

## OBSERVATIONS ON THE BONE BED AT CLACTON.

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The estuarine peaty shale still to be seen in the cliff section below the Martello tower at Clacton has a thickness of 10 or 12 feet, and seems to pass gradually into a dark clay which we find as the top layer of the shore deposit. On the shore below the Martello, and east of the stone groyne, the following layers were observed:—

1. Dark, stiff clay, without shells. To be seen only on the upper part of the shore, near the sea-wall. Further down, it has been denuded. Thickness, *c.* 9 in. from shore sand.
2. A shelly layer, containing much *Unio littoralis*: more sandy than the last. *c.* 3 in.
3. A dark layer with occasional shells. Lower limit variable. *c.* 4 in.
4. Blue loam: one of the most characteristic features of the deposit. Shells of *Unio* occur. *Helix* was also found. There is also in some parts much wood. Partly embedded in this layer most of the bones are found on the shore surface. Eastwards the layer grows less homogeneous and comes to rest directly on the London Clay. I am not sure what is the full thickness of this layer, but, where it is covered by others, I have dug 18 in. into it without reaching anything else. Accumulation of water and return of the tide prevented deeper trenching, but I think if we gave 2 feet as the total thickness we should not be far wrong.
5. A very thin layer, made up almost wholly of fragments of *Unio*.
6. Sand, shells, and broken flints. Thickness varies; 3 in. and 5 in. were measured in two trenches.
7. Stony layer. Flint pebbles, broken flints, some sand, some shells. Astragalus of deer, horn core (probably of deer), tibia of deer were found in trenching this layer.

West of the stone groyne the layers are more variable. A trench about 40 feet from the sea-wall and 30 feet west of the groyne showed, below the shore sand, layers 1 and 2 as above. Lower down the shore the layers are more sandy and variable than on the eastern side of the groyne. The loam is more sandy; it contains wood and shells of *Limnæa*, *Bithynia*, and *Planorbis*. The stony layer appears on the lower part of the shore. The stones are much blackened as though from decomposing organic matter, and below them occurs sand similarly darkened.

BONES.—Almost all are on or partially embedded in the blue loam. Identified specimens include the following:—*Bos primigenius*: base of skull, horn cores, teeth, most of the limb bones. *Elephas antiquus*: occipital condyles, teeth, vertebræ, acetabulum, various portions of limb bones, metapodials, cuneiform, right lunar. [Some of the *Elephas* bones were found in excavations made in the cliff in putting up a new shelter. This was at the spot

where in W. H. Dalton's section (Mems. of Geol. Survey, Geol. of Neighbourhood of Colchester, p. 10) the clay band in the cliffs dips down towards the fresh water deposit.] *Rhinoceros leptorhinus*: two fine specimens of lower jaw; also acetabulum and metatarsal of rhinoceros (species undetermined). *Cervus*: skull (imperfect), various limb bones, vertebræ, calcanea, horn cores, etc. Most of the remains are those of *Cervus elaphus*, but some portions of antler seem to belong to *C. megaceros*. *Equus*: os innominatum, teeth, perhaps part of femur and radius.

SHELLS.—All fresh water or terrestrial. Bivalves: *Pisidium amnicum*, *Unio littoralis*. Gasteropods: (Fresh-water) *Bithynia tentaculata*, *Planorbis*, *Limnæa peregra*, var. *ampla*. (Terrestrial), *Helix nemoralis*. Several specimens of this last were found buried in the loam of layer 4.

SEEDS.—*Cratægus oxycantha* (Hawthorn), *Cornus sanguinea* (Dogwood), *Alnus glutinosa* (Alder). Mr. Clement Reid, who kindly identified these, and described them as "certainly fossil," added, "There is also a curious elongated *Cornus* fruit, which may be something different. I have never seen *C. sanguinea* this shape, but there is a Mediterranean species with an elongated fruit, though the stone of that is usually larger than the stone of our *Cornus*."

FLINTS.—Flakes can often be found about the surface of the fresh-water deposit. They show flattened top, inner bulb, and outer concavity. A good hollow scraper has also been found. Apparently this shows signs of glaciation. An axe of Neolithic type was found on this surface some years ago. This seems out of place, and may have been washed down from elsewhere. It has indeed been suggested by some of the advanced school of the hypercritical that none of the finds is *in situ*, but I do not think this extreme view is tenable. It would be strange that seeds, shells, bones, and flints, of a type that would naturally occur together, should by accident severally be washed into the same area and there kept together. The region would seem to have been of a marshy character, and the mammalian bones, as Dalton suggested, may be the result of animals getting mired at the edge of the marsh. "The presence," he wrote, "of purely fresh-water beds below high-water mark, passing up into estuarine deposits on the top of the cliff . . . . indicates gradual submergence and subsequent re-elevation"

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