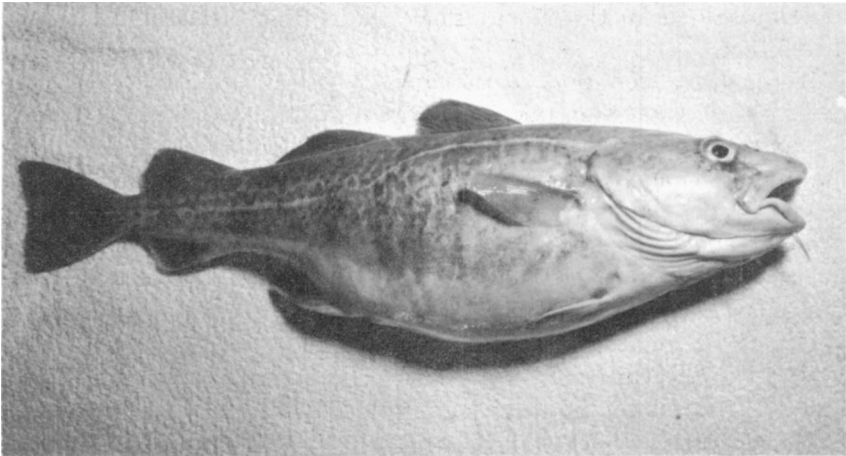


FIGURE 17.—Alaska cod, *Gadus macrocephalus*, False Pass, August 5, 1938.

Gadus macrocephalus, the common Alaska cod, was taken with hook and line at nearly every anchorage (fig. 17). In deep water near Atka Island on August 10 the ship's crew caught more than 80 fish in half a day. Most of them were later salted down. All specimens taken during the summer were wormy, although not unfit for eating. Stomach contents from three localities contained masses of the nematode *Contracaecum clavatum*. In one stomach, a female *Cystidicola* sp. was found. The mesenteries of the cod were usually knotted with masses of cysts of the nematode *Porro-*

caecum decipiens—this worm also was taken from the stomach of an adult hair seal on Khwestof Island. External parasites of the cod included a copepod, *Lepeophtheirus parviventris*, an isopod, *Rocinela belliceps*, and a leech, *Platybdella quadrioculata*.

Stomach contents of cod were examined from time to time, partly out of curiosity and partly to recover specimens of invertebrates for the general collection. Common items in the diet included large amphipods (often half a pint or more in a single stomach), shrimp, octopus or squid beaks, sea urchins, snails, clams, crabs, and many small fishes. Near Chuginadak Island, on August 21, the head of an adult cormorant *Phalacrocorax* sp. was found in a cod stomach. Off Ogliuga Island, on August 12, the entire body, considerably softened, of a parakeet auklet (*Cyclorhynchus psittacula*) was recovered (Scheffer 1943).

Gasterosteus aculeatus aculeatus, the three-spined stickleback, was taken on three islands in fresh-water pools. *G. a. microcephalus* was taken on four islands, also in fresh-water pools or streams. Both races of *aculeatus* may be found in both salt and fresh water, but the resident salt-water form is more heavily plated and is given the subspecific name *aculeatus*, while the resident fresh-water form is given the name *microcephalus*. In fresh water, all but four or five plates near the head are eventually lost.

In some places, as on Kavalga Island, sticklebacks occur in ponds on plateaus isolated from the sea and now inaccessible to fish. It is our opinion that the fish gained access to such ponds before the outlet streams became steep.

In several cases, sticklebacks were noted heavily infested with

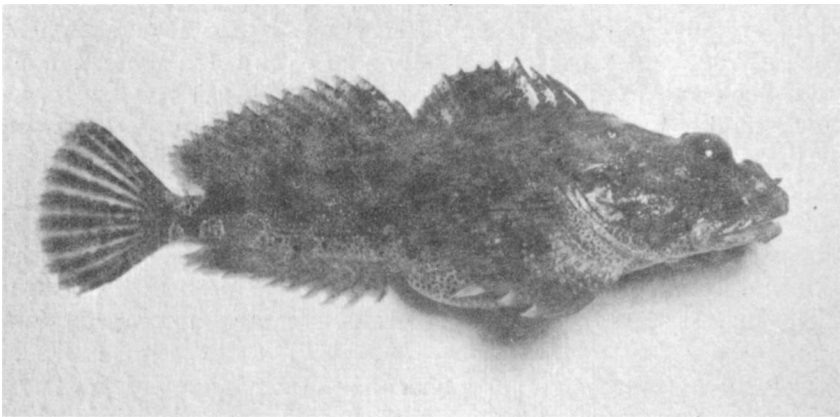


FIGURE 18.—Red sculpin, *Hemilepidotus hemilepidotus*; color: red and brown. Kagamil Island, August 29, 1938.

tapeworms, which filled the body cavity to the extent that the fish had a pot-bellied appearance. (See also *Pungitius*, the many-spined stickleback.)

Gymnocanthus pistilliger is a bullhead, or cottoid, of interest because it was found in a sea-otter scat on Ogliuga Island. There are many species of cottoids in the shoal water and tide pools of the Aleutian Islands.

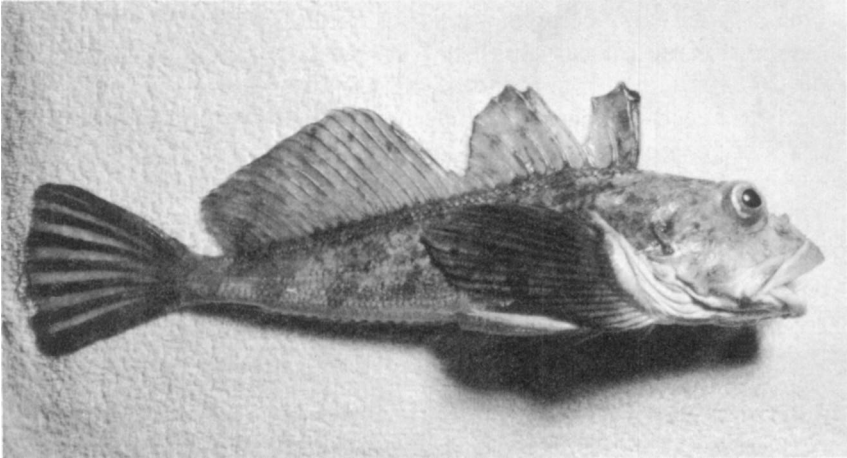


FIGURE 19.—Irish lord, *Hemilepidotus jordani*; color: dirty olive and black. Kiska Island, August 19, 1938.

Two species of *Hemilepidotus* are very common in the islands. *H. hemilepidotus*, the red sculpin, is brick red to brown in color (fig. 18); *H. jordani*, the Irish Lord, is a dirty, olivaceous brown with irregular dark bars (fig. 19). Sculpins are bottom feeders with an amazing capacity to swallow large objects. When caught with hook and line, it is often necessary to dissect the fish to recover the hook. When the boat was at anchor, sculpins were soon attracted to the spot by garbage thrown overboard from the galley. Among other items found in sculpin stomachs, we have noted a match box, a boiled potato, a good-sized chicken leg, and the entire carcass of small bird specimens discarded from the skinning room. Invertebrates seem to make up most of the natural diet: brittle stars, snails, clams, crabs, shrimps, amphipods, and many others.

Color notes were taken of a specimen of *H. hemilepidotus* from Kagamil Island: red, mottled with brown, belly is white with chocolate spots; color fades rapidly. A specimen from Vsevidof Island: head appears as though bright-red paint had been poured

over it; a few red splotches on body; general body color is light brown and red; belly is light with small chocolate specks; a dark-colored stripe runs along each side near dorsal line, and a dark horizontal stripe runs across each eyeball.

Color of a specimen of *H. jordani* from Kiska Island: dirty olive with several short, vertical, irregular dark bars near the dorsal line; lips are yellow; belly is light.

Hippoglossus stenolepis, the halibut, is fished on certain banks, but it may be encountered anywhere among the islands (fig. 20). It is the largest of the flounders and is said to reach a weight of almost 400 pounds. We took a 100-pound fish off Bogoslof Island in the deeper waters that it frequents. The halibut swims with its right side up.

Lebius superciliosus, the pogie, greenfish, or red rock trout, was taken on seven islands (fig. 21). Color notes on one specimen: general ground color of skin is black with greenish cast, covered

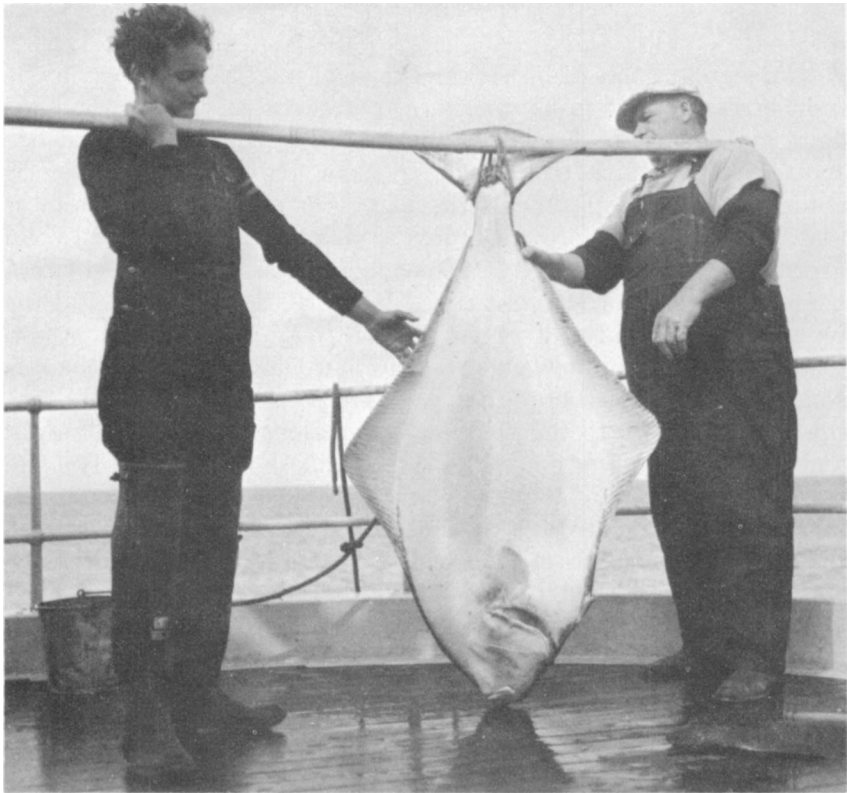


FIGURE 20.—Halibut, *Hippoglossus stenolepis*, weighing approximately 100 pounds. Bogoslof Island, August 31, 1938.

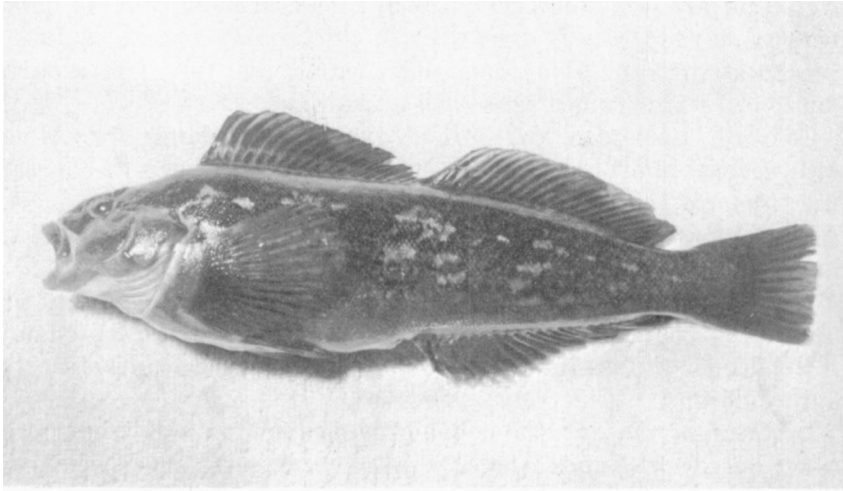


FIGURE 21.—Pogie, *Lebius superciliosus*. The flesh may be vivid green or white. Attu Island, August 16, 1938.

with irregular spots of light tan. Inside of mouth and under jaw is light green; flesh and viscera are green. Another specimen: back and sides are brownish olive mottled with black, and are spotted with bluish green; under-parts are yellowish; flesh is white. On many specimens, the skin is a rich dark red, almost matching the fronds of kelp, among which the fish swim. The vivid green flesh of the majority of specimens is a startling sight to a person seeing it for the first time. Dr. L. P. Schultz says that the presence, or absence, of green color throughout the flesh is not, to the best of his knowledge, a sex character. The flesh color is sometimes more of a blue than a green. O. J. Murie reports that the fish comes up to the shallow water along the beach at night and makes a popping noise like kelp bladders exploding. The fish was found in nests of the bald eagle on several occasions, suggesting that it is a shoal-water species.

Lepidopsetta bilineata, was called "flounder" on one occasion and "sole" on another, by the same fisherman. It swims with its right side up. Evermann and Goldsborough (1907) state that the flounder is widely distributed and that it takes the hook readily.

Myoxocephalus polyacanthocephalus was taken on four islands. This is said to be a large sculpin, but we have no field notes on it.

All five species of Northeast Pacific salmon were collected in the Aleutians, the humpback and the silver salmon were found most frequently:

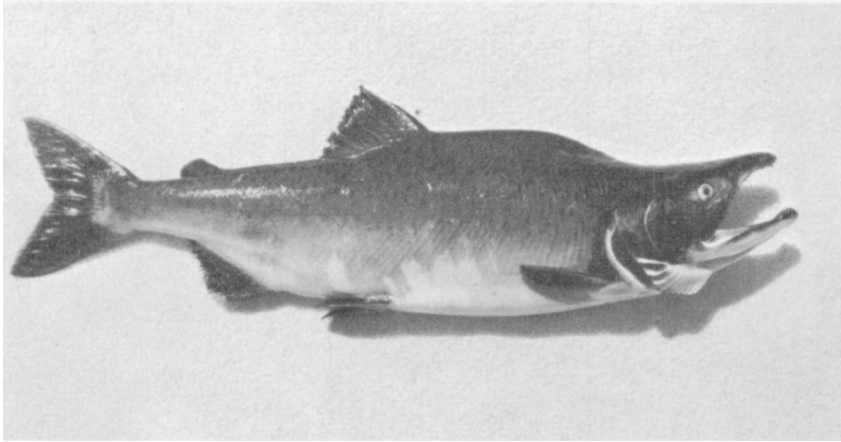


FIGURE 22.—Pink or humpback salmon, *Oncorhynchus gorbuscha*, breeding male. Amchitka Island, August 22, 1938.

Oncorhynchus gorbuscha, the humpback, or pink salmon is said by Evermann and Goldsborough to be the most common species in Alaska (fig. 22). Some of our specimens were adults, and others were fingerlings caught on hook and line in streams. A parasitic copepod, *Lepeophtheirus salmonis*, was collected from the back of a humpback salmon on Tanaga Island.

Oncorhynchus keta, the dog, or chum salmon, was collected only once—on Atka Island. The natives had constructed a crude fish trap at the outlet to Korovin Lake. On August 13, the silver salmon were running and there were also a few dog salmon in the trap. These were not recognized by the natives as dog salmon, but were termed “winter salmon” and were given an Aleut name slightly different from that of the silver. Four specimens examined were males with apparently mature testes but without the external hump that is characteristic of the breeding fish.

Oncorhynchus kisutch, the silver salmon, was collected on five islands.

Oncorhynchus nerka, the sockeye, or red salmon, was running into a lake on Attu Island in early June 1937 (figs. 23 and 24). The species runs only into streams that have lakes somewhere in the headwaters.

Oncorhynchus tshawytscha, known as the king, spring, or chinook salmon, was collected only in the fingerling stage. The adults frequent deep, or offshore waters, occasionally reaching a size of 100 pounds. They are taken by trolling.

Oxycottus acuticeps is of the many species of tide-pool bullheads.



FIGURE 23.—Native boy netting sockeye salmon, *Oncorhynchus nerka*. Attu Island, August 17, 1938.



FIGURE 24.—Red or sockeye salmon, *Oncorhynchus nerka*, taken in gill nets by Attu Island natives and dried for winter food. June 8, 1937.

It is a bizarre little fish, colored bright grass green over the entire body, matching the sea lettuce (*Ulva*) among which it lives. The webs of the fins are transparent, with yellow at the base. There is a little silver color on the jaws; otherwise, the body is uniformly green. Another bullhead, *Oligocottus*, is also commonly green.

Phallocottus obtusus, a cottoid taken on Igitkin Island, was the basis for the description of a new species and genus by Schultz (1939).

Pallasina barbata, a sea poacher, is a very slender fish with a long sturgeon-like snout. Specimens about 5 inches long were taken in a seine haul in the surf at Umnak Island.

Pholis laetus is one of the many blennies that inhabit the tide pools. It is a small, smooth fish, shaped like a slender cigar; it is yellowish with a series of paired transverse black bands on the dorsal surface.

Platichthys stellatus was taken only at Unimak Island. The starry flounder is said by Evermann and Goldsborough (1907) to be the most abundant and most widely-distributed flounder in Alaska. It has black spots along both dorsal and ventral fins, and is unlike other species in the North Pacific. It swims with its left side up.

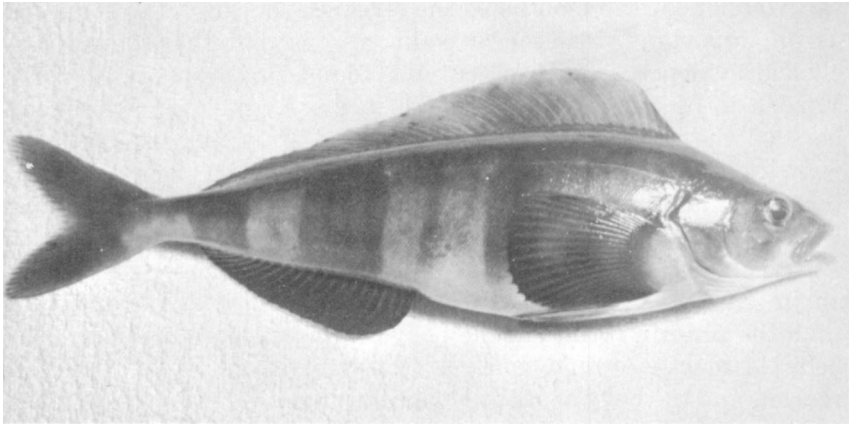


FIGURE 25.—Atka mackerel, *Pleurogrammus monoptyerygius*. Attu Island; August 16, 1938.

Pleurogrammus monoptyerygius, the Atka or Attu mackerel, occurs along the Aleutian chain, but apparently it is most abundant near the west end (fig. 25). At the mouth of Chichagof Harbor, Attu Island, we were able to look down into the clear water and see dozens of Atka mackerel swimming among the kelp fronds.

The body is strikingly marked with broad bands of black and yellow. A number of specimens were taken by the crew by "jigging" (jerking a hook with an artificial lure up and down in the water). Specimens were also found in nests of the bald eagle.

Pungitius pungitius, the many-spined stickleback, was taken in fresh water pools on Afognak Island and the Semichi Islands, both localities east of the Aleutian Islands proper.

Salmo? William Gardner, employee at the salmon cannery at False Pass, told us that there are at least four streams on Umnak Island where steelhead trout run. No species of *Salmo* were collected in the Aleutian Islands by our party, and it is unlikely that any occur far from the Alaska mainland. Evermann and Goldsborough state that there are no records for rainbow trout (*S. gairdneri*) in any waters off, or north of, the Alaska Peninsula, and that there are no records for cutthroat trout (*S. clarki*) beyond Kodiak Island. However, there may be more recent records extending the range of these species. Salmonoid fingerlings collected along the Aleutians by our party invariably were young salmon or Dolly Varden trout.

Salvelinus malma spectabilis, the Dolly Varden trout, is abundant throughout the islands, both in fresh-water streams and in salt water near the mouths of the streams. Locally, it is regarded as an important predator on salmon eggs, but there is no conclusive evidence to this effect. We found the flesh of the Dolly Varden to be quite tasty, although it was scorned by some members of the party. On Amchitka Island, July 19, 52 specimens were taken with a single haul of a small beach seine. An interesting landlocked form of Dolly Varden was observed at Unalaska. On August 17, Captain H. A. Searles presented us with six specimens taken with hook and line in Pyramid Creek above an impassable falls. This form is much smaller and less silvery than the sea-run form, but the body colors are more brilliant. The belly is bright orange, back of the ventral and anal fins it is scarlet, and the body spots are bright orange.

On Attu Island, on August 17, the natives were removing dozens of large Dolly Vardens from gill nets set for red salmon, leaving them to rot on the lakeshore. Several odd-looking trout, said by the natives to be different "kinds" of trout, proved to be *spectabilis*.

Sebastes ciliatus. A few sea bass were taken with hook and line over the rail of the ship. The fish is not particularly common in the Aleutians.

Sigmistes smithi, a small cottoid, was described by Schultz (1939) from a collection made on Igitkin Island.

Theragra chalcogramma chalcogramma, the Alaska pollack, or silver hake, was not observed in the islands, although it was discovered that a young specimen had been taken in a beach haul made on Igitkin Island (fig. 26). Adults were taken readily at Seward and Petersburg, on the mainland.

Trichodon trichodon was taken several times among kelp. It is a small sand fish with an undershot jaw studded with fine, sharp teeth. Its odd appearance attracts immediate attention.

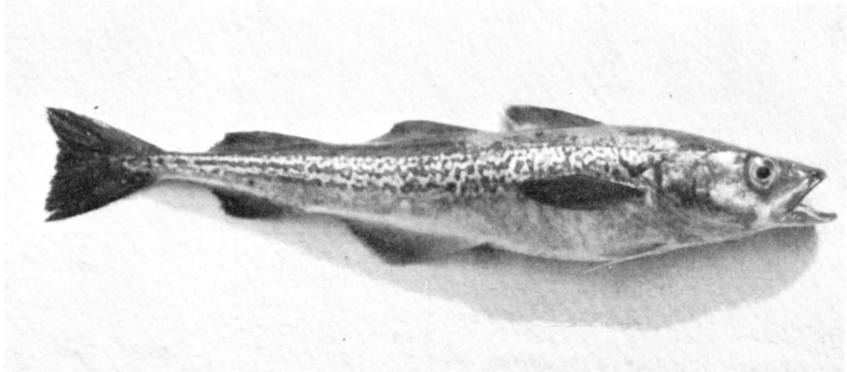


FIGURE 26.—Silver hake or Alaska pollack, *Theragra chalcogramma*. Chignik, Alaska, September 14, 1938.

Zaprora silenus. A specimen was taken by one of the ship's crew while he was fishing for Atka mackerel from a dory. The ungainly body so startled the man that his first impulse was to drop it back into the ocean. Another specimen, not recognized at the time, was observed off Umnak Island, hovering under a large orange jellyfish (*Cyanea*) at a depth of about 1 foot. It followed the shelter of the umbrella and the hanging tentacles. When the jellyfish was netted, the fish darted into the bell and was later found in the center. Color: belly is white, sides and back are olive gray; from above, it appeared orange because of the reflected light from the *Cyanea*. The jellyfish was taken about $\frac{1}{4}$ mile offshore (Scheffer 1940).

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