

## VI.

NOTICE OF A ROMAN BRONZE PATELLA, FOUND ON THE FARM OF PALACE IN TEVIOTDALE, ROXBURGHSHIRE; WITH CHEMICAL ANALYSIS OF THE METAL AND INSIDE COATING OF THE PATELLA, BY STEVENSON MACADAM, PH.D., LECTURER ON CHEMISTRY. BY JOHN ALEX. SMITH, M.D., SEC. S.A. SCOT.

A short notice of the finding of this Roman Bronze was previously laid before the Society.<sup>1</sup> I have now, however, the pleasure of presenting it for preservation to our Museum of Antiquities, and shall enter a little more

<sup>1</sup> Proceedings, vol. i. p. 69.

into detail, than was previously done. This small pot or patella with handle, probably a vessel for cooking purposes, is formed of fine yellowish bronze, and is beautifully finished, apparently on the lathe, marks of the tool still remaining on its inner surface. It measures  $7\frac{1}{2}$  inches in diameter across the mouth, and about  $4\frac{1}{2}$  inches in depth; and tapers a little towards the bottom, which is flat, measuring  $5\frac{1}{2}$  inches across, and is ornamented on the outside (fig. 2) with five concentric circles or rings of thicker metal, projecting from its surface. The handle is flat, and  $6\frac{1}{4}$  inches in length; it springs from the rim or mouth of the vessel, of which it forms a part, and terminates in a circular-shaped extremity nearly 3 inches across, which is perforated by a round hole in the centre. The vessel (fig. 1) is well shown in the annexed drawings, fig. 2 representing the inverted bottom of the vessel. An ornamental stripe or band



Fig. 1.

Fig. 2.

is cut on the outside of the pot, just below the projecting lip or rim; and the inside has the appearance of having been lined or thinly coated with a white metal resembling tin.

The pot was discovered in the month of December 1849, by Robert Watson, while cutting drains in a field called the Ward-law Meadow, on the farm of Palace, in the parish of Crailing, about a mile and a quarter from the bank of the river Teviot, and nearly about the same distance to the east of the river Jed, and line of the Roman Road, which passes through the Cheviots, running north for St Boswells and the village of

Newstead. The pot was lying at a depth of 18 or 20 inches from the surface, and the drainer unfortunately struck his pick-axe through its side before he discovered it. The bottom of the vessel, which is formed of a separate and thicker piece of metal, was also probably loosened by the stroke, and before long fell out altogether. To remedy this defect, and prevent the bottom being lost, several holes were pierced through the sides and bottom of the vessel, which were then tied together, the discovery being made that the metal was now very brittle.

Learning that a bronze pot had been dug up in Teviotdale, and that a relative of the finder lived in the Melrose district, I communicated with the latter, got him to pay a visit to his friend, and try to purchase the vessel for me, and after some time he was successful. It was reported to have been filled with money when found, but on careful inquiry, it appeared the vessel had been quite empty.

This pot, apparently of Roman manufacture, corresponds in style and workmanship to bronze patellæ found at Roman sites in various parts of England; but, as far as I am aware, comparatively few vessels of a similar kind have been discovered in Scotland. It is also interesting from its being discovered at no great distance from the line of the great Roman road, which crosses the district, and especially from its being the only Roman relic known to have been found in that neighbourhood, in which some antiquaries have believed a Station must have existed, not far from the place where the Great Road crossed the river Teviot on its way to the north. (See Roy's Milit. Antiq., p. 102.)

The style of manufacture of this Roman pot is perhaps worth notice, in so far that we seem to have an arrangement of the metal skilfully made so as best to adapt it for use in cooking. The strong rim of the vessel, with its firm handle forming a component part of it; the sides of the vessel thin, so as to be easily and rapidly heated; and the bottom stronger and thicker, the metal being thrown into ribs or rings, projecting from its surface, which not only increases its strength, and enables it to stand the wear and tear of use, by skilfully adding to the amount of metal, but also its power of retaining heat; which, with the tinned lining of the pot, seem to show an amount of applied science to vessels of domestic use, that I am not sure we have surpassed in our own day.

Being anxious to compare the chemical composition of the metal of

this pot, with that of other bronzes believed to have a different origin, as the axe-heads or celts of different kinds found in Scotland, of which analyses have been published in the "Prehistoric Annals," from specimens in our Museum, selected by Dr Daniel Wilson so as to furnish "a comprehensive diversity in the elements of comparison." I requested Dr Stevenson Macadam, Lecturer on Chemistry, to make a careful analysis of this patella, and give me the result to lay before the Society; —at the same time specially calling his attention to the peculiar appearance of the white metal which seemed to have formed a lining to the pot, as I was not aware what particular alloys the Romans used for coating or tinning their copper vessels, to avoid corrosion and the deleterious effects which would in consequence follow any admixture of the copper with the food cooked in the vessel.

Dr Macadam accordingly made the following analysis, estimating the composition of its white lining, from a part of the thin and broken side of the pot; and cut a portion from the back of the thicker handle, to judge of the character of the bronze itself. The result shows, that the Romans, occasionally at least, tinned their copper vessels; and the details allow a comparison to be made with the published analyses of other bronzes.

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"NOTE OF THE ANALYSIS OF THE METAL AND INSIDE COATING OF A BRONZE PATELLA, NOW PRESENTED TO THE MUSEUM BY DR J. A. SMITH. BY DR STEVENSON MACADAM.

"About the year 1848, I was requested by the late Professor George Wilson, whose senior assistant I then was, to examine, by chemical analysis, six specimens of ancient bronze which he had received from his brother, Dr Daniel Wilson. These analyses, with accompanying remarks regarding the nature of the bronze relics, and the localities in which they were found, were printed in the admirable work on "The Archæology and Prehistoric Annals of Scotland," written by Dr Daniel Wilson, and published in 1851, p. 246.

"In these six specimens of ancient bronze, the proportion of Copper

ranged from 81.19 (81) to 92.89 (93) per cent. ; the Tin from 5.15 (5) to 18.31 (18½) per cent. ; and the Lead from 0.75 (¾) to 8.53 (8½) per cent.

“ The Roman bronze pot or patella now presented to the Museum of the Antiquaries of Scotland by Dr John Alexander Smith, appears highly finished, and is composed of fine yellow bronze, which is coated over with metal to represent the process of tinning resorted to at the present day.

“ The composition of the bronze metal, as obtained by the analysis of fragments of the patella, is as follows :

Copper, . . . . .	79.77
Tin, . . . . .	10.56
Lead, . . . . .	9.43
Loss in Analysis, . . . . .	0.24
	100.00

Specific gravity, 6.62 (water = 1.00).

“ It will be observed, therefore, that this bronze contains a medium percentage of tin, and a comparatively large percentage of lead.

“ The white metal lining or tinning of the true bronze of the patella, is composed of tin and lead, in nearly equal proportions.

“ STEVENSON MACADAM, Ph.D.”

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This being the concluding Meeting of the Session, votes of thanks were given to the Office-bearers and Chairman, and the Society adjourned until next November.