with the mouth. The barbules or horns of the cat-fish are said to receive sensations of smell and taste.

Along each side of most fish is a line of small pits provided with sense organs. This area, called the lateral line, is said to be sensitive to mechanical jars of low rate of frequency, so that as a sense it stands between touch and hearing. This lateral line is innervated by the 10th cranial nerve. What is the office of the 10th cranial nerve in man?

The ear is just back of the eye, imbedded in the side of the head, with no opening or thin area for receiving sound waves. This ear is not fitted for hearing, but serves as a balancing organ.

Watch the fish at rest or when it is swimming slowly, what motion does it make with its mouth and the operculum plates? It seems to be biting the water, taking it in by mouthfuls, and then sending it out through the gills.

The gills, or organs of respiration, are composed of numerous delicate filaments attached to rib-like structures called gill arches. There are several of these arches; the number varies somewhat with different kinds of fish, and the spaces between them are called the gill clefts.

All vertebrates possess gill arches and gill clefts at some period of their life. In fish they are permanent organs, i. e., remain functional throughout life. In amphibia they may be permanent as in some of the lower forms of the class, or as in some of the salamanders we may find them associated with lungs in adult life. In many others as frogs, toads, etc., the functional gills of early life are replaced by lungs towards the close of the larval period.

Among the reptilia, birds and mammals we never find functional gills though all possess gill arches and gill clefts for a longer or shorter period of embryonic life.

And what is even more strange, in all the classes above the fish, parts of the old gill arches and clefts are worked over by nature into various permanent adult structures. The lower jaw (the upper jaw is developed from the lower jaw), the small bones in the middle ear, the hyoid apparatus, and thyroid cartilage are all formed from old gill arches, while the Eustachian tube is the remnant of an old gill cleft.

the blood pass into the water, and at the same time oxygen from the air dissolved in the water passes into the blood. This in brief is the respiration of the fish. Compare this water respiration with air respiration? Why must fish in an aquarium be frequently supplied with fresh water?

Compare the respiration of plants and animals.

Oxygen is necessary for the life of all living substance, protoplasm, whether it is in the form of plants or animals.

Explain why a sprig of growing water plant in an aquarium will keep the water in good condition for the respiration of fish. Do animals give off a similar supply of oxygen?

Examine the mouth of a fish, and note the position of the gill arches, and note also the projecting teeth — like structures along their inner side. These structures are the gill rakers and serve to strain out small organisms and particles of food from the water taken in for respiration. Many fish feed chiefly on very small organisms, and in such forms we find the gill rakers well developed. Explain why?

Make a sketch of a dorsal view and a ventral view of a fish. Label all the parts we have mentioned. From a dead specimen cut away with a pair of scissors the operculum so as to expose the gill. Sketch the gills in the side view mentioned earlier, showing the arches, clefts and gill filaments.

The internal organs are studied from dead specimens, by cutting away one side of the body wall carefully, so as not to disturb the organs within. Push a blunt probe down the gullet to the sac-like stomach. From this organ the intestine is easily traced to the external opening vent. In front of the stomach and partly covering it is the liver, a large lobed gland, of a reddish color. Above the stomach and filling the upper half of the body cavity is a glistening white thin-walled sac filled with gases, the air bladder. Between the air bladder and the stomach and intestine are the reproductive organs. The kidneys are slender elongated dark red organs, that lie close against the body wall on each side of the vertebral column.

The air or swim bladder is an organ of considerable importance, and deserves more than a passing mention. It arises from the dorsal wall of the pharynx, and in the young fish of many species is seen to be connected with it by a tube. This connecting tube remains open throughout life in

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The gill filaments are colored from the blood they contain. They are covered with a very thin membrane or skin, through which impurities from