

## ROBOROUGH STONE

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Vesicular quartz porphyry called Roborough Stone is widely used in the west and south of Devon for the dressings and less commonly the quoins of medieval churches. The distribution of the stone in buildings is described and discussed and LiDAR elevation data is used to identify many of the quarries from which the stone was formerly won.

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## INTRODUCTION

During the course of a study of the building stones of Devon and nearby parts of adjacent counties (Barr, 2016), it became apparent that an unusual quartzo-feldspathic rock-type was widely though sparingly used throughout the South Hams and in western parts of Devon. Comparison with published descriptions of Devon's building stones (Moore, 1829; Prideaux, 1830; Coppard, 1831; De La Bêche, 1839; Henwood, 1843; Worth, 1875; Ussher, 1906, 1912; Hoskins, 1954; Perkins, 1971; Worth, 1979; Clifton-Taylor, 1989; Brown, 1995; Tavistock Community Page, 2009 and English Heritage and British Geological Survey, 2015) demonstrated that this kind of building stone was well known, especially in the past, and was called Roborough Stone after the location, Roborough Down, north of Plymouth, from which it was won.

The location of the Roborough Stone quarries is, with few exceptions, rather poorly located in the cited references, near or on Roborough Down. However, Moore (1829, p. 307) locates the quarries: "...extending from a point nearly opposite Hoo Meavey to Bickham, is a bed of a singular porphyry, without defined dip; bowlders of which are strewn about the Down so extensively as to have acquired for it the name of "Roborough-Down stone". Henwood (1843, p.138) notes that the stone was won from a locality "not far from the water-course that crosses Roborough Down"; Prideaux (1830, p. 30) identifies the quarry locality in words so exactly matching those of Moore that it is hard to credit that they were arrived at independently.

Perhaps the most reliable evidence as to the location of the quarries, is Ussher's memoir (1912) covering the Ivybridge area and the accompanying geological map, Sheet 349 (Ivybridge), which is still used as part of the country-wide digital geological cover at 1:50,000 scale provided free of charge by the British Geological Survey through a web mapping service. The section of this memoir dealing with economic minerals and building stone is vague as to details of the quarry localities, but hidden in the text (Ussher, 1912, p. 67) is a description of a north-south section which intersects a microgranite dyke and identifies it as the locus of the Roborough Stone quarries. Reference back to the topographic map reveals an east-west line of anomalous ponds extending across the Down coincident with this microgranite dyke shown on Ussher's map.

In order to confirm and if possible extend this insight, LiDAR elevation data (Ferraccioli *et al.*, 2014) was acquired for the area of Roborough Down and processed to highlight surface irregularities as described later in this paper, followed by a field investigation.

## LITHOLOGY

Roborough Stone is a distinctive and striking rock-type used mainly for the dressings of medieval churches in the South Hams and west Devon (Figs 1, 2). The rock is typically pale fawn or grey and is strongly vesicular, almost pumice-like in texture, composed of a fine-grained granular matrix of quartz and feldspar with few dark minerals, enclosing rounded limpid phenocrysts of quartz up to 5 mm in diameter. The matrix encloses vesicles typically up to 10 mm across representing original gas bubbles in the solidifying rock and showing varying amounts of departure from the spherical presumably caused by deformation and flow during solidification. Prideaux (1930) was of the opinion that these voids have an approximately cubic shape but this was not confirmed by the present study.

The rock-type is markedly homogeneous where used as a building stone (freestone) and has been successfully shaped for decorative use. As mentioned above, its use is largely for the dressings and quoins of buildings and it is seldom used for ordinary walling, perhaps reflecting not only the value placed on it by medieval masons but also its scarcity, especially as large blocks.

Float of this rock-type, identical with that used for building, is widespread lying on the surface around the quarry locations. Here it is joined by more normal microgranite consisting almost exclusively of a fine-grained homogeneous mosaic of quartz and feldspar lacking any discernible oriented fabric or dark minerals. Some of these blocks are composite, consisting partly of this fine-grained microgranite, typically adjacent to joints and fractures, and partly of the more typical vesicular Roborough Stone (Figure 3). It is likely that in order to win good quality stone, some material marred by joints and fractures with accompanying loss of the characteristic texture, had to be discarded. However, there is very little waste now visible at the quarry sites.