

PLATE V. Lingcod (*Ophiodon elongatus*). Two common shades of colour, illustrated on specimens about 30 inches long.

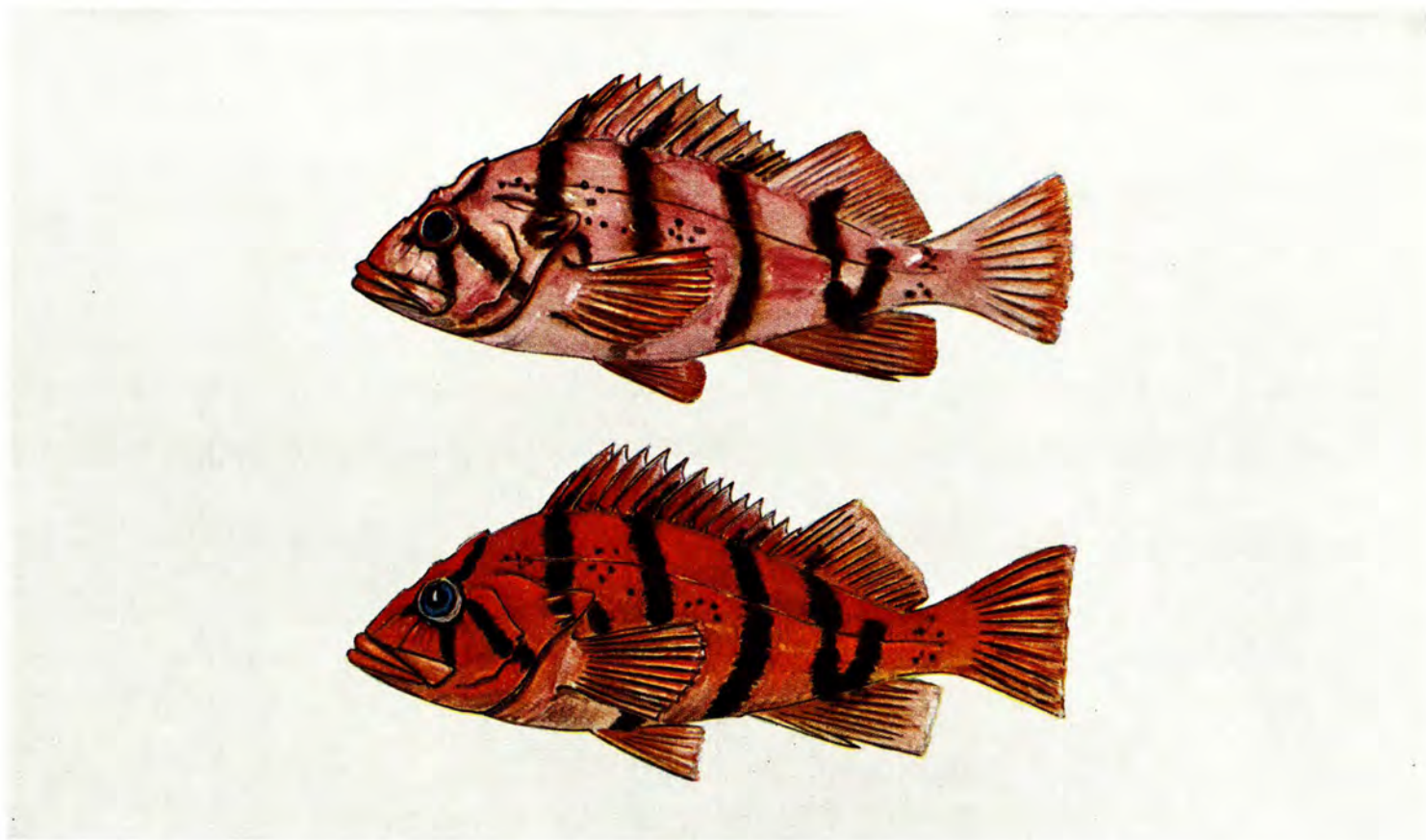


PLATE VI. Blackbanded rockfish (*Sebastes nigrocinctus*). Two common shades of colour, illustrated on a specimen 10 inches long.

near Nootka but was not examined. In August, 1939, west of Cape St. James, Lat.  $52^{\circ} 49' N$ , Long.  $134^{\circ} 29' W$ , three specimens were obtained on a tuna lure and were recorded in 1940 by V. J. Samson. The albacore has been captured off the west coast of Vancouver Island in increasing numbers since 1939. The first large commercial catch was made in 1940. The abundance of the fish has proven to be rather variable in Canadian waters as it has off the California coast.

This pelagic fish is distributed throughout all warm to temperate seas. Since no mature individuals have been taken anywhere along the Pacific coast of North America, it would seem that the albacore is a tropical fish whose young make extensive feeding migrations to distant regions and return to the tropics at the onset of maturity. The food consists of schooling small fishes such as anchovies, pilchards, herring, sauries, young mackerel and albacore, blue lanternfish (*Tarletonbeania crenularis*), as well as squid and zooplankton. It is a highly-prized sport and commercial fish and is taken with jigs made of bone, rags and feathers, towed behind boats. The commercial catch in Canadian waters is secured by trolling with bright red feather lures and is frozen for the most part, for subsequent canning. Fishermen sometimes refer to the albacore as the tuna or longfin tuna.

Range: southern California to southeastern Alaska.

### Bluefin tuna

*Thunnus saliens* Jordan and Evermann 1926

Body elongate, fusiform; caudal peduncle slender, keel on each side. Head conical; mouth terminal, moderate; gill rakers below angle of first arch. Fins: dorsal (2), XIII or XIV—13, interspace very short, spinous fin long, high anteriorly, finlets 9 or 10; anal, 12, origin below rayed dorsal fin, finlets, 8 or 9; pelvic, I, 5, thoracic; pectoral, short, shorter than head, reaching about midway between pelvic and anal fins, pointed; caudal, lunate. Lateral line: decurved anteriorly, nearly straight for greater part of length. Scales: cycloid, moderate, covering body;



FIGURE 130. Bluefin tuna. *Thunnus saliens* Jordan and Evermann 1926

corselet well developed extending farther back than pectoral fin. Colour: dark steely blue on dorsal surface more or less sharply shading into silvery gray on side above lateral line; dusky on spinous dorsal fin, dusky to reddish brown on rayed dorsal fin, silvery gray on anal fin, dusky to silvery on caudal fin, blackish above, silvery below on pectoral and pelvic fins; large silvery spots on ventral surface below and behind pectoral fin; yellow on dorsal and anal finlets.

Length to 7 feet.

Distinguished by the uniform dark steely blue colour on the dorsal surface, the yellow finlets and the large silvery spots along the ventral surface of the body.

The bluefin tuna was first taken in British Columbia waters August 25, 1957, by the *Fort Ross*, Lat. 49° N, Long. 134° 24' W, and another August 28, 1957, Lat. 48° 50' N, Long. 131° 06' W. In the following year a specimen was secured by the *Key West II*, Lat. 51° N, Long. 130° W, near the northern end of Vancouver Island. These specimens were recorded in 1959 by F. Neave. The food consists of small schooling fishes, according to supply, such as anchovies and mackerel, as well as squid. The bluefin tuna in turn forms part of the food of the killer whale. Weights up to 250 pounds have been recorded.

Range: Southern California to Gulf of Alaska.

#### **Pacific bonito**

*Sarda lineolata* (Girard) 1858

Body elongate, fusiform; caudal peduncle slender, keel on each side. Head pointed, conical; mouth terminal, moderate; gill rakers below angle of first gill arch, 16 or 17. Fins: dorsal (2), XVIII—I, 12 interspace much less than length of pectoral fin, spinous fin long, high anteriorly, finlets, 8 or 9; anal II, 11, origin below posterior end of rayed dorsal, finlets, 6 or 7; pelvic, I, 5, thoracic; pectoral, shorter than head, extending barely beyond corselet, triangular; caudal, lunate. Lateral line: irregularly wavy. Scales: cycloid, small; covering body; in corselet, large; corselet large, prominent. Colour: dark metallic blue on dorsal surface, shading into silvery on ventral surface; blackish stripes, 10 or 11, narrow stripes extending backward and upward along upper portion of body.



FIGURE 131. Pacific bonito. *Sarda lineolata* (Girard) 1858

Length to 3 feet.

Distinguished by the slender caudal peduncle with finlets above and below, the very short interspace between the dorsal fins and the 10 or 11 narrow stripes extending obliquely along the upper portion of the body.

The Pacific bonito was first taken in British Columbia waters in September, 1900, near Rivers Inlet and was recorded in 1909 by F. Kermode as *Sarda chilensis* Cuvier and Valenciennes. This specimen is now represented by a cast in the Provincial Museum at Victoria. A second individual, 30½ inches in total length, recorded in the same year as from Victoria, was taken in a salmon trap at Otter Point near Sooke and is also in the Provincial Museum. Individuals are caught occasionally off the west coast of Vancouver Island. The bonito is a fish of the open ocean appearing in large schools along the California coast where its food consists principally of squid and various fishes. It is an important food fish, has an excellent flavour when baked and is valued as a sport fish as well.

Range: Southern California to northern end of Vancouver Island.

### Skipjack tuna

*Katsuwonus pelamis* (Linneaus) 1758

Body elongate, fusiform; caudal peduncle slender, keel on each side. Head pointed, conical; mouth terminal, moderate; gill rakers below angle of first gill arch, 35 to 43. Fins: dorsal (2), XV or XVI—14 to 16, interspace much less than length of pectoral fin, spinous fin long, high anteriorly, finlets, 7 or 8; anal, II, 12 to 14, origin below posterior end of rayed dorsal, finlets, 6 to 8; pelvic, I, 5, thoracic; pectoral, shorter than head, not extending beyond corselet, triangular; caudal, lunate. Lateral line: nearly straight to point below rayed dorsal

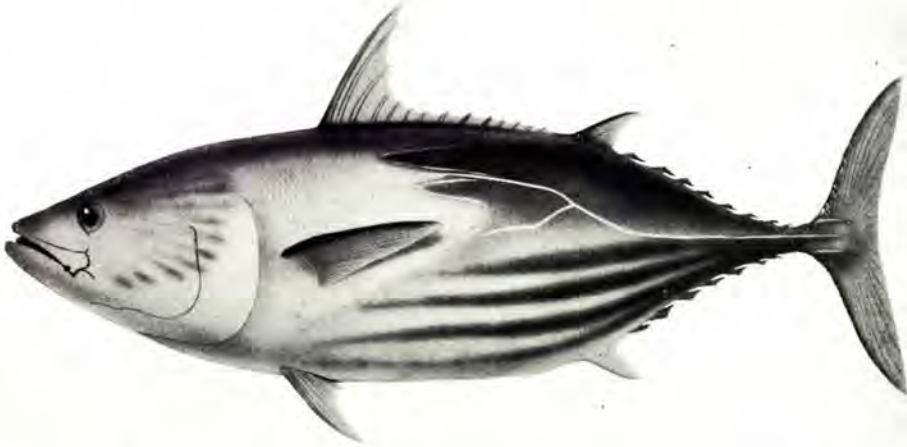


FIGURE 132. Skipjack tuna. *Katsuwonus pelamis* (Linneaus) 1758

fin, sharply decurved, then straight. Scales: cycloid, small, covering upper anterior portion of body only; corselet present. Colour: dark metallic blue on dorsal surface, shading into silvery on ventral surface; black to dusky stripes on lower portion of body, 4 or 5, narrow, longitudinal.

Length to 3 feet.

Distinguished by the slender caudal peduncle with finlets above and below, the very short interspace between the dorsal fins and the 4 or 5 narrow longitudinal stripes along the lower portion of the body.

The skipjack tuna was first taken in British Columbia waters on July 6, 1943, in Barkley Sound and recorded in the same year by J. L. Hart. The specimen,  $25\frac{1}{2}$  inches in total length, is now in the collection of the Biological Station at Nanaimo. A second individual was caught in a gill net on September 16, 1958, off the entrance to Juan de Fuca Strait on the "Bonilla-Tatoosh line", by E. Olafsen. The skipjack tuna is a fish of warm oceanic seas where it usually occurs in large schools. In southern California waters it forms a very important part of the commercial fishery and is also an excellent game fish on light tackle. The food consists of small fishes and plankton crustaceans.

Range: Southern California to Vancouver Island.

### **Pacific mackerel**

*Pneumatophorus japonicus* (Houttuyn) 1780

Body elongate, fusiform; caudal peduncle slender, keel absent. Head conical; mouth terminal, moderate. Fins: dorsal (2), VIII to X—I, 12, interspace greater than length of pectoral fin, spinous fin short, high, triangular, finlets, 5 or 6; anal, II, 11, origin slightly behind that of rayed dorsal, finlets, 5 or 6; pelvic, I, 5 thoracic; pectoral, shorter than head, triangular; caudal, lunate. Lateral line: slightly wavy. Scales: cycloid, very small; covering body; in corselet, slightly enlarged. Airbladder, present. Colour: metallic steel blue on dorsal surface; silvery on ventral surface; iridescent blackish stripes, 25 to 30, irregular, wavy, extending obliquely forward across back to short distance below lateral line.

Length to  $22\frac{1}{2}$  inches.

Distinguished by the slender caudal peduncle with 5 or 6 finlets above and below, the long interspace between the dorsal fins and the 25 to 30 irregular wavy blackish stripes across the back and down the sides of the body.

The Pacific mackerel was first taken in British Columbia waters on November 30, 1904, at Nanaimo. The 2 specimens secured were recorded in 1909 by F. Kermode as *Scomba colias* Gmelin. The species was listed in 1946 by Clemens and Wilby as *Pneumatophorus diego* (Ayres). The mackerel is very abundant at times off the west coast of Vancouver Island where many tons are sometimes obtained in purse seines. Small numbers enter the Strait of Georgia and small schools have been observed in the vicinity of Prince Rupert. Spawning has not been observed in British Columbia waters but is known to take place

off the California coast from late April through July near the shore, usually at depths down to 50 fathoms. A female may produce as many as half a million eggs. These are pelagic and hatch in about 3 days. Some individuals mature in their second year and the length of life may extend to 9 or 10 years. The food consists of a varied diet of crustaceans, squids and small fishes. This is an excellent food fish of fine flavour, especially when baked or broiled.

Range: Southern California to southeastern Alaska.



FIGURE 133. Pacific mackerel. *Pneumatophorus japonicus* (Houttuyn) 1780

#### Suborder TRICHIUROIDEA

The fishes in this suborder have the body very elongate. The premaxillaries are non-protractile, beak-like, firmly attached to the maxillaries. The lower jaw usually is projecting. The teeth are mostly strong and canine-like. The dorsal fins are long and the pectoral fins are placed low on the body.

One family, the Trichiuridae, is represented in British Columbia waters.

#### Family TRICHIURIDAE

#### Hairtails

In the hairtails the body is elongate, strongly compressed, without scales. The dorsal fin is long and low, composed of spines anteriorly, rays posteriorly; the pectoral fins are small, placed low on the body; the pelvic fins are absent, or each is represented by a minute spine or scale-like structure thoracic in position; the caudal fin is small, pointed or deeply forked.

#### Frostfish

*Benthodesmus simonyi* (Steindachner) 1891

Body very elongate, slender, much compressed, tapering to very slender caudal peduncle narrower than diameter of pupil. Head elongate, flattened above; mouth terminal, large; upper jaw beak-like; lower jaw projecting, fleshy appendage at tip conspicuous; teeth numerous, canine-like on premaxillary and mandible, first three on premaxillary fang-like; eye large, about midlength of head. Fins:

dorsal (1), XLV or XLVI, 102 to 106 long, low continuous from opercular region to caudal peduncle; anal, I, 91 to 98, long, extending from anus to caudal peduncle; pelvic, absent, or represented by minute spine or scale-like structure; pectoral, 12, small, low on body; caudal, small deeply furcate. Lateral line: almost straight, along midline in deep furrow. Scales: absent. Colour: silvery anteriorly; gray to black posteriorly; black on lips, inside of mouth and gill cavity; black on peritoneum.

Length to 3 feet 10 inches.



FIGURE 134. Frostfish. *Benthodesmus simonyi* (Steindachner) 1891

Distinguished by the very elongate compressed scaleless body, the elongate head with the beak-like upper jaw, the fleshy appendage on the tip of the lower jaw, the large teeth, the slender caudal peduncle and the small deeply forked caudal fin.

The frostfish is represented by a single specimen taken on May 30, 1916, at Bentinck Island near Victoria. It was recorded in 1917 by C. H. Gilbert as *Benthodesmus atlanticus* Goode and Bean and is now in the Provincial Museum at Victoria. This apparently constitutes the only record for the Pacific. The species occurs in the north Atlantic as an inhabitant of deep waters. It was listed in 1946 by Clemens and Wilby as *B. atlanticus* Good and Bean.

Range: Juan de Fuca Strait.

#### Suborder STROMATEOIDAE

The fishes in this suborder have an elongate, compressed body. The posterior part of the pharynx is expanded to form a muscular sac lined with papillae or plications, usually bearing teeth.

This suborder comprises 4 or more families, 3 of which, the Stromateidae, Centrolophidae and Zaproridae are represented in British Columbia waters.

#### Family STROMATEIDAE

#### Butterfishes

In the butterfishes the body is moderately elongate, deep and strongly compressed. The papillae of the pharyngeal sac have bristle-like teeth. The dorsal and anal fins are long, highest anteriorly, each preceded by 3 spines; the pelvic fins are thoracic and minute or absent in the adult; the pectoral fins are long and falcate; the caudal fin is deeply furcate.

The butterfishes inhabit the warm open seas. They are highly attractive in their form and bright coloration and are much prized because of their excellent flavour.



**Pacific pompano**

*Palometa simillima* (Ayres) 1860

Body elongate, deep, greatly compressed; caudal peduncle short, slender. Head rounded in profile; mouth terminal, small; teeth: on jaws minute, weak; on pharyngeal papillae, bristle-like; snout bluntly rounded; gill membranes united, free from isthmus. Fins: dorsal (1), III, 45 to 47, long, high anteriorly; anal, III, 40 to 44, similar to dorsal; pelvic, absent in adult; pectoral, long, reaching nearly to middle of dorsal fin, falcate; caudal, deeply furcate. Lateral line: upcurved anteriorly, following the dorsal contour of the body. Scales: cycloid, small. Colour: metallic blue on dorsal surface; bright silvery on sides and ventral surface; entirely iridescent; dusky on margin of lobes of dorsal and anal fins.

Length to 11 inches.

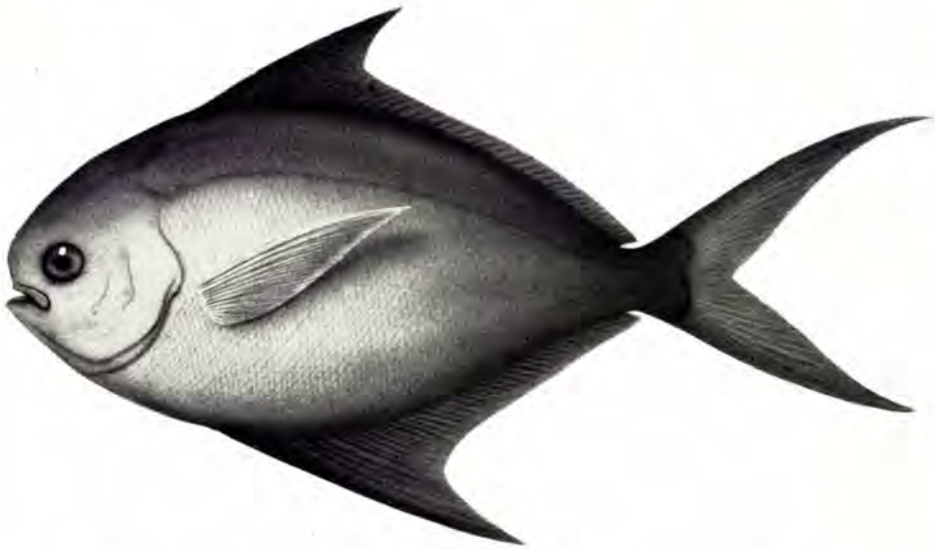


FIGURE 135. Pacific pompano. *Palometa simillima* (Ayres) 1860

Distinguished by the greatly compressed deep scaly body, the long falcate pectoral fins and the absence of pelvic fins.

The Pacific pompano was first taken in British Columbia waters in September, 1903, in Juan de Fuca Strait and the specimen is now in the collection of the Provincial Museum. It was recorded in 1909 by F. Kermode. Other individuals have been obtained as follows: two in 1908 off Victoria; one on December 15, 1940, off the Chemainus River in an otter trawl; one on August 26, 1941, at Sooke in a salmon trap. Between 1946 and 1949, numerous occurrences of the pompano were recorded from both the east and west coasts of Vancouver Island. Catches up

to 150 pounds were reported. In 1951, a specimen was taken in Fitzhugh Sound, thus extending the range northward. This is a fish of southern distribution and frequently reaches Canadian waters. It was particularly abundant in 1947. It has a ready sale on the fresh-fish market of California because of the richness and delicacy of its flesh. It was recorded in 1946 by Clemens and Wilby as *Peprius simillimus* (Ayres), the California pompano.

Range: Southern California to Queen Charlotte Sound.

Family CENTROLOPHIDAE

Rudderfishes

In the rudderfishes the body is elongate, moderately deep and compressed. The plications of the pharyngeal sac have weak needle-like teeth. The dorsal and anal fins are highest posteriorly, each preceded by 3 weak spines; the pelvic fins are thoracic, small, each composed of 1 weak spine and 5 rays; the caudal fin is rounded.

The rudderfishes are pelagic, frequently extending into deep water.

**Brown rudderfish**

*Icichthys lockingtoni* (Jordan and Gilbert) 1880

Body elongate, slender, compressed, flexible; narrowly compressed at base of dorsal and anal fins. Head small, dorsal surface spongy, with free margin posteriorly overlapping anterior of occipital region; mouth terminal, moderate, slightly oblique; maxillary extending to point below pupil; teeth: on jaws only, minute, slender, sharp, weak; on pharyngeal plications, needle-like, weak; operculum striate; gill membranes separate, free from isthmus. Fins: dorsal (1), III, 34 to 39, spines slender, fin low anteriorly, higher posteriorly, maximum height near posterior end; anal, III, 20 to 25, similar to dorsal; pelvic, I, 5, thoracic, spine slender, weak, fifth ray slender, filamentous; pectoral, small, rounded, base fleshy; caudal, rounded, rudder-like. Lateral line: nearly straight, indistinct. Scales: cycloid, deciduous; covering body and head; on lateral line, 115 to 121, small. Colour: bluish gray to brown; darker on scale pockets; dusky to black on fins.

Length to 8 inches.

Distinguished by the flexible slender compressed scaled body, the spongy crown, the free flap on the head, the pelvic fins each with 1 spine and 5 rays, the fifth ray slender and filamentous and the rudder-like caudal fin.

The brown rudderfish is known in British Columbia waters from two specimens. The first, 8 inches in length, was taken on August 5, 1935, from a fishtrap at Sooke by Mr T. Spouse. It was recorded in 1938 by I. McT. Cowan and is now in the Provincial Museum at Victoria. The second, 4 inches in length, was obtained on August 22, 1935, from Esperanza Inlet by Mr M. Brevik and is now in the collection of the Biological Station at Nanaimo. The skeleton of this fish is very flexible because of the weak ossification, a characteristic of many deep-sea fishes

such as the ragfishes. The young are found frequently near the surface and in California waters have been observed in association with jellyfishes, whence the name medusafish, which is recommended by the AFS/ASIH committee.

Range: northern California to Gulf of Alaska.

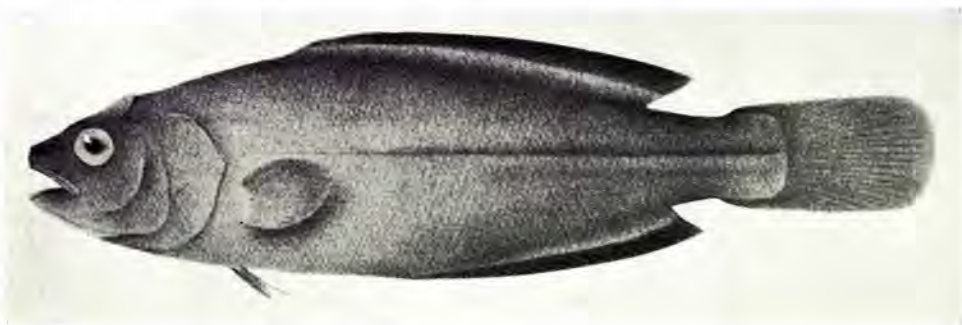


FIGURE 136. Brown rudderfish. *Icichthys lockingtoni* (Jordan and Gilbert) 1880

Family ZAPRORIDAE

Prowfishes

In the prowfishes the body is stout and compressed. The gill membranes are united with a wide free fold posteriorly. Teeth are present in the pharynx, absent from the oesophagus. The lateral line is absent. The long dorsal fin is supported by spines and the anal fin by 3 weak easily-overlooked spines and 24 to 27 rays, each fin well separated from the broad caudal fin; the pelvic fins are absent.

There is but one species in this family.

**Prowfish**

*Zaprora silenus* Jordan 1896

Body elongate, stout, compressed; caudal peduncle deep. Head short, broad, profile abruptly convex; mouth terminal, small, oblique; lower jaw heavy, slightly projecting; lips thick; teeth small, close-set; snout blunt, high; eye small; gill membranes broadly united, with wide free fold posteriorly. Fins: dorsal (1), LIV to LVII, long, high; anal, III, 24 to 27; pelvic, absent; caudal, broad, truncate to rounded. Lateral line: absent. Scales: cycloid, small, elongate; in oblique rows above midline of body, about 200; on head, except snout and around eye; on basal two-thirds of all fin membranes. Pores: on head numerous, large. Colour: gray to dark green on dorsal surface; lighter on ventral surface; punctulated with dark spots; lemon yellow to orange on sides of head and behind each pectoral fin; dark at base of each pectoral fin, lighter in central portion, black distally, white on margin.

Length to 2 feet 10½ inches.

Distinguished by the high blunt snout, the long dorsal fin, the short anal fin, the absence of pelvic fins, the absence of a lateral line and the large pores on the head.

The prowfish was first taken in British Columbia waters in November, 1895, in Nanaimo Harbour by Mr George Marsh. Two specimens were obtained, one of which was described in 1896 by D. S. Jordan as the type of the species, and both individuals are now in the collection of the Provincial Museum at Victoria. Since this time several specimens have been reported at various points from Juan de Fuca Strait to Dixon Entrance, some being obtained in pilchard and herring seines. Between May 13, 1930, and June 8, 1932, the International Halibut Commission took 36 small specimens, ranging in length from  $\frac{1}{2}$  inch to 3 inches, in plankton nets operated in waters north and west of British Columbia at depths between 16 and 195 fathoms. While the flesh is firm and the red colour is attractive, this fish is not marketed.

Range: California to Gulf of Alaska.



FIGURE 137. Prowfish. *Zaprora silenus* Jordan 1896

#### Suborder ICOSTEOIDEA

In this suborder the body is moderately deep and compressed. Scales are present, sometimes reduced to a few spiny tubercles or spinules on the lateral line and fins. The skeleton is weakly ossified so that the body is limp. All fins are supported by rays only; the pelvic fins, when present, are thoracic.

One family is represented in the suborder, the Icosteidae.

#### Family ICOSTEIDAE

#### Ragfishes

In the ragfishes the body is elongate, much compressed and very limp. Teeth are absent from the pharynx. The ragfishes probably inhabit the deeper parts of the North Pacific Ocean, although the majority of the specimens taken in British Columbia waters have been from moderately shallow depths.

#### Ragfish

*Icosteus aenigmaticus* Lockington 1880

Body elongate, oblong to elliptical, moderately deep, much compressed, limp; caudal peduncle very slender. Head short; mouth terminal, small; jaws about equal; teeth minute; snout blunt; eye very small. Skin: thick, rough. Fins: dorsal

(1), 52 to 55, low anteriorly, higher posteriorly, anterior rays buried in skin; anal, 34 to 40, similar to dorsal; pelvic, absent (present in young); pectoral, rounded to pointed; caudal, broad, emarginate, in young—rounded. Lateral line: slightly arched, then straight. Scales: absent in adult; in young—on lateral line reduced to groups of small spines, sometimes referred to as spiny tubercles, on fins numerous, reduced to spinules, otherwise absent from body. Colour: chocolate brown; rich dark brown on inside of mouth and gill openings; in young: pellucid yellow and brown, irregularly spotted and blotched with faint purple; dusky on fins.

Length to 7 feet.

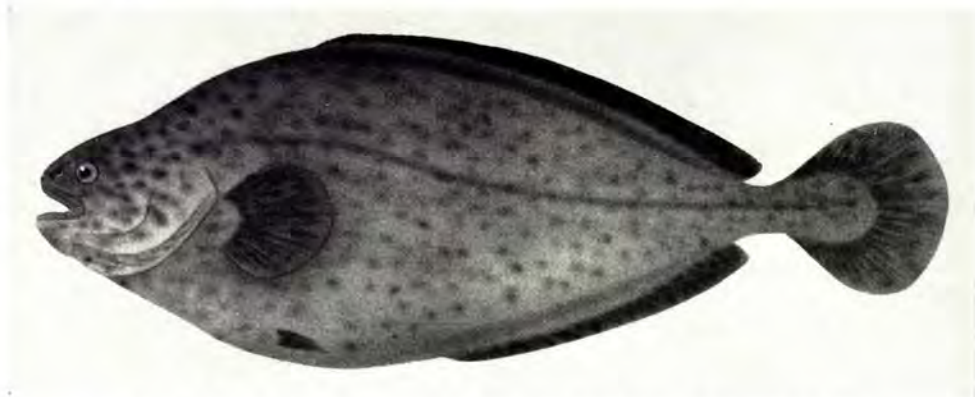


FIGURE 138a. Ragfish (young). *Icosteus aenigmaticus* Lockington 1880



FIGURE 138b. Ragfish (adult). *Icosteus aenigmaticus* Lockington 1880

Distinguished by the elongate elliptical, greatly compressed limp body, with a few scales reduced to spines, the broad round to emarginate caudal fin, the small eyes and the brown coloration.

The ragfish was first taken in British Columbia waters on July 19, 1912, near Victoria by Mr J. Dixon and recorded in 1913 by F. Kermode as *Acrotus willoughbyi* Bean. On September 25, 1928, Messrs G. J. Alexander and J. R.

Townsend captured a young specimen in the Queen Charlotte Islands area in Werner Bay in a purse seine. This individual was recorded in 1929 by A. L. Pritchard and deposited in the fish collection of the Biological Station at Nanaimo. During the summers of 1936 and 1937 large individuals were found commonly in the stomachs of sperm whales taken 30 miles off Rose Harbour in the Queen Charlotte Islands. A second juvenile was obtained on July 22, 1941, in Barkley Sound by Mr F. H. Carroll, which is now in the Provincial Museum at Victoria. Quite recently it has been found that the fish described as *Acrotus willoughbyi* (the brown ragfish) is the adult of *Icosteus aenigmaticus* (the fan-tailed rag-fish). Apparently the pelvic fins, which are loosely attached in the young, become lost; the limp skin encroaches more and more over the anterior ends of the dorsal and anal fins thus giving a low count of the rays except under dissection; the modified scales disappear; the character of the pectoral and caudal fins is changed from round to pointed in the former, and from round to broadly emarginate in the latter; the yellow colour and purplish spots change to a more sombre brown as the adults attain greater size.

Range: Southern California to southeastern Alaska.

#### Suborder TETRAGONUROIDEA

The fishes in this suborder have an elongate subcylindrical body with a long caudal peduncle. The pharynx does not have lateral sacs lined with papillae or plications as in the Stromateoidea. The oesophagus is lined with villous grooves. The suborder is comprised of a single family, one genus and one or possibly more species.

#### Family TETRAGONURIDAE

#### Squairetails

In the squairetails the caudal peduncle is long and bears a pair of keels on each side so that in cross section the outline is almost square. The body is covered with ridged scales.

The squairetails are inhabitants of waters of fair depths but individuals appear at or near the surface sometimes encompassed in schools of fishes such as pilchards.

#### Squairetail

*Tetragonurus cuvieri* Risso 1810

Body elongate, subcylindrical; caudal peduncle long, slender, keels on each side, 2, cross section almost square. Head elongate, snout bluntly rounded; mouth terminal; teeth small, numerous, conical, slightly recurved, in lower jaw almost truncate; gill membranes united, free from isthmus; eye large. Fins: dorsal (2), XV to XVIII—11 to 13, spinous fin long, low, rayed fin short, high; anal, I—12 or 13; pelvic I, 5, thoracic; pectoral, small, low on body; caudal, furcate. Lateral line: arched anteriorly then straight along midline of body to end of caudal peduncle.

Scales: ctenoid, ridged; on lateral line, 114 to 126; on body, in a flat S-shaped curve up and back from ventral surface; present on keels. Colour: dark brown.

Length to  $14\frac{3}{4}$  inches.



FIGURE 139. Squaretail. *Tetragonurus cuvieri* Risso 1810

Distinguished by the long slender subcylindrical body, the paired keels on the long caudal peduncle, the long low spinous dorsal fin, the short highrayed dorsal and anal fins and the S-shaped pattern of the scales.

The squaretail was first taken in British Columbia waters on February 4, 1952, by the otter trawler *Kristine* southwest of Esteban Point at a depth of 90 to 100 fathoms, and recorded in 1954 by A. D. Welander and D. L. Alverson. On August 22, 1957, two specimens were captured in a gill net by the *Fort Ross*, Lat.  $51^{\circ}$  N, Long.  $140^{\circ}$  W, and on August 25, 1957 another individual was obtained by the *Fort Ross* in a gill net at Lat.  $49^{\circ} 01'$  N, Long.  $134^{\circ} 24'$  W. On May 21, 1958, another specimen was taken off the coast of Washington from the stomach of a fur seal. Eight adult individuals have been taken in California waters since the first capture in 1919 when numerous juvenile specimens up to  $1\frac{1}{2}$  inches in length were taken in small-meshed nets. The only food items recorded are jellyfishes and combjellies. In the Mediterranean Sea this species is said to be poisonous. The name recommended by the AFS/ASIH committee for the squaretail of the Pacific is smalleye squaretail.

Range: Southern California to west of Vancouver Island.

#### Suborder MUGILOIDEA

The fishes in this suborder have 2 dorsal fins, well separated, the first spinous, the second rayed, sometimes with 1 spine; the pelvic fins are technically thoracic although situated well behind the pectoral fins (and are sometimes referred to as subabdominal by authors), each with 1 spine and 5 rays; the pelvic bones usually are attached to the cleithra by a long ligament.

The suborder includes 3 families: the Sphyraenidae, barracudas; Mugiloidae, mullets; and Atherinidae, silversides; only the first of these appears in British Columbia waters.

In the barracudas the body is elongate, slender, more or less terete. The head is very long, pointed, pike-like; the mouth is large; the lower jaw is projecting; the teeth are large, strong, sharp-edged, unequal in size on jaws and palatines. The first dorsal fin is depressible in a groove; the second dorsal fin is placed far back on the body over the anal fin.

The barracudas are large swift-swimming predaceous fish, reaching a length of 8 feet and a weight of about 100 pounds. They are voracious and occasionally attack bathers. For the most part the distribution of this family is subtropical and tropical.

**Pacific barracuda***Sphyræna argentea* Girard 1854

Body elongate, slender, subterete. Head very elongate, sharply pointed; mouth terminal, large; lower jaw projecting; teeth well developed, large, sharp, fang-like, on jaws and palatines; snout acute; gill membranes separate, free from isthmus. Fin: dorsal (2), V—I, 9 or 10, widely separated; anal, I, 8 to 10, origin slightly behind that of rayed dorsal; pelvic, I, 5, thoracic, some distance behind pectorals; pectoral, low; caudal, furcate. Lateral line: high anteriorly, decurved gradually, then straight. Scales: cycloid, small; on lateral line, about 166; in row above lateral line, about 274. Colour: bluish brown on dorsal surface; silvery white on ventral surface.

Length to 5 feet.



FIGURE 140. Pacific barracuda. *Sphyræna argentea* Girard 1854

Distinguished by the slender subterete body, the sharply pointed head with the protruding lower jaw, the large fang-like teeth, the presence of 2 widely separated dorsal fins—the first spinous, the second with 1 spine and 9 or 10 rays and the pelvic fins thoracic in position but situated well behind the pectoral fins.

The Pacific barracuda was first taken in British Columbia waters on July 27, 1904, at Otter Point near Sooke in a fish trap. Three specimens were obtained, presented to the Provincial Museum at Victoria and recorded in 1909 by F. Kermode. The barracuda is captured rather frequently along the coast from Juan de Fuca Strait to the Queen Charlotte Islands and the vicinity of Prince Rupert.



It is common off the coast of California where spawning takes place chiefly during June in the open ocean. A length of 32 inches may be reached at the end of the sixth year and sexual maturity may be attained in the second or third years at lengths of 16 to 25 inches. The food consists of various fishes. This is an important commercial species in California where its rich, firm, well-flavoured flesh is in much demand. It is also a sport fish, being taken with jigs, plugs and live bait.

Range: Southern California to Gulf of Alaska.

### Suborder SCORPAENOIDEA

In this suborder are included fishes which are characterized by having the third suborbital bone greatly enlarged and forming a rod or stay or plate extending downward and backward from the eye, touching or nearly touching the preopercle. In some instances the stay is outwardly evident but often its presence and form can only be determined by dissection.

#### Family ANOPOLOMATIDAE

#### Skilfishes

In the skilfishes the head is without ridges, spines or cirri. There are two well developed nostrils on each side. The lateral line is single. The dorsal fins are 2, the anterior composed of spines and the posterior with 1 or 2 spines preceding the rays; the pelvic fins are thoracic, each with 1 spine and 5 rays.

Included in this family are the sablefish and skilfish. These are fishes of the North Pacific.

#### **Sablefish**

*Anoplopoma fimbria* (Pallas) 1811

Body elongate, slightly compressed, tapering into rather long slender caudal peduncle. Head conical, rather elongate; mouth terminal, moderate; lower jaw included; maxillary very narrow, reaching to point below front of pupil; teeth small, cardiform, on jaws, vomer and palatines; nostril double; gill membranes united, joined to isthmus. Fins: dorsal (2), XVII to XXI—I, 16 to 19, well separated, interspace about twice diameter of eye or more; anal, III, 15 to 19, spines usually embedded in adults, difficult to locate, origin below that of rayed dorsal; pelvic, I, 5, thoracic; caudal, deeply emarginate. Lateral line: moderately high, following dorsal contour. Scales: weakly ctenoid, small, elongate, covering body and head; in oblique rows above lateral line, about 190. Cirri: absent. Colour: slaty black or greenish gray on dorsal surface, somewhat reticulated; light gray on ventral surface; pale on outer margins of all fins except spinous dorsal; black margin narrow, on spinous dorsal fin; black on lining of operculum. In young, colours brighter and more contrasting, often light green with dusky bars on dorsal surface.

Length to 3 feet 4 inches.

Distinguished by the well separated dorsal fins, the pelvic fins each with 1 spine and 5 rays, the long slender caudal peduncle and the black lining of each operculum.



FIGURE 141. Sablefish. *Anoplopoma fimbria* (Pallas) 1811

The sablefish was first recorded from British Columbia waters in 1872 from Vancouver Island by W. Peters who described it as a new genus and species, *Scombrocottus salmoneus*. The second recorded occurrence is that of a specimen 13½ inches in length which was taken on August 2, 1881, in Kingcome Inlet at a depth of 18 fathoms by Captain H. E. Nichols and properly recorded in the same year by T. H. Bean as *Anoplopoma fimbria* (Pallas). This fish is fairly common in the Strait of Georgia and very abundant northward. Tagging has shown that the species tends to be localized but in some instances individuals have travelled over 1200 miles. The methods of capture are, for the most part, by set-line and trawl in deep water. The spawning season is in early spring. A partially spawned female was obtained on March 4, 1941, off Cape St. James. The eggs are pelagic. Post-larval individuals about an inch in length have been secured at the surface at distances of 100 to 185 miles off the coast of Oregon in the later part of May. The males do not attain as large a size as the females and reach maturity at an earlier age. Frequently considerable numbers of small individuals, about 18 inches in length, are secured on hand lines in various parts of the Strait of Georgia in comparatively shallow water. Large individuals 3 feet in length and 40 pounds in weight have been captured on the halibut banks at depths down to 170 fathoms. It is estimated that a 40-inch fish is about 20 years of age. The food consists of crustaceans, worms and small fishes. The sablefish is considered one of the best of the smoked fishes but is not sold fresh to any extent because of the high oil content. Small quantities are drysalted. The liver oil has a very high vitamin "A" and "D" content, ranking close to that of the lingcod. Various names have been applied to the sablefish such as skil, coalfish and blackcod, the latter term being inappropriate since the fish is not a cod.

Range: Southern California to Bering Sea.

## Skilfish

*Erilepis zonifer* (Lockington) 1880

Body elongate, stout, somewhat compressed. Head large; mouth terminal, moderate; lower jaw projecting; maxillary reaching to point about below centre of pupil; teeth slender; recurved on jaws; small on vomer and palatines; nostril double; gill membranes united, joined to isthmus. Fins: dorsal (2), XII to XIV—I or II, 15 to 17, closely approximated, interspace equal to diameter of eye or less, two spines in rayed fin may be inconspicuous or buried in flesh; anal, III, 11 to 14, origin posterior to that of rayed dorsal; pelvic, I, 5, thoracic; caudal, slightly emarginate. Lateral line: moderately high following dorsal contour. Scales: ctenoid; covering body, head and soft-rayed fins; in oblique rows above lateral line, 122 to 134. Cirri: absent. Colour: very dark; black on dorsal surface and sides; gray to white on ventral surface; soiled white on margins of scales. In young, nearly uniform gray with white blotches and circles on head and anterior of body.

Length to 6 feet.



FIGURE 142. Skilfish. *Erilepis zonifer* (Lockington) 1880

Distinguished by the approximated dorsal fins, the pelvic fins each with 1 spine and 5 rays, the anal fin with 3 spines and 11 to 14 rays and the scales on the rayed fins. This species is illustrated in colour on Plate IV following page 224.

The skilfish was first taken in British Columbia waters in November, 1915, off the west coast of the Queen Charlotte Islands and recorded in 1916 and later in 1917 by W. F. Thompson. Subsequently two individuals were obtained in October, 1916, off the west coast of the Queen Charlotte Islands at a depth of 240 fathoms. One of them about 5 feet 10 inches in length and weighing 175 pounds was presented to the Provincial Museum in Victoria by the Canadian

Fishing Co. and is now represented by a cast covered with the skin. The other specimen, 3 feet 8 inches in length, was given to Stanford University. In July, 1956, a small specimen, a little over a foot in length, was obtained in a surface gill net, Lat. 50°N, Long. 135°W, by the *Challenger* and transferred to the Vancouver Public Aquarium where it is now living nearly five years later. It readily rises to the surface to be fed by hand and is now about 31 inches in length. Nothing is known of the life history in British Columbia waters. The species is known to attain a weight of 200 pounds. The name used by Clemens and Wilby (1946) was the giant skil-fish.

Range: Northern California to southeastern Alaska.

#### Family HEXAGRAMMIDAE

#### Greenlings

In the greenlings the head is without ridges or spines but possesses cirri. There is a fully developed anterior nostril on each side; the posterior, if present, is reduced to a small pore. Multiple lateral lines frequently are present. The scales are cycloid or ctenoid and completely cover the body. The dorsal fin is single with 16 to 27 spines and 11 to 24 rays; the anal fin has 1 to 3 weak spines, or none; the pelvic fins are thoracic, each with 1 spine and 5 rays.

The various members of the family usually have a bright coloration which evidently is associated with the prevailing hues of the seaweeds and rocks of the habitat. In some species there is a marked difference in the colours and colour patterns of the sexes.

#### **Kelp greenling**

*Hexagrammos decagrammus* (Pallas) 1810

Body elongate, moderately deep anteriorly; caudal peduncle slender. Head short, conical; mouth terminal, small; teeth small; nostril single; gill membranes united, free from isthmus. Fins: dorsal (1), XXI or XXII, 24, moderately notched; anal, I, 23 or 24, spine short, stout, closely applied to first ray; pelvic, I, 5, thoracic, caudal, slightly emarginate. Lateral lines: 5; first, from occipital region close to dorsal fin ending at point below middle of rayed portion (closer to dorsal fin than to second lateral line); second, from occipital region to base of caudal fin; third (usual lateral line), from immediately above opercle to base of caudal fin; fourth, from gill opening below pectoral, passing above pelvic, terminating near posterior end of anal fin; fifth, from isthmus, branching in front of anus, ending at base of caudal fin. Scales: ctenoid; covering body, top of head, cheeks and opercles. Cirri: 4, multifid, thick; supraocular, 2, prominent; occipital, 2, very small, each in slight depression almost midway on straight line from middle of front of eye to origin of dorsal fin. Colour in male: brownish olive, often tinged with blue or copper; blue spots on head and anterior part of body, each surrounded by reddish brown ring of small spots, mottled brown on dorsal fin, dusky blue on pelvic and anal fins; brown to black on pectoral fins, spotted with white giving appearance of transverse

bars. Colour in female: from light brown, with small reddish spots, to light blue with rows of round orange spots; red to orange on dorsal fin, clouded with blue; orange or pale yellow on pectoral fins, without markings. In both sexes: conspicuous ocellus at posterior end of rayed portion of dorsal fin.

Length to 21 inches.



FIGURE 143. Kelp greenling. *Hexagrammos decagrammus* (Pallas) 1810

Distinguished by the two pairs of cirri on the head, the single small spine at the front of the anal fin and the conspicuous ocellus on the posterior portion of the dorsal fin.

The kelp greenling was first recorded from British Columbia waters in 1866 by J. K. Lord, without date of capture or exact locality as *Chirus constellatus* and *Chirus decagrammus* (probably not distinguishing between male and female). The first definite record is that of 3 specimens taken on September 13, 1881, in Nootka Sound at Friendly Cove by Captain H. E. Nichols and recorded in the same year by T. H. Bean as *Hexagrammus decagrammus* (Pallas). The species is fairly common in British Columbia waters, particularly along the west coast of Vancouver Island, and is found along rocky shores, reefs and around kelp beds. Small specimens 1 to 3 inches in length are taken commonly in surface plankton on the high seas in the Gulf of Alaska. Spawning occurs in October and November when the pale blue eggs are laid in large masses. The food consists to a large extent of worms, crustaceans and small fishes. It is present frequently in the stomachs of steelhead and salmon. The kelp greenling seldom is brought to market by commercial fishermen but is caught by handlines and speared by Indians for food. The flesh is very palatable, not unlike that of certain rockfishes in flavour. This is one

of the most strikingly coloured of our sea fishes and hence sometimes is called erroneously rocktrout and kelptrout. The classic description of J. K. Lord bears quoting here:

"THE CHIRUS . . . a handsome shapely fish, about 18 inches in length. Its sides, though somewhat rough, rival in beauty many a tropical flower; clad in scales, adorned with colours not only conspicuous for their brilliancy, but grouped and blended in a manner one sees only represented in the plumage of a bird, the wing of a butterfly, or the petals of an orchid, this 'ocean swell' is known to the ichthyologist as the Chirus—the *Terpugh* (a file) of the Russians—the *Idyajuk* of the Aleutian Islanders—the *Tath-le-gest* of the Vancouver Islanders.

". . . to give the faintest conception of the colourings that adorn the chirus red, blue, orange, and green are so mingled, that the only thing I can think of as a comparison is a floating flower-bed, and even the gardener's art, in grouping, is but a bungle contrasted with Nature's painting!"

This species was recorded in 1946 by Clemens and Wilby as *Chiropsis decagrammus* (Pallas).

Range: Southern California to southeastern Alaska.

### Whitespotted greenling

*Hexagrammos stelleri* Tilesius 1809

Body elongate, rather slender; caudal peduncle slender, depth 3 or more in length of head. Head short, conical; mouth terminal, small; teeth small; nostril single; gill membranes united, free from isthmus. Fins: dorsal (1), XXII to XXV, 19 to 24, moderately notched; anal, 23 to 25; pelvic, I, 5, thoracic; caudal, slightly emarginate. Lateral lines: 5; first short, from occipital region close to dorsal fin, ending at point below middle of spinous portion; second, from occipital region to base of caudal fin; third (usual lateral line), from immediately above opercle to base of caudal fin; fourth, very short, from gill opening below pectoral fin to point above pelvic fin; fifth, from isthmus, branching in front of anus, ending at base of caudal fin. Scales: ctenoid; covering body and top of head; cycloid, on



FIGURE 144. Whitespotted greenling. *Hexagrammos stelleri* Tilesius 1809

cheek and opercle in one or more patches. Cirri: 2; supraocular, small, multifid, length less than diameter of eye. Colour: varying from light brown to green, sometimes tinged with pale red, barred or blotched with dusky; white spots conspicuous on body; pale yellow on anal fin with 6 dark bars; light reddish yellow on pectoral fins, barred with dark stripes.

Length to 16 inches.

Distinguished by the small cirrus above each eye, the conspicuous white spots on the body, the short first and fourth lateral lines and the slender caudal peduncle.

The whitespotted greenling was first recorded from British Columbia waters in 1866, without date of capture, or locality, by J. K. Lord as *Chirus hexagrammus*. The first definite record is that of a specimen taken in August, 1881, at Port Simpson by Captain H. E. Nichols; and recorded in the same year by T. H. Bean as *Hexagrammus asper* Steller. The species occurs along the whole coast and is the commonest greenling in the Strait of Georgia. It inhabits areas along the rocky shores but also is found frequently in shallow water over sandy beaches. An individual spawned February 10, 1942, in the English Bay Aquarium depositing a large cluster of light blue eggs on a rock. The food consists of worms, crustaceans and small fishes. Youthful anglers find this species a good sport fish and very inappropriately call it "tommycod" or "rocktrout". The flesh has a good flavour, not unlike that of the best of the rockfishes.

Range: Northern California to Bering Sea.

### Rock greenling

*Hexagrammos superciliosus* (Pallas) 1810

Body elongate, moderately deep; caudal peduncle stout, depth about 2 in length of head. Head short, conical; mouth terminal, small; teeth small; nostril single; gill membranes united, free from isthmus. Fins: dorsal (1), XX or XXI, 23 or 24, moderately notched; anal, 21 or 22; pelvic, I, 5, thoracic; caudal, rounded. Lateral lines: 5; first, from occipital region close to dorsal fin, ending at point below middle of rayed portion (closer to dorsal fin than to second lateral line); second, from occipital region to base of caudal fin; third (usual lateral line), from immediately above opercle to base of caudal fin; fourth, from gill opening below pectoral, passing above pelvic, terminating near posterior end of anal fin; fifth, from isthmus, branching in front of anus, ending at base of caudal fin. Scales: ctenoid, small, covering body and top of head; cycloid on cheeks and opercles. Cirri: 2; supraocular large, slender, multifid, length equal to, or greater than, diameter of eye. Colour: usually bright, extremely variable; ground colour dark green, brown or brighter, especially in adult; red stripes downward and backward from eye, 2; bright red on isthmus and branchiostegal membranes; dark conspicuous spot above base of pectoral fin; usually pale to bright round spots or blotches on sides of body which may be cherry red at times; brown, light green

or red on pectoral fin, usually with three dusky crescent-shaped cross bands; sometimes red spots or bars on pelvic and anal fins; dull green on caudal fin margined with red.

Length to 2 feet.



FIGURE 145. Rock greenling. *Hexagrammos superciliosus* (Pallas) 1810

Distinguished by the very large fringed cirrus above each eye and the round dark spot above the base of each pectoral fin.

The rock greenling was first taken in British Columbia waters on September 18, 1881, in Rose Harbour by Captain H. E. Nichols and was recorded in the same year by T. H. Bean as *Hexagrammus superciliosus* (Pallas). Other records are from Departure and English Bays, the west coast of Vancouver Island and Port Simpson. Undoubtedly it occurs in other localities. It was listed in 1946 by Clemens and Wilby as *Lebius superciliosus* (Pallas), the fringed greenling.

Range: Southern California to Bering Sea.

### Painted greenling

*Oxylebius pictus* Gill 1862

Body elongate, moderately deep; caudal peduncle moderately stout. Head elongate, pointed, compressed; mouth terminal, small; maxillary not reaching to anterior margin of eye; teeth small; nostril single; gill membranes broadly united, free from isthmus. Fins: dorsal (1), XVI, 14 to 16, slightly notched; anal, III or IV, 12 or 13, notch between spinous and rayed portions, shallow; pelvic, I, 5, thoracic; caudal, somewhat rounded. Lateral line: nearly straight. Scales: ctenoid, small, covering body, head and opercle; cycloid on cheek. Cirri: 4, multifid; supraocular, 2, moderate; occipital, 2, small. Colour: light brown to gray; dark bars, 7, vertical, across body, dorsal, anal and caudal fins; bars on pectoral and pelvic fins, irregular.

Length to 10 inches.



Distinguished by the elongate pointed head with two pairs of cirri, the single lateral line, the notched anal fin and the vertical dark bars on each side of the body.



FIGURE 146. Painted greenling. *Oxylebius pictus* Gill 1862

The painted greenling was first recorded from British Columbia waters in 1881 by D. S. Jordan and C. H. Gilbert on the basis of a specimen seen in Saanich Arm. The species occurs in the vicinity of Victoria and an occasional individual is captured in beach seines in Departure Bay. It may be more numerous than is indicated here as it may be seen in its habitat along rocky shores and amongst seaweeds, but it does not take a bait. As its name implies it is a strikingly marked fish and sometimes is called the "convictfish" because of the vertical bars.

Range: Southern California to Strait of Georgia.

#### **Longspine combfish**

*Zaniolepis latipinnis* Girard 1857

Body elongate, slender, tapering gradually to very slender caudal peduncle. Head short, conical; mouth terminal, small; maxillary reaching behind anterior margin of eye; teeth small; nostril single; preopercular spines, 3 to 5, upper two closely approximated, sharp; gill membranes united anteriorly, free from isthmus. Fins: dorsal (1), XX or XXI, I, 11 or 12, very deeply notched, first 3 spines with connecting membranes very low, first three spines elongate, second greatly prolonged, length equal to half that of body; anal, III, 16 or 17, slightly notched between spinous and rayed portions, spines small, rays increasing in length to fourth last; pelvic, I, 5, thoracic, first two rays fleshy extending beyond anus; caudal, slightly emarginate. Lateral line: somewhat high, following dorsal contour of body throughout its length. Scales: ctenoid, very small, firmly set in tough skin, covering body and head except portion of snout. Cirri: 2; supraocular, small,

multifid, often absent; maxillary, 2, small. Colour: varying from olive green to light yellowish brown; brown or black spots on body, faint; dark spots in bars on all fins; black streak from front of eye to tip of snout.

Length to 12 inches.

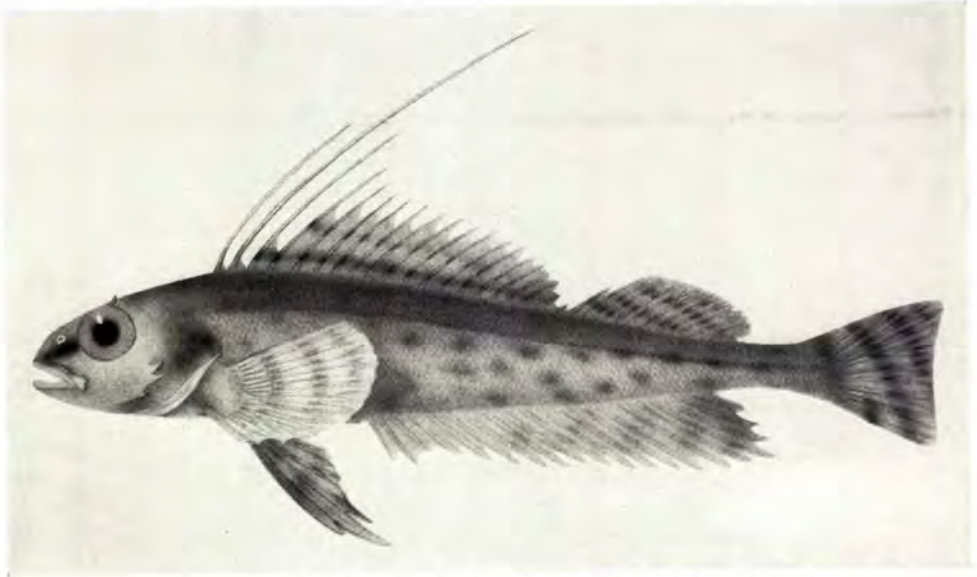


FIGURE 147. Longspine combfish. *Zaniolepis latipinnis* Girard 1847

Distinguished by the very long second spine in the spinous portion of the dorsal fin, the rough scales firmly set in the tough skin and the thickened first 2 rays in each pelvic fin.

The longspine combfish was first taken in British Columbia waters in 1889 in the Strait of Georgia, also in 1890 near Victoria, and these specimens were recorded in 1898 by J. Fannin as being in the Provincial Museum at Victoria. Other individuals have been secured near Alberni, in Saanich Inlet, near Nanaimo and in Nanoose Bay. The longspine combfish occurs at moderate depths down to 62 fathoms. It feeds to some extent upon crustaceans. Clemens and Wilby (1946) used the name long-spined greenling.

Range: Southern California to Vancouver Island.

### Lingcod

*Ophiodon elongatus* Girard 1854

Body elongate, moderately deep; caudal peduncle slender. Head elongate, conical, depressed; mouth terminal, small; lower jaw projecting; maxillary reaching behind anterior margin of eye; teeth large, canine-like; nostril double, posterior small; preopercular spines, 3 to 5; gill membranes slightly united anteriorly, free from isthmus. In male, anal papilla small. Fins: dorsal (1), XXIV to XXVII,

21 to 24, moderately notched; anal, III, 21 to 24, spines buried in flesh in adult, third closely applied to first ray; pelvic, I, 5, thoracic; caudal, truncate. Lateral line: high on side of body bending slightly downward to midlateral position below rayed portion of dorsal fin, then straight. Scales: cycloid, small, covering body. Pores: tubular; on lateral line, 154 to 180. Cirri: 2; supraocular, large, thick, multifid. Colour: dark on dorsal surface, ranging from black, brown, blue to green; dusky greenish gray or dusky cream on ventral surface; frequently mottled on back, sides, and dorsal and anal fins; grayish green on pectoral, pelvic and anal fins; males often with large dark greenish brown areas on back and sides outlined with tracings of pale blue or orange; females similarly marked but usually lighter, with orange tracings rather than blue, small orange spots scattered amongst the larger areas; colours and colour patterns varying with habitat and subject to rapid changes.

Length to 5 feet.



FIGURE 148. Lingcod. *Ophiodon elongatus* Girard 1854

Distinguished by the pelvic fins thoracic in position each with 1 spine and 5 rays, the long continuous notched dorsal fin, the small smooth scales covering the body and the head, the large mouth and teeth and the large fleshy cirrus above each eye. The lingcod is shown in colour on Plate V following page 224.

The lingcod, also known as cultus cod, was first recorded from British Columbia waters in 1881 by D. S. Jordan and C. H. Gilbert on the basis of a specimen seen at Victoria. It is common along the northeastern shore of the Pacific Ocean with the centre of abundance in British Columbia waters. It is taken by trolling, in otter trawls and on jigs using live herring for bait. The habitat is near the bottom of the intertidal zone down to at least 60 fathoms, among kelp beds and reefs, especially where there are strong tidal movements. The fish when resting on the bottom supports its weight on its pectoral and pelvic fins. Spawning takes place from late December to February or March. The female deposits her eggs in a sheltered rocky location in large adhesive pinkish white masses below the lowest tide level. Individuals 34 and 46½ inches in length have been found to con-

tain 170,000 and 476,000 eggs respectively. After fertilizing the eggs the male guards them until they are hatched. He fans the eggs with his pectoral fins to keep up a good circulation of water and drives off all enemies with fierce rushes, biting at any approaching intruder. The young hatch with a small yolk-sac attached and can be identified by the bright yellow oil globule near the liver, the large blue eyes and the elongate body. Little is known of the post-larval stages but young fingerlings from 3 to 5 inches in length are taken occasionally by seining in the eelgrass during the summer. Tagging operations have not indicated a regular migration but merely local random movements, the greatest distance recorded being 80 miles. The lingcod feeds chiefly upon herring and other fishes such as flounders, hake, cod, whiting, sandlances and younger lingcod, although various crustaceans and squid remains have been found in the stomach contents. The juveniles feed upon copepods and other small crustaceans.

The lingcod is highly esteemed as a fresh fish. It is used extensively in restaurants and is available at all seasons of the year. The 1958 catch amounted to nearly 6 million pounds. Most of the trawl catch comes from the west coast of Vancouver Island, while the line catch is mainly from the Strait of Georgia. The flesh of the adults is almost white and of the young is sometimes intensely green. The green colouring matter is not harmful and all traces of it disappears upon cooking. This fish has been found to be one of the richest sources of insulin amongst the fishes of the world. The liver oil is remarkably rich in vitamins "A" and "D", assays showing the highest ranges of potency of any known fish or selachian oil from British Columbia waters. The females attain a larger size than do the males and dressed weights between 80 and 100 pounds are known.

Range: Southern California to Bering Sea.

#### Family SCORPAENIDAE

#### Rockfishes

In the rockfishes the body is elongate and stout anteriorly. The head is large and usually bears prominent ridges and spines in definite positions. The scales are large and ctenoid. The dorsal fin is single with 13 to 15 spines and 9 to 16 rays; the anal fin has 3 stout spines and 5 to 9 rays; the pelvic fins are thoracic, each with a spine and 5 rays.

The rockfishes constitute a group of many species largely in the north temperate seas. Over 50 species are known along the eastern shores of the Pacific Ocean from California to Alaska and at least 24 of these are found in British Columbia waters, in two genera, *Sebastes* and *Sebastes*.

These fishes frequently are called rockcods but since they have no close relationship with the true cods, Gadidae, it seems advisable to adopt the term rockfishes and discard the term "cod" in reference to members of this family.

Many species inhabit rocky shores but the family has representatives in a vertical range from tide-water to 822 fathoms. Species living near the surface are for the most part brown in colour while those in deep water often have red predominating.

All species of the genus *Sebastes* have internal fertilization of the eggs and subsequent release of the young. These are less than  $\frac{1}{2}$  inch in length and are produced in large numbers during the summer months.

The rockfishes have firm white flesh which is very palatable and of excellent food value. The market demand for them has been increasing steadily. The bulk of the catch is filleted for the fresh-fish trade.

### **Bocaccio**

*Sebastes paucispinis* (Ayles) 1854

Body rather elongate, slender, depth 3.4 to 4.1 in standard length. Head elongate, pointed; upper profile moderately sloping, straight from tip of upper jaw to origin of dorsal fin; length 2.6 to 2.8 in standard length; mouth terminal, large; lower jaw greatly projecting, more so than in any other species of *Sebastes*, extending beyond upper profile of head; symphyseal knob large; interorbital space at midorbits highly convex, broad, width 4.2 to 4.8 in length of head; cranial spines: parietal; posttemporal; cleithral; all minute; opercular, 2, upper larger; preopercular sharp, third distinctly largest; lacrymal lobes, 2, second minutely spinous; rakers on first gill arch, 28 to 31. Fins: dorsal (1), XII to XIV, 13 to 15, very deeply notched so that spinous and rayed portions almost separate, membranes of spinous portion slightly incised; anal, III, 8 to 10; pelvic, I, 5, thoracic, relatively short, not reaching anus; pectoral, 15 or 16, 5 to 7 rays unbranched, not reaching anus. Scales: weakly ctenoid, very small; in oblique rows above lateral line, 90 to 105. Pores: on lateral line, 56 to 70. Colour: light green to dark brown on dorsal surface; everywhere flushed with clear pale red, often with intense black spots on body; red on lower jaw, black on tip; white to silvery on peritoneum.

Length to 3 feet.



FIGURE 149. Bocaccio. *Sebastes paucispinis* (Ayles) 1854

Distinguished by the highly convex interorbital space, the large mouth with the greatly projecting lower jaw, the 15 or 16 rays in each pectoral fin and the deeply notched dorsal fin.

The bocaccio was first recorded from British Columbia waters in 1866, by J. K. Lord, without date or locality of capture, as *Sebastes paucispinis*. On September 27, 1888, a specimen 8 inches in length was secured by the *Albatross* in Barkley Sound and recorded in 1907 by B. W. Evermann and E. L. Goldsborough. Subsequent records have been from Barkley and Howe Sounds and in September, 1942, from Bates Pass at Bull Harbour. It is included frequently in commercial catches of rockfishes from Juan de Fuca Strait and the west coast of Vancouver Island. The species usually occurs at depths below 40 fathoms. The food consists of small fishes. It is a relatively swift-moving rockfish and in Howe Sound has become a popular sport fish in deep trolling with light tackle using herring skin for a lure. In California it is an important commercial species. The word bocaccio means large mouth.

Range: Southern California to Queen Charlotte Sound.

### **Blue rockfish**

*Sebastes mystinus* (Jordan and Gilbert) 1880

Body elongate, deep, depth 2.7 to 2.9 in standard length; dorsal and ventral profiles evenly curved. Head relatively short, bluntly pointed, length 3.0 to 3.1 in standard length; mouth terminal, large, lower jaw projecting, not extending beyond upper profile of head; symphyseal knob, evident; eye diameter, 4.1 to 5.0 in length of head; interorbital space at midorbits highly convex, broad, 3.2 to 3.5 in length of head; cranial spines: nasal; prefrontal; posttemporal; cleithral, short, delicate; opercular, 2, moderate; preopercular, rather strong; lacrymal lobes and spines, absent; rakers on first gill arch, 33 to 38. Fins: dorsal (1), XIII, 15 to 17, moderately notched, membranes of spinous portion slightly incised, very low, spines much shorter than longest rays; anal, III, 8 to 10; pelvic, I, 5, thoracic, not reaching anus; pectoral, 17 or 18, 8 to 10 rays unbranched, short, not reaching anus. Scales: ctenoid; in oblique rows above lateral line, 62 to 66. Pores: on lateral line, 44 to 56. Colour: bluish to grayish black on dorsal surface; paler below; often vaguely dappled or blotched with darker and lighter shades on back and sides; black streaks radiating downward and backward from eye, 2; dusky to black on all fins: young up to 6 inches, somewhat reddish; black on peritoneum.

Length to 20 inches.

Distinguished by the highly convex interorbital space without spines, the small prefrontal spines, the low spinous portion of the dorsal fin, the small eyes, the bluish to grayish black coloration on the body and the black peritoneum.

The blue rockfish was first taken in British Columbia waters in 1885 from Queen Charlotte Strait by Dr G. M. Dawson at a depth of 10 fathoms and recorded in 1887 by J. F. Whiteaves as *Sebastes mystinus* Jordan and Gilbert. There was no further report of occurrence until the summer of 1940, when two

specimens were captured in the Strait of Georgia in an otter trawl and were on display in the English Bay Aquarium. This species occurs commonly between 40 and 50 fathoms and hence is not taken as frequently as the black rockfish. Breeding occurs from November to January and a female may carry up to 500,000 embryos. The fish mature at 5, 6, and 7 years of age. This species was recorded as the priest-fish in 1946 by Clemens and Wilby.

Range: Southern California to Bering Sea.



FIGURE 150. Blue rockfish. *Sebastes mystinus* (Jordan and Gilbert) 1880

#### **Yellowtail rockfish**

*Sebastes flavidus* Ayres 1862

Body elongate, moderately deep, depth 2.9 to 3.5 in standard length. Head with upper profile steep, slightly curved, length 2.7 to 2.9 in standard length; mouth terminal, large; lower jaw strongly projecting, not extending beyond upper profile of head; symphyseal knob prominent; snout sharply pointed; eye, diameter 3.4 to 4.5 in length of head; interorbital space at midorbits highly convex, broad, 3.7 to 4.3 in length of head; cranial spines: nasal; posttemporal (sometimes absent); cleithral; all minute; opercular, 2, small; preopercular small, second and third largest; lacrymal lobes and spines, absent; rakers on first gill arch, 35 to 38. Fins: dorsal (1), XIII, 14 or 15, moderately notched, membranes of spinous portion deeply incised; anal, III, 7 to 9; pelvic, I, 5, thoracic, not reaching anus; pectoral, 17 or 18, rarely 19, 8 to 10 rays unbranched, not reaching anus. Scales: weakly ctenoid; in oblique rows above lateral line, 60 to 70. Pores: on lateral line, 49 to 60. Colour: dark gray, vaguely streaked and mottled with black and washed with dusky green; dusky green with faint yellow on fins; dusky yellow on tip of caudal fin; white on peritoneum.

Length to 2 feet 2 inches.

Distinguished by the highly convex interorbital space without spines, the deeply incised membranes of the spinous portion of the dorsal fin, the dark gray coloration on the body washed with dusky green, the dusky yellow on the tip of the caudal fin and the white peritoneum.

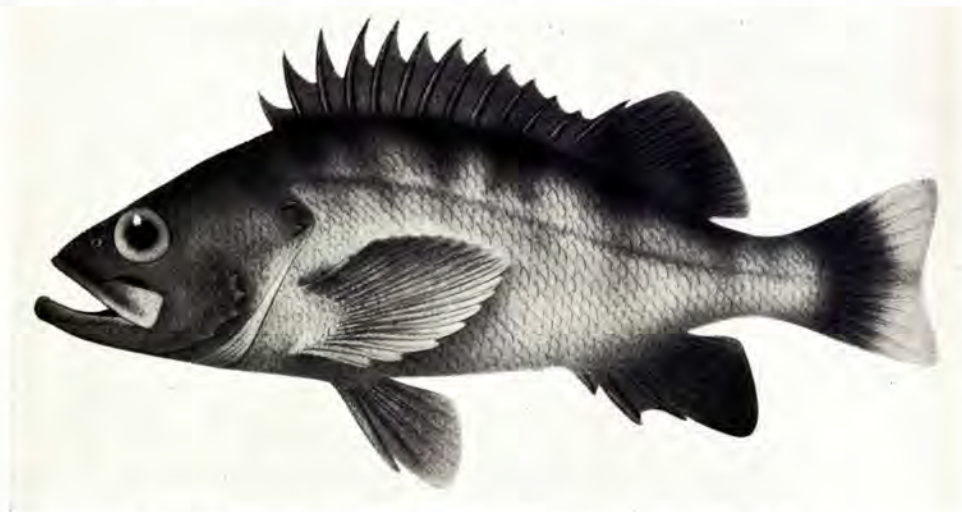


FIGURE 151. Yellowtail rockfish. *Sebastes flavidus* Ayres 1862

The yellowtail rockfish was first taken in British Columbia waters on March 18, 1934, when two large specimens were caught off Departure Bay. Other individuals have been examined from Clayoquot Sound near Flores Island, taken on May 23, 1934; from Baynes Sound, on February 12, 1942, at depths of 30 to 40 fathoms; and 3 juveniles from Sooke traps on August 17, 1942. Additional specimens have been taken from various localities around Vancouver Island and in Hecate Strait in trawls, on trolls and on lingcod lines. The yellowtail rockfish is considered an excellent food fish.

Range: Southern California to Vancouver Island.

### **Black rockfish**

*Sebastes melanops* (Girard) 1856

Body elongate, deep, depth 2.5 to 3.1 in standard length. Head with upper profile steep, almost straight, length 2.7 to 2.9 in standard length; mouth terminal, large; lower jaw slightly projecting, blunt, not extending beyond upper profile of head; symphyseal knob moderate; snout rather blunt; eye, diameter 3.7 to 4.3 in length of head; interorbital space at midorbits highly convex, broad, 3.9 to 4.4 in length of head; cranial spines: nasal; posttemporal (sometimes absent); cleithral; all minute; opercular, 2, small; preopercular small, second and third largest; lacrymal lobes and spines, absent; rakers on first gill arch, 34 to 39. Fins: dorsal



(1), XIII, 13 to 16, moderately notched, membranes of spinous portion moderately incised; anal, III, 7 to 9; pelvic, I, 5, thoracic, barely reaching anus; pectoral, 18 to 20, 9 to 11 rays unbranched, not reaching anus. Scales: ctenoid; in oblique rows above lateral line, 60 to 70. Pores: on lateral line, 46 to 53. Colour: olive brown to black on dorsal surface; paler on sides; soiled white on ventral surface; dusky black above on head, dark streak from eye across cheek, dark streak on maxillary; usually black spot on posterior of spinous portion of dorsal fin (conspicuous in young); black on all fins; sometimes carmine red on mandible and all fins except dorsal; white on peritoneum.

Length to 20 inches.



FIGURE 152. Black rockfish. *Sebastes melanops* (Girard) 1856

Distinguished by the highly convex interorbital space without spines, the moderately large eyes, the black coloration sometimes blotched with carmine red and the white peritoneum.

The black rockfish was first recorded from British Columbia waters in 1866, without date or locality, by J. K. Lord as *Sebastes melanops*. On September 23, 1888, it was taken in Barkley Sound by the *Albatross* and recorded in 1907 by B. W. Evermann and E. L. Goldsborough. Two specimens obtained in 1895 in Juan de Fuca Strait near Victoria were recorded in 1898 by J. Fannin as *Sebastichthys melanops*. Apparently the species is widely distributed along the coast of British Columbia. It is a common shore form amongst the rocks and is taken frequently on hand-lines. The black rockfish and the blue rockfish are confused by many fishermen, who call them "black bass" indiscriminately.

Range: Northern California to Gulf of Alaska.

**Orange rockfish**

*Sebastes pinniger* (Gill) 1864

Body elongate, moderately deep, depth 2.5 to 3.0 in standard length. Head with upper profile somewhat curved; length 2.7 to 2.8 in standard length; mouth terminal, large; lower jaw projecting, not extending beyond upper profile of head; symphyseal knob moderate; interorbital space at midorbits highly convex, broad, 4.3 to 4.8 in length of head; cranial spines: nasal; prefrontal, frontals I, II, III, minute; parietal, small; posttemporal, large; cleithral, large; opercular, 2, large; preopercular, slender, sharp; lacrymal lobes, 2, sharp spine on each, anterior small, sometimes absent; rakers on first gill arch, 38 to 45, rough. Fins: dorsal (1), XIII, 14 or 15, slightly notched, membranes of spinous portion moderately incised; anal, III, 7 to 9; pelvic, I, 5, thoracic, long, barely reaching anus; pectoral, 17 or 18, 8 or 9 rays unbranched, barely reaching anus. Scales: ctenoid on



FIGURE 153. Orange rockfish. *Sebastes pinniger* (Gill 1864)

body; cycloid on head, maxillary and mandible; in oblique rows above lateral line, 45 to 51. Pores: on lateral line, 39 to 47. Colour: light olive gray with clear orange red or light orange yellow, red predominating, on dorsal surface; paler, nearly white, on ventral surface; reddish orange streak along upper portion of body below dorsal fin; pale grayish streak immediately above posterior two-thirds of lateral line; orange blotch above pectoral fin, orange saddle over caudal peduncle; golden blotches on side of caudal peduncle, 2; yellow orange stripes radiating from eye, 3, bright; bright orange on all fin membranes; usually black

blotch on membranes of spinous portion of dorsal fin between seventh and tenth spines, large, very distinct in young; pale red, with dusky mottling, on lining of mouth; white on peritoneum.

Length to 2 feet 6 inches.

Distinguished by the orange coloration, the three bright orange stripes across the head, the pale red with dusky mottling on the lining of the mouth, the spines on the lacrymal lobes and the smooth scaly maxillary and mandible.

The orange rockfish was first recorded from British Columbia waters in 1891 from the vicinity of Victoria by Ashdown Green as *Sebastichthys pinniger*. On June 20, 1903, a specimen 4½ inches in length was obtained in the Strait of Georgia off Bowen Island by the *Albatross*, at station 4193, Lat. 49° 20' N, Long. 123° 43' W, depth 23 fathoms. The species is rather common along the coast. The young inhabit shore waters while the older fish are distributed in the deeper waters, very large individuals occurring at depths of at least 100 fathoms. Females with embryos somewhat less than ⅓ inch in length have been observed in February and March. Large individuals may contain as many as 600,000 young. Commercial catches are made in trawls and on jigs baited with live herring. The fish is very palatable and finds a ready market. The name recommended by the AFS/ASIH committee is canary rockfish.

Range: Southern California to Dixon Entrance.

### **Vermilion rockfish**

*Sebastes miniatus* (Jordan and Gilbert) 1880

Body elongate, moderately deep, depth 2.6 to 3.0 in standard length. Head with upper profile somewhat curved, length 2.6 to 2.7 in standard length; mouth terminal, large; lower jaw slightly projecting, not extending beyond upper profile of head; dentary elevation fitting into notch in upper jaw; symphyseal knob moderate; interorbital space at midorbites slightly convex, width medium, 4.1 to 4.5 in length of head; cranial ridges: low, broad, weak; cranial spines: nasal; prefrontal; frontals I, II, III; parietal delicate; posttemporal large; cleithral large; opercular, 2, large; preopercular moderately long, sharp, radiating; lacrymal lobes and spines, absent; rakers on first gill arch 35 to 42, long, slender. Fins: dorsal (1), XIII, 13 to 15, deeply notched, membranes of spinous portion deeply incised; anal, III, 6 to 8; pelvic, I, 5, thoracic, long, reaching behind anus almost to anal fin; pectoral, 17 or 18, 8 to 10 rays unbranched, not reaching anus. Scales: ctenoid on body, head, maxillary and mandible; in oblique rows above lateral line, 45 to 53. Pores: on lateral line 40 to 51. Colour: deep vermilion on dorsal surface; pinkish mottling on sides; light red on ventral surface; black dots in clusters everywhere on back and sides giving dusky shade to body; red on lips, mottled with darker red streak on maxillary; orange stripes radiating from eye, 3, obscure; cross blotches on top of head, faint; bright vermilion scattered on all fins: black on margins, black dots on membranes; olive gray spots on base of spinous portion of

dorsal fin, somewhat black on posterior margin; dark olive streak on each membrane, red on lining of mouth; white, sometimes slightly dusky, on peritoneum.

Length to 3 feet.



FIGURE 154. Vermilion rockfish. *Sebastes miniatus* (Jordan and Gilbert) 1880

Distinguished by the vermilion coloration, the 3 obscure orange stripes radiating from each eye, the red mouth and the rough scaly maxillary and mandible.

The vermilion rockfish was first taken in British Columbia waters on May 14, 1934, in Clayoquot Sound near Flores Island at a depth of about 30 fathoms in a trawl, by E. G. Hart, and is now in the collection of the Biological Station at Nanaimo. A second specimen, 3 feet in length, was obtained in the summer of 1934 in the Strait of Georgia and it was examined at a reduction plant at Deep Bay.

Range: Southern California to Vancouver Island.

#### **Blackblotched rockfish**

*Sebastes crameri* Jordan 1896

Body elongate, depth 2.3 to 2.8 in standard length. Head with upper profile nearly straight, length 2.4 to 2.7 in standard length; mouth terminal, moderate; lower jaw not projecting beyond upper; dentary elevation small, not completely included by upper jaw; symphyseal knob moderate, directed downward; premaxillaries not separated into lobes; interorbital space at midorbital very slightly convex, width medium, 3.3 to 4 in length of head; cranial ridges: low, weak; cranial spines: nasal; prefrontal; frontals, I, II, III; parietal, 2, sharp, prostrate; posttemporal, well developed; cleithral, well developed; opercular, 2, sharp; preopercular, radially

directed, second and third largest; lacrymal lobes, spine on each, sometimes bifid on posterior; rakers on first gill arch, 29 to 33. Fins: dorsal (1), XIII, 13 or 14, occasionally 12; moderately notched, membranes of spinous portion moderately incised; anal, III, 7, second spine much thicker than third, somewhat curved; pelvic, I, 5, thoracic, not reaching anus; pectoral, 18 to 20, 8 to 11 rays unbranched, not reaching anus. Scales: ctenoid, large, in oblique rows above lateral line, 88. Pores: on lateral line, 40 to 50. Colour: red, pink or orange, dusky black patches on dorsal surface, 5, three under spinous dorsal fin, one under rayed dorsal, one on caudal peduncle; brown to black on peritoneum.

Length to 20 inches.



FIGURE 155. Blackblotched rockfish. *Sebastes crameri* Jordan 1896

Distinguished by the creamy yellow to orange or pink coloration, the 5 black blotches on the dorsal surface and the brown to black on the peritoneum.

The blackblotched rockfish was first taken in British Columbia waters in the summer of 1950 by the *John N. Cobb* and was recorded in 1952 by D. L. Alverson and A. D. Welander. The vessel operated from 30 to 380 miles off shore and obtained large numbers of albacore in whose stomachs there were great quantities of juvenile rockfish, chiefly *S. crameri* and *S. alutus*. On November 19, 1953, an individual was captured in Haro Strait at a depth of 60 fathoms and the specimen is now in the collection of the Biological Station at Nanaimo. In California waters the species has been taken at depths to 200 fathoms. The name recommended by the AFS/ASIH committee is blackmouth rockfish.

Range: California to Bering Sea.

**Redstripe rockfish***Sebastes proriger* (Jordan and Gilbert) 1880

Body elongate, slender; depth 3.1 to 3.7 in standard length. Head with upper profile almost straight, length 2.9 to 3.1 in standard length; mouth terminal, moderate; lower jaw projecting, not extending beyond upper profile of head; symphyseal knob prominent; interorbital space at midorbits slightly convex, width medium, 4.1 to 4.3 in length of head; cranial ridges: low, weak; cranial spines: nasal; prefrontal; frontals, II, III; parietal; posttemporal; cleithral; opercular, 2; well developed, delicate; preopercular sharp, second longest; lacrymal lobes, 2, spines absent; rakers on first gill arch, 38 to 43, long, slender. Fins: dorsal (1), XIII, 13 to 15, slightly notched, membranes of spinous portion moderately incised, longest spine about equal to longest ray; anal, III, 6 to 8, second spine longer and stronger than third; pelvic, I, 5, thoracic, barely reaching anus; pectoral, 17 or 18, 8 or 9 rays unbranched, reaching anus. Scales: ctenoid; in oblique rows above lateral line, 65 to 75. Pores: on lateral line, 47 to 51. Colour: bright light red, mottled on dorsal surface with dusky olive green; light red stripe along lateral line, continuous, distinct; olive stripes radiating from eye, 2, wide; purplish cross shades on head; dusky to black on lips and tip of lower jaw; bright light red on fins; black on spinous portion of dorsal fin; black spot between 8th and 11th spines prominent in young; olive on rayed portion; olive speckling on caudal fin; black on peritoneum.

Length to 2 feet.



FIGURE 156. Redstripe rockfish. *Sebastes proriger* (Jordan and Gilbert) 1880

Distinguished by the shallow notch in the dorsal fin, the 65 to 75 scales in oblique rows above the lateral line, the red stripe along the lateral line and the black peritoneum.

The redstripe rockfish was first taken in British Columbia waters on August 6, 1881, near Campbell Island (Port McLaughlin), by Captain H. E. Nichols in 14 fathoms and recorded in the same year in error as *Sebastes paucispinis* (Ayres). A second individual was obtained on June 19, 1928, from Departure Bay and is now in the collection of the Royal Ontario Museum at Toronto. On September 14, 1949, three specimens were taken in Quatsino Sound by H. Hetrand and these are now in the museum of the Institute of Fisheries at the University of British Columbia. The species is taken more commonly to the southward where it has been captured at depths to 100 fathoms.

Range: Southern California to Bering Sea.

**Rougheye rockfish**

*Sebastes aleutianus* Jordan and Evermann 1898

Body elongate; depth 2.7 to 3 in standard length. Head with upper profile nearly straight; length 2.5 to 2.7 in standard length; mouth terminal, moderate; lower jaw much projecting, not extending beyond upper profile of head; symphyseal knob prominent; dentary elevation on lower jaw fitting into notch in upper jaw; interorbital space at midorbits flat, width medium, 4.6 to 5 in length of head; cranial ridges: well developed; cranial spines: nasal; prefrontal; frontals I, II, III; parietal, I, II; median frontal; suborbital spines variable, 2, or more; posttemporal; cleithral; opercular, 2; preopercular moderate, upper two pointing backward; lacrymal lobes broad, spine sometimes present on each; rakers on first gill arch, 30 to 34, long, slender. Fins: dorsal (1), XIII, 13 to 15; moderately notched, membranes of spinous portion slightly incised; anal, III, 6, to 8; pelvic, I, 5, thoracic, not reaching anus; pectoral, 18 or 19, 7 to 9 rays unbranched, reaching anus. Scales: ctenoid, in oblique rows above lateral line, about 50. Pores: on



FIGURE 157. Rougheye rockfish. *Sebastes aleutianus* Jordan and Evermann 1898

lateral line, 29 to 34. Colour: red on dorsal surface, shading to pink on sides; vague dusky bars on body; dusky spot in axils of pectoral fins; reddish on fins with black on outer margins of membranes; dusky blotch on operculum; white or pink on lining of mouth with some black blotches in old specimens.

Length to 22 inches.

Distinguished by the flat interorbital space with parietal II and median frontal spines, the sharp suborbital spines, the long lower jaw not extending into the upper profile of the head and the large symphyseal knob on the lower jaw.

The rougheye rockfish was first taken in British Columbia waters on February 16, 1952, in Clio Channel, Lat. 50° N, Long. 126° W, when 2 specimens were obtained by K. S. Ketchen in an otter trawl at a depth of 52 fathoms. These fish are now in the collection of the Biological Station at Nanaimo. The name recommended for this species by the AFS/ASIH committee is blackthroat rockfish.

Range: California to Gulf of Alaska.

### **Longjaw rockfish**

*Sebastes alutus* (Gilbert) 1890

Body elongate, slender, depth 2.8 to 3.5 in standard length. Head with upper profile nearly straight, length 2.6 to 2.8 in standard length; mouth terminal, large; symphyseal knob, very prominent; dentary elevation of lower jaw fitting into notch in upper jaw; interorbital space at midorbits slightly convex to flat, width medium, 4.6 to 4.9 in length of head; cranial ridges; moderately developed; cranial spines: nasal; prefrontal; frontals, I, II, III; parietal, I, slender, delicate; median frontal, absent; suborbital, absent; posttemporal; cleithral; opercular, 2; preopercular, broad, upper two pointing backward; lacrymal lobes weakly developed, spine sometimes present on each; rakers on first gill arch, 33 to 38, long, clavate. Fins: dorsal (1), XIII, 14 to 17, rarely 16 or 17, moderately notched, membranes of spinous portion slightly incised; anal, III, 8 or 9; pelvic, I, 5, thoracic, reaching anus; pectoral, 17 or 18, 6 to 9 rays unbranched, reaching slightly behind anus. Scales: ctenoid, large; in oblique rows above lateral line, 60 to 75. Pores: on lateral line, 44 to 51. Colour: bright carmine red; lighter on ventral surface with some silvery; olive brown blotches at base of spinous portion of dorsal fin, 2, below rayed portion of fin, 1; dark blotch on upper surface of caudal peduncle, small; blotches or bars on side of head, irregular; black on lower lip and tip of mandible; red on all fins, black on margin of spinous portion of dorsal fin; dusky on lining of mouth; dusky to black on peritoneum.

Length to 18 inches.

Distinguished by the slightly convex to flat interorbital space, the long lower jaw not extending beyond the upper profile of the head, the very large symphyseal knob, the carmine red coloration with black markings and the absence of parietal II and median frontal spines together with the lack of suborbital spines.

The longjaw rockfish was first taken in British Columbia waters on August 28, 1891, in Juan de Fuca Strait off Port San Juan, by the *Albatross*, station 3449,



Lat. 48° 29' N, Long. 124° 40' W, depth 135 fathoms. Two other individuals were obtained the following month in the same region and all were recorded in 1895 by C. H. Gilbert. On June 5, 1934, four specimens were captured off the west coast of Vancouver Island near Esteban Point at 61 fathoms. The species is abundant along the British Columbia coast particularly in Queen Charlotte Sound. Since 1950 it has become increasingly important in the trawl fishery off the British Columbia coast. In 1958 over 2 million pounds were landed from the Cape Scott and Goose Island grounds in Queen Charlotte Sound. It occurs at depths between 38 and 350 fathoms. The longjaw rockfish is an important part of the food of the halibut and albacore. The trade name ocean perch is used extensively in California and the term is entering the Canadian market to some extent; the AFS/ASIH committee recommends Pacific ocean perch.

Range: Southern California to Bering Sea.



FIGURE 158. Longjaw rockfish. *Sebastes alutus* (Gilbert) 1890

#### Pygmy rockfish

*Sebastes wilsoni* Gilbert 1915

Body elongate, depth 3.1 to 3.7 in standard length. Head with upper profile straight, length 2.7 to 2.9 in standard length; mouth terminal, moderate; lower jaw projecting, not extending beyond upper profile of head; symphyseal knob small; interorbital space at midorbital flat, width medium 4.7 to 5.8 in length of head; cranial ridges: well developed; cranial spines: nasal; prefrontal; frontals II, III; parietal; strong; posttemporal, 2; cleithral; opercular, 2; preopercular, strongly developed; lacrymal lobes, 2, spines absent; rakers on first gill arch, 38 to 43, long, slender. Fins: dorsal (1), XIII, 13 or 14, very slightly notched, membranes of spinous portion moderately incised; anal, 6 or 7, short; pelvic, I, 5, thoracic, just reaching anus; pectoral, 16 or 17, 7 or 8 rays unbranched; just reaching anus.

Scales: ctenoid; in oblique rows above lateral line, 45 to 48. Pores: on lateral line, 39 to 54. Colour: very light brown, flushed with clear red; dark blotches in series along base of dorsal fin, 4, extending somewhat onto fin; brownish red stripe along side below lateral line; silvery on ventral surface; black on peritoneum. Length to 7½ inches.

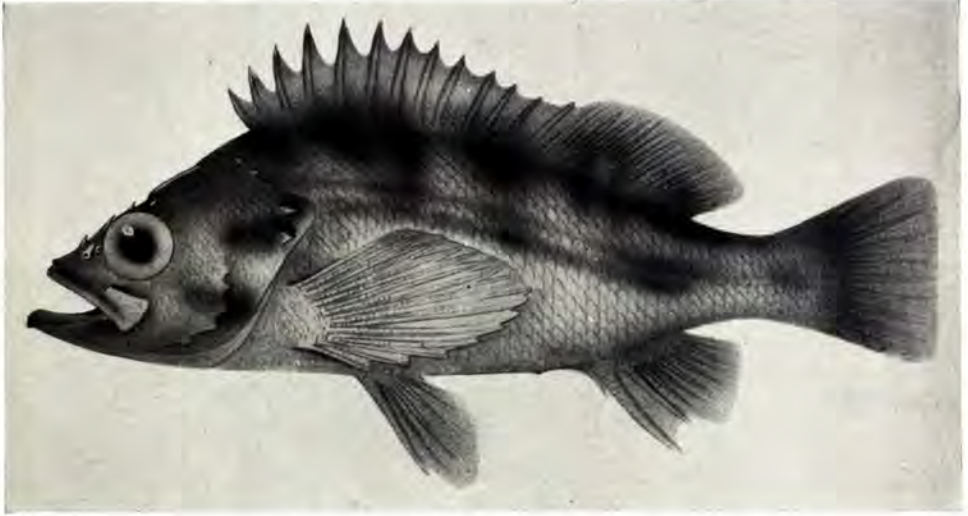


FIGURE 159. Pygmy rockfish. *Sebastes wilsoni* Gilbert 1915

Distinguished by the coloration, the 45 to 48 scales in oblique rows above the lateral line, the 2 posttemporal spines, the elongate body and the short anal fin with 6 or 7 rays.

The pygmy rockfish was first taken in British Columbia waters on September 10, 1912, off Swiftsure Shoal at a depth of 23 fathoms by Professor J. P. McMurrich and was recorded in 1932 by C. L. Hubbs and L. P. Schultz. The specimen is now in the collection of the Biological Station at Nanaimo. Three other individuals have been obtained between Esteban Point and Sydney Inlet at depths of 61 and 30 fathoms. Apparently it is an off-shore species since all Canadian records are from the west coast of Vancouver Island. It was called Wilson's rockfish in 1946 by Clemens and Wilby.

Range: California to west coast of Vancouver Island.

### **Stripetail rockfish**

*Sebastes saxicola* (Gilbert) 1890

Body elongate; depth 2.8 to 3.25 in standard length. Head with upper profile somewhat curved; length 2.5 to 2.8 in standard length; mouth terminal, moderate; lower jaw slightly projecting, not extending beyond upper profile of head; symphyseal knob, small; premaxillaries not produced into prominent dentigerous

lobes; dentary elevation on lower jaw, small; interorbital space at midorbits flat, width 4.7 to 5.3 in length of head; cranial ridges: moderately developed; cranial spines: nasal; prefrontal; frontals, II, III; parietal; moderately developed; post-temporal, large; cleithral; opercular, 2; preopercular, pointed, sharp; lacrymal lobes usually bluntly triangular, sometimes minute spine on each lobe, directed backward; rakers on first gill arch, 30 to 34, long, slender. Fins: dorsal (1), XIII, 12 or 13, slightly notched, membranes of spinous portion moderately incised; anal, III, 5 to 8, second spine longer and stronger than third; pelvic, I, 5, thoracic, usually not reaching anus; pectoral, 15 to 17, 6 or 7 rays unbranched, reaching almost to anus. Scales: ctenoid, large; in oblique rows above lateral line, about 50. Pores: on lateral line, 35 to 42. Colour: olive brown on dorsal surface; silvery on ventral surface, overlaid with light red; usually black on tips of all fins, sometimes faint on pectorals; olive brown bands on caudal fins, conspicuous; white on lining of mouth and gill cavity; black on peritoneum.

Length to 13½ inches.

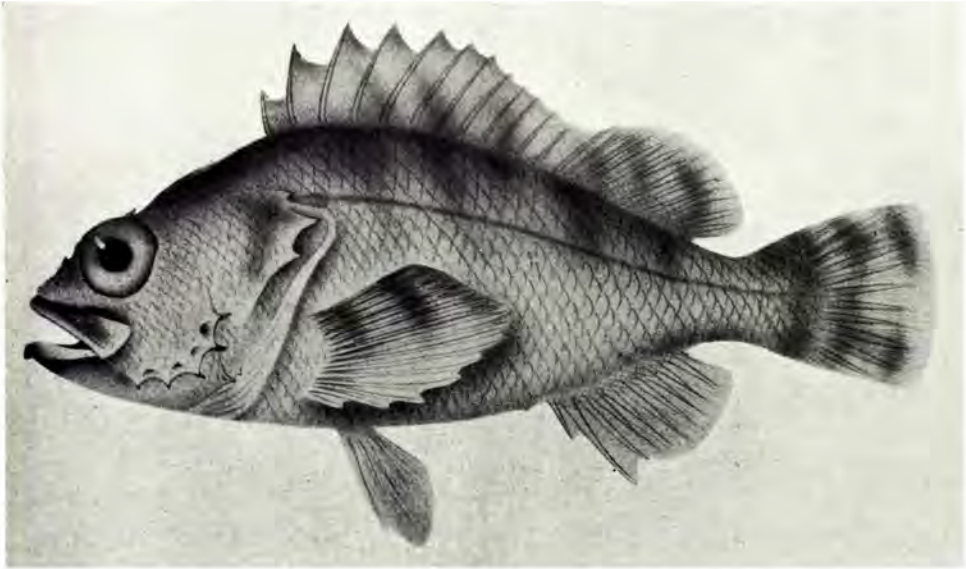


FIGURE 160. Stripetail rockfish. *Sebastes saxicola* (Gilbert) 1890

Distinguished by the absence of prominent dentigerous lobes from the upper jaw, the white lining of the mouth and gill cavity, the black peritoneum and the olivaceous coloration of the body.

The stripetail rockfish was first taken in British Columbia waters in 1888 in Barkley Sound by the Albatross and recorded in 1907 by B. W. Evermann and E. L. Goldsborough. Another specimen was obtained in July 1934, 16 miles off Nootka Sound in 74 fathoms by Mr E. C. Hart, and a third individual was secured

in 1939 near Porlier Pass in an otter trawl. It occurs at depths ranging from 25 to 391 fathoms in waters outside the Province. This species was called olive-backed rockfish in 1946 by Clemens and Wilby.

Range: Southern California to southeastern Alaska.

**Splitnose rockfish**

*Sebastes diploproa* (Gilbert) 1890

Body elongate; depth 2.6 to 3.1 in standard length. Head with upper profile straight; length 2.4 to 2.7 in standard length; mouth terminal, moderate; jaws about equal; symphyseal knob, very small; premaxillaries greatly produced on each side of median line of snout forming 2 prominent forwardly projecting dentigerous lobes, widely separated; dentary elevation on lower jaw forming single median lobe at symphysis, fitting into notch of upper jaw; interorbital space at midorbis flat, width 5.0 to 6.1 in length of head; cranial ridges: moderately developed; cranial spines: nasal; prefrontal; frontals, II, III; parietal; thin, sharp, moderately developed; posttemporal, small; cleithral, large; opercular, 2, large; preopercular, pointed, sharp, almost evenly spaced, second and third longest; lacrymal lobes, 2, large spine on each, pointing downward; rakers on first gill arch, 32 to 37, long slender. Fins: dorsal (1), XIII, 11 to 14, moderately notched, membranes of spinous portion moderately incised; anal, III, 6 to 8, second spine longer and stronger than third; pelvic, I, 5, thoracic, barely reaching anus; pectoral, 17 to 19, 6 to 9 rays unbranched, long, reaching slightly behind origin of anal fin. Scales: ctenoid, large, deciduous; in oblique rows above lateral line, about 48.



FIGURE 161. Splitnose rockfish. *Sebastes diploproa* (Gilbert) 1890

Pores: on lateral line, 33 to 43. Colour: uniform rose red to brick red on dorsal surface; bright silvery on sides and ventral surface; sometimes sparsely spotted with black; dusky bar behind pectoral fin; rose red on lining of mouth and gill cavity; jet black on peritoneum.

Length to 18 inches.

Distinguished by the large projecting toothed lobes on the upper jaw into which fits the median dentary elevation of the lower jaw, the 2 prominent sharp lacrymal spines pointing downward, the rose red lining of the mouth and gill cavity, the jet black peritoneum and the rose red and silvery coloration of the body.

The splitnose rockfish was first taken in British Columbia waters on June 19, 1903, near Nanaimo, by the *Albatross*, station 4191, Lat. 49° 11' N, Long. 123° 54' W, depth 54 fathoms, when two specimens, 3¼ inches and 3½ inches in length, were obtained and were recorded in 1907 by B. W. Evermann and E. L. Goldsborough. Others have been secured in shrimp trawls off English Bay at depths between 50 and 70 fathoms. In 1934, an individual was obtained from the west coast of Vancouver Island south of Flores Island. This rockfish inhabits deep water for the most part, having been taken at depths from 50 to 369 fathoms. This species was called the lobe-jawed rockfish in 1946 by Clemens and Wilby.

Range: Southern California to Vancouver Island.

### Rosy rockfish

*Sebastes rosaceus* Jordan and Gilbert 1882

Body elongate, depth 2.7 to 3.0 in standard length. Head with upper profile slightly curved, length 2.4 to 2.5 in standard length; mouth terminal, moderate; jaws about equal; symphyseal knob, small; premaxillaries well separated into toothed lobes; dentary elevation on lower jaw, small; interorbital space at mid-orbits, concave, 6.5 to 7.4 in length of head; cranial ridges: well developed; cranial spines: nasal; prefrontal; frontal, I, II, III; parietal, 2; sharp, well developed; posttemporal, 1, broad; cleithral, broad; opercular, 2; preopercular, pointed, evenly spaced; lacrymal lobes. 2, spine present or absent on posterior lobe; rakers on first gill arch, 30 to 33, long, slender. Fins: dorsal (1), XIII, 12 or 13, moderately notched, membranes of spinous portion moderately incised; anal, III, 6, second spine much longer and stronger than third; pelvic, I, 5, thoracic, reaching anus; pectoral, 16 to 18, 7 to 9 rays unbranched, moderate, reaching anus. Scales: ctenoid, large; in oblique rows above lateral line, 55 or 56. Pores: on lateral line, 36 to 42. Colour: yellow, overlaid with dark red on dorsal surface and sides; somewhat whitish below; whitish blotches, bordered with purple, on body above lateral line, 4 or 5; pink on fins; dusky, with black dots, to black on peritoneum.

Length to 12 inches.

Distinguished by the concave interorbital space, the presence of frontal I spines, the evenly spaced pointed preopercular spines, the yellow coloration and the lack of black coloration on the fins.

The rosy rockfish was first taken in British Columbia waters on May 21, 1948, at Goose Island, by Mr W. Simpson. This is the only specimen known from these waters and is now in the museum of the Institute of Fisheries at the University of British Columbia. This species is moderately common in California waters to depths of 70 fathoms.

Range: southern California to Queen Charlotte Sound.



FIGURE 162. Rosy rockfish. *Sebastes rosaceus* Jordan and Gilbert 1882

### **Red snapper**

*Sebastes ruberrimus* Cramer 1895

Body elongate, deep; depth 2.4 to 3.0 in standard length. Head with upper profile slightly curved; length 2.4 to 2.5 in standard length; mouth terminal, large; lower jaw slightly projecting, not extending beyond upper profile of head; symphyseal knob, small; interorbital space at midorbits, concave to flat, narrow, 5.7 to 7.0 in length of head; cranial ridges: well developed, sharp, in adult broken up into irregular spines and tubercles; cranial spines: nasal; prefrontal; frontals I, II, III; parietal; well developed, blunt; posttemporal; cleithral; opercular, 2; preopercular broad, third multifid, others sometimes bifid; lacrymal lobes little developed, spines absent; rakers on first gill arch, 26 to 30, short, rough, clavate. Fins: dorsal (1), XIII, 13 to 15, moderately notched, membranes of spinous portion moderately incised; anal, III, 7, second spine slightly longer and stronger than third; pelvic, I, 5, thoracic, not reaching anus; pectoral, 18 to 20, 8 to 10 rays unbranched, broad, not reaching anus. Scales: ctenoid, on body and head; in oblique rows above lateral line, 50 to 52. Pores: on lateral line, 40 to 45. Colour: deep vermilion red; paler on ventral surface; whitish streak along lateral line,

becoming rather indistinct in adults; in very large specimens from deep water, body and head frequently much dotted and blotched with black; red on fins, usually black on margins of rayed fins; white with scattered black dots on peritoneum.

Length to 3 feet.

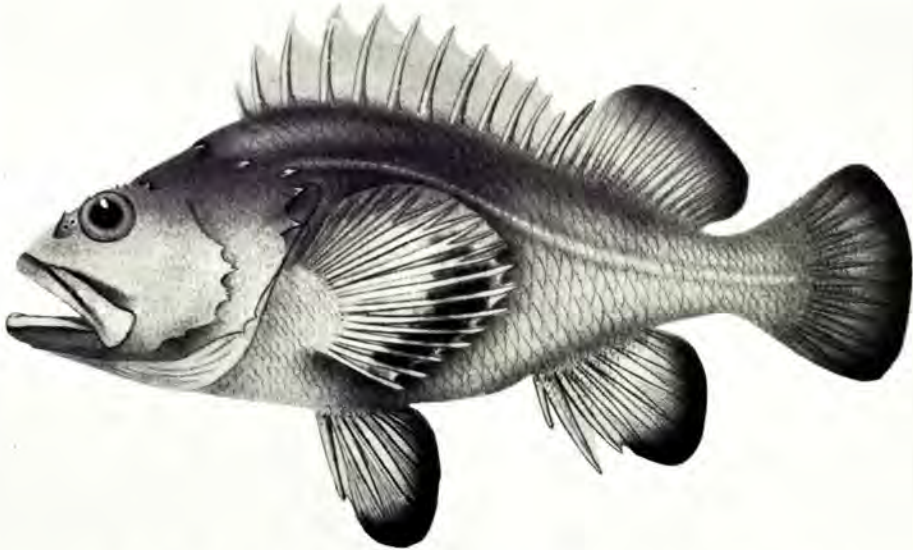


FIGURE 163. Red snapper. *Sebastes ruberrimus* Cramer 1895

Distinguished by the multifid points on the third preopercular spine, the rough, thick spiny cranial ridges and the red coloration.

The red snapper was first recorded from British Columbia waters in 1881 by D. S. Jordan and C. H. Gilbert who reported seeing large specimens at Victoria and recorded them as *Sebastichthys ruber* (Ayres). These were undoubtedly *S. ruberrimus*, described in 1895 by F. Cramer. The species is common along the coast, occurring at depths between 30 and 150 fathoms, and is captured in trawls and on halibut, lingcod and dogfish lines. In February, 1942, several large catches of red snappers were seen at the Vancouver fish docks, the fish having been caught near Pender Harbour on dogfish lines at depths between 100 and 150 fathoms. These were mostly of large size up to 3 feet in length. Little is known of the life history but Dr J. L. Hart states that a female weighing 19½ pounds contained approximately 2,700,000 eggs. This fish is of high quality and is sold in the round and as fillets. The species is also known as the red cod, red rockfish, turkey rockfish or rasphead rockfish, the last being the name recommended by the AFS/ASIH committee.

Range: Southern California to Gulf of Alaska.

**Flag rockfish***Sebastes rubrivinctus* (Jordan and Gilbert) 1880

Body elongate, depth 2.6 to 2.9 in standard length. Head with upper profile nearly straight, length 2.5 to 2.8 in standard length; mouth terminal, moderate; lower jaw slightly projecting, not extending beyond upper profile of head; symphyseal knob, very small; interorbital space at midorbits, flat, narrow; 4.5 to 7.2 in length of head; cranial ridges: moderately developed; cranial spines: nasal; prefrontal; frontals, II, III; parietal; prostrate, sharp; posttemporal; cleithral, strong, sharp; opercular, 2; preopercular, upper 3 narrow, sharp, lower 2 short, stout; lacrymal lobes, present, spines on posterior lobe, 2 to 4, minute, sometimes multifid; rakers on first gill arch, 26 to 32, short, stout. Fins: dorsal (1), XIII, 13 or 14, deeply notched, membranes of spinous portion deeply incised; anal, III, 6 or 7, second spine longer and stronger than third; pelvic, I, 5, thoracic, not reaching anus; pectoral, 17 to 19, 7 to 9 rays unbranched, not reaching anus. Scales: ctenoid, mostly cycloid on head; in oblique rows above lateral line, 40 to 57. Pores: on lateral line, 40 to 48. Colour: light pink to white with 4 bright red cross bars, first between occiput and third dorsal spine across operculum to origin of pectoral fin, second between fifth and eleventh dorsal spines extending to below lateral line, third below rayed portion of dorsal fin onto anal fin, fourth across caudal peduncle; indistinct red band from eye to base of pelvic fin; variously silvery, silvery with black dots to black on peritoneum.

Length to 25 inches.



FIGURE 164. Flag rockfish. *Sebastes rubrivinctus* (Jordan and Gilbert) 1880



Distinguished by the smooth scales on the head, the multiple spines on the posterior lobe of the lacrymal bone, the absence of a frontal I spine and the pale coloration with the red bands on the body.

The flag rockfish was first recorded from British Columbia waters in 1954 by K. S. Ketchen who obtained 3 specimens on July 26, 1947, approximately 10 miles SSW of Rafael Point on the west coast of Vancouver Island at a depth of 52 fathoms. Subsequently, on July 18, 1953, he obtained 14 specimens near Rose Spit at depths of 82 and 100 fathoms. The species is taken commonly on long lines at depths between 100 and 200 fathoms and less commonly in otter trawls between 50 and 60 fathoms. The distribution, as shown by commercial catches, is in open waters from the northern end of Vancouver Island to Dixon Entrance, including Goose Island banks and Hecate Strait. In 1915, W. F. Thompson described an individual of this species as new to science under the name *Sebastes babcocki*, a new species from British Columbia. However, his type specimen had been taken in Alaskan waters, and there was no reference to the occurrence of individuals along the British Columbia coast in the paper. The name Spanish Flag has also been used for this species.

Range: Southern California to southeastern Alaska.

#### Sharpchin rockfish

*Sebastes zacentrus* (Gilbert) 1890

Body very elongate, slender; depth 2.7 to 3.2 in standard length. Head with upper profile straight; length 2.7 to 2.8 in standard length; mouth terminal, moderate; lower jaw projecting, not extending beyond upper profile of head; symphyseal knob, small; eye large, diameter 2.9 to 3.4 in length of head; interorbital space at midorbits, concave, width 4.5 to 5.6 in length of head; cranial ridges: moderately developed; cranial spines: nasal; prefrontal; frontals, II, III; parietal; strong; posttemporal; cleithral; opercular, 2; preopercular, slender, sharp; lacrymal lobes, 2, sometimes minute spine on posterior lobe; rakers on first gill arch, 33 to 37, long, very slender. Fins: dorsal (1), XIII, 13 to 15, slightly notched, membranes of spinous portion moderately incised; anal, III, 7 or 8, second spine stout, usually longer than third; pelvic, I, 5, thoracic, reaching anus; pectoral, 17 or 18, 8 or 9 rays unbranched, reaching anus, lower rays not thickened. Scales: weakly ctenoid, on body and head; in oblique rows above lateral line, about 70. Pores: on lateral line, 39 to 46. Colour: pale red with dark brown irregular patches, on dorsal surface; dark brown irregular blotches on body, 5, extending onto dorsal fin; very dark stripes radiating from eye, 2, upper ending in large blotch; white on ventral surface; brownish on caudal fin; jet black on peritoneum.

Length to 13 inches.

Distinguished by the very large eyes, the slender body, the clear pale red coloration and the brownish blotches.

The sharpchin rockfish was first taken in British Columbia waters on March 17, 1941, in Burrard Inlet by a shrimp trawler at a depth of about 40 fathoms

and was given to the second author. The specimen is  $5\frac{3}{8}$  inches in standard length and is now in the fish collection of the Institute of Fisheries at the University of British Columbia. On May 2, 1949, a specimen was taken by trawl in 60 fathoms off Hope Island and on September 25, 1958, another specimen was secured in Hardy Bay, in Queen Charlotte Strait. The name big-eyed rock-fish was used for this species in 1946 by Clemens and Wilby.

Range: Southern California to north end of Vancouver Island.



FIGURE 165. Sharpchin rockfish. *Sebastes zacentrus* (Gilbert) 1890

### Greenstripe rockfish

*Sebastes elongatus* (Ayres) 1859

Body very elongate, slender; depth 3.1 to 3.7 in standard length. Head with upper profile straight, length about 2.6 in standard length; mouth terminal, moderate; lower jaw distinctly projecting, not entering upper profile of head; symphyseal knob, very small; eye moderate, diameter 3.2 to 4.0 in length of head; interorbital space at midorbital, concave, width 7.0 to 8.1 in length of head; cranial ridges: moderately developed; cranial spines: nasal; prefrontal; frontals, II, III; parietal; small, slender, sharp; posttemporal, 2, small; cleithral; opercular, 2; preopercular narrow, very sharp; lacrymal lobes little developed, spines absent; rakers on first gill arch, 28 to 33, long, strong. Fins: dorsal (1), XIII, 12 to 14, deeply notched, membranes of spinous portion moderately incised; anal, III, 6 or 7, second spine much longer than third; pelvic, I, 5, thoracic, not reaching anus; pectoral, 16 or 17, 7 or 8 rays unbranched, reaching anus, lower rays not thickened. Scales: ctenoid, on body and head; in oblique rows above lateral line, 55 to 58. Pores: on lateral line, 40 to 45. Colour: clear pale red; white on ventral surface; olive green stripes irregular, interrupted, strongly developed on sides; two below lateral line

becoming confluent posteriorly; olive on head, blotched dorsally, pink ventrally; black on tip of chin; pale red or pink, on all fins with olive extending onto dorsal, pectoral and caudal fins; dusky on peritoneum.

Length to 15 inches.



FIGURE 166. Greenstripe rockfish. *Sebastes elongatus* (Ayres) 1859

Distinguished by the slender body, the medium sized eye and the irregular olive green stripes along the sides of the body.

The greenstripe rockfish was first taken in British Columbia waters on July 18, 1928, in Boat Harbour by Professor J. R. Dymond and the specimen is now in the collection of the Royal Ontario Museum at Toronto. The species is fairly common in the Strait of Georgia, Burrard Inlet, Pender Harbour and Baynes Sound, inhabiting the deeper waters. In California there are records of its capture at depths down to 496 fathoms. This rockfish is obtained frequently in commercial trawls but seldom is marketed. The AFS/ASIH committee spells the name greenstriped rockfish.

Range: Southern California to Strait of Georgia.

#### **Brown rockfish**

*Sebastes auriculatus* (Girard) 1854

Body elongate, moderately deep, depth 2.7 to 2.8 in standard length. Head with upper profile nearly straight, length 2.5 to 2.7 in standard length; lower jaw slightly projecting; symphyseal knob, very small; interorbital space at mid-orbits, slightly convex to flat, width 4.5 to 5.1 in length of head; cranial ridges: moderately developed; cranial spines: nasal; prefrontal; frontals, II, III; parietal; moderately strong, prostrate; median frontal; posttemporal, sometimes bifid; cleithral; opercular, 2, strong, sharp; preopercular, strong, occasionally spine may be

bifid; lacrymal lobes, 2, anterior small, posterior somewhat triangular; rakers on first gill arch, 25 to 30. Fins: dorsal (1), XIII, 12 to 15, deeply notched, membranes of spinous portion rather deeply incised, spines moderately high, length of longest spine 1.9 or more in that of head; anal, III, 6 to 8, second spine thicker than third, not longer; pelvic, I, 5, thoracic, not reaching anus; pectoral, 15 to 18, 8 to 11 rays unbranched, not reaching anus. Scales: ctenoid; in oblique rows above lateral line, 61 or 62. Pores: on lateral line, 42 to 49. Colour: light brown, mottled with dark brown; dark brown blotches on upper part of operculum and on under side; dusky pink on fins; silvery white on peritoneum.

Length to 18 inches.



FIGURE 167. Brown rockfish. *Sebastes auriculatus* (Girard) 1854

Distinguished by the presence of the median frontal spines, the slightly convex to flat interorbital space and the brown mottled coloration.

The brown rockfish was first recorded from British Columbia waters in 1881 from the vicinity of Vancouver Island by T. H. Bean as *Sebastichthys auriculatus* (Girard), apparently on the basis of an earlier record by Theodore Gill. A second record is that of a specimen taken on June 23, 1903, at Union Bay by the *Albatross* and recorded in 1907 by B. W. Evermann and E. L. Goldsborough as *Sebastes dalli* (Eigenmann and Beeson). This specimen was deposited in the United States National Museum. Recently this fish was re-examined by Dr C. L. Hubbs, who determined it to be *S. auriculatus*. It was recorded in 1946 by Clemens and Wilby as *Sebastes dalli* (Eigenmann and Beeson).

Range: Southern California to southeastern Alaska.

## Copper rockfish

*Sebastes caurinus* (Richardson) 1844

Body elongate, moderately deep, depth 2.5 to 2.9 in standard length. Head with upper profile slightly curved, length 2.5 to 2.8 in standard length; mouth terminal, moderate; lower jaw slightly projecting; symphyseal knob, very small; interorbital space at midorbits slightly concave, width 5.4 to 6.3 in length of head; cranial ridges: moderately developed; cranial spines: nasal; prefrontal; frontals, II, III; median frontals, absent; parietal; moderately developed, sharp; posttemporal; cleithral; opercular, 2; preopercular, upper two narrow, sharp, other 3 broad, sometimes bifid; lacrymal lobes, 2, spine on posterior lobe; rakers on first gill arch, 27 to 31, moderately short, stout, rough, somewhat clavate. Fins: dorsal (1), XIII, 12 to 14, deeply notched, membranes of spinous portion moderately incised, spines moderately high, length of longest spine 2 or more in that of head; anal, III, 6 or 7, second spine longer and stronger than third; pelvic, I, 5, thoracic, usually reaching anus; pectoral, 17 or 18, 7 to 9 rays unbranched, reaching behind anus, lower rays slightly thickened. Scales: ctenoid; in oblique rows above lateral line, 40 to 48. Pores: on lateral line, 39 to 45. Colour: dark brown to dark green, more or less washed with copper or dull yellow, sometimes black with copper or yellow obscured; greenish brown stripes often radiating from eye, 2 or 3; black area in upper posterior angle of operculum; coppery black on all fins; white on peritoneum.

Length to 20 inches.

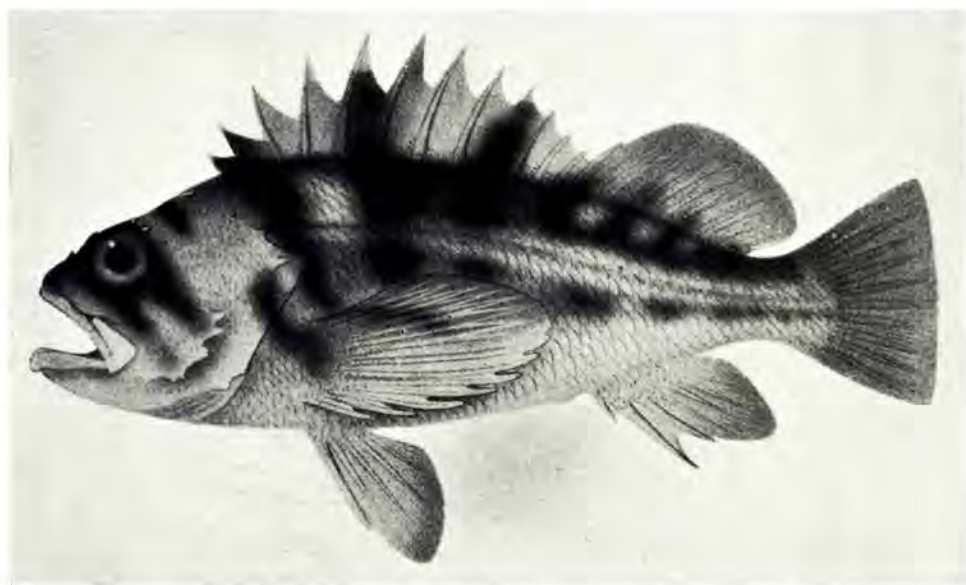


FIGURE 168. Copper rockfish. *Sebastes caurinus* (Richardson) 1844

Distinguished by the long blackish pectoral fins with slightly thickened rays, the 40 to 48 scales in oblique rows above the lateral line and the coppery brown coloration.

The copper rockfish was first taken in British Columbia waters on July 26, 1881, in Departure Bay, when 2 specimens were obtained at a depth of 20 fathoms by Captain H. E. Nichols. These were recorded in the same year by T. H. Bean as *Sebastichthys caurinus* (Richardson). The species is abundant in the Strait of Georgia and occurs along the coast of the Queen Charlotte Islands. It is perhaps the most common rockfish in shallow water in the Strait of Georgia area. Commercial catches are made mainly by other trawls, and are sold as fillets.

Range: Southern California to southeastern Alaska.

### Quillback rockfish

*Sebastes maliger* (Jordan and Gilbert) 1880

Body elongate, stout, deep, depth 2.3 to 2.8 in standard length. Head with upper profile slightly curved, length 2.4 to 2.6 in standard length; mouth terminal, large; jaws, nearly equal; symphyseal knob, small; interorbital space at midorbits concave, 5.5 to 6.6 in length of head; cranial ridges: strongly developed, high, thick; cranial spines: nasal; prefrontal; frontals, II, III; median frontals, absent; parietal; strongly developed, moderately sharp; posttemporal; cleithral, 2; opercular, 2; preopercular short, narrow; lacrymal lobes little developed, spines absent; rakers on first gill arch, 27 to 33, short, stout, clavate. Fins: dorsal (1), XIII, 12 to 14, deeply notched, membranes of spinous portion between first and fifth spines very deeply incised so that attachment to front of each spine is less than half length of that spine, spines very high, higher than in any other species, length of longest spine about 1.8 in length of head; anal, III, 6 or 7, second spine equal to or greater than third in length and stoutness; pelvic, I, 5, thoracic, barely reaching anus; pectoral, 17 or 18, 8 or 9 rays unbranched, reaching anus or behind, lower rays thickened. Scales: ctenoid; in oblique rows above lateral line, 47 to 55. Pores: on lateral line, 35 to 48. Colour: yellow to brown; usually yellow or orange on anterior of body, closely covered with small round spots of clear orange to brownish orange; darker brown to black on posterior of body, variously mottled; pale brownish stripes radiating from eye, 3, sometimes faint; pale to bright yellow area commencing on spinous portion of dorsal fin between third and fifth spines extending in form of wedge to lateral line, sometimes absent in adults; slaty black on rayed fins; silvery white on peritoneum.

Length to 2 feet.

Distinguished by the high dorsal fin with the deeply incised membranes and the yellow to brown coloration with the orange to brownish orange spotting.

The quillback rockfish was first taken in British Columbia waters on August 5, 1881, at Campbell Island (Port McLaughlin), when a specimen 15 inches in length was obtained at a depth of 14 fathoms by Captain H. E. Nichols. This was

recorded in the same year by T. H. Bean as *Sebastichthys maliger* Jordan and Gilbert. The species is common in the Strait of Georgia at all depths down to 150 fathoms, the young occurring along the shores and the adults usually in deeper waters. Commercially the quillback rockfish is taken in trawls and marketed as fillets. As a sport fish it is taken on rod and line at depths between 30 and 40 fathoms with herring bait and provides excellent sport on light tackle because of its splendid fighting ability. It was called orange-spotted rock-fish in 1946 by Clemens and Wilby.

Range: Southern California to Gulf of Alaska.



FIGURE 169. Quillback rockfish. *Sebastes maliger* (Jordan and Gilbert) 1880

#### **Yellowstripe rockfish**

*Sebastes nebulosus* (Ayres) 1854

Body elongate, deep, depth 2.4 to 2.75 in standard length. Head with upper profile nearly straight; length 2.4 to 2.5 in standard length; mouth terminal, moderate; jaws about equal; symphyseal knob, very small; interorbital space at midorbits deeply concave, width 6.4 to 7.7 in length of head; cranial ridges: strongly developed, high, blunt; cranial spines: nasal; prefrontal; frontals, II, III; median frontals, absent; parietal; strongly developed, thick; posttemporal, large; cleithral, large; opercular, 2, short, triangular; preopercular, short, broad, points single; lacrymal lobes, 2, spines absent; rakers on first gill arch, 27 to 31, short, clavate. Fins: dorsal (1), XIII, 13, deeply notched, membranes of spinous

portion moderately incised, highest spine about 2 in length of head; anal, III, 6 or 7, second spine longer, stronger, than third; pelvic, I, 5, thoracic, barely reaching anus; pectoral, 17 to 19, 9 to 11 rays unbranched, reaching anus, lower rays much thickened. Scales: ctenoid; in oblique rows above lateral line, 45 to 51. Pores: on lateral line, 38 to 41. Colour: blue black of varying intensities; bright yellow stripe commencing on membrane of spinous portion of dorsal fin between third and fourth spines, broad, passing obliquely backward to, thence along, lateral line to caudal fin; yellowish or whitish speckling, sometimes tinged with blue, everywhere on body and head; blue black on all fins; white on peritoneum.

Length to 12 inches.



FIGURE 170. Yellowstripe rockfish. *Sebastes nebulosus* (Ayres) 1854

Distinguished by the broad bright yellow stripe on each side of the blue black body.

The yellowstripe rockfish was first recorded from British Columbia waters in 1881 from Vancouver Island by T. H. Bean as *Sebastichthys nebulosus* (Ayres). In 1882, T. Gill recorded a second individual on the basis of a colour sketch of a specimen observed on May 20, 1859, at Mayne Island in Deep Bay and labelled *Sebastes fasciatus* (Girard). A later definite locality record is that of a specimen 2½ inches in length taken on June 23, 1903, off Fort Rupert by the *Albatross*, station 4204, Lat. 50° 43' N, Long. 127° 19' W, depth 69 fathoms and recorded in 1907 by B. W. Evermann and E. L. Goldsborough. The yellowstripe rockfish



occurs around Vancouver Island, in Pender Harbour and is obtained commonly in Hecate Strait on halibut gear at moderate depths. The name recommended by the AFS/ASIH committee is China rockfish.

Range: Northern California to southeastern Alaska.

**Blackbanded rockfish**

*Sebastes nigrocinctus* (Ayres) 1859

Body elongate, deep, depth 2.4 to 2.8 in standard length. Head with upper profile nearly straight, length 2.5 to 2.6 in standard length; mouth terminal, moderate; lower jaw slightly projecting; symphyseal knob, small; interorbital space at midorbits concave, width 7.0 to 8.1 in length of head; cranial ridges: strongly developed, blunt, higher than in any other species of *Sebastes*; median frontal ridges well developed, spinous; cranial spines: nasal; prefrontal; frontals, I, II, III, sometimes I and II fused; median frontals large; parietal; all strongly developed, short, sharp to blunt; accessory spines present; postorbital 1 to 4: posttemporal, 1 or 2; cleithral, sometimes bifid; opercular, 2, sharp; preopercular short, upper 3 moderately sharp, lower 2 blunt; lacrymal lobes, 2, bluntly triangular, spines absent; rakers on first gill arch, 27 to 30, rough, clavate. Fins: dorsal (1), XIII or XIV, 13 to 15, slightly notched membranes of spinous portion slightly incised highest spine more than 2 in length of head; anal, III 7, second spine slightly shorter and stronger than third; pelvic, I, 5, thoracic, barely reaching anus; pectoral, 18 to 20, 9 to 11 rays unbranched, reaching anal fin in male, not reaching anus in female, lower rays somewhat thickened in female. Scales: ctenoid; in oblique rows above lateral line, 50 to 64. Pores: on lateral line, 43 to 50. Colour: pink to gray to pale rose with 5 carmine vertical bars, or bright orange red with 5

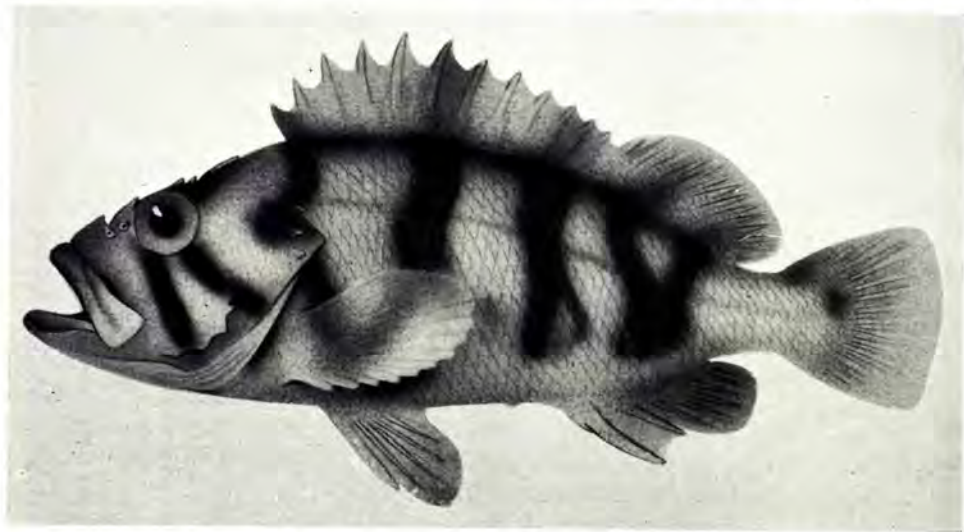


FIGURE 171. Blackbanded rockfish. *Sebastes nigrocinctus* (Ayres) 1859

jet black vertical bars, on each side of body; no bar across caudal peduncle; dark stripes downward and backward from eye, 2, prominent; white on peritoneum.

Length to 2 feet.

Distinguished by the high blunt cranial ridges, the well developed spinous median frontal ridges and the 5 well defined carmine or black vertical bars on each side of the body. This species is shown in colour on Plate VI following page 224.

The blackbanded rockfish was first recorded from British Columbia waters in 1881 from Vancouver Island by T. H. Bean as *Sebastichthys nigrocinctus* (Ayres). The species is taken occasionally in rather large numbers in Juan de Fuca Strait and apparently is abundant in Johnstone Strait where considerable numbers were killed by the underwater explosion which destroyed Ripple Rock. In February, 1940, several specimens were caught by lingcod fishermen in the Strait of Georgia and in February, 1942, many were secured on dogfish set-lines in Pender Harbour at depths between 30 and 150 fathoms. In April 1958, blackbanded rockfish were the principal victims of the Ripple Rock demolition in Discovery Passage. During the winter of 1941-1942, 3 individuals captured in the Strait of Georgia were maintained in the English Bay Aquarium for some time. In the bright light they were in the colour phase with carmine bars but as the fish passed into a dark portion of the tank they changed to the colour phase with the jet black bars. This change and the reversal were effected in less than a minute. In November, 1944, 3 specimens, 2 males and a female, were obtained from a fish dealer in Victoria in the carmine phase. After a week's preservation in formalin only the males retained the vertical bars and these became brownish black. The blackbanded rock-fish apparently is an inhabitant of the deeper waters and is not observed very frequently along the shore. This species was called the banded rock-fish by Clemens and Wilby in 1946; the name recommended by the AFS/ASIH committee is tiger rockfish.

Range: California to southeastern Alaska.

### **Spinycheek rockfish**

*Sebastobus alascanus* Bean 1890

Body elongate, slender; depth 3.5 to 4.3 in standard length. Head with upper profile slightly curved; mouth terminal, large; jaws about equal; symphyseal knob prominent. Cranial ridges and spines numerous, strongly developed; cranial spines: nasal; prefrontals; frontals, I, II, III; parietal; postorbital series sharp; posttemporal; cleithral; opercular, 2; preopercular, 5, uppermost longest; suborbital ridge sharp, knife-like, spines prominent; lacrymal lobes, 2, spine on posterior lobe; rakers on first gill arch, 18 to 23, short, stiff, rough, clavate. Fins: dorsal (1), XV to XVII, 9 or 10, very deeply notched, membranes of spinous portion deeply incised anteriorly, fourth or fifth spine longest, 3 to 4.3 in length of head; anal, III, 5, second spine equal to third, stronger; pelvic, I, 5, thoracic; pectoral, 20 to 23, large, lower portion extended to form distinct lobe of 7 to 9 exerted rays.

Scales: ctenoid, large; in oblique rows above lateral line, 44 to 48; absent from branchiostegal membranes. Pores: on lateral line, 29 to 33. Cirri: nasal, 2, narrow, filamentous. Colour: uniform bright red; black markings on fins.

Length to 2 feet.



FIGURE 172. Spinycheek rockfish. *Sebastolobus alascanus* Bean 1890

Distinguished by the knife-like spinous suborbital ridge on each side of the head, the lobed pectoral fins with the lower rays exerted and the large number of spines and rays in the dorsal fin.

The spinycheek rockfish was first taken in British Columbia waters on August 31, 1888, off Fort Rupert by the *Albatross*, station 2862, Lat.  $50^{\circ} 49' N$ , Long.  $127^{\circ} 36' W$ , depth 238 fathoms and recorded in 1926 by C. L. Hubbs. A second specimen was captured on September 2, 1891 off Jordan River by the *Albatross*, station 3460, at a depth of 53 fathoms and recorded in 1895 by C. H. Gilbert. Additional individuals have been taken in the Strait of Georgia in trawls at depths of 50 fathoms and greater. It is a deep water species ranging down to 822 fathoms. An individual captured in March, 1941, in English Bay was maintained in the English Bay Aquarium until November of the same year. This fish is sometimes erroneously called the gurnard or gurnet by fishermen, who consider it one of the choicest of the rockfishes. It is known also as the shortspine channel rockfish, which is the name recommended by the AFS/ASIH committee.

Range: Southern California to Bering Sea.

Family COTTIDAE

Sculpins

In the sculpins the head is usually large with the eyes placed high. The preopercle is armed with one or more spines, variously developed, sometimes the uppermost becomes highly specialized into an antler-like structure. The scales,

when present, may be either: typically ctenoid and never completely covering the body below the lateral line; or in various modifications of the reduced ctenoid type which may or may not cover the body completely below the lateral line; or the scales may be modified into thick tuberculate plates confined on the body to the lateral line. The pectoral fins are large, frequently procurrent; the pelvic fins, when present, are thoracic, each with 1 spine and 5, 4, 3 or 2 rays. The anal papilla in the males of some species of sculpins is very greatly developed.

The colours in many species are extremely variable, according to the environments. In some species there are marked colour differences between the sexes. In several tidepool sculpins a striking similarity in colours and colour patterns may be exhibited by individuals of different species.

The cottids for the most part are small fishes but a few attain large sizes. They inhabit tidepools, shallow shore waters and also waters of considerable depths. A few species occur in fresh water and are known as bullheads, miller's thumbs and muddlers.

### **Cabezon**

*Scorpaenichthys marmoratus* (Ayres) 1854

Body elongate, stout. Head large; mouth terminal, large; snout bluntly rounded; spines: nasal, stout, sharp; preopercular, 3, upper 2 longest; gill membranes united, free from isthmus. Anus immediately in front of anal fin. Anal papilla small, rounded. Skin: thick, smooth. Fins: dorsal (1), VIII to XII, 15 to 18, deeply notched between spinous and rayed portions, spinous portion emarginate, membranes between first and fifth spines progressively more deeply incised; anal, 11 to 13; pelvic, I, 5, thoracic; caudal, truncate to rounded. Lateral line: slightly decurved, then straight. Scales: minute, deeply embedded, not visible.



FIGURE 173. Cabezon. *Scorpaenichthys marmoratus* (Ayres) 1854

Pores: on lateral line, 71 to 88. Cirri: premaxillary, 1, median, prominent, projecting forward from tip of snout; maxillary, 1, at posterior tip; supraocular, 1, large, lacinate, posterior in position. Colour: olive green to brown, mottled with large light areas frequently margined with darker shades of body colour, coloration exceedingly variable, changing rapidly with environment through shades of blue, green, to grayish black and even red on occasion.

Length to 2 feet 6 inches.

Distinguished by the stout body, the smooth skin without visible scales, the prominent cirrus on the snout, the emargination of the spinous portion of the dorsal fin, the pelvic fins each with a spine and 5 rays and the large pale areas on the body.

The cabezon was first recorded from British Columbia waters in 1881 by D. S. Jordan and C. H. Gilbert who reported having seen the species in Victoria. It is common along the whole coast to the Queen Charlotte Islands at moderate depths on rocky, sandy and muddy bottoms as well as in kelp beds. This is one of the largest of the sculpins. Males may attain an age of 9 years and females as great as 13. It is a bottom fish, sluggish in movements except when capturing prey. Spawning occurs during the winter months from January to March when greenish eggs, as many as 100,000, may be deposited in a large mass. The food consists of a varied diet of crustaceans, particularly crabs and shrimps, as well as fishes and fish eggs. The name cabezon means large head. This fish is also known as the giant marbled sculpin.

Range: Southern California to northern British Columbia.

### **Brown Irish lord**

*Hemilepidotus spinosus* (Ayres) 1855

Body elongate, stout. Head large, broad; mouth terminal, large; snout bluntly rounded; spines: nasal large, stout, sharp; preopercular, 4, upper two simple, strong, sharp, lower 2 blunt, usually embedded in skin; opercular, 4, short, sharp; gill membranes united, broadly joined to isthmus. Anus immediately in front of anal fin. Anal papilla small, rounded. Skin: thin, loose. Fins: dorsal (1), XI, 18 to 20, deeply notched between spinous and rayed portions, spinous portion emarginate; anal, 14 to 16; pelvic, I, 4, thoracic; caudal, rounded. Lateral line: high anteriorly, decurved to midline, then straight. Scales: ctenoid, small, some in pediculate papillae; in band closely encircling base of dorsal fin; six or seven rows in width diagonally at widest part; in row immediately above and contiguous with middle third of lateral line, about 19; on lateral line, 57 to 66, small; in rows of varying lengths below and contiguous with lateral line; in small patch behind base of pectoral fin. Cirri: on anterior third of lateral line, few, small, filamentous; on head: prenasal, postocular, postfrontal, occipital, opercular, maxillary, mostly multifid. Colour: brown, often tinged with red on dorsal surface, mottled and barred with dark brown; white on ventral surface.

Length to 10 inches.

Distinguished by the emarginate spinous portion of the dorsal fin, the bands of scales encircling the dorsal fin 6 or 7 rows in width diagonally at the widest part and the gill membranes united and broadly joined to the isthmus.

The brown Irish lord has been taken but once in British Columbia waters. A single specimen, 5 inches in length, was obtained on June 26, 1934, on Nootka Island at Bajo Point in a beach seine by Mr E. G. Hart of the *Wm. J. Stewart* expedition. It is now in the collection of the Biological Station at Nanaimo. The species is not uncommon along the California coast where it is caught in rather deep water and it is said to feed upon crustaceans.

Range: Southern California to Vancouver Island.



FIGURE 174. Brown Irish lord. *Hemilepidotus spinosus* (Ayres) 1855

### Red Irish lord

*Hemilepidotus hemilepidotus* (Tilesius) 1810

Body elongate, stout. Head large, broad; mouth terminal, large; snout bluntly rounded; spines: nasal, large, stout, sharp; preopercular, 4, upper 2 simple, strong, sharp, lower 2 blunt, usually embedded in skin; opercular, 4, short, sharp; gill membranes united, narrowly joined to isthmus. Anus immediately in front of anal fin. Anal papilla small, rounded. Skin: thick, firm. Fins: dorsal (1), X to XII, 18 to 20, moderately notched between spinous and rayed portions, spinous portion emarginate; anal, 13 to 16; pelvic, I, 4, thoracic; caudal, rounded. Lateral line: high anteriorly, decurved to midline, then straight. Scales: ctenoid, small, some in pediculate papillae; in band closely encircling base of dorsal fin, four rows in width diagonally at widest part; in row immediately above and contiguous with middle third of lateral line, about 17; on lateral line, 59 to 69; small; in rows of varying lengths below lateral line, separated from lateral line anteriorly; in triangular patch behind base of pectoral fin. Cirri: on anterior third of lateral line, small, filamentous; on head; prenasal, nasal, postocular, postfrontal, occipital, opercular, maxillary,

multifid. Colour: dull to brilliant red on dorsal surface, more or less mottled, barred with brownish red; pale red to grayish green on ventral surface, profusely covered with rusty to black spots.

Length to 20 inches.



FIGURE 175. Red Irish lord. *Hemilepidotus hemilepidotus* (Tilesius) 1810

Distinguished by the emarginate spinous portion of the dorsal fin, the bands of scales encircling the dorsal fin 4 rows in width diagonally at the widest part and the gill membranes united and narrowly joined to the isthmus.

The red Irish lord was first taken in British Columbia waters in June, 1882, in Duncan Bay near Port Simpson, by Captain H. E. Nichols and recorded in 1883 by T. H. Bean as *Hemilepidotus trachurus* (Pallas). The species is common along the coast and is obtained frequently in shore seines. The red Irish lord is one of the large sculpins and one to which the term "bullhead" is applied sometimes. It spawns in March, laying tough, pink eggs in conspicuous masses, often above low-tide mark. The food consists of crabs, barnacles and mussels.

Range: Northern California to Bering Sea.

### Longfin sculpin

*Jordania zonope* Starks 1895

Body elongate, slender. Head moderate; mouth terminal, small; snout blunt; spines: nasal, long, sharp, recurved; preopercular, 2, lower well developed, upcurved; gill membranes united, free from isthmus. Anus immediately in front of anal fin. Anal papilla small, conical. Scales: in plate-like folds extending obliquely from lateral line to within short distance of base of anal fin. Fins: dorsal (2), XVII or XVIII—15 to 17; anal, 22 to 24, origin below posterior third of spinous dorsal; pelvic, I, 5, thoracic; caudal, rounded. Lateral line: slightly decurved, then straight. Scales: strongly ctenoid, covering body above lateral line; on lateral line, 48 to

50; on posterior margins of oblique folds of skin below lateral line, small, finely, sharply serrate. Cirri: nasal, 2, one large, one small; supraocular, 2, large plumose, posterior larger; frontoparietal, 3, moderate. Colour: olive green, spotted with red; dark cross saddles on dorsal surface of body, 6 or 7; dark bands across dorsal, pectoral and caudal fins, narrow; black on snout and upper lip; chocolate brown bars radiating downward from eye, 2.

Length to 4 inches.



FIGURE 176. Longfin sculpin. *Jordania zonope* Starks 1895

Distinguished by the slender body, the long spinous dorsal fin, the platelike folds of skin below the lateral line, the scales completely covering the body above the lateral line and on the posterior margins of the folds of skin below the lateral line and the pelvic fins each with 1 spine and 5 rays.

The longfin sculpin was first taken in British Columbia waters in June, 1909, near Ucluelet, Vancouver Island, by Messrs C. H. Young and W. Spreadborough and recorded in 1920 by B. A. Bean and A. C. Weed. On June 12, 1960, a second specimen was obtained at Sooke by Mrs G. C. Carl.

Range: Northern California to Barkley Sound.

### **Roughback sculpin**

*Chitonotus pugetensis* (Steindachner) 1877

Body elongate, moderately slender. Head moderate; mouth terminal, large; snout bluntly rounded; spines: nasal, small, sharp; sphenotic, 2, or 1; parietal, 1; preopercular, 4, uppermost stout, antler-like, with 3 sharp upwardly directed spinules; gill membranes united, free from isthmus. Anus midway between insertion of pelvic fins and origin of anal fin. Anal papilla stout, narrower posteriorly, ending in curved tip with slender tubular filament attached near end. Fins: dorsal (2), X or XI—14 to 17, spinous fin deeply emarginate, first spine longest, second and third successively shorter; anal, 14 to 17; pelvic, I, 3, thoracic; caudal, slightly rounded. Lateral line: slightly decurved, then straight. Scales: ctenoid; almost



covering body above lateral line; on lateral line, 36 to 39, large, rough. Cirri: nasal, 1, conspicuous, broad; on eyeball, 1, small, slender, filamentous; postocular, 1, moderate, broad. Colour: dark grayish green to brown with series of dark brown to black blotches on dorsal surface; white below lateral line; brownish red area often present behind base of each pectoral fin below lateral line and brilliant red blotch below anterior portion of rayed dorsal fin, especially during breeding season; dusky on margins of dorsal fins.

Length to 9 inches.



FIGURE 177. Roughback sculpin. *Chitonotus pugetensis* (Steindachner) 1877

Distinguished by the emarginate spinous dorsal fin and the rough scales almost completely covering the body above the lateral line on each side.

The roughback sculpin was first taken in British Columbia waters in July, 1906, at Port Simpson and the specimen is now in the collection of the Biological Station at Nanaimo. The first published record is that of two individuals collected in June, 1909, at Ucluelet by Messrs C. H. Young and W. Spreadborough and recorded in 1920 by B. A. Bean and A. C. Weed. The species is common in the Strait of Georgia in waters of moderate depth, probably not much beyond 40 fathoms. The food consists to a large extent of shrimps and other crustaceans.

Range: Southern California to northern British Columbia.

### Comb sculpin

*Icelinus borealis* Gilbert 1895

Body elongate, rather slender. Head moderate; mouth terminal, moderate; snout bluntly rounded; spines: nasal, short, sharp; preopercular, 3, uppermost stout, antler-like, with 3 to 6 sharp upwardly directed spinules; gill membranes united, free from isthmus. Anus three-quarters distance between insertion of pelvic fins and origin of anal fin. Anal papilla small, short, conical. Fins: dorsal (2), IX or X—15 to 17, spinous fin not emarginate, none of spines elongate; anal, 12

to 14; pelvic, I, 2, thoracic, short, frequently curved; caudal, truncate to rounded. Lateral line: slightly decurved, then straight. Scales: ctenoid; on upper part of body in two rows close to dorsal fins beginning below first or second spine, upper row ending behind rayed fin, lower row not extending to end of rayed fin; on lateral line, 37 to 40, rough. Cirri: along lateral line, filamentous; on head; nasal, 1, long, slender; supraocular, 1, moderate, multifid; elsewhere numerous, filamentous, slender. Colour: dark olive gray or brown on dorsal surface; white to cream on ventral surface, sometimes with fine red reticulations; dark saddles across body, 4, one below spinous dorsal fin, two below rayed dorsal fin, one at base of caudal fin; brown bars narrow, on lips, cheeks and all fins except pelvics and anal. In male: jet black spots on spinous dorsal fin, 2, anterior long, narrow, posterior large, nearly round, spots sometimes connected.

Length to 4 inches.



FIGURE 178. Comb sculpin. *Icelinus borealis* Gilbert 1895

Distinguished by the antler-like uppermost preopercular spines each with 3 to 6 upwardly directed spinules, the numerous slender filamentous cirri on the head and the double row of scales below the dorsal fins the upper of which extends beyond the posterior end of the rayed dorsal fin to meet the corresponding row of the opposite side.

The comb sculpin was first taken in British Columbia waters on September 2, 1891, west of Jordan River by the *Albatross*, station 3460, Lat.  $48^{\circ} 25' N$ , Long.  $124^{\circ} 10' W$ , depth 53 fathoms and recorded in 1895 by C. H. Gilbert. Many specimens have been secured off the south and west coasts of Vancouver Island, in the Strait of Georgia and in Burrard Inlet. The species is found at depths from 10 to 60 fathoms. The food consists to a considerable extent of shrimps. The name northern sculpin was used for this species by Clemens and Wilby in 1946, and is now recommended by the AFS/ASIH committee.

Range: Washington to Bering Sea.

**Lesser filamented sculpin**

*Icelinus tenuis* Gilbert 1890

Body elongate, rather slender. Head moderate; mouth terminal, moderate; snout bluntly rounded; spines: nasal, moderate, sharp; parietal, 2; preopercular, 4, uppermost stout, antler-like, with 4 or 5 sharp, upwardly directed spinules; gill membranes united, free from isthmus. Anus two-thirds distance between insertion of pelvic fins and origin of anal fin. Anal papilla very small, conical. Fins: dorsal (2), IX to XI—16 to 19, first spine elongate, filamentous, reaching middle of rayed dorsal fin, second spine shorter; anal, 13 to 17; pelvic, I, 2, thoracic; caudal, truncate to rounded. Lateral line: sharply decurved, then straight. Scales: ctenoid; on upper part of body in two rows close to dorsal fins, beginning below middle of spinous fin or slightly behind, ending approximately below fourth or fifth ray of rayed fin, in each row, 9 to 14; on lateral line, 38 to 43, rough. Cirri: along lateral line, small, filamentous; on head, nasal, absent, supraocular, 1, moderate, flattened, multifid, on various other parts of head, slender, filamentous. Colour: light brown on dorsal surface, variously blotched with orange; creamy white on ventral surface with dusky blotches below lateral line; dark saddles across upper part of body, 4, one below spinous dorsal fin, two below rayed dorsal fin, one at base of caudal fin; jet black on supraocular cirri; bright yellow on lateral line cirri; white to cream, variously barred with orange to brown, on all fins except pelvics and anal; dusky on margins of dorsal and anal fins; male with large black spot about the sixth spine of spinous dorsal fin; white band near base of each pectoral fin, prominent.

Length to 5½ inches.

Distinguished by the somewhat elongate first spine in the spinous dorsal fin reaching the middle of the rayed fin when depressed, the second spine not reaching



FIGURE 179. Lesser filamented sculpin. *Icelinus tenuis* Gilbert 1890

this point, the 2 short rows of scales on the upper part of the body extending slightly behind the origin of the rayed dorsal fin and the presence of 2 moderate, flattened, supraocular cirri.

The lesser filamented sculpin was first taken in British Columbia waters on June 20, 1903, in the Strait of Georgia off Bowen Island, when two small specimens were obtained by the *Albatross*, station 4193, Lat. 49° 20' N, Long. 123° 43' W, depth 23 fathoms and recorded in 1907 by B. W. Evermann and E. L. Goldsborough as *Tarandichthys tenuis* (Gilbert). Other individuals have been obtained from False Narrows, near Nanaimo, northward to Tasu Harbour in the Queen Charlotte Islands. The depth range recorded from British Columbia waters is 20 to 70 fathoms, but in California it is from 18 to 204 fathoms. The food consists in part of shrimps. The name recommended by the AFS/ASIH committee is spotfin sculpin.

Range: Southern California to Queen Charlotte Islands.

### Filamented sculpin

*Icelinus filamentosus* Gilbert 1890

Body elongate, moderately slender. Head moderate; mouth terminal, moderate; snout bluntly rounded; spines: nasal small, sharp; preopercular, 4, uppermost stout, antler-like, with 3 or 4 sharp, upwardly directed spinules; gill membranes united, free from isthmus. Anus two-thirds distance between insertion of pelvic fins and origin of anal fin. Anal papilla short, stout, conical. Fins: dorsal (2), IX to XI—15 to 18, first two spines elongate, filamentous, reaching middle of rayed fin or beyond; anal, 13 to 15; pelvic, 1, 2, thoracic; caudal, truncate to rounded. Lateral line: sharply decurved, then straight. Scales: ctenoid; on upper part of body, in two rows close to dorsal fins, beginning below third or fourth spine, ending below last ray, in each row, 27 to 33; on lateral line, 36 to 39, rough. Cirri: along lateral line in short series, small, filamentous; on head, nasal, 1, supraocular, 1, large, flattened, multifid, between supraocular and origin of spinous dorsal fin, 2, on posterior tip of maxillary, 1, on cheek, 1, on preopercle, 3. Colour: olive green to light brown on dorsal surface; creamy yellow to light brown on ventral surface; dark saddles across body, 4, one below spinous dorsal fin, two below rayed dorsal fin, one at base of caudal fin; jet black on supraocular cirri; barred with rows of black blotches on all fins except pelvics and anal; dusky along margin of anal fin; males sometimes variously blotched with orange to red.

Length to 10 $\frac{3}{8}$  inches.

Distinguished by the first 2 very elongate spines in the spinous dorsal fin reaching at least to the middle of the rayed dorsal fin when depressed, the 2 rows of scales on the upper part of the body reaching merely to the posterior end of the rayed dorsal fin and the presence of 2 large flattened supraocular cirri.

The filamented sculpin was first taken in British Columbia waters on June 20, 1903, in the Strait of Georgia off Bowen Island by the *Albatross*, station 4193, Lat. 49° 20' N, Long. 123° 43' W, depth 23 fathoms. This specimen was 2 $\frac{1}{2}$  inches in

length and was recorded in 1907 by B. W. Evermann and E. L. Goldsborough as *Tarandichthys filamentosus* (Gilbert). Single individuals have since been obtained: in 1928, near Porlier Pass, at 25 to 30 fathoms; in 1934, at Active Pass, depth 40 fathoms; in Burrard Inlet, depth 10 to 20 fathoms; also in 1934 from southwest of Esteban Point on the west coast of Vancouver Island, depth 60 fathoms; in 1941, from the Strait of Georgia at approximately 40 fathoms. The food consists of a varied diet of crustaceans, including shrimps and isopods. The name recommended by the AFS/ASIH committee is threadfin sculpin.

Range: Southern California to northern British Columbia.



FIGURE 180. Filamented sculpin. *Icelinus filamentosus* Gilbert 1890

### Slim sculpin

*Radulinus asprellus* Gilbert 1890

Body elongate, very slender, dorsal surface flattened, forming prominent ridge with lateral surface. Head elongate, somewhat depressed; mouth terminal, small; snout bluntly rounded; eye large; interorbital space: very narrow; spines: nasal long, strong; preopercular, 2, short, simple, sharp; gill membranes united, free from isthmus. Anus two-thirds distance between insertion of pelvic fins and origin of anal fin. Anal papilla very elongate, slender. Fins: dorsal (2), VIII to XI—20 to 23, close together; anal, 22 to 25, origin below that of rayed dorsal; pelvic, I, 3, thoracic; pectoral, barely reaching origin of anal fin in male, slightly shorter in female, lower rays not thickened, slightly exerted; caudal, rounded. Lateral line high, almost straight, following conspicuous dorsolateral ridge of body. Scales: strongly ctenoid; small, in single row commencing in median position on

posterior area of interorbital space, passing around posterior margin of eye, thence backward above and contiguous with lateral line, extending to point below middle of rayed dorsal fin; on lateral line, 38 to 41, large, keeled, spinous; absent from occipital area. Cirri: absent. Spinous projections in row across upper margin of eyeball, minute. Colour: light brown to gray on dorsal surface; lighter brown to creamy white on ventral surface; dark saddles and blotches across back, 3 or 4, faint; brownish black streak downward and forward in front of eye; fins translucent without colour except for fine red dots on spines and rays of dorsal, anal and pectoral fins.

Length to 6 inches.



FIGURE 181. Slim sculpin. *Radulinus asprellus* Gilbert 1890

Distinguished by the very slender angular body, the absence of scales from the top of the head, the long nasal spines, the high lateral line with very spinous keeled scales and the row of small scales contiguous with the lateral line extending onto the head.

The slim sculpin was first taken in British Columbia waters on June 19, 1903, near Nanaimo by the *Albatross*, station 4191, Lat. 49° 11' N, Long. 123° 54' W, depth 54 fathoms and recorded in 1907 by B. W. Evermann and E. L. Goldsborough. The species is fairly common in the Strait of Georgia and Burrard Inlet, at moderate depths and is caught frequently in shrimp trawls. Specimens have been obtained off the west coast of Vancouver Island in the Nootka area in 1934 by the *Wm. J. Stewart*, near Fort Rupert in 1903 by the *Albatross*, station 4204, and in 1935 near Graham Island by the *Wm. J. Stewart*; the depth range in the above areas was 10 to 70 fathoms. In southern California waters individuals have been recorded from depths as great as 155 fathoms. This species was called the darter sculpin in 1946 by Clemens and Wilby.

Range: Southern California to Gulf of Alaska.

### Spinynose sculpin

*Radulinus taylori* (Gilbert) 1912

Body elongate, moderately stout; dorsal surface slightly arched. Head elongate, moderately deep; mouth terminal, small; snout bluntly rounded; eye, large; spines: nasal, long, strong; preopercular, 3, upper two short, flat, triangular, lower-

most minute, all spines covered with skin; gill membranes broadly united, free from isthmus. Anus two-thirds distance between insertion of pelvic fins and origin of anal fin. Anal papilla elongate, conical. Fins: dorsal (2), X or XI—15 or 16; anal, 15 to 17, origin below that of rayed dorsal; pelvic, I, 3, thoracic; pectoral, reaching third or fourth ray of anal fin, lower 10 or 11 rays thickened, slightly exerted; caudal, rounded. Lateral line: high, slightly arched, then straight. Scales: ctenoid, above lateral line in single row or in 4 rows, lowermost contiguous with lateral line; on lateral line, 34 to 36, in form of spinous plates with slight keels forming rough ridge; on occipital area, numerous, small, forming ill-defined row toward row above lateral line. Cirri: below lateral line in row, slender, filamentous; on posterior margin of orbital rim, 1, short. Spinous projections in row on anterior and upper margin of eyeball, minute. Colour: olive brown on dorsal surface; lighter on ventral surface; dark saddles across body, 4; dark bars on dorsal, pectoral and caudal fins; unmarked on pelvic and anal fins.

Length to 2½ inches.



FIGURE 182. Spinynose sculpin. *Radulinus taylori* (Gilbert) 1912

Distinguished by the moderately stout body, the presence of scales on the top of the head, the long nasal spines, the high lateral line of slightly keeled spinous scales, the 1 or 4 rows of scales immediately above and contiguous with the lateral line and the long pectoral fins.

The spinynose sculpin is represented by 3 known specimens. The type, a female, was taken some time prior to 1910 in Departure Bay by the Reverend G. W. Taylor, first Director of the Biological Station at Nanaimo. It was described in 1912 by C. H. Gilbert as a new genus and species *Asemichthys taylori* and is now lodged in the Natural History Museum of Stanford University. It was so recorded in 1946 by Clemens and Wilby. The second specimen, a male, was secured January 4, 1934, in Burrard Inlet in a shrimp trawl at a depth of 20 fathoms, recorded in 1936 by G. V. Wilby and is now in the collection of the Institute of Fisheries of the University of British Columbia. The third, also a male, was obtained June 27, 1935, in Tasu Harbour, Queen Charlotte Islands, in a dredge

at a depth of 7 to 25 fathoms by the *Wm. J. Stewart* expedition and is in the collection of fishes at the Biological Station at Nanaimo. The species was called Taylor's sculpin in 1946 by Clemens and Wilby.

Range: Strait of Georgia to Queen Charlotte Islands.

### **Roughspine sculpin**

*Triglops macellus* (Bean) 1883

Body elongate, very slender, tapering to very slender caudal peduncle; lower profile nearly straight. Head elongate, somewhat depressed; mouth terminal, moderate; snout moderately long, rounded; spines: nasal, short, sharp; preopercular, 2, upper sharp, lower blunt; gill membranes united, free from isthmus. Anus about midway between insertion of pelvic fins and origin of anal fin. Anal papilla elongate, conical, constricted at tip. Skin: in series of oblique folds along each side of body below lateral line. Fins: dorsal (2), XI—28 or 29; anal, 28 or 29, origin below that of rayed dorsal; pelvic, I, 3, thoracic; pectoral, 15 to 17, lower 5 to 7 rays greatly exerted; caudal, emarginate. Lateral line: high, slightly decurved below spinous dorsal fin, then straight. Scales: ctenoid; covering body above lateral line, very small; no row of enlarged scales near bases of dorsal fins; on lateral line, 50 to 53, moderately large, without keels, forming rough ridge; below lateral line, on posterior margins of oblique folds of skin, minute; on top of head, dense, minute; on spines and rays of all fins in form of minute prickles. Spinous projections on eyeball in single row, minute. Cirri: absent. Colour: olive green to light brown on dorsal surface; cream on ventral surface; dark saddles across body, 5; jet black spot on each side of snout near tip; fins translucent, barred with brown on rayed dorsal, pectoral and caudal fins, faint on rayed dorsal fin; jet black spot on tip of membrane between first and second spines of spinous dorsal fin.

Length to 8 inches.



FIGURE 183. Roughspine sculpin. *Triglops macellus* (Bean) 1883

Distinguished by the slender body, the oblique folds of skin on each side of the body below each lateral line margined with minute scales, the greatly exerted lower rays in each pectoral fin, the absence of a row of large scales from each side of the body near the bases of the dorsal fins and the row of spinous projections across each eyeball.



The roughspine sculpin was first taken in British Columbia waters in August 1882, in Carter Bay by Captain H. E. Nichols. It was described in 1883 as the type of a new genus and species by T. H. Bean and was deposited in the United States National Museum. A second individual was obtained in the following year in the same locality. Additional specimens have been secured in Burrard Inlet, English Bay and Howe Sound in shrimp trawls at depths ranging from 10 to 50 fathoms, as well as one each from Safety Cove, Dean Channel, and near Prince Rupert. It was recorded in 1946 as *Prionistius macellus* Bean, by Clemens and Wilby.

Range: Washington to Bering Sea.

### Ribbed sculpin

*Triglops beani* Gilbert 1895

Body elongate, stout anteriorly, tapering to slender caudal peduncle; dorsal surface highly arched; lower profile nearly straight. Head elongate, depressed; mouth terminal, moderate; snout long, pointed; spines: nasal, short, sharp to blunt; frontal, 2, blunt; preopercular, 4, short, upper two sharp; gill membranes united, free from isthmus. Anus midway between insertion of pelvic fins and origin of anal fin. Anal papilla elongate, conical. Skin: in series of oblique folds along body below lateral line. Fins: dorsal (2), X or XI—23 to 26; anal, 23 to 26, origin below that of rayed dorsal; pelvic, I, 3, thoracic; pectoral, 17 or 18, not thickened, not exerted; caudal, truncate. Lateral line: high, decurved below spinous dorsal fin, then straight. Scales: ctenoid; above lateral line and on head numerous, small, of various sizes and shapes; in row near bases of dorsal fins commencing above preopercle, extending to point below middle of rayed fin, moderately large, upright, spines large; on lateral line, 49 to 50, large without keels, forming rough ridge; below lateral line on posterior margins of oblique folds of skin, represented by minute prickles; on spines and rays of all fins, in form of minute prickles. Spinous projections on eyeball in 3 rows. Cirri: absent. Colour: light olive brown on dorsal surface; white on ventral surface; dark saddles across



FIGURE 184. Ribbed sculpin. *Triglops beani* Gilbert 1895

body, 5; in male, narrow black stripe along body below lateral line, separated therefrom by narrow silvery streak; in female, stripe represented by disconnected series of irregular dark areas.

Length to 8 inches.

Distinguished by the slender tapering body, the slender caudal peduncle, the oblique folds of skin below the lateral line on each side of the body margined with minute prickles, the row of enlarged scales near the bases of the dorsal fins and the 3 rows of spinous projections across each eyeball.

The ribbed sculpin was first taken in British Columbia waters on September 4, 1891, near Victoria, by the *Albatross*, station 3465, Lat. 48° 21' N, Long. 123° 14' W, depth 48 fathoms and recorded in 1895 by C. H. Gilbert. A second specimen was obtained in 1908 near Esquimalt and is now in the Provincial Museum at Victoria.

Range: Washington to Bering Sea.

### Scalyhead sculpin

*Artedius harringtoni* (Starks) 1896

Body elongate, slender to stout. Head moderate to large, depressed; mouth terminal, moderate to large; teeth on jaws, in male: large anteriorly, cardiform posteriorly; in female: small; snout bluntly rounded; eye, large; spines: nasal, long; preopercular, 2, upper broad or weakly bifid, often covered with thick skin, lower minute; gill membranes united, free from isthmus. Anus, in male: about midway between insertion of pelvic fins and origin of anal fin; in female: immediately in front of anal fin. Anal papilla in mature male large, cylindrical, with small conical tubular filament asymmetrically placed at tip, in immature male, small, conical. Fins: dorsal (2), IX or X—16 to 18; anal, 10 to 14; pelvic, I, 3, thoracic; caudal, truncate. Lateral line: slightly decurved, then straight. Scales: ctenoid; in broad band on upper part of body 8 to 10 rows in width diagonally at widest part, not contiguous with lateral line, extending backward almost to origin of caudal fin, bands of each side meeting behind rayed dorsal fin; in longitudinal series, 38 to 51; on lateral line, 35 to 39; on head in patches. Cirri: on lateral line, paired or single, short, filamentous, 1 to 3 on each scale pocket, in anterior portion; on head, supraocular, 2, in male: multified, anterior very large, posterior large; in female: anterior small, filamentous, posterior small, bifid or multifid; behind eye, several, short, filamentous. Colour in male: brownish olive on dorsal surface; dusky cream on ventral surface; dark saddles across back, 5 to 7; white spots on lower portion of body numerous, round, sometimes not clear-cut, lower spots often incomplete; brilliant orange yellow on ventral surface of head in adults; inconspicuously mottled with reddish brown on dorsal, pectoral and caudal fins; golden yellow on anal fin with interlocking series of white hexagons. Colour in female: brown to olive brown on dorsal surface; creamy white on ventral surface; dark saddles across back, 5 to 7; white spots on lower portion of body and head numerous, round, clear-cut, on sides becoming larger below, lower spots often

incomplete, fusing with white of ventral surface; white to pink or red on pelvic and anal fins; dark streaks on other fins, wavy; white spot on caudal peduncle conspicuous in male, less so in female.

Length to 4 inches.



FIGURE 185. Scalyhead sculpin. *Artemius harringtoni* (Starks) 1896

Distinguished by the bifid partially embedded upper preopercular spine on each side of the head, the band of scales along the upper side of the body meeting its fellow on the opposite side behind the rayed dorsal fin, the scales on the top of the head, the large cardiform teeth, the pattern of white hexagons on the golden yellow anal fin of the mature male and the row of complete and incomplete white spots along the margins of the dark pigmentation of the body of the female.

The scalyhead sculpin was first taken in British Columbia waters in July, 1909, in Barkley Sound at Ucluelet, at low tide by Mr C. H. Young and recorded in 1920 by B. A. Bean and A. C. Weed as the type of a new genus and species, *Pterygiocottus macouni*, on the basis of a male specimen  $3\frac{1}{4}$  inches in length. Dr R. L. Bolin has shown recently that this species is actually the mature male of *Artemius harringtoni*. The male at maturity becomes robust, develops a large head, enlarged anterior teeth and very plumose cirri and assumes a series of colours and colour patterns quite unlike the female or the immature male. In 1911 Dr E. C. Starks recorded a specimen from Nanaimo as *Axyrias harringtoni* Starks. The species is taken infrequently near Nanaimo, in Burrard Inlet, in English Bay and in the Queen Charlotte Islands area. It occurs at moderate depths and in most cases has been secured in beam trawls. It was called the plumose sculpin in 1946 by Clemens and Wilby.

Range: Southern California to northern British Columbia.

**Padded sculpin***Artedius fenestralis* Jordan and Gilbert 1882

Body elongate, stout anteriorly, slender posterior to anus. Head large, depressed, broad; mouth terminal, large; snout blunt; spines: nasal short, sharp, recurved; preopercular 3, frequently covered with skin, uppermost enlarged, with 2 or 3 spinules; gill membranes united, free from isthmus. Anus immediately in front of anal fin. Anal papilla very small, conical. Fins: dorsal (2), VIII or IX—16 to 18; anal, 12 to 14; pelvic, I, 3, thoracic; caudal, truncate to rounded. Lateral line: gradually decurved, then straight. Scales: weakly ctenoid, in fleshy pad-like papillae; on upper part of body in broad band about 9 rows in width diagonally at widest part, extending backward almost to origin of caudal fin, bands on each side meeting behind rayed dorsal fin, in longitudinal series, 26 to 29; on lateral line, 35 to 37, small, deeply embedded, smooth except for few at anterior end; on head, stellate, in small patch in postocular and subocular regions. Cirri: on lateral line, slender, filamentous; on head, few, small, filamentous, except for multifid pairs with bulbous bases behind eyes. Colour: extremely variable, variously orange, yellow, light green, occasionally cream on dorsal surface; dusky on ventral surface of male, cream to pale brown on ventral surface of female; green, brown or black saddles across body, 4, one below spinous dorsal fin, two below rayed dorsal fin, one at base of caudal fin; white spots on body irregularly scattered; green, brown or rusty bars on fins except pelvics and anal; dusky to black on pelvic and anal fins in male; cream to pale brown on pelvic and anal fins in female; in male: black spots on spinous dorsal fin, 2, anterior small, posterior large; breeding colours: body becomes very dusky to almost black, particularly on lower portion, other colours become very intense; black spots on spinous dorsal fin joined by 3 bands of colour, upper dusky, middle pale blue, lower golden yellow.

Length to 5½ inches.



FIGURE 186. Padded sculpin. *Artedius fenestralis* Jordan and Gilbert 1882

Distinguished by the enlarged uppermost preopercular spine with the 2 or 3 spinules partly or entirely covered with skin, the stellate scales on the head, the dorsal bands of scales in fleshy pad-like papillae meeting its fellow behind the rayed dorsal fin and the smooth embedded scales on each lateral line.

The padded sculpin was first taken in British Columbia waters on July 27, 1881, in Drew Harbour by Captain H. E. Nichols and recorded in the same year by T. H. Bean as *Artedius notospilosus* Girard. In 1910 a specimen was obtained in the Strait of Georgia by Mr W. Spreadborough and was recorded in 1920 by B. A. Bean and A. C. Weed as *Astrolytes fenestralis* (Jordan and Gilbert). The padded sculpin is abundant in the Strait of Georgia and Burrard Inlet and has been captured at Ucluelet. It inhabits waters down to 30 fathoms. Spawning occurs from January to March, the female depositing salmon-coloured eggs. The food consists to a considerable extent of shrimps and small fishes.

Range: Northern California to Gulf of Alaska.

### Smoothhead sculpin

*Artedius lateralis* (Girard) 1854

Body elongate, moderately stout; lower profile nearly straight. Head much depressed, broad; mouth terminal, moderate; snout bluntly rounded, in dorsal view; spines: nasal, short, blunt; preopercular, 1, strongly bifid, covered with skin; gill membranes united, free from isthmus. Anus immediately in front of anal fin. Anal papilla small, bluntly conical. Fins: dorsal (2), VIII to X—16 or 17; anal, 12 to 14; pelvic, I, 3, thoracic; caudal, truncate to rounded. Lateral line: slightly decurved, then straight. Scales: weakly ctenoid; on upper part of body in broad band 7 or 8 rows in width diagonally at widest part, not contiguous with lateral line, terminating before posterior end of rayed dorsal fin, in longitudinal series, 24 to 31; on lateral line, 35 or 36, embedded in skin; on head, none. Cirri: along anterior of lateral line, slender, filamentous, sometimes paired; on nasal spine, small, multifid; on dorsal surface of head, numerous, small, slender. Colour: olive green to dark brown on dorsal surface; cream to faint green on ventral surface; dark saddles across back, 6, light between first two; pale cream spots on lower portion of body and head numerous, roundish, becoming larger below, lower spots often incomplete, fusing with cream of ventral surface of body; conspicuous dark bars on all fins except pelvics. In male: small black spot on membrane of spinous dorsal fin between first and second spines; in breeding season duskiness pronounced.

Length to 5 inches.

Distinguished by the bifid preopercular spines, the straight lower profile of the body, the bluntly rounded snout as viewed from above, the depressed head without scales, the narrow band of scales on the upper part of each side of the body terminating before the posterior end of the rayed dorsal fin and the embedded scales on the lateral lines.

The smoothhead sculpin was first taken in British Columbia waters in 1893 at Comox by Mr J. Macoun and recorded in 1920 by B. A. Bean and A. C. Weed.

However the first published record is 1901 for the Queen Charlotte Islands by W. H. Osgood. The species is distributed generally along the coast in tidepools and shallow water. Spawning occurs in February. The small bright cherry red eggs are deposited in a mass in a protected location amongst rocks and hatch in about 16 days. This species was called the round-nosed sculpin in 1946 by Clemens and Wilby.

Range: Southern California to Queen Charlotte Islands.



FIGURE 187. Smoothhead sculpin. *Arctidius lateralis* (Girard) 1854

### Saddleback sculpin

*Oligocottus rimensis* (Greeley) 1901

Body elongate, slender. Head moderate, front profile very steep; mouth terminal moderate; snout bluntly rounded; spines: nasal, small, sharp; preopercular, 1, small, simple, curved upward; gill membranes united, free from isthmus. Anus immediately in front of anal fin. Anal papilla small, slender, usually curved forward. Skin: thick, firm. Fins: dorsal (2), VIII to X — 16 to 19; anal, 13 to 15, origin below posterior end of spinous dorsal fin (in male, first two rays greatly enlarged, subequal, membranes deeply incised); pelvic, I, 3, thoracic; pectoral, very large; caudal, rounded. Lateral line: high anteriorly, decurved, then straight. Scales: reduced ctenoid, in form of minute plates, each with long slender spine; everywhere on body, minute, weak; on head, scattered, smaller. Pores: on lateral line, 35 to 41. Cirri: long, filamentous, in row along anterior half of lateral line; on head, sparse, scattered. Colour: light olive green or reddish brown on dorsal surface; creamy white to pale green on ventral surface; dark blotches across body, 5, irregular, bordered by light blue; faintly barred with green or reddish brown on rayed dorsal, pectoral and caudal fins. In young, colours often much brighter.

Length to 2 inches.

Distinguished by the almost vertical profile of the snout, the single upcurved preopercular spine on each side of the head, the minute scales in form of prickles and the anus immediately in front of the anal fin.

The saddleback sculpin was first taken in British Columbia waters on July 27, 1926, at Gabriola Island in Taylor Bay, by Dr J. R. Dymond and was recorded in 1928 by C. L. Hubbs as *Rusciculus rimensis* Greeley. This individual is now in the Royal Ontario Museum at Toronto. On July 29, 1930, a second specimen was obtained in Barkley Sound by Dr V. E. Shelford in a tidepool, recorded in the same year by L. P. Schultz as *Rusciculus rimensis* Greeley. On August 24, 1942, three males were secured by Dr G. C. Carl and the second author at Victoria on Gonzales Point in a tidepool at extreme low tide. The species is one of the smallest of the tidepool forms. It was called the prickly sculpin in 1946 by Clemens and Wilby.

Range: Northern California to Vancouver Island.



FIGURE 188. Saddleback sculpin. *Oligocottus rimensis* (Greeley) 1901

### Tidepool sculpin

*Oligocottus maculosus* Girard 1856

Body elongate, moderately stout, slightly compressed. Head conical; mouth terminal, small; snout bluntly rounded; spines: nasal stout, blunt; preopercular, 1, small, bifid, one spinule pointing upward, other backward; gill membranes united, free from isthmus. Anus immediately in front of anal fin. Anal papilla long, slender, usually curved forward. Skin: thick, smooth, firm. Fins: dorsal (2), VIII or IX—16 to 18; anal, 12 to 14, origin below posterior third of spinous dorsal fin (in male, first 3 or 4 rays longest, stoutest, membranes deeply incised; in female, first ray very short); pelvic, I, 3, thoracic; pectoral, large, lower rays somewhat exerted; caudal, rounded. Lateral line: high anteriorly, decurved, then straight. Scales: absent. Pores: on lateral line, 34 to 39. Cirri: single or paired, filamentous; along lateral line anteriorly for about distance of 15 pores; on head, numerous; in breeding male, on tips of dorsal fin spines fleshy. Colour: reddish brown, green or crimson on dorsal surface, according to surroundings; white to cream, suffused with green or blue, on ventral surface; dark blotches across body, 5, irregular; white spot at base of caudal fin, prominent; variously mottled and barred on rayed

dorsal, pectoral and caudal fins. In male, small orange spot on anterior membranes of spinous dorsal fin margined below by jet black which becomes broader and less intense posteriorly.

Length to  $3\frac{1}{2}$  inches.

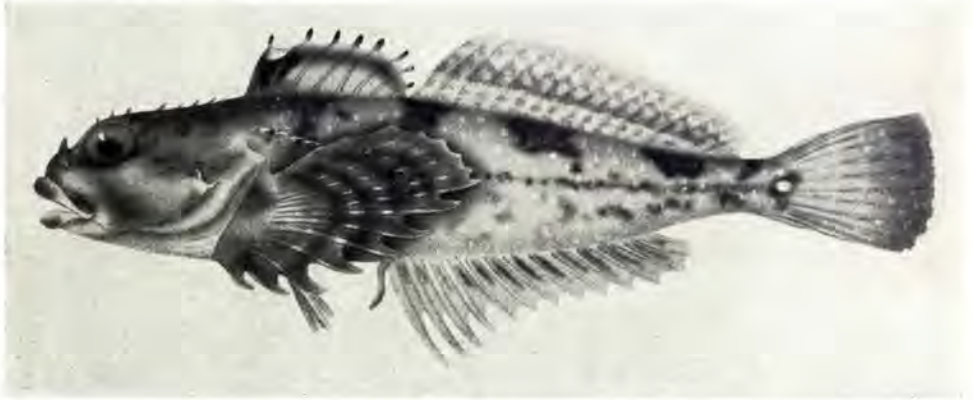


FIGURE 189. Tidepool sculpin. *Oligocottus maculosus* Girard 1856

Distinguished by the forked preopercular spine on each side of the head, the filamentous cirri on the head and the anterior portion of each lateral line, the anus immediately in front of the anal fin and below the rayed dorsal fin and the 3 or 4 stout rays in the anal fin of the male.

The tidepool sculpin was first taken in British Columbia waters at Vancouver Island by H.M.S. *Plumper* and recorded in 1860 by A. Günther as *Centridermichthys maculosus*. An individual captured in 1893 at Comox by Mr J. Macoun was recorded in 1920 by B. A. Bean and A. C. Weed as *Oligocottus borealis* Jordan and Snyder. The species is exceedingly abundant in the shallow waters, especially in tidepools around rocky shores, where it darts from one protective spot to another with great speed. Spawning was observed on February 17, 1942, in the English Bay Aquarium. The male clasped the female with one pectoral fin and fertilized the pale greenish blue eggs as they were deposited on a rock.

Range: Northern California to Bering Sea.

### Fluffy sculpin

*Oligocottus snyderi* Greeley 1901

Body elongate, moderately stout, slightly compressed. Head conical; mouth terminal, small; snout pointed; spines: nasal, stout, blunt; preopercular, 1, small, bifid, one spinule pointing upward, other backward; gill membranes united, free from isthmus. Anus immediately in front of anal fin. Anal papilla long, slender, conical. Skin: thick, smooth, firm. Fins: dorsal (2), VII to IX—17 to 20; anal, 12 to 15, origin below posterior third of spinous dorsal fin (in male first ray long,



stout, second not enlarged, separated from remainder of fin; in female, membranes between first 3 or 4 rays deeply incised); pelvic, I, 3, thoracic; pectoral, large, lower rays exerted; caudal, rounded. Lateral line: high anteriorly, gradually decurved, then straight. Scales: absent. Pores: on lateral line, 36 to 39. Cirri: very numerous, filamentous, usually in groups of 3 or 4; in row along bases of dorsal fins from third spine in spinous fin to sixteenth or seventeenth ray in rayed fin; in row along anterior two-thirds of lateral line; between these two rows, short row extending from under last two spines in spinous dorsal fin to beneath third or fourth ray in rayed fin; on head in groups of 3 or 4, joined at bases; on spinous dorsal fin, single, immediately behind tip of each spine. Colour: bright, green to light reddish brown but frequently pink or lavender; dark blotches across body, 5 or 6, irregular; dark brown circles along lateral line, 5; white spots on body numerous, small; dusky blotches on spinous dorsal fin, 2, anterior and posterior; lightly barred with dusky dots on rayed dorsal, pectoral, anal and caudal fins.

Length to 3½ inches.



FIGURE 190. Fluffy sculpin. *Oligocottus snyderi* Greeley 1901

Distinguished by the forked preopercular spine on each side of the head, the 3 rows of cirri in groups along each side of the body, the anus immediately in front of the anal fin and the long stout first ray in the anal fin of the male.

The fluffy sculpin was first taken in British Columbia waters in June or July, 1909, by W. Spreadborough at Ucluelet and recorded in 1920 by B. A. Bean and A. C. Weed as *Dialarchus snyderi* (Greeley). The species has been collected from Vargas Island to Kyuquot on the west coast of Vancouver Island and from Skidegate Inlet in the Queen Charlotte Islands. This is one of the small brightly marked tidepool sculpins which changes its colour according to its environment.

Range: Southern California to Queen Charlotte Islands.

## Mosshead sculpin

*Clinocottus globiceps* (Girard) 1857

Body elongate, moderately stout. Head blunt, anterior profile rounded; mouth terminal, small; lower jaw included; lips thick; snout very blunt; spines: nasal, blunt; preopercular, 1, small, blunt, covered with skin; gill membranes united, free from isthmus. Anus two-thirds distance from insertion of pelvic fins to origin of anal fin. Anal papilla stout, conical, expanded at tip, ending in horn. Skin: thick, smooth. Fins: dorsal (2), IX or X—15 to 17; anal, 10 to 12, membranes greatly incised, origin below anterior third of rayed dorsal fin; pelvic, I, 3, thoracic; pectoral, large; caudal, rounded. Lateral line: high anteriorly, decurved, then straight. Scales: absent. Pores: on lateral line, 34 to 40. Cirri: multifid; in row along anterior half of lateral line; on head, numerous, dense, large. Colour: olive to reddish brown on dorsal surface; cream to light brown on ventral surface; black blotches across body, 6; heavily barred with dark brown or black on fins except pelvics. Colours often very bright with yellow, orange, green and blue in various distributions according to habitat.

Length to  $7\frac{1}{2}$  inches.



FIGURE 191. Mosshead sculpin. *Clinocottus globiceps* (Girard) 1857

Distinguished by the bluntly rounded head, the single blunt preopercular spine on each side of the head, the dense multifid cirri on each lateral line and the head and the somewhat forward position of the anus.

The mosshead sculpin was first recorded from British Columbia waters in 1866 by J. K. Lord as *Centridermichthys globiceps*, but from no specific locality. It was listed in 1901 from the Queen Charlotte Islands by W. H. Osgood as *Blenicottus globiceps* (evidently a misprint for *Blennicottus*). Probably the species is not uncommon in the tidepools and shallow waters of the exposed coast. Specimens have been taken at Victoria, on the west coast of Vancouver Island from

Ucluelet to Kyuquot and from the Queen Charlotte Islands. The name *globiceps* refers to the globular shape of the head, and the common name globe-headed sculpin was used for the species in 1946 by Clemens and Wilby.

Range: Southern California to Gulf of Alaska.

### Calico sculpin

*Clinocottus embryum* (Jordan and Starks) 1895

Body elongate, moderately slender, slightly compressed. Head acute, anterior profile pointed; mouth terminal, small; lower jaw barely included; lips thick; snout blunt; spines: nasal, short, blunt; preopercular, 1, small, blunt, covered with skin; gill membranes united, free from isthmus. Anus about half distance between insertion of pelvic fins and origin of anal fin. Anal papilla stout, conical, usually curved forward. Skin: moderately thick, smooth. Fins: dorsal (2), VIII to X—14 to 17; anal, 9 to 12, membranes deeply incised, origin below anterior third or rayed dorsal fin; pelvic, I, 3, thoracic; pectoral, very large; caudal, truncate to rounded. Lateral line: high anteriorly, decurved, then straight. Scales: absent. Pores: on lateral line, 34 to 38. Cirri: multifid; in row on anterior third of lateral line; on head, scattered, large. Colour: light olive green to pink or rich maroon on dorsal surface; light green to dusky on ventral surface; brownish green blotches across body, 5 or 6; brown to black triangular spot surrounded by light brownish orange below eye; brown to orange bars on all fins except pelvics.

Length to 2 $\frac{3}{4}$  inches.



FIGURE 192. Calico sculpin. *Clinocottus embryum* (Jordan and Starks) 1895

Distinguished by the sharp pointed head in dorsal view, the single blunt preopercular spine on each side of the head, the triangular dark spot below each eye, the multifid cirri on the anterior third of each lateral line and on the head and the forward position of the anus.

The calico sculpin was first taken in British Columbia waters in June, 1909, at Ucluelet by Messrs C. H. Young and W. Spreadborough. This was a single

individual 2½ inches in length and was recorded in 1920 by B. A. Bean and A. C. Weed as *Oxycottus embryum* (Jordan and Starks). The species has been secured in Departure and Alert Bays and on the west coast of Vancouver Island from Ucluelet to Nootka Island. It probably is not uncommon in the rocky littoral areas. It was called mossy sculpin in 1946 by Clemens and Wilby.

Range: Northern California to Bering Sea.

### Sharpnose sculpin

*Clinocottus acuticeps* (Gilbert) 1895

Body elongate, slender, slightly compressed. Head acute, anterior profile pointed; mouth terminal, small; lower jaw barely included; snout sharply pointed; spines: nasal, short, sharp; preopercular, 1, small, simple, sometimes weakly bifid, slender, sharp, curved upward and inward, tip exposed; gill membranes united, free from isthmus. Anus one-third distance between insertion of pelvic fins and origin of anal fin. Anal papilla large, flattened anteroposteriorly, expanded laterally, ending abruptly in narrow conical tip beyond lateral expansions. Skin: smooth, firm. Fins: dorsal (2), VII to IX—14 to 16; anal, 10 to 13, origin below anterior third of rayed dorsal fin; pelvic, I, 3, thoracic; pectoral, large; caudal, rounded. Lateral line: high anteriorly, decurved, then straight. Scales: absent. Pores: on lateral line, 33 to 36. Cirri: simple; in row along lateral line to point opposite tip of pectoral fin, small, filamentous; on head, scattered, filamentous; at base of nasal spine; on eyeball, 1, filamentous, sometimes minute or absent in female. Colour: green to light brown on dorsal surface, varying with surroundings; white to cream on ventral surface; irregular dark brown band along each side of body extended dorsally to form 6 saddles across back; variously blotched with light colours along lateral line and below, dark bars radiating from eye, 3; dusky area on spinous dorsal fin between first and third spines.

Length to 2 inches.



FIGURE 193. Sharpnose sculpin. *Clinocottus acuticeps* (Gilbert) 1895

Distinguished by the acute snout, the slender sharp incurved preopercular spine on each side of the head, the forward position of the anus, the filamentous cirri, the small cirrus on each eyeball and the dusky area on the anterior tip of the spinous dorsal fin.

The sharpnose sculpin was first taken in British Columbia waters between May 10 and 13, 1890, in Departure Bay, by the *Albatross*, in a shore seine and recorded in 1895 by C. H. Gilbert as *Oligocottus acuticeps*. The species is found along the coast in tidepools and on sandy beaches. Specimens have been obtained near Victoria, at False Narrows, in Departure and Deep Bays, along the west coast of Vancouver Island from Vargas Island to Kyuquot, in Dean Channel and in Prince Rupert Harbour.

Range: Northern California to Bering Sea.

### Great sculpin

*Myoxocephalus polyacanthocephalus* (Pallas) 1811

Body elongate, stout anteriorly. Head large, depressed, broad; mouth terminal, large; snout bluntly rounded; cranial ridges and spines numerous, low; spines: nasal, short, blunt; preopercular, 3, uppermost long, equal to diameter of eye, straight, usually simple, sometimes bifid at tip, lowermost pointing downward, usually covered with skin; gill membranes united, jointed to isthmus with free fold posteriorly. Anus slightly in advance of anal fin. Anal papilla small, rounded. Fins: dorsal (2), IX or X—13 to 16; anal, 11 to 13; pelvic, I, 3, thoracic; pectoral, broad, procurent; caudal, truncate. Lateral line: high, following dorsal contour, decurved below posterior of rayed dorsal fin, then straight. Scales: reduced ctenoid in form of small plates embedded in fleshy papillae, each usually with small embedded or projecting spine; on body scattered; on head numerous, small, rounded, especially behind eye. Pores: on lateral line, about 35. Cirri: absent. Colour: dark



FIGURE 194. Great sculpin. *Myoxocephalus polyacanthocephalus* (Pallas) 1811

olive to black on dorsal surface; white to cream on ventral surface; creamy white bands across body, 2; black mottling or barring on all fins except pelvics.

Length to 2 feet 6 inches.

Distinguished by the stout body with scattered small papillae, the long straight uppermost preopercular spine on each side of the head and the lateral line decurved below the rayed dorsal fin.

The great sculpin was first recorded from British Columbia waters in 1866 by J. K. Lord as *Cottus polyacanthocephalus*, without definite locality or date of capture stated. The first specific record is that of two specimens taken in 1880 at Victoria from the stomach of a big skate, *Raja binoculata*, and recorded in the same year by D. S. Jordan and C. H. Gilbert as *Cottus polyacanthocephalus* Pallas. The species is common along the whole coast at moderate depths. The food consists to some extent of small fishes such as sculpins and blennies.

Range: Washington to Bering Sea.

### Buffalo sculpin

*Enophrys bison* (Girard) 1854

Body elongate, very stout anteriorly. Head large, broad; mouth terminal, moderate, snout blunt; occipital ridges, 2, prominent; spines: nasal, broad, rough; preopercular, 4, uppermost greatly elongate, simple, sharp, rough serrate anteriorly, lower three much smaller, two projecting backward, one downward; gill membranes united, broadly joined to isthmus, without free fold posteriorly. Anus immediately in front of anal fin. Anal papilla, long. Fins: dorsal (2), VII to IX—9 to 12; anal, 8 to 10; pelvic, I, 3, thoracic; caudal, truncate to rounded. Lateral line: high, following dorsal contour. Scales: in form of large rough tubercles; absent from body above and below lateral line; on lateral line, 29 to 33; on head, numerous, irregular. Cirri: absent. Colour: dark green to brown on dorsal surface; yellow to



FIGURE 195. Buffalo sculpin. *Enophrys bison* (Girard) 1854

white on ventral surface; black saddles across body, 3, broad; yellowish white on bands across back and sides, on pectoral fins and at base of caudal fin; colours various on slender bands across all fins except pelvics.

Length to 12 inches.

Distinguished by the very long rough uppermost preopercular spines, the gill membranes joined to the isthmus without a free posterior fold and the large raised tubercles on the high lateral lines.

The buffalo sculpin was first taken in British Columbia waters in May, 1882, at Esquimalt by Captain H. E. Nichols and recorded in 1883 by T. H. Bean as *Aspidocottus bison* Girard. It was listed in 1901 by W. H. Osgood from the Queen Charlotte Islands as *Euophrys bison* (evidently a misprint for *Enophrys*). The species is very common along the whole coast and is found frequently in shallow water where it feeds upon shrimps, crabs, amphipods, mussels, small fishes such as herring, young salmon, seaperches and sandlances as well as upon considerable quantities of sea lettuce, *Ulva*. The buffalo sculpin spawns in February and March and the orange brown eggs are laid in small clusters. When disturbed it expands the preopercles so that the spines are greatly elevated thus presenting a formidable appearance. This fish will take a bait readily and provides sport for the young, who frequently suffer hand wounds from the jagged spines.

Range: Southern California to Gulf of Alaska.

### Staghorn sculpin

*Leptocottus armatus* Girard 1854

Body elongate, moderately stout anteriorly. Head depressed, moderately broad; mouth terminal, large; lower jaw included; snout bluntly rounded; spines: nasal, absent; preopercular, 3, uppermost large, antler-like, spinules, 4, three prominent, one minute, lower two spines small; gill membranes united, broadly joined to isthmus. Anus immediately in front of anal fin. Anal papilla small, conical. Fins: dorsal (2), VI to VIII—15 to 20; anal, 15 to 20; pelvic, I, 4, thoracic; caudal, truncate. Lateral line: almost straight. Scales: absent. Pores on lateral line, 37 to 42. Cirri: absent. Colour: grayish olive to green with some yellow on dorsal surface; orange yellow to white on ventral surface; creamy yellow with green or black bars on all fins except pelvic and anal; orange on margin with large black spot on posterior portion of spinous dorsal fin.

Length to 12 inches.

Distinguished by the scaleless body, the prominent antler-like uppermost preopercular spine on each side of the head, the grayish olive to green coloration with the yellow and black markings and the conspicuous black spot on the posterior portion of the spinous dorsal fin.

The staghorn sculpin was first taken in British Columbia waters by H. M. S. Plumper near Vancouver Island and was recorded in 1880 by A. Günther as *Centridermichthys armatus*. In June, 1882, it was collected near Port Simpson by Captain H. E. Nichols and recorded in 1883 by T. H. Bean as *Leptocottus armatus*

Girard. In 1901 it was listed as from the Queen Charlotte Islands by W. H. Osgood as *Leptocottus maculosus* (evidently an error for *armatus*). The species is very abundant along the whole coast in shallow water. It is to be found frequently in tidepools and will expand its gill covers and erect its preopercular spines when disturbed. The juvenile sportsman takes it on a hand line using a marine worm for bait and occasionally on a trout spinner. Spawning occurs in February. The food consists of a countless variety of invertebrates. The staghorn sculpin is eaten to a considerable extent by waterfowl, especially ducks. The name cabezon was applied to this species in 1946 by Clemens and Wilby; the name recommended by the AFS/ASIH committee is Pacific staghorn sculpin.

Range: Southern California to Gulf of Alaska.



FIGURE 196. Staghorn sculpin. *Leptocottus armatus* Girard 1854

### Rosylip sculpin

*Ascelichthys rhodorus* Jordan and Gilbert 1880

Body elongate, stout anteriorly, compressed posteriorly. Head depressed, broad; mouth terminal, large; lower jaw included; snout bluntly rounded; spines: nasal, covered with skin; gill membranes united, free from isthmus. Anus slightly in advance of anal fin; anal papilla small, rounded. Skin: smooth, loose. Fins: dorsal (1), VIII to X, 17 to 20, deeply notched, spinous portion low, weak, rayed portion about twice height of spinous portion; anal, 13 to 16; pelvic, absent; caudal, rounded. Lateral line: faint, decurved, then straight. Scales: absent. Pores: on lateral line, 34 to 38. Cirri: on head above and behind eye, 1, multifid; above base of pectoral fin, 5 to 9, filamentous. Colour: dark olive brown to black on dorsal surface; lighter on ventral surface; dark blotches across body vague; bright rosy red on lips, dusky on spinous portion of dorsal fin, margined with bright crimson; dusky on other fins, pale on margins; faintly barred with dark green to black on pectoral, anal and caudal fins.

Length to  $4\frac{1}{2}$  inches.

Distinguished by the low spinous portion of the dorsal fin, the hooked preopercular spine on each side of the head and the absence of pelvic fins.



The rosy lip sculpin was first taken in British Columbia waters at Victoria by Messrs Dall and Brown and recorded in 1881 by T. H. Bean. The species has been obtained along the coast near Victoria, Telegraph and Departure Bays, Comox, on the west coast of Vancouver Island from Ucluelet to Nootka Island, and around the Queen Charlotte Islands. It is a tidepool fish and is found often under rocks at low tide.

Range: Northern California to southeastern Alaska.



FIGURE 197. Rosy lip sculpin. *Ascelichthys rhodorus* Jordan and Gilbert 1880

### Spinyhead sculpin

*Dasycottus setiger* Bean 1890

Body elongate, stout anteriorly. Head large; mouth terminal, large, oblique, snout bluntly rounded; spines: nasal, absent; cranial numerous, large, upright, blunt, occipital largest; preopercular, 4, simple, upper 2 shorter than diameter of eye, slender, lower 2 small, usually covered with skin; gill membranes united, free from isthmus. Anus two-thirds distance between insertion of pelvic fins and origin of anal fin. Anal papilla small, rounded. Skin: thin, loose; thick at bases of dorsal and anal fins. Fins: dorsal (2), IX or X—13 to 15, slightly connected at bases by low membranes; anal, 13 or 14; pelvic, I, 3, thoracic; pectoral, large, procurrent; caudal, rounded. Lateral line: slightly decurved, then straight. Scales: reduced ctenoid, in form of dome-shaped plates embedded in papillae, each with numerous spines; below spinous dorsal fin in row, 7 to 9; on head behind occipital spine, 5; on upper margin of eyeball, scattered, minute. Pores: on lateral line, 14 or 15. Cirri: on lateral line pores, filamentous; on head, numerous, filamentous, longer ones in and about jaws; on upper margin of eyeball, minute. Colour: gray with chocolate brown spots on dorsal surface; pale brownish white on ventral surface, darker posteriorly; dark brown saddles across body, 5 or 6; black punctulations on all fins, minute; broad bars on all fins except pelvic.

Length to 9 inches.

Distinguished by the large head with the upright blunt spines, the loose skin, the short row of conical spinous papillae near the base of the spinous dorsal fin and the dorsal fins slightly connected at their bases by low membranes.



FIGURE 198. Spinyhead sculpin. *Dasycottus setiger* Bean 1890

The spinyhead sculpin was first taken in British Columbia waters on June 19, 1903, in Nanaimo Harbour by the *Albatross*, station 4191, Lat. 49° 11' N, Long. 123° 54' W, depth 54 fathoms and the single specimen secured was recorded in 1907 by B. W. Evermann and E. L. Goldsborough. The species is common in the Strait of Georgia and is obtained in shrimp trawls in Burrard Inlet and English Bay at depths between 10 and 60 fathoms, in otter trawls in the channels amongst the islands along the east coast of Vancouver Island between Sidney and Nanaimo, and has been collected off the west coast of Graham Island at a depth of 60 fathoms.

Range: Washington to Bering Sea.

### **Blackfin sculpin**

*Malacocottus kincaidi* Gilbert and Thompson 1905

Body elongate, stout anteriorly. Head large; mouth terminal, moderate; snout bluntly rounded; spines: cranial, absent; preopercular, 4, simple, upper 3 sharp, shorter than diameter of eye, lowermost very short, usually not projecting through skin; gill membranes united, broadly joined to isthmus. Anus two-thirds distance between insertion of pelvic fins and origin of anal fin. Anal papilla small, rounded. Skin: thin, smooth, loose, on body and along bases of fins. Fins: dorsal (2), VIII or IX—14 or 15, slightly connected at bases by membrane, spines weak; anal, 11 or 12; pelvic, I, 3, thoracic, small; pectoral, large, procurrent; caudal, rounded. Lateral line: slightly decurved, then straight. Scales: absent. Pores: on lateral line, 14 or 15. Cirri: on anterior nasal openings, multifid; on head few, filamentous; on eyeball, small. Colour: gray to light brown with several irregular brown blotches on dorsal surface; bluish to purplish black with fine black punctulations on ventral surface; white in narrow band on margins of all fins, jet black on broad band below each margin; white bands on pectoral, rayed dorsal and caudal fins. In mature male, white margins of dorsal fins become golden in breeding season.

Length to 8 inches.

Distinguished by the thin smooth loose skin, the gill membranes broadly joined to the isthmus and the jet black coloration on the fins with their white margins.

The blackfin sculpin was first taken in British Columbia waters off Entrance Island, near Nanaimo, on June 20, 1903, by the *Albatross*, station 4198, Lat. 49° 19' N, Long. 123° 47' W, depth 157 fathoms. It was recorded in 1907 by B. W. Evermann and E. L. Goldsborough as *Malacocottus zonurus* Bean, in error, the type of *M. kincaidi* having been described in 1905, probably while *Albatross* records were in press. The species is common in the Strait of Georgia at depths ranging from 15 to 65 fathoms and is captured often in shrimp trawls in Burrard Inlet and in otter trawls along the east coast of Vancouver Island. On November 11, 1954, a specimen was taken in Drury Inlet in a shrimp trawl.

Range: Washington to Queen Charlotte Sound.



FIGURE 199. Blackfin sculpin. *Malacocottus kincaidi* Gilbert and Thompson 1905

### Soft sculpin

*Gilbertidia sigalutes* (Jordan and Starks) 1895

Body elongate, stout anteriorly, somewhat tadpole-shaped. Head large, broad; mouth terminal, moderate; lower jaw projecting; snout blunt; spines: absent; gill membranes broadly joined to isthmus. Anus immediately in front of anal fin. Skin: smooth, very loose on body, head and fins; papillae: numerous. Fins: dorsal (1), VIII, 17 or 18, continuous, anterior portion very low, buried in skin, becoming elevated posteriorly, spines and rays not countable without dissection; anal, 12 to 14, high posteriorly; pelvic, I, 3, thoracic: pectoral, 15 to 17; caudal, rounded. Lateral line: straight, indistinct. Scales: absent. Pores: on lateral line, 11 to 14; on head, in row below eye and on lower jaw. Colour: dusky olive to dark gray or brown on dorsal surface; lighter on ventral surface; blue tinge on fins, sometimes on body.

Length to 3½ inches.

Distinguished by the general tadpole-like appearance, the anus immediately in front of the anal fin, the low anterior portion of the dorsal fin, the very loose skin on the head and body and the projecting lower jaw.

The soft sculpin was first taken in British Columbia waters on May 23, 1936, in English Bay off Jericho Beach in a shrimp trawl at a depth of 35 fathoms. The single specimen obtained is now in the collection of fishes of the Institute of Fisheries at the University of British Columbia. In July, 1937, a specimen was taken from the stomach of a lancetfish, *Alepisaurus borealis*, captured off Quatsino Sound near Kains Island on a trolling spoon at a depth of approximately 30 fathoms, and is now in the Provincial Museum at Victoria. These captures were recorded in 1945 by G. C. Carl and G. V. Wilby. In the Puget Sound area the species has been found in sponges at a depth of 60 fathoms.

Range: Washington to southeastern Alaska.



FIGURE 200. Soft sculpin. *Gilbertidia sigalutes* (Jordan and Starks) 1895

### Tadpole sculpin

*Psychrolutes paradoxus* Günther 1861

Body elongate, stout anteriorly, somewhat tadpole-shaped; caudal peduncle short, distinct. Head large, broad; mouth terminal, small; jaws equal; snout very blunt; spines: absent. Gill membranes broadly joined to isthmus. Anus midway between insertion of pelvic fins and origin of anal fin. Skin: smooth, somewhat loose, on body, head and fins. Fins: dorsal (1), X to XII, 12 to 17, continuous, spinous portion and anterior or rayed portion very low, buried in ridge of skin, delicate spines and first few rays not countable without dissection, posterior of rayed portion high; anal, 12 to 14, high; pelvic, I, 3, thoracic; pectoral, 20 to 23; caudal, truncate to rounded. Lateral line: straight, indistinct. Scales: absent. Papillae: small, scattered, on body, head and fins, on eyeball in row on upper margin. Pores: on lateral line, about 10. Colour: gray to light brown on dorsal surface; creamy white on ventral surface; black bands and light blotches across back, irregular pale orange, pink and yellow variously marking pectoral fins; black bar across each pectoral fin toward tip, prominent; dark cross bar toward tip of caudal fin.

Length to 2½ inches.

Distinguished by the general tadpole-like appearance, the anus situated midway between the insertion of the pelvic fins and the origin of the anal fin, the low spinous portion of the dorsal fin and the smooth somewhat loose skin on the head and body with the scattered small papillae.



FIGURE 201. Tadpole sculpin. *Psychrolutes paradoxus* Günther 1861

The tadpole sculpin was first taken in British Columbia waters in the Strait of Georgia during a voyage of H.M.S. *Plumper*, and the specimen, 21 lines ( $1\frac{3}{4}$  inches) in length, was presented by the Lords of the Admiralty to the British Museum. It was described in 1861 by A. Günther as the type of a new genus and species. The next record was August 28, 1891, west of Jordan River by the *Albatross*, station 3460, Lat.  $48^{\circ} 25' N$ , Long.  $124^{\circ} 10' W$ , depth 53 fathoms, and recorded in 1895 by C. H. Gilbert as *Psychrolutes zebra* Bean. The species apparently is distributed generally along the coast, many individuals having been secured since off the southern end of Vancouver Island, at Pender Island in Otter Bay, and in Burrard and Skidegate Inlets. It inhabits waters from moderate depths down to at least 120 fathoms.

Range: Washington to Bering Sea.

#### Silverspotted sculpin

*Blepsias cirrhosus* (Pallas) 1811

Body elongate, much compressed. Head compressed; mouth terminal, moderate, lower jaw barely included; snout bluntly rounded; cranial ridges: posterior to eye, 3, blunt; spines: nasal, blunt; preopercular, 2, small, bluntly rounded; gill membranes united, free from isthmus. Anus one-third distance between insertion of pelvic fins and origin of anal fin. Anal papilla small, rounded. Fins: dorsal (2), VI to IX—20 to 25, spinous fin emarginate, first three or four spines elevated, rayed fin long, high, higher than spinous fin; anal, 18 to 21; pelvic, I, 3, thoracic, short, spine short; pectoral, 12 low, narrow; caudal, rounded. Lateral line: high anteriorly, slightly decurved, then straight. Scales: reduced ctenoid, in form of

minute plates, each with minute spine embedded in erect fleshy papilla, covering body except along lateral line, caudal peduncle and large silvery white areas on each side of body; on head in small scattered patches. Pores: on lateral line, 43 to 57. Cirri: long, slender; on snout, 3, two lateral, one median; on lower jaw, 6, three on each side. Colour: light olive brown or green of varying shades on dorsal surface; white to coppery yellow on ventral surface; black spots on upper anterior portion of body, 4 to 6, rounded; silvery white spots below lateral line anteriorly, 3 or 4, large, rounded; black bars radiating from eye, 3; black bar between eyes; brown to black with large translucent areas on all fins except pelvics.

Length to  $7\frac{1}{2}$  inches.



FIGURE 202. Silverspotted sculpin. *Blepsias cirrhosus* (Pallas) 1811

Distinguished by the prominent cirri on the snout and on the lower jaw, the emarginate spinous dorsal fin, the high rayed dorsal fin, the silvery white spots on each side of the body, the translucent areas on the fins and the minute spines embedded in papillae.

The silverspotted sculpin was first recorded from British Columbia waters in 1886 by J. F. Whiteaves on the basis of a specimen in the National Museum at Ottawa which may have been taken by Dr G. M. Dawson. The species is common in the Strait of Georgia and has been secured on the west coast of Vancouver Island at Maquinna Point, also at Alert Bay and off Moresby Island. Spawning occurs in the summer months. The eggs are a clear light brown colour and are attached in clusters to rocks in shallow water. This is one of the handsomest of the cottids. It is a shallow water form, usually frequenting eelgrass areas and often is captured in shrimp trawls at depths down to 20 fathoms. It was recorded in 1946 by Clemens and Wilby as the silver spot.

Range: Northern California to Bering Sea.

## Crested sculpin

*Blepsias bilobus* Cuvier 1829

Body elongate, deep anteriorly, much compressed. Head conical, depressed; mouth terminal, moderate; snout bluntly rounded; cranial ridges: numerous, irregular, bluntly rounded, posterior to eye, 3, prominent, transverse; spines; nasal, blunt; preopercular, 3, bluntly rounded, shorter than diameter of eye; gill membranes united, free from isthmus. Anus one-fifth distance between insertion of pelvic fins and origin of anal fin. Anal papilla small, rounded. Fins: dorsal (2), VIII or IX—21 or 22, spinous fin entire, rayed fin long, high, higher than spinous fin; anal, 18 to 20; pelvic, I, 3, thoracic, very short, stout; pectoral, 16, low, long; caudal, truncate. Lateral line: almost straight. Scales: reduced ctenoid; in form of minute round plates each with spine in centre, embedded in thick conical fleshy papilla, covering body, head and bases of all fins except pelvics. Pores: on lateral line, about 52. Cirri: long, slender; on snout, 3, two lateral, one median; on lower jaw, 6, three on each side. Colour: olive green on dorsal surface; paler on ventral surface; dusky blotches across body, 4 or 5, faint; dusky bars on rayed dorsal, pectoral, anal and caudal fins.

Length to 10 inches.



FIGURE 203. Crested sculpin. *Blepsias bilobus* Cuvier 1829

Distinguished by the prominent cirri on the snout and on the lower jaw, the entire spinous dorsal fin, the high rayed dorsal fin, the prominent cranial ridges and the conical fleshy papillae covering the scales.

The crested sculpin was first taken in British Columbia waters in September, 1938, in Dean Channel, opposite Cascade Inlet, by Captain Jack. A second specimen was taken on September 13, 1950, in a gill net at Bella Bella. Both individuals

are now in the collection of the Biological Station at Nanaimo. These are the only known specimens taken south of Alaska. Nothing is known of the life history. The species was recorded in 1946 by Clemens and Wilby as *Histiocottus bilobus* (Cuvier and Valenciennes).

Range: Northern British Columbia to Bering Sea.

**Sailfin sculpin**

*Nautichthys oculo-fasciatus* (Girard) 1857

Body elongate, slender, compressed, anteriorly rising abruptly above head. Head compressed; mouth terminal, moderate; lower jaw slightly included; snout blunt; eye large, very high; interorbital space depressed; occiput depressed, rough; cranial spines: bluntly spinous; spines: nasal, large, sharp; preopercular, 2, small, sharp; gill membranes united, broadly joined to isthmus. Anus about half distance between insertion of pelvic fins and origin of anal fin. Anal papilla bulbous, rounded, ending in long slender filament. Fins: dorsal (2), VIII or IX—27 to 30, spinous fin very high, first 5 spines very elongate, remaining four or five diminishing rapidly, rayed fin very long, moderately high; anal, 18 to 20, long, low; pelvic, I, 3, thoracic, moderately long, spine short, slender; pectoral, 13 or 14, placed low; caudal, asymmetrical, obliquely rounded, lower rays longer than upper. Lateral



FIGURE 204. Sailfin sculpin. *Nautichthys oculo-fasciatus* (Girard) 1857



line: slightly decurved, then straight. Scales: reduced ctenoid, in form of small slender spines; everywhere on body and head; on rayed dorsal and caudal fins to tips; on bases of pectoral and anal fins; on lateral line, large, in form of long stout bifid spines, preceding each pore. Pores: on lateral line, 41 to 45. Cirri: on nasal spines; on eyeball above pupil, 4, first large, multifid, plumose, followed by 3 small, filamentous; on maxillary, small, weakly multifid. Colour: light brown to dark gray on dorsal surface; very light brown to cream on ventral surface; black blotches across body, 5; black spots in series along lateral line; jet black band on supraorbital cirrus, downward through eye across cheek, conspicuous; barred with green on dorsal fins, sometimes flecked with light brick red on rayed dorsal fin; heavily barred with black on base of pectoral fins, on posterior of anal and caudal fins.

Length to 8 inches.

Distinguished by the high spinous dorsal fin, the large plumose cirrus on each eyeball, the black band downward through each eye and across the cheek, the depressed occiput and the asymmetrical rounded caudal fin.

The sailfin sculpin was first taken in British Columbia waters on September 4, 1891, east of Victoria, by the *Albatross*, station 3465, Lat. 48° 21' N, Long. 123° 14' W, depth 48 fathoms and was recorded in 1895 by C. H. Gilbert. The species is obtained often in Burrard Inlet in shrimp trawls and has been reported from Victoria, Sydney, Uchuelet, Departure and Duncan Bays and Jervis and Rivers Inlets. This fish is an inhabitant of the shore waters but is known to range to a depth of at least 60 fathoms. In the Vancouver Public Aquarium specimens attract much attention by their method of swimming gracefully along with a wave-like motion of the long rayed dorsal fin, the other fins taking little part in the movement of the fish. The food consists in part of crustaceans. The species was called the sailor-fish in 1946 by Clemens and Wilby.

Range: California to southeastern Alaska.

### **Grunt sculpin**

*Rhamphocottus richardsoni* Günther 1874

Body short, stout, compressed; caudal peduncle slender. Head very large, elongate, length about half standard length, broad, with large fronto-parietal ridges; mouth terminal, small; lower jaw included; lips thick; snout long, pointed; eye deep-set; spines: nasal, stout, sharp; preopercular, 1, weakly bifid; post-temporal, moderate; clavicular large, sharp; gill opening small, above base of pectoral fin. Anus three-quarters distance between insertion of pelvic fins and origin of anal fin. Anal papilla short, conical. Fins: dorsal (2), VII or VIII—12 to 13, spinous fin small, weak, folding in groove; anal, 6 or 7, far back; pelvic, I, 3, thoracic; pectoral, very large, lower rays thickened, greatly exerted; caudal, rounded. Lateral line: high anteriorly, roughly following dorsal contour. Scales: on body and head reduced to minute plates bearing stiff multifid spines, each embedded in erect fleshy papilla; on eyeball, minute, in 4 or 5 rows on upper

margin. Pores: on lateral line, about 25, small, elevated. Colour: creamy yellow on dorsal surface, barred with dark brown streaks passing downward and forward; creamy yellow to pale red on ventral surface; creamy brown on head with dark brown blotches; dark streaks around eye extending onto cornea; clear coral red margined with crimson on rayed dorsal, pectoral, anal and caudal fins; orange on exerted rays of pectoral fins and on pelvic fins; black spots scattered on spinous dorsal fin and in series at base of each ray of rayed dorsal fin.

Length to 3 inches.



FIGURE 205. Grunt sculpin. *Rhamphocottus richardsoni* Günther 1874

Distinguished by the large head with the prominent fronto-parietal ridges, the prolonged snout, the restricted gill openings, the greatly exerted lower rays of the large pectoral fins and the brown and cream coloration.

The grunt sculpin was first taken in British Columbia waters at Fort Rupert by H.M.S. *Plumper* and the British Museum obtained the specimen by purchase. This was described in 1874 by A. Günther as the type of a new genus and species. The grunt sculpin occurs along the whole coast in tidepools and shallow water usually along rocky shores but it has been secured in seines on sandy beaches and in trawls down to a depth of 90 fathoms. The food consists to some extent of small crustaceans. This bizarre highly-coloured fish is, perhaps, the comedian amongst fishes. It crawls deliberately over rocks and seaweeds on its long pectoral fin rays, using them as "fingers", and turns its head slowly from side to side. When it rolls its eyes independently of one another, suddenly bringing the dark streaks on the eyeball alternate with those surrounding it, the observer has the feeling that he has

been winked at. When removed from the water this fish makes a half grunt, half hissing sound, hence the name grunt sculpin. It was listed as grunt-fish in 1946 by Clemens and Wilby.

Range: Southern California to Bering Sea.

**Bigmouth sculpin**

*Hemitripteris bolini* (Myers) 1934

Body elongate, very stout anteriorly. Head very large, very broad, much depressed; interorbital space very broad, deeply concave; mouth terminal, oblique, very large; teeth in bands, very sharp, conical, hooked, on jaws, palatines, vomer and pharynx; snout short, very broad; eye large, deeply set in high socket; cranial spines: numerous, greatly developed, high, blunt; on interorbital space, around eye and on suborbitals; preopercular, 4, upper two longest; gill membranes united, free from isthmus. Anus about midway between insertion of pelvic fins and origin of anal fin. Anal papilla small, rounded. Skin: thick, tough. Fins: dorsal (2), XIII or XIV—11 or 12, spinous portion very deeply incised, 4th and 5th spines shorter than 3rd and 6th; anal, 13, origin below origin of rayed dorsal; pelvic, 1, 3, thoracic, spine shorter than first ray (not evident without dissection); pectoral, 20 to 23; caudal, truncate to rounded. Lateral line: very slightly decurved, then straight. Scales: mostly in form of spiny prickles or tubercles embedded in skin. Pores: on lateral line, 40 to 42. Cirri: large, mainly on head; at symphysis of premaxillaries, 2; at posterior tip of maxillary, 2; on lower jaw numerous, branched; on tips of dorsal fin spines, pennant-like to filamentous. Colour: mottled brown above; whitish with fine black speckling below head and anterior of body; tan stripes across head, 2; light brick red below anterior of spinous dorsal fin; dark bands across body at posterior of spinous dorsal fin, 2, at posterior of rayed dorsal fin, 2; mottled red brown on membranes of spinous dorsal fin, whitish between 5th and 8th spines; chestnut brown with pale gray marbling on rayed dorsal fin;

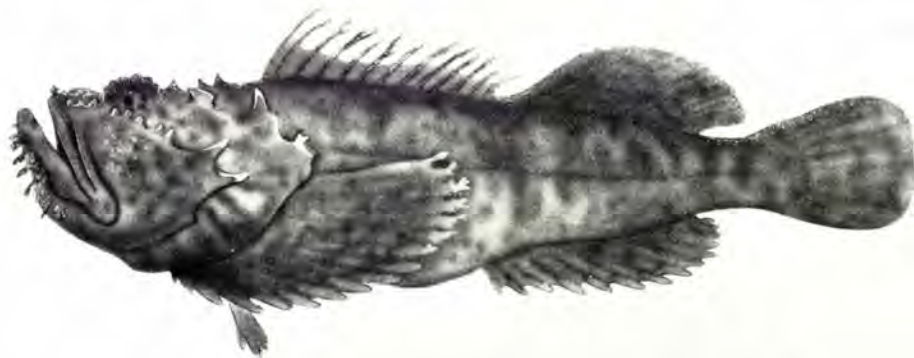


FIGURE 206. Bigmouth sculpin. *Hemitripteris bolini* (Myers) 1934

yellowish brown bands alternating with mixed light gray and dark brown reticulations on pectoral fins; light gray with fine black speckling and orange patches on anal fin, tips of rays white; dark reddish brown on caudal fin with fine vertical irregular striping of gray brown.

Length to 2 feet 3 inches.

Distinguished by the enormous oblique mouth, the large, bony, high, blunt spines on the head, the greatly incised spinous dorsal fin with filamentous cirri on the tips of each spine and the brown, gray and white coloration.

The bigmouth sculpin was first taken in British Columbia waters on June 25, 1958, 40 miles southwest of Hakai Pass in Queen Charlotte Sound by means of an otter trawl at a depth of 118 fathoms. A second individual 27 inches in length was obtained on March 23, 1959, 23 miles northeast of Reef Island, east of Moresby Island, in 67 fathoms. Both specimens were taken by Mr H. McBride, skipper of the *Gail Bernice*. The second individual was in excellent condition and both specimens are now in the collection of the Institute of Fisheries at the University of British Columbia.

Range: Northern British Columbia to Bering Sea.

### **Manacled sculpin**

*Synchirus gilli* Bean 1889

Body elongate, slender. Head elongate; mouth terminal, small; lower jaw included; snout sharply pointed; eye large; spines: nasal, stout, sharp; preopercular, 1, sharp, widely bifid; gill membranes united, free from isthmus. Anus one-quarter distance between insertion of pelvic fins and origin of anal fin. Anal papilla large, cylindrical, constricted to slender filamentous tip, between two lateral inwardly curved processes, cylindrical, portion in groove between anus and anal fin. Fins: dorsal (2), VIII to X—19 to 21, anal, 18 to 20; pelvic, I, 3, thoracic, long, tips of fins expanded, bent inward, used as holdfasts; pectoral, large, completely united anteriorly and ventrally, rays curved inward; caudal, rounded. Lateral line: slightly wavy. Scales: ctenoid; in row near bases of dorsal fins; on lateral line, 38 to 40. Cirri: postocular, 1, small. Colour: green to yellowish brown on dorsal surface; paler on ventral surface; light blotches across back, about 7; immediately below lateral line, vaguely blotched; coloration extremely variable depending upon habitat. Membranes of all fins transparent, black pigment sparse, minute, confined to rays of rayed dorsal, pectoral, anal and caudal fins.

Length to 2 inches.

Distinguished by the united pectoral fins.

The manacled sculpin was first taken on September 27, 1888, in Barkley Sound by the *Albatross*. Three specimens from  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inches in length were obtained, one of which was selected as the type of the genus and species, recorded as such in 1889 by T. H. Bean and deposited in the United States National Museum. Since that time individuals have been obtained in Departure Bay and at Gabriola Island in Taylor Bay. The manacled sculpin, so named in reference to the united

pelvic fins, inhabits the shallow waters of bays and tidepools and also is found around wharf piles and rocks clinging to barnacles by means of its pectoral and pelvic fins.

Range: California to southeastern Alaska.



FIGURE 207. Manacled sculpin. *Synchirus gilli* Bean 1889

Family AGONIDAE

Poachers

In the poachers the body is completely covered with an armour of bony plates which do not overlap and do not have free margins. The pelvic fins are thoracic, each with 1 spine and 2 rays, and are frequently shorter in the female than in the male.

The poachers, also called sea-poachers, are distributed, for the most part, in the cold waters of northern regions. They live on rocky or muddy bottoms at depths ranging from 10 to 339 fathoms and are taken rarely except in the trawls of commercial fishermen or scientific expeditions. Two species, however, are found occasionally in tidepools.

**Fourhorn poacher**

*Hypsagonus quadricornis* (Cuvier) 1829

Body elongate, stout anteriorly, compressed; outline rising abruptly at origin of spinous dorsal fin, rising slightly before origin of rayed dorsal fin. Head somewhat compressed, slightly depressed at occiput; mouth terminal, small; lower jaw projecting; snout bluntly rounded; eye large, elevated; cranial ridges high; spines: nasal, sharp, curved; frontal, erect; occipital, prominent; preopercular, 4, blunt; gill membranes united, free from isthmus. Fins: dorsal (2), IX to XI—6 or 7; anal, 9 or 10; pelvic, I, 2, thoracic; pectoral, large, lower rays greatly exerted; caudal, asymmetrically rounded. Lateral line: nearly straight. Plates: on body, spinous. Pores: on lateral line, 15 to 19, first single, remainder paired, each pair, separated by spine, on body plate. Cirri: nasal, single, median, elongate, sometimes

branched. Colour: senna brown with various markings of yellow to carmine on dorsal surface; paler on ventral surface; brown to black bars across body and fins, several, narrow; black on posterior margin of caudal fin.

Length to 2½ inches.



FIGURE 208. Fourhorn poacher. *Hypsagonus quadricornis* (Cuvier) 1829

Distinguished by the stout body with spinous plates, the highset eyes, the 4 prominent spines on the top of the head, the abrupt elevation of the body before the spinous dorsal fin, the gill membranes free from the isthmus and the elongate cirrus on the snout.

The fourhorn poacher was first taken in British Columbia waters on September 4, 1891, in Juan de Fuca Strait by the *Albatross*, station 3465, Lat. 48° 21' N, Long. 123° 14' W, depth 48 fathoms, recorded in 1895 by C. H. Gilbert. Two other individuals, also obtained by the *Albatross*, were secured on June 19, 1903, in Queen Charlotte Strait off Fort Rupert, station 4204, at a depth of 69 fathoms. The species occurs in shallow water, including tidepools, and at depths down to 70 fathoms. A hydroid, *Perigonimus pugetensis* Heath, is found frequently in large numbers on this fish giving it a somewhat plumose appearance. It was recorded in 1946 by Clemens and Wilby as the four-horned sea-poacher.

Range: Washington to Gulf of Alaska.

#### **Warty poacher**

*Occa verrucosa* (Lockington) 1880

Body elongate, stout anteriorly. Head depressed; mouth terminal, small; lower jaw prominently projecting; snout bluntly rounded; eye moderate; cranial ridges, low; spines: nasal small, sharp; others minute or absent; gill membranes united,

free from isthmus. Fins: dorsal (2), VII to IX—7 or 8; anal, 10 to 12; pelvic, I, 2, thoracic; caudal, rounded. Lateral line: nearly straight. Plates on body: spinous on ridges, smooth elsewhere. Pores: on lateral line, 36 to 38, single. Cirri: near posterior tip of maxillary, 1. Colour: dark gray or light brown on dorsal surface; paler on ventral surface; brownish black saddle-like markings in series of 6 or more across back and sides; dusky on dorsal fins, black on caudal fin; pectoral fins washed with orange, dark blotches on upper portion, 2. In male, orange yellow on pelvic fins; in female, pale.

Length to 8 inches.



FIGURE 209. Warty poacher. *Occa verrucosa* (Lockington) 1880

Distinguished by the prominently projecting lower jaw, the weakly developed spines on the top of the head and the gill membranes free from the isthmus.

The warty poacher was first taken in British Columbia waters on August 20, 1945, in Wickaninnish Bay off Florencia Island and identified by Mr. W. E. Barraclough. The 3 specimens are now in the collection of the Biological Station at Nanaimo. This is the first record from north of Washington. The species occurs in waters from 11 to 36 fathoms. It was recorded in 1946 by Clemens and Wilby as the warty sea-poacher.

Range: California to Vancouver Island.

#### **Tubesnout poacher**

*Pallasina barbata aix* (Starks) 1896

Body elongate, very slender, depressed. Head very elongate; mouth terminal, small; lower jaw prominently projecting, turned upward at tip; snout elongate, rounded; eye, moderate; barbel on lower jaw, projecting forward; cranial ridges, low; spines: minute or absent; gill membranes united, free from isthmus. Fins: dorsal (2), VI or VII—7 or 8, anal, 11 or 12; pelvic, I, 2, thoracic; caudal, rounded. Lateral line: nearly straight. Plates on body: smooth, slightly keeled, spines absent; anterior to pelvic fins, 2, unpaired on median line. Pores: on lateral line, 45 or 46. Cirri: absent. Colour: gray to brown, heavily punctulated with black; pale to white on ventral surface; spotted with black on spines or rays of all fins.

Length to 5 inches.

Distinguished by the very elongate head, the barbel on the lower jaw pointing forward and the gill membranes free from the isthmus.

The tubesnout poacher was first taken in British Columbia waters on July 24, 1947, in Whitesand Cove, Flores Island, off the west coast of Vancouver Island by Dr K. S. Ketchen. On April 10, 1948, a specimen was taken west of Turnour Island in Johnstone Strait at a depth of 30 fathoms by Captain G. Gerbrandt. On August 31, 1957, two individuals were taken in a beach seine on the east side of Vargas Island by W. E. Barraclough. All these specimens are in the collection of the Biological Station at Nanaimo. The name recommended by the AFS/ASIH committee is tubenose poacher.

Range: Oregon to Gulf of Alaska.

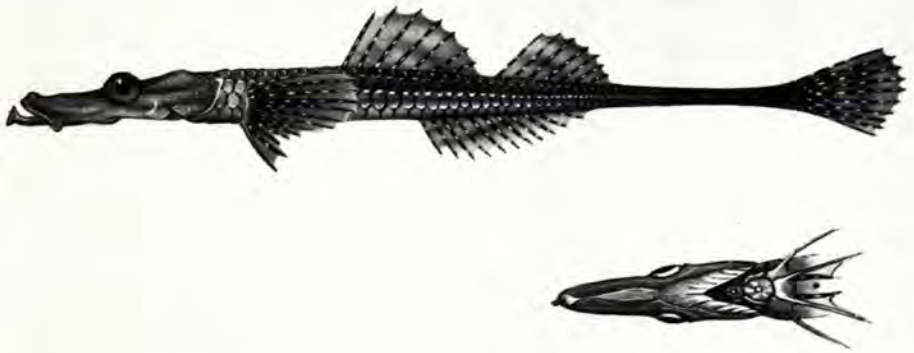


FIGURE 210. Tubesnout poacher. *Pallasina barbata aix* (Starks) 1896

### Windowtail poacher

*Agonopsis emmelane* (Jordan and Starks) 1895

Body elongate, slender, moderately stout anteriorly. Head moderate; mouth subterminal, small; snout depressed, narrowly pointed, with median pit near tip; spines: on tip of snout, 4, anterior pair directed forward and upward, covered with skin, posterior pair sharp, naked, directed backward; nasal, sharp, sometimes multifid; prefrontal, multifid; frontal, blunt; spinous projections on eyeball in 3 or 4 rows, variable in number and size; occipital pit with slight longitudinal median ridge; gill membranes united, joined to isthmus. Anus behind bases of pelvic fins by width of two plates. Fins: dorsal (2), VIII to XI—7 or 8; anal, 10 to 12; pelvic, I, 2, thoracic; in male, extending well beyond anus, in female, extending barely beyond anus; pectoral, broad, lower rays exerted; caudal, rounded. Lateral line: nearly straight. Plates: on body spinous; on caudal peduncle, weakly spinous in older individuals. Pores: on lateral line: 38 to 42. Cirri: simple, small; in rows on lower side of snout, lower jaw and branchiostegal membranes. Colour: light brown on dorsal surface; white to brownish white on ventral surface; dark brown



to black saddle-like markings in series of 6 or more across back and sides; black on tip of snout; black and white on fins; white on tips of pectoral, pelvic, anal and caudal fins; conspicuous semitransparent light spot, not reaching margin, on caudal fin.

Length to 8 inches.



FIGURE 211. Windowtail poacher. *Agonopsis emmelane* (Jordan and Starks) 1895

Distinguished by the pointed snout with the two blunt skin-covered spines, the slightly inferior mouth, the small cirri in rows below the snout, on the lower jaw and on the branchiostegal membranes and the conspicuous semi-transparent light spot on the caudal fin not reaching the margin.

The windowtail poacher was first taken in British Columbia waters on March 20, 1907, at Mayne Island and the single specimen is now in the collection of fishes at the Biological Station at Nanaimo. In 1908 two individuals were obtained at Esquimalt; these are now in the Provincial Museum at Victoria. The first published record of the species from the Province is that of 3 specimens secured in June, 1909, at Ucluelet, by Messrs C. H. Young and W. Spreadborough at a depth of 30 fathoms and recorded in 1920 by B. A. Bean and A. C. Weed as *Averruncus emmelane* Jordan and Starks and so listed in 1946 by Clemens and Wilby. The windowtail poacher is common in the Strait of Georgia and Burrard Inlet and it also has been found at Victoria and off the west coast of Vancouver Island. One individual from the latter locality was removed from the stomach of a lancetfish, *Alepisaurus borealis*. This poacher is taken frequently in shrimp trawls on muddy bottoms at depths between 10 and 70 fathoms. It was recorded in 1946 by Clemens and Wilby as the window-tailed sea-poacher; the name recommended by the AFS/ASIH committee is northern spearnose poacher.

Range: California to southeastern Alaska.

### **Blackfin poacher**

*Bathyagonus nigripinnis* Gilbert 1890

Body elongate, slender. Head somewhat depressed; mouth terminal, small; lower jaw projecting; snout depressed, broadly rounded; rostral plate terminal, movable; spines: on rostral plate, 5, minute, upright, diverging; nasal, small,

sharp, recurved; frontal, small, erect; spinous projections on eyeball, absent; gill membranes united, broadly joined to isthmus. Fins: dorsal (2), VI to VIII—6 or 7; anal, 7 to 9; pelvic, I, 2, thoracic; pectoral, broad; caudal, truncate to rounded. Lateral line: nearly straight. Plates: on body spinous, except ventral series behind anal fin. Pores: on lateral line, 40 to 44; on suborbital and dentary bones, large. Cirri: near posterior tip of maxillary, 2. Colour: light brown on dorsal surface; dusky light brown on ventral surface; blue black on ventral surface of head; intensely black on all fins.

Length to 8 inches.



FIGURE 212. Blackfin poacher. *Bathyagonus nigripinnis* Gilbert 1890

Distinguished by the blue black fins, the broadly rounded snout and the protruding lower jaw.

The blackfin poacher was first taken in British Columbia waters on June 19, 1903, in Nanaimo Harbour by the *Albatross*, station 4191, Lat. 49° 11' N, Long 123° 54' W, depth 54 fathoms, and recorded in 1907 by B. W. Evermann and E. L. Goldsborough. It has been secured only in the vicinity of the Strait of Georgia at depths ranging from 50 to 230 fathoms. It is known to occur at much greater depths off the coasts of Washington and Alaska and even to 682 fathoms off Kamchatka. In English Bay and in Burrard Inlet at Bedwell Bay it is captured frequently in shrimp nets when operated at 50 fathoms and deeper. It was recorded in 1946 by Clemens and Wilby as the black-finned sea-poacher.

Range: Washington to Bering Sea.

### **Blacktip poacher**

*Xeneretmus latifrons* (Gilbert) 1890

Body elongate, slender. Head somewhat depressed; mouth terminal, small; jaws about equal; snout pointed; rostral plate small, terminal, rigid; spines: on rostral plate, 1, large, curved, upright; nasal, sharp, diverging; frontal, sharp; spinous projections on eyeball, 3 to 5, well developed, sharp, in single row; gill membranes united, joined to isthmus with free fold posteriorly. Fins: dorsal (2), VI or VII—6 to 8; anal, 7 to 9; pelvic, I, 2, thoracic; pectoral, frequently with some of lower rays exerted; caudal, truncate to rounded. Lateral line: high anteriorly, sharply decurved, then straight. Plates: on body spinous except on

ventral surface behind anal fin. Pores: on lateral line, 39 to 41. Cirri: near posterior tip of maxillary, 1, stout; near anterior tips of dentaries, 4, small. Colour: light brown on dorsal surface; lighter brown to cream on ventral surface; dark brown saddle-like markings in series of 7 or 8 across back and sides; pale brownish gray on all fins; jet black on margin of spinous dorsal fin; dusky on margins of rayed dorsal and caudal fins.

Length to  $7\frac{1}{2}$  inches.



FIGURE 213. Blacktip poacher. *Xeneretmus latifrons* (Gilbert) 1890

Distinguished by the single rigid rostral spine and the black margin on the spinous dorsal fin.

The blacktip poacher was first taken in British Columbia waters on June 20, 1903, in the Strait of Georgia off Bowen Island by the *Albatross*, station 4193, Lat.  $49^{\circ} 20' N$ , Long.  $123^{\circ} 43' W$ , depth 23 fathoms. This capture was recorded in 1907 by B. W. Evermann and E. L. Goldsborough as *Xenochirus pentacantha* Gilbert. The specimen was reexamined by Dr L. P. Schultz of the United States National Museum who applied the name *Xenopyxis latifrons* (Gilbert), and was so recorded in 1946 by Clemens and Wilby. The blacktip poacher is fairly common in southern British Columbia waters. It has been taken at Ucluelet, Porlier Pass, in Northumberland Channel at a depth of 60 fathoms, and occasionally in Burrard Inlet and English Bay from 10 to 50 fathoms. An individual was obtained on April 20, 1933, in Sechelt Inlet at Narrows Arm from about 45 fathoms in water low in oxygen and having a strong odour of hydrogen sulphide. In California waters it has been recorded at depths from 50 to 218 fathoms. It was recorded in 1946 by Clemens and Wilby as the black-tipped sea-poacher.

Range: California to southern British Columbia.

#### Gray starsnout

*Asterotheca alascana* (Gilbert) 1895

Body elongate, slender. Head somewhat depressed; mouth terminal, small; jaws about equal; snout moderately pointed; rostral plate small, terminal, erect, movable; spines: on rostral plate, 5 or more, small, in form of star, 3 diverging upward, backward, one at each lower lateral angle, 1 or 2 additional spines usually projecting downward between lateral spines; nasal, sharp; frontal, sharp; lacrymal,

absent; spinous projections on eyeball, 6 to 8, large, directed backward, in single row; occipital pit transverse, moderately deep; gill membranes united, joined to isthmus, with slight free fold posteriorly. Fins: dorsal (2), V to VIII—5 to 8, small; anal, 6 to 8, origin below interspace between dorsal fins; pelvic, I, 2, thoracic; pectoral, broad, lower rays exerted; caudal, rounded. Lateral line: high anteriorly, sharply decurved, then straight. Plates: on body, spinous; in dorsal series, 36 to 39; in lateral series, 37 to 41; anterior to pelvic fins, 1 pair. Pores: on lateral line, 39 or 40. Cirri: at posterior tip of maxillary, 2, large; near anterior tip of



FIGURE 214. Gray starsnout. *Asterothea alascanus* (Gilbert) 1895

dentary, 1, small. Colour: greenish gray to light brown on dorsal surface; very light brown on ventral surface; dark brown saddle-like markings in series of 5 or 6 across back and sides; dark brown bars on pectoral, dorsal and caudal fins; white on pelvic and anal fins.

Length to 5 inches.

Distinguished by the erect movable many-spined rostral plate, the origin of the anal fin below the interspace between the dorsal fins, the single pair of plates immediately in front of the pelvic fins and the absence of spines from the front of the lacrymal bones.

The gray starsnout was first taken in British Columbia waters August 27, 1891, in Juan de Fuca Strait west of Race Rocks, by the *Albatross*, station 3445, Lat. 48° 16' N, Long. 123° 45' W, depth 100 fathoms and was recorded in 1895 by C. H. Gilbert as *Xenochirus alascanus* Gilbert. The species is common along the coast and is captured frequently in Burrard Inlet and English Bay in shrimp trawls at depths ranging from 10 to 30 fathoms. It has been taken off Graham Island in Rennell Sound by the *Wm. J. Stewart* at 60 fathoms.

Range: Washington to Bering Sea.

### Spinycheek starsnout

*Asterothea infraspinata* (Gilbert) 1904

Body elongate, slender. Head somewhat depressed; mouth terminal, small; jaws about equal; snout moderately pointed; rostral plate small, terminal, erect, movable; spines: on rostral plate, 5 or more, small, in form of star, 3 diverging upward, one at each lower lateral angle, 1 or 2 additional spines usually pro-

jecting downward between lateral spines; nasal, sharp; frontal, blunt; on lacrymal numerous, large, diverging; spinous projections on eyeball, 5 to 7, low, blunt, in single row; occipital pit transverse, very shallow; gill membranes united, joined to isthmus with slight free fold posteriorly. Fins: dorsal (2), V to VIII—5 to 8, small; anal, 6 to 8, origin below insertion of spinous dorsal fin; pelvic, I, 2, thoracic; pectoral, broad, lower rays exerted; caudal, rounded. Lateral line: high anteriorly, sharply decurved, then straight. Plates: on body, spinous; in dorsal series, 36 to 39, in lateral series, 38 to 41; anterior to pelvic fins, 1 pair. Pores: on lateral line, 37 to 39. Cirri: at posterior tip of maxillary, 2, large; near anterior tip of dentary,



FIGURE 215. Spinycheek starsnout. *Asterotheca infraspinata* (Gilbert) 1904

1, small. Colour: light olive green to light brown on dorsal surface; white on ventral surface; dark brown saddle-like markings in series of 5 or 6 across back and sides; dark brown bars on pectoral, dorsal and caudal fins; white on pelvic and anal fins.

Length to  $4\frac{3}{4}$  inches.

Distinguished by the erect movable many-spined rostral plate, the origin of the anal fin below the insertion of the spinous dorsal fin, the single pair of plates immediately in front of the pelvic fins and the presence of spines on the front of lacrymal bones.

The spinycheek starsnout was first taken in British Columbia waters September 19, 1913, at Nanoose Bay and the specimen is now in the fish collection of the Biological Station at Nanaimo. It has been obtained at Porlier pass, Boat Harbour and Burrard Inlet and off the west coast of Vancouver Island. The depths range from 10 to 30 fathoms.

Range: Washington to Bering Sea.

### Bigeye starsnout

*Asterotheca pentacantha* (Gilbert) 1890

Body elongate, slender. Head somewhat depressed; mouth terminal, small; jaws about equal; snout bluntly pointed; eye large; rostral plate small, terminal, erect, movable; spines: on rostral plate, 5 or more, small, in form of star, 3 diverging upward, backward, 1 at each lower lateral angle, 1 or 2 additional spines usually projecting downward between lateral spines; nasal, sharp; frontal,

large, sharp; lacrymal, absent; spinous projections on eyeball, 4 to 6, low, blunt, in single row; occipital pit transverse, moderately deep; gill membranes united, joined to isthmus without free fold posteriorly. Fins: dorsal (2), V to VIII—6 or 7, small; anal, 6 to 8, origin below interspace between dorsal fins; pelvic, I, 2, thoracic; pectoral, broad, lower rays greatly exerted; caudal, rounded. Lateral line: high anteriorly, sharply decurved, then straight. Plates: on body spinous; in dorsal series, 41 to 44; in lateral series, 43 to 46; anterior to pelvic fins, 2 pairs. Pores: on lateral line, 39 to 42. Cirri: at posterior tip of maxillary, 2, large; near anterior tip of dentary, 1, small. Colour: olive brown on dorsal surface; light brown on ventral surface; faint black or brown saddle-like markings in series of 5 or 6 across back and sides; dark brown to dusky on pectoral and dorsal fins, dark brown on caudal fin; white on pelvic and anal fins.

Length to  $7\frac{3}{4}$  inches.

Distinguished by the erect movable many-spined rostral plate, the origin of the anal fin below the interspace between the dorsal fins, the 2 pairs of plates immediately in front of the pelvic fins and the absence of spines from the front of the lacrymal bones.

The bigeye starsnout was first taken in British Columbia waters in December, 1954, in the Strait of Georgia off Galiano Island at a depth of 72 fathoms in a shrimp trawl by Mr J. Bauer. The specimen is now in Mr Bauer's collection of fishes at Steveston, British Columbia. This is the first and only record of the species in British Columbia waters. The AFS/ASIH committee's name is bigeye poacher.

Range: Southern California to Bering Sea.

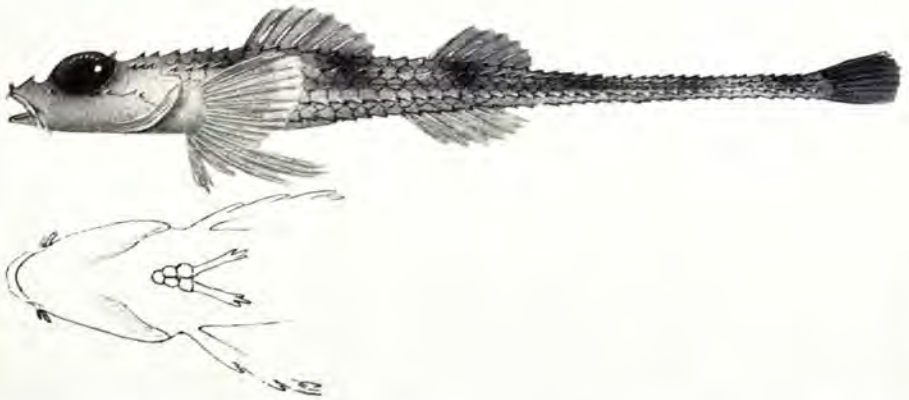


FIGURE 216. Bigeye starsnout. *Asterotheca pentacantha* (Gilbert) 1890

**Pygmy poacher**

*Odontopyxis trispinosa* Lockington 1879

Body elongate, slender. Head somewhat depressed; mouth terminal, small; jaws about equal; snout depressed, narrowly pointed; rostral plate terminal, movable; spines: on rostral plate, 1, small, upright; nasal, sharp; frontal, strongly recurved; spinous projections on eyeball, 3 to 5, in single row; occipital pit shallow to deep, with slight median longitudinal ridge; gill membranes united, joined to isthmus. Fins: dorsal (2), III to VI—6 or 7; anal, 5 to 7; pelvic, I, 2, thoracic; pectoral, broad, lower 5 to 7 rays exerted; caudal, rounded. Lateral line: decurved anteriorly, then straight, wavy posteriorly. Plates: on body, spinous; dorsolateral ridges usually separate, continuous on either side of the spinous dorsal fin to occiput, in some individuals ridges join on median line anterior to spinous dorsal fin for short distance but separate posterior to occiput. Pores: on lateral line, 35 to 38. Cirri: near posterior tip of maxillary, 1, small. Colour: gray to olive green on dorsal surface; lighter on ventral surface; brownish black saddle-like markings in series of 6 or more across back and sides; dusky on dorsal and caudal fins with white on margin; black and brown in narrow bars on pectoral fins; white on pelvic and anal fins.

Length to  $3\frac{1}{2}$  inches.



FIGURE 217. Pygmy poacher. *Odontopyxis trispinosa* Lockington 1879

Distinguished by the small slender body, the pointed snout with the single upright rostral spine and the partially-divided occipital pit.

The pygmy poacher was first taken in British Columbia waters on June 20, 1903, in the Strait of Georgia near Bowen Island by the *Albatross*, station 4193, Lat.  $49^{\circ} 20' N$ , Long.  $123^{\circ} 43' W$ , depth 23 fathoms and recorded in 1907 by B. W. Evermann and E. L. Goldsborough as *O. trispinosus* Lockington. It is common in the Strait of Georgia, Burrard Inlet and Nanoose Bay and has been collected at Ucluelet. The pygmy poacher inhabits sandy or rocky bottoms and is taken in shrimp trawls at depths from 10 to 40 fathoms. In California waters it has been found at depths down to 204 fathoms. It was recorded in 1946 by Clemens and Wilby as the pigmy sea-poacher.

Range: California to southeastern Alaska.

**Deep-pitted poacher**

*Bothragonus swanii* (Steindachner) 1877

Body elongate, stout anteriorly, compressed posteriorly. Head large, depressed; broad posteriorly; mouth terminal, small; jaws about equal; snout bluntly pointed; rostral plate terminal, rigid, bluntly rounded; spines: absent from rostral plate and nasal bones; spinous projections on eyeball, small, sharp, in two rows, middle spine of lower row large; occipital pit very large, deep, depth nearly half that of head, transverse, somewhat oval, spinous processes several, small, blunt, extending from posterior margin into cavity; gill membranes united, broadly joined to isthmus. Fins: dorsal (2), III or IV—4 or 5; small; anal, 4 or 5; pelvic, I, 2, thoracic; pectoral, large, fin rays not exerted; caudal, rounded. Lateral line: high anteriorly, decurved, then straight. Plates: on body, smooth; on head very bluntly rounded; on isthmus and branchiostegals, small, elevated. Pores: on lateral line, about 32. Cirri: on lips numerous, short, filamentous; on dentary pores, in rows; on isthmus, scattered. Colour: brown with black bars, orange with bluish bars or scarlet with brown bars, coloration very variable corresponding to environment;

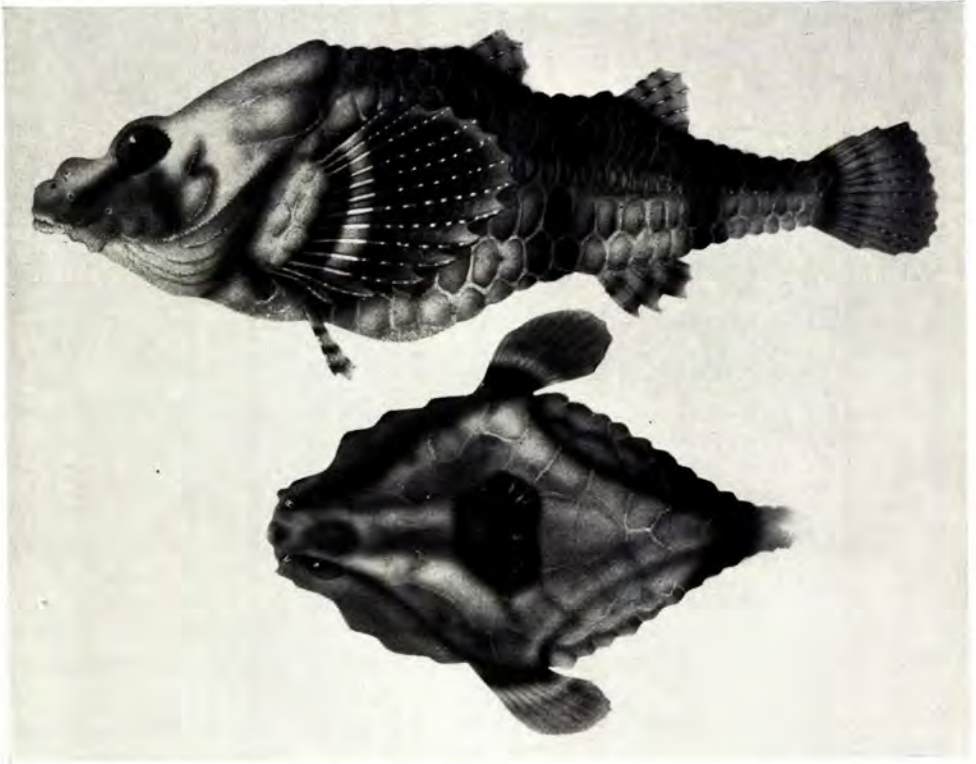


FIGURE 218. Deep-pitted poacher. *Bothragonus swanii* (Steindachner) 1877



brown to black bars on dorsal, pelvic, anal and caudal fins; brown to black on pectoral fins, white band near base of each, prominent; white spots along rays of all fins.

Length to  $3\frac{1}{2}$  inches.

Distinguished by the stout body, the smooth plates and the broad head with the large cavity on the top.

The deep-pitted poacher was first taken in British Columbia waters in the summer of 1909, when 4 specimens from  $1\frac{1}{4}$  inches to  $2\frac{1}{4}$  inches in length were collected at Ucluelet by Messrs C. H. Young and W. Spreadborough and recorded in 1920 by B. A. Bean and A. C. Weed. Other individuals have been obtained from William Head, Quatsino and Port Hardy in tidepools. It was recorded in 1946 by Clemens and Wilby as the deep-pitted sea-poacher; the name recommended by the AFS/ASIH committee is rockhead.

Range: California to Queen Charlotte Islands.

### Smooth poacher

*Anoplagonus inermis* (Günther) 1860

Body elongate, slender, depressed anteriorly. Head depressed, broad; mouth terminal, very small; jaws about equal; snout roundly pointed; rostral plate small; spines: on upper tip of operculum in patch, small, conical; gill membranes narrowly joined to isthmus with free fold posteriorly. Fins: dorsal (1), 5 or 6; anal, 4 or 5, origin below that of dorsal fin; pelvic, I, 2, thoracic; pectoral, small; caudal, rounded. Lateral line: high anteriorly, decurved, then straight. Plates: on body, without spines Pores: on lateral line, 41 to 44. Cirri: absent. Colour: brown on dorsal surface; brownish gray on ventral surface; black band from mouth across cheek to pectoral fin, continuing, with interruptions, along body; dusky mottling and spotting on posterior half of dorsal fin; dark brown bars on pectoral, dorsal and caudal fin; brown spots minute, on anal fin; white on pelvic fins; white band near base of each pectoral fin; semi-translucent patches near base of caudal fin, 2.

Length to 6 inches.



FIGURE 219. Smooth poacher. *Anoplagonus inermis* (Günther) 1860

Distinguished by the slender body covered with smooth plates, the single rayed dorsal fin immediately above the anal fin and the two light patches on the caudal fin.

The smooth poacher was first taken in British Columbia waters near Victoria by H.M.S. *Plumper*. The single specimen obtained was  $32\frac{1}{2}$  lines, ( $2\frac{7}{10}$  inches), in length, was described in 1860 by A. Günther as the type of a new genus and species, *Aspidophoroides inermis*, and deposited in the British Museum. The smooth poacher has been secured in Nanoose Bay and is common in English Bay and Burrard Inlet. On September 26, 1954, a specimen 6 inches in length was taken in Alice Arm by the shrimp trawler *Yuri M.* The species usually is taken by shrimp trawlers near and on rocky bottoms at depths between 15 and 30 fathoms. It was recorded in 1946 by Clemens and Wilby as the smooth sea-poacher. The name recommended by the AFS/ASIH committee is smooth alligatorfish.

Range: Washington to Gulf of Alaska.

### Sturgeon poacher

*Agonus acipenserinus* Tilesius 1811

Body elongate, moderately stout anteriorly, general appearance somewhat sturgeon-like. Head large; mouth ventral, weakly protrusible; snout depressed broadly pointed; spines: on tip of snout, 4, sharp, naked, anterior pair horizontal, parallel, posterior pair directed backward; nasal, sharp, sometimes multifid; frontal, sharp, slightly curved; gill membranes united, joined to isthmus with narrow fold posteriorly. Anus immediately behind bases of pelvic fins. Fins: dorsal (2), VIII to X—7 to 9; anal, 6 to 9; pelvic, I, 2, thoracic, in male length about equal to that of snout, in female length about half that of snout; caudal, truncate to rounded. Lateral line: high anteriorly, sharply decurved, then straight. Plates: on body spinous; on caudal peduncle, weakly spinous in older individuals. Pores: on lateral line, 37 to 40. Cirri: large, in two groups on each lower side of snout, outer simple, inner multifid; in group at each angle of mouth, on broad pedicel. Colour: light grayish brown on dorsal surface; light yellow to orange on ventral surface; orange spot under each eye; golden on iris; brownish black saddle-like markings in series of six or more across back and sides, with intermediate narrow brownish black streaks; bright yellow on cirri below head; dusky on dorsal, pectoral and caudal fins; obscurely barred on pectoral and caudal fins; creamy white on pelvic fins, sometimes black tipped in male; creamy white on anal fin with brownish black blotch near posterior tip.

Length to 12 inches.

Distinguished by the sturgeon-like appearance, the 4 sharp naked spines at the tip of the snout, the inferior mouth and the large clusters of elongate cirri below the snout and on pedicels at each angle of the mouth.

The sturgeon poacher was first taken in British Columbia waters near Vancouver Island by H.M.S. *Plumper* and was presented to the British Museum by the Lords of the Admiralty where it was identified and recorded in 1860 by A. Günther. In 1881, T. H. Bean recorded this species from Vancouver Island as *Podothecus acipenserinus* (Pallas). This poacher is very common along the whole coast of the Province with records from Victoria and English Bay to Graham Island

at Rose Spit. It is obtained chiefly in shrimp trawls on muddy bottoms and probably is the commonest poacher in waters between 10 and 30 fathoms. Swimming is accomplished by short quick movements of the large pectoral fins, the rays have a wave-like motion and direct the fish as well as move it forward. The food consists in part of crustaceans and marine worms. This species was called the sturgeon-like sea-poacher in 1946 by Clemens and Wilby.

Range: Washington to Bering Sea.



FIGURE 220. Sturgeon poacher. *Agonus acipenserinus* Tilesius 1811

Family CYCLOPTERIDAE

Lumpsuckers

In the lumpsuckers the body is short and stout with a thick skin in which may be embedded plates with spines or tubercles. The dorsal fins usually are two, short, the first spinous and the second rayed, the spinous dorsal sometimes is absent; the anal fin is short; the rayed dorsal and anal fins are separate from the caudal; the pelvic fins are thoracic and modified to form an adhesive disk.

The lumpsuckers are fishes of the colder northern seas, mostly of Arctic distribution. Because of their body form they are slow-moving and attach themselves to rocks, frequently in currents. The food consists of worms, crustaceans and even small fishes. Their eggs are deposited in masses among rocks and guarded by the male until hatched.

The species are fairly numerous and at least one reaches a length of 23 inches.

#### Spiny lumpsucker

*Eumicrotremus orbis* (Günther) 1861

Body short, deep, stout anteriorly, compressed posteriorly. Head globular, bluntly rounded; mouth terminal, small; snout broad, profile steep; nostrils paired, tubular; interorbital space flat, broad; opercular opening small, above base of pectoral fin. Fins: dorsal (2), VI or VII—9 to 11; anal, 8 to 11; pelvic, thoracic, modified into large adhesive disk with fringed thickened margin; caudal, truncate to rounded. Lateral line: absent. Scales: in form of spinous conical tubercles of

various sizes, scattered on body, head and spinous dorsal fin. Cirri: in series below and behind lower jaw. Colour: light to dark green, sometimes light brown, on dorsal surface; light brown or plum on ventral surface; lavender on lips.

Length to 5 inches.



FIGURE 221. Spiny lumpsucker. *Eumicrotremus orbis* (Günther) 1861

Distinguished by the short body and globular head, the conical spinous tubercles and the adhesive pelvic disk with the thickened fringed margin.

The spiny lumpsucker was first taken in British Columbia waters at Esquimalt by H.M.S. *Plumper* and presented to the British Museum by Lord John Russell. It was a small specimen, 22 lines ( $1\frac{1}{8}$  inches), and was described in 1861 by A. Günther as the type of a new species, *Cyclopterus orbis*. The species was recorded by Ashdown Green as *Cyclopterus spinosus* and by Bean and Weed as *Eumicrotremus spinosus* (Müller), thus considering the Pacific and Atlantic species identical. The spiny lumpsucker is taken frequently in shrimp trawls in Burrard Inlet and English Bay where there is a rocky bottom. It also has been obtained at low tide in the Nanaimo area, in Wickaninnish Bay north of Ucluelet, around the Queen Charlotte Islands and in Nass Harbour. Three individuals from Alaska were secured from the stomach of a lancetfish, *Alepisaurus borealis*. These lumpsuckers have been observed frequently attached to rocks in fast-moving tidal waters at extremely low tides and they have been recorded from a depth of 80 fathoms. The name recommended by the AFS/ASIH committee is Pacific spiny lumpsucker.

Range: Washington to Bering Sea.

### Smooth lumpsucker

*Aptocyclus ventricosus* (Pallas) 1770

Body short, deep, stout anteriorly, slightly compressed posteriorly. Head globular, bluntly rounded; mouth terminal, small; snout short, broad, profile curved; nostrils paired, anterior tubular; eye small; interorbital space convex; opercular opening very small, above base of pectoral fin. Skin: thick, smooth, loose. Fins: dorsal (1), 8 or 9, far back on body; anal, 7 to 9; pelvic, modified into moderate adhesive disk with thickened margin; caudal, rounded. Lateral line: absent. Scales: absent. Cirri: absent. Colour: brownish gray, spotted with black on dorsal surface; muddy gray on ventral surface.

Length to  $7\frac{1}{2}$  inches.



FIGURE 222. Smooth lumpsucker. *Aptocyclus ventricosus* (Pallas) 1770

Distinguished by the short stout body and globular head, the absence of tubercles, the smooth skin, the single rayed dorsal fin and the adhesive pelvic disk.

The smooth lumpsucker was first taken in British Columbia waters on August 1, 1950, in Dean Channel in a salmon purse seine. A second specimen was obtained in early September, 1951, on the west coast of Moresby Island in a purse seine and presented to the Institute of Fisheries at the University of British Columbia. In the collection of the Biological Station at Nanaimo are two other individuals, one, taken on August 3, 1952, length  $6\frac{3}{4}$  inches, in Mathieson Channel, the other, from a salmon seine on July 13, 1955, in Portland Canal off Haystack Island was  $7\frac{1}{2}$  inches in length.

Range: Northern British Columbia to Bering Sea.

Family LIPARIDAE

Snailfishes

In the snailfishes (or liparids) the body is elongate, usually with thin loose skin and no scales. The dorsal fin is long, the anterior portion of which is supported by very weak spines (which are not countable without dissection), and the

posterior portion supported by rays; the spines and rays are not distinguished herein and are recorded as rays; the anal fin is long; the dorsal and anal fins usually reach to or extend onto the caudal fin; the pelvic fins, when present, are thoracic, and modified to form an adhesive disk.

The species range from shallow intertidal waters to depths as great as 2,000 fathoms. In the shallow-water group the eye is small, the gill opening is long, the disk is large and thoracic, the anus is slightly in advance of the anal fin and the colours are shades of brown variously marked with stripes and mottlings. In the deep-water group the eye is large, the gill opening is short, the disk is progressively more anterior and smaller and in some species is absent, and the anus moves forward, corresponding to the advance of the disk until in some species the disk disappears and the anus is so far advanced in position as to be located below the vertical from the eyes.

In the very deep-water species the skin is very thin, loose and translucent to transparent, white to pale pink in colour, while the flesh is pink to jet black.

The snailfishes are distributed widely in the colder north temperate waters and the Arctic and Antarctic seas. Approximately 13 genera and over 100 species are known.

#### **Tidepool snailfish**

*Liparis florae* (Jordan and Starks) 1895

Body elongate, stout anteriorly, compressed posteriorly; greatest depth slightly behind origin of anal fin. Head depressed; mouth terminal, small; lower jaw included; teeth trilobed; snout bluntly rounded; nostril double; eye diameter 6 to 7 in length of head; gill opening extending downward to between third and fifth rays of pectoral fin. Skin: loose. Fins: dorsal (1), 31 to 33, lobed anteriorly, scarcely reaching caudal fin; anal, 25 to 27, scarcely reaching caudal fin; pelvic adhesive disk thoracic, slightly longer than wide, margin thickened, length 2 to 2.4 in length of head, posterior margin behind vertical from gill opening; pectoral, 29 to 33, lobed; lower rays slightly exserted; caudal, truncate to rounded. Lateral line: absent. Scales: absent. Pyloric caeca: 70 or fewer. Colour: uniform brown, varying from olive green to dusky purple.

Length to 5 inches.



FIGURE 223. Tidepool snailfish. *Liparis florae* (Jordan and Starks) 1895

Distinguished by having the greatest depth of the body slightly behind the origin of the anal fin, the oval adhesive disk and the gill openings extending downward to between the third and fifth rays of the pectoral fins.

The tidepool snailfish was first taken in British Columbia waters June 8, 1929, at False Narrows, south of Nanaimo, by Dr J. L. Hart and is now in the Institute of Fisheries at the University of British Columbia. A second specimen was obtained at the same place on May 30, 1934, by Dr W. A. Clemens and is now in the fish collection of the Biological Station at Nanaimo. Other records are from Burrard Inlet and the west coast of Vancouver Island as far north as Esperanza Inlet. This is a shore species whose coloration varies with the environment. It was recorded in 1946 by Clemens and Wilby as the shore liparid.

Range: California to Bering Sea.

### Ringtail snailfish

*Liparis rutteri* (Gilbert and Snyder) 1898

Body elongate, terete anteriorly, compressed posteriorly. Head depressed, broad; mouth terminal, small; lower jaw included; teeth trilobed; snout bluntly rounded; nostril double; eye diameter 6 to 7 in length of head; gill opening entirely above base of pectoral fin. Skin: very loose. Fins: dorsal (1), 30 to 32, low, lobed anteriorly, just reaching base of caudal fin; anal, 23 to 27, extending onto caudal fin about one-sixth length of caudal fin; pelvic adhesive disk, thoracic, nearly circular, margin thickened, length 1.4 to 1.8 in length of head, posterior margin behind vertical from gill opening; pectoral, 30 to 33, lobed, lower rays slightly exerted; caudal, truncate to rounded. Lateral line: absent. Scales: absent. Pyloric caeca: 23 to 31. Colour: jet black to bluish slate or brown; white band across base of caudal fin extending to posterior tips of dorsal and anal fins; somewhat white sometimes on margins of dorsal, pectoral and anal fins; light brown irregular longitudinal stripes sometimes present.

Length to 4½ inches.

Distinguished by the small gill openings above the pectoral fins, the white band across the base of the caudal fin and the large adhesive pelvic disk.



FIGURE 224. Ringtail snailfish. *Liparis rutteri* (Gilbert and Snyder) 1898

The ringtail snailfish was first taken in British Columbia waters in July, 1909, at Ucluelet by Messrs C. H. Young and W. Spreadborough. Twelve specimens were secured up to 2½ inches in length, and recorded in 1920 by B. A. Bean and A. C. Weed as *Neoliparis rutteri* Gilbert and Snyder. In February, 1934, 5 specimens were obtained in Burrard Inlet at a depth between 10 and 12 fathoms, and on December 10, 1940, a single individual was secured in English Bay in a shrimp trawl at a depth between 30 and 40 fathoms. It is a species of moderate depths. It was recorded in 1946 by Clemens and Wilby as the ring-tailed liparid.

Range: California to Bering Sea.

### Spotted snailfish

*Liparis callyodon* (Pallas) 1811

Body elongate, stout anteriorly, compressed posteriorly. Head somewhat depressed; mouth terminal, small; lower jaw included; teeth trilobed; snout bluntly rounded; nostril double; eye diameter 6 to 7 in length of head; gill opening above pectoral fin, or at most not below first ray of pectoral fin. Skin: loose. Fins: dorsal (1), 33 to 35, lobed anteriorly, just reaching base of caudal fin; anal, 25 to 27, extending onto caudal fin less than one-fifth length of caudal fin; pelvic adhesive disk, thoracic, nearly circular, margin thickened, length 2.2 to 3 in length or head, posterior margin behind vertical from gill opening; pectoral, 28 to 31, lobed, lower rays slightly exerted; caudal, truncate to rounded. Lateral line: absent. Scales: absent. Pyloric caeca: 42 to 66. Colour: olive brown on body and fins, spotted with larger areas about size of pupil; dusky on chin; dark spots on rays of dorsal, anal and caudal fins forming bands.

Length to 5 inches.



FIGURE 225. Spotted snailfish. *Liparis callyodon* (Pallas) 1811

Distinguished by the lobe in the dorsal fin, the very small gill openings and the dark spotting on the body and on the rays of the dorsal, anal and caudal fins.

The spotted snailfish was first taken in British Columbia waters in 1885 in Johnstone Strait, Discovery Passage, by Dr G. M. Dawson and the 3 specimens were recorded in 1920 by B. A. Bean and A. C. Weed as *Neoliparis callyodon*



(Pallas). Other records are from the Strait of Georgia and the Queen Charlotte Islands. This is a shore species frequently found in tidepools. In 1946, Clemens and Wilby called this species Pallas's liparid.

Range: Washington to Bering Sea.

### Ribbon snailfish

*Liparis cyclopus* Günther 1861

Body elongate, stout anteriorly, compressed posteriorly; greatest depth behind posterior margin of disk. Head depressed; mouth terminal, small; lower jaw included; teeth trilobed; snout bluntly rounded; nostril double; eye diameter 5 to 6.2 in length of head; gill opening extending downward to between 5th and 10th rays of pectoral fin. Skin: moderately firm. Fins: dorsal (1), 35 to 37, not lobed, extending onto caudal fin less than one-fifth length of caudal fin; anal, 29 to 31, extending onto caudal fin less than one-fifth length of caudal fin; pelvic adhesive disk, thoracic, margin thickened, length 2 to 2.5 in length of head, posterior margin behind vertical from gill opening; pectoral, 29 to 32, lobed, lower rays much exerted; caudal, truncate to rounded. Lateral line: absent. Scales: absent. Pyloric caeca: 32 to 39. Colour: olivaceous, speckled with olive brown on body and fins; brown longitudinal stripes on body in some specimens.

Length to 4½ inches.



FIGURE 226. Ribbon snailfish. *Liparis cyclopus* Günther 1861

Distinguished by the entire dorsal fin extending onto the caudal fin for less than one-fifth length of caudal fin, the gill openings extending downward to between the 5th and 10th rays of the pectoral fins and the circular pelvic adhesive disk.

The ribbon snailfish was first taken in British Columbia waters in Esquimalt Harbour by H.M.S. *Plumper* and presented to the British Museum by Lord John Russell. This specimen was used by Dr A. Günther as the type and it was recorded as such in 1861. Other specimens have been secured in Juan de Fuca Strait and in the Queen Charlotte Islands in Massett and Skidegate Inlets. The only depth recorded in these instances was 100 fathoms in Juan de Fuca Strait. It was recorded in 1946 by Clemens and Wilby as Gunther's liparid.

Range: Washington to Bering Sea.

### Slipskin snailfish

*Liparis fucensis* Gilbert 1895

Body elongate, stout anteriorly, compressed posteriorly. Head depressed; mouth terminal, small; lower jaw included; teeth trilobed; snout bluntly rounded; nostril double; eye diameter 5 to 6.5 in length of head; gill opening extending downward to point between 12th and 16th rays of pectoral fin. Skin: thin, loose. Fins: dorsal (1), 33 to 35, lobed anteriorly, extending onto caudal fin less than one-fifth length of caudal fin; pelvic adhesive disk, thoracic, circular, margin thickened, length 2 to 3 in length of head, posterior margin behind vertical from gill opening; pectoral, 37 to 43, lobed, lower rays greatly exerted, usually extending behind anus; caudal, truncate to rounded. Lateral line: absent. Scales: absent. Pyloric caeca: 55 or fewer. Colour: olive brown to blackish brown, frequently tinged with pink, variously mottled or striped; dusky on fins; red, brown and black bars on pectoral and caudal fins, light oblique band across caudal fin.

Length to 7 inches.



FIGURE 227. Slipskin snailfish. *Liparis fucensis* Gilbert 1895

Distinguished by the diameter of the eye 5 to 6.5 in the length of the head, the anal fin extending onto the caudal fin for less than one-fifth of the length of the caudal fin, the gill openings extending downward to between the 12th and 16th rays of the pectoral fins and the light oblique band across the caudal fin.

The slipskin snailfish was first taken in British Columbia waters on August 27, 1891, in Juan de Fuca Strait by the *Albatross*, station 3445, Lat. 48°16'N, Long. 123°45'W, depth 100 fathoms and recorded in 1895 by C. H. Gilbert. Since then it has been found in English Bay, Burrard Inlet, Lowe Inlet and on Moresby Island at Kaisun Bay. It ranges from shallow water to 212 fathoms in depth. The food consists in part of crustaceans. It was recorded in 1946 by Clemens and Wilby as the Juan de Fuca liparid.

Range: California to southeastern Alaska.

### Marbled snailfish

*Liparis dennyi* Jordan and Starks 1895

Body elongate, stout anteriorly, compressed posteriorly. Head moderately depressed; mouth terminal, small; lower jaw included; teeth trilobed; snout bluntly rounded; nostril double; eye diameter 7 to 7.5 in length of head; gill opening extending downward to point between 10th and 15th rays of pectoral fin. Skin: thin, loose. Fins: dorsal (1), 37 to 40, slightly lobed anteriorly (lobe usually absent in large individuals), extending onto caudal fin for about one-fifth length of caudal fin; anal, 30 to 34, extending onto caudal fin for about two-fifths length of caudal fin; pelvic adhesive disk, thoracic, almost circular, margin thickened, length 2.2 to 2.4 in length of head, posterior margin behind vertical from gill opening; pectoral, 36 to 39, lower rays much exerted, usually not extending to anus; caudal, truncate to rounded. Lateral line: absent. Scales: absent. Pyloric caeca: 19 to 31. Colour: olive to dark brown or black, with wavy stripes and mottlings or with white dots.

Length to 12 inches.

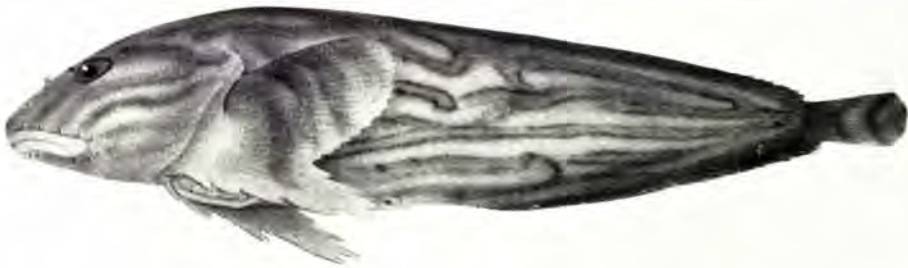


FIGURE 228. Marbled snailfish. *Liparis dennyi* Jordan and Starks 1895

Distinguished by the diameter of the eye 7 to 7.5 in the length of the head, the anal fin extending onto the caudal fin for about two-fifths of the length of the caudal fin and the gill openings extending downward to a point between the 10th and the 15th rays of the pectoral fins.

The marbled snail-fish was first taken in British Columbia waters on August 27, 1891, in Juan de Fuca Strait off Race Rocks by the *Albatross*, station 3445, Lat. 48°16' N, Long. 123°45' W, depth 100 fathoms, and in the following month at 4 stations around the southern end of Vancouver Island at depths from 48 to 123 fathoms. These were recorded in 1895 by C. H. Gilbert. On January 17, 1934, two 6-inch specimens were secured by trawling in Active Pass at a depth of 40 fathoms. These contained mature eggs, faintly pink in colour, which flowed freely from the body. Other individuals have been obtained in the lower part of the Strait of Georgia, in English Bay and Burrard Inlet in shrimp trawls at depths between 10 and 53 fathoms. The food consists in part of crustaceans. It was recorded in 1946 by Clemens and Wilby as Denny's liparid.

Range: Washington to Gulf of Alaska.

### Shorttail snailfish

*Liparis pulchellus* Ayres 1855

Body elongate, stout anteriorly, compressed posteriorly. Head depressed, broad; mouth subterminal, small; lower jaw included; teeth trilobed; snout bluntly rounded to truncate; nostril double; eye diameter 4.5 to 5.4 in length of head; interorbital space broad; gill opening above pectoral fin or not extending downward below the 4th ray. Skin: thin, loose. Fins: dorsal (1), 47 to 53, without lobe; anal, 39 to 41; both dorsal and anal connected to caudal for more than four-fifths length of caudal fin; pelvic adhesive disk, thoracic, circular, margin thickened, length 2.3 to 2.4 in length of head, posterior margin behind vertical from gill openings; pectoral, 36 or 37, lower rays slightly exerted; caudal, truncate. Lateral line: absent. Scales: absent. Pyloric caeca: about 32. Colour: light to dark brown on dorsal surface; lighter on ventral surface; dots or wavy longitudinal dark lines sometimes present; black on dorsal, anal and caudal fins, or light brown with oblique black bars, especially pronounced in young; usually barred with darker shades on pectoral fins.

Length to 10 inches.



FIGURE 229. Shorttail snailfish. *Liparis pulchellus* Ayres 1855

Distinguished by the extremely long connection of the dorsal and anal fins with the caudal fin, the broad head with the eyes widely spaced and the sub-inferior mouth.

The shorttail snailfish was first taken in British Columbia waters in 1885 by Dr G. M. Dawson in Queen Charlotte Sound at a depth of 30 fathoms and recorded in 1887 by J. F. Whiteaves as *Liparis pulchella* Ayres. It occurs along the whole coast and apparently is rather common in the Strait of Georgia, in English Bay, Burrard Inlet, Departure and Nanoose Bays. It is obtained in shrimp trawls at depths of 10 to 50 fathoms as well as in shore seines. It was recorded in 1946 by Clemens and Wilby as the continuous-finned liparid. The name recommended by the AFS/ASIH committee is showy snailfish.

Range: California to Bering Sea.

## Lobefin snailfish

*Polypera greeni* (Jordan and Starks) 1895

Body elongate, little compressed. Head somewhat depressed, broad; mouth terminal, small; lower jaw included; teeth simple and trilobed; snout bluntly rounded; nostril double; eye diameter about 10 in length of head; gill opening above pectoral fin or not extending downward below 4th ray. Skin: thin, loose. Fins: dorsal (1), 37 to 40, lobed anteriorly, extending onto caudal fin for less than one-fifth length of caudal fin; anal, 31 or 32, barely reaching caudal fin; pelvic adhesive disk, thoracic, nearly circular, margin thickened, length 2.3 to 2.8 in length of head, posterior margin below or slightly anterior to vertical from gill opening; pectoral, 33 to 37, lower rays much exserted; caudal, truncate to rounded. Lateral line: absent. Scales: absent. Pyloric caeca: more than 300. Colour: light brown to bluish black on dorsal surface; cream to light brown on ventral surface.

Length to 12 inches.



FIGURE 230. Lobefin snailfish. *Polypera greeni* (Jordan and Starks) 1895

Distinguished by the small eyes, the posterior margin of the pelvic adhesive disk placed below or slightly anterior to the vertical from the gill openings, the lobed dorsal fin, the short gill openings not extending below the upper 4 rays of the pectoral fins and the large number of pyloric caeca.

The lobefin snailfish was first taken in British Columbia waters in 1895, in Esquimalt Harbour, by Mr Ashdown Green and recorded in the same year by D. S. Jordan and E. C. Starks as the type of a new species, *Neoliparis greeni*, in honour of its discoverer and first British Columbia ichthyologist, Mr Ashdown Green. The specimen was deposited in the Provincial Museum at Victoria. A second specimen, 12 inches in length, was captured on December 19, 1944, in Porlier Pass in a herring seine by Captain J. McGinnis. This individual is now in the collection of the Institute of Fisheries at the University of British Columbia. Eighteen more specimens collected near Vancouver were given to the Institute of Fisheries on October 8, 1956. It was recorded in 1946 by Clemens and Wilby as Green's liparid.

Range: Washington to Bering Sea.

## Abyssal snailfish

*Careproctus ovigerum* (Gilbert) 1895

Body elongate, greatest depth anterior to origin of dorsal fin, compressed. Head large, deep, broad; mouth terminal, moderate; lower jaw included; teeth simple, slender; snout bluntly rounded; nostril single; eye diameter 6 or 7 in length of head; gill opening extending downward to about 8th ray of pectoral fin. Anus near posterior margin of pelvic disk. Skin: thin, loose. Fins: dorsal (1), 43, high, extending onto caudal fin for about two-fifths length of caudal fin; anal, 34, extending onto caudal fin for about two-fifths length of caudal fin; pelvic adhesive disk, thoracic, nearly circular, margin thickened, large, length 2.9 in length of head, posterior margin anterior to vertical from gill openings; pectoral, 34, lower rays much exserted; caudal, narrow, pointed. Lateral line: absent. Scales: absent. Pyloric caeca: 19. Colour: pale, dusted with light brown.

Length to 12½ inches.

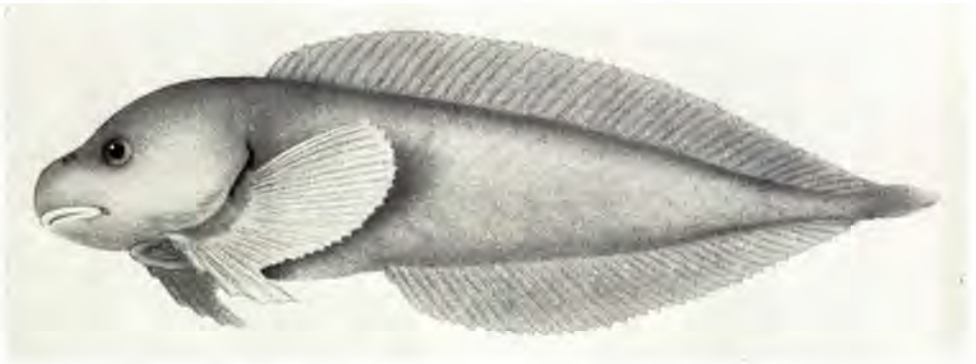


FIGURE 231. Abyssal snailfish. *Careproctus ovigerum* (Gilbert) 1895

Distinguished by the high dorsal fin, the single nostrils, the gill openings extending downward to the upper 8 rays of the pectoral fins and the anterior position of the pelvic adhesive disk.

The abyssal snailfish was first taken in British Columbia waters on September 3, 1890, west of Moresby Island, by the *Albatross*, station 3342, Lat. 52° 39' N, Long. 132° 38' W, depth 1,588 fathoms, recorded in 1895 by C. H. Gilbert as the type of a new genus and species, *Bathyphasma ovigerum* and deposited in the United States National Museum. This is the only known specimen, a male. The name *ovigerum*, meaning "egg-bearing", was given because the fish when captured contained a mass of eggs in its mouth. It was recorded in 1946 by Clemens and Wilby as the abyssal liparid.

Range: Queen Charlotte Islands.

### Smalldisk snailfish

*Careproctus gilberti* Burke 1912

Body elongate, greatest depth at origin of dorsal fin, compressed. Head large, deep, compressed; mouth terminal, moderate; lower jaw included; teeth simple, few with lateral lobes; snout bluntly rounded; eye large, diameter about 3.5 in length of head; gill opening extending downward to about 14th ray of pectoral fin. Anus near posterior margin of pelvic disk. Skin: very thin, loose. Fins: dorsal (1), about 55, without lobe, extending onto caudal fin for about half length of caudal fin; anal, 46 to 48, extending onto caudal fin for about half length of caudal fin, pelvic adhesive disk, thoracic, below eye, slightly wider than long, margin thickened, very small, length 7.3 to 9 in length of head; pectoral, about 31, lower rays greatly exerted, middle rays very short; caudal, truncate to rounded. Lateral line: absent. Scales: absent. Pyloric caeca: 10 to 12. Colour: creamy white to pale pink, sometimes light brown on dorsal surface; pale to dusky on fins; silvery on lower half of blue eye; viscera showing as dark mass.

Length to 3½ inches.



FIGURE 232. Smalldisk snailfish. *Careproctus gilberti* Burke 1912

Distinguished by the very small pelvic adhesive disk vertically below the large eye, the single nostrils and the gill openings extending downward to the 14th rays in the pectoral fins.

The smalldisk snailfish was first taken in British Columbia waters on August 31, 1888, off Fort Rupert by the *Albatross*, station 2862, Lat. 50° 49' N, Long. 127° 36' W, depth 238 fathoms, and recorded in 1930 by C. V. Burke. On November 21, 1953, a second specimen was taken in Seymour Inlet, Lat. 51° N, Long. 127° W, depth 40 fathoms, in a shrimp trawler operated by Mr J. Schibler. This fish is now in the collection of the Biological Station at Nanaimo. This is a deep-water species with depths recorded down to 482 fathoms. It was recorded in 1946 by Clemens and Wilby as the small-disked liparid.

Range: Northern end of Vancouver Island to southeastern Alaska.

**Blacktail snailfish***Careproctus melanurus* Gilbert 1891

Body elongate, greatest depth at origin of dorsal fin, compressed. Head short, compressed; mouth terminal, small; lower jaw included; teeth simple, few with lateral lobes; snout bluntly rounded; nostril single; eye moderately large, diameter 3.5 to 4 in length of head; gill opening entirely above pectoral fin. Anus near posterior margin of pelvic disk. Skin: very thin, loose. Fins: dorsal (1), 54 to 58, without lobe, extending onto caudal fin for half length of caudal fin; anal, 47 to 50, extending onto the caudal fin for half length of caudal fin; pelvic adhesive disk, thoracic, below eye, nearly circular, margin thickened very small, length 6.4 to 6.9 in length of head; pectoral, 30 or 31, lower rays very slightly exerted, thickened; caudal, truncate to rounded. Lateral line: absent. Scales: absent. Pyloric caeca: 20 to 27. Colour: white to pale rose red on body and portions of pectoral, dorsal and anal fins; dusky on abdomen; black on caudal fin, on posterior portions of dorsal and anal fins, on inner surface of pectoral fins, inside of mouth and gill openings.

Length to 9 inches.



FIGURE 233. Blacktail snailfish. *Careproctus melanurus* Gilbert 1891

Distinguished by the very small pelvic adhesive disk vertically below the eye, the single nostrils and the gill openings entirely above the pectoral fins.

The blacktail snailfish was first taken in British Columbia waters on August 29, 1888, between the northern end of Vancouver Island and the southern end of Moresby Island by the *Albatross*, station 2860, Lat. 51° 23' N, Long. 130° 34' W, depth 876 fathoms, and recorded in 1930 by C. V. Burke. On June 7th, 1953, a second individual was secured in Swanson Channel at a depth of 49 fathoms and is now in the collection of fishes at the Biological Station at Nanaimo. It was recorded in 1946 by Clemens and Wilby as the black-tailed liparid.

Range: California to northern British Columbia.

**Prickly snailfish***Paraliparis deani* Burke 1912

Body elongate, greatest depth at origin of dorsal fin, very slender posteriorly, attenuate, compressed. Head short, deep, compressed; mouth terminal, small; lower jaw included; teeth simple, few with slight lateral lobes, on both jaws in



bands; snout bluntly rounded; nostril single; eye moderately large, diameter 3 to 4.5 in length of head; gill opening extending downward to point between 10th and 13th rays of pectoral fin. Anus below vertical from gill openings, opening downward; genital opening immediately posterior to anus. Skin: very thin, loose. Fins: dorsal (1), 56 to 59, without lobe, extending onto caudal fin for half length of caudal fin; anal, 44 to 49, extending onto caudal fin for half length of caudal fin; pelvic fins (adhesive disk), absent; pectoral, 18 to 21, lower rays greatly exerted, middle rays short; caudal, 6, slender, truncate. Lateral line: absent. Scales: in form of minute "thumb-tack" prickles on lower portion of pectoral fins. Pyloric caeca: about 9. Colour: white to opaque on dorsal surface; silvery on ventral surface, translucent; pale pinkish red on lips and fins; dusky to black on peritoneum.

Length to 4 inches.



FIGURE 234. Prickly snailfish. *Paraliparis deani* Burke 1912

Distinguished by the attenuated posterior portion of the body, the absence of a pelvic disk, the anus opening downward and the extremely minute prickles on the greatly exerted lower rays of the pectoral fins.

The prickly snailfish was first taken in British Columbia waters on June 20, 1903, in the Strait of Georgia by the *Albatross*, station 4194, Lat. 49° 19' N, Long. 123° 43' W, depth 111 fathoms, and recorded in 1907 as *Paraliparis holomelas* Gilbert by B. W. Evermann and E. L. Goldsborough. *P. deani* was described as a new species in 1912 and the specimen mentioned above, upon re-examination, was found to be the new species and it was recorded in 1930 by C. V. Burke. The prickly snailfish also was obtained off Fort Rupert by the *Albatross*, station 4203, in 36 fathoms. Twenty-five specimens were secured in February, 1934, in English Bay at depths between 50 and 70 fathoms in shrimp trawls. In May, 1936, one male and 3 females were obtained in English Bay at 35 fathoms. On September 9, 1954, an individual 4 inches in length was taken in Chatham Sound, Lat. 54° N, Long. 130° W, in a shrimp trawl. The females in February contained what appeared to be fully mature eggs 2 mm in diameter. It was recorded in 1946 by Clemens and Wilby as the prickly liparid.

Range: California to southeastern Alaska.

**Tadpole snailfish***Nectoliparis pelagicus* Gilbert and Burke 1912

Body elongate, greatest depth at origin of dorsal fin, slender posteriorly, attenuate, compressed. Head short, deep, moderately compressed; mouth terminal, small; lower jaw included; teeth minute, simple, on lower jaw only, in single row; snout bluntly rounded; nostril single; eye large, diameter 2.4 to 2.7 in length of head; gill opening entirely in front of pectoral fin, extending from 1st to 14th ray. Anus below vertical from eyes, in deep dorsally flattened groove, pointing forward; genital pore ventral to anus, pointing forward; anal papilla ventral to genital pore, pointing downward. Skin: very thin, loose. Fins: dorsal (1), about 53, without lobe, extending onto caudal fin for half length of caudal fin; anal, about 48, extending onto caudal fin for half length of caudal fin; pelvic fins (adhesive disk), absent; pectoral, 18 to 21, in two wholly distinct lobes, rays in upper lobe, 13 or 14, well developed, in lower lobe, 3 or 4, greatly exerted, in portion between lobes, rays 2 or 3 sometimes developed, very short; caudal, 6, slender truncate. Lateral line: absent. Scales: absent. Pyloric caeca: about 8. Colour: pale, silvery on body beneath loose transparent skin; dark area on cheek; dark spots scattered over head and posterior part of body, small, irregularly shaped; dark on lining of mouth and gill cavity; jet black on peritoneum.

Length to 2½ inches.



FIGURE 235. Tadpole snailfish. *Nectoliparis pelagicus* Gilbert and Burke 1912

Distinguished by the tadpole shape, the absence of a pelvic disk, the gill openings entirely in front of the pectoral fins, the forwardly-projecting anus located in a groove at a point below the eyes and the widely separated lobes of the pectoral fins.

The tadpole snailfish was first taken in British Columbia waters in November, 1905, by the *Albatross*, station 4755, Lat. 49° 06' N, Long. 123° 21' W, 3.4 miles off the "Old North Sand Headlight", depth 120 fathoms. The species was not described until 1912 and so was not recorded with the fishes taken by the *Albatross* in this series. In 1953 a catalogue of the type specimens of fishes in the Natural History Museum of Stanford Museum was published and the above record was listed as a paratype. A second individual was obtained on April 20, 1933, in Sechart

Inlet at Narrows Arm, by Dr N. M. Carter, at a depth of 130 fathoms in a grab dredge. The bottom consisted of green mud and debris, chiefly leaves and twigs, from which came a strong odour of hydrogen sulphide. The bottom water was stagnant and practically devoid of oxygen. Previous records of this fish from United States waters give a depth range of 300 to 1217 fathoms. In 1936, however, two individuals were obtained in English Bay from a shrimp trawl at a depth of 35 fathoms and in 1940 another from the same area at a depth of 30 to 40 fathoms. It was recorded in 1946 by Clemens and Wilby as the tadpole liparid.

Range: California to Bering Sea.

### Suborder GASTEROSTEOIDEA

In this suborder the head is pointed, sometimes much produced, the mouth is small with the premaxillary bone forming most of the margin of the upper jaw. The pelvic fins are thoracic with the pelvic girdle free from the pectoral girdle; there are free spines representing the first dorsal fin. Bony pitted plates, sometimes embedded, usually are present on the body.

One family, the Gasterosteidae, is represented in British Columbia marine waters.

#### Family GASTEROSTEIDAE

#### Sticklebacks

In the sticklebacks the body is somewhat elongate, compressed to terete, with a slender caudal peduncle. There are 2 dorsal fins, the first represented by free spines. The sides of the body are covered sometimes partially or completely with bony plates, which sometimes are embedded.

These are small fishes represented by 7 genera and about 12 species which inhabit the fresh and salt waters of North America, Europe and Asia.

#### **Threespine stickleback**

*Gasterosteus aculeatus* Linnaeus 1758

Body elongate, moderately compressed; caudal peduncle slender, sometimes with well developed lateral keels in marine forms. Head pointed; mouth terminal, moderate; teeth minute, sharp. Fins: dorsal (2), II or III—I, 11 or 12, spinous fin with 2 or 3 widely separated stout serrate spines, rarely spine in second fin absent; anal, I—8 or 9, spine short; pelvic, I, 1 thoracic, spine large, serrate, ray small, fins below interspace between first and second spines of spinous dorsal fin; all spines may be locked rigidly in their sockets to stand out from body at right angles, thus forming a very effective armour; pectoral, truncate, origin some distance behind gill opening; caudal, slightly furcate. Lateral line: high, following dorsal contour, pores microscopic. Plates: large bony, oblong, vertical, in series along side of body in marine individuals, greatly reduced in brackish-water individuals, almost completely absent in freshwater individuals. Bony plate formed by fusion of pelvic

girdle parts, elongate, triangular, on ventral surface of body between and behind pelvic fins. Colour: variable; silvery green to intensely bluish black in marine, mottled brown in freshwater specimens; bright silvery in young.

Length to 4 inches.

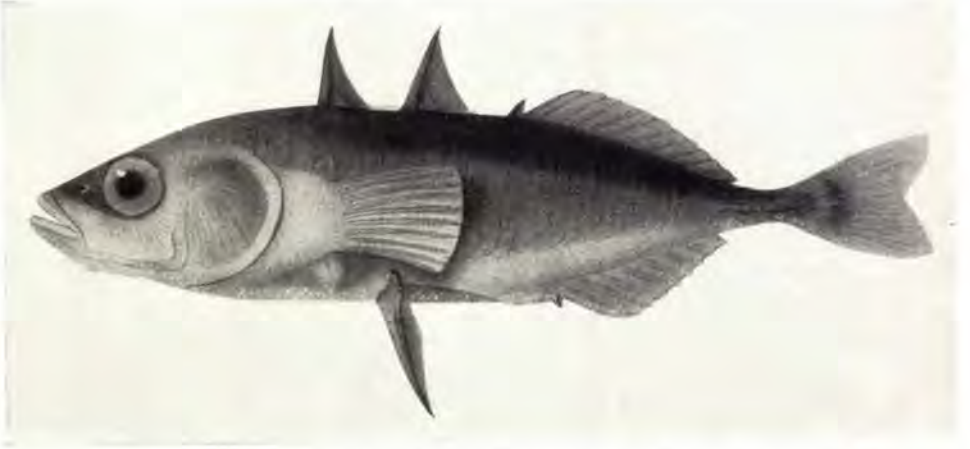


FIGURE 236. Threespine stickleback. *Gasterosteus aculeatus* Linnaeus 1758

Distinguished by the large spines in the dorsal and pelvic fins, the slender caudal peduncle and the vertical bony plates on the sides of the body.

The threespine stickleback was first recorded from British Columbia waters in 1866 by J. K. Lord as *Gasterosteus serratus* and *G. concinnus*, without definite locality stated. The first locality record was that of a specimen taken in June, 1882, near Duncan Bay, collected by Captain H. E. Nichols and recorded in 1883 by T. H. Bean as *Gasterosteus cataphractus* Pallas. The species is common along the whole coast and in the various streams and lakes. It occurs frequently in small schools, particularly in eelgrass and around wharves. The habit of remaining stationary with the tail bent is a characteristic posture. Specimens have been found in the stomachs of furseals obtained 20 miles off the west coast of Vancouver Island. That large numbers may occur in off-shore waters is indicated by the fact that in a 10-minute surface tow with a 3-foot trawl in the Gulf of Alaska over 4000 specimens were obtained. One individual, entirely bluish black in colour, was taken in July, 1941, in northern British Columbia at Laredo Inlet in a herring seine at a depth of 15 fathoms. The spawning activities of this fish in fresh water are of interest in that the male constructs a rather elaborate nest, induces one or more females to spawn therein and then guards the nest and its eggs until the fry have left to forage for themselves. The classic description of these activities is to be found in *The Naturalist in Vancouver Island and British Columbia*, by J. K.

Lord, published in 1866. The food of this stickleback in the sea consists largely of small crustaceans but in fresh water aquatic insects are taken in addition. In spite of the spines, the stickleback is eaten readily by other fishes and waterfowl.

Range: Southern California to Bering Sea.

Family AULORHYNCHIDAE

Tubesnouts

In the tubesnouts the body is elongate, slender and almost cylindrical with a slender caudal peduncle. The head is prolonged into a peculiar snout with a very small mouth at the end and a hinged upper jaw. There are 2 dorsal fins, the first represented by free spines, about 25 in number. The body is covered partially with rows of small bony plates.

There is only one species in the family, confined to the northeastern Pacific Ocean.

**Tubesnout**

*Aulorhynchus flavidus* Gill 1861

Body very elongate, slender, terete; caudal peduncle elongate, tapering, depressed. Head elongate; snout elongate, tubular, depressed; mouth terminal, small; lower jaw flattened, projecting beyond upper; premaxillaries enlarged, hinged, freely movable; teeth small, recurved; eye, large. Fins: dorsal (2), about XXV—9 or 10, spinous fin represented by minute, free, sharp spines; rayed fin far back on body; anal, I, 9, spine minute, broad; pelvic, I, 4, thoracic; pectoral, broad, truncate; caudal, furcate. Lateral line: straight. Plates: small, bony embedded; in series along mid-dorsal line; in series along lateral line; in paired series along mid-ventral line on caudal peduncle. Colour: usually pale mottled brown, varying from olive green to yellow brown on dorsal surface; pale creamy white on ventral surface.

Length to 6½ inches.



FIGURE 237. Tubesnout. *Aulorhynchus flavidus* Gill 1861

Distinguished by the very elongate terete body, the prolonged tubular snout with the small mouth at the tip and the numerous minute free spines preceding the rayed dorsal fin.

The tubesnout was first recorded from British Columbia waters in 1866 without date or locality by J. K. Lord as *Gasterosteus spinachia*. The first definite locality record is that of a specimen 5½ inches in length taken on May 12, 1893,

in the Queen Charlotte Islands at Massett by Mr J. H. Keen and recorded in 1920 by B. A. Bean and A. C. Weed. The species is common in the Strait of Georgia and has been reported from the west coast of Vancouver Island. The tubesnout is a common shore fish, often appearing in small schools at the surface of the water around wharves, swimming slowly with fins moving rapidly and jaws snapping constantly. It is obtained frequently with the pipefish in shore seines, especially around eel grass beds. The food consists of small plankton crustaceans. The AFS/ASIH committee's spelling is tube-snout.

Range: Southern California to southeastern Alaska.

### Suborder SYNGNATHOIDEA

In this suborder the body usually is elongate. The snout is prolonged into a more or less elongate and tube-like "beak" at the extreme end of which is a small mouth. Teeth usually are absent and when present are exceedingly small.

Six families comprise the suborder, all of which are found in tropical or temperate seas, generally living near the shore and sometimes entering fresh water. Only one of these, the Syngnathidae, is represented in British Columbia waters and comprises the pipefishes and seahorses.

#### Family SYNGNATHIDAE

#### Pipefishes

In the pipefishes the body is elongate, slender and is enclosed in an armour of bony plates which form a series of encircling rings. There is a single rayed dorsal fin; the pelvic fins are absent.

The pipefishes, and seahorses swim in a more or less upright position, propelling themselves partly by the dorsal fin and partly by wriggling movements of the body. The care of the eggs and also of the fry is undertaken by the male.

#### Pipefish

*Syngnathus griseolineatus* Ayres 1854

Body elongate, very slender, subcylindrical, 6-angled anteriorly, 4-angled posteriorly. Head elongate; snout elongate, tubular, almost cylindrical, slightly longer in female; mouth terminal, small; upper and lower jaws united by membrane; teeth, absent. Sexes very different in appearance; in female; body anterior to anus moderately stout of slightly greater length than that of male, posterior to anus slender and tapering to origin of caudal fin; in male, body posterior to anus expanded into pair of lateral folds forming longitudinal brood pouch, about one-third of total body length, edges of folds meeting on midline below. Fins: dorsal (1), 36 to 41, short, approximately at middle of body in female, slightly forward in male; anal, minute in female, immediately behind anus, absent in male; pelvic, absent; pectoral, small; caudal, small, fan-shaped. Lateral line: absent. Bony plates

on body: in rows, 6 anteriorly (dorsal, 1, ventral, 1, lateral, 4), 4 posteriorly, lateral. Colour: variable, from pale olive green to dark green or brown, according to environment; frequently pale olive green with narrow horizontal gray lines.

Length to 13 inches in female, slightly less in males.



FIGURE 238. Pipefish. *Syngnathus griseolineatus* Ayres 1854

Distinguished by the elongate, subcylindrical, angular body enclosed in bony plates, the tubular mouth and snout and the absence of pelvic fins.

The pipefish was first recorded from British Columbia waters in 1866 by J. K. Lord as *Syngnathus arundinaceus*. The first definite locality record is that of a specimen taken in 1885 in the Strait of Georgia by Dr G. M. Dawson and recorded in 1887 by J. F. Whiteaves as *Siphostoma Californiense* (evidently a misprint for *californiense*). The pipefish is very common in the Strait of Georgia and has been recorded from the west coast of Vancouver Island, Loughborough Inlet and the Queen Charlotte Islands. Occurring along the shores, amongst eel grass and about wharves, it swims slowly in a jerky manner often maintaining an almost vertical position in the water. The reproductive period is in the spring. The female transfers the fertilized eggs to the brood pouch of the male where they are incubated and the young remain therein until they reach a length of about  $\frac{3}{4}$  inch. Males, have been found carrying eggs as early as May 26, and young as late as August. The food consists largely of small crustaceans and is taken into the tubular mouth by a sucking movement accompanied by an inflation of the cheeks. The name recommended by the AFS/ASIH committee is bay pipefish.

Range: Southern California to southeastern Alaska.

#### Suborder GOBIOIDEA

The fishes in this suborder have an elongate, somewhat stout body. The head is depressed. The mouth is large with protractile premaxillaries. The eyes are small, high on the head. The lateral line is absent. The spinous dorsal fin, when present, is small, composed of not more than 8 flexible spines; the anal fin is similar to the rayed dorsal fin; the pelvic fins are thoracic; the caudal fin usually is rounded or slightly pointed.

About 600 species have been described. Only one family is represented in British Columbia waters.

In the gobies the pelvic fins usually are united to form a flaring cone free from the body. The gill openings are small.

The gobies are, for the most part, small bottom-living fishes of shallow coastal waters including estuaries, lagoons and fresh waters in the tropics. However, some species extend into the marine temperate waters.

They inhabit muddy or sandy areas where they lie with the head upraised due to the weight of the body being supported by the pelvic and caudal fins. Frequently they are almost completely buried with only the highly placed eyes visible but their presence may be detected by sudden spurts of water ejected forcefully backward through the small gill openings.

Five species have been recorded from British Columbia waters but there is considerable doubt as to the validity of the occurrences of *Quietula y-cauda* and *Gillichthys mirabilis*. These two species are omitted from this account for the following reasons: (1) there is much confusion in the records: (2) the species are southern in distribution and have not been taken north of southern California; (3) it is very likely that the former has been confused with *Coryphopterus nicholsii* and the latter with *Clevelandia ios*.

### Crested goby

*Coryphopterus nicholsii* (Bean) 1881

Body elongate, moderately stout, depth 5 to 5.25 in standard length, slightly compressed. Head moderate; mouth terminal, small; maxillary not reaching to point below anterior margin of eye; eye large, diameter 3 to 4 in length of head; crest on head dorsal, median, from slightly behind eyes to origin of spinous dorsal fin. Fins: dorsal (2), VI or VII—12 to 14; anal, 11 or 12; pelvic, thoracic, united, forming hollow cone free from body; caudal, rounded. Lateral line: absent. Scales: cycloid, large; on head none; in oblique rows above midline of body, 25 to 28. Colour: pale orange olive, irregularly streaked horizontally with purplish brown, promiscuously flecked with metallic green; iridescent stripe below eye, faint; pale



FIGURE 239. Crested goby. *Coryphopterus nicholsii* (Bean) 1811



yellow, barred with fine wavy vertical orange lines on vertical fins; jet black on tips of first 5 spines and membranes of spinous dorsal fins; white margin on tips of rayed dorsal, anal and caudal fins; black on pelvic fins except at bases.

Length to  $4\frac{3}{4}$  inches.

Distinguished by the fleshy crest on top of the head from behind the eyes to the origin of the spinous dorsal fin, the 25 to 28 large scales in oblique rows above the midline of the body, the black area on the spinous dorsal fin and the black pelvic fins with pale bases.

The crested goby was first taken on July 26, 1881, in Departure Bay by Captain H. E. Nichols of the United States Coast and Geodetic Survey steamer *Hassler*. It was a specimen  $4\frac{3}{4}$  inches in length, obtained at a depth of 20 fathoms and was described in the same year by T. H. Bean as the type of a new species, *Gobius Nicholsii*, in honour of its discoverer who took a great interest in natural history. The individual was deposited in the United States National Museum. Since then over a dozen specimens have been secured in Departure Bay. A few individuals also have been taken in English and Nanoose Bays, in Barkley Sound at Ucluelet and in Esperanza Inlet on the west coast of Vancouver Island, and on June 12, 1935, a specimen was dredged from Skidegate Channel, Queen Charlotte Islands. Nothing is known of the life history but all specimens taken in British Columbia have been from 20 fathoms or less. It was recorded in 1946 by Clemens and Wilby as *Rhinogobiops nicholsii* (Bean), the large-scaled goby; the AFS/ASIH committee recommends bluespot goby.

Range: Southern California to Queen Charlotte Islands.

#### Finescale goby

*Lepidogobius lepidus* (Girard) 1854

Body elongate, slender, terete, depth about 7 in standard length. Head small subconical; mouth terminal, moderate; maxillary reaching to point below pupil of eye; eye large, diameter about 4 in length of head; no crest on top of head. Fins: dorsal (2), VII—16 to 18; anal, 15 or 16; pelvic, thoracic, united, forming hollow cone free from body; caudal, rounded. Lateral line: absent. Scales: cycloid, very small; covering body and head; in oblique rows above midline of body, about 86.



FIGURE 240. Finescale goby. *Lepidogobius lepidus* (Girard) 1854

Colour: pale olive green, somewhat mottled with brown on dorsal surface, rayed dorsal, anal and caudal fins; dusky to black on ventral surface of head and on tips of fins.

Length to 4 inches.

Distinguished by the elongate terete body, the conical head, the 86 or so small scales in oblique rows above the midline of the body, and the dusky to black coloration on the tips of the fins.

The finescale goby was first recorded from British Columbia waters in 1881, from Victoria, by D. S. Jordan and C. H. Gilbert from a single specimen 4 inches in length as *Lepidogobius gracilis* (Girard). It has been taken at Esquimalt, in Burrard Inlet, Howe and Baynes Sounds and near Comox. The finescale goby inhabits muddy bottoms from shallow water down to 30 fathoms. The AFS/ASIH committee recommends the name bay goby.

Range: Southern California to Vancouver Island.

### Arrow goby

*Clevelandia ios* (Jordan and Gilbert) 1882

Body elongate, slender, depth 6 to 7 in standard length, somewhat compressed. Head long; mouth terminal, large; maxillary reaching to point far behind eye; eye small, diameter about 6.5 in length of head; no crest on top of head. Fins: dorsal (2), IV or V—15 to 17; anal, 14 to 17; pelvic, thoracic, large, united, forming hollow cone free from body; caudal, rounded. Lateral line: absent. Scales: cycloid, very small; in oblique rows above midline of body, about 70. Colour: gray to pale, light olive green to tawny, black spotting promiscuous, fine; light orange spots minute, scattered over body without pattern, on dorsal, pectoral and caudal fins forming irregular bars; bright iridescent green spots scattered over body; shining iridescent white opaque spots on sides of body and head; in male, black band on anal fin conspicuous.

Length to 2 inches.



FIGURE 241. Arrow goby. *Clevelandia ios* (Jordan and Gilbert) 1882

Distinguished by the slender body, the maxillary extending about two-thirds on the length of the head and the bright iridescent spots on the body and the head.

The arrow goby was first taken in British Columbia waters in June, 1880, in Saanich Arm, when a specimen 2 inches in length was obtained from the stomach of a whitespotted greenling, *Hexagrammos stelleri* (recorded as *Hexagrammus asper*), recorded in 1882 by D. S. Jordan and C. H. Gilbert as the type of a new species, *Gobiosoma ios*, and deposited in the United States National Museum. In recent years it has been secured in Departure and Taylor Bays, from Pender Harbour and in the vicinity of Victoria where it is found commonly in burrows of the sand shrimp, *Upogebia*. These fish are found over mixtures of sand and mud in shallow water and are so well camouflaged that they are difficult to see except when disturbed. By rapid vibrations of their bodies and gill covers they are able to bury themselves in the sand very quickly. Frequently their presence can be detected by the two spurts of water issuing from behind the gill covers.

Range: Southern California to Strait of Georgia.

### Suborder BLENNIOIDEA

In this suborder the fishes have an elongate slender body which is usually eel-like and compressed. The teeth are small and conical except in the Anarrhichadidae where they are greatly enlarged canines and molars. The dorsal fin is long, usually extending the full length of the body, composed of spines or rays, or both; the number of dorsal and anal spines or rays corresponds to the number of vertebrae; the pelvic fins, when present, are thoracic, with or without 1 spine and 5 rays or fewer.

In British Columbia waters there are represented 10 families, such as kelpfishes, ronquils, wolffishes, quillfishes, pricklebacks and others.

#### Family CLINIDAE

#### Kelpfishes

In the kelpfishes the gill membranes are united and free from the isthmus. The lateral line is well developed, decurved anteriorly, straight posteriorly. The dorsal fin usually has elevated anterior and posterior portions and is spinous except for a few rays posteriorly; the vertical fins are not confluent; the pelvic fins are thoracic, with 1 spine and 3 or 4 rays.

The kelpfishes are small colourful tidepool fishes of tropical and temperate shores, represented by 2 species in British Columbia waters.

#### Striped kelpfish

*Gibbonsia metzi* Hubbs 1927

Body elongate, moderately stout, compressed. Head short, pointed; mouth terminal, small; teeth on jaws, small; gill membranes united, free from isthmus. Fins: dorsal (1), XXIV to XXVII, 7 to 9 (usually 8 or 9), long, first 3 anterior spines closely approximated, high, decreasing in height posteriorly, forming shallow notch with remainder of fin, posterior spines little elevated, last spine about half height of first ray, rays evenly spaced; anal, II, 24 to 27; pelvic, I, 3, thoracic; caudal,

rounded. Lateral line: decurved then straight. Scales: cycloid, minute. Cirri: 2, small, one over each eye; on tips of dorsal spines, minute. Colour: red or brown, weakly striped with darker shades.

Length to  $5\frac{1}{2}$  inches.



FIGURE 242. Striped kelpfish. *Gibbonsia metzi* Hubbs 1927

Distinguished by the elongate dorsal fin with the anterior part of the spinous portion and the rayed portion elevated, the first 3 anterior spines closely approximated, the last spine approximately half the height of the first ray, and the absence of ocelli.

The striped kelpfish was first taken in British Columbia waters in July, 1909, at Ucluelet by Messrs C. H. Young and W. Spreadborough and distinguished in 1920 by B. A. Bean and A. C. Weed as different from *Gibbonsia evides*, without, the application of a name. Fourteen specimens were obtained. In 1927, C. L. Hubbs pointed out that this second species was actually a new species, which he named *Gibbonsia metzi*. On July 10, 1934, two other specimens were obtained on Nookta Island at Maquinna Point in a beach seine and recorded in 1936 by L. P. Schultz and A. C. DeLacy. This species inhabits shallow water, usually in tidepools.

Range: Southern California to Vancouver Island.

### **Crevice kelpfish**

*Gibbonsia montereyensis* Hubbs 1927

Body elongate, moderately stout, compressed. Head short, pointed; mouth terminal, small; teeth on jaws small; gill membranes united, free from isthmus. Fins: dorsal (1), XXXIV to XXXVI, 5 to 8 (usually 6 or 7), long, first 4 or 5 anterior spines evenly spaced, high, decreasing in height posteriorly, forming shallow notch with remainder of fin, posterior spines gradually increasing in height posteriorly to height of first ray, rays crowded anteriorly, more widely spaced posteriorly; anal, II, 23 to 28; pelvic, I, 3, thoracic; caudal, rounded. Lateral line; decurved, then straight. Scales: cycloid, minute. Cirri: 2, small, one over each

eye; on tips of dorsal spines, minute. Colour: variable, red, brown or frequently intense lavender, variously spotted, usually with two well developed brownish black ocelli, one above the base of each pectoral fin.

Length to 4 inches.



FIGURE 243. Crevice kelpfish. *Gibbonsia montereyensis* Hubbs 1927

Distinguished by the elongate dorsal fin with the anterior part of the spinous portion and the rayed portion elevated, the first 4 or 5 anterior spines evenly spaced, the last spine approximately the same height as the first ray and the 2 brownish black ocelli, one on each side of the body.

The crevice kelpfish was first taken in British Columbia waters in July, 1909, at Ucluelet, by Messrs C. H. Young and W. Spreadborough and the 38 specimens obtained were recorded in 1920 by B. A. Bean and A. C. Weed as *Gibbonsia evides* (Jordan and Gilbert). In 1927, C. L. Hubbs re-examined the collection and designated one of the specimens as a paratype of his new subspecies *Gibbonsia elegans montereyensis*; this name was used in 1946 by Clemens and Wilby. In 1952, Clark Hubbs, in a revision of the species of the genus *Gibbonsia*, designated the subspecies as *Gibbonsia montereyensis vulgaris*. This is a kelpfish inhabiting tidepools. The species was called the spotted kelp-fish by Clemens and Wilby in 1946.

Range: Southern California to Vancouver Island.

#### Family BATHYMASTERIDAE

#### Ronquils

In the ronquils the body is elongate with small cycloid or ctenoid scales. The lateral line is high and straight. The head is subconic, well supplied with mucous pores. The dorsal fin is long, composed of rays, the anterior of which are entire, the remainder branched; the anal fin is long, supported by rays only; the pectoral fins are broad and rounded; the pelvic fins are thoracic, each with 1 spine and 5 rays.

The members of this family are bottom-living fishes of moderate depths. The 2 species recorded herein are of northern distribution.

## Ronquil

*Ronquilus jordani* (Gilbert) 1888

Body elongate, rounded anteriorly. Head subconic; mouth terminal, moderate; maxillary extending to point approximately below anterior margin of pupil; eye large, high; gill membranes separate, slightly joined anteriorly to isthmus; in male, puffy crest from snout to dorsal fin, conspicuous in breeding season. Fins: dorsal (1), 41 to 48, long, high, first 20 to 30 rays entire, remainder branched; anal, 31 to 34; pelvic, I, 5, thoracic; pectoral, about 18, rounded; caudal, rounded. Lateral line: high, almost straight. Scales: cycloid; absent from fins; on cheek below and behind eye, numerous, minute. Pores: on lateral line, about 93, exposed; on head numerous, not conspicuous, none elevated. Colour of male: orange on dorsal surface; dull olive green on ventral surface; yellow longitudinal lines below lateral line, 2, or more, fine; golden bar below eye, another across middle of cheeks; jet black behind eye; black saddle across occiput extending onto opercle; dusky blotch on anterior of dorsal fin, small; black, margined with yellow, on dorsal and caudal fins; iridescent light blue, margined with black on anal fin with golden spots at base (these colours particularly brilliant in breeding season); black entirely on pelvic fins; yellow on upper half, black on lower half of pectoral fins. Colour of female: olive green on dorsal surface; lighter on ventral surface; yellow longitudinal lines on sides as in male; somewhat red on occiput; dusky blotch on anterior of dorsal fin as in male; bright orange on tips of dorsal and caudal fins; pale light blue, margined with brown, on anal fin; white on pelvic fins.

Length to 6 $\frac{3}{4}$  inches.

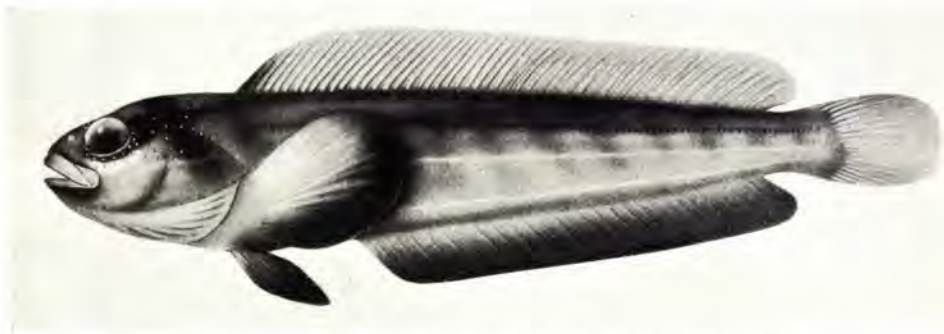


FIGURE 244. Ronquil. *Ronquilus jordani* (Gilbert) 1888

Distinguished by the first 20 to 30 rays in the dorsal fin entire and the remainder branched, the cycloid scales, the minute scales on the cheeks and the inconspicuous pores on the head.

The ronquil was first taken in British Columbia waters on September 4, 1891, east of Victoria by the *Albatross*, station 3465, Lat. 48° 21' N, Long. 123° 14' W, depth 48 fathoms, and recorded in 1895 by C. H. Gilbert as *Bathymaster jordani* Gilbert. Apparently it is fairly common along the whole coast and has been cap-

ured in the Strait of Georgia, off the west coast of Vancouver Island west of Vargas Island at a depth of 24 fathoms, at Fort Rupert (northeastern end of Vancouver Island) and northward to Prince Rupert at various depths down to 90 fathoms. Shrimp trawlers frequently secure individuals in Burrard Inlet at depths between 10 and 20 fathoms. Females with fully developed salmon-coloured eggs have been taken early in March and at this time the males were in full breeding colours. The name recommended by the AFS/ASIH committees is northern ronquil.

Range: California to Bering Sea.

### Searcher

*Bathymaster signatus* Cope 1873

Body elongate, moderately compressed. Head subconic; mouth terminal, large; maxillary extending to point below posterior margin of pupil; eye high; gill membranes separate, slightly joined anteriorly to isthmus. Fins: dorsal (1), about 47, long, high, first 3 or 4 rays entire, remainder branched; anal, 32 to 34; pelvic, I, 5, thoracic; pectoral, about 21, rounded; caudal, truncate to rounded. Lateral line: high, almost straight. Scales: ctenoid; extending onto dorsal and pectoral fins about half length of rays; absent from cheek. Pores: on lateral line, about 100, each covered with fleshy flap; on head, numerous, large, mostly elevated, some with dermal flap. Colour: brown on dorsal surface with black markings; lighter on ventral surface with yellow to orange streaks; yellow on head in some areas; yellow mottlings on fins; black blotch on anterior of dorsal fin conspicuous, extending backward to fourth or fifth ray; dusky on pelvic and anal fins; somewhat dusky on other fins; blue on eyes.

Length to 12 inches.

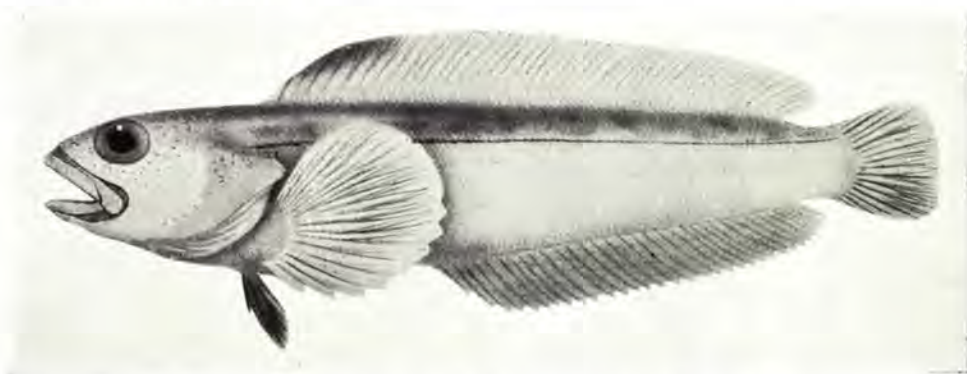


FIGURE 245. Searcher. *Bathymaster signatus* Cope 1873

Distinguished by the first 3 or 4 rays in the dorsal fin entire and the remainder branched, the prominent elevated pores on the head, the ctenoid scales and the absence of scales from the cheeks.

The searcher was first taken in British Columbia waters in June, 1882, north

of Milbanke Sound at Carter Bay, by Captain H. E. Nichols and recorded in 1883 by T. H. Bean. A second specimen, a male 9¼ inches in total length, was obtained on August 15, 1924, off the west coast of the Queen Charlotte Islands by Captain A. M. Henderson of the fisheries Patrol Service and is now in the collection of the Biological Station at Nanaimo. The searcher appears to be a fish of northern distribution.

Range: Washington to Bering Sea.

Family ANARRHICHADIDAE

Wolfishes

In the wolfishes the gill membranes are broadly attached to the isthmus. There is no lateral line. The dorsal fin is composed of spines only; the pelvic fins are absent.

The wolfishes are large fishes of northern seas, inhabiting waters of moderate depths. They have a remarkable development of grasping and grinding teeth which enable them to prey upon fishes and crush the hard outer coverings of various invertebrates.

**Wolf-eel**

*Anarrhichthys ocellatus* Ayres 1855

Body greatly elongate, compressed. Head deep, compressed; mouth terminal, large; lips thick; teeth on anterior of each jaw, 4 to 6, very strong conical canines, on sides of lower jaw strong molars, on vomer in two series, on palatines molars in two series meeting lateral series of lower jaw; in juveniles all conical; snout short, blunt; eye, small; gill membranes broadly joined to isthmus. Fins: dorsal (1), CCXXVIII to CCL, long, continuous to posterior end of body, low; anal, 200 to 233, long, continuous to posterior end of body; pelvic, absent; caudal, slender, pointed, separated from dorsal and anal fins by slight notch. Lateral line: absent. Scales: cycloid, minute, embedded in skin. Colour: gray, brown or dark green; sometimes orange in young; black spots round, ocellate, of various sizes, everywhere covering body and dorsal fin; pale on anal fin.

Length to 8 feet.



FIGURE 246. Wolf-eel. *Anarrhichthys ocellatus* Ayres 1855

Distinguished by the absence of pelvic fins, the extremely elongate body, the large canine and molar teeth, the dorsal and anal fins extending to the posterior end of the body, the slender caudal fin separated from the dorsal and anal fins by slight notches and the gray, brown or green coloration with the large ocellated black spots.



The wolf-eel was first taken in British Columbia waters in 1894 in Juan de Fuca Strait near Race Rocks when 2 specimens were obtained, placed in the Provincial Museum, and recorded in 1898 by J. Fannin. The species is caught rather frequently along the coast in salmon traps, seines and occasionally on hook and line, probably accidentally. The records are from the Strait of Georgia, Kyuquot and Hecate Strait. The Kyuquot specimen, a young individual about 16½ inches in length, was removed from the stomach of a salmon. In the spring and summer months of 1940, four individuals from the west coast of Vancouver Island were on exhibition at the English Bay Aquarium. The food consists of crustaceans, sea-urchins, mussels, clams and other hard-shelled invertebrates as well as fishes. That the wolf-eel will attack other fishes is shown by the fact that an individual about 4 feet in length was observed to make a violent attack upon a lingcod slightly smaller than itself in an exhibition tank at the English Bay Aquarium. It seized the lingcod by the middle of the back, tearing the skin and flesh so that the victim died as a result of its injuries. In June, 1959, at the Vancouver Public Aquarium a wolf-eel was being fed crabs as part of its meal. Swimming slowly behind the crab it opened its mouth and engulfed the carapace of its victim, neatly shearing off the chelipeds and legs, showing no interest in these parts.

Range: Southern California to Gulf of Alaska.

#### Family PTLICHTHYIDAE

#### Quillfishes

In the quillfishes the body is extremely elongate, tapering gradually to a short free fleshy portion. The gill membranes are united and free from the isthmus. The lateral line is absent. Scales are absent. The dorsal fin is low and spinous anteriorly, high and rayed posteriorly; the pelvic and caudal fins are absent.

The family includes a single species which occurs in the northeastern Pacific Ocean.

#### Quillfish

*Ptilichthys goodei* Bean 1881

Body extremely elongate, slender, tapering gradually posteriorly, ending in short free fleshy portion beyond attenuated vertebral column. Head small; mouth terminal, small; lower jaw greatly projecting to form fleshy tip; teeth on jaws closely set, sharp; gill membranes broadly united, free from isthmus. Fins: dorsal (1), XC, 137 to 145, very long, beginning close behind nape, anterior portion for about half body length composed of very low stiff fins, tips free, hooked, posterior portion of fin much higher, rays slender, unsegmented, unbranched, connected by membranes; anal, 185 to 196, very long, high, rays slender, unsegmented, unbranched; pelvic, absent; caudal, absent. Lateral line: absent. Scales: absent. Colour: amber green, yellow or orange; dark longitudinal strip on each side of body on some specimens.

Length to 13½ inches.

Distinguished by the extremely elongate body ending in a free fleshy portion beyond the attenuated vertebral column, the protruding lower jaw with the fleshy tip, the free hooked tips of the spines in the anterior portion of the dorsal fin and the absence of pelvic and caudal fins.



FIGURE 247. Quillfish. *Ptilichthys goodii* Bean 1881

The quillfish was first taken in British Columbia waters in August, 1925, off the Nass River at Haystack Island in a salmon trap by Dr H. C. Williamson who recorded it in 1927. The species has since been secured on July 8, 1928, off Porlier Pass in Trincomali Channel in a beam trawl; on July 13, 1935, at Flamingo Inlet in a dip net; and on June 7, 1956, at Kyuquot. One individual is known from the stomach of a coho salmon caught on August 18, 1956, off the west coast of Vancouver Island. Little is known of the life history. These fish may be attracted at night to bright lights suspended over the water, toward which they slowly swim with snakelike undulations. Upon alarm they dart away swiftly. The majority of known specimens have been obtained at the surface.

Range: Washington to Bering Sea.

#### Family STICHAEIDAE

#### Pricklebacks

In the pricklebacks the gill membranes are united and either free from or joined to the isthmus. The lateral line is faint, incomplete or absent but in some species without pelvic fins there may be 4 lateral lines with many vertical branches. The dorsal fin is supported by spines only; the vertical fins frequently are confluent, or nearly so; the pelvic fins when present, are thoracic with 1 spine and 3 or 4 rays. Scales, when present may be found either covering the body or only the posterior portion in some species.

The pricklebacks usually inhabit the cold waters. They occur from the intertidal area to depths of at least 200 fathoms and are bottom dwellers.

The prickleback family, Stichaeidae, now includes the species formerly grouped in the families Xiphisteridae, the belted blennies, and Lumpenidae, the eel-blennies.

#### Whitebarred prickleback

*Poroclinus rothrocki* Bean 1890

Body elongate, slender, compressed. Head short; mouth terminal, small; lower jaw included; teeth small on jaws, vomer and palatines; snout short; eye large; gill membranes united, joined to isthmus anteriorly, without free fold posteriorly. Fins: dorsal (1), LVII to LXVII, membrane of last spine slightly joined to base of uppermost ray of caudal; anal, III, 40 to 44, second spine longer and stronger

than third, free from caudal; pelvic, I, 3, thoracic, spine short, sharp, rays relatively long; pectoral, broad, rounded; caudal, pointed. Lateral line: faint, straight. Scales: cycloid, small; covering body and cheeks. Colour: light brown on dorsal surface; white on ventral surface; white vertical bars margined with brown in series on each side of body above lateral line, 10 to 12, confluent with white of ventral surface; pale cream on lining of mouth.

Length to 10 inches.



FIGURE 248. Whitebarred prickleback. *Poroclinus rothrocki* Bean 1890

Distinguished by the pelvic fins each with 1 spine and 3 long rays, the gill membranes joined to the isthmus anteriorly without a free fold posteriorly, the anal fin with 3 spines and the white vertical bars along the sides of the body.

The whitebarred prickleback was first taken on April 6, 1929 in Burrard Inlet at Deep Cove, by Dr A. A. Berkeley Needler who obtained one specimen from a shrimp trawl operating at a depth of probably 50 fathoms or more. Other individuals have been secured as follows: one June 10, 1935, in Rennel Sound, Queen Charlotte Islands, at a depth between 60 and 70 fathoms; two in 1939, near Porlier Pass in an otter trawl at a depth of about 25 fathoms; and three in 1941, in shrimp trawls in Burrard Inlet. It was called the white-barred blenny in 1946 by Clemens and Wilby, and this name is recommended, without the hyphen, by the AFS/ASIH committee.

Range: Southern California to Bering Sea.

#### **Longsnout prickleback**

*Lumpenella longirostris* (Evermann and  
Goldsborough) 1907

Body elongate, slender, compressed. Head short; mouth terminal, small; lower jaw included; teeth small on jaws, absent from vomer and palatines; snout long; cheek somewhat inflated; gill membranes united, joined to isthmus anteriorly, without free fold posteriorly. Fins: dorsal (1), LXI to LXXI, spines stiff; tips exposed, free from caudal; anal, III to V, 36 to 42, free from caudal; pelvic, I, thoracic, small, spine short, length about half that of rays, sharp; pectoral broad, rounded; caudal, rounded. Lateral line: faint, straight. Scales: cycloid, small; covering body and head. Colour: bluish brown on dorsal surface; silvery to sooty blue on ventral surface; sooty blue on cheeks, opercles and gill membranes; dusky black on lining of mouth. Some preserved specimens lose the brown colours, the sides then show irregular dark blotches on paler ground.

Length to 10 inches.

Distinguished by the long, blunt snout with the included lower jaw, the inflated cheeks, the stiff spines with the naked tips in the long dorsal fin, the anal fin with 3 to 5 spines, the bluish coloration on the body and the blackish coloration on the fins.



FIGURE 249. Longsnout prickleback. *Lumpenella longirostris* (Evermann and Goldsborough) 1907

The longsnout prickleback was first taken in British Columbia waters on January 4, 1929, in Burrard Inlet at Deep Cove, by Dr A. A. Berkeley Needler who obtained 3 individuals in a shrimp trawl at a depth of about 60 fathoms. Various records, consisting of 19 specimens, are from Burrard Inlet near the entrance to the North Arm at depths from 50 to 65 fathoms. The longsnout prickleback is associated in this area with *Bathyagonus nigripinnis*, *Lycodes diapterus* and *Lycodes brevipes*. The species is common in Prince Rupert Harbour. This is a northern form. It was called the long-snouted blenny in 1946 by Clemens and Wilby; the variant longsnout blenny is recommended by the AFS/ASIH committee.

Range: Burrard Inlet to Gulf of Alaska.

### **Y-prickleback**

*Allolumpenus hypochromus* Hubbs and Schultz 1932

Body elongate, slender, somewhat compressed. Head short; mouth terminal, small; lower jaw included; teeth small on jaws, absent from vomer and palatines; gill membranes united, joined to isthmus anteriorly with wide free fold posteriorly. Fins: dorsal (1), XLIV, free from caudal; anal, I, 31, free from caudal; pelvic, I, 3, thoracic; pectoral, large, pointed; caudal, rounded. Lateral line: absent. Scales: cycloid, small, covering entire body; absent from head. Colour: in preservative, light brown with dark markings; black markings on sides of body in irregular series, some forming distinct "Y" 's below midline of body; black dots along base of dorsal fin, 5, in series; black spots at base of caudal fin, 2, conspicuous, black bar connecting upper with lower.

Length to  $2\frac{3}{4}$  inches.

Distinguished by the gill membranes joined to the isthmus anteriorly with a wide free fold posteriorly, the dark "Y"-shaped markings along the sides of the body, the large pelvic fins each with 1 spine and 3 rays, the dorsal fin with 49 spines and the anal fin with 1 spine and 31 rays.

The Y-prickleback is known from a single specimen, taken on August 8, 1927, near Newcastle Island, Departure Bay, at a depth of 20 fathoms. It was described in 1932 as the type of a new species by C. L. Hubbs and L. P. Schultz. This is the only specimen known and is deposited in the collection of fishes at the Biological Station, Nanaimo. It was called the "Y"-blenny in 1946 by Clemens and Wilby, which name is still recommended by the AFS/ASIH committee.

Range: Departure Bay.



FIGURE 250. Y-prickleback. *Allolumpenus hypochromus* Hubbs and Schultz 1932

### Snake prickleback

*Lumpenus sagitta* Wilimovsky 1956

Body greatly elongate, very slender, moderately compressed. Head short; mouth terminal; lower jaw included; teeth small on jaws, absent from vomer and palatines; snout short; gill membranes separate, joined to isthmus anteriorly, without free fold posteriorly. Fins: dorsal (1), LXVI to LXXII free from caudal; anal, I, 45 to 50, spine short, slender, sometimes absent, free from caudal; pelvic, I, 3, or 4, thoracic; pectoral, large, pointed; caudal, rounded. Lateral line: straight. Scales: cycloid, covering entire body and head. Colour: light green on dorsal surface; cream on ventral surface; dark green to brown streaks on sides numerous, short; brownish green short bars and dots on dorsal and caudal fins forming rows and bands; plain on other fins; pale on lining of mouth.

Length to 20 inches.

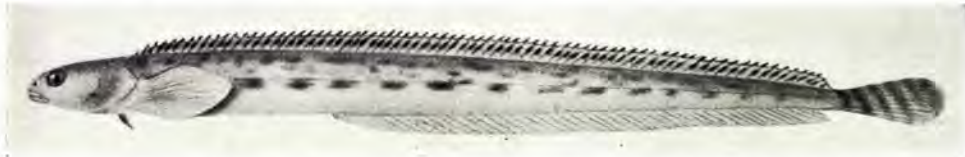


FIGURE 251. Snake prickleback. *Lumpenus sagitta* Wilimovsky 1956

Distinguished by the very elongate body, the gill membranes joined to the isthmus anteriorly without a free fold posteriorly, the anal fin with 1 short spine or none and the short dark streaks along the sides of the body.

The snake prickleback was first taken in British Columbia waters in May, 1882, in Esquimalt Harbour by Captain H. E. Nichols and recorded in 1883 by T. H. Bean as *Lumpenus anguillaris* (Pallas), and so listed in 1946 by Clemens

and Wilby. Apparently it is common along the coast having been captured at Victoria, Ucluelet, Strait of Georgia (including Stuart Channel, English Bay, Burrard Inlet, Howe Sound and Comox), and Massett Inlet, from shallow water to 113 fathoms. It will take marine worms as bait and forms a minor sport fish for children. The species was called the eel-blenny in 1946 by Clemens and Wilby. The name recommended by the AFS/ASIH committee is Pacific snakeblenny.

Range: Northern California to Bering Sea.

### **Black-and-white prickleback**

*Plectobranchus evides* Gilbert 1890

Body elongate, slender, compressed. Head short; mouth terminal, small, lower jaw included; teeth small, conical, on jaws, vomer and palatines; snout short; eye large; gill membranes united, free from isthmus. Fins (1), LVI or LVII, membrane of last spine slightly joined to uppermost ray of caudal fin; anal, II, 34 or 35, free from caudal; pelvic, I, 3, thoracic, spine short, rays long; pectoral, broad, lower rays slightly elongate, exerted; caudal broad, rounded. Lateral line: indistinct, straight. Scales: cycloid, small, covering body and posterior of head. Pores: on head, 1 between and behind eyes, in 2 rows behind eyes, each with 5 pores, at third pore, 3 pores connect 2 rows. Colour: dusky olive brown on dorsal surface; white bars on sides about 25, narrower than interspaces; light brown on ventral surface; on dorsal fin about 15 dark oblique bars sloping downward and backward; black spots on dorsal fin, 2, one near posterior end, one at posterior end.

Length to 5¼ inches.



FIGURE 252. Black-and-white prickleback. *Plectobranchus evides* Gilbert 1890

Distinguished by the pelvic fins each with 1 short spine and 3 long rays, the gill membranes free from the isthmus, the anal fin with 2 spines, the white bars on the sides of the body and the 2 black spots on the posterior end of the dorsal fin.

The black-and-white prickleback was first taken in British Columbia waters on November 15, 1951, by the *Investigator No. 1*, in Ladysmith Harbour, depth 47 fathoms, when 3 specimens were obtained. On June 23, 1954, the shrimp trawler *Yuri M.* obtained a fourth specimen in Tahsis Inlet at a depth of 65 to 71 fathoms on a mud and shell bottom. All these specimens are now in the collection of the Biological Station at Nanaimo; they have been recorded by W. E. Barraclough in 1959, using the common name two-spotted prickleback. The name recommended by the AFS/ASIH committee is bluebarred prickleback.

Range: California to northern British Columbia.

## Decorated prickleback

*Chirolophis polyactocephalus* (Pallas) 1811

Body elongate, moderately slender, compressed. Head short, blunt; mouth terminal, small, oblique; lips thick; teeth on jaws, small; gill membranes united, free from isthmus; gill filaments thin, platelike, bearing on each side series of numerous leaflets. Fins: dorsal (1), LXI or LXII, slightly joined to caudal; anal, I, 44 to 61, free from caudal; pelvic, I, 4, thoracic; caudal, rounded. Lateral line: shorter than length of pectoral fin; pores, 6 to 15. Scales: cycloid, small, embedded. Cirri: numerous, high, plumose, fleshy, covering top of head, extending backward to first 4 to 8 spines of dorsal fin. Colour: pale brown, with white to cream markings; light areas on upper half of body, irregular to almost pentagonal with dark centres; white bars in series on lower half of body; dark band extending downward from eye to lower margin of cheek, thence backward, prominent; black bars on dorsal, anal and caudal fins prominent, on pectoral fins, faint; on pelvic fins, dusky white.

Length to 16½ inches.



FIGURE 253. Decorated prickleback. *Chirolophis polyactocephalus* (Pallas) 1811

Distinguished by the numerous plumose cirri on the top of the head and extending onto the first 4 to 8 spines of the dorsal fin, the anal fin with 1 spine and 44 to 61 rays and the general coloration.

The decorated prickleback was first taken in British Columbia waters in November, 1890, at Alert Bay, by Mr Spencer. This was a specimen 14½ inches in length, deposited in the provincial Museum at Victoria and recorded in 1891 by Ashdown Green as *Chirolophus polyactocephalus*. In 1903, D. S. Jordan and J. O. Snyder described a new species as *Bryostemma decoratum* and expressed the opinion that all specimens previously referred to as *Chirolophus* or *Bryostemma polyactocephalus*, taken on the northeastern shores of the Pacific Ocean, should be considered as *Bryostemma decoratum*. In 1942, P. J. Schmidt pointed out that the structure of the gill filaments of this species was of the nature of that described by Swainson for the genus *Chirolophis*, hence the scientific name should be *Chirolophis polyactocephalus* (Pallas). Individuals have been secured in the following localities: Juan de Fuca Strait, English Bay, Burrard Inlet, Stuart Island,

Alert Bay and Prince Rupert Harbour. The species has been secured at depths ranging from 10 to 50 fathoms. It was called the decorated blenny in 1946 by Clemens and Wilby, which name is still recommended by the AFS/ASIH committee.

Range: Washington to Bering Sea.

**Mosshead prickleback**

*Chirolophis nugator* (Jordan and Williams) 1895

Body elongate, moderately slender, compressed. Head short, blunt; mouth terminal, small, oblique; lips thick; teeth on jaws, small; gill membranes united, free from isthmus; gill filaments thin, plate-like, bearing on each side series of numerous leaflets. Fins: dorsal (1), LIII to LV, slightly joined to caudal; anal, I, 37 to 42, free from caudal; pelvic, I, 4, thoracic; caudal, rounded. Lateral line: shorter than length of pectoral fin; pores about 10. Scales: cycloid, small, embedded. Cirri: numerous, low, slender, fleshy, covering head, extending backward to first spine of dorsal fin. Colour of male: brown, sometimes with reddish tinge, variable; pale cross bars in series on lower half of body, lighter markings fainter on upper half; light on lower part of head with numerous brown streaks; black spots margined with yellow rings (ocelli), on dorsal fin, 12 or 13, conspicuous; white on pelvic fins; brownish dots in rows forming bars on other fins. Colour of female: nearly plain brown on body; dark bars on dorsal fin instead of ocelli as in male.

Length to 4 $\frac{1}{2}$  inches.



FIGURE 254. Mosshead prickleback. *Chirolophis nugator* (Jordan and Williams) 1895

Distinguished by the cirri on the top of the head and extending only onto the first spine of the dorsal fin, the anal fin with 1 spine and 37 to 42 rays, the numerous narrow brown streaks on the lower part of the head, and the ocelli on the dorsal fin of the male.

The mosshead prickleback was first taken in British Columbia waters on April 20, 1912, at Snake Island near Departure Bay. This was a small male specimen and it is now in the fish collection of the Biological Station at Nanaimo. Four other individuals were obtained in May, 1934, south of Nanaimo on the reef at False Narrows. All these specimens were labelled *Bryostemma nugator*. An



examination of the gill filaments disclosed the fact that their structure was similar to that of *Chirolophis polyactcephalus*, therefore the genus should be *Chirolophis* instead of *Bryostemma*. This is a small species found under rocks in the intertidal zone. It is strikingly marked and one of the handsomest of the pricklebacks. It was called the ornamented blenny in 1946 by Clemens and Wilby.

Range: Northern California to Strait of Georgia.

### Cockscomb prickleback

*Anoplarchus purpurescens* Gill 1861

Body elongate, slender, compressed. Head small; mouth terminal, moderate, oblique; lower jaw included; lips fleshy; teeth; on jaws, small, conical; on vomer and palatines minute, in bands; crest on top of head fleshy; gill membranes united, joined to isthmus. Fins: dorsal (1), LIV to LX, long, slightly joined to caudal; anal, 35 to 39, free from caudal; pelvic, absent; pectoral, moderately large, length about twice diameter of eye; caudal, rounded. Lateral line: faint, visible as short row of spaced pores. Scales: cycloid, small; on posterior half of body; absent from anterior half. Colour: in male, dark gray, purple or black, sometimes bright red; bright red to orange on anal fin; in female, gray variously marked with brownish gray reticulations and spots; dull gray on anal fin; in both sexes, black bar obliquely downward and backward from eye across preopercle, light bar parallel and above black bar margined with sharp red line; olive green on dorsal fin with 1 to 3 black spots anteriorly; pale gray to white band across caudal peduncle sharply defined.

Length to  $7\frac{1}{4}$  inches.



FIGURE 255. Cockscomb prickleback. *Anoplarchus purpurescens* Gill 1861

Distinguished by the absence of pelvic fins, the presence of a fleshy crest on the top of the head, the scales on the posterior half of the body only and the pale sharply defined band across the base of the caudal fin.

The cockscomb prickleback was first recorded from British Columbia waters in 1861 from Vancouver Island and the mouth of the Fraser River by A. Günther as *Centronotus crista galli*. The specimens were collected by Lieut.-Col. Hawkins during the voyage of H.M.S. *Plumper*. This prickleback is very common along the coast, occurring under rocks in the intertidal zone. Spawning takes place in late winter or early spring. The female deposits the eggs under and between stones in a mass which usually has the form of a truncated cone containing as many as 3,000

eggs and then coils her body about them. The eggs are small, about  $\frac{1}{16}$  inch in diameter, at first white, later becoming gray and showing a yellowish oil globule. The species was called the crested blenny in 1946 by Clemens and Wilby. The AFS/ASIH committee recommends simply cockscomb.

Range: Northern California to Bering Sea.

### **Ribbon prickleback**

*Phytichthys chirus* (Jordan and Gilbert) 1880

Body elongate, slender, compressed. Head small; mouth terminal, small, oblique; teeth on jaws small, conical; gill membranes united, free from isthmus. Fins: dorsal (1), LXIX to LXXVIII, long, low, confluent with caudal; anal, II or III, 40 to 50, confluent with caudal; pelvic; absent; pectoral small, length slightly greater than diameter of eye; caudal, rounded. Lateral lines: 4, vertical branches numerous, lowermost joining that of opposite side anteriorly. Scales: cycloid, small, over entire body. Colour: olive green to olive brown on dorsal surface; yellow to green on ventral surface; frequently with various markings of darker on sides; small white spots on midlateral line, 5 to 7; light and dark streaks diverging backward from eye; green to brown, tinged with yellow, on fins.

Length to 8 inches.



FIGURE 256. Ribbon prickleback. *Phytichthys chirus* (Jordan and Gilbert) 1880

Distinguished by the absence of pelvic fins, the 4 lateral lines on each side of the body and the 2 or 3 spines and 40 to 50 rays in the anal fin.

The ribbon prickleback was first taken in British Columbia waters near the Queen Charlotte Islands by W. H. Osgood who recorded it in 1901 as *Xiphistes chirus*. In June, 1910, a specimen 5½ inches in length was collected in Skidegate Inlet by Mr W. Spreadborough and recorded in 1920 by B. A. Bean and A. C. Weed as *Xiphistes ulvae* Jordan and Straks. The species is common along the entire coast inhabiting the shallow water of the intertidal zone where stones provide lurking places. The food consists largely of red and green algae. It was called the belted blenny in 1946 by Clemens and Wilby.

Range: Southern California to Bering Sea.

### **Rock prickleback**

*Xiphister mucosus* (Girard) 1858

Body elongate, slender, rather deep, compressed. Head small, rather blunt; mouth terminal, small, oblique; teeth on jaws small, conical; gill membranes united, free from isthmus. Distance from tip of snout to origin of dorsal fin about equal

to length of head. Fins: dorsal (1), LXXI to LXXVII, confluent with caudal; anal, 46 to 50, confluent with caudal; pelvic, absent; pectoral minute, length slightly greater than diameter of eye; caudal, rounded. Lateral lines: 4, vertical branches numerous; lowermost joining that of opposite side anteriorly. Scales: cycloid, small, over entire body. Colour: greenish black with several dusky white bars on posterior portion of body; dark bands diverging backward from eye, 2, prominent, pale in centre, margined with black, outside of which sometimes pale streak.

Length to 20 inches.



FIGURE 257. Rock prickleback. *Xiphister mucosus* (Girard) 1858

Distinguished by the absence of pelvic fins, the 4 lateral lines on each side of the body, the absence of spines from the anal fin, the distance from the tip of the snout to the origin of the dorsal fin about equal to length of the head and the dark bands with pale centres diverging from each eye.

The rock prickleback was first recorded from British Columbia waters in 1898 by J. Fanin as *Xiphister mucosus* Girard, based on a specimen in the Provincial Museum. In 1901 F. Steindachner recorded a specimen taken in 1896 or 1897 at Bare Island as *Xiphidion mucosum*. The species was listed in 1901 from the Queen Charlotte Islands by W. H. Osgood as *Xiphidion umcosum* (evidently a misprint for *mucosum*). In 1920 B. A. Bean and A. C. Weed recorded two individuals as taken in 1893 from Vancouver Island by Mr J. Macoun. The rock prickleback is common along the coast, the young being taken frequently beneath rocks in the upper intertidal zone and the adults in the lower intertidal zone at a depth of at least 10 fathoms. It is the largest of the shore pricklebacks. The food consists largely of algae. The species was called the rock blenny in 1946 by Clemens and Wilby, which name is still recommended by the AFS/ASIH committee.

Range: Southern California to southeastern Alaska.

### **Black prickleback**

*Epigeichthys atropurpureus* (Kittlitz) 1858

Body elongate, slender, compressed. Head small, pointed; mouth terminal, small, oblique; teeth on jaws small, conical, outer row somewhat enlarged; gill membranes united, free from isthmus. Distance from tip of snout to origin of dorsal fin  $1\frac{1}{2}$  times length of head. Fins: dorsal (1), LXV to LXXIII, confluent with caudal; anal, 40 to 52, confluent with caudal; pelvic, absent; pectoral, minute,

length slightly less than diameter of eye; caudal, rounded. Lateral lines: 4, vertical branches numerous; lowermost joining that of opposite side anteriorly. Scales: cycloid, small, over entire body. Colour: reddish brown to black; dark to black bands diverging backward from eye, 3, prominent, each conspicuously and sharply margined with narrow white to light olive lines; white bar across base of caudal fin extending onto dorsal and anal fins, prominent.

Length to 12 inches.



FIGURE 258. Black prickleback. *Epigeichthys atropurpureus* (Kittlitz) 1858

Distinguished by the absence of pelvic fins, the 4 lateral lines on each side of the body, the absence of spines from the anal fin, the distance from the tip of the snout to the origin of the dorsal fin  $1\frac{1}{2}$  times the length of the head and the dark bands with narrow white margins diverging from each eye.

The black prickleback was first recorded from British Columbia waters in 1881 by T. H. Bean as *Xiphister rupestris* Jordan and Gilbert, based on a specimen from Vancouver Island collected by Mr S. W. Hewson. In the same year he recorded 2 individuals from the east side of Campbell Island (Port McLaughlin), collected by Captain H. E. Nichols, as *Anoplarchus atropurpureus*. In the following year T. H. Bean recorded the species under the name *Xiphister rupestris* from Alert Bay, Alaska (evidently intending British Columbia), taken in February, 1882, by Dr Wm. Jones. In 1901 F. Steindachner recorded 3 individuals taken in 1896 or 1897 from Bare Island near Victoria. In 1885 a specimen was collected in Discovery Passage by Dr G. M. Dawson and recorded in 1920 by B. A. Bean and A. C. Weed as *Xiphidon rupestre* (Jordan and Gilbert). The black prickleback occurs along the entire coast in shallow water and is found frequently under rocks well up on the beach when the tide recedes. It is more often observed in the intertidal zone than is the rock prickleback which it closely resembles. It was called the black blenny in 1946 by Clemens and Wilby.

Range: Southern California to southeastern Alaska.

### Giant wrymouth

*Delolepis gigantea* Kittlitz 1858

Body greatly elongate, compressed. Head oblong, flattened above; mouth terminal, large, oblique; lower jaw projecting; maxillary extending one diameter of eye behind eye; teeth: on jaws small, bluntly conical, sharp; on vomer, few; on palatines in two rows, outer larger; snout short, blunt; no crest on top of head;

eye very small, high; gill membranes united, joined to isthmus. Fins: dorsal (1), LXXIII to LXXVII, confluent with caudal; anal, II, 43 to 49, confluent with caudal; pelvic, absent; pectoral, moderately large, length about three times diameter of eye; caudal, pointed to rounded. Lateral line: faint, pores closely spaced. Scales: cycloid, small; on posterior half of body; absent from anterior half except for row on lateral line. Colour: pale brown, tinged with yellow and violet; lighter on ventral surface; markings variable; one colour phase with dark stripe along base of dorsal fin, dark above and below lateral line with pale area between; irregular dark spots in series above and below bands; other phase almost uniform light fawn, dark band along lateral line.

Length to 3 feet 10 inches.



FIGURE 259. Giant wrymouth. *Delolepis gigantea* Kittlitz 1858

Distinguished by the absence of pelvic fins, the projecting lower jaw, the maxillary extending well behind the eye, the scales on the posterior half of the body and the pale brown coloration with the dark bands along the sides of the body.

The giant wrymouth was first taken in British Columbia waters on August 2, 1881, at the head of Kingcome Inlet, depth 18 fathoms, by Captain H. E. Nichols, and described in the same year by T. H. Bean as the type of a new genus and species, *Delolepis virgatus*, now considered to be synonymous with *D. gigantea*. This fish has been captured along the coast at Barkley Sound, Victoria, Nanaimo, English Bay, Comox, Pender Harbour, Alert and Hardy Bays. Most of these individuals were taken on set-lines and in trawls at depths from 18 to 70 fathoms.

Range: Northern California to Bering Sea.

### Red devil

*Lyconectes aleutensis* Gilbert 1895

Body elongate, slender, slightly compressed. Head short, blunt, rather square in cross section; mouth terminal, moderate; jaws almost vertical; lower jaw projecting; maxillary extending to point below eye; teeth: on jaws small, bluntly conical; on vomer, 2 or 3, bluntly rounded; on palatines, none; nostril tube long, overhanging upper lip; eye very small, high; gill membranes united, joined to isthmus. Skin: loose. Fins: dorsal (1), LX to LXIX, confluent with caudal, tips of spines slightly projecting; anal, II, 45 to 49, confluent with caudal, spines weak;

pelvic, absent; pectoral, small; caudal, rounded. Lateral line: faint, visible as row of spaced pores. Scales: absent. Colour: completely red in life due to blood in transparent skin; dull gray in preservative.

Length to 8 inches.



FIGURE 260. Red devil. *Lyconectes aleutensis* Gilbert 1895

Distinguished by the absence of pelvic fins, the almost vertical jaws, the projecting lower jaw, the maxillary extending behind the eye, the loose transparent skin, the naked body and the red coloration.

The red devil was first taken in British Columbia waters on February 22, 1934, off Pender Island. The specimen was discovered by Mr J. Shannon in the stomach of a cod, *Gadus macrocephalus*, captured in an otter trawl operated at a depth of about 40 fathoms. Two individuals were taken in 1936 and 1941 in English Bay by shrimp trawlers. On June 2, 1957, an individual was secured by Mr R. Nickells in Cordova Bay near Victoria on anchor mud. This fish apparently inhabits muddy bottoms as indicated by the places of capture, the nature of the skin and the position of the eyes. In California waters it has been found as deep as 191 fathoms. It is known also as the dwarf wrymouth—the name recommended by the AFS/ASIH committee.

Range: Northern California to Bering Sea.

Family PHOLIDAE

Gunnels

In the gunnels the gill membranes are united and free from the isthmus. The lateral line is short or absent. The dorsal fin is low and supported by spines only; the vertical fins are confluent; the pelvic fins, when present, are thoracic with 1 spine and 1 ray.

The gunnels are brightly coloured fishes inhabiting the eelgrass and rockweed areas of the intertidal zone.

### Saddleback gunnel

*Pholis ornata* (Girard) 1854

Body elongate, moderately slender, compressed. Head small, compressed; mouth terminal, small, oblique; teeth small, conical; gill membranes broadly united, free from isthmus. Fins: dorsal (1), LXXIV to LXXIX, confluent with caudal; anal, II, 35 to 38, confluent with caudal; pelvic, I, 1, thoracic, minute; pectoral small, length about half that of head; caudal; rounded. Lateral line: absent. Scales cycloid, very small. Colour: olive green to brown on dorsal surface; yellow,

orange or red on ventral surface; dark bar across head behind eyes; dark bar downward from eye; dusky bars in series across sides of body; black markings in series along base of dorsal fin "V" to "U"-shaped, enclosing dark green or brown areas darker than body colour; orange sometimes on pectoral, anal and caudal fins; light green with series of white bars on anal fin in some specimens.

Length to 12 inches.



FIGURE 261. Saddleback gunnel. *Pholis ornata* (Girard) 1854

Distinguished by the series of "V" to "U"-shaped black markings along the base of the dorsal fin and the presence of the minute pelvic fins, thoracic in position, each with 1 spine and 1 ray.

The saddleback gunnel was first recorded from British Columbia waters in 1861 from Vancouver Island by A. Günther as *Centronotus nebulosus* on the basis of 3 specimens collected by Lieut-Col. Hawkins of the H.M.S. *Plumper*. The species was listed in 1898 by J. Fannin as *Muraenoides ornatus* on the basis of an individual in the Provincial Museum. (Many of the records of *Pholis ornatus* may be confused with the following species, *Pholis laeta*, because of the fact that over a considerable period of years the two species were considered identical and were recorded as *P. ornatus*.) The first definite locality record from these waters is that of a single individual taken in 1885 in Houston Stewart Channel by Dr G. M. Dawson and recorded in 1920 by B. A. Bean and A. C. Weed. Specimens have been taken at Fort Rupert, Union Bay, Departure Bay, Burrard Inlet and Victoria. The saddleback gunnel occurs frequently near the mouths of streams on muddy bottoms and at depths between 10 and 20 fathoms although it is found occasionally in the intertidal zone. It feeds upon small crustaceans and molluscs. It was called the saddled blenny in 1946 by Clemens and Wilby.

Range: Northern California to Bering Sea.

#### Crescent gunnel

*Pholis laeta* (Cope) 1873

Body elongate, moderately slender, compressed. Head small, compressed; mouth terminal, small, oblique; teeth small, conical; gill membranes united, free from isthmus. Fins: dorsal (1), LXXIV, to LXXX, confluent with caudal; anal, II, 35 to 37, confluent with caudal; pelvic, I, 1, thoracic, minute; pectoral, small, length 2.2 to 3 in that of head; caudal, rounded. Lateral line: absent. Scales: cycloid, very small. Colour: yellowish green, darker on dorsal surface; slightly mottled on

sides; black markings in series along base of dorsal fin, crescent-shaped, enclosing orange or yellow areas; light area on top of head, "V"-shaped, narrowly margined with black; green spot sometimes on opercle; orange on anal fin, sometimes on caudal fin.

Length to 10 inches.



FIGURE 262. Crescent gunnel. *Pholis laeta* (Cope) 1873

Distinguished by the series of crescent-shaped black markings along the base of the dorsal fin and the presence of the minute pelvic fins, thoracic in position, each with 1 spine and 1 ray.

The crescent gunnel was first taken in British Columbia waters in 1903 by the *Albatross* as follows: on June 23, at Union Bay; on June 25, at Fort Rupert; in July at Metlakatla near Port Simpson. These specimens were recorded in 1907 by B. W. Evermann and E. L. Goldsborough as *Pholis ornatus*, although figuring *Pholis laeta*. Re-examination of the collections from these localities by Dr L. P. Schultz revealed the presence of *P. laeta* as indicated above, as well as *P. ornata* at Union Bay and Fort Rupert. The crescent gunnel is common along the coast in shallow water, being found frequently in the intertidal zone, around seaweeds and rocks, in tidepools and occasionally down to 30 or 40 fathoms. It has been taken in Burrard Inlet, Departure Bay, Nootka Island, Massett Inlet and Prince Rupert Harbour and apparently is more common northward. It was recorded as the bracketed blenny in 1946 by Clemens and Wilby.

Range: Northern California to Bering Sea.

### **Penpoint gunnel**

*Apodichthys flavidus* Girard 1854

Body elongate, moderately slender, compressed. Head small, compressed; mouth terminal, small, oblique; teeth small, conical; crest on head, low; gill membranes united, free from isthmus. Fins: dorsal (1), XC to XCIV, confluent with caudal; anal, I, 38 to 42, confluent with caudal, spine very large, penpoint shaped, deeply excavated on anterior surface, very convex behind, thin, flexible, with sharp edges, entirely included in pouch of skin; pelvic, absent; pectoral length, about 2.5 in that of head; caudal, rounded. Lateral line: absent. Scales: cycloid, small. Colour: vivid green, yellow, orange brown or red; light spots frequently



along midline of body, in series; silvery line from middle of maxillary through lower part of eye to nape or to opercle, narrow, margined with orange and black; dark bar downward from eye, narrow.

Length to 18 inches.



FIGURE 263. Penpoint gunnel. *Apodichthys flavidus* Girard 1854

Distinguished by the vivid green to red coloration with the silvery line across each side of the head, the penpoint shaped spine in the anal fin and the absence of pelvic fins.

The penpoint gunnel was first taken in British Columbia waters by H.M.S. *Plumper* in the Strait of Georgia and was recorded in 1861 by A. Günther who stated that the specimen, a female, was presented to the British Museum by the Lords of the Admiralty. The first definite locality record is that of a specimen taken in 1895 in Active Pass by Professor E. E. Prince and recorded in 1920 by B. A. Bean and A. C. Weed. Distribution probably is general along the coast as it is common in the Strait of Georgia and has been recorded from Victoria, Ucluelet, Vargas Island, Clayoquot Sound and the Queen Charlotte Islands. On January 25, 1956, several pairs were found coiled around masses of white eggs at about low tide level near Second Narrows bridge in Burrard Inlet. Its brilliant uniform colour of green or yellow green admirably blends this species with its eelgrass habitat. The food consists of small crustaceans and molluscs. It was called the pen-point blenny in 1946 by Clemens and Wilby.

Range: Southern California to southeastern Alaska.

#### **Rockweed gunnel**

*Xererpes fucorum* (Jordan and Gilbert) 1880

Body elongate, slender, compressed. Head small; mouth terminal, small, oblique; teeth small, conical; crest on head, low; gill membranes united, free from isthmus. Fins: dorsal (1), LXXXIII or LXXXIV, confluent with caudal; anal, II, 32 to 38, confluent with caudal, spines small, first short, enlarged, rounded, not channeled on anterior surface, only partially included in very slight pouch; pelvic, absent; pectoral, very small; caudal, rounded. Lateral line: absent. Scales: cycloid, small. Colour: bright green to deep red; dark spots sometimes along midline of body in series; dark bar downward from eye, narrow.

Length to 9 inches.

Distinguished by the uniform bright green to red coloration, the short stout round spine in the anal fin partially enclosed in a pouch and the absence of pelvic fins.



FIGURE 264. Rockweed gunnel. *Xerperes fucorum* (Jordan and Gilbert) 1880

The rockweed gunnel was first taken in British Columbia waters in June, 1909, at Ucluelet and recorded in 1920 by B. A. Bean and A. C. Weed. In June and July, 1934, specimens were collected from Vargas and Nootka Islands. A single individual was obtained on July 10, 1936, in the stomach of a Farralone cormorant found at Bare Island near Victoria. Others have been taken on June 20, 1943, at Comox and in July, 1959, at Miracle Beach, near Courtenay, by shore collecting. This exceedingly active gunnel appears to occur most frequently in masses of the seaweed *Fucus*, commonly known as bladderweed or rockweed. Its food includes small crustaceans and molluscs. It was listed as the fucus blenny in 1946 by Clemens and Wilby.

Range: Southern California to Vancouver Island.

#### Family SCYTALINIDAE

#### Graveldivers

In the graveldivers the gill membranes are united and free from the isthmus. The lateral line is absent. The dorsal and anal fins are confined to the posterior half of the body, composed of rays only, and are confluent with the caudal fin; the pelvic fins are absent.

In this family there is but a single species, the type specimen of which was discovered near Cape Flattery in 1880. This fish is an inhabitant of the intertidal zone and is able to burrow rapidly in the sand or gravel.

#### Graveldiver

*Scytalina cerdale* Jordan and Gilbert 1880

Body elongate, moderately slender, deeper behind anus than anteriorly. Head elongate, depressed; mouth terminal, moderate, oblique; lower jaw projecting; teeth small, conical, on jaws, vomer and palatines; eye very small, high on head; cheek distended; gill membranes united, free from isthmus. Fins: dorsal (1), 41 to 51, low, commencing near middle of body, confluent with caudal, rays slender, anterior rays embedded in flesh, not visible without dissection; anal, 36 to 41, confluent with caudal; pelvic, absent; pectoral, very small; caudal, rounded. Lateral line: absent. Scales: absent. Colour: pale pink, finely mottled with pale purple.

Length to 6 inches.

Distinguished by the elongate scaleless body with the greatest depth in the posterior half, the dorsal and anal fins commencing about the middle of the body, of almost equal length and confluent with the caudal fin and the absence of pelvic fins.



FIGURE 265. Graveldiver. *Scytalina cerdale* Jordan and Gilbert 1880

The graveldiver was first taken in British Columbia waters on May 31, 1934, off Esteban Point by Mr E. G. Hart, who obtained one individual in a seine. Two other specimens were secured on June 13, 1934, off the west coast of Vancouver Island, at Maquinna Point, Nootka Island, and three on June 22, 1935, at Moresby Island in Kaisun Bay. It occurs in tidepools and on beaches amongst loose gravel and stones and burrows in the sand. It was recorded as the burrowing blenny in 1946 by Clemens and Wilby.

Range: Southern California to Bering Sea.

#### Family ZOARCIDAE

#### Eelpouts

In the eelpouts the head is elongate; the mouth is moderately large and the upper jaw overhangs the lower; the eyes are high on the head. The gill membranes are joined to the isthmus and the gill openings are large. The lateral line, when present, may be continuous or in two parts. The dorsal and anal fins are supported by rays only and are confluent with the rounded caudal fin; the pelvic fins, when present, are thoracic, small and composed of rays only.

The eelpouts number about 60 species of which 8 occur in British Columbia waters. They are bottom-living, usually in muddy areas at depths between 10 and 1,000 fathoms. Some of the species, possibly all, give birth to young.

#### **Blackbelly eelpout**

*Lycodopsis pacifica* (Collett) 1879

Body elongate, slender, somewhat compressed. Head elongate, somewhat compressed, larger in male; snout rounded; mouth terminal, moderate; upper jaw overhanging lower; teeth small on jaws, absent from vomer and palatines; fold of skin overhanging maxillary, moderate; gill membranes broadly joined to isthmus. Fins: dorsal (1), 90 to 107, confluent with caudal; anal, 70 to 90, confluent with caudal; pelvic, 3, thoracic, small, length about 2 in diameter of eye; pectoral, broad, entire; caudal, narrow, rounded. Lateral line: along midline of body, faint. Scales: cycloid, small, embedded, covering body and vertical fins. Colour: light gray to light reddish brown; light spots where pigment is less dense over scales; light bars

vertical, margined with black across body, sometimes faint in adult; black on margin of dorsal fin and elongate spot at anterior end; black on margin at posterior end of anal fin; pale on pelvic fins; jet black on peritoneum.

Length to 18 inches.



FIGURE 266. Blackbelly eelpout. *Lycodopsis pacifica* (Collett) 1879

Distinguished by the conspicuous jet black peritoneum, the absence of teeth from the vomer and palatines and the elongate black spot on the anterior portion of the dorsal fin.

The blackbelly eelpout was first recorded from British Columbia waters in 1898 by J. Fannin as *Lycodopsis pacificus* Collett on the basis of a single individual in the collection of the Provincial Museum at Victoria. This is the commonest member of the family found in these waters. In the Strait of Georgia area it is obtained in shrimp trawls, in which it frequently becomes enmeshed in large numbers, and in otter trawls, at depths between 10 and 120 fathoms, especially on muddy bottoms. The blackbelly eelpout has been recorded from depths of over 200 fathoms in California waters. The food includes marine worms, crustaceans, small bivalves and brittlestars. It was recorded as the black-bellied eel-pout in 1946 by Clemens and Wilby.

Range: California to Gulf of Alaska.

### **Bigfin eelpout**

*Aprodon cortezianus* Gilbert 1890

Body elongate, slender, compressed. Head elongate broad, greatly depressed; snout long, rounded, depressed; mouth terminal, large, upper jaw greatly overhanging lower; teeth small, on jaws and palatines, absent from vomer; fold of skin overhanging maxillary not conspicuous; cartilaginous folds on ventral surface of head; parallel to mandibles, 2, little developed, without lobes; gill membranes broadly joined to isthmus. Fins: dorsal (1), 105 to 108, confluent with caudal; anal, 89 or 90, confluent with caudal; pelvic, 3, thoracic, small, length about 1.7 in diameter of eye; pectoral, large, margin entire, lower rays thickened; caudal, narrow, rounded. Lateral line: faint. Scales: cycloid, small, embedded, covering most of body, less evident ventrally. Colour: brown to blue black on dorsal surface and sides; lighter on ventral surface; white on scale pockets of body; black blotch on body at base of upper pectoral fin rays; black on anterior border of

dorsal fin, on posterior third of pectoral fins and posterior of anal fin and on caudal fins; white on margins of pectoral fins; white to dusky on pelvic fins; white on lining of mouth, dusky on lining of gill cavity; jet black on peritoneum.

Length to 18 inches.

Distinguished by the broad depressed head, the absence of teeth from the vomer, the large entire pectoral fins and the jet black peritoneum.

The bigfin eelpout was first taken in British Columbia waters in June, 1944, at Barkley Sound in an otter trawl at a depth of 50 fathoms by Mr G. H. Smith and was recorded in 1945 by G. C. Carl and G. V. Wilby. The single specimen, a female, is now in the fish collection of the Provincial Museum at Victoria. On May 20, 1953, an individual was taken in an otter trawl in Queen Charlotte Sound at a depth of 100 fathoms and recorded in 1954 by A. T. Palmen. In California the species has been reported at depths to 339 fathoms. The species is known to be fairly common in the Strait of Georgia.

Range: Southern California to Queen Charlotte Sound.



FIGURE 267. Bigfin eelpout. *Aprodon cortezianus* Gilbert 1890

### **Blackfin eelpout**

*Lycodes diapterus* Gilbert 1891

Body elongate, slender, somewhat compressed. Head elongate; snout rounded; mouth terminal, moderate, upper jaw overhanging lower; teeth small, on jaws, vomer and palatines; fold of skin overhanging maxillary, moderate; gill membranes broadly joined to isthmus. Fins: dorsal (1), 109 to 117, confluent with caudal; anal, 101 to 107, confluent with caudal; pelvic, 3, thoracic, small, length about 2 in diameter of eye; pectoral, large, deeply notched, middle rays much shorter than either upper or lower, rays in lower lobe thickened; caudal, narrow, rounded. Lateral line: single, wavy, passing along lower portion of body, sometimes indistinct. Scales: cycloid, small, embedded, covering body. Colour: dusky brown on dorsal surface; blue black on ventral surface; white punctulations over scales fine, prominent; white vertical bars across side of body, 8 or 9, extending somewhat onto dorsal fin, spreading or furcate on lower portion of side; in adults, bars frequently faint or absent; black on margin of dorsal and anal fins; blue black on pectoral, pelvic, and anal fins; blue black on lining of mouth and gill cavity; dusky to black on peritoneum. In male, elongate black blotch anteriorly on dorsal fin.

Length to 12½ inches.

Distinguished by the deeply notched pectoral fins, the dark lining on the mouth and gill cavities and the blue black coloration on the ventral surface of the body, the pectoral, pelvic and anal fins.



FIGURE 268. Blackfin eelpout. *Lycodes diapterus* Gilbert 1891

The blackfin eelpout was first taken in British Columbia waters on June 20, 1903, near Nanaimo by the *Albatross*, station 4198, Lat. 49° 19' N, Long. 123° 47' W, depth 157 fathoms, and recorded in 1907 by B. W. Evermann and E. L. Goldsborough as *Furcimanus diaptera* (Gilbert). The species has since been obtained in English Bay, Burrard Inlet and Howe Sound. The habitat is in the deeper waters with a range from 30 to 391 fathoms. Small numbers are secured in shrimp trawls in Burrard Inlet where it is associated with the blackfin poacher, *Bathyagonus nigripinnis*. It was recorded in 1946 by Clemens and Wilby as *Furcimanus diapterus* (Gilbert). The name recommended by the AFS/ASIH committee is black eelpout.

Range: Southern California to Bering Sea.

#### **Wattled eelpout**

*Lycodes palearis* Gilbert 1895

Body elongate, slender, compressed. Head elongate, slightly compressed; snout angular; mouth terminal, large, upper jaw greatly overhanging lower; teeth small, on jaws, vomer and palatines; fold of skin overhanging maxillary, prominent; cartilaginous folds on ventral surface of head parallel to mandibles, 2, prominent, ending anteriorly in wide, free, closely approximated lobes; gill membranes broadly joined to isthmus. Fins: dorsal (1), 94 to 105, confluent with caudal; anal, 83 to 90, confluent with caudal; pelvic, 3, thoracic, small, length 1.25 to 1.5 in diameter of eye; pectoral, entire; caudal, narrow, rounded. Lateral line: faint or absent. Scales: cycloid, small, embedded, covering body. Colour: light brown to blue black on dorsal surface; dark margin on dorsal and anal fins, narrow; pale on pelvic fins; in young, white vertical bars across body, sometimes onto anal fin, second white bar entirely in front of dorsal fin; creamy white to pink on peritoneum.

Length to 20 inches.

Distinguished by the conspicuous lobed cartilaginous folds on the ventral surface of the head, the small pelvic fins, the angular snout, and in the young the second white bar across the body entirely in front of the dorsal fin.

The wattled eelpout was first taken in British Columbia waters on January 17, 1934, in Active Pass by Mr J. Shannon, who secured a specimen in an otter trawl at a depth of approximately 40 fathoms. This specimen is now in the fish collection of the Institute of Fisheries at the University of British Columbia. Three other individuals have been secured since in otter trawls, two on February 26, 1941, in Satellite Channel between 30 and 50 fathoms, and one on February 27, 1942, in Active Pass at 35 fathoms. These captures were recorded in 1945 by G. C. Carl and G. V. Wilby. On July 20, 1953, a specimen was taken in a trawl off the Goose Islands at a depth of 110 fathoms. From specimens taken in Puget Sound it appears that spawning takes place in the winter months and the food consists of small bivalves and shrimps.

Range: Oregon to Bering Sea.



FIGURE 269. Wattled eelpout. *Lycodes palearis* Gilbert 1895

#### Shortfin eelpout

*Lycodes brevipes* Bean 1890

Body elongate, moderately slender, compressed. Head elongate, compressed; snout rounded; mouth terminal, large, upper jaw much overhanging lower; teeth small, on jaws, vomer and palatines; fold of skin overhanging maxillary, moderate; cartilaginous folds on ventral surface of head parallel to mandibles, 2, small, moderately conspicuous, without lobes; gill membranes broadly joined to isthmus. Fins: dorsal (1), 85 to 96, confluent with caudal; anal, 74 to 85, confluent with caudal; pelvic, 3, thoracic, minute, length 2.5 to 3 in diameter of eye; pectoral, large, broad, entire; caudal, narrow, rounded. Lateral line: faint or absent. Scales: cycloid, small, embedded, covering body. Colour: light brown on dorsal surface; pale to dusky on ventral surface; white vertical bars across nape and across body and dorsal fin, 9 to 13, second distinctly behind origin of dorsal fin; dark margin on dorsal and anal fins, narrow; pale on pelvic fins; creamy white to pink on peritoneum.

Length to 10 $\frac{3}{4}$  inches.



FIGURE 270. Shortfin eelpout. *Lycodes brevipes* Bean 1890

Distinguished by the moderately conspicuous folds without lobes on the ventral surface of the head, the minute pelvic fins, the rounded snout and the second white cross-bar on the body distinctly behind the origin of the dorsal fin.

The shortfin eelpout was first taken in British Columbia waters on June 25, 1903, in Queen Charlotte Sound off Fort Rupert by the *Albatross*, station 4201, Lat. 50° 45' N, Long. 127° 16' W, depth 138 fathoms and recorded in 1907 by B. W. Evermann and E. L. Goldsborough. Probably it is common along the coast. Specimens have been obtained regularly in English Bay and Burrard Inlet in shrimp trawls at depths between 15 and 65 fathoms. One individual was found in the stomach of a lingcod caught in the Victoria area.

Range: Washington to Gulf of Alaska.

### Soft eelpout

*Bothrocara molle* Bean 1890

Body very elongate, slender, compressed. Head elongate, compressed, length 4.25 in standard length; snout blunt, angular; eye,  $3\frac{1}{2}$  to 4 in head, on long axis; mouth terminal; upper jaw overhanging lower; maxillary reaching anterior of pupil; gill membranes joined to isthmus; gill rakers long, pointed. Fins: dorsal (1), 100 to 107, moderately high, confluent with caudal; anal, 89 to 95, confluent with caudal; dorsal and anal fins enveloped anteriorly in soft gelatinous tissue; pelvic, absent; pectoral, entire, about half length of head; caudal, narrow, rounded. Lateral line: indistinct. Scales: cycloid, minute, covering body and vertical fins. Colour: uniform light brown, semi-translucent; blue or black toward margins of dorsal and anal fins, colour more intense posteriorly; transparent on narrow margins of vertical fins; light on lining of mouth; black on peritoneum.

Length to  $5\frac{1}{2}$  inches.



FIGURE 271. Soft eelpout. *Bothrocara molle* Bean 1890

Distinguished by the projecting upper jaw, the long axis of the eye greater than the length of the snout and the absence of pelvic fins.

The soft eelpout has been taken but once in British Columbia waters on August 29, 1888, off the Queen Charlotte Islands near Cape St. James, by the *Albatross*, station 2860, Lat. 51° 23' N, Long. 130° 34' W, depth 876 fathoms. This specimen was the type, described in 1890 by T. H. Bean, and is now in the collection of the United States National Museum.

Range: Southern California to Bering Sea.



### **Blackmouth eelpout**

*Lycodapus fierasfer* Gilbert 1890

Body elongate, slender, somewhat compressed. Head elongate, concave from snout to occiput, viewed laterally; snout angular; mouth terminal, large, oblique; lower jaw slightly projecting; teeth small, on jaws, vomer and palatines; fold of skin overhanging maxillary, moderate; gill membranes joined far forward to isthmus. Skin: on body and bases of fins; loose, translucent. Fins: dorsal (1), 82 to 85, moderately high, confluent with caudal; anal, 70 to 74, confluent with caudal; pelvic, absent; pectoral, small, entire; caudal, narrow, rounded. Lateral line: absent. Scales: absent. Colour: dusted with fine black speckling on pearly background; jet black on jaws, lining of mouth, gill cavity and peritoneum.

Length to 6 inches.



FIGURE 272. Blackmouth eelpout. *Lycodapus fierasfer* Gilbert 1890

Distinguished by the oblique mouth with the projecting lower jaw, the concave lateral view of the head, the translucent skin on the pearly background, the black lining on the mouth, gill cavities and peritoneum and the absence of pelvic fins and scales.

The blackmouth eelpout is known from British Columbia waters by a small specimen about 1½ inches in length taken from the mouth of a blackfin eelpout, *Lycodes diapterus*, which was obtained on August 29, 1928, in Howe Sound at a depth of 120 fathoms in a shrimp trawl. This specimen was recorded in 1932 by C. L. Hubbs and L. P. Schultz and is now in the fish collection of the Biological Station at Nanaimo. Off the California coast the blackmouth eelpout has been found at depths ranging from 27 to 1,076 fathoms. It was recorded as the pearly eelpout in 1946 by Clemens and Wilby.

Range: Southern California to Bering Sea.

### **Pallid eelpout**

*Lycodapus mandibularis* Gilbert 1915

Body elongate, moderately slender, compressed. Head elongate, straight from snout to occiput, viewed laterally; snout rounded; mouth terminal, small; jaws equal; teeth moderately canine-like, on jaws, vomer and palatines; gill membranes joined far forward to isthmus. Skin: on body and bases of fins, loose, translucent. Fins: dorsal (1), 86 to 88 confluent with caudal; anal, 76 to 78, confluent with caudal; pelvic, absent; pectoral, small, entire; caudal, narrow, rounded. Lateral

line: absent. Scales: absent. Colour: absent from skin except for sparse and minute speckling with black; speckling more intense posteriorly; black on posterior lining of mouth; dusky on lining of gill cavity; black on peritoneum.

Length to  $6\frac{3}{4}$  inches.



FIGURE 273. Pallid eelpout. *Lycodapus mandibularis* Gilbert 1915

Distinguished by the terminal mouth with the equal jaws, the absence of pelvic fins and scales, the translucent skin and the black lining on the mouth, gill cavities and peritoneum.

The pallid eelpout was first taken in British Columbia waters on March 9, 1934, off the northwest coast of Graham Island by the International Fisheries Commission, station 1094A, Lat.  $54^{\circ} 19' N$ , Long.  $133^{\circ} 13' W$ , in a vertical haul between 116 and 54 fathoms. This specimen,  $3\frac{3}{4}$  inches in length, was recorded in 1940 by W. M. Chapman as *Bothrocara mollis* Bean, but upon re-examination it was found to be *Lycodapus mandibularis* Gilbert and was recorded as such in 1941 by C. L. Hubbs and L. P. Schultz. In Monterey Bay, California, this species has been taken at depths between 32 and 609 fathoms. It was recorded as the pale eelpout in 1946 by Clemens and Wilby.

Range: California to southeastern Alaska.

#### Family DEREPODICHTHYIDAE

#### Cuskpouts

In the cuskpouts the body is very elongate and the gill opening is reduced to a small vertical slit in front of the pectoral fin. The lateral line is absent. The dorsal and anal fins are supported by rays only and are confluent with the small pointed caudal fin; the pelvic fins are filamentous, each supported by a minute unbranched ray situated below the eye.

In this family there is but a single species based upon a single specimen obtained from a great depth off the Queen Charlotte Islands.

#### Cuskpout

*Derepodichthys alepidotus* Gilbert 1895

Body very elongate, slender, terete. Head elongate, terete; snout, rounded; mouth terminal, moderate; upper jaw slightly overhanging lower; teeth small, cardiform, on jaws, vomer and palatines; gill opening reduced to small vertical slit in front of pectoral fin. Skin: thick, enveloping vertical fins, concealing rays. Fins: dorsal (1), long (count unknown), confluent with caudal; anal, long (count

unknown), confluent with caudal; pelvic, 1, thoracic, inserted below vertical from posterior margin of eye, fins arising from common base, closely approximated, each reduced to slender unbranched filament; pectoral, slender; caudal, pointed. Lateral line: absent. Scales: absent. Colour: brown on dorsal surface; blue black on ventral surface; soiled white on dorsal and pectoral fins; dark margin on anal fin becoming black posteriorly.

Length to 4½ inches.



FIGURE 274. Cuskpout. *Derepodichthys alepidotus* Gilbert 1895

Distinguished by the extremely forward position of the minute pelvic fins, the very elongate terete body, the small slit-like gill openings and the absence of scales and lateral lines.

The cuskpout is known from a single specimen, the type, taken on September 3, 1890, west of Moresby Island, by the *Albatross*, station 3342, Lat. 52° 39' N, Long. 132° 38' W, depth 1,588 fathoms. This specimen was described in 1895 by C. H. Gilbert and was deposited in the United States National Museum.

Range: Queen Charlotte Islands.

#### Family BROTULIDAE

#### Brotulas

In the brotulas the body is elongate, compressed and covered with thick lax skin which also envelops the dorsal and anal fins. The pelvic fins are thoracic. The scales, when present, are cycloid, minute and embedded.

The brotulas are closely related to the eelpouts. The species are numerous and diverse in habitat. Some members of the family inhabit great ocean depths, others the shallow coastal waters. Two species have penetrated fresh water in Cuba. These are blind as adults, live in subterranean caves and are viviparous.

The family is represented in British Columbia waters by a single species.

#### Red brotula

*Brosomphycis marginata* (Ayres) 1854

Body elongate, compressed. Head elongate, length greater than depth of body; snout bluntly rounded anteriorly; mouth terminal, large, upper jaw slightly overhanging lower; premaxillaries forming entire border of upper jaw; maxillary received under loose fold of skin; teeth small, villiform, in narrow band on premaxillaries, lower jaw, vomer and anterior of palatines; eye small, diameter about half length of snout; papillae numerous on head, more numerous, larger, on snout and lower jaw; gill membranes united, free from isthmus. Skin: on head, on dorsal and anal fins, lax; everywhere covered with thick mucous secretion. Fins:

dorsal (1), 92 to 101, long, low, rays slender; anal, 70 to 72, similar to dorsal; pelvic, 2, thoracic, long, slender, filamentous, outer ray twice length of inner, pectoral, rounded; caudal narrow, rounded. Lateral line: in two parts, upper highly arched, ending at point above midlateral position, directly above anus; lower almost straight, commencing directly below posterior end of first, extending to caudal fin. Scales: cycloid, small, embedded; in oblique rows above midline of body, about 170. Pores: below nostril, 1, large; above upper jaw, 3; along lower jaw, 3; behind lower jaw above isthmus, 1; in angle of dentaries, 1, large; in upper angle of operculum, 1, tubular. Colour: bright red to brown on dorsal surface; nearly white on ventral surface; pale red on ventral surface of head and margins of fins; reddish tinge on entire mucous secretion.

Length to 18 inches.



FIGURE 275. Red brotula. *Brosmophycis marginata* (Ayres) 1854

Distinguished by the pelvic fins thoracic in position each consisting of 2 rays forming a slender filament, the thick mucous secretion on the head and the body, the large pores on the head and the lateral line on each side of the body in two parts.

The red brotula was first taken in British Columbia waters on October 11, 1941, in English Bay at about 30 fathoms in a shrimp trawl and collected by Mr P. H. Nasmyth. On June 6, 1950, a second individual was obtained in Saanich Arm by Mr J. Gilbert. Other individuals also have been secured in Departure Bay and near Texada Island. It is apparently a fish of moderate depths. Nothing is known of its life history. In 1946 the variant name red brotulid was used by Clemens and Wilby.

Range: Southern California to southeastern Alaska.

#### Suborder AMMODYATIOIDEA

The fishes in this suborder have elongate slender bodies. The vertical fins are without spines; the pelvic fins, if present, are thoracic, each with 1 spine and 3 rays.

There is only one family, Ammodytidae, in the suborder.

In the sandlances the body is elongate, slender and covered with small cycloid scales. The lateral line is high and straight. The head is long and pointed with the lower jaw projecting; teeth are absent and the gill rakers are long and slender. The dorsal fin is long, supported by rays only, and the pelvic fins usually are absent.

The fishes in this family often occur in large schools near the shore and frequently are abundant on banks off shore. They are active in the surf of sandy shores and in quiet waters sometimes can be seen partially buried in the sand.

**Pacific sandlance***Ammodytes hexapterus* Pallas 1811

Body elongate, very slender. Head elongate, sharply pointed; mouth terminal, moderate; lower jaw projecting; maxillary reaching to point below front of eye; teeth, absent from jaws; snout elongate, pointed; gill membranes separate, free from isthmus; gill rakers long, slender; skin: on side of body in 130 to 150 diagonal folds; above ventrolateral angle of body in slender delicate longitudinal fold. Fins: dorsal (1), 54 to 59, very long; anal, 24 to 30, less than half length of dorsal; pelvic, absent; pectoral, narrow, low; caudal, deeply furcate. Lateral line: high, almost straight, close to dorsal fin. Scales: cycloid, minute. Colour: pale light green on dorsal surface; silvery on ventral surface.

Length to 8 inches.



FIGURE 276. Pacific sandlance. *Ammodytes hexapterus* Pallas 1811

Distinguished by the sharply pointed head with the projecting lower jaw, the oblique folds of skin along the sides of the very slender body, the delicate longitudinal folds above the ventrolateral angles of the body and the absence of pelvic fins.

The Pacific sandlance was first taken in British Columbia waters in June, 1882, near Port Simpson by Captain H. E. Nichols, and recorded in 1883 by T. H. Bean as *Ammodytes personatus* Girard. It is everywhere abundant along the coast, occurring in large schools. At times it may bury itself in the sand of the beaches and has been observed with the anterior third of the body projecting obliquely from the sea bottom. It feeds upon plankton, especially small crustaceans, including barnacle larvae, and in turn is eaten extensively by chinook and coho salmon, lingcod, halibut and many other fishes and to some extent by the furseal. The sandlance is said to be an excellent food fish of delicious flavour. It was

recorded in 1946 by Clemens and Wilby as the sandlance, *Ammodytes tobianus personatus* Girard. The name recommended by the AFS/ASIH committee is arctic sandlance.

Range: Southern California to Bering Sea.

#### Order XENOPTERYGII

In this order the head is depressed. Scales are absent. The dorsal and anal fins are supported by rays only; the pelvic fins are thoracic and united anteriorly, forming, with a fold of skin, a large cleft adhesive disk.

The order includes a single family, the Gobiessocidae.

#### Family GOBIESSOCIDAE

#### Clingfishes

In the clingfishes the species occur chiefly in tropical waters although some extend into temperate seas. They inhabit the littoral zone, adhering to rocks and shells. The food consists largely of small invertebrates. Their body colours vary from pale brown to cherry red which blend with their immediate surroundings.

#### Flathead clingfish

*Gobiesox maeandricus* (Girard) 1858

Body elongate, stout, depressed anteriorly, compressed posteriorly. Head very large, depressed, broad; mouth terminal, large; lower jaw included; snout bluntly rounded; gill membranes united, free from isthmus. Anus about midpoint between posterior margin of adhesive disk and origin of anal fin. Anal papilla short, conical. Fins: dorsal (1), 13 to 16, far back on body; anal, 12 to 14, origin slightly posterior to that of dorsal; pelvic, 4, thoracic, large, united anteriorly by membrane to form anterior portion of large adhesive disk whose posterior formed by broad fold of skin from ventral surface of body, anterior and posterior portions separated by lateral clefts; pectoral, short, broad; caudal, rounded. Lateral line: absent. Scales: absent. Colour: light olive brown to cherry red; everywhere reticulated with brownish orange; sometimes streaked or speckled with black; pale brown bar between eyes, another across cheek.

Length to 6 inches.



FIGURE 277. Flathead clingfish. *Gobiesox maeandricus* (Girard) 1858

Distinguished by the broad flat head, the single rayed dorsal fin set far back on the body and the large cleft adhesive disk.

The flathead clingfish was first taken in British Columbia waters in June, 1893, at Comox, when 14 specimens under 3½ inches in length were secured by Mr J. Macoun. This collection was recorded in 1920 by B. A. Bean and A. C. Weed as *Caularchus maeandricus* (Girard). The first published records were in 1901, when W. H. Osgood listed the species as *Caularchus maeandricus* from the Queen Charlotte Islands and F. Steindachner recorded several specimens taken in 1896 and 1897 at Bare Island, near Victoria, as *Gobiesox maeandricus*. The flat-head clingfish occurs along the whole coast as far north as the Queen Charlotte Islands and is particularly abundant in the Strait of Georgia. It clings to the rocks in the intertidal zone and feeds upon small crustaceans and molluscs. It was recorded in 1946 by Clemens and Wilby as *Sicyogaster maeandricus* (Girard), the common clingfish. The name recommended by the AFS/ASIH committee is northern clingfish.

Range: Southern California to southeastern Alaska.

#### **Kelp clingfish**

*Rimicola muscarum* (Meek and Pierson) 1895

Body elongate, slender. Head small, much depressed, narrow; mouth terminal small; lower jaw included; snout bluntly rounded; gill membranes united, free from isthmus. Anus much nearer anal fin than adhesive disk. Anal papilla long, slender, conical. Fins: dorsal (1), 6 to 8, far back on body, first one or two rays embedded; anal, 6 to 8, origin slightly anterior to that of dorsal, first one or two rays embedded; pelvic, 4, thoracic, united anteriorly by membrane to form anterior portion of small adhesive disk whose posterior formed by broad fold of skin from ventral surface of body, anterior and posterior portions separated by lateral clefts; pectoral, short, broad; caudal, rounded. Lateral line: absent. Scales: absent. Colour: light olive green to brown; in female, sometimes sparsely covered with distinct brownish red spots as large as pupil of eye.

Length to 2 inches.

Distinguished by the slender body, the single small rayed dorsal fin set far back on the body and the small cleft adhesive disk.



FIGURE 278. Kelp clingfish. *Rimicola muscarum* (Meek and Pierson) 1895

The kelp clingfish has been taken once only in British Columbia waters. Four individuals, all males, were secured on May 3, 1935, during an extremely low tide on the west coast of Vancouver Island in Clayoquot Sound on Round Island flats by Dr J. L. Hart, and are now in the collection of the Biological Station at Nanaimo. These specimens were recorded in 1936 by G. V. Wilby and in 1946, by Clemens and Wilby, as *Rimicola eigenmanni* (Gilbert), the slender clingfish. This is the only record of the species north of Monterey, California.

Range: Southern California to west coast of Vancouver Island.

## Order HAPLODOCI

In this order the body is stout anteriorly and the head is depressed. Scales, if present, are ctenoid and embedded. The gill openings are somewhat restricted and lead from a gill chamber in which are only 3 gill arches. The spinous dorsal fin is small, supported by 2 to 4 spines; the rayed dorsal and anal fins are long; the pelvic fins are thoracic, with 1 spine and 2 or 3 rays.

The order comprises a single family, the Batrachoididae.

### Family BATRACHOIDIDAE

### Toadfishes

The toadfishes are chiefly tropical in distribution, living on the bottom in shallow to moderately deep water. In some species the spines of the head and dorsal fin are hollow and each is connected with a poison gland. A poisonous secretion is discharged through the hollow spines in a similar manner to the ejection of the venom from the fang of a snake.

### Midshipman

*Porichthys notatus* Girard 1854

Body elongate, stout anteriorly. Head large, much depressed, broad; mouth terminal, large; lower jaw projecting; maxillary reaching to point below posterior margin of eye; teeth large, recurved; snout bluntly rounded; eyes high, protrusible; interorbital space broad; opercular spine, 1, strong, concealed by skin; gill openings somewhat restricted, membranes broadly united to isthmus. Fins: dorsal (2), II—33 to 37, well separated, spinous fin small, low, in groove, rayed fin long; anal, 29 to 34, long; pelvic, I, 2, thoracic, broad, rays much branched; pectoral, large, broad; caudal, rounded. Lateral lines: 4. Scales: absent. Photophores: on body and head in rows of varying lengths, each in form of shiny round area covering minute lens. Pores: on head in several rows. Cirri: rounded to multifid; in pairs along lateral lines and along rows of pores on head. Colour: olive brown to dark iridescent blue on dorsal surface; silvery gray on sides; golden yellow on ventral surface; white space under eye with black crescent below; white on posterior margin of maxillary; dusky to black on margins of vertical fins.

Length to 15 inches.



Distinguished by the numerous rows of photophores or "buttons", the broad flat head, the prominent widely separated protrusible eyes and the small spinous dorsal fin.



FIGURE 279. Midshipman. *Porichthys notatus* Girard 1854

The midshipman was first taken in British Columbia waters near Vancouver Island by H. M. S. *Plumper* and the individual obtained was recorded in 1861 by A. Günther as *Porichthys porosissimus*. In 1920, B. A. Bean and A. C. Weed recorded the species from Ucluelet, collected in 1909, as *Porichthys notatus* Girard, and from Vancouver Island, collected in 1915, as *P. margaritatus* (Richardson). The midshipman is common in the Strait of Georgia and on the west coast of Vancouver Island at least as far north as Nootka Island. It occurs frequently in the intertidal zone and ranges to depths of at least 145 fathoms. In the shoreward areas these fish may be found beneath rocks. The breeding season is in the spring and the large pale pink to yellow eggs are attached singly, by means of an adhesive disk, to the lower surface of a rock or shell until a large mass is formed. This mass is guarded carefully by the male and the fry emerge in early July, at which time they are about  $\frac{3}{8}$  inch in length. They remain attached for 2 or 3 weeks until the yolk is absorbed, after which the young fish, about an inch in length, become free-swimming. The food of the adults consists of fishes and crustaceans. The rows of photophores with fancied resemblance to buttons have suggested the name midshipman. This fish is known also as the singing fish because of the loud humming sounds which are produced by vibrations in the air bladder. The name recommended by the AFS/ASIH committee is northern midshipman.

Range: Southern California to southeastern Alaska.

#### Order PLECTOGNATHI

In this order the mouth is small with short, powerful jaws; the premaxillaries and maxillaries are more or less fused. The gill openings are restricted in size and do not extend below the bases of the pectoral fins. The body is covered with

scales, rough shields or bony plates, or is naked. The spinous dorsal fin, when present, consists of a small number of spines; the rayed dorsal and anal fins are opposite and far back on the body; the pelvic fins are absent.

The order includes a varied group of fishes such as the triggerfish, parrotfish, filefish, trunkfish, porcupinefish, burrfish and ocean sunfish. These are chiefly tropical in distribution and the flesh of many of them is poisonous.

#### Family MOLIDAE

#### Ocean sunfishes

In the ocean sunfishes the body is deep, compressed, truncate posteriorly and covered with a thick, rough, scaleless skin. The teeth are fused, forming a single bony sharp-edged plate, or "beak", in each jaw. The fins are supported by rays only.

These are fishes of the open sea and often are observed at the surface in calm weather. They are reported to swim by moving the dorsal and anal fins sidewise with a twisting motion which results in a propeller effect. The pectoral fins move continuously and act as stabilizers while the caudal fin serves as a rudder. The adults become large and grotesque, often drifting passively in the current although at times they dive to considerable depths. Specimens have been known to attain a length of 9 feet and weight estimated at over a ton.

#### Ocean sunfish

*Mola mola* (Linnaeus) 1758

Body short, deep, ovate, greatly compressed. Head deep, compressed; mouth terminal, small; teeth beak-like; eye small; gill opening in front of pectoral fin, smaller than diameter of eye. Skin: thick, rough, leathery. Fins: dorsal (1), 17 or 18; anal, 16 to 18; both fins short, very high, far back on body; pelvic, absent; pectoral, small; caudal, short, very broad, outline wavy. Lateral line: absent. Scales: absent. Colour: dark gray on dorsal surface; grayish brown on sides with silvery reflections; light gray band at bases of dorsal, anal and caudal fins.

Length to 9 feet.

Distinguished by the short deep greatly compressed body, the high dorsal and anal fins far back on the body, and the absence of pelvic fins.

The ocean sunfish was first taken in British Columbia waters on July 14, 1915, off Ucluelet by Indians, presented to the Provincial Museum by Mr A. Jansen, and now represented by a model. It was recorded in 1916 by F. Kermode. Individuals appear occasionally off the west coast of Vancouver Island and the Queen Charlotte Islands and two individuals have been reported from inside waters, one at Quathiaski Cove, Johnstone Strait, and one from near Butedale on the east coast of Princess Royal Island. This is a southern or tropical form and small to medium-sized specimens up to 3 feet in length arrive in British Columbia waters in certain years. The fish frequently swim slowly or drift at or near the surface but smaller individuals are capable of more active movements, even to leaping clear of the water. In spite of its size it has a relatively small brain and a very short spinal

cord. The eggs are produced in enormous quantities, estimated as high as 300,000,000 in a pair of ovaries. These are set free in the open ocean and when hatched, each produces an elongate larva about  $\frac{1}{10}$  inch in length with a well developed caudal fin. The caudal fin soon disappears and at the same time the body becomes covered with numerous spines, five of which grow very large. The body then changes in shape, becoming deeper than long and truncate posteriorly; the spines get smaller and disappear finally while a new short broad tail develops. The approximate length at this stage is about  $\frac{1}{2}$  inch. From this point the fish gradually gets larger, assuming the adult shape. The food consists of jellyfishes, crustaceans and molluscs, brittlestars and small fishes. The word *Mola* means millstone which perhaps would be a more appropriate common name than headfish used by some authors.

Range: Southern California to southeastern Alaska.



FIGURE 280. Ocean sunfish. *Mola mola* (Linnaeus) 1758

## Order PEDICULATI

In this order the body is broad, globular to greatly depressed. The gill openings are small and never in front of the pectoral fins. Scales are often absent or obsolete. The spinous dorsal fin is represented usually by one or more free spines, the first of which is situated on the head and may be surmounted by a short globular luminous organ, or a long whip-like lure called an illicium; the pelvic fins when present, are thoracic, with 1 spine and 5 rays. The pediculate fishes usually are small but some may attain a length of about 3 feet. They vary greatly in shape and appearance. The males are free swimming as young but in some species later become permanently attached to the females. They have no teeth, no tentacle-like spine and no eyes and are little more than testes sacs.

The order comprises some 16 families. While most species dwell on the bottom of fairly deep water, or are bathypelagic, one or two are known to inhabit floating seaweeds.

Among the common names applied to these fishes are: angler, fishingfrog, monkfish, sargassumfish, seadevil and bulbfish.

### Family ONEIRODIDAE

### Dreamers

In the dreamers the body is short, oval to globular. The mouth is large with acute depressible teeth. The rayed dorsal and anal fins are short, are far back on the body, and approximately equal in size. The skin is scaleless, except in one genus, and usually black.



FIGURE 281. Dreamer. *Oneirodes bulbosus* Chapman 1939

**Dreamer***Oneirodes bulbosus* Chapman 1939

Body short, deep, broad, nearly globular; caudal peduncle short. Head large, very deep, broad, pointed; mouth terminal, very large; teeth long, slender, depressible; snout long, acute; eye very small, somewhat protruded; interorbital space deeply concave to base of illicium; spines: sphenotic, 1, above and behind eye; gill membranes joined to body, gill opening small, below and behind pectoral fin. Fins: dorsal (3), 1-1-5, first fin, known as illicium, elongate, jointed, arising from snout, cirri at tip, 4, three much branched, one posterior, curved, unbranched, second fin a single lax fleshy ray above gill opening, third fin far back on body, directed backward; anal, 4, similar to third dorsal; pelvic, absent; pectoral, 13, high on body; caudal, large, fan-shaped. Lateral line: absent. Scales: absent. Colour: jet black; pale on bulb and appendages of illicium.

Length to 3¼ inches.

Distinguished by the almost globular shape of the body, the jointed illicium on the snout, the small eyes, the small gill openings below and behind the pectoral fins and the jet black coloration.

The dreamer is known from a single specimen taken on March 11, 1934, west of Graham Island by the International Fisheries Commission, station 1109C, Lat. 53° 50' N, Long. 133° 54' W, in a vertical haul at a depth between 487 and 379 fathoms. This specimen, the type, and only one known, was described in 1939 by W. M. Chapman and is now in the collection of the United States National Museum. It was called the bulb-fish in 1946 by Clemens and Wilby.

Range: Queen Charlotte Islands.

## GLOSSARY OF TERMS USED

- Abdomen.* Externally the ventral surface of the body, ordinarily between the pectoral fins and the anus.
- Abdominal.* Pertaining to the abdomen.
- Abyssal.* Pertaining to waters of great depths, below 1500 fathoms.
- Accessory lateral line.* See lateral line.
- Adhesive disk.* A modified portion of the external anatomy forming a sucker, *e.g.* around the mouth of the lamprey; the modified first dorsal fin in the whale sucker; the pelvic fins in the snailfishes.
- Adipose fin.* A fleshy fin on the dorsal median line of the body behind the rayed dorsal fin, as in the salmon, smelts, etc. Technically a dorsal fin but for convenience because of its fleshy nature, without rays, it is referred to in the text and key as a separate fin.
- Anal.* Pertaining to the anus.
- Anal fin.* The fin on the ventral median line of the body behind the anus.
- Anal papilla.* A protuberance in front of, or bearing, the genital pore; behind the anus in certain groups of fishes, functioning as a penis, *e.g.* in certain sculpins and other fishes.
- Anterior.* In front.
- Anus.* The posterior opening of the digestive tract, sometimes referred to as the vent. Varying in position from near the posterior end of the abdominal cavity, to below the lower jaw, as in the tadpole snailfish. More usually found in the middle third of the body on the ventral surface.
- Asymmetrical.* Not symmetrical: one side not the mirror image of the other, *e.g.* the body and head of a flounder.
- Barbel.* An elongate fleshy projection under the snout, around the mouth or below the lower jaw, as in the sturgeons, dragonfishes and cods.
- Base of fin.* The area of contact of a fin with the body; the distance from the first ray or spine to the last ray or spine.
- Bathypelagic.* Living freely in open waters below 200 fathoms.
- Bifid.* Having a forked end, as of the preopercular spine in some members of the family Cottidae.
- Bifurcate.* Divided into two branches.
- Body.* That portion of a fish between the head and the base of the caudal fin.
- Branchial.* Pertaining to the gills.

- Branchiostegal membrane.* The membrane enclosing the gill chamber ventrally. Also called gill membrane.
- Branchiostegals.* The bony rays which support the branchiostegal membrane.
- Buccal.* Pertaining to the mouth, *e.g.* the buccal or mouth cavity.
- Caecum (pl. caeca).* A blind sac, *e.g.* the pyloric caeca, connected with the anterior portion of the intestine. Used in the identification of the salmon and snailfishes.
- Canines.* Teeth that are enlarged and conical.
- Cardiform teeth.* Teeth that are small and sharp, arranged like a series of combs, or like wool cards.
- Carina (pl. carinae).* A keel.
- Caudal.* Pertaining to the tail, as caudal fin, caudal peduncle.
- Caudal peduncle.* The posterior end of the body upon which rests the base of the caudal fin. Usually considered as the part of the body from the posterior margin of the anal fin to the end of the vertebral column.
- Chondrocranium.* A cartilaginous skeleton enclosing the brain, as in the sharks, rays and other selachians.
- Claspers.* Extensions of the pelvic fins in male sharks, skates and other selachians, for the transference of sperms to the female.
- Cleithrum (pl. cleithra).* A bone forming the dorsal, and usually anterior, part of the pectoral girdle.
- Compressed.* Flattened from side to side.
- Confluent.* Meeting smoothly without a notch.
- Corselet.* A patch of scales posterior to the base of pectoral fin of some members of the mackerel family.
- Cranial.* Pertaining to the brain case or skull.
- Cranial ridge.* A bony ridge on the top of the skull.
- Cranial spine.* A spine on the skull.
- Crenulate.* Scalloped.
- Crest.* A fleshy longitudinal ridge between the eyes.
- Cusp.* A projection or point on the crown of a tooth.
- Deciduous.* Falling off; loosely attached.
- Decurved.* Curved downward; said of a lateral line which curves downward from its origin to or below the mid-lateral position.
- Depressed.* Flattened from above downward.
- Dentary.* The bone forming the anterior portion of each half of the lower jaw.
- Dentary elevation.* An elevation at the symphysis or junction of the dentary bones which may fit into an emargination between the symphysis of the premaxillary bones of the upper jaw.

- Denticles.* Minute teeth; tooth-like growths.
- Dentigerous.* Bearing teeth.
- Dentition.* Having reference to the arrangement and character of the teeth.
- Depth of the body or head.* The vertical distance through the body or the head at its greatest distance dorsoventrally, not including the fins.
- Dermal.* Pertaining to the skin.
- Diameter of eye.* The greatest diameter of the eye ball measured antero-posteriorly.
- Distal.* Farthest away; most distant.
- Dorsal.* Pertaining to the upper surface or back.
- Dorsolateral.* Refers to the position of the area or line where the back and side meet.
- Elongate.* Lengthened: longer than deep; very long.
- Emarginate.* Having the margin notched.
- Embedded.* With reference to scales: the scale margin is so enveloped in skin that there is no free edge, *e.g. Pleuronichthys*, the scales appear as if punched into the skin.
- Exserted.* Fin rays much projecting beyond the fin membrane. Usually used with reference to pectoral fin rays.
- Falcate.* Sickle or scythe-shaped; long, narrow, curved.
- Filament.* A thread-like projection, *e.g.* the very elongate first spine of the dorsal fin of *Icelinus filamentosus*.
- Fimbriae (sing. fimbria).* A fringe of fleshy projections.
- Frenum.* The fold of skin joining the lower lip to the symphysis of the lower jaw, as in some members of the family Embiotocidae.
- Furcate.* Forked.
- Fusiform.* Spindle-shaped; tapering towards each end but rather more abruptly anteriorly, *e.g.* the mackerels.
- Gill.* The structure by means of which gases are exchanged between the blood of the fish and the water environment.
- Gill arch.* The bony support to which the gill filaments and gill rakers are attached.
- Gill chamber.* The space around the gills enclosed by the operculum and the gill or branchiostegal membranes.
- Gill filaments.* The slender delicate fringe-like structures composing the gill.
- Gill membrane.* The membrane supported by the branchiostegal rays, which closes off the gill chamber, in part. Also known as the branchiostegal membrane.
- Gill membranes separate.* The gill membranes are free from one another posteriorly.



- Gill membranes united.* The membrane covering the gill cavity on one side is united to its fellow of the opposite side to form a fold over the isthmus (the forward pointed projection of the body).
- Gill membranes, free from isthmus.* The membranes are free so that a needle may be run across the isthmus from side to side under the gill membranes posteriorly.
- Gill membranes, joined to isthmus.* The membranes are attached laterally or ventrally to the isthmus.
- Gill rakers.* The protuberances on the gill arch opposite the gill filaments; these are short and usually rough in carnivorous fishes, long and very slender in plankton-feeding fishes. The formula 15+25, indicates 15 rakers on the upper limb of the arch and 25 on the lower.
- Girdle, pectoral.* The internal bony or cartilaginous structure supporting the paired pectoral fins.
- Girdle, pelvic.* The internal bony or cartilaginous structure supporting the paired pelvic fins.
- Heterocercal.* Referring to a caudal fin in which the upper lobe is longer than the lower and encloses the end of the vertebral column.
- Homocercal.* Referring to a caudal fin with the upper and lower lobes of equal, or nearly equal, length.
- id (suffix).* Indicating a member of a family, a non-scientific terminology, *e.g.* salmonid, a salmon; cottid, a sculpin.
- idae (suffix).* Indicating a family, a scientific terminology, *e.g.* Clupeidae, herrings.
- Illicium.* A whip-like structure on the head derived from a modified dorsal fin spine or ray, sometimes luminescent.
- Imbricated.* Overlapping, referring to the scales of a fish.
- Incised.* Cut in, referring to the membranes between the tips of the rays or spines of a fin.
- Included.* Said of a lower jaw which is overlapped by the upper.
- Inferior.* Below; not terminal, *e.g.* the mouth of a sturgeon and some poachers.
- Insertion of a fin.* The posterior end of the base of a fin.
- Interorbital space.* The least width of the skull between the eyes. In the Scorpaenidae the interorbital space is broad when it is 4 or less in the length of the head; medium width, 4 to 5 in length of head; narrow, 5 or more in length of head. The shape, (convex, flat or concave), refers to the portion of the skull between the eyes and not including the cranial ridges or spines.
- Interspace.* The space between vertical fins, usually referring to dorsal fins.
- Isthmus.* The narrow triangular portion of the body beneath the head and between the gill chambers.

- Keel.* A ridge extending longitudinally along the midline of the side; on the caudal peduncle of certain sharks, on the scales of certain fishes such as the shad and the slim sculpin, and others.
- Lamina.* A small thin plate.
- Lanceolate.* Shaped like the blade of a lance, *e.g.* the caudal fin of the ratfish.
- Larva.* The early stage after hatching from the egg, frequently different in appearance from the adult.
- Lateral.* Pertaining to the side.
- Lateral line.* A sensory canal along the side of the body with a series of pores opening to the exterior. The lateral line may be single or multiple.
- Lateral line pore.* One of a series of openings from the sensory lateral line canal to the outside.
- Lateral line with accessory dorsal branch.* The lateral line system beginning on the head has an extra or accessory dorsal branch passing above the main lateral line more or less close to the dorsal fin, *e.g.* in certain pricklebacks, greenlings, flatfishes and other fishes.
- Littoral.* Along the shore; shore-dwelling.
- Lobule.* A small lobe.
- Luminous organ.* A specialized area on the body or head, capable of producing light, without a lens and usually irregular in shape.
- Lunate.* Having the shape of a half moon; a broadly rounded, rather shallow fork.
- Mandible.* The main bone forming the lower jaw.
- Maxillary.* The main bone forming the upper jaw.
- Median.* Situated on the vertical axis of the body.
- Metamorphosis.* Change in body structure or form; having reference to marked changes occurring in fishes during development from the larval to the adult stages.
- Molar.* An enlarged tooth for grinding or crushing.
- Mouth oblique.* The mouth is modified so that the jaws, when closed, are not in a horizontal position, *e.g.* some kelpfishes and pricklebacks.
- Mouth subterminal.* The mouth is almost at the anterior tip of the head and opens anteriorly, *e.g.* anchovy, rattail.
- Mouth terminal.* The mouth is at the anterior end of the head.
- Mouth ventral.* The mouth is located far behind the tip of the head and opens ventrally, *e.g.* sharks, sturgeons.
- Muciferous.* Carrying mucus.
- Mucous.* Slimy. The adjective of mucus.
- Mucus.* A slimy secretion from the skin.
- Multicuspid.* Having many cusps.

- Multifid.* Having many branches or forks.
- Nasal.* Pertaining to the nose.
- Neural processes.* Broad plate-like structures arising dorsally from the vertebrae, exposed in the silvery hatchetfish.
- Notch.* In the case of the dorsal and anal fins, an indentation partially dividing the fin into two parts, *e.g.* rockfishes; in the case of the pectoral fin, a broad indentation resulting from the shortening of some of the rays thus dividing the fin into two lobes, *e.g.* blackfin eelpout.
- Occipital.* The most posterior bone on the top of the head; pertaining to the occiput.
- Occiput.* The posterior portion of the upper part of the head; in some fishes the cross line separating the head from the body, *e.g.* some pricklebacks.
- Ocellus (plural, ocelli).* An eye-like spot, *e.g.* big skate.
- Ocular.* Pertaining to the eye.
- Operculum.* Gill-cover. Supported by the following bones: opercle, preopercle, interopercle, subopercle.
- Oral hood.* A fleshy extension anterior and dorsal to the mouth of the larval lamprey.
- Orbit.* The eye socket.
- Orbital.* Pertaining to the orbit of the eye.
- Origin of a fin.* The anterior end of the base of a fin.
- Palatines.* A pair of bones on the roof of the mouth, one on each side, extending outward and backward, from the head of the vomer, sometimes bearing small teeth.
- Papilla.* A small fleshy projection, sometimes tubular.
- Pectoral.* Pertaining to the pectoral girdle, the pectoral fins or the area adjacent to the pectoral fins.
- Pedicel.* A small or slender support for a larger structure, *e.g.* the oral cirri of the sturgeon poacher.
- Peduncle.* See caudal peduncle.
- Pelagic.* Living freely in open waters.
- Pelvic.* Pertaining to the pelvic girdle, the pelvic fins or the area adjacent to the pelvic fins.
- Peritoneum.* The lining of the abdominal cavity.
- Pharyngeal.* Pertaining to the region of the pharynx.
- Pharynx.* The region posterior to the mouth into which open the internal branchial clefts.
- Photophore.* A specialized organ, on the body or head, capable of producing light, usually with a lens and round reflector.

- Plankton.* Minute aquatic plants and animals, sometimes microscopic.
- Plications.* A series of small folds.
- Posterior.* Behind.
- Premaxillary.* One of two bones, on either side of the midline of the upper jaw, immediately in front of the nasal bones, sometimes overlapping the maxillary bone laterally.
- Preopercle.* The bone in the operculum in front of the opercle.
- Preopercular spine.* A bony protuberance from the preopercle. The spine, or spines, may be barely discernible to very elongate, simple or multifold.
- Prickle.* A scale reduced to a sharply pointed spine.
- Procurent fin.* The base of the fin is broad and curved forward and the lowest ray is inserted well forward, as in the pectoral fin of some cottids, *e.g.* the spinyhead sculpin.
- Profile.* The contour of the body or head, from the side view unless otherwise stated.
- Protractile.* Capable of being extended forward, *e.g.* premaxillary and maxillary bones.
- Protrusible.* Capable of being thrust forward or outward, *e.g.* the mouth of a sturgeon.
- Pyloric caeca.* See caecum.
- Ray.* In this text the term, when applied to a fin, refers to the segmented support to the fin membranes, the segmentation usually being visible by transmitted light, (sometimes referred to as "soft" rays by authors).
- Recurved.* Curved upward and inward, *e.g.* the preopercular spine in the sharp-nose sculpin.
- Redd.* A nest in sand or gravel in which the eggs of lampreys and fishes are deposited.
- Reticulations.* Markings in the form of a network of lines.
- Rostral.* Pertaining to the snout.
- Rostral plate.* A small plate on the anterior tip of the snout, as in some poachers.
- Rostral spine.* A spine on the rostral plate.
- Serrate - ed.* Notched like a saw.
- Sessile.* Attached without a stem or pedicel.
- Snout.* The portion of the head which projects in front of the eyes and above the mouth.
- Snout, rounded.* Usually referring to the dorsal aspect.
- Spine.* In this text the term when applied to a fin refers to the unsegmented supports of the fin membranes regardless of whether or not they are stiff.

- Spinule*. A small spine, *e.g.* on the uppermost preopercular spine of some cottids.
- Spiracle*. The opening behind the eye of a shark or ray connected with the branchial chamber and through which water may be taken and passed over the gills.
- Stellate*. Star-like; ridges or lines radiating from a central point; said of the tubercles on the starry flounder.
- Striae*. Fine lines or ridges, as on the opercula of some fishes, *e.g.* the pilchard and eulachon.
- Subequal*. Not quite equal.
- Suborbital*. Below the eye.
- Supraocular*. Above the eye.
- Suture*. A line of junction between two immovably connected bones.
- Symmetrical*. Having symmetry. Each side a mirror image of the other.
- Symphyseal knob*. A projection or swelling below and in front of the symphysis or point of junction of the two dentaries or lower jaw bones.
- Symphysis*. Point of junction of two bones, *e.g.* the two dentaries or lower jaw bones.
- Synonymy*. A list of technical names which have been applied to certain species. Occasionally the same species has been described independently by two or more scientists. In this case the name which was first applied, in 1758 or subsequently, must be given priority. The later names are then said to go into synonymy.
- Tail*. The part of the body posterior to the body cavity; in most fishes this is applied to the caudal peduncle and fin inclusive.
- Terete*. Round in cross section, *e.g.* lamprey, pilchard, barracuda and other fishes.
- Terminal*. At the end.
- Thoracic*. In the region of the thorax.
- Truncate*. Ending abruptly or square-cut, as the tails of some fishes.
- Tubercle*. A modified scale, sometimes represented by a hard or soft excrescence, or a small rounded hump.
- Tuberculate*. Covered with tubercles.
- Type locality*. The particular locality in which a type specimen was collected.
- Type specimen*. The particular specimen upon which was based the original description of a species.
- Ventral*. Pertaining to the lower surface of the body or head.
- Ventrolateral*. The area in which the side and ventral surfaces meet.
- Vermiculations*. Fine lines more or less worm-like in shape.
- Villiform teeth*. Very small slender teeth, crowded into bands or patches.
- Vomer*. The bone in the roof of the mouth immediately behind the premaxillaries, frequently bearing teeth.

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