
Coast of the Isles of Scilly

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Introduction

The Isles of Scilly comprise five main islands, St Mary's, Tresco, St Martin's, Bryher and St Agnes, and over 100 smaller islands and islets (see (Figure 8.2) for general location and (Figure 8.26)). Many of the larger islands have been formed by the linking together of smaller islands by sand tombolos, but some are linked by low terraces underlain by head and/or till (Barrow and Flett, 1906; Mitchell and Orme, 1967). For example, the largest settlement on St Mary's, Hugh Town, is built mainly on a low isthmus fringed by sandy beaches. Apart from the islands of Scotland (mainly Orkney and Shetland) where Steers (1973) described over 40 such features, the Isles of Scilly contain the largest assemblage of tied islands in Great Britain. The beaches are predominantly sandy, derived from the weathering and erosion of head and/or till as well as the mainly granitic rocks that form the islands. Many of the linking beaches have been built upon, but the four islands that comprise this GCR site represent best the different stages of island linking.

The islands of Great and Little Ganinick represent early stages in the process of island linkage with a beach ridge extending from Little Ganinick towards Great Ganinick. On Great Arthur, the processes of beach development have linked two former islands and a third is gradually being joined to them. On Tean, not only are three small islands with links at various stages of the linking sequence, but there is evidence of older beaches joining these islands and others. The changes in these developing features are affected both by the availability of sand derived from erosion on cliffs and platforms, and by the variation in wave direction and climate brought about by shelter and refraction around the larger islands of Scilly. There are no other sites in England and Wales in which these forms are common, let alone as well developed. Tied islands have received only limited attention in the literature (Gulliver, 1898-1899; Gullcher, 1954; Farquhar, 1967; Carter and Orford, 1988). The only comprehensive regional descriptions remain those of Steers (1973) and Mather and Smith (1974) for Orkney and Shetland. Although Steers (1981) drew attention to their unusual characteristics, there has been no detailed examination of them and their origins may need to be reconsidered in the light of Scourse's (1987, 1991) re-evaluation of the Pleistocene stratigraphy and Foster *et al.*'s (1991) evidence for surges and tsunamis in south-west England.

Description

The site comprises four islands, Tean, which lies at the northern end of Crow Sound between Tresco and St Martin's, and a group of three smaller islands (Great Arthur, Great and Little Ganinick) which lie at the south-eastern end of Crow Sound about 1.5 km north-east of St Mary's (Figure 8.26). Apart from waves that approach Tean from the north and the group of three islands from the ESE and south-east, all waves approaching the site are strongly refracted by the shallow seabed around the other islands. Each island is surrounded by platforms cut into granite. Sand, derived from the erosion both of these platforms and the cliffs and cliff-top sediments, supplies the beaches that rest upon the platforms. Their exact alignment depends upon wave direction and refraction between the major islands as well as over the platforms themselves.

At Great Ganinick, there are two beaches separated by zones of boulders. On the north side of the island (Figure 8.26), the beach forms a small cusped foreland, whereas on the south side of the island the beach fringes the island. Little Ganinick has a single beach that trends north-westwards towards Great Ganinick. Although the sand of this beach spreads across the platform towards Great Ganinick, the sediment supply appears to be insufficient to link the two islands completely. In contrast at Great Arthur, the process is complete. Great Arthur comprises three rock islands joined by two sandy beaches. The larger of these is aligned with the rocky shore of the two southernmost former islands. Its eastern sheltered side is aligned towards small waves that refract into the bay from the east. The northern beach appears related to waves that pass between Great Ganinick and Little Ganilly before local refraction on the platform and

headlands of Great Arthur.

On Tean (Figure 8.26), the process is demonstrated well by a set of beaches that not only tie small islands, but also show how these beaches may develop in the lee of islands without tying them completely. On Tean the balance between sediment supply and wave energy is such that double beaches have developed with a sandy flat between them. One beach has formed a cusped form in the lee of a small island as the beach itself has been supplied with insufficient sediment to complete the link (Figure 8.26).

Interpretation

Tombolos have a limited research literature. Gulliver (1898–1899) suggested that the term 'tombolo' should be adopted from its Italian usage to include all beaches joining islands to the mainland. Where links between islands exist, the term is also used. Farquhar (1967) described a number of examples of tied islands, including the Isle of Portland and Holy Island. However, it is uncommon to find an assemblage of comparable forms at different stages of development within one area. Within Great Britain, there are two main areas where this occurs, the Isles of Scilly and Orkney and Shetland. Carter and Orford (1988) have described similar features on the drumlin coast of Clew Bay, County Mayo in the Republic of Ireland. Elsewhere within Europe, many of the best examples occur along the Italian coast. This site is, therefore, an important element in the assemblage of coastal landforms in southern Britain. It differs, both in its scale and the variety of forms within it, from Farquhar's other tied island site (Holy Island, Northumberland). Whereas Holy Island is affected by refracted North Sea swell, the features in Scilly are related to both refracted Atlantic swell and local wave systems within the island group.

In their study of linked islands in Clew Bay, Carter and Orford (1988) emphasized that many of the links were established by solitary gravel ridges founded on coarse boulder frameworks. These links have been shown to facilitate sediment mobility and are sometimes marked by small crestal washovers, i.e. they have some slight tendency to transgressive behaviour. The principal factor in maintaining the beaches is the sediment supply from the continuing erosion of the cuffed drumlins. On the Isles of Scilly, erosion of the cliffs is slow, except in Pleistocene sediments, but there are some similarities with the Clew Bay features. First, many of the linking sandy beaches are commonly based on a more resistant foundation, in this case rock platforms strewn with boulders or possibly what is left or eroded ridges of till or head. Second, the beaches on Scilly are fed by erosion of low cliffs often cut into Pleistocene sediments (Mitchell and Orme, 1967; Steers, 1981). Erosion frequently exposes artefacts of archaeological importance.

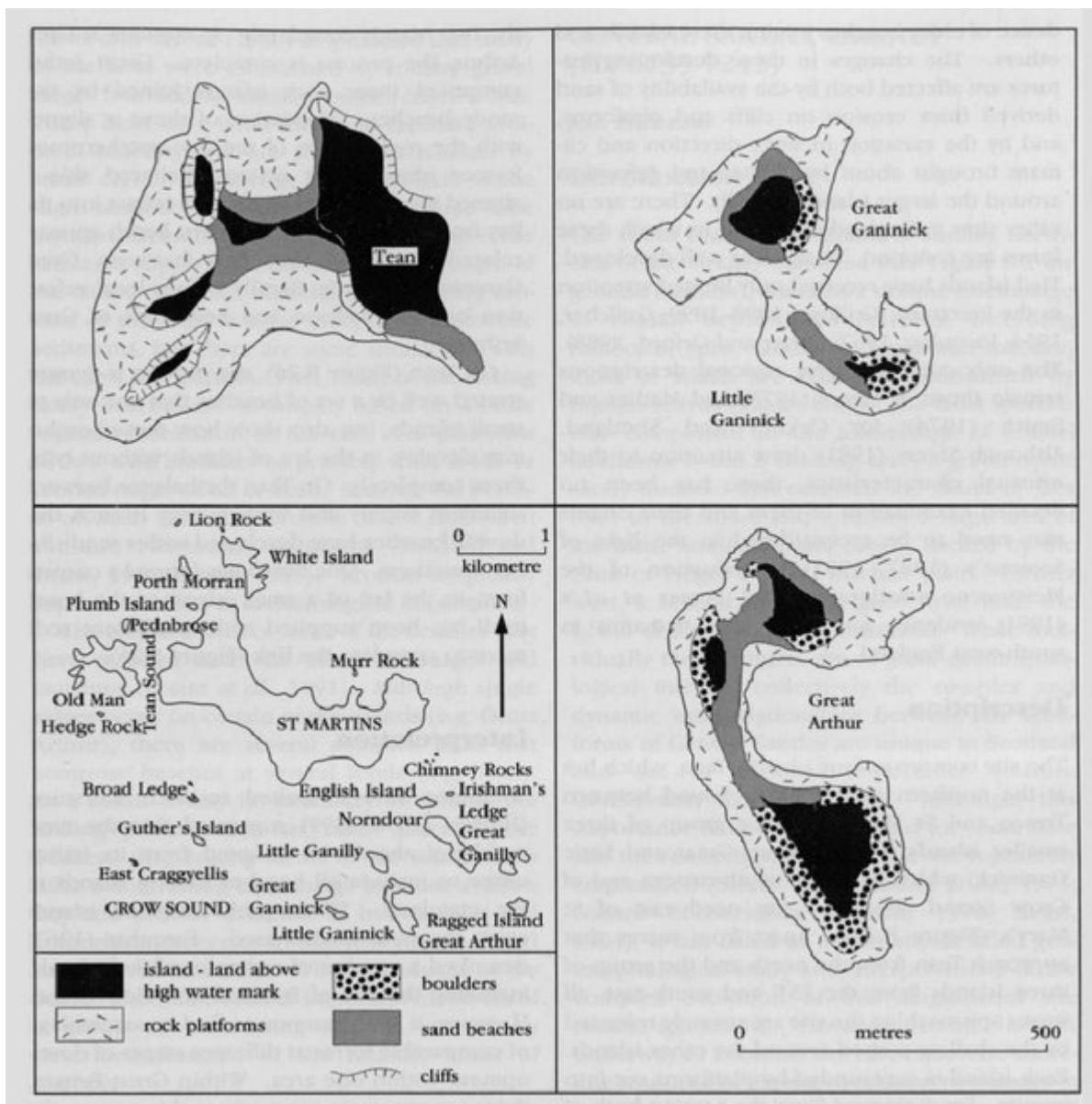
The emplacement of some of the beaches may have resulted from the effects of surges and tsunamis (Foster *et al.*, 1991). Although single ridges occur on certain of the islands (e.g. Great Arthur), there are several complex links that comprise beaches at several levels (e.g. Tean). As a result it may be necessary to rethink the linking process that has taken place in the Scillies. The linking forms of the islands thus offer a contrasting assemblage to those at Clew Bay and provide evidence of both similar and contrasting processes in different materials and on different timescales. The tied islands of the Scillies should be seen as important members of a group of contrasting and as yet poorly described features of the Atlantic coast of Europe.

Conclusions

Tied islands are rarely observed in England and Wales, but they are more common in the islands of Scotland and in Ireland. The Isles of Scilly include the largest British group of tied islands at various stages of development outside Orkney and Shetland. Their small size and variety makes them a very important location for further research into the relationships between sediment supply, sea level, wave patterns and beach development that bring about tied island formation; the site will be important for the study of the effects of sea-level rise on the completion of island tying.



(Figure 8.2) The location of sand spits in Great Britain, also indicating other coastal geomorphology GCR sites that contain sand spits in the assemblage. (Modified after Pethick, 1984).



(Figure 8.26) Key features of the coast of the Isles of Scilly.