

stray to southern New England and Georges Bank; from Bermuda; from Madeira; and from tropical West Africa. Mantas are also widespread in the tropical-subtropical belt of the Pacific and Indian Oceans, but it is not yet known whether they are identical with the Atlantic species or not.

*Occurrence in the Gulf of Maine.*—The only reason for mentioning this giant ray here is that a pair, judged to be 18 to 19 feet wide, were

encountered on the southeast part of Georges Bank late in August 1949, by Capt. Henry W. Klimm, while out after swordfish, and so close at hand that their cephalic fins and purplish color were noted. The nearest record to the westward and southward is of one 19 feet wide, weighing 1,686 pounds, harpooned by a sword fisherman a few miles off Block Island and landed there in August 1921.<sup>84</sup>

## CHIMAERIDS. SUBCLASS HOLOCEPHALI

The chimaeroids, being cartilaginous fishes, are allied to the sharks, skates and rays, but are separated from them by many important anatomic characters. Most obvious of these externally are that they have no spiracle; that they have only one external gill opening on either side; that their tails are symmetrical; and that their gill filaments are free at the tips like those of bony fishes. The chimaeroids remotely suggest the grenadiers in general body form (p. 243), but are easily separable from them at a glance; first of all by the softness of their bodies and by their naked

skins, also by the location of the pelvic fins which are set far back under or behind the tips of the pectorals, and by the large size of the pectoral fins, to list only the most obvious differences. There is no danger of confusing them with any other Gulf of Maine fishes, so curious is their appearance.

They lay eggs that are astonishingly large for the size of the parent fish, and enclosed in brown horny capsules which are elliptical, spindle-shaped or tadpole-shaped in different species. But fertilization is internal.

### The Chimaeras. Order Chimaerae

#### FAMILY CHIMAERIDAE

*Chimaera Hydrolagus affinis* (Brito Capello)  
1868

Bigelow and Schroeder, 1953, p. 539

*Description.*—This species of chimaeroid, the only one known from within the geographic limits of the Gulf, is deepest (one-sixth to one-seventh as deep as long) just behind the gills, tapers gradually backward to a weak slender tail, and is very soft-bodied. The head is short, its dorsal

profile oblique, the snout conical with a blunt tip. The forehead of the male bears a curious cartilaginous hook, armed with recurved prickles on its lower surface, which probably serves to clasp the female. The mouth, on the lower side of the head, is small, with thick fleshy lips; the upper jaw is armed with 4 flat plates in place of teeth,

<sup>84</sup> Reported by Gudger (Science, N. Ser., vol. 55, 1922, p. 339). There are photographs of this specimen in the American Museum of Natural History in New York.

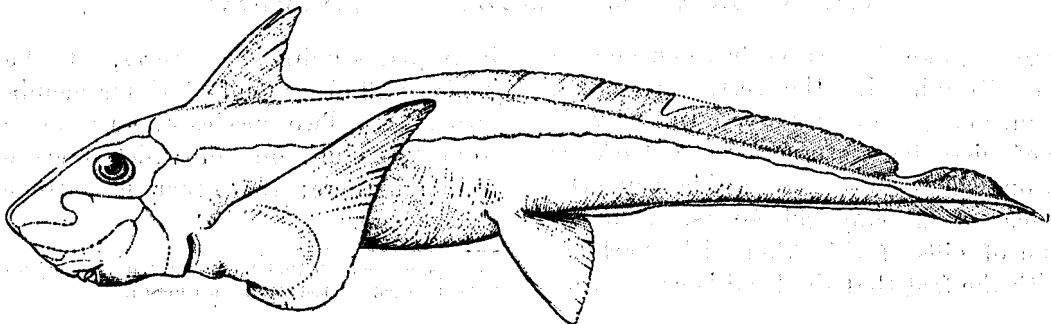


FIGURE 35.—*Chimaera (Hydrolagus affinis)*, female, about 31¼ inches long, Banquereau Bank. From Bigelow and Schroeder. Drawing by E. N. Fischer.

the marginal pair set edgewise, the lower jaw with a pair of marginal plates set edgewise. The gill openings are vertical, set very low down on the sides of the neck, and each is covered with a flap of skin, paralleling the gill cover of bony fishes.

There are two distinct dorsal fins. The first of these originates about over the gill openings, is triangular, about as high as long, and supported at its anterior margin by a stout spine that is free along the terminal part, with the rear surface of the free part double saw-edged. The second dorsal is separated from the first by a space variable in length, and is less than one-third as high as the first, with straight margin. The small caudal fin, marked off from the second dorsal by a deep notch, is lanceolate in shape, ending as a short, whiplike filament; and it extends a short distance forward along the ventral surface of the trunk, there being no separate anal fin. The pelvics and pectorals both have pointed tips, the latter being much the larger and reaching back nearly to the point of origin of the pelvics. The male has a trifold copulatory organ arising from the base of each pelvic fin on the inner side, and also a supplementary bladlike clasping organ close in front of each pelvic fin, its margin armed with 4 or 5 hooks, and lying in a pocket from which it can be protruded. The skin is smooth; the lateral-line system is well developed and ramifies over the head in several branches.

This species is a close ally of the well known chimaera of north European seas (*Chimaera monstrosa*), but is distinguishable from it by the fact that it has no separate anal fin; that there is a considerable free space between its two dorsal fins; that the outline of the second dorsal fin is

straight; that its caudal filament is much shorter; and that its pectorals hardly reach back to the pelvics.

*Color*.—Lead color, tan-brown or dark sepia below as well as above, except paler on the throat and grayish on the snout. The margin of the first dorsal, the rear and inner margins of the pelvics, and the rear margins of the pectorals are dark.

*Size*.—The largest specimen yet reported, taken 85 miles off Cape Sable, Nova Scotia, at a depth of between 400 and 500 fathoms, was 49 inches long and weighed 17½ pounds dressed.

*General range*.—Not uncommon on the continental slope of North America from the latitude of Cape Cod northeastward, along the Nova Scotia Banks, to the Grand Banks, in 160 fathoms to more than 1,200 fathoms; also in the eastern side of the Atlantic off the coast of Portugal.

*Occurrence in the Gulf of Maine*.—Our only reason for mentioning this chimaera is that it is (or was) so plentiful along the offshore slopes of the Banks off the eastern part of the Gulf and off Nova Scotia that many were brought in for a few years subsequent to 1875, when fishermen long lining for halibut extended their operations down to 300 fathoms or so. Only one seems to have been reported during the past 25 years, caught off Browns Bank, 85 miles southwest of Cape Sable, between 400 and 500 fathoms on October 15, 1930.<sup>85</sup> But perhaps it would be found no less plentiful now than of old, if sought at the proper depth. The shoalest capture of which we found record was at 160 fathoms. Nothing is known of its way of life nor have its egg cases been seen.

## THE BONY FISHES. CLASS OSTEICHTHYES

### THE STURGEONS. FAMILY ACIPENSERIDAE

The sturgeons, like the sharks, have an uneven ("heterocercal") tail with the vertebral column extending out along the upper lobe. But there is no danger of mistaking a sturgeon for a shark for it has only one gill opening on each side, while the gills are enclosed by bony gill covers. And the combination of gills of this kind with sharklike tail and with the fact that the head is covered by

bony plates united by sutures, sets the sturgeons off from all other Gulf of Maine members of their own class. Two species of sturgeons are known from the Gulf, one of which once was rather common there; the other is extremely scarce everywhere.

<sup>85</sup> Reported by Firth, Bull. Boston Soc. Nat. Hist., 61, 1931, p. 9. It was 49 inches long and weighed 17½ pounds dressed.