ANCIENT MINING IMPLEMENTS OF CORNWALL,[1]

By R. N. WORTH.

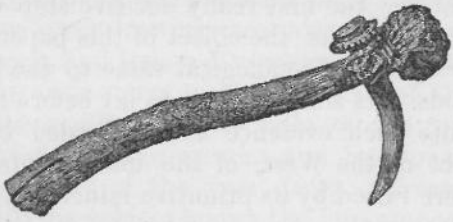
A UNIQUE interest attaches to the earliest traces of handicraft work which mark the first stages in the progressive history of man. Among these, none are so important—none so interesting—as those which relate to the introduction of the use of metals; the first really decisive step on the road to civilization. It is not the object of this paper to attempt to assign any definite chronological value to the bronze or to the iron periods. Its simple aim is to lay before the members of the Institute such evidence as is afforded by the great mining district of the West, of the instruments wherewith the metals were raised by its primitive miners, and their more immediate successors.

The recorded history of Cornish mining takes us back at least 2000 years, and then introduces us to a state of things in which Cornwall was carrying on a large export trade in tin to the East. Mining even then was a pursuit of great antiquity. Since Cornwall has always been the chief source of tin in Europe, and indeed for many a century seems to have been the only source, we may perhaps assume that we have indirect evidence of mining operations in Cornwall in the earliest days of the general European bronze period. This has been reckoned as dating back 3000 to 4000 years in Switzerland, and in England as originating at the latest 500 to 600 B.C. When fully worked out, I am inclined to the opinion that the evidence which Cornwall affords will throw back the mining operations of that county to a date even earlier than that first mentioned. In the stream works at Pentewan, relics of human life and occupation were found more than 40 feet below the surface, and several feet beneath a stratum which contained the remains of a whale—*Eschrichtius Robustus*—now extinct. Still deeper, and nearly

[1] Read in the Section of Antiquities of the Exeter Meeting of the Institute, August 4, 1873.

50 feet below the present level of the sea at high water are some remnants of that forest—now submerged—which once extended all around our western coast; with oyster-shells attached to the stumps of the trees.

These facts may seem to have more bearing upon the antiquity of man than upon that of mining. We have, however, to read them in connection with discoveries made in stream works at Carnon, where similar deposits occur. Here, in strata of an earlier date than that in which the remains of the whale were found, and chronologically under layers of oyster shells *in situ*, three to four feet thick, have been discovered hewn pieces of wood, a wooden shovel and a deer-horn pick.



Deer-horn pick found at Carnon.
Length of original 1¼ inches.

Similar horns to that of which the pick is formed are scattered throughout the same stratum. This seems to indicate that the use of the pick was contemporaneous with the formation of that stratum (otherwise it might have been objected that the pick found its way to the place in which it was discovered in connection with shaft workings), and proves that since mining commenced in Cornwall, sufficient time has elapsed at least for the formation of 50 feet of deposit, marine and fluviatile, in the valleys at Carnon and Pentewan, accompanied by important changes of level, since the spots when worked must have been above sea level, whereas they are now far below.

There is nothing to wonder at in this. Analogy teaches us that some amount of metallurgic skill is associated with a very low, if not the lowest grade of civilization. Thus the native copper of the Lake Superior district was worked by an ancient race, who used fire to reduce the rock, dug shafts, and timbered their workings, and yet worked the metal cold, being unacquainted with the simplest process of smelting.

In Cornwall, where native copper is of too unimportant occurrence, although not uncommon in the shallower parts of the copper levels, it is probable that the tin stones found in the valleys were the first ores to attract attention from their great weight ; but unless the copper was derived from some other district, the use of bronze proves that both metals must have been worked in the county at a very early period. Some copper may have been brought from Wales.

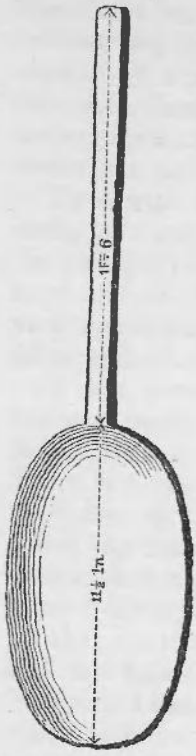
There are peculiarities in the occurrence of tin ore which clearly governed the methods of mining pursued, and the implements used, in the earliest days of that industry in Cornwall. It is not only found in lodes, but among the alluvium of the valleys, into which it has been washed as the result of ages of denudation and sub-ærial degradation. These valley deposits are called stream tin, and they were the easiest and the first worked. The implements required for this purpose were exceedingly simple. In the dawn of mining, when the deposits were at the richest, small quantities, in the upper parts of the valleys especially, may have been raised by the unaided hands of the first workers, and reduced into metal, as we know was the case, simply by being piled into a heap with sticks, and so smelted. For many centuries afterwards, when tin streaming had become an art, a pick and a shovel formed the entire kit of a tinner, and so continued, with the addition of a wooden bowl for baling, down to within the last three centuries. Such changes as were made were in the direction of the improvement of the old implements, not in that of the addition of new ones. For dealing with alluvial deposits nothing more was really needed. For mining proper, for sinking shafts and driving levels through rocky strata, further mechanical aids were required ; but down to the introduction of the use of gunpowder, these were supplied only by the employment of wedges.

Here we have at once indicated a very remarkable difference between the early accessories of mining industry in Cornwall, and those of most other mining districts, the almost entire absence of hammers. They were not needed to raise the tin stuff in the stream works ; and very few have been found, although it was the custom to pound such of the ore as needed it with stones, on hollowed blocks of elvan or other hard close-grained rock. In the copper mines of

Wales, Spain, Lake Superior, and Chili, on the contrary, hammers were indispensable, and hence large quantities of them have been discovered. They were very simple, merely pebbles and boulders grooved round the middle for the reception of a handle of withe. By the time that mining proper in Cornwall had commenced, the pick had apparently undergone such modifications as to render the special provision of a hammer unnecessary.

Thus, with the possible exception of a few hammers of stone (so exceptional as to prove the rule), the first tools of the Cornish miner of which we have any knowledge, were of horn or wood. Of the hammers we may dispose in a very few words. Stone hammers or axes of very perfect form, and of very early date, have been found in Cornwall, but rarely under such circumstances as necessarily connect them with mining. It is likely that the hammer stones used in the dressing processes were extemporised. There is, however, in the museum of the Royal Institution, at Truro, a perforated stone described as a weight, but which was found in the ancient mining district of the Tregoss moors, and which I believe to have been a hammer. It is formed of very hard granite, and seems to bear signs of use. Its shape is that of a truncated pyramid with rounded edges, and the hole—near the apex—appears as if polished by friction. I have seen, too, a very large and perfectly formed stone hammer, of modern shape, which was found upon Dartmoor, and was probably used for mining purposes ; but this I suspect belonged to a very recent period indeed. With such qualifications as these, and with the exception that the old tinners cast their metal in stone moulds, and in some instances used stone ladles, stone seems to have had very little to do with early mining operations in the West.

Carew in his "Survey," says that the first mines were wrought with picks of holm (holly), box, or hartshorn, and that such implements were daily found among the refuse of old works. Frequent, but by no means daily illustrations have been given of his accuracy in later days. The finest example of the deer-horn pick that has come down to us is now in the possession of Mr. R. W. Fox, F.R.S. It was found about seventy years ago at Carnon, between thirty and forty feet below the surface, lying on the tin-bearing stratum, and associated with human skulls, deer horns, and a wooden shovel,

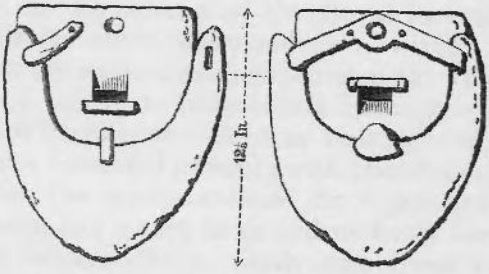


Carnon. Spoon hewn out of one piece of oak.

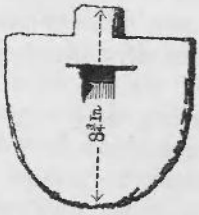
Goso Moor.

Temple.

Oak pick.



Iron-shod Shovel sixteenth century, found in stream work, Lewalyan.



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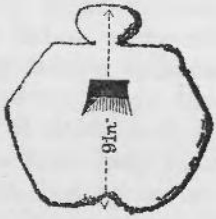

Altarnan.

Boscarne, Bodmin.

Ancient Mining Implements in the Museum of the Royal Institution of Cornwall, Truro.

around which a piece of decayed string still remained. This is the implement to which I previously referred (see p. 54). The horn forming the handle has been pierced for the insertion of the tine, adapted as the actual pick. This is a marked advance upon the use of the antlers in their natural state. Many such horn picks have been found in the flint pits at Brandon, in Suffolk; but so far as I am aware that in the possession of Mr. Fox is the finest example in this country of what we may call the manufactured type. We may be certain that there was a similar direction of progress with the wooden picks. At first suitably-formed branches would be taken (there are men still living in Cornwall who in their younger days used to cut their ploughshares from the hedges), afterwards the handle and the head would be made in two pieces. There is a pick head of oak in the Truro Museum.

The first use of metal in connection with Cornish mining was the employment of bronze celts. Carew speaks of their frequent discovery in stream works, although he does not seem to have understood how they could be applied, and mentions them under the familiar name, thunder-axes. They have been found at intervals from the time of Carew—three hundred years since—down to the present day. Carew remarks that "they make small show of any profitable use;" but they must have been far more serviceable than either the horn or the wood pick. Metal bowls have also occasionally been found in stream works. Traditionally wood are said to have been employed; but I am not aware that any are extant.

The shovel was the streamer's chief implement, and of these there remain a great variety. The most complete series is that in the museum of the Royal Institution of Cornwall, whence I have drawn my illustrations. The first were of wood; and the earliest form was that in which the handle and the blade were hewn out of the same piece. The first improvement was the making of the blade and handle separate; the handle being fixed slopewise in a splayed socket in the face of the shovel proper. At the top of the blade a small projection was left, to which the handle was secured by a string or thong. These shovels are all oblong and small. Some appear to indicate that the handle was fastened in from the back, but this would have interfered so seriously with the usefulness of the implement, that it is

more likely the wood has warped while lying in the peat bogs wherein they have been preserved. Next we come to shovels exhibiting an approach to the present form; and then we find a hole through the upper part of the shovel substituted for the projection already mentioned.[2]

Such implements must have continued in use for a very long period. There is extant an impression of a Tinner's seal, certainly not later than the early part of the fourteenth century, the device on which is two men working with pick and shovel. By the courtesy of Mr. W. C. Borlase, of Castle Horneck, we are enabled to give an impression of this unique object, which was found in the form of a leaden affixed seal or *bulla*, in a field at Lee Down, Bath, in 1842. It will be

seen that the device, on a diapered ground, is,—a man with a pick, and another with a shovel, a lion's head between. Legend + S'COMVNITATIS. STANGNATORVM. CORNVBIE. Both sides of the *bulla* are alike. It would be unsafe to build much upon this piece of evidence, but the two implements shown are clearly of a very rude character. The pick may be intended for metal, and that iron picks preceded iron shovels we have distinct proof.

Carew describes the pick of his day as being of iron, about

[2] Mr. Wright in his "Uriconium" figures wooden shovels found in the Roman copper mines in Wales, which are identical in type with some of those used in Cornwall. He suggests that the short handles were used for working in confined spaces; and the holes for the insertion of levers. But the stream works of Cornwall were not confined for room, and it will be seen hereafter that we have direct testimony to the manner in which the staff was fastened, as just described.

16 inches long, sharp at one end, and flat-headed at the other to answer the purpose of a hammer in driving wedges. In effect it was similar to the common poll pick of the present day. The shovel, however, had become a very elaborate affair. He describes it as being "broad, the vtter part of yron, the middle of timber, into which the staff is slopewise fastned." Two examples of these singular 16th century shovels are in the Royal Institution Museum, at Truro. The completeness of their detail indicates that they were by no means of hurried device. An iron plate covers the edge of the shovel all round, containing a groove into which the wooden nucleus fits. The iron is clamped on to the wood at three points—two at top and one at bottom—with great firmness. The staff is fitted into the face of the blade in the old way, but the socket is protected both back and front by a piece of iron fixed close to the edge. The whole arrangement is complicated, for a shovel, but effective; though to turn out such a shovel in the present day would cost fully three times as much as an ordinary iron one, and certainly the difficulties of manufacture would be wholly on the side of the former.

It may be asked why, seeing this, the shovel was not made wholly of iron. To this there are two answers. First,—the mode of attachment of the handle then in vogue was only adapted to an implement wholly or in part of wood, and the modern socket does not seem to have been known. Second,—Economy. Now labour is dear, and iron comparatively cheap; then labour was cheap and iron dear; and the saving in actual outlay was an important thing to the working tinner of those days. He was miserably poor; his lot was harder than that of any of his neighbours, and his gains were by no means proportionate. Hence arose the local proverbs—"a Tinner has nothing to lose;"—"a Tinner is never broke until his neck's broke," and the like. Such a man had to consider the cost of his shovel; and I have little doubt, considering the exceptionably good preservation in which some of the wooden ones have been found, that they were used in comparatively recent times by men who could not afford to acquire the new-fangled iron arrangement.

These early Tinners, I may add, in conclusion, formed little settlements up and down the county where their work lay. In many a moorland valley in Devon and Cornwall

diligent search will discover the remains of their habitations, formed upon the same plan as the British huts,[3] of which they are the direct descendants, with a foundation of stones, and a superstructure of peat or boughs. In fact the traditional idea survives even yet, for I have myself seen such huts reared for shelters by men engaged in china clay works in Cornwall, the remains of which would in a few years not be distinguishable from that which had lain for centuries on the hillside hard-by.

[3] See "Vestiges of early habitation in Cornwall," by W. C. Borlase, F.S.A., Arch. Journal, vol. xxx. p. 325.