

DEPARTMENT OF THE ENVIRONMENT FOR NORTHERN IRELAND

DECLARATION OF AREA OF SPECIAL SCIENTIFIC INTEREST AT SCRABO, CO DOWN.
ARTICLE 24 OF THE NATURE CONSERVATION AND AMENITY LANDS (NORTHERN IRELAND) ORDER
1985.

The Department of the Environment for Northern Ireland (the Department), having consulted the Council for Nature Conservation and the Countryside and being satisfied that the area described and delineated on the attached map (the area) is of special scientific interest by reason of its geological features and accordingly needs to be specially protected, hereby declares the area to be an area of special scientific interest to be known as the 'Scrabo area of special scientific interest'.

A number of quarries around Scrabo Hill have exposed excellent sections through the Triassic Sherwood Sandstone Group in addition to the vent and sills related to Tertiary volcanism. Various features record the action of volcanic activity on the sandstones. The capping dolerite sill has protected the relatively soft Triassic sandstone from subsequent erosion. Scrabo provides the only evidence of reptilian habitation from the Irish landmass during Triassic times.

The well-bedded sandstones are from the Sherwood Sandstone Group and are reddish, fine- and medium-grade with subordinate dark red-brown mudstone and siltstone intercalations. Some 37m of strata are exposed, with 5° dip to the north-east. They are of Triassic or 'New Red Sandstone' age (200-225 million years old), a period of arid conditions resulting in desert environments subject to spate flooding and impersistent rivers and lakes. Ireland was positioned approximately at latitude 20° north during this time.

Thicker beds, in the order of 1m thick, are graded commonly from medium grained at the base, through finer grained to laminated towards the top. Sand grains are mainly of quartz, with up to 40% feldspar. Other minerals include mica, zircon and tourmaline, while the minor accessory staurolite may indicate a northerly sediment source. Weak cements of haemitite and limonite are present, occasionally with calcite.

Planar cross-bedded sandstones are common, as are beds and channels with varying contents of ripped-up mudstone fragments. Some of the latter exhibit polygonal mudcrack patterns, indicating subaerial desiccation.

In the fine-grained sandstones and siltstones, linguoid and rectilinear ripples are preserved and some are draped with mud, indicating a shallow-water depositional environment with variable energy levels. Aeolian deposited muds adhered to still wet subaerial sands; these units are particularly rich in trace fossils.

The presence of some well-rounded sand grains and the survival of cracked and curled mudstone flakes suggests the additional influence of aeolian deposition, which increases towards the top of the Group. The penetration of some cracked mudstone layers by sandstone dykes indicates a close association, and possibly alternation, of wet and dry conditions.

A range of trace fossils have been preserved and include footprints of the reptile Chirotherium ichnosp., possibly C. lomasi. The first of these footprints was found some 50 years ago, while more recently, in 1994, a probable second one was discovered. In addition, footprints made by other three- and four-toed reptiles have been found, with further footprints assigned to the

reptile Chelichnus ichnosp. Finally, scorpion tracks have been identified as those belonging to Paleohelcura ichnosp. This is one of very few sites internationally yielding evidence of Triassic scorpions. Other invertebrate trace fossils include trails of Cruziana and Unisulcus, smooth burrows assigned to Planolites beverlyensis, 'beaded burrows' assigned to Edaphichnium and 'insect trackways'. The Scrabo ichnofauna is moderately diverse and represents a Scovenia ichnofacies.

Despite later igneous activity the Scrabo sandstones are only slightly metamorphosed. It has been suggested that the rocks are more compact, harder and more variegated in colour than the unaltered Triassic. Intensely baked and fritted sandstones have been recorded as a xenolith/raft within the main dolerite sill. Temperatures were sufficient to cause partial fusion as tridymite has crystallized from the interstitial melt, indicating a temperature of at least 550°C. Overall the sandstone here has been altered to an orbicular quartzite. Metasomatic activity has also been recorded with feldspathized clay galls and mudstone laminae. Smaller clasts are totally altered to feldspar while larger ones exhibit an alteration rim.

Tertiary vulcanism consisted principally of explosive activity and a later phase of major and minor sill emplacement with associated cross-cutting dykes.

A volcanic vent agglomerate, composed principally of sandstone fragments up to 1 metre across, is exposed. The sandstone fragments are softer and whiter than the undisturbed wall rock. Feldspar has been altered to clay while the interstitial material is now a green serpentine. Depositional structures are not apparent in the agglomerate. This may be due to the marginal nature of the exposure, to the agglomerate being due to a single explosion, or to gassing keeping the sill in motion, destroying any bedding. Small dolerite units have invaded the soft breccia and show chilling. The main sill lies undisturbed above the vent indicating a later date.

The vent walls consist of either sandstone breccia or undisturbed sandstone. Where it is the latter, the rock is bleached and altered, especially along mineralized joint planes, while the cement has been thermally altered. Diopsidic pyroxene is abundant. Diopside and tremolitic amphibole is well developed in the clayey bands of the sandstone. A medium grade of metamorphism is indicated. The breccia consists of a bright red mass of pulverised sandstone with many disturbed large blocks. None of the additional constituents seen in the vent agglomerate are present, suggesting an earlier date.

The origin of these coarse sandstone breccias has been a feature of some debate; they cannot be sedimentary in origin and are not related to lines of faulting. An explosive origin seems most likely.

Two unusual sandstone dykes radiate through the sandstone wall of the vent. One is closely associated with an explosion breccia, while the other occupies an open joint. The horizontal clay bands and bedding planes in the wall terminate abruptly against the dyke, within which faint vertical banding is apparent. The cement of the sandstone dyke is rather less sericitic (generally micaceous) and richer in specular haemitite than that of the undisturbed sandstone. Cavities, from 1-5mm diameter, appear to be gas cavities and contain a range of minerals, including a feathery-dendritic form of iron-ore and feldspar, brown chlorite and probably pyroxene, while smaller cavities contain tremolitic amphibole with aggregated quartz grains in interstices.

These features indicate that the sandstone dyke fill is derived from the host sandstone. The mineralized vugs and proximity of the vent suggests that

magmatic or phreatic (the violent conversion of ground water to steam) explosions were responsible for pulverizing the sandstone and injecting it into the open joints as tuff-dykes. The tuff-dykes are very fresh, suggesting that the vent did not exist at the time of tuff emplacement.

Unusual mineral veneers coat the sandstone jointing around the vent. Commonest are apatite, haemitite and sphene with rarer sphalerite, rutile, tremolite, diopside and calcite.

The main intrusive sill which now caps the hill is composed of olivine-dolerite; a series of minor sills are also present. Emplacement is related to bedding within the sandstones, although transgressive steps are present. The sills were probably intruded in a single phase as there is an absence of internal chilled margins. Late stage segregations yield gabbro pegmatite veins. Some of the sills are cut by dykes, also of an olivine-dolerite composition.

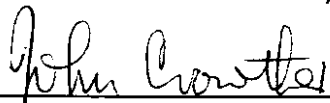
The site regularly supports breeding peregrine falcon Falco peregrinus.

SCHEDULE

The following operations and activities appear to the Department to be likely to damage the geological features of the area:

1. Any activity or operation which involves the damage or disturbance by any means of the surface and subsurface of the land, including extraction of minerals, sand and gravel.
2. The storage or dumping, spreading or discharge of any material.
3. Construction, removal or disturbance of any permanent or temporary structure including building, engineering or other operations.
4. Alteration of natural or man-made features, the clearance of boulders or stones and grading of rock faces.
5. The following activities undertaken in a manner likely to damage the interest of the area:
 - (i) Educational activities;
 - (ii) Research activities;
 - (iii) Recreational activities.
6. Sampling of rocks, minerals, fossils or any other material forming a part of the site undertaken in a manner likely to damage the scientific interest.

Sealed with the Official Seal of the
Department of the Environment for
Northern Ireland on 27 June, 1995



J CROWTHER

Assistant Secretary

ASI95005/CWB

H. Spivett
CIVIL SERVANT
CLARONCE COURT
BELFAST

/GC

FOOTNOTES

- (a) Please note that consent by the Department to any of the above operations or activities does not constitute planning permission. Where required, planning permission must be applied for in the usual manner to the Department under Part IV of the Planning (NI) Order 1991. Operations or activities covered by planning permission are not normally covered in the list of Notifiable Operations.
- (b) Also note that many of the operations and activities listed above are capable of being carried out either on a large scale or in a very small way. While it is impossible to define exactly what is "large" and what is "small", the Department would intend to approach each case in a common sense and practical way. It is very unlikely that small scale operations would give rise for concern and if this was the case the Department would give consent, particularly if there is a long history of the operation being undertaken in that precise location.