

Near here a boring was carried down to a depth of about 600 ft. in search of Coal, but without success. The Red Marl was not "bottomed." In the Radstock Coal-field most of the mines are sunk through this formation, some even commence in the Inferior Oolite and penetrate the underlying rocks, the Lias, Rhætic beds, and Red Marl, to the Coal-measures, but the maximum thickness of these rocks is much thinner on that side of the Mendips than it is to the south. There is little doubt that the Coal-measures occur to the south of the Mendips, and at a workable depth: the structure of the Mendip Hills being, geologically speaking, an anticlinal or "saddle," which has brought the older rocks to the surface in a fold or ridge, leaving the newer Coal-measures resting conformably on their flanks, partly exposed or very thinly covered by the Secondary rocks on the north of the Mendips, and entirely concealed on the South. A boring would probably have to be continued a thousand feet there to prove the question, and should the great Sub-Wealden exploration prove successful so far as regards the finding of coal, perhaps the landholders of Somerset may be induced to combine and make a trial sinking south of the Mendips.

## II.—ON A SKULL OF *BOS PRIMIGENIUS* PERFORATED BY A STONE CELT.

By JAMES CARTER, M.R.C.S., etc.

IN 1863 the skull and a portion of the skeleton of a large extinct species of Ox (*B. primigenius*), which had been found in the peat of the Cambridgeshire Fens, and which apparently had been killed by a celt, was placed in the Woodwardian Museum at Cambridge. At the time of its deposition there a portion of the flint remained firmly fixed in a fracture in the frontal bone, being partially retained *in situ* by a mass of peat: as, however, this peat gradually dried, it crumbled away, and the celt became loosened and displaced; moreover, some small fragments of bone fell away from the margin of the wound, so that in its present condition the specimen merely exhibits an irregular fracture in the forehead, in which a fragment of a flint implement lies loosely; but it no longer furnishes conclusive and positive evidence to prove that the fracture was actually caused by the celt which occupies it.

The scientific value and interest of the object therefore must now in great measure rest upon the testimony of those observers who examined it soon after its discovery, and when it was in such condition as to admit of no doubt as to the correct interpretation of the facts which it presented.

I therefore publish a portion of a paper which I read before the Cambridge Philosophical Society in May, 1863:—

In January, 1863, some workmen who were employed in Burwell Fen, about ten miles from Cambridge, in digging through the peat for the purpose of quarrying phosphatic nodules from the Upper Greensand, came upon the skeleton of a large Ox—*Bos primigenius*. A few days after discovery, the upper portion of the skull, with the horn-cores complete, and with the peat from which it had been dug

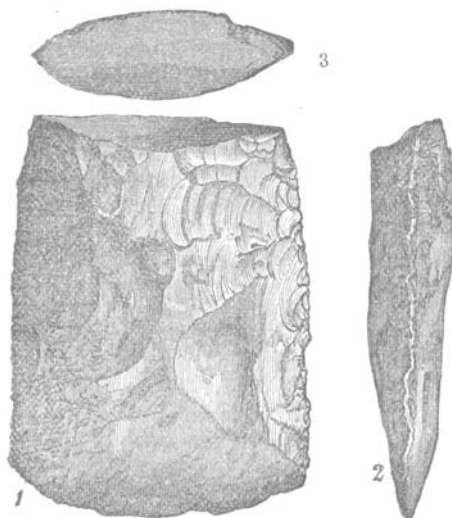
still fresh about it, was brought to Cambridge by the men who had found it, and was purchased for a small sum by Mr. Farren, who was then actively engaged in collecting fossils for the Woodwardian Museum. At the time of purchase the specimen was not known to possess any unusual interest. It was not until an attempt was made to clear away a large boss of peat which adhered to the broken facial extremity of the skull that the fact was discovered which gives it a singular archæological importance, namely, the presence of a portion of a stone celt firmly fixed in a wound in the right frontal bone, partly penetrating the cavity of the skull, and slightly projecting from it. The peat so completely concealed the celt from view that the workmen of whom it was purchased were almost certainly not aware of its presence, or they would have mentioned it, as they are in the habit of collecting, and are quite familiar with, such objects, and could scarcely have failed to have recognized the nature of the flint, if they had seen it.

Having noticed this remarkable circumstance, I made a careful examination for the purpose of satisfying myself as to the authenticity of the specimen, and as to the credibility of the several points of interest which it appeared to offer. In this investigation I gladly availed myself of the critical knowledge and experience of Professor C. Cardale Babington and the Rev. T. G. Bonney of St. John's College. It was also closely inspected by many other members of the University and scientific observers, including Mr. John Evans F.R.S. (now President of the Geological Society of London). The general appearance of the peat which covered the celt, the arrangement of the small rootlets, fibres, etc., of which it was composed, the manner in which it was matted upon the flint, and had accurately moulded all its inequalities of surface,—these characters and appearances were so distinctly marked as to leave no doubt whatever as to the fact that the peat must have formed upon the celt after its implantation in the skull, and had not been subsequently disturbed. I insist upon this statement most positively, because the peat has since become dry and crumbled away, so that the appearances described above are no longer observable. The examination, however, while the peat was still fresh, was absolutely conclusive as to the fact that the flint could not have been recently placed in the position it occupies.<sup>1</sup>

The flint was at once recognized as being a portion of a celt of the Neolithic type. The greater portion of the surface is chipped, but at the broader extremity it is *ground smooth* for about a quarter of an inch from the cutting edge. In dimension it measures nearly 3 inches in length and  $2\frac{1}{4}$  inches at its greatest width. The elliptical surface produced by the transverse fracture of the celt is 2 inches by  $\frac{3}{4}$  of an inch. This implement is unusually thin and the edges very sharp, characters which render it all the better adapted for the purpose to

<sup>1</sup> In a short notice read before the Cambridge Antiquarian Society, on February 23, 1863, and published in the "Antiquarian Communications" of that Society, vol. ii. no. xiii. p. 285, 1864, Professor C. C. Babington expresses himself most positively on this point, and asserts his confident belief that the celt could not possibly have been recently placed in the skull.

which it has been applied in this instance. The greater portion of the fragment lies within the cavity of the skull, rather more than half an inch projecting from it. The transverse fracture is evidently an old one—the broken end being patinated equally with that of any other portion of the celt; and it is reasonable to infer that it was produced by the violence employed in killing this huge animal.



Neolithic Flint Celt, found imbedded in the frontal bone of the skull of *Bos primigenius*, from the Cambridgeshire Fens (reduced one-third nat. size). Fig. 1. The broad surface. Fig. 2. The profile. Fig. 3. The end view.

On inspecting the wound in the skull, in order to ascertain the probable manner in which it had been produced, it is evident that it is precisely such as would have been made by the flint implement which is implanted in it: its edges are irregularly splintered and depressed, and in contour at the upper and outer part it corresponds accurately with that of the celt; unfortunately the skull had been broken across at the level of the upper margin of the orbits in such a way as to interfere with the fractured opening, and a portion of bone has fallen away, a natural separation having taken place at the mid-frontal suture, so that it cannot now be ascertained whether the lower portion of the opening corresponded in outline with that of the celt, as does the upper part. It is, however, clearly manifest from the characters of the wound, that the flint could not have been placed in its present position—either by accident or design—after the facial bones had been broken away from the rest of the skull. Moreover, the supposition that the fracture was produced during the life of the animal, or, at least, whilst the skull was yet fresh and retained its animal matter, is confirmed by the fact that the small fragments of bone which were detached from the edges of the wound did not fall away, as they would have done in a dried skull,

but were apparently retained by the soft animal matter, and subsequently by the peat which filled the skull. As an indication that the wound was intentional, and not accidental, it may be observed that it was inflicted precisely in that small portion of the forehead which it was necessary to strike, in order to penetrate the brain, and so kill the animal.

It must have required a vigorous blow to have caused so comparatively blunt an implement to pierce the tough hide of the animal, covered by a dense coat of shaggy hair, and penetrate the cavity of the skull for nearly three inches. The force sufficient to have produced a wound of this depth through such dense structures must have been so great that it can be readily understood how it happened that the thin celt which was made use of should have been broken at about a level with the skin upon the animal's forehead. So small a portion projected as to render the extraction of the remainder from a fracture through fresh bone no easy matter: it was left in the wound, and has become an historical record of great interest.

So far as I know, the specimen is the only example which has yet occurred to prove *positively* that the stone celt was used by the early inhabitants of these islands for the purpose of killing animals. Skulls of extinct species of oxen have been found having a fractured opening in the forehead. Prof. Newton, in a paper read before the Cambridge Philosophical Society, states that he saw a skull of *Bos primigenius*, found near Ely, which had received such a blow as must have killed the animal, but how this wound was produced could not be ascertained. Professor Newton also states that at Thetford, in Norfolk, many skulls of *Bos longifrons* were found, all having a fracture in the forehead. Dr. Falconer informs us that a specimen of a vertebra of a Reindeer, "pierced through and through by a flint weapon which still remains imbedded in the bone," was discovered in a cave in Central France.

After it was ascertained that the skull possessed archæological interest, search was made upon the spot where it was found for other portions of the animal, and nearly the whole skeleton was recovered. The bones were found imbedded in the peat, and arranged nearly in their natural order. It would seem that the animal must have been killed upon the spot where the bones were found, and that the carcase or skeleton must have been buried in the peat soon after death, inasmuch as the bones afford no indication of having remained long upon the surface, exposed to the action of the various atmospheric and other agencies.

As regards the geological period to which this skeleton belongs, it seems tolerably certain that we may refer it to the later portion of the interval during which peat was formed; but any chronological considerations must be conjectural. The rate of growth of peat cannot be made to afford any very definite information as to the measurement of time, inasmuch as it varies so considerably according to the tribe of plants of which this substance is composed, and the quantity of water by which it is moistened or covered. It is im-

possible to hazard a conjecture as to the period in years since the formation of the Burwell peat commenced, but we know that—except in the dykes—it ceased when the Fens were drained, less than a century ago, and the occurrence of this skeleton proves positively that the district was so far drained as to be traversable at the time this ox was killed, and there is no evidence of any subsequent long-continued submergence; for undoubtedly the greater portion of the peat found above the skeleton was not formed upon it, but was the result of the carcase having sunk into it when in a moist state.

Indeed such few facts as we possess all tend to warrant the conclusion that this specimen need not be referred to any very remote period in time. It is of interest not with reference to the antiquity of man, but as affording evidence of the contemporaneity of man with *Bos primigenius*, as a proof of one especial purpose to which celts were applied, and as rendering it probable that this ox lived, and that the early inhabitants of the Cambridgeshire Fens continued primæval habits, to a much more recent period than has been generally supposed.

The celt (Fig. 1) is figured one-third less than the natural size. Fig. 2 as seen in profile. Fig. 3, section as shown at the broken proximal end.

### III.—ON DRIFT.

By J. G. GOODCHILD, F.G.S.  
of H.M. Geological Survey.

**I**N a letter to *Nature* for 14th May, 1874, Mr. Belt has expressed his belief that the presence of shells in glacial deposits, at whatever elevation they may be found, does not necessarily constitute a proof that the land has been depressed to that extent relatively to the level of the sea; but that in such cases as those of the drifts of the basin of the Irish Sea the shells occur in their present positions because they were thrust thither out of the bed of the sea by the ice-sheet which was advancing from the North.

Somewhat similar views with regard to other drifts had been previously advanced by Messrs. Croll and Tiddeman; but up to the time of the publication of Mr. Belt's letter no one had ventured, in print, to extend this theory to such deposits as those of Macclesfield and Moel Tryfaen.

The communication referred to gave rise to an instructive discussion, which was brought to a close by a letter from Prof. Green, in which attention was recalled to the fact that the drifts in question were finely stratified, and that, therefore, they could not have originated in the way suggested.

As no one since has ventured to re-open the discussion, I propose to take advantage of the renewed interest in the subject likely to be occasioned by the publication of Mr. James Geikie's paper on "The Occurrence of Erratics at Higher Levels than the Rock Masses from which they have been derived," which I have just read, to re-state some of the arguments used in a paper read to the Geological Society on the 24th of June last, in which I have sought to establish a new