
A4 Kynance Cove

[SW 684 133]

Highlights

Primary and recrystallized types of peridotite are well exposed here, and the relationships between these rocks and granite veins, basic dykes and hornblende schist are clearly seen at a locality that is readily accessible.

Introduction

Kynance Cove is one of the few places on the west coast of the Lizard where it is possible to descend the large cliffs. Here, the two main types of peridotite, the primary and recrystallized types are juxtaposed by a fault. In the gap between Asparagus Island and the mainland, and in the cliffs going northwards to Lawarnick Cove, are a variety of granitic, amphibolitic and banded gneisses within the peridotite. This area has not been discussed in many publications, and only Flett and Hill (1912) have described it in detail and published a sketch map. There have been no major controversies about the interpretation of the rocks in this area.

Description

The east side of Kynance Cove has a large wall formed of the primary-type peridotite, though the rock is probably more easily studied on the paths leading down to the cove. It is a coarse, partially serpentized peridotite with prominent, bronzy orthopyroxenes and a distinct coarse steep foliation. When at its freshest it is a dark, green-black colour, but many samples from this area have been slightly hematized to give a dull red-brown. In the rocks at the base of the cliff there are several basaltic dykes cutting the peridotite. A large fault runs roughly parallel to this western side of the cove and, in the central and western parts the peridotite, is of the recrystallized type. This has a distinct, closely spaced, metamorphic foliation with prominent augening around orthopyroxene porphyroblasts. Amphiboles are common in this type, and most rocks are reddish or brownish due to oxidation of the iron minerals.

Granitic sheets several metres in thickness are present between Asparagus Island and the mainland and also in the cliff to the north towards Lawarnick Cove. They are quartz–feldspar rocks with a little muscovite, and little or no foliation is developed. They do, however, show some boudinage structure. These features distinguish them from the acid fraction of the Kennack Gneiss. Similar granite sheets are also found at several other localities along the west coast of the Lizard. There is often a marked reaction zone at the contact with the peridotite, forming zones of talc and chlorite representing the migration of chemical components across the contact. Silica has moved into the peridotite to form talc, and magnesium migrated into the granite to form chlorite.

Within the rocks in the centre of the gap between the base of the cliffs and Asparagus Island, is a block of amphibolite. The contact relations are not clear, but it appears to be of the more banded Traboe type rather than the massive Landewednack-type amphibolite. This and the presence of banded gneiss a little to the north in Lawarnack Cove, suggest that this is close to the lower contact of the peridotite.

Interpretation

Kynance Cove shows the two main peridotite types, the primary and recrystallized types, in close proximity. However, this is not a transitional contact that records the sequence of events of how one is formed from the other. The two rock types with their contrasting mineral assemblages and previously formed structural fabrics, have been juxtaposed by late, steep faults. The intrusive relations and contact alteration of the late granite sheets are well-displayed.

The presence of the Traboe type amphibolites both here and in George's Cove, 2 km to the north, is of regional structural interest. Their presence and the bodies of Kennack Gneiss here and further south at Pentreath suggest that this level is close to the base of the peridotite sheet similar to the east coast. The base of the peridotite is clearly offset in numerous places by late faults, such as that at the east side of Kynance Cove. It is generally close to sea-level both here and at George's Cove, but is downfaulted to somewhat deeper levels in the intervening area. Previous discussions of the structure of the peridotite, covered in the introduction to the chapter, and particularly Green (1964c), suggested that, although the contact on the east coast might be flat lying, that on the west coast was steep, and consistent with a diapir-like form. The evidence outlined above, however, points to a structure similar to the east coast, although less well exposed, and hence does not support a diapir-like form.

Conclusions

Here outcrops of both primary and recrystallized Lizard peridotite are seen to be cut by later granitic veins and basaltic dykes. The peridotite represents a slice of upper mantle, thrust over younger rocks of the then continental margin, during the late Devonian. It forms part of the ultramafic base to the Lizard ophiolite, being formed at high temperatures and pressures in the mantle prior to subsequent recrystallization and serpentinization. The site at Kynance Cove therefore presents graphic evidence for the juxtaposition of Lizard rocks with an oceanic origin carried on the back of a major thrust over the top of continental crust.

[References](#)