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# Peninnis Head, St Mary's

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## Highlights

This site contains some of the most spectacular granite landforms in the British Isles. These include the finest development on the Isles of Scilly of the 'castellated' or 'mammilated' tor forms which are characteristically found only outside the glacial limit which straddles the islands.

## Introduction

Although the granite landforms of Peninnis Head (Figure 8.1) have been mentioned briefly by a number of authors (Barrow, 1906; Mitchell and Orme, 1967), they have never been the focus of a major individual study. Scourse (1986, 1987) discussed the general aspects of tor morphology on the islands and cited the examples at Peninnis Head as constituting some of the finest granite landforms in Britain. He (Scourse, 1986, 1987, 1991) further drew attention to the association between different tor forms and the glacial limit (Figure 8.1) and (Figure 8.6) which he, and others (Mitchell and Orme, 1967), were able to identify across the islands.

## Description

Scourse (1986, 1987, 1991) mapped four tor forms on the Isles of Scilly (Figure 8.6). Peninnis Head [SV 911 094] contains the largest concentration of forms A, B and C in the islands, and the finest individual examples of each form (Figure 8.7). Horizontal tors (form A) are characterized by extensive sub-horizontal discontinuities separating large granite slabs which typically touch at only a few points. These resemble 'pedestal' features locally called logan stones'. Elsewhere this particular tor form has been described as 'manuilated', 'castellated' or 'lamellar' (Waters, 1955). Vertical tors (form B) are characterized by vertical discontinuities with granitic rubble often filling the voids between granite slabs. Form C, hillslope tors, are a coastal variant of forms A and B.

## Interpretation

Granite tors occur throughout the Isles of Scilly, but they are particularly well developed to the south of the ice limit which has been identified across the islands (Figure 8.1). South of this limit all tors can be classified as forms A, B or C, as described above, or resultant transitional or composite forms (Figure 8.6). These forms are well displayed on St Agnes, where ornate, individual, weathered granite slabs have been assigned popular local names, on Annet, the Western Rocks, St Mary's and the southern part of Tresco. However, the scale, concentration and extent of the features at Peninnis Head justify selection of this site to represent these landforms which typify the Scillonian landscape south of the ice limit.

Examples of tor form D (Figure 8.6) have only been identified north of the reconstructed ice limit. This form is smoothed and rounded, with all loose material removed. Alternatively, forms A, B and C are all ornate and contain a large proportion of loose or delicately shaped rock masses.

The distribution of the different tor varieties provides a key to understanding their evolution. The lower slopes of tor forms A, B and C at Peninnis Head, as elsewhere on the islands, are mantled by thick periglacial slope deposits or 'head' (Porthloo Breccia; (Figure 8.3)) which have been interpreted by most workers as being of soliflual origin (e.g. Scourse, 1987). This provides strong evidence that exhumation of the corestones of these tors took place under periglacial conditions during the Pleistocene. The radiometric dates on organic sediments from within the mantling Porthloo Breccia (Figure 8.3) provide valuable evidence on the timing and rate of tor exhumation during periglacial conditions of the late Middle and early Late Devensian.

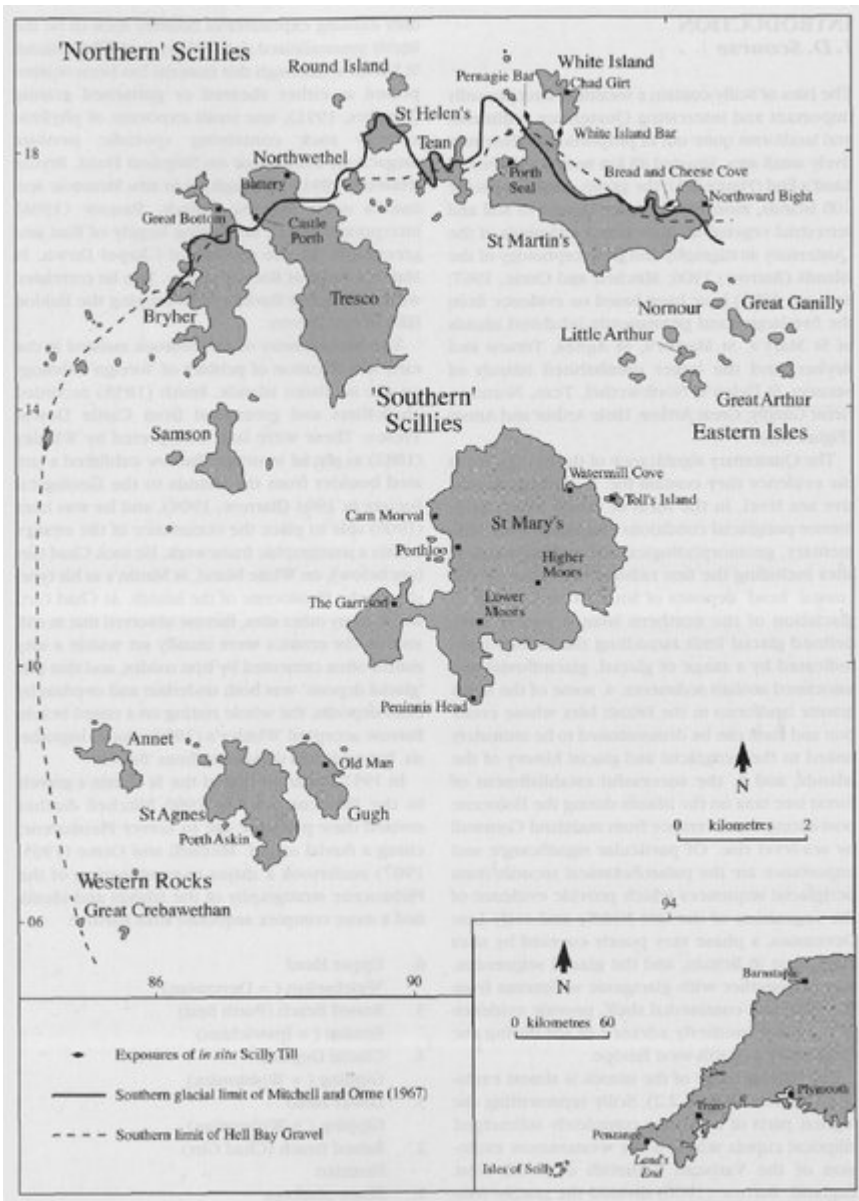
Tors attributable to form D, however, are quite distinct in resembling roches moutonnees; .a good example is provided by Round Island (Figure 8.1) and (Figure 8.6) in the northern Isles of Scilly. The clear association between these different landforms and the proposed ice limit suggests that the smoothed form D is a product of glacial erosion. Despite the fact that some authors have interpreted elaborate tor forms as occurring within former ice limits (Dahl, 1966; Sugden, 1968; Clapperton, 1970), Scourse (1987) points out that it is difficult to envisage how the more delicate tor forms, typified by those at Peninnis Head, could have survived being overridden by ice.

The origin of tors has long been a matter of considerable debate, and the various mechanisms and processes proposed are discussed more fully in Chapter 4. Some authors have invoked a two-stage process of tor formation involving deep chemical weathering during the Tertiary followed by exhumation of corestones by Pleistocene periglacial processes (Linton, 1955). Others have argued that Pleistocene periglacial activity alone was responsible for the tors (Palmer and Radley, 1961; Palmer and Nielson, 1962). The Scilly tors, and the Peninnis Head features in particular, therefore support the widely recognized implication of periglacial slope processes in tor exhumation. However, there is no evidence at Peninnis Head, or at any other tor site on Scilly, which might point to an earlier phase of deep chemical weathering during the Tertiary.

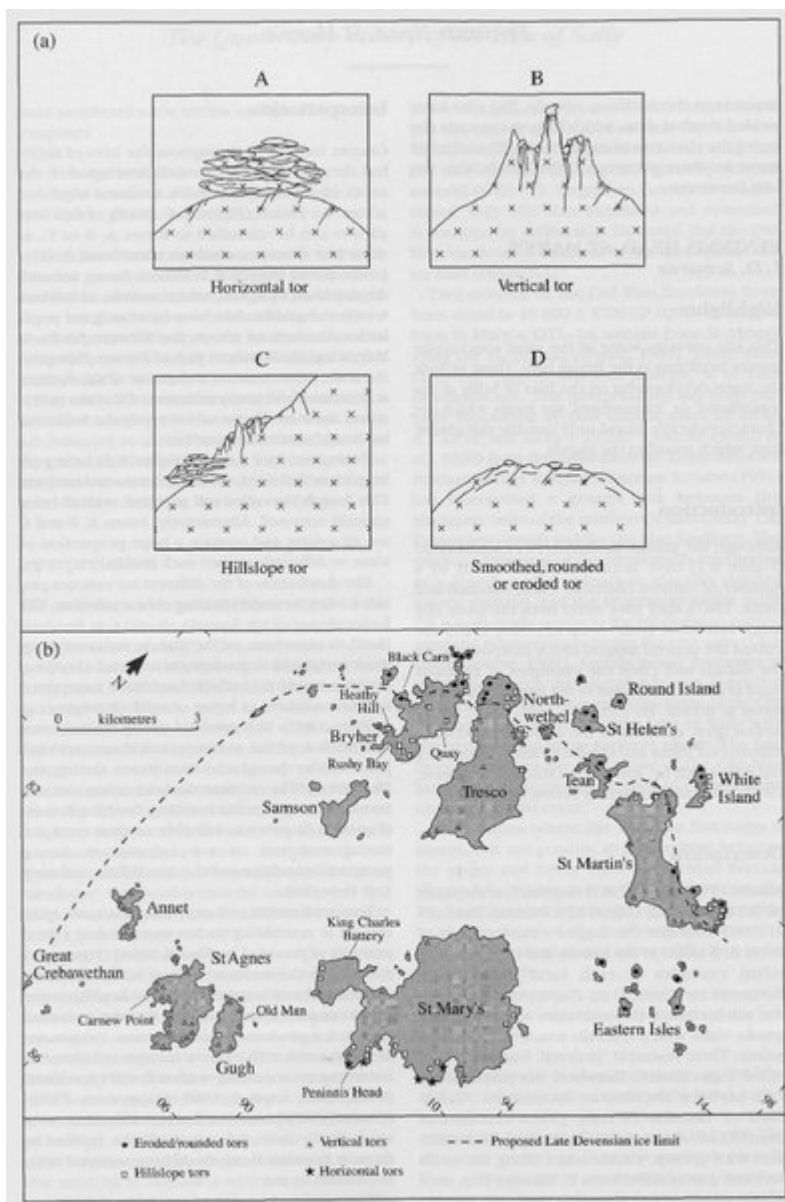
## **Conclusion**

Peninnis Head contains the largest concentration, and the finest examples, of granite tors in the Isles of Scilly. The association of these features with dated slope deposits formed under cold climates elsewhere on Scilly provides unique evidence of the timing and conditions of their formation. The intricate and delicate tor forms at Peninnis Head contrast with the much smoothed and apparently ice-eroded tors which occur in association with glacial sediments in the northern Isles of Scilly. They therefore provide supporting evidence that the southern islands remained unglaciated during the proposed Late Devensian (*c.* 19 ka BP) glaciation of the northern islands.

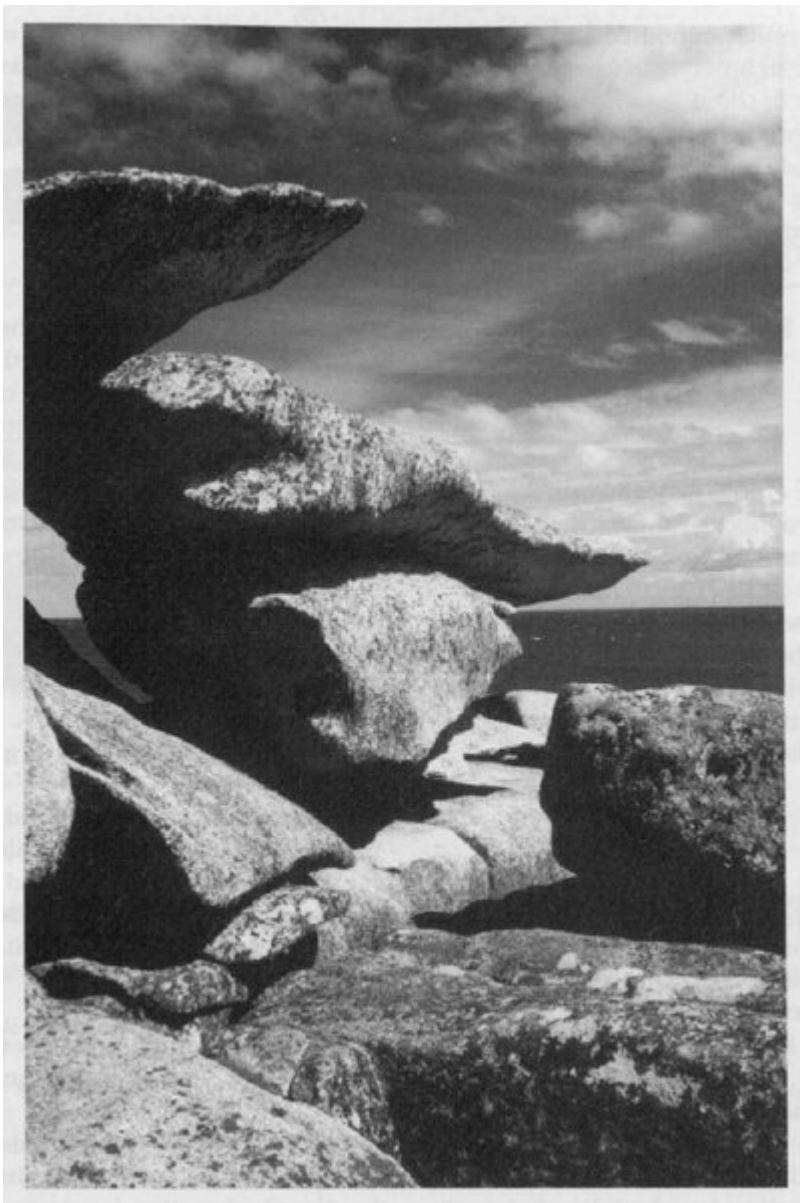
## **References**



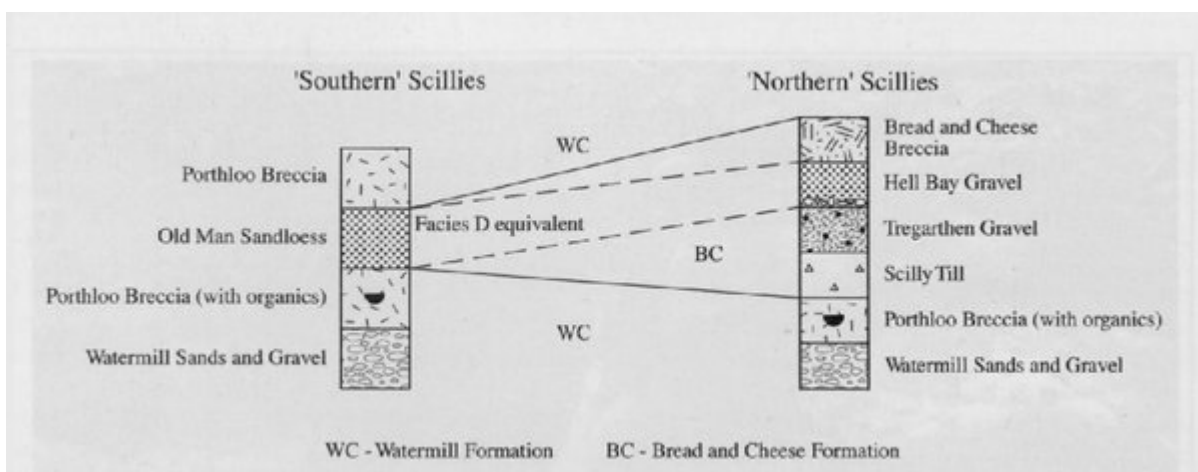
(Figure 8.1) The Isles of Scilly: critical sites, exposures of the Scilly Till, the southern limit of the Hell Bay Gravel and Mitchell and Orme's (1967) glacial limit. (Adapted from Scourse, 1991.)



(Figure 8.6) (a) Variations in tor morphology. (b) Their distribution across the Isles of Scilly. (Adapted from Scourse 1986.)



(Figure 8.7) The spectacular development of horizontal tors (form (a); (Figure 8.6)) on the eastern side of Peninnis Head. (Photo: S. Campbell.)



(Figure 8.3) A lithostratigraphic model for the Isles of Scilly. (Adapted from Scourse, 1991.)