

AN

ATTEMPT TO APPROXIMATE THE DATE OF THE FLINT FLAKES OF DEVON AND CORNWALL.

BY C. SPENCE BATE, F.R.S., F.L.S.,

Corresponding Member of the Zoological Society, &c.

THE large number of flakes and broken fragments of flint that have been found scattered over the surface of the country, has attracted considerable attention from archaeologists.

In the neighbourhood where flint is abundant, the circumstance does not strike the observer so forcibly as in localities where, geologically, flint does not exist. Throughout the counties of Devon and Cornwall flint flakes and chips are broadly scattered. In some localities, such as the neighbourhoods of Barnstaple and the Lizard, they are abundant, whereas in other places they are only found as isolated specimens.

The character and appearance of these flaked specimens are various, some being well-formed arrow heads, others representing the block from which the flakes were struck, and other fragments of most irregular shape. These latter are more common in districts where the flint flakes are most abundant; but in those regions where they are scarce, the few specimens found generally represent well formed flake implements.

It is several years since it was first reported by Mr. Whitley, that flint flakes of this description were to be found abundantly distributed at Baggy Point, on the north of Devon, as well as along the coast line. They have since been observed by him several miles inland, on the banks of the Taw; and they are also scattered over the waste lands that surround Dosmare Pool, where they were found by Mr. Hext in some quantity, and recently by Mr. Whitley; they have been found in abundance on the waste as well as cultivated lands of the Lizard district, and as far west as the Scilly Islands by Mr. Augustus Smith. In sparser numbers

specimens have been taken on the borders of Dartmoor,* and by Mr. Pengelly in the neighbourhood of Brixham; and occasionally in tumuli throughout the counties of Devon and Cornwall.

The assertion by archæologists that these flint flakes are the result of human labour, either, as in the more perfectly adapted forms of design, or as the waste material left in the efforts to produce those forms, has given an interest and importance to the discovery of these flakes, in the hope that their more extended study may throw some light on their history, as well as on the period at which they were made.

Near the village of Croyde, at a place called Baggy Point, the flint flakes appear to be abundantly spread over the face of the hills; but towards the sea-shore, at the entrance to a little vale, through which a small stream of fresh water runs, these flints appear to have collected in larger quantities. The place in which they are found is evidently the accumulation of the superficial soil of the hill, having been gradually brought into the valley, and probably with it some of the flakes; but if so, they could not have been borne from far, as there is not the slightest evidence of wear, or rolling of the flints, circumstances that must have occurred had they been water-borne for any great distance. These flints have been found with other stones, and evidences of the most primitive kind of human industry. These mostly exist in the form of rolled-stones from the sea-beach, some of which show evidence of having been used as hammers, and others as whet-stones; with these have been found some portions of pottery of very coarse structure, as also several specimens of flint flakes, that evidently have been under the action of fire, together with small traces of charcoal, and a piece of a long bone—probably human. These severally having been collected together, afford presumptive evidence that the spot on which they were found was in the neighbourhood where a colony of the ancient people sojourned, the exact site of which has yet to be determined. Similar flints to those that lie buried here

* Since the reading of this paper, we are indebted to Mr. Aborn, of the Government Establishment at Prince Town, for numerous flint-flakes that he obtained from the prisoners, who found them during their labours for the draining of the soil, under four feet of peat, and two more that had previously been received. These were all on the soil beneath the peat, inclusive of an exquisitely wrought barbed arrow-head, excepting one, beautifully worked on both sides, leaf-shape specimen.

may be found in tolerable numbers on the adjoining hill, where the plough has never been, but where the soil has been washed away from the surface of the rock; these are to be found, but more sparsely, on the opposite hill, and along the coast toward and beyond Croyde Bay.

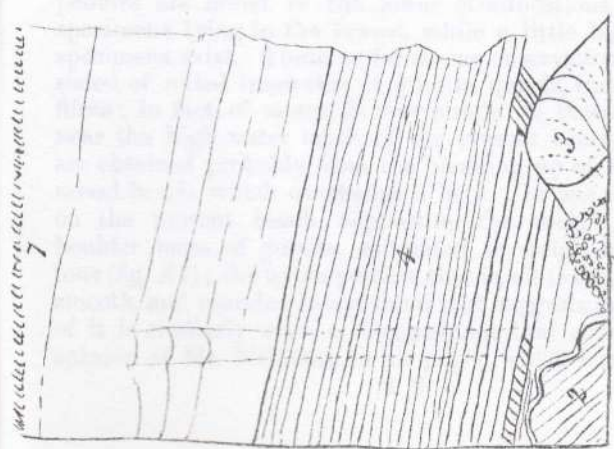
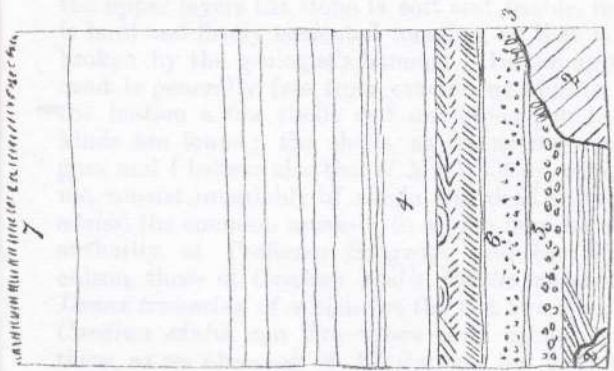
The soil in the chief place of excavation is about eight or ten feet above the slate rocks of the country. The lower portion of the bed consists of a yellowish clay, and the upper part of surface soil washed down from the adjoining hill; a few inches above the clay a line of black mould exists, and it was in and above this line that all the flints and materials were found, that is, within four feet of the surface.

Along the coast, from Baggy Point to Braunton Burrows, a belt of sandy rock exists; soft in its structure towards the upper part, but hard as granite in the lower beds; this belt of sand has been pronounced to be a raised sea beach by Sir Rod. Murchinson and Professor Sedgwick, who state it to be one of the finest specimens of the kind. Over this so-called raised beach the surface soil has accumulated, and in this soil some flint flakes were found. Passing onward, we come to a tract of two or more miles of blown sand, which is separated by a broad and navigable river from a low grassy plane (fig. *C1*), that stands at a level with high spring tides, and which is separated from the sea by a broad ridge of large pebbles, that rise to the height of about sixteen or twenty feet. Outside this pebble ridge, an extensive beach of fine sand covers the surface, as far as low water mark at ordinary tides; beneath the sand, and which at different spots may be seen peeping through, is a bed of blue clay, about six feet thick (fig. *C2*); beneath which is a layer of pebble boulders (fig. *C3*), below which exists the angular fragments formed by the disintegration of the slate rock (fig. *C4*).

In the bed of clay beneath the sand, the roots and trunks of trees testify to the former presence of vegetable growth, of which the kinds may be interpreted by the presence of acorns and nuts found in the clay; and the strength and luxuriance of the trees may be supposed from the quantity of the fruit, the size of the remains both of the roots and the trunks, as well as from the circumstance that the perforations of the nuts show that squirrels skipped among the branches of the trees that grew here.

In this clay, in which roots, nuts, and acorns exist, flakes of flint are not uncommon, and some have been found which bear the impress of having been under the action of fire.

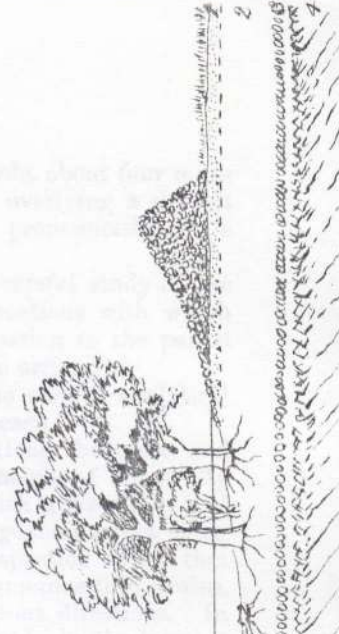
Thus we see, in this place, the flints exist in connection



D



E



High Water Line

Low Water Line

with a submerged forest, whereas at Croyde, about four miles to the eastward, they are found in soil overlying a deposit that has been, by our ablest geologists, pronounced to be a raised sea beach.

It appears to me, therefore, that by a careful study of the geological history of these different formations with which the flints are in connection, an approximation to the period at which the flints were deposited may be arrived at.

The first important study will be the careful analytical examination of the so-called raised sea beach.

It extends for more than two miles along the coast, and rises from the present sea beach to the height of about fifty feet. It consists of fine sand, mixed with a few shells and pebbles towards the lower portion. The general aspect being a series of horizontal layers, a nearer inspection shews that these horizontal layers are built up by numerous thin stratas, exhibiting lines of false bedding in various directions. In the upper layers the stone is soft and friable, in the lower it is hard and firmly cemented together, so that it is not easily broken by the geologist's hammer. In the upper layers the sand is generally free from extraneous objects, but towards the bottom a few shells and numerous pebbles of different kinds are found; the shells, as far as my own experience goes, and I believe also that of Mr. Whitley, who accompanied me, consist invariably of single and dead valves of (*Mytilus edulis*) the common mussel; to which may be added, on the authority of Professor Sedgwick and Sir Roderick Murchison, those of *Cardium edulis*, *Patella vulgaris*, *Solen*, and *Donax trunculus*, of which list the last two species, as well as *Cardium edulis*, can live where sand exists; and probably these, as we observed of *Mytilus*, are but dead valves. The pebbles are found in the lower stratifications, the largest specimens lying in the lowest, while a little higher smaller specimens exist. These, as far as our observations went, consisted of rolled fragments of granite, quartz, trap, basalt, and flints; in fact, of materials very similar to those which exist near the high water mark of the present beach, and which are obtained probably from the breaking up of this so-called raised beach, which overhangs it here. In one place, resting on the present beach, supporting the ancient, is a large boulder mass of granite, estimated to weigh about twelve tons (fig. A 1); the upper portion, that is, all that can be seen, is smooth, and rounded in a manner that suggests that the whole of it is similarly worn, a circumstance that corroborates the opinion of Mr. Williams, in his paper, which forms a supple-

ment to that of Sir R. Murchison and Prof. Sedgwick, that it has been borne from afar, probably by an iceberg in the great glacial epoch. The granite contains red felspar, and is said not to resemble Dartmoor or Lundy granite. But I have recently been informed by Dr. Trefry, that every kind of granite is found in his quarries in Cornwall; and I have seen in his porphery hall, at Place House, Fowey, specimens very similar to that of the boulder in Barnstaple Bay; therefore we need not go so far as Aberdeen, as supposed by Mr. Williams. But still, we cannot but suppose that some great transporting power must have been required to bring this granite mass even from the nearest granite district to where it rests. Not being a geologist, I cannot pronounce the epoch to which this boulder belongs; but of this there can be no doubt, that it was lodged in its present position before the deposit that we call the raised beach commenced. The elevation of the highest point of the raised beach is about forty feet, we must therefore suppose that the highest point must have been covered with water, at least, at high tide, before the elevation of the mass commenced. Forty or fifty feet being the greatest depth of the structure, it must necessary follow, that the lowest portions of the stratification must have been from three to four fathoms below the level of the lowest tides. Now if we examine the so-called raised beach, where it rests upon the slate rocks of the present beach, we find that specimens of *Balanus balanoides* remain in abundance attached to the rocks (fig. A 3), a certain proof that they were living in the position in which they were found before the sand that forms the raised beach was deposited, the deposition of which probably killed them. Therefore, when the sand was first thrown on them, they must have been several fathoms under water. But we know that the species of *Balanus* that we find here cannot live in such a position; that its normal habitat is a belt on our rocks, between half tide and high water; it is therefore evident, that the present beach must have been at or near its present level when the *Balani* that we found below the so-called *raised sea beach* were living; that is, that they were in the same position as they are now, with respect to the land and sea, when the sand was first deposited on them; consequently, no evidence that any elevation of the coast line has taken place since the so-called raised beach has been found.

To shew what a thing is not, may be easy; to shew what it is, may not be so. The evidence in the latter case may not be so conclusive as in the former; but still, that which

exists appears to be tolerably demonstrative. The lowest stratification alone contains pebbles, and these are all rolled and worn, and such as will be frequently found belting a sandy shore at and above high water wash; above these lines of pebbles the structure of the beds is that of finely comminuted sand, without admixture of foreign bodies. A stray valve of mussel, and according to Professor Sedgwick, of limpet and cockle, may occasionally be met with; but these our experience has shown to be dead valves, a fact that is proved from the concave side of the shell being invariably downwards, as well as the specimens of the bivalve species being solitary. The stratification of the beds is such as corresponds with no sedimentary deposit, the false bedding is persistent in any part, and takes peculiar forms, sometimes those of semi-circles (fig. A 4), and short oblique lines, assimilating to lines of cleavage. The upper portions of the beds are soft and friable, the lower is hard and petrous; occasioned, I believe, by the action of the sea-water decomposing a portion of the calcareous material, and cementing the whole into a solid mass. And the entire structure conduces to the conviction that the so-called raised beach is, in reality, the undestroyed remnant of an extensive district of wind-borne sand, similar to that which now exists at Braunton Burrows, that formerly extended from that place to Baggy Point, and reaching some way out towards the sea; of this latter hypothesis we have evidence in the portions remaining, hardened into firm stone, that still exist, capping the summits of the rocks on the beach to the extent of some two hundred yards seaward. Moreover, a study of the stratification of the hills of drifted sand demonstrates a series of layers that assimilate to the various modes of stratification found in the ancient bed, and which, I think, can be accounted for by no other means than the varying and ever-changing direction of the wind, that builds, destroys, and restores again, still ever adding to the heap.

This, I think, will demonstrate, since the flints are in the soil that surmounts the ancient sandbed, and as this ancient bed has been deposited since the present beach has been at its present level, that the flints are more recent than the most recent elevation of land upon that coast.

But the question now arises, whether or not, since the flints have been found in the submerged forest at Northam Burrows, they may have been deposited prior to the latest depression of the land upon that coast? To determine this point, it will be necessary to analyse carefully the geological conditions of

the deposits that exist in connection with the flint flakes there found.

The Northam Burrows form a large grassy plane, that exists at the level of high water, being perhaps a little below the level of extraordinary spring tides. The burrows are separated from the beach by the extensive pebble ridge, that affords a barrier to the wash of the sea.

The origin of this pebble ridge has not, by geologists, been determined; but I think that the most correct opinion is, that it is formed by the wash of the sea destroying the beds that overlie the pebble bed that exists beneath the clay. This pebble bed we have, by excavations made through the clay, been able to trace to within a short distance of the pebble ridge; recently, borings made for the purpose of obtaining water have shown, that in diminished size these pebbles exist as far up the sides of the shore as the Westward-Ho Hotel. I think, therefore, that there can be little doubt, but that the terrible wash of the Atlantic thins off the clay, and so exposes the pebble bed below to the action of the sea, which, by degrees, carries pebble after pebble to add to the wall that separates the burrow from the beach. That the great pebble ridge is moving inwards, is certain, but the rate of progress has not, I believe, been determined. The gradual movement inwards of the ridge, however fast or slow, exposes all the shore that is seaward of its protection to the destructive agency of the waves: it is to this, and not to any variation in the level of the coast line, that I believe the submergence of the forest along the shore is due. The beach, to a very great extent, is covered by sand, and so protected to a large degree from destruction; but that this has been of only recent occurrence is demonstrable in the quantities of the shells of *Pholus dactylis* that are found in the clay, which must have lived and burrowed their holes after the clay had been exposed to the action of the sea, and before the existence of any sand being deposited on the beach, from the presence of which the beach is still free for a considerable distance above low water mark. The facts, that the beach at the shore extremity is scarcely below the level of the burrows, while the strata of which it is composed gradually thins out as it approximates the low water line, demonstrate clearly, I think, that the submergence of the old forest bed is due to the removal of the beds, and encroachment of the sea, and not to the subsidence of the land. Assuming this to be true, of which I retain no doubt, it follows that the flints found in the clay must have been

deposited since the latest downward movement upon our Devonshire coasts, of which the submerged forests are supposed to afford conclusive evidence.

The next point of enquiry that suggests itself is the connection of the flint flakes found at Northam and Croyde, with those that lie scattered over the Western Promontory. To trace them from spot to spot has not been yet done, but the places at which they have been found throughout Devon and Cornwall are sufficiently numerous to induce one to believe that they may be found everywhere.

Around Barnstaple, in an area of twenty miles diameter, they appear to be abundant. They have been found at Torquay and Brixham; between Ivybridge and Plymouth; abundantly on the moorland around Dosmare Pool; and also at Curza Down, in the Lizard district, &c. In all these localities they lie in the surface soil of the country; and as far as I can see, must have belonged to the same common era. Specimens from the basin on the top of the Maen-rock at Constantine, and those taken from an ancient barrow near Trevoze Head, appear to me to afford but small distinction, except that those found in the barrow are less artistic in their form.

In taking into consideration the relation of the flints generally found in Devon and Cornwall, with those existing in barrows, &c., it is desirable that we should give attention to the circumstance under which they were found, and the materials with which they were in connection.

In the barrow, to which reference is made at Constantine, with the flint flakes were found burnt human bones, and a coarse clay vase. In the kitchen-midden found near the barrow, and of which an account was given to this Society at Torquay, pottery of different qualities was found, some of which cannot be distinguished from that found in the barrow; with the pottery procured from the kitchen-midden were found stone hammers, obtained from the rolled pebbles of the sea beach.

Now if we turn our attention to the discovery at Croyde, we find that, both by Mr. Whitly and by Mr. Hall, specimens of coarse pottery have been found, as well as beach stone hammers, that closely approximate in character and appearance with those found in the Constantine barrow and the kitchen-midden. In either case the pottery assimilates in appearance with that of the clay found in the neighbourhood, and is of a quality that approximates it in appearance to that of the present bricks of the county.

It certainly appears to me, that a uniformity of material, with a uniformity of design and application of material, existing under similar geological conditions, is suggestive of an approximation in time; and thus the Croyde, Lizard, and Dosmare pool flints are in all probability of the same age as those existing in barrows containing cremated human bones.

But it must strike the observer as peculiar, that the flint flakes which archæologists pronounce as being the most primitive form of human implement, are found in such abundance in the sub-soil of the Western Promontory, whilst the more perfect flint tools of St. Achin, &c., are found in the drift period of geology; thus placing the more complex and perfected structure at a far earlier geological period than the flint-flake, a fact that is not consistent with the latter being the more primitive form of the two.

Now if we look upon the flakes, as I believe they are, as parts only of a more perfect tool—some being the heads of ancient arrows—which themselves would be useless without the assistance of a stringed bow, an instrument, I think, that required a higher degree of thought to suggest, than did either the hatchet or spear. Now as arrows were in use, and retained as instruments of chase and war until a late period, it is tolerably certain that flint was retained, owing to the scarcity of metal, long after the use of iron was known.

Recently, while pursuing research in an ancient British burial-place, in which the Roman feature of civilization has largely entered, we found, in a grave with a human skeleton, besides two vases, a bronze beaded fibula, some rings, and parts of an armlet, a specimen of a flint core, from which flakes had been struck. Now the presence of this flint core is witness that the material was still in use after the Roman invasion; and therefore I contend, that there is no evidence to show that these flint flakes may not have been coëval with the civilization of the period that immediately precedes the introduction of Roman civilization into this county.