IX.—*On some Iron Tools and other Articles formed of Iron found at Silchester in the year 1890; by SIR JOHN EVANS, K.C.B., F.R.S., Vice-President.*

Read February 16th, 1893.

IN the account of excavations at Silchester, given to this Society by Messrs. G. E. Fox and W. H. St. John Hope, in December, 1890, and published in the *Archaeologia*,^a attention is called to a very remarkable collection of antiquities which were found in a pit in the part of the town known as *Insula I*.

This consisted of a number of iron objects mixed with a few others of different material. At a depth of five feet from the surface lay a sword-blade, broken in two, and two iron bars, but below these was found a mass of nearly sixty iron articles, which it is the object of the present paper to describe at somewhat greater length than could be afforded in an account dealing with the whole of the discoveries made during a season's excavations.

The authors, however, called attention to most of the principal forms of tools and instruments, and in the list they gave mentioned two files, which on further examination appear more probably to have been chisels, while, as was perhaps unavoidable, some other forms were passed by unnoticed.

They also called attention to the closely analogous find of no less than ninety-six iron articles, many of them identical in form with those from Silchester, which was made by the late Lord Braybrooke, in 1854, at Great Chesterford, in Essex. An illustrated account of this discovery is given in the *Archaeological Journal*,^b to which I shall have frequent occasion to refer.

^a Vol. lii. p. 742.

^b Vol. xiii. p. 1.

The authors regarded this as the only other discovery of the same kind that had been made in Britain, and possibly the iron tools found at Kingsholm, Gloucestershire, and figured by Lysons^a in his *Roman Antiquities* discovered in that county, did not constitute a hoard. The objects, whether found together or not, are now in the British Museum.

The discovery of some smaller deposits has also been recorded, such as that at Bigberry^b Hill, near Canterbury, whence the late Mr. John Brent obtained a plough-share, a coulter, and a cattle-goad, and subsequently four iron sickles or bill-hooks, several rings, part of an iron rod, and other objects, all associated with Roman remains.

In France a considerable number of iron tools of the Roman period have been discovered, and notably an extensive series of carpenters' and builders' tools, near Saumur, and preserved in the museum of that town. Many of these have been figured by Liger.^c

The numerous iron instruments found at Hod Hill, Dorset,^d belong to the late-Celtic rather than to the Roman period; at that place some seventeen swords, with a kind of socketed hilt, were found, while at Bourton-on-the-Water,^e Gloucestershire, in 1860, no less than one hundred and forty-seven such blades were found together. The sword from Silchester is of a different character, having a plain tang for the hilt, and in general appearance much resembling the ordinary swords from Saxon cemeteries, such, for instance, as those from Ozingell.^f

Sword.—The blade (fig. 1), now broken in half, is $25\frac{1}{2}$ inches long. It is

Fig. 1. Sword-blade. $\frac{1}{2}$.

double-edged, $1\frac{3}{4}$ inch wide at the hilt and tapering to about $1\frac{1}{2}$ inch at three inches from the point. It has a tapering tang to go into the hilt, which is $\frac{5}{8}$ inch wide, where it joins the blade so as to leave a square shoulder on either side. Near the tang on one face of the blade is what may be a maker's mark somewhat like the numerals VII.

Besides the two iron bars that lay with the sword was a third at a greater depth, which formed part of the more extensive deposit.

^a *Reliquiæ Britannico-Romanæ*, ii. Pl. XI.

^b *Collectanea Antiqua*, vi. 262.

^c *La ferronnerie*.

^d *Collectanea Antiqua*, vi. 1.

^e *Proceedings of the Society of Antiquaries*, 2nd S. i. 234.

^f *Collectanea Antiqua*, iii. Pl. II.

One of these bars (fig. 2) is perhaps the longest object found. It is 3 feet

Fig. 2. Axle (?). $\frac{1}{8}$.

$\frac{3}{4}$ inch in length, but has the appearance of being unfinished. It is indeed much like a portion of an axle of a carriage roughly forged. At one end it is conical and tapers from $1\frac{1}{4}$ inch to $\frac{3}{4}$ inch in a space of little more than 6 inches. Then comes a collar 2 inches square and $\frac{1}{2}$ inch wide, beyond which the bar is about $1\frac{1}{4}$ inch square for a distance of about 7 inches, it then becomes round and about $1\frac{1}{4}$ inch in diameter, but for a few inches at the end is drawn down flat on each side as if for some other pieces to be welded on. The whole bar shows some signs of having been originally two flat bars welded together.

The two other bars of iron appear both to have been forged for the same purpose, but what that purpose was is very uncertain. One of them is 2 feet $6\frac{1}{2}$ inches long, for about 1 foot 6 inches, made from a bar nearly an inch square, on which another bar 1 inch by $\frac{3}{4}$ inch has been welded, the weld being quite visible. At one end three sides of the bar have been more or less rounded and brought to a blunt point somewhat like the end of a boat. The other end appears to be unfinished, but gradually tapers in thickness.

The other of these two bars is 2 feet $5\frac{3}{4}$ inches long and of much the same general character. At a foot from the pointed end it is $1\frac{1}{8}$ inch by 1 inch bare. From a point about a foot from the other end it is gradually reduced both in width and thickness, the end itself being left truncated. It is hard even to suggest a purpose for these bars; they may, however, have belonged to some form of scarifier, harrow or *irpev*. In the Chesterford deposit were five bars, varying in length from 2 feet 2 inches to 2 feet 6 inches, of iron $1\frac{1}{4}$ inch by 1 inch and tapering to a point at each end. From the figure given by Lord Braybrooke,^a they seem to have been almost identical with the Silchester examples. He offers no suggestion as to their use.

In addition to the bar already described, the objects of which the principal deposit consisted were—anvils of three kinds, axes, adzes, hammers, tongs, chisels, gouges, a kind of file, a plane, a horse-shoe, a lamp, and a gridiron. On all of these it will be well to say a few words, though the classification of the tools must be somewhat arbitrary as they are such as were used by workmen of various

^a *Archaeological Journal*, xiii. Pl. II. fig. 17.

trades, blacksmiths, husbandmen, carpenters, coopers, shoemakers, cooks, and possibly others.

Anvils.—Of these three kinds were found, the one much like those in common use by blacksmiths at the present day, the other two of less well-known types.

Of the first kind but one example occurred (fig. 3). Its face is nearly flat, about $14\frac{1}{2}$ inches in extreme length, its greatest breadth being about $2\frac{1}{2}$ inches.

Fig. 3. Anvil. $\frac{1}{4}$.

One end forms a conical beak while the other is as usual flat. The face of this latter is somewhat depressed, possibly by hard wear. It is rounded at the end, toward which it slightly tapers. The stem of the anvil, which was probably received by a wooden block, is about $10\frac{1}{2}$ inches long, and tapers from about 2 inches square at the top to about $1\frac{1}{4}$ inch square at the bottom. The total weight is $20\frac{1}{2}$ lbs. Many of the earlier forms of large iron anvils seem to have had no beaks, though some of the small bronze anvils of the Bronze Age are provided with them. An anvil with a single beak is figured on a gem.^a

Fig. 4. Shoemaker's Anvil. $\frac{1}{4}$.

Two anvils of a second kind were present. These are of a different and lighter character, and of a form still in use by shoemakers, having a flattish sole-shaped face supported on a long stem. In the larger of the two this face is about 6 inches long, tapering from about 2 inches to 1 inch in breadth, and somewhat rounded at each end (fig. 4). The part forming the face is about $\frac{1}{4}$ inch thick, but it is strengthened by flanges at the edges on the lower side, and by a central support about $\frac{3}{8}$ inch deep, branching from the stem. This stem is in all about $11\frac{1}{4}$ inches long, $1\frac{3}{8}$ inch by $\frac{3}{4}$ inch in section at the top, and 1 inch by $\frac{3}{4}$ inch where it starts from a square collar $1\frac{1}{2}$ inch by $1\frac{1}{4}$ inch, and $\frac{1}{2}$ inch wide, which prevented a projecting tang $2\frac{5}{8}$ inches long from being driven too far into some wooden support. The tang is rounded towards the end, and the central part of the stem has also its angles rounded.

^a Blümner, *Technologie*, vol. ii. p. 189 a. Smith's *Dictionary of Antiquities*, 3rd ed. s. v. Incus.

The face of the smaller anvil is about $5\frac{3}{8}$ inches long, tapering from $1\frac{1}{2}$ inch to 1 inch, with rounded ends. The stem is about 9 inches long with a strong arm proceeding from it to support the face. At the top it is about $1\frac{1}{8}$ inch by $\frac{7}{8}$ inch in section, tapering to about $\frac{7}{8}$ inch by $\frac{3}{4}$ inch at $2\frac{1}{2}$ inches from the end. From this point it is drawn down with a slight shoulder into a wedge-like tang to fix in wood. This form of anvil appears to have been unknown to Blümner.

Of the third class of anvils there are no less than four specimens, varying in total length from about $10\frac{1}{2}$ inches to 7 inches. The principle on which they are constructed is the same in all. A piece of iron, rather more or less than an inch square, has been drawn down to a point at one end, the other being left flat, and the angles flattened so as to give that end an octagonal or nearly circular form. At about a third or a quarter of the total length of the iron from the top, or just about at the spot where it begins to be drawn down towards the point, a hole has been punched through the square part of the bar. Through this, in three cases, two pieces of flat iron, and in one case one only, have been passed, and the ends projecting beyond the bar have then been coiled, so as to make rings or spirals, which form brackets at right angles to the principal stem. The pieces of iron thus inserted are usually about $\frac{1}{2}$ inch wide and from $\frac{1}{8}$ inch to $\frac{1}{4}$ inch thick, and the rings or spirals formed by coiling them are from $1\frac{1}{2}$ inch to 1 inch in diameter, their depth being the width of the iron, or about $\frac{1}{2}$ inch. There was at first a difference of opinion as to the purpose which these instruments were intended to serve, some persons having regarded them as tent-pegs, but it was soon recognised that they were anvils. This was shortly afterwards conclusively confirmed. Mr. J. A. Jones, of Gijon, near Oviedo, Spain, obligingly sent over two small anvils of the same kind, which he described as being in daily use in Spain by the farmers and mowers, on which to beat out the edges of their scythes. They are constantly used in the province of Asturias, and are made in large quantities at a factory at Toledo. Our Fellow Mr. Frederick Davis says that such anvils are also in use in the north of Italy, and has kindly sent us a specimen made on the same principle as those from Silchester, and now regularly shipped from Birmingham to the Spanish settlements of South America.

Fig. 5.
Mower's Anvil. $\frac{1}{4}$

Mr. Thomas J. Jeakes also pointed out in *Notes and Queries*^a the true use of these objects, and cited the use of "enclumettes" of the same character in Burgundy.

^a January 31, 1891, 7th S. xi. p. 81.

The principal difference between the old and the new form is, that the proportions of the stem above and below the brackets have been reversed, the tapering part in the modern examples forming only about one-third of the total length instead of two-thirds. This brings the face of the anvil higher above the ground, say 7 inches instead of 3 or 4 only, and no doubt adds to convenience in use. The manner in which these anvils are fixed is by driving the spiked end into the ground, and at the same time placing stones or other supports under the brackets to prevent them from going down farther into the earth. In my *Ancient Bronze Implements*,^a I have, on the authority of the Rev. W. C. Lukis, F.S.A., mentioned the use in Brittany of iron-tipped stakes, which, when driven into the ground, form convenient anvils on which to hammer out the edges of sickles, and have called attention to the fact that in England a small anvil to cut and punch upon, and on which to hammer cold work, is still called a "stake."

Among the Roman antiquities of iron discovered at Great Chesterford, Essex, in 1854, and described by the late Lord Braybrooke,^b were five of these instruments, which he terms "anvils or anvil-pegs." Three of them were 9 inches and two 11 inches in length, and all had loops, one on each side, projecting from 1 to $1\frac{1}{2}$ inches horizontally. Another of the same kind, but without loops, had been found in the same neighbourhood, and had been termed a "gate-anvil." It is to be observed that in the Chesterford hoard no less than twelve scythes were present. An example of an anvil of the same kind has been engraved by Liger^c as a mower's anvil, "*enclume de faucheur*," "*laquelle est absolument semblable à celles dont on se sert de nos jours*."

Plough-coulters.—Of these two were found, both of very heavy fabric. The total length of one is 2 feet $2\frac{3}{4}$ inches, that of the other, which has lost a part of its point, must have been fully 2 feet 4 inches (fig. 6). The stem of each has been

Fig. 6. Plough-coulter. $\frac{1}{8}$.

formed of iron about $1\frac{1}{4}$ inch square, with the angles chamfered. The blade part of the smaller is 8 inches long and 3 inches wide at the top, that of the larger has been rather shorter, but nearly $\frac{3}{4}$ inch wider. They weigh $8\frac{1}{2}$ lbs. and 10 lbs.

^a p. 181.

^b *Archaeological Journal*, xiii. p. 1.

^c *La ferronnerie*, ii. 103.

respectively. Five even more ponderous coulters, weighing from 14 to 16 lbs., and from 2 feet 3 inches to 2 feet 11 inches long, were in the Chesterford deposit. The stems of two were octagonal, $1\frac{3}{4}$ inch in diameter; those of the other three were 2 inches square.

The plough-shares in Roman times in Britain seem generally to have been made of wood tipped with iron. Some form of wheel-plough appears to have been known, and possibly the next object described may have belonged to a plough-wheel.

Axle-box (?)—A sort of ferrule made of thin iron, about 4 inches long and 2 inches in diameter, may have served as an axle-box (fig. 7).

At the ends the metal has been hammered over outwards, so as to form a flange to keep the box in its place.

Fig. 7. Axle-box (?). $\frac{1}{2}$.

Hammers.—Of hammers there are three, all somewhat different but resembling each other in being slightly curved so to form an arc of which the haft was the radius. They all have a nearly circular and flat face at one end, and a transverse semi-cylindrical one at the other. This is at right angles to the haft so that they are what is technically known as “cross-paned.”

The heaviest weighs $34\frac{3}{4}$ ounces avoirdupois, and is nearly 7 inches long. The flat face is about $1\frac{1}{4}$ inch in diameter and the other $\frac{7}{8}$ inch wide (fig. 8). The hole for the haft is in the middle of a lozenge-shaped expansion, about $2\frac{1}{4}$ inches from angle to angle, and is circular, tapering from $\frac{5}{8}$ inch on the inner face to $\frac{1}{2}$ inch on the outer. In any section both the inner and outer faces of the head are comparatively flat and the sides rounded.

Fig. 8. Hammer-head. $\frac{1}{2}$.

The next head, about 6 inches long, weighs $33\frac{3}{4}$ ounces, but the socket for the haft is filled up with apparently a piece of iron. The striking face is more octagonal than round, and is about $1\frac{3}{8}$ inch across. Some of the oxidized iron has scaled off, and there is every appearance of the face of the iron hammer having been “steelled” by having a thin plate of steel welded on in precisely the same manner as that now usual in the making of hammers. The “pane” end is $1\frac{1}{4}$ inch wide, the rounding being about $\frac{1}{2}$ inch in diameter, as is the case with the other just described.

The third hammer-head is somewhat lighter, 22 ounces, but is fully $6\frac{1}{2}$ inches long. The face has been much spread by use, and is now about $1\frac{1}{2}$ inch across,

though originally only an inch (fig. 9). The other end is about $\frac{7}{8}$ inch wide.

Fig. 9. Hammer-head. $\frac{1}{3}$.

The shaft hole is partly blocked with rust, but it appears to be nearly of equal size throughout and $\frac{5}{8}$ inch in diameter.

There were five hammers of much the same form and character in the Chesterford deposit, but though from 6 to 7 inches long they were of lighter make, weighing from 12 to 28 ounces.

The perforation for the handle seems to have been little more than $\frac{3}{4}$ inch in diameter. It is indeed remarkable how small the shaft holes in these heavy hammers are, and it is difficult to conceive how any wooden hafts, however tough, not more than $\frac{3}{4}$ inch across and placed in circular and not oval sockets, can have sufficed for hammers over 2 lbs. in weight. Driving a wedge into the end of the haft to make it tight in the socket would at the same time tend to diminish its strength. The fact that one of the Silchester hammer-heads has its socket completely filled apparently with iron, suggests the possibility of some kind of compound haft of which the iron end went into the socket of the head. Possibly the hafts may have been made of softened hide which was subsequently stiffened by drying.

Tongs.—A single pair of tongs was found closely resembling the common blacksmith's tool of the present day. In extreme length it measures $24\frac{5}{8}$ inches, the rivet that joins the two limbs being $18\frac{1}{8}$ inches from the end of the longer (fig. 10).

Fig. 10. Pair of Tongs. $\frac{1}{6}$.

This limb is about $\frac{9}{16}$ inch in diameter in the middle, tapering to about $\frac{5}{16}$ inch at the end, which is rounded. The other limb measures $16\frac{3}{4}$ inches. It is of the same diameter in the middle as its fellow, and tapers down to $\frac{1}{16}$ inch at the end, where it expands into a small somewhat conical knob. When the tongs are closed the handles are still $1\frac{1}{2}$ inch apart.

The grip of the tongs extends $6\frac{3}{8}$ inches beyond the centre of the rivet. The ends are turned up at right angles for about $1\frac{3}{4}$ inch, but one of them has a second turn of about $\frac{1}{2}$ inch in length and overlaps the opposite end. This part of the tool is considerably curved, so that there is a pointed oval opening between the two limbs nearly $1\frac{1}{2}$ inch wide in the middle. At the hinge they

have a section of $1\frac{3}{8}$ by $\frac{3}{8}$ inch, but taper down to about $\frac{3}{8}$ inch square at the end. A pair of tongs of rather smaller dimensions was found with other tools at Kingsholm,^a Gloucestershire, and is now in the British Museum. In several ancient representations of tongs on vases and wall-painting one limb of the handle is shown as shorter than the other, as in these examples. Representations of several ancient forms of blacksmiths' tongs are given by Blümner^b and Liger.^c

Axes.—Of axes eight were found, all of them with curved blades and with an edge at one end and a flat rectangular face at the other, which could be used as a hammer. The longest is 10 inches in extreme length, with an edge $2\frac{3}{4}$ inches wide and a hammer face $\frac{7}{8}$ inch by 2 inches. This is $2\frac{3}{4}$ inches above the eye, which is oval and about $1\frac{1}{2}$ inch by 1 inch. There is a projecting rim round the eye, which gives it a length of $1\frac{7}{8}$ inch. Without this rim the blade would have been only $1\frac{1}{8}$ inch through. It weighs nearly 3 lbs. 10 ounces.

FIG. 11. Axe-head. $\frac{1}{2}$.

An axe-head of the same character was found in the Romano-British village at Woodcuts Common^d by General Pitt-Rivers.

The next five to be described are all of one pattern and without any rim round the eye. They vary in extreme length from $7\frac{1}{2}$ inches to 8 inches. The eyes are oval, about $1\frac{1}{2}$ inch by 1 inch, and the hammer faces from $1\frac{1}{2}$ inch square

FIG. 12. Axe-head. $\frac{1}{2}$.

FIG. 12. Upper View.

to $1\frac{3}{4}$ inch by $1\frac{1}{4}$ inch. The cutting edges, which are slightly curved, are from 3 inches to $3\frac{3}{8}$ inches long. The heaviest weighs 3 lbs. 7 ounces and the lightest 2 lbs. 15 ounces.

^a Lysons, *Reliquiae Britannico-Romanae*, ii. Pl. xi. 2.

^b *Technol.*, ii. 193.

^d *Excav. in Cranborne Chase*, i. Pl. xxvi. 2.

^c *La ferronnerie*, ii. 151.

The other two are smaller, weighing only 2 lbs. and 1 lb. 10 ounces respectively. They are rather more curved in form and the eyes nearer the hammer end. They are $6\frac{5}{8}$ inches and 7 inches in extreme length, with edges about 3 inches wide and hammer faces $1\frac{1}{2}$ inch square and $1\frac{3}{8}$ inch by $1\frac{1}{4}$ inch.

In general appearance they closely resemble the *franciscas* so frequently found in Merovingian and Saxon tombs. An axe-head of the same form and about the same size occurred in the Chesterford hoard.^a One from Combe End,^b Gloucestershire, has the blade thinner near the shaft-hole.

Adzes.—Two adzes were present in the hoard, both of rather peculiar form, and not improbably tools for a cooper. The longer combines a hammer with an

Fig. 13. Combined Adze and Hammer. $\frac{1}{3}$.

adze (fig. 13). The socket for the shaft is about 1 inch in diameter at the inner end and $1\frac{1}{8}$ at the outer end, so that the haft could be wedged firmly into it. The metal of the socket is about a quarter of an inch thick, and from one side of it at its outer end springs a square stem with rounded corners about $2\frac{3}{8}$ inches long and barely $\frac{3}{4}$ inch across, the end of which has been considerably "upset" by hammering. From the opposite side of the socket springs an adze-blade $\frac{3}{4}$ inch square at its origin, and expanding to a cutting edge $2\frac{1}{2}$ inches wide. The blade is about $4\frac{1}{2}$ inches long and is bent in a kind of ogee curve. It is much inclined inward, so that a line drawn from the edge to the outer end of the socket would make an angle of about forty degrees. An adze of the same character but with the blade simply curved is in the Saumur Museum.^c

The other tool is more like an ordinary adze. The shaft-hole, which is only $\frac{5}{8}$ inch in diameter, is very near the flat end, which has a hammer-like face $1\frac{1}{4}$ inch by $\frac{3}{4}$ inch. The blade below the shaft-hole measures $4\frac{1}{2}$ inches along its outer face, and expands into a gouge-like edge about $1\frac{3}{4}$ inch across (fig. 14). The circle, of which it forms an arc, would be about 2 inches in diameter.

Fig. 14. Adze. $\frac{1}{3}$.

Such a tool is well adapted for any hollow work, such as the inside of tub-staves or bowls.

^a *Archaeological Journal*, xiii. Pl. I. 9.

^b Lysons, *op. cit.*, Pl. II. 5.

^c *Coll. Ant.*, iv. Pl. ix. 4; Liger, *op. cit.* Pl. xxvi.

A somewhat analogous adze to that first described was in the Kingsholm hoard,^a but the blade is not bent back and the length is rather greater.

Many representations of the Roman adze or *ascia* are known.^b

Chisels.—Of chisels there are at least five, four of them socketed, and three of them apparently mortising chisels. The two largest are about 10 inches long, with tapering round sockets about 1 inch in diameter at the mouth. The blade in one is $\frac{5}{8}$ inch by $\frac{1}{2}$ inch, in the other $\frac{3}{4}$ inch by $\frac{3}{8}$ inch, and the edges $\frac{7}{8}$ inch and $\frac{3}{4}$ inch wide. (Fig. 15.) A lighter chisel is about $8\frac{1}{2}$ inches long, with a cutting edge about $\frac{1}{2}$ inch wide. Two others may be paring chisels. One of them is, however, of heavy make, $8\frac{1}{2}$ inches long and nearly $\frac{3}{4}$ inch wide at the edge. The other is lighter, $6\frac{3}{4}$ inches long and $\frac{5}{8}$ inch wide, with a socket $\frac{3}{4}$ inch in diameter at the mouth. The blade tapers from about $\frac{5}{16}$ inch in thickness to $\frac{3}{16}$, and then has a long bevel. The sockets seem to have been made by drawing out the iron and then welding the edges together over a conical mandrel. A sixth socketed tool is apparently a chisel, but is too much rusted for certain identification.

Fig. 15. Group of Chisels. $\frac{1}{2}$

There is a flat blade $\frac{5}{8}$ inch by $\frac{7}{16}$ inch, but somewhat tapering, which has a tang about 3 inches long instead of a socket, and is in all $10\frac{1}{2}$ inches long. The end is broken off, but the broken part is extant and is about 3 inches long, and is turned up at the end like a modern heel-tool for turning iron. It may possibly have been used for such a purpose.

Gouges.—Of socketed gouges there are five, made after the same manner as the chisels. The longest measures about $12\frac{1}{2}$ inches, and beyond the socket has an octagonal stem about $\frac{5}{8}$ inch thick (fig. 16). The channel of the gouge is about $\frac{1}{2}$ inch across, and the edge is formed by grinding from the outside, after the manner of a modern turning gouge. The tool may have been intended for use with a lathe.

^a Lysons, *op. cit.* Pl. XI. 1.

^b See Smith's *Dictionary of Antiquities*, 2nd ed., s. v. *Ascia*; and Blümner, *op. cit.* ii. 206.

Another gouge is 12 inches long, with a socket $\frac{7}{8}$ inch in diameter at the mouth. The octagonal stem is fully $\frac{3}{4}$ inch across. The hollowed part extends only a short distance up the stem,

Fig. 16. Group of Socketed Gouges. $\frac{1}{2}$.

and has been ground from the inside. Its width is $\frac{3}{4}$ inch. A gouge of the same kind, with a round stem which tapers from the socket to only $\frac{5}{8}$ inch in diameter, expands rapidly to a cutting, almost semicircular, edge fully an inch across. This tool is $9\frac{3}{4}$ inches long. The other two are of long and slender build, one having a round and the other a nearly square stem proceeding from sockets of about $\frac{5}{8}$ inch and $\frac{3}{4}$ inch openings. They have cutting edges about $\frac{1}{2}$ inch wide, and have been ground both from the inside and the outside. They are $10\frac{5}{8}$ and $10\frac{1}{4}$ inches long respectively. A socketed gouge, 9 inches^a long, occurred in the Kingsholm hoard. Another, about $6\frac{1}{2}$ inches long, was found by General Pitt-Rivers at Woodcuts Common.^b A German example is figured by Lindenschmit.^c

Paring-knives (?).—There are two curious blades, which may possibly have been parts of some kind of shaving or paring tool, like a spokeshave. The blade of the more perfect of the two is $8\frac{5}{8}$ inches long and rather more than 1 inch wide

Fig. 17. Paring-knife (?). $\frac{1}{2}$.

(fig. 17). The back of the blade is nearly $\frac{3}{8}$ inch thick, and has at one end a small projecting stop about $\frac{3}{8}$ inch long, and at the other a square tapering tang, of

^a Lysons, *op. cit.* Pl. XI. 5.

^b *Excav. in Cranborne Chase*, i. Pl. XXVII. 6.

^c *Alt. u. heidn. Vorzeit*, I. Heft 12, Pl. v. 14.

which about $1\frac{1}{2}$ inch in length remains. About $\frac{1}{2}$ inch from this end of the blade there is a deep notch in the edge about $\frac{1}{8}$ inch wide, running in nearly $\frac{1}{2}$ inch. There is a similar notch in the other blade, but I am at a loss to assign a purpose for them. This second blade is considerably broken at one end, and looks like an ordinary knife. It may, however, well have been a blade of precisely the same character as that first described. The straight tang at the end is perfect and 3 inches long. Both blades are much striated transversely, possibly by wear against some gritty substance, or possibly from their having been wrapped up in a coarse cloth when buried. The latter supposition seems more likely to be true, as the striations appear on the edge, which is now blunt, owing to the whole surface of the blades being covered with a thick coating of rust.

Plane.—Of this tool a single specimen was found, in shape and character almost identical with the planes of the present day (fig. 18). It has, however, been plated with iron, both on the face and sides, the plate on the face having been secured by four broad-headed rivets passing through the wood, one at each end and one immediately behind the plane-iron. The face is $13\frac{1}{4}$ inches

Fig. 18. Plane. $\frac{1}{4}$.

long and $2\frac{1}{4}$ inches wide, and is turned up with a rounded angle at each end so as to grip the wooden body. The angles at the sides seem to have been slightly rounded. The opening for the iron is about 6 inches from the front end, and measures about $1\frac{1}{2}$ inch by $\frac{3}{8}$ inch. The greater part of the side plates has perished, but a little in front of the plane iron, and also behind it, a rivet, about $\frac{1}{4}$ inch in diameter, passes from side to side. On the rivet behind the plane iron is a leaden roller about $\frac{3}{4}$ inch in diameter, which seems to have formed the support of the plane iron, which was probably secured in its place by a wedge against the rivet in front of it, the opening for the passage of the shavings being on the other side of the rivet. The plane-iron is about $4\frac{1}{2}$ inches long and $1\frac{3}{8}$ by $\frac{5}{16}$ inch in section. The sides have been slightly upset. It is fixed at an angle of 70 degrees to the face of the plane. I am uncertain as to the wood of which the body of the plane was made; at the present day it is usually beech.

A representation of a Roman plane is given, with those of several other carpenters' tools, on a sepulchral monument, published by Gruter.^a Another is from a

^a Smith's *Dictionary of Antiquities*, 3rd ed. ii. 243.

monument at Rastadt.^a In each case the body of the plane seems to have been made lighter by having two transverse openings through it. These two openings have by some authors, including Mr. James Yates and Mr. Marindin in Smith's Dictionary,^b been regarded as intended to allow of the passage of the shavings. This view is, of course, erroneous, and has been exploded by Blümner. In the museum at Naples is a plane from Pompeii,^c which closely resembles the Silchester example.

Mr. Hilton Price has kindly called my attention to two other Roman planes from the valley of the Rhine. One of these, found at Cologne, is in very perfect condition, and appears to have been formed with an ornamental frame-work entirely of iron without any wood inserted. The other, in the Saalburg Museum at Homburg, is imperfect, and only one of the side-irons and the plane-iron has been preserved. The latter has a maker's mark PERGNVS F—Peregrinus fecit.

Fig. 19. File. $\frac{1}{4}$

File.—The last tool to be described is a kind of single-cut flat file, the cutting surface of which, however, has not been produced in the ordinary manner, but by its having been filed into teeth like those of a saw (fig. 19). These teeth are not quite at right angles to the axis of the blade. They are rather shallow, and run about five to the inch. The face of the file is about $7\frac{1}{2}$ inches long and $\frac{7}{8}$ inch in extreme width. At the point it is only $\frac{3}{8}$ inch wide, the sides being curved like those of a modern file. It has a cranked tang rising $1\frac{1}{2}$ inch from the face and then tapering for about $2\frac{1}{2}$ inches for it to

be fixed in a handle. It appears to be a tool adapted for working wood rather than metal.

A cranked file of the same kind, but much narrower and rounded on the face, was found at Hod Hill, Dorset, and is now in the British Museum. Some straight files toothed in the same manner are given by Daremberg and Blümner.^d They are, however, of bronze.

^a Blümner, *op. cit.* ii. 227.

^c Liger, *op. cit.* Pl. xxviii.

^b s. v. *Runcina*.

^d *Op. cit.* iv. 276.

Lamp.—The only iron objects that remain to be described are a lamp, a gridiron, and a horseshoe. The vessel for holding the oil or grease for the lamp (fig. 20) has been much injured. What remains of it is saucer-shaped, about 3 inches in diameter and $\frac{3}{4}$ inch deep. The wick-end is wanting, but from the margin of the saucer at the other end a handle, formed of a strip of one piece with the saucer, stands up to a height of 2 inches. The upper part is bent round so as to form a conical socket $\frac{1}{2}$ inch in diameter at the mouth, but the strip below, where it joins the edge of the saucer, is only $\frac{1}{2}$ inch wide. The lamp has been riveted on to an upright stem, barely $\frac{1}{2}$ inch in diameter, supported on a tripod, into which the stem has been divided, each from $2\frac{1}{4}$ inches to $2\frac{1}{2}$ inches long, and turned down to form flat feet, so that the bars are about $\frac{1}{2}$ inch above the surface on which the lamp stands. The bars are nearly square in section, and have one of the angles upwards. In general character this lamp is much like an iron candlestick from a Roman villa at Abbots Ann, preserved in the Andover Museum, and figured by Mr. Roach Smith.^a This, however, is only 6 inches high.

Fig. 20. Lamp. $\frac{1}{4}$

Gridiron.—Another very interesting object found with the others in the pit is a large gridiron well adapted for cooking purposes (fig. 21). It consists of an iron frame, nearly square, being about 17 by 18 inches, formed of bar-iron about $\frac{3}{4}$ by $\frac{1}{4}$ inch full, and supported at the angles on four feet about 4 inches high. Within this frame at each end are two bars riveted through it about $1\frac{1}{4}$ inch apart. Within the inner bars and at right angles to them are riveted six similar bars, three at each end. Within these again are six more bars arranged in a similar manner, and also a central bar which expands into a circle about 3 inches in diameter, well adapted for the reception of a small saucepan or pot. The bars of which this framework consists are all about $\frac{5}{8}$ inch deep by $\frac{1}{4}$ inch thick. The gridiron has somewhat perished by rust, and has been skilfully restored by Mr. Ready. It shows signs of having been warped by the fire over which it was used. At each end of the gridiron is a ring about 3 inches in diameter, passing through a loop riveted into the frame.

Examples of Roman *craticulae* are rare in this country, but a small one from

Icklingham is in the British Museum. Some others, one with a ring at each end, are figured by Liger,^a but are of quite plain construction. Several from Pompeii

Fig. 21. Gridiron. $\frac{1}{4}$.

are preserved, with numerous other cooking utensils, in the Museum at Naples, but I cannot speak with certainty as to the correspondence of any of them in their details with the Silchester specimen.

Horseshoe.—Among the miscellaneous objects found was one of those peculiar horseshoes to which the name of hippo-sandal has in modern times been applied, and possibly some fragments of a second. It differs in form from that engraved in the *Journal of the British Archaeological Association*,^b inasmuch as it has no hook in front and the two side wings were connected above. It was kept in its place by two projecting wings which bend over to clasp the hoof which was, as it were, dovetailed into the shoe. These were joined above so as to form an arch, at the top of which was a ring. It was probably secured by some simple bandage that passed through this ring and under the hook behind the foot. The flat bottom of the shoe has a small kite-shaped opening in it, and the fore part of it is rather worn away by use. In an example, figured by Mr. Roach Smith,^c each of the side wings has a ring at the top through which a band might pass, and there are two holes in the hind plate that would be suitable for a string passing over the hoof. Mr. Roach Smith mentions the use in Holland at the present day

^a Figs. 342 and 343.

^b Vol. xxiii., Pl. v. p. 107.

^c *Coll. Ant.* iii. p. 128; see also his *Roman London*, p. 146.

of iron pattens for horses fastened to the foot by a leather band. Such shoes as this from Silchester seem admirably adapted for temporary use. They are said to have been occasionally found close to ancient nailed horseshoes.^a General Pitt-Rivers in his examination of the Romano-British village, Woodcuts Common,^b found both hippo-sandals and the ordinary horseshoes. Several examples found in London are preserved in the Guildhall Museum, and Lindenschmit^c has figured others from Mainz. He regards them as temporary shoes for the protection of injured hoofs. Others will be found in Liger.^d

Two horseshoes of nearly the modern form, with calkins and apparently nail-holes, form the device on some bronze *tesserae* ascribed to the time of Domitian.^e

There remains one object of metal to be described, which, though not of iron, formed part of the mass of tools and implements discovered in the pit at Silchester. It is the beam or *jugum* of a pair of scales, made of bronze and of a rather peculiar character (fig. 22). In total length this beam is about 13 inches. At the centre it is about $\frac{3}{8}$ inch in diameter, and it tapers away in either direction towards the ends, which are ornamented by neat mouldings and finished with a narrow projecting eye, through which passes a small ring formed of wire. In the centre of the beam is a projecting tongue about $1\frac{1}{4}$ inch long, which passes through a slit in a handle or harness 3 inches long, terminating in a small ring and decorated with a succession of small mouldings. Through the harness and through the top of the tongue a small hole has been drilled, and when these coincide the beam would presumably be in a horizontal position, and the weight on each side of the beam equal. The beam works on a round pin passing through the base of the harness and of the tongue. The *lances* or scales themselves are absent. A peculiar feature of the beam is that each of its limbs, and not, as is frequently the case, only one is subdivided into a number of equal divisions by small marks punched on the top. One limb is thus divided into twelve equal parts, the third and the ninth marks being double, so that they may be easily recognised. The other limb was intended to be divided into twenty-four equal parts, though the intention has not been perfectly carried out. The sixth, twelfth, fifteenth, and eighteenth marks are doubled for the sake of distinction.

The more common form of weighing instrument in use among the Romans was the *statera* or steel-yard, in which the principle of the lever was introduced and the weight ascertained from the position of a moveable weight which was made to

^a See Smith's *Dictionary of Antiquities*, 2nd ed. ii. 687.

^b *Excav. in Cranborne Chase*, i. Pls. xxv. and xxvii. ^c *Alt. u. h. Vorz.* i. Heft xii. Pl. v. 1 to 6.

^d *Op. cit.* ii. 87.

^e Cohen, viii.—*Annuaire de Numismatique*, 1892, Pl. VIII. 1-2.

slide along the longer arm of the lever—steelyards, and several of these weights of a plain character, and not, as is frequently the case, in the shape of busts, have been found during the excavations at Silchester.

The scales now under consideration appear to have combined the character of the ordinary balance or *bilana* and of the steel-yard—and by this means the use of

Fig. 22. Bronze Balance. $\frac{1}{4}$.

small portable weights, which are easily lost, was to some extent avoided. A weight of one pound to place in one of the scales, and another sliding weight of one pound to move along the beam would enable the user to weigh with a fair degree of accuracy any object from one or two ounces up to two pounds in weight. If the object were over a pound the sliding weight and that in the scale would be on the same side of the centre of the beam. If it were less than a pound the two weights would be on opposite sides of the centre. There being twelve ounces to the pound the shifting of the weight from point to point would give an ounce or half an ounce, in accordance with its being on the side divided into 12 or 24. The double marks on the beam would show the position of the weight when aliquot portions of a pound larger than the ounce had to be weighed. As a rule, however, the sliding weight was less than a pound. On a beam in the British Museum it is indeed less than an ounce, and it may have served only to adjust the scales.

In conclusion I have only to apologise for the amount of dry detail into which it has been necessary to enter in describing this interesting deposit. I can only urge in extenuation that an account of such objects as those which I have been describing would be of comparatively little value to future observers had minute peculiarities been neglected.