

The Stratigraphical Position of the Transitional Culture in the South and South-West of England.

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Now that the presence of the Tardenoisian culture, together with typical Late Pleistocene mammals, has been definitely established in the upper Cave Earth at Aveline's Hole, Burrington Combe, Somerset, it would seem appropriate to consider the relation of this deposit to deposits of the same horizon from other districts.

Of the Late Pleistocene deposits of the South of England, perhaps the Ponder's End¹ and Barnwell Station Gravels² are generally accepted as being most typical of the later stages of the last cold episode in this country. Recently, Mr. Miles C. Burkitt has coupled these Gravels with the culture of Magdalenian times,³ whilst Mr. A. S. Kennard⁴ has pointed out that the mollusca, for example *Columella*, are particularly characteristic of the Late Pleistocene period, and denote a colder climate than that of the present day.

On the South coast the uppermost "Coombe Rocks" are evidence of this last cold period. These gravels are usually unstratified and sub-angular, but often vary greatly in the size and condition of the flints of which they are composed. Their formation is probably due to the action of waters from melting ice and snow, together with extreme cold. In speaking of the more angular Coombe Rocks Clement Reid⁵ has suggested that heavy rains and much frost may account for their nature. Quite recently Lt. Col. J. H. Cooke⁶ has succeeded in finding shells, including *Columella columella* (Benz) and *Pupilla muscorum* (Linn.), in this upper Coombe Rock. Their identification by Mr. Kennard has

¹ Q. J. G. S., Vol. 68, p. 213.

² Geol. Mag., 1916, p. 339.

³ *Proceedings Prehistoric Society East Anglia*, Vol. III, Pt. II, p. 311.

⁴ Q. J. G. S., Vol. 68, p. 235, and *Proceedings Prehistoric Society East Anglia*, Vol. II, Pt. II, p. 249.

⁵ Q. J. G. S., Vol. 43, p. 364.

⁶ *The Pleistocene Deposits of the Portsmouth District and their Relation to Man*, Proc. Geol. Assoc. (In print).

definitely established the fact that this deposit is Late Pleistocene and contemporary with the last cold period experienced in this country. At Waterbeach, North of Portsmouth, Clement Reid found the teeth of mammoth and horse in the same horizon. These upper Coombe Rocks generally overlie a Raised Beach deposit, or a lower Coombe Rock, but a sandy layer frequently separates the two formations.

The Raised Beaches are typified by the presence of a marine fauna, and well rounded pebbles and shingle. Flints bored by mollusca, such as the *Pholas crispata* are common in such deposits. Examples of these are to be seen at Brighton, Chichester, Selsey, Portsdown, etc., whilst further West the lowest Raised Beach is more often characterised by a wave-cut rock platform as at Torquay, Jersey, Weston-super-Mare, South Wales, etc. As on the South Coast, so on the West, this Raised Beach is overlain by a sandy deposit, which, in turn, is covered by a Coombe Rock formation. This latter, in the West, generally goes by the name of Rubble Head.⁷ At Jersey, Dr. R. R. Marett⁸ has found Mousterian implements on the Raised Beach rock platform, whilst at Gower in South Wales, Professor Sollas⁹ has found an Aurignacian industry in the yellowish loam immediately overlying the Raised Beach. He shows that the Aurignacian culture is older than the culmination of the last glacial epoch, and younger than the last but one. Covering the cave and its contents is the Rubble Head, which, as shewn by the fauna of the contemporary Coombe Rock, is also a representative of the last cold period of Late Pleistocene times. The mammalian remains from the loam include cave bear, brown bear, hyæna, wolf, cave lion, *Elephas antiquus*, *Elephas Primigenius*, *Rhinoceros*, giant deer, ox, boar, etc. The presence of cave lion, *Elephas antiquus* and *Rhinoceros* tends to show that the yellow loam is slightly older than the upper Cave Earth of Aveline's Hole.

The bone layers of Gower are situated between the Raised Beach and the overlying Head, and are therefore presumably contemporary with the sandy layers occupying similar horizons along the South and West coasts. On the South Coast the sandy deposits are sometimes absent, whilst on the West they usually

7 Q.J.G.S. Vol. 48, p. 263.

8 *Archæologia*. Vol. 62, Pt. II, p. 449.

9 *Journ. Roy. Anthro. Inst.* Vol. XLIII, (1913).

take the form of dunes. These have so far yielded no faunal evidence, whilst an extensive search on the South Coast for flint implements in this deposit has also proved fruitless. It seems possible that the yellowish loam underlying the Cave Earth at Aveline's Hole, which Mr. J. A. Davies informs me is also barren*, may be contemporary with these sand dunes, and with the yellowish loam of Aurignacian date at Gower. The rounded nature of the constituents of this lower loam from Aveline's Hole is quite different from the angular insoluble limestone residue which comprises a large percentage of the superficial Cave Earth. It may be that the lower layer is æolian in origin, but has been re-assorted and deposited by the cave stream.

Recently Dr. Greenly¹⁰ has pointed out that the sandy deposits on the East side of Clevedon Hill are æolian, and he records six forms of mollusca (including *Pupilla muscorum* (Linn.) four of which also occur in the South coast Coombe Rocks, and constitute a typical Late Pleistocene fauna. These æolian sands lie between two deposits of limestone rubble which seem to be the local analogues of the Coombe Rocks of the South Coast. The whole series of Clevedon deposits are banked against what appear to be wave-worn rocks, in which is situated the cave investigated and recorded by Professor S. H. Reynolds.¹¹ The mammalian remains from the cave and from the lower gravels include horse, bear, wolf, fox, arctic fox, Norwegian lemming, etc., which both Professor Reynolds and Mr. Hinton consider to be Mid-Pleistocene. Recently in the upper limestone gravels have been found remains of horse, and four of the shells described by Dr. Greenly, together with *Polita cellaria*, *Helicigona lapicida* and *Helix nemoralis*.¹² These were also obtained from the similar deposit in a quarry about half a mile further South on the same contour.

It thus appears that there is a Late Pleistocene Rubble Gravel separated from a Mid-Pleistocene deposit by a barren æolian sand. This is an exact repetition of the South Coast deposits at this height above sea level, and for reasons stated elsewhere⁶ the upper Late Pleistocene deposit is considered to be contemporary with Late

* A few bird bones have since been found in this deposit.

¹⁰ *Geol. Mag.* Vol. LIX, pp. 365 and 414.

¹¹ *Proc. Bristol Naturalists Soc.* 4th Series. Vol. I., Pt. III (1907).

¹² Kindly identified by Mr. A. S. Kennard.

Aurignacian or Transitional times. This agrees with the position of the Aurignacian horizon in Gower, and with the position of the Tardenoisian Culture at Aveline's Hole.

Hence Walton Cave deposit is Mid-Pleistocene, and, if of 50 feet Raised Beach times, probably contemporary with the Late Mousterian culture; Gower Cave bone layer is later Pleistocene and contemporary with Aurignacian times; whilst Aveline's Hole is still later, and contemporary with the Transitional culture.

It will be interesting to see if the molluscan remains from Aveline's Hole bear out these correlations.

There are no deposits, other than varying thicknesses of road washings, overlying the Cave Earth at Aveline's Hole, but elsewhere deposits yielding a plentiful supply of Neolithic flints and pottery are to be found. One example is the superficial Brick earths of the South Coast which everywhere overlie the upper Coombe Rocks. Besides unabraded Neolithic flints, these Brick earths yield many derived artifacts of Aurignacian and Mousterian types, but no undoubted Magdalenian forms have been recorded. They frequently grade imperceptibly into the underlying Coombe Rocks, thus indicating a gradual abatement of the climatic conditions responsible for their formation.

It is interesting to compare the foregoing with the Continental evidence, for example, from the Somme valley. There, the Aurignacian culture is found in the Newer Loess, which is, from this standpoint, contemporary with the sand dunes, and the recent æolian deposits of the South-West of England. Above the upper loess on the Continent is a Brick earth covered by recent Alluvia, and containing Neolithic flints, whilst preceding it are deposits containing Mousterian flints.

Thus it would appear that:—

1. The Cave Earth of Aveline's Hole is contemporary with or just later than the period during which the Rubble Head and Coombe Rocks were formed, and that the presence of both deposits is due to the waning of the last cold period.

2. Preceding these Coombe Rock formations is a sandy deposit. This, there is some reason to suppose, may be contemporary with the lower loam of Aveline's Hole, which would thus be contemporary with the yellowish loam of the Gower Caves, and with the æolian sands at Clevedon.