

Natural History.

SCALY-FINNED FISHES.

Our engraving represents members of a large family of fishes called by Dr. Günther *Squamipinnæ* or scaly-finned fishes, because "the vertical fins are more or less densely covered with small scales;" but the spinous portions are not always scaly. These fishes are mostly carnivorous, and are inhabitants of the tropical seas and rivers. They are remarkable for their peculiar shape and their strange coloring. Their bodies are thin and very deep in proportion to their length, and their mouths are usually small.

The first group of this family have small mouths furnished with several rows of tiny, slender, and bristle-like teeth, which give them their scientific name *Chaetodontina*, a term composed of two Greek words, the former signifying hair, and the latter a tooth. The colors of this group are brilliant and generally arranged in stripes or spots. Black and yellow are the prevailing colors, but blue and green are found in some species.

Fig. 1 in our engraving represents a fish which is found in the Indian Ocean and the western part of the Pacific Ocean, and is called by the Arabian fishermen of the Red Sea the flag fish (*Chaetodon setifer*), on account of the considerable lengthening of the fourteenth ray of the dorsal fin. Dark bands run in different directions upon the whitish ground of the body. A black band edged with white extends from the neck through the eye to the throat; it is widened on the under side. Five or six blackish bands run obliquely from the front upward toward the dorsal fin, and from these lines eight or ten bands issue nearly at right angles, take a slight sweep downward, and then converge toward the tail. The region over the eye is also ornamented with four orange-yellow diagonal lines. The back part of the dorsal fin is lemon color, and has a black spot surrounded with an edge of white; above this the fin is a fiery red edged with black. The caudal fin is lemon yellow, ornamented on the back side with a crescent-shaped pale yellow and white-edged girdle, then with a cylindrical dark brown, black-edged girdle. The anal fin is orange color edged with black and seamed with white. The pectoral and abdominal fins are reddish-white. The dorsal fin has thirteen spinous and twenty-five soft rays, the anal fin three spinous and twenty soft rays; the pectoral fin has sixteen, the abdominal fin six, and the caudal fin seventeen rays. The length of the fish is about eight inches.

The coral fish (*Chaetodon fasciatus*), Fig. 2, is about six and a half inches long. The main color of the head is white, with a broad black band extending from the crown of the head to the "præ operculum," or front gill cover. The body is a bright yellow, ornamented with from nine to twelve brownish-black bands running obliquely from the front upward and back, reaching to the yellow fins. The lips are rosy red. The soft dorsal and anal fins have a black border. The caudal fin has near the end a lentiform black diagonal marking and a whitish edge. The dorsal fin has twelve hard and twenty-five soft rays, and the anal fin three hard and nineteen soft rays. This fish inhabits the waters extending from the Red Sea to China.

A third species of this group is the cliff fish (*Chaetodon villatus*), Fig. 3. It is about four and a quarter inches long. The ground color of the body is lemon yellow, and has about thirteen longitudinal stripes. The head is ornamented with a broad black curved eyeband, with a narrower band behind it running in the same direction. The brow has three or four diagonal lines, which, with the bands and the surroundings of the mouth, are black. The soft part of the yellow dorsal fin has a black edged band and an orange colored border. The anal fin has a bright yellow stripe extending the whole length with an orange colored border, and the black caudal fin has a broad rosy-red border. The dorsal fin has thirteen hard and twenty-one soft rays, and the anal fin has three hard and nineteen soft rays. This beautiful fish is found in the waters between Eastern Africa and the Society Islands.

Fig. 4 represents a remarkable fish which, on account of the peculiarly elongated dorsal spine, has received the name of long-spined chaetodon or charioteer. It also exhibits well the scale covered fins. Both of the scientific names *Heniochus monoceros* are of Greek origin, the former signifying a charioteer—the long slender spine representing the whip; and the latter signifies "single horned," in allusion to the same peculiarity. The fourth dorsal spine is enormously elongated and whip-like, its use not being as yet ascertained. The prevailing color is grayish-yellow, which passes upon the breast and throat into a silvery white; the head is partially or wholly black, the side of the snout light. Two very broad black bands are drawn across the body touching

the fins. The first extends from the back to the abdomen; the second is almost parallel with the first, and runs from the fifth to the eighth spine of the dorsal fin downward to the extreme end of the anal fin. The fins are lemon color where they are not touched with the bands. This fish inhabits the whole of the Indian Ocean.

Nearly forty species of the genus to which the duke fish (*Holocanthus diacanthus*), Fig. 5, belongs are now known. They all possess some remarkable peculiarity of coloring, and the front gill cover is armed with a strong sharp-pointed thorny spine. The ground color of the body is lemon yellow. There are eight or nine pale blue bands broadly edged with black extending diagonally across the body. The back of the head is black, and beautifully marked with blue longitudinal and diagonal lines. A blue stripe surrounds the eye, another runs down to the edge of the front gill cover. The pectoral, abdominal, and caudal fins are yellow. The soft part of the dark brown dorsal fin is striped with black and blue at the edge; the remainder is spotted with dark blue. The brown anal fin is ornamented with six or seven curved bright brown bands. Fourteen hard and nineteen soft rays support the dorsal fin; three hard and nineteen soft rays, the anal fin.

The emperor fish (*Holocanthus imperator*), Fig. 6, is still more beautiful. The smutty sulphur-yellow head is adorned with a brownish black brow and eye band, which is edged with bright blue. The region over the pectoral fins has a large black spot bordered with yellow which stands out distinctly from the violet blue color of the body. The body is ornamented with a large number of curved yellow stripes extending throughout its entire length. The abdomen and breast are a greenish brown, the fins bluish, their rays brighter or darker orange color merging into black. The brown anal fin is decorated with blue curved longitudinal lines. This fish has also the thorny spine on the front gill cover. It is an inhabitant of the Indian Ocean.—*Brehm's Animal Life*.

Miscellaneous.

THE TEST OF DEATH.

The discussion is still continued in scientific circles as to what constitute the surest indications of death. The rigidity of the remains, say the majority, although that has set in before the extinction of life. The flexibility of the members is a proof of the absence of death; but such can exist along with death. Bichat maintained that in the case of the asphyxiated, no stiffness of the body is found; and Hunter asserted such was absent in the case of death from lightning; a foetus does not become rigid after death according to many. However, rigidity is a phenomenon very constant after every form of death, and observed alike with vertebrate and invertebrate animals. Though this stiffness be peculiar to the muscles, other tissues, as the brain, liver, kidneys, present a rigidity analogous, while less marked. The rigidity is presumed to be due to the coagulation of the albuminoid matters which enter into their constitution. What is the difference between congelation and rigidity? A muscle in the latter condition has still a certain degree of elasticity, but a frozen muscle is hard as metal, and when struck, sounds; when pressed, emits the crackling noise peculiar to tin. When does rigidity set in? The moment is very variable; immediately after death in some cases, and later in others. Sardines and white bait become rigid immediately after asphyxiation. There is a close connection between this stiffness and muscular irritability. All muscle separated from the nutritive action of liquid blood, passes through three stages: increase of excitability, decrease of some, rigidity and putrefaction. The stiffness is presumed to commence by the trunk and neck, next the thoracic membranes, and afterwards the abdomen. The muscles of the jaw, according to some authorities, are the first affected. Upwards of 27 per cent. of corpses become rigid within four hours, and 20 per cent. within six hours. The turning of the thumb against the palm of the hand, to be covered by the fingers, is not always a sign of death. There is a rigidity, a kind of catalepsy peculiar to battlefields; thus, a soldier has been found dead and stiff, one hand holding the bridle of his horse, the other his carbine, one foot in the stirrup and the other on the ground; another soldier whose head had been carried off by a shell, held firmly in his hand a goblet full of water that he was in the act of drinking. These phenomena can be reproduced by killing rabbits. A sardine expires instantaneously when removed from the water, but a conger