

II.

NOTICE OF THE GUN FLINT MANUFACTORY AT BRANDON, WITH REFERENCE TO THE BEARING OF ITS PROCESSES UPON THE MODES OF FLINT-WORKING PRACTISED IN PREHISTORIC TIMES. (WITH ILLUSTRATIVE EXAMPLES OF THE TOOLS AND SPECIMENS OF THE MANUFACTURE.) By EDWARD LOVETT, WEST BURTON HOUSE, CROYDON.

In that remote period in the history of man in Britain known to us as the Age of Stone, the chief material used for the manufacture of implements was flint. There are abundant traces of this age of flint occurring even in places where flint is not found *in situ*, as for example, in some parts of Ireland and Scotland, and notably in the island of Jersey. Where, however, flint does occur *in situ*, worked implements and traces of working and chipping are common, and show by their position that they were obtained and worked up into weapons on the spot. Several of these old Stone-Age men's workshops exist on our south coast and on the Wolds of Yorkshire. Perhaps, however, no one spot possesses more interest in this respect than the locality now occupied by the picturesque village of Brandon, on the borders of Suffolk and Norfolk, and near the town of Thetford. Near this village there still exist deep and curiously formed pits in the chalk, excavated by prehistoric man to obtain flint for his weapons. These old pits are known as "Grimes' Graves," and they are of great interest to students of the early history of man, as the rude flint implements found in and near the pits fix their age in the Stone period with certainty. Besides this, a fact of great importance and interest came to light in the investigation of the pits, and this was the discovery of the picks used by these early diggers. These picks are made of the horns of the red deer, and all the tynes or branches of the horn are removed except the one at the base of the horn, and this one serves for the point of the pick. These remarkable tools were found in considerable numbers in the galleries of the pits; their points were bruised and worn, and the part held in the hand was smooth. In one case, the impression of a hand could be traced on the once wet chalky handle. It is also remarkable that the present flint pits are

worked on almost exactly the same method and principle as the old ones, and that the iron pick of to-day, which is peculiar to these workmen, strangely resembles in form and make the old deer-horn pick of an unrecorded age.

Being desirous of examining for myself a manufacture so interesting and so connected with a lost industry, I made a visit to the locality, and owing to the kindness of Mr Snare, one of the leading manufacturers of Brandon, I was able in a very short time to examine the whole history of a gun-flint, from the digging of the rough material to the packing up of the finished gun-flints for export. The method by which the flint is obtained is one of the most remarkable features of the whole industry. One man and a boy is the usual staff to a pit. No rope, chain, ladder, basket, windlass, or plank is used; and yet masses of flint of great weight are raised to the surface from a depth of 50 feet. In short, the method pursued to-day is in all probability identical with that followed by paleolithic man, and I will now endeavour to describe it. First of all, a pit is dug on the surface, about 6 feet long, by 3 feet wide, by 3 feet deep; then a second pit is sunk of the same length and width, but 6 feet in depth; this second sinking includes half the first area, but is excavated at right angles to obtain its full size; below this, again, a third is sunk at right angles to the second (still excavating), and so on, leaving a step or stage each time, so that when the floor stone is reached, about six or seven steps, of 6 feet to 8 feet each, are formed, and the bottom of the shaft is some 12 feet from the perpendicular of the top opening, and at an angle of 45° to the angle of the mouth of the pit. When the bottom is reached tunnels are cut and the good flint brought to the foot of the shaft and lifted on to the first step; to this step the man ascends by means of notches cut in the sides of the shaft. The blocks of flint are then lifted to the next step, the man following as before, until the top is reached, when the flint is stacked in one-horse loads, called a "jag." These stacks of flint I observed were covered with branches of Scotch fir, which I was told was very necessary to protect the flint from the influence of sun, rain, &c., as the surface of the flint was much altered thereby, and the flint itself was not so good for use.

The flint being dug it is carted down to the workshops. The places in which the gun-flints are made are small sheds situated at the back of a house or cottage, and the piece of ground adjoining is generally used to deposit the waste chippings upon. The shed we inspected accommodated three workmen, but as trade was dull, only one was at work at the time. The three work benches were really three stumps of trees, like butchers' blocks, and a small stump before each serves as a seat; another stump is used to sit upon when "flaking" is being done. Each block is nearly buried in flint débris and waste chips, and the whole flints for breaking up are stacked up on the opposite side of the shed. The process of reducing these natural masses of flint to marketable gun-flints is as follows:—The workman sits down upon the flaking block, and puts on a stout leathern apron; he then buckles on his left leg, above the knee, a thick pad faced with strong leather. Having finished these preliminaries he takes up a flint, often one of 40 or 50 pounds in weight, and placing it on this pad he breaks it into pieces of about eight pounds weight with a short massive hammer, called a quartering hammer. This is apparently done with the greatest ease, the pieces coming off as if they were lumps of chocolate instead of flint. An idea, however, of the difficulty of the operation to any one but a skilled workman may be formed from the fact that the quartering hammer, though of steel, becomes in a comparatively short time battered and turned as if it were lead. We also ascertained upon inquiry that the leg of the workman, though protected by the pad, becomes hard and insensible to delicate feeling. The large blocks of flint being thus quartered, the same man takes up another hammer, called a flaking hammer, which is somewhat like a stonebreaker's hammer, bluntly pointed at either end, and it is also of steel. Selecting one of the pieces of flint, he places it on his pad, with a fractured black face uppermost, and with the side of the flaking hammer he breaks off all the outside crust or rough irregular flint. Having done this he strikes a sharp blow with the thin end of the hammer, about half an inch from the edge of the now clean black lump of flint, and this blow strikes off a long flake usually an inch in width, and from three to seven inches long, according to the thickness of the flint. These

flakes are struck off in rapid succession until nothing is left but the rough crust on the opposite side of the lump. When all the batch has been flaked up, the long knife-like pieces are turned out on the big block before referred to. This block has a piece of steel, very much like a broad chisel, fixed perpendicularly in it, and a hammer is used, called a knapping hammer, which is a flat piece of steel about six inches in length by one inch wide, and very thin; this is fixed horizontally into a handle. The flakes are held across the "stake," as the chisel-like arrangement is called, and struck with the knapping hammer; this flakes off pieces about the size and shape of a gun-flint, and a tap or two more completes the implement. The rapidity with which a skilled workman can produce gun-flints is remarkable, and the difficulty which a novice encounters on trying to fabricate a gun-flint is equally striking. There are several recognised sizes of gun-flints, known chiefly as carbines, muskets, single barrels, and horse pistol; and, as the flakes produce unequal sizes, the workman is supplied with different receptacles, so that he has to discriminate as to which class the particular gun-flint he produces at each blow of the hammer belongs to, and deposits it accordingly. No gauge or measurement of any kind is used, and yet when the gun-flints are turned out in the bulk according to pattern they run with remarkable uniformity in size and appearance. The present gun-flints are struck from long flakes, several to a flake, and I was informed that they are called "Frenchmen," owing to the fact of their having been introduced to Brandon from France. The old gun-flints appear to me to have been rounded at the base, and were more like what the flint-makers call "Strike-a-lights," only smaller; these again resemble the so-called "scrapers" of the Neolithic age. Indeed, I was much struck with the evolution of these recent flint implements from those of the older period. The "Strike-a-lights," already referred to, are generally known as "Englishmen"; they are used with flint and steel, and I was surprised at the demand for these things even now. Not only do they go abroad, but many are used in this country, and I understand that the flint workers themselves never obtain fire but by the old flint-and-steel method.

We now come to the final use of gun-flints. It is no doubt a matter

of astonishment to many that such articles are made at all in these days of percussion caps, breech-loaders, pinfires, central-fires, &c.; yet so it is, and for these reasons. Our old flint-lock rifles and guns are not destroyed by any means; they are, or were, sold to merchants for purposes of barter with natives, chiefly of equatorial Africa. As therefore these guns still exist, and as they require gun-flints, flint being scarce or even unknown in Central Africa, it follows that a demand still exists in these regions for the article of commerce in question. Zanzibar and other ports communicating with the interior are the chief points of consignment; and as Mr Snare was good enough to supply me with some of his business statistics, I am able to quote the annual output of gun-flints from one firm in six years:—1880, 4,500,000; 1881, 2,832,500; 1882, 3,115,000; 1883, 4,721,300; 1884, 4,793,150; 1885, 3,203,250. After the flints are made they are counted off into store casks, which are usually flour barrels, and I saw thus stored several hundred thousands in one warehouse. For export they are packed into kegs or well-made small barrels, each holding as near as possible 29,800 gun-flints. In this condition they go out to the African ports for barter with the natives to make fire for the old flint-lock muskets, which did duty in this country before the days of the Enfield, the Snider, and the Martini-Henry.

In conclusion, there are one or two points of great interest which I wish to point out in reference to this gun-flint manufactory. We have seen how that in all probability Brandon has been a continuous source for flint implements from the very earliest times. We have also seen that in the methods of obtaining the flint the same primitive means, with a total absence of mechanical appliances, is now adopted, which we have every reason to believe men of the Stone Age employed. We also find the methods of working up the flint to be probably identical with that of primeval times. As I was desirous of ascertaining to what extent the gun-flint workers were capable of producing other implements besides those of their regular trade, I took a man off his work and gave him some ideas to work out. Beyond the chipping that could be produced by means of the knapping hammer on the "stake," I soon found that nothing could be reproduced at all like prehistoric imple-

ments, beyond the scrapers already referred to. The so-called secondary working, admired and valued as a proof of the genuineness of Neolithic weapons, is produced on the gun-flint worker's block as a natural consequence of breaking off the overlapping flint by the hammer when the flint is laid over the edge of the stake. Indeed, I produced the same effect myself with the greatest ease, and I fabricated a "scraper" out of a piece of waste flint which is certainly equal in finish to any I ever saw of Neolithic age. But when we come to face flaking and chipping the matter is a very different one. I did all I could to get the worker to do this, but all attempts broke the flake each time, and I was assured the thing was quite impossible. Here at any rate is a point in favour of the superior skill of prehistoric man.

But there are two other points to which I would refer. Firstly, I observed that the Brandon flints under certain conditions of exposure became much altered as to their freshly broken surfaces, and were therefore protected by branches of trees, as I have already stated. Now it is generally held that the glazed, stained, or polished surface of worked flints is a sure and certain proof of the great age and undoubted antiquity of the specimens, but I am certain, from what I saw at Brandon, that such surfaces, at least there, do most decidedly undergo such alteration and decomposition in a remarkably short space of time, so that I am inclined to attach but little importance to such an indication *per se* as a proof of genuineness. Secondly, I made a careful note of the fracture produced in flaking the flint, which, being naturally conchoidal, results in what is termed a bulb of percussion. Now, this bulb has been held most properly to be another sure indication of genuineness and human origin, although I believe some have argued to the contrary, but I do not see how it is possible for such a fracture to be produced by natural causes. To produce it, or indeed to produce a flake at all, the flint must be struck sharply by a hard body (iron, stone, or otherwise), having a point or striking surface of a smaller area than the flint itself; the flint to be flaked must be held or fixed so as to ensure an elastic blow, for if a dead or solid blow be struck the flint is either crushed, or what is more likely, does not break at all. It is obvious, therefore, that such a combination as the above does not occur in nature, and the bulb of

percussion must on that account be taken as a certain proof of the human origin of the implement or flake in question. One feature of implements of the Stone Age may be considered also as conclusive proof of their genuine origin, and that is the face-flaking or chippings of the flat surface. This is I believe considered to be a lost art, and I think it must be so, for I was quite unable to get the flint workers to do anything of the kind, although they did their best to produce some spear-heads. We see, therefore, that as most modern ideas help us to understand better the remains of ancient phenomena, so also, by a careful examination of the manufacture of gun-flints, considerable light may be thrown on the methods adopted by Paleolithic man, whose sole object in life was to live, and whose sole means of supporting that life existed indirectly in the hard flint stone.