III.

NOTICE OF TWO STONE MOULDS FOR CASTING SPEAR-HEADS, RECENTLY DISCOVERED AT CROGLIN, CUMBERLAND.

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I have the pleasure of exhibiting before the Society a set of moulds consisting of two stone blocks, adapted for the casting of spear-heads which were lately found in Cumberland, and which have fortunately been recovered in an unique condition, and almost perfect.

The village of Croglin is one of a line of villages which lie at the base of the western slope of the Pennine range; it is one of the Fell-side villages of Edenside. It is situated about 800 feet above the sea, and is about 14 miles to the north-east of Penrith, and 5 miles to the north of the stone circle of "Long Meg and her Daughters," at Little Salkeld. Besides this famous megalithic monument, the country round affords traces of British occupancy, in the remains of tumuli on Cumrew Fell and Carlattan, and of sepulchral circles on King Harry Common.

I may state parenthetically that at this spot we are quite out of the line of march of the Roman roads of the country, and 14 or 15 miles distant from the nearest station on the wall of Hadrian, which is Birdoswald or Amboglanna, which lies directly to the north.

In close proximity to the village of Croglin there is some waste land, near what has always been the public quarry. On the 14th of June 1883, two workmen were engaged in removing some soil from this waste ground, and at a depth of about three feet they found the two stones now exhibited, which attracted their attention, and which, though broken in several pieces, they very judiciously and carefully removed, and recovered. Not anywhere in the environs of the place where the stones were found were there any evidences of tumuli or cairn-structure, nor were there any fragments of bone, flint, pottery, or metal, noticed.

The stones were shortly after placed in my possession. For the

sake of distinction, I will call them A and B, as indicated in the annexed engraving.[1] The block A was in three pieces recently fractured, but admitting of ready adaptation, and a perfect restoration was made by dowelling and cementing. The other block B was rather more mutilated, with some fragments wanting to complete the lower end of it. I have succeeded in restoring it as far as possible.

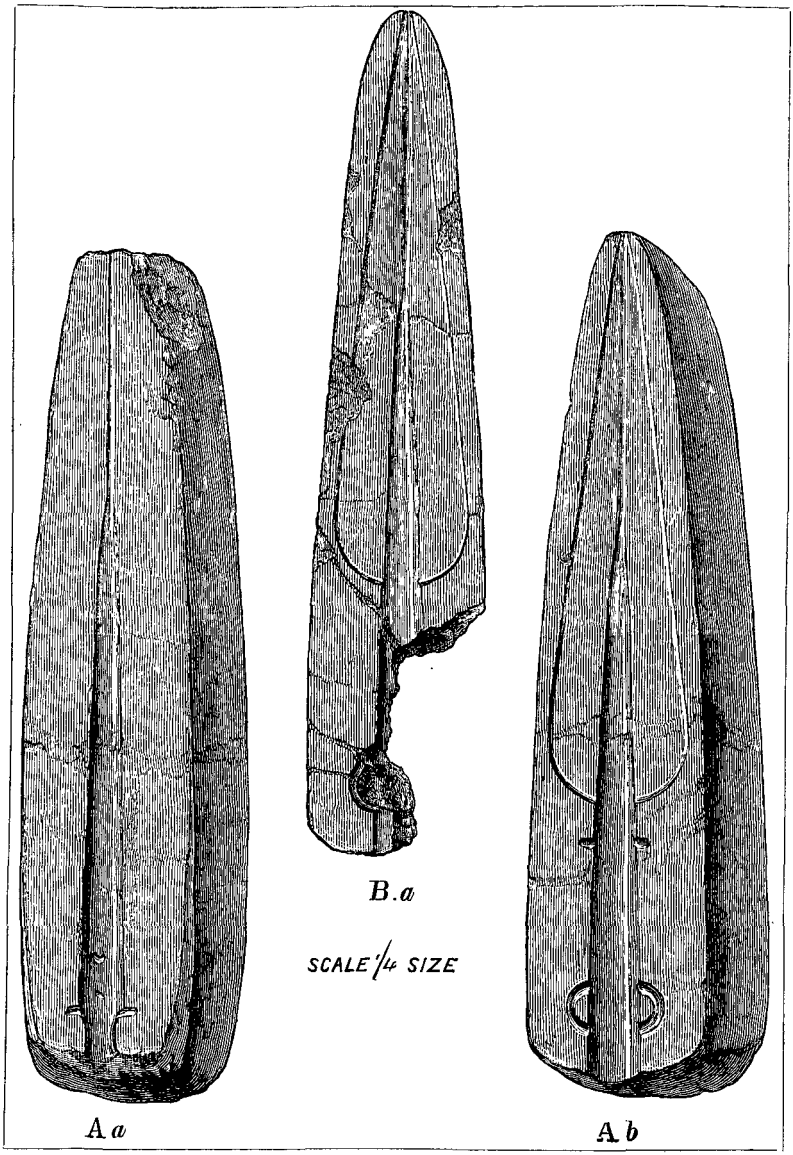
The stones are composed of a sandstone of the Carboniferous series, of an exceedingly fine grain and soft consistence, so as to be capable of being cut or pared with a knife, and of a pale fawn colour. It is a kind of sandstone which occurs in the strata of the Eden valley.

The two blocks are a pair, in their size, shape, and configuration; they are exact counterparts of each other, so that the description about to be given applies to both. Each stone is 18 inches in length; breadth $3\frac{5}{8}$ inches at base, narrowing to 1 inch at the top; thickness $2\frac{1}{2}$ inches, and uniform throughout. It is of a prismatic form, quadrangular in section, with a narrow lanceolate outline. The sides are rectangular, flat, smooth, and polished. The narrow end is bevelled downwards, so that the inferior face is $1\frac{1}{2}$ inch shorter than the upper. That which we call the superior face, as shown in A*b* and B*a*, is that on which has been carved out the mould of the spear-head. The form of the object has been worked out of the material with wonderful precision, smoothness, and accuracy; so that when the two blocks A*b* and B*a* are put together, they furnish a double mould, which would give a casting of the implement in solid metal.

The form and dimensions of the weapon are delineated by the drawing of the *intaglio*. The blade is leaf-shaped, 12 inches long, and 3 inches broad at the base, tapering to a point. The socket is 6 inches long, and 1 inch in diameter at the shaft end, and it is continued as a tapering half round midrib along the blade to the point. There are two semicircular loops attached to the socket 1 inch from the shaft.

This example is one of the very latest types of spear-heads, and belongs to the second variety in the classification adopted by Sir W.

[1] For the use of these woodcuts the Society is indebted to the Cumberland and Westmoreland Archæological Association, through their Secretary, Mr R. S. Ferguson, F.S.A. Scot.



Stone Moulds for Spear-head of Bronze, found at Croglin, Cumberland.

Wilde,[1] viz., those with loops on each side of the socket, below and on the same plane with the blade. These loops were, of course, for the passage of a thong for attachment to the shaft.

Dr Evans remarks, that there are usually no rivet holes in the spear-heads of this class,[2] nor do they appear in any he has chosen for illustration of this variety, except in one from the collection of Canon Greenwell, F.R.S.,[3] found at Knockans, county Antrim. But I think I shall be able to show that, in the example before us, arrangements have been made in the mould for providing rivet holes.

It has been accepted also as a rule, that the cores of sockets were always made of loam or sand. This doubtless is true in regard to the short thick cores of socketed celts and palstaves, as unfinished weapons have been found from time to time with burnt cores still in them,[4] but I expect to be able to prove, from these stones, that in these long slender-fashioned spear-heads, metal cores were used for coring the socket and long midrib. This custom was probably followed, on account of the difficulty of steadying a long slender core of loam, and possibly from a knowledge that a metal core toughens or hardens, or (as the foundry men say), chills the casting.[5]

I conceive the conical-shaped object, the moulds for which are graven on the reverse faces of the two stones, was the metal core. It has been suggested that it may have been a javelin, or even a ferrule to tip the lower end of a spear or lance. However, a consideration of their details will indicate that these moulds were contrived for casting solid pieces of metal for coring the socket, and forming the rivet holes. Each of the two faces presents a half-round hollow, one inch in diameter at the base, tapering to a point 11 inches along the length of the stone, terminating in a fine V-shaped gutter, which was simply the vent for the escape of air. The presence of this vent proves that the mould was for a metal casting, and that it was not a core-box for clay or loam.

[1] *Catalogue Mus. Roy. Irish Acad.*

[2] *Ancient Bronze Implements*, p. 321.

[3] *Ibid.*, p. 331.

[4] *Op. cit.*, p. 445.

[5] Metal or chill cores are constantly used with this object, in casting ploughshares, the tines of cultivators, &c.

On both moulds, 1 inch from the base, there are two transverse nicks in the stone $\frac{1}{2}$ inch long, which would give two trunnion-like stops on the casting. On the reverse of the stone B there are two similar but smaller notches, situated $5\frac{1}{4}$ inches distant from the former; these are about $\frac{1}{4}$ inch long, and $\frac{1}{4}$ inch in diameter, and conical in form. The result of the casting, after cutting off the jet and runner, would be a solid conical rod 11 inches long, with these two sets of cross stops upon it, that near the base showing a full round, the other a half-round. Now, if we examine the obverse of the stone A, we shall find notches exactly at corresponding points in the socket, and just of a size to accommodate these nipple-like projections; these notches, however, do not appear on the same face of the stone B. For the sake of a critical test, I took a cast of this conical object in modelling wax, and suspended it within the double mould for the spear-head, with its end stops resting in the mouth of the socket, and it was seen that the second set of stops fitted the notches in the stone A, and so supported the rod in its place.

Dr Evans remarks—"It is difficult to understand the manner in which the cores for forming the sockets of the spear-heads were supported in the moulds. Possibly small pieces of bronze were attached to the clay core, which kept it in position, but which during the casting process got burnt into the molten metal; I have, however, found no actual traces of such contrivance."[1] These stones demonstrate the contrivances designed to support a metal core within the mould, and the method of producing the rivet holes: besides these, I find there are two other examples amongst the stone moulds for spear-heads existing in the museums of the country which present the same arrangement.[2]

These trunnion-like projections, however, within the socket must have been movable, otherwise it would have been impossible to have withdrawn the core after the metal had cooled. The following I conceive must have been the procedure. The two cross stops were chiselled off from the metal core, and laid in their appropriate notches, after having been rubbed over with plumbago or some simple means to prevent the

[1] *Ancient Bronze Implements*, p. 435.

[2] One in British Mus. from Loch Gur, co. Limerick, *Arch. Journ.*, vol. xx. p. 170; and one from Anglesea, *Arch. Journ.*, vol. iii. p. 257.

action of the hot metal; the pointed spiked object would be similarly treated, and then be wedged between the two loose cross stops, which would steady it in its place, and act as *chaplets*, as they are called in the foundry language. The inside of the moulds would then probably be smoked, as is done with plaster moulds at the present day; a little fine damp sand would be sprinkled between the opposing surfaces of the stones, to secure a fine joint; the two blocks would then be firmly bound together, and placed upright in sand; the molten bronze would then be poured in from the crucible. After the cooling of the casting, the metal core would be easily withdrawn, and the two little wedges punched through the rivet holes, and extracted from the interior of the socket. A moderate amount of heat suffices to bring bronze to the proper temper for hammering; the semicircular loop-holes would then be slightly flattened, and the edge of the blade would be drawn fine by beating, and finally sharpened on the whetting-stone. The end of the tough ash shaft would be pared to fit the socket, and fill the midrib, which was made hollow half-way up the blade, both to lighten the weight of the weapon, and to improve its poise and balance; a peg of horn would probably be used as a rivet, and a thong of deer-hide or split sinews would be passed through the loops, and lapped round the haft.