

Libby Peter's Rock Essentials

No. 3 : Rhyolite

Back to school – plate tectonics

The Earth's surface is made up of continental and oceanic crust laid out in a jigsaw pattern of 'tectonic plates'. These plates float on top of a magma layer and are constantly on the move, in some places drifting apart, in others colliding. The movement at these boundaries (at a pace similar to the growth rate of our hair) causes earthquakes, volcanic activity, mountain building and the formation of deep ocean trenches. When two continental plates collide the forces are spectacular, in a slow-motion kind of way, and they buckle up to create great mountain chains. Over the life of the earth there have been many of these mountain building phases or orogenies. The Caledonian orogeny some 410 million years

ago created mountains across Scotland that in their prime rose to at least 4000m. The ripples from this orogeny also created mountains and caused buckling or folding in the Lakes, Wales, Ireland and Scandinavia. Though only mere remnants of these giant mountains now remain, we owe much of our geological form to this period. Elsewhere in the world plates are colliding at this very moment, the Himalayas, for example, are still growing as India continues to pile into Asia.

The layout of continents and oceans has changed vastly over the eons. The Southern half of Britain and Ireland once sat on a much larger plate called Avalonia, whilst Scotland and the North of Ireland were part of Laurentia and the Lapetus ocean separated them. As the two continents moved

closer together this ocean was squeezed and eventually closed. It was the colliding of Laurentia and Avalonia (plus another piece of the jigsaw called Baltica) that united Scotland with England and the North with the South of Ireland, geologically speaking.

How rhyolite is formed

When two different types of plate collide the less dense oceanic plate is pushed down deep into the Earth's mantle under the more buoyant continental plate and this is exactly what happened before Avalonia crashed with Laurentia. The oceanic Lapetus plate that separated the two continents started disappearing beneath Avalonia. Under phenomenal displacement pressure molten

Dinas Mot displays a cocktail of rock types. Immaculate pale grey Rhyolitic tuff on the central Nose with darker rough Dolerite above and on its wings. All photography: Mike Robertson.



Libby high on the first pitch of the lovely Flying Buttress (VD), Dinas Cromlech, Llanberis Pass. Honest, solid, typical Rhyolitic Breccia climbing.



Positive holds and careful foot placements – the bread and butter of Rhyolite climbing.

magma from deep inside the earth was forced to escape upwards, either as slow-flowing intrusive lava or in explosive volcanic eruptions. Rhyolite is one of three main types of volcanic rock created from this magma, with Basalt and Andesite being the others. Worldwide, Rhyolite is relatively rare so we're lucky to have so much in the UK as it makes a fine climbing medium. Chemically it contains mostly silica and is an acidic rock, which makes it less plant loving, in other words a bit cleaner than other mountain rock types.

True Rhyolite comes from intrusive lava flows, and as you might imagine, has a calmer smoother texture. Telltale signs that it once stretched and flowed is seen in the flow-banding that looks confusingly like sedimentary layers. The rhyolites born



A two finger pocket typical of Rhyolitic Breccia.

from more violent births are typically more complex, containing a mix of ash, pumice and other volcanic fragments collected along the way. Those comprised mainly of ash are fine grained and referred to as tuffs, whilst those containing larger grains and imbedded lumps of other rock are known as breccias.

Geographical spread

Thanks to its volcanic inheritance you find Rhyolite in mountainous areas. These violent origins have also created areas where the geology is complex and you're forgiven for being baffled by the array of rock types you encounter even in one valley.

North Wales and the Lakes are particularly well endowed with many varieties of Rhyolite, in fact if you've climbed a classic mountain route in either area the chances are that's what you'll have been climbing on. Glen Coe also makes a spectacular display but Ireland has only a smattering.

How to climb it

Rhyolite is an honest rock to climb on. What you see is what you get. In other words you don't get too many baffling moves. At times though you do need to be able to cling on hard and in other places you need to use confident footwork on steep slabs. You don't get a better example of this steep versus slabby contrast than on Dinas Mot and Dinas Cromlech, two crags that gaze across at each other in the Llanberis Pass. Go and do *Diagonal* (HVS 5a) on the Rhyolite tuff of the Mot and you'll be nervously considering

every foot placement and wondering where all the holds have gone. Compare it with a Rhyolitic Breccia Cromlech arm-blaster like *Cemetery Gates* (E1 5b) where there are huge holds a plenty but an angle to make you feel weak instantly.

How to place gear

The smooth grained varieties either have sinker cracks that take cams and nuts galore or nothing for miles. Do your research before you set off so you're not in for a nasty surprise. The more pocketed pyroclastic strains of Rhyolite take a connoisseurs eye to protect it well. Sneaky placements in pockets are legendary and narrow slings are useful for small spikes and thin flakes.

Special features and particular hazards

The extra ingredients of climbing Rhyolite routes are those that give mountain routes their unique character – seepage, dirt, vegetation and looseness – mmm an enticing list! But strangely, rather than detract from the enjoyment this heightened sense of the unexpected adds to the satisfaction (once the experience is over). At the time you may well curse the insecurity of dirt-filled cracks that need clearing out to get gear placements or be alarmed at the need for extra care when pulling on creaking flakes and frustrated by the difficulty in route finding without a blaze of chalk to follow. Yet afterwards you somehow always look back on the experience fondly.

That's not to underestimate the added seriousness of mountain routes and certainly



Pyroclastic Rhyolitic weirdness.

the feeling of exposure can add a (subjective) grade if you're not used to it. And of course it's not all over until you've found and negotiated the descent.

Best loved crags and routes

Scotland: *Agag's Groove* and *January Jigsaw*, VD and S respectively. High on the Buachaille in Glencoe they are both out there and memorable. Put them high on your must do list.

Carnivore E2 5c, low down on the Buachaille on Creag A'Bhancair, an old classic with a timeless quality (and seriousness).

Lakes: Dow Crag has a big cliff feel and a great spread of grades. Chilly and North facing you need to wait for the right moment, but it's worth the wait.

The Borrowdale Valley – just how many classic can one valley hog!

Wales: *The Cracks* (HS) and *Direct Route* (VS), Dinas Mot, are simply immaculate.

The Rhwiau Caws (slabs of cheese) better known as the Idwal Slabs, Ogwen, have something for everyone including so many climbers first multi-pitch excursion.

Flying Buttress (VD), Dinas Cromlech, Llanberis Pass, is another contender for your first multi-pitch climb. And while you're up

there gaze up at the steep pocketed walls above you – they're nearly all classic and nearly all brilliant – get strong and go there!

Clogwyn Du'r Arddu or *Cloggy* amongst friends must be the best chunk of Rhyolite we've got. Nothing of quality below VS and with all the added extras of a true mountain cliff (loose rock, limited sunlight, seepage, dirt) but none of that detracts from its brilliance. Make sure you're leading very comfortably at the grade before you head there and be extra careful at weekends – stonefall is plentiful. □

Libby has been climbing for over 20 years, she's a qualified Mountaineering Instructor and IFMGA Guide and is the author of *Rock Climbing – Essential Skills and Techniques* published by MLTUK and recently produced *Get Out On Rock* – the definitive instructional DVD. In late April/May she'll be on tour with Lucy Creamer to deliver a series of rock climbing lectures and practical masterclasses, organised by the BMC and sponsored by Cotswold Outdoors. For more info check thebmc.co.uk



The smooth fine-grained Rhyolitic tuff of the RAC boulders requires precise foot placements.