SOFT AS GRANITE

Re-thinking one of our most durable building stones

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Perhaps second only to nautical parlance, the building trades have provided a plethora of colloquialisms and sayings that have become part of everyday language. 'On the level', 'square deal', 'like putty in his hands', 'here's mud in your eye', 'tough as nails' and 'hard as granite'.

Indeed, fresh granite is hard, but very basic tools have been used to shape blocks of granite for buildings since prehistoric times. Although traditional tools and methods were relatively sophisticated, careful selection of granite was a major consideration to maximise the efficiency of the tools concerned.

It is essential at this point in the discussion to explore some definitions and terminology associated with granite.

Firstly, the strict definition is much more precise than the general label applied by stone masons and quarrymen. Geologically, granite is an igneous rock slowly cooled and crystallised at depth with a chemical composition that varies between specific limits. The main minerals within a true granite are quartz, feldspar and mica along with a selection of dark ferromagnesian minerals. Within the trade, the term granite is often applied to any igneous rock with a large crystalline structure. In the 19th century the stonemasons of Derbyshire referred to some of the hard and coarse Millstone Grit as 'granite' and the stone was sometimes sold as such.

In the United Kingdom there are a number of geologically true granites including the well known upland areas of the South West: Bodmin Moor, Dartmoor and parts of Exmoor. There is the well-known 'Shap' granite of the Lake District and nearly a dozen examples in Scotland with the best known coming from the East Coast around Aberdeen.

Towards the edge of granite outcrops it is often softer than in the 'core' of the intrusion. This is caused partly by the cooling process and partly by the pressure of volatile gasses and liquids interfering with the efficiency of the crystallisation process.

Close up of a piece of weathered granite

These softer areas were often the areas exploited in the search for building materials, being easily shaped and roughly squared using simple hand tools.

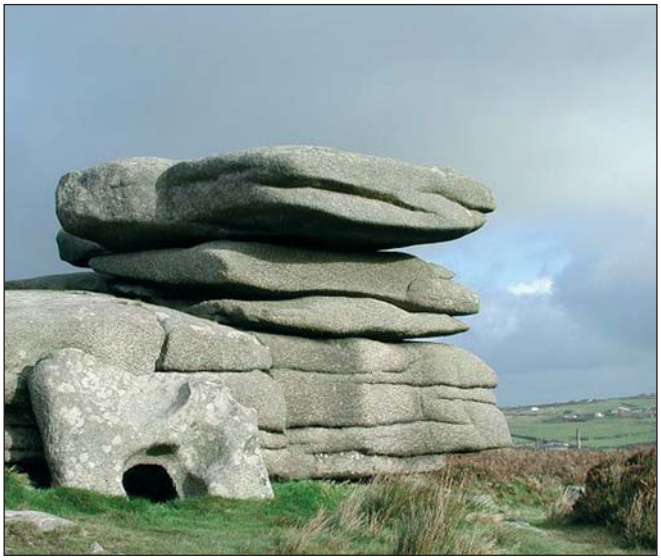
The decomposition of large areas of granite is a relatively slow process but certain minerals particularly the feldspars (and ferromagnesian minerals) are quite unstable when exposed to 'the elements'. These pockets of decay are often close to the surface of the granite regions and were the first to be exploited for building materials. The decomposition usually occurs in layers exploiting the different composition of the rock providing lines and planes of weakness along which the stone breaks more readily, making the conversion into ideal-sized blocks even easier.

The large deposits of Kaolin (China Clay) and the clay-rich soils associated with granite regions are essentially the result of the decomposition of the feldspar crystals.

Traditional methods of shaping granite for building include the use of ice (expanding as it thaws; the water having been deliberately poured into a series of prepared holes). Dry wooden pegs were also used and were driven into a set of holes before being soaked to expand creating a straight crack through a block. Another more sophisticated method using metal 'feathers and wedges' has been used since Roman times; this method uses wrought iron wedges driven between metal 'feathers' that direct the force from hammer blows. Each hole contains a set of 'feathers and wedges' and is struck in a particular order to generate a straight crack.

Castle Drogo

A small piece of fresh Cornish Granite



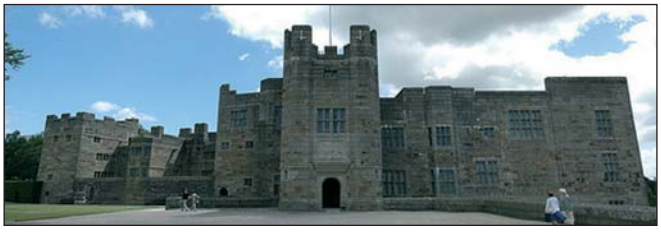
Granite on the landscape

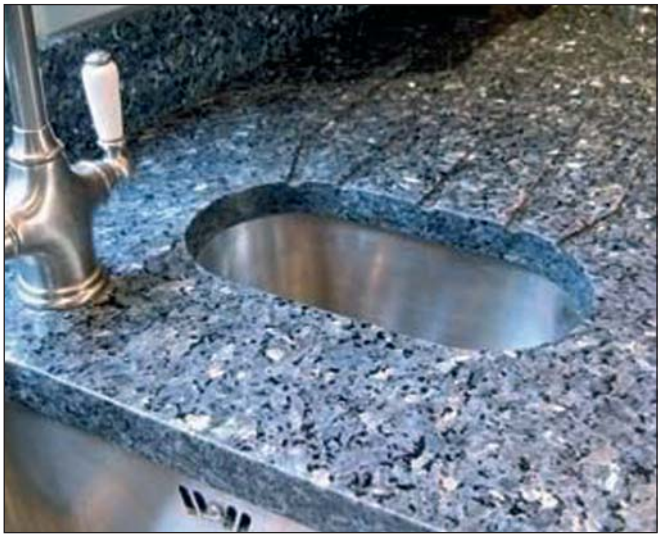
Vernacular and indeed most traditional buildings of granite will have been constructed of locally available materials either from nearby outcrops or small pits where the sub-soil is particularly shallow. The clay-rich sub-soil was particularly useful as the prime ingredient for mortars between courses of masonry. Pockets of finer clay in fissures and on the surface of the granite landscape provided ideal material for making renders and plasters especially when organic material in the form of straw (and a whole range of animal bi-products) was available to add to the mix. Granite regions are often quite remote from sources of lime and clay has to be relied on to facilitate the 'binding' of many mortars and renders.

Freshly cut and polished granite has very different properties when compared to the rubble and roughly hewn blocks used for a traditional building. In particular, the colours of a polished slab of granite depend on the actual colours of the mineral in their 'fresh' form whereas the rough granite blocks of a traditional building demonstrate the colours and textures associated with the decay process of the feldspar and in particular the ferromagnesian minerals generating colours as varied as yellow, buffs, ochre, rusty red through to purple and dark brown.

The decayed minerals provide an ideal (and nutritious) surface for the development of mosses and lichen adding to the attractive 'patina' of traditional granite buildings.

• Charles Hippisley-Cox graduated with a degree in Geology before studying Architecture as a mature student. He currently teaches at Huddersfield University where he runs the degree programmes in Architectural Technology.





Modern polished granite sink

Scottish Pink Granite