

Pleistocene sections at Gerrans Bay, south Cornwall

H.C.L. JAMES

Faculty of Environmental Studies, Bulmershe College of Higher Education, Woodlands Avenue, Earley, Reading RG6 1HY



Pleistocene features along the eight kilometre coastline of Gerrans Bay, south Cornwall are, in ascending order, a low-level raised platform, basal conglomerate and raised beach, head deposits of differing facies, cryoturbation phenomena and finally loessic deposits. In addition, occasional exposures of the fossil cliff and the fossil cliff/platform junction may be observed especially at Pendower.

The prominent raised shore platform may be traced almost continuously from St Anthony Head in the south to east of Pendower Beach in the north. This platform, at times more than 10m wide, is cut across south-east-dipping slates, shales and sandstones with interbedded quartz veins of the Portscatho and Veryan Series. The ubiquitous low platform has been levelled to a notch at Pendower with a maximum elevation of 4.4m O.D. and extends down to below H.W.M. and this platform in turn cuts into a higher platform of indeterminate height. Earlier references to these low level platforms in south Cornwall may be found in Everard and others (1964), Wright (1967) and James (1974).

There are relatively few exposures of the fossil cliff/raised platform junction and the raised cliff in Cornwall, but both are revealed at Pendower (GR 899382) where the notch may be seen near a gully while the adjoining fossil cliff has fragments of raised beach and cliff debris firmly cemented to it. Elsewhere at Pendower, the raised platform has been almost completely eroded except for stacks which support a roof of indurated raised beach.

The deposits lying upon the platform in stratigraphical order consist of occasional large blocks incorporated into the cobbles, pebbles and sands of the raised beach. These large blocks are best revealed on the 5 to 10m wide platform between the western and eastern extremities of the Pendower section and are almost certainly derived from local rocks including so-called erratics of quartzitic origin (Stephens 1970) from the Gor(r) an Quartzite west of Nare Head.

The raised beach deposits have been described by James (1974) and others, e.g. Robson (1944), but the Pendower sections are notable, consisting largely of small rounded quartz pebbles with some slate in a sandy matrix and firmly cemented by manganese and iron oxides. The fossil beach has a maximum thickness of three metres at Pendower and fragments of the overlying coarse blocky head are incorporated into the upper part of the raised beach. Elsewhere in the south of Gerrans Bay the induration of the beach material is much less marked or

absent. Occasional bands of silty-clay occur within the raised beach as recorded by the author (James 1975(a)) at Godrevy, but shell fragments are totally absent from all sections examined in Gerrans Bay, a feature already noted by the author in earlier work.

Without exception the angular head deposits overlie the beach material, however some sections, e.g. Towan Beach reveal a marked hiatus between these differing deposits, but elsewhere there is a degree of interdigitation of the peri-glacial material into the ancient marine deposits. The latter observation suggests that solifluction transport processes were proceeding at the same time as the formation of the beach. Again without exception, the head deposits consist of local shales, slates, grits and quartz-vein fragments displaying crude stratification, a feature that is common along the south coast of Cornwall in localities where there is some considerable distance from the degraded fossil cliff, for example, Caerthillian Cove, Lizard and Perranuthnoe, Mounts Bay.

A coarse blocky slate head facies can be traced along Gerrans Bay and is well illustrated at Towan Beach (GR 871330), Greeb Point (GR 878336), Creek Stephen Point (GR 887371), and Pendower (GR 903383). The head deposits are generally finer below and above the blocky head and include colluvium and wash material. The upper section of the periglacial deposits commonly consists of approximately 50cm to 100cm of fine sharply angular comminuted shale/slate suggesting a return to more severe climatic conditions suitable for frost-shattering processes to occur. Clear signs of cryoturbation are observed in the comminuted shale layer including involutions and a few wedges, e.g. Towan Beach (GR 873332).

The presence of loess also appears to be a ubiquitous feature on low-lying coastal platforms of south Cornwall (Catt, in press) overlying head deposits. At Towan Beach the loessic material contains small fragments of local shales and quartz and preliminary particle size analysis shows that the fines consist of more than 70% silts, mainly of medium to coarse grade. The presence of local gravels amongst the silts suggests that the deposit is more an accumulation of silts washed from the surrounding upland rather than an aeolian deposit *in situ*. (A similar observation was made for slope wash deposits at Gunwalloe Fishing Cove by James (1975 (b)).

The problems of absolute dating of the low raised beach deposits in south Cornwall have been discussed

elsewhere, (James 1974 and Mottershead 1977), but the lack of shell means that amino-racemisation techniques such as, discussed by Andrews and others (1979) are not feasible although thermo-luminescence has been applied to dating loess on an experimental basis and has recently produced Late Devensian dates from samples obtained from south Cornwall and the Scilly Isles (Wintle 1981). Thus relative dating of the Cornish raised beaches is possible at present and it is now generally agreed that the head deposits described above constitute one chrono-stratigraphical unit, namely the Devensian period, despite the differing facies within the head (see Mottershead 1977 and Kidson 1977). Therefore it is interpreted that the raised beaches were laid down during the preceding Ipswichian interglacial period. Where contemporaneity of both marine and overlying periglacial deposition is evident, then the raised beaches are probably late Ipswichian or early Devensian in age. Finally, the shore platforms were at least re-trimmed during the Ipswichian if not comprehensively formed at that time. Indeed, Bowen (1973) suggested sequential occupancy of these platforms by various seas throughout the Pleistocene.

Loess - Late Devensian (Wintle 1981)
 Cryoturbated upper head - Late Devensian
 Head of varying thickness and facies - Devensian
 Raised beaches - Ipswichian to early Devensian
 (Stage 5e? Bowen 1978)
 Shore platform - re-trimmed during Ipswichian to
 early Devensian

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