

CHAPTER XXII

ELECTRIC ORGANS

A GREAT many fishes are possessed of an electric organ—a curious specialization found only in this class of Vertebrates. They are all developed from modified muscular tissue formed into plates arranged in series ; the only exception is that of the electric catfish, *Malopterurus*, which is developed from cutaneous glands (Garten, 1910). When a muscle contracts the energy



FIG. 901.—THE STARGAZER, *ASTROSCOPUS*.

The electric organs are seen as the flat areas behind the eyes. The fish normally lies buried in the mud with only the eyes, mouth, electric plates and a fin showing, so that the small fish which swim too near are electrocuted and fall straight into the ugly open mouth (Alice Jane Mansueti, Chesapeake Biol. Lab., Maryland, U.S.A. : from the *Illust. Lond. News*).

developed is expended in motion, heat, and electricity ; in electric organs the electrical properties, in place of being subsidiary, become predominant. Among Selachians, in electric rays (*Hypnarce*, *Torpedo*) the organ is immense, running through the entire thickness of the body between the head and the pectoral fin ; in other rays and in the teleostean electric eel, *Electrophorus*, it is smaller and situated at the sides of the root of the tail. In the American stargazer, *Astroscopus*, however, the great rarity is found of an electric organ situated in the orbit derived from the extra-ocular muscles, all of which with the exception of the inferior rectus and the inferior oblique, while retaining to some extent their original function, have become modified

for this purpose (White, 1918 ; Woelfflin, 1955) (Fig. 901). The electric organ of the stargazer assumes a considerable size, about 1/10 of the length of the body, and occupies most of the space of the enlarged orbit so that the small eye, protected by an unusually thick sclera, is crowded into its anterior

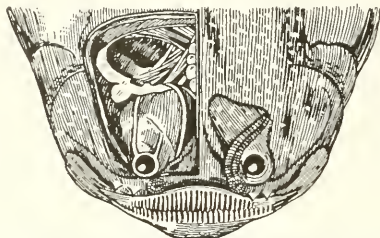


FIG. 902.—THE ORBIT OF THE STARGAZER.
Showing the electric organ (Bland-Sutton).

portion (Fig. 902) ; although the organ is relatively large, the shock derived from it, while somewhat unpleasant, is a mere tickle compared with that of certain electric fishes which can knock a man off his feet. The upward-looking eyes are situated on the upper aspect of the head just in front of the mouth, and as small fishes swim over the stargazer, it paralyses them with an electric shock so that they tumble into its gaping mouth (Dahlgren and Sylvester, 1906).

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