

Excavation Discoveries in the Derwent Valley.

By EDWARD SANDEMAN.



IN excavating the large trench for the foundations of the Derwent Masonry Dam, which is now in course of construction in the Derwent Valley in North Derbyshire, a number of hard nodules were found in the shale beds of the lower Yoredale rocks.

Some of these nodules contained fossils, and one, which was found in the year 1903 at a depth of 45 feet below the surface of the ground, contained a fossil-fish, of which a description has been very carefully written by Dr. N. Smith Woodward, of the British Museum.

Dr. Smith Woodward says: "The well-preserved fossil-fish from the Derwent Valley belongs to a species, *Acrolepis Hopkinsi*, of which numerous fragmentary remains have already been found in the lower Carboniferous rocks of England, Scotland, and Belgium. Its chief interest consists in the fact that it displays the form of the trunk and some of the fins more satisfactorily than any specimen hitherto discovered. It is a typical example of the highest group of fishes which lived in the waters of the Carboniferous period, and shows how greatly they differed from the characteristic fishes of the present day. In *Acrolepis* the head is armoured with enamelled bony plates, and the body is completely covered with regular series of enamelled bony scales. Inside this external covering there are only the slightest traces of bones. In the typical modern fishes, on the other hand, the

internal skeleton is completely of bone, while the scales are usually thin, without any bony material in their substance. The only representatives of *Acrolepis* surviving at the present day are the sturgeons, which still retain an imperfect and gristly skeleton inside, with remains of the enamelled bony armour outside. Grouped with the Palæ Oniscid fishes, to which *Acrolepis* belongs, they form the great fish tribe of Chondrostei, which is characterised not only by having the principal part of the hard skeleton external, but also by the incompleteness of their fins. For instance, the tail-fin is not a perfectly symmetrical fan-shaped membrane at the end of the body, as is the case in modern bony fishes, but it runs below a long and tapering upturned prolongation of the body, which would be more efficient for wriggling on the sea bottom than for sustained swimming. In short, fashion in the highest ranks of fish life has changed since the Carboniferous period. When *Acrolepis* lived, fishes were aided in the struggle for existence by a thick, bony armour, and depended less on alertness; at the present day, they have an internal skeleton, with fins adapted for fleetness in swimming, and under such circumstances external armour has become superfluous."

The fish is 18 inches long by $5\frac{1}{2}$ inches wide.

A curious stone was also found, in digging the foundations of a shed, on September 26th, 1905, on the hillside near the Derwent Dam, at a depth of five to six feet.

There are four circular holes cut in the stone, about two and a quarter inches in diameter and half an inch deep. In the centre of two of them a circular piece of stone is left, one inch in diameter.

There is also a cutting five and a half inches long by five-eighths of an inch wide and half an inch deep, and another one, smaller and apparently unfinished.

On the under side of the stone one of the circular holes had been commenced, and, to all appearance, abandoned because of a crack in the stone on that side.



MOULD FOR CASTING RINGS.

The stone in one of the circular holes is slightly discoloured or stained.

In regard to this stone, Mr. C. H. Read, of the British Museum, says: "The stone you have found is evidently an open mould for casting bronze ingot and rings, and is probably of the Bronze Age."

Professor W. Boyd Dawkins gives his opinion as follows: "The slab of sandstone is a most interesting specimen, unlike any prehistoric mould with which I am acquainted. It appears to me to be one half of a mould for either pottery or bronze, if it is stained green for the latter. The prehistoric Iron Age people made very good castings."