

NO. XXIV.—THE BEARING OF FOSSIL ICHTHYOLOGY ON THE DOCTRINE OF EVOLUTION. By R. H. TRAQUAIR, M.D., LL.D., F.R.S., Keeper of the Natural History Collections in the Museum of Science and Art, Edinburgh.

[Read 24th February, 1898.]

[ABSTRACT.]

THE lecturer pointed out that it had been urged against the doctrine of descent by Hugh Miller and others that the oldest fossil fishes we know are the remains of creatures of high organisation, and not of a low or primitive type. But we cannot accept the fishes of the Upper Silurian or of the Old Red Sandstone formation as the oldest fishes which ever lived, as the most primitive ancestors of the class of fishes could not have possessed any hard parts which were capable of preservation in a fossil state.

The palæontological record was also very imperfect from other causes, and therefore afforded us only very disjointed glimpses of the history of organic life on the globe. Many anti-evolutionists had not been able to differentiate the idea of highness and lowness of organisation from that of generalisation and specialisation of structure. The old sharks and ganoids of palæozoic times were doubtless more highly organised as animals than the mass of the fishes of the present day, but they were not so specialised as fishes. They were animals of "generalised" structure, having, as it were, the potentialities of higher development in them, and in all probability, the amphibia, and through them the higher vertebrata, had their origin from the palæozoic Crossopterygian ganoid fishes.

Thereafter as the higher vertebrata evolved, the class of fishes became more and more specialised in a direction of their own, while they tended to lose the characters which linked their ancestors and the few surviving representatives of their ancestors to the amphibia.

In illustration of the process of specialisation of various groups of fishes a very large and fine series of lantern slides was exhibited. Particularly interesting were those showing how, as M. Dollo of Brussels has pointed out, the living Dipnoi, or "lung fishes," have probably been evolved through *Dipterus*

from the ancient *Holoptychiidæ*. The line of descent of the modern bony fishes was shown to have been probably from the ancient *Acipenseroids* (*Palæoniscidæ*) through the *Lepidosteoid* and *Amioid* forms of the mesozoic periods. The gradual change of the tail from the heterocercal to the homocercal form was also shown in a selected series of slides, concluding by demonstrating how in modern homocercal fishes, as the flounder, the tail is heterocercal in the embryo.

It was strange that Agassiz, though the first to call attention to this significant fact, was an anti-evolutionist to the end of his life. But not only has knowledge increased since his time, but people's ways of looking at things have also changed, so that whether we believe in Darwin's theory of natural selection or not, the doctrine of descent is now accepted by the great majority of living naturalists.