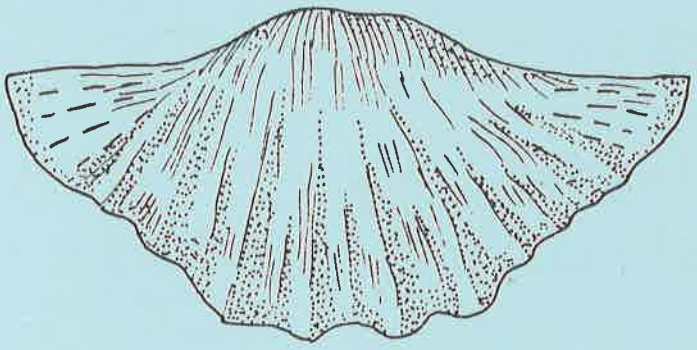
PROCEEDINGS OF THE GEOLOGICAL SOCIETY OF GLASGOW



Sessions 123/124 1981/1982

SESSION 123 1981-82

MEMBERSHIP

The Membership of the Society for session 123 was as follows:

Honorary Life members	3
Life Members	3
Ordinary Members	386
Associate Members	34
Junior Members	10

During the session forty-two new members joined the Society and forty-two members were deleted.

G. R. Thomson

LIBRARY REPORT

The Library received greater use this session with 33 members making 194 loans between them, on subjects as far apart as Ordovician trilobites and the facies of contact metamorphism.

Among this year's additions are a large number of foreign journals belonging to the Society which had been left behind at the Mitchell Library when the Society's holdings were transferred to the Geology Department. The majority of these are now in the University Library and the balance is in store, but available to members, in the department. The collection consists of 78 periodicals with varying runs, and while some are of historical interest only others are of greater relevance. A catalogue exists and may be consulted on application to the librarian.

The list of the Society's exchange partners has been increased by the addition of the Nanking Institute of Geology and Palaeontology, who now send us **Acta Palaeontologica Sinica** on a regular basis. We have also increased the number of copies of the **Scottish Journal** which we send to the Academy of Sciences of the USSR, receiving the journals **Geotectonics** and **Geology and Ore Deposits** in exchange.

Book purchases this year include, notably, **Nyiragongo: The Forbidden Volcano** by **Haroun Tazieff,** an account of a sulphurous descent into a very active volcano.

The financial transactions of the Library will be found on the Society's balance sheet for the session.

C. J. Burton

NEW BOOKS IN THE SOCIETY'S LIBRARY

The literary crop for this session is as diverse as ever and in harvesting it I've attempted to satisfy the tastes of all society members — a difficult enough job given the range of interests shown by library loans. However most of us agree on a liking for fieldwork and this year's guides provide an interesting variety of places and rocks to visit. **W. Mykura's British Regional Geology** volume **Orkney and Shetland** gives a very detailed look at these northern islands and, unusually for this series, lists a selection of excursions (p. 137, **et seq.**) covering such items as the best localities for fossil fish, sedimentary structures, mineral occurrences and much beside.

Going south the new G.A. guides to **Anglesey** by **D. E. B. Bates** and **J. R.**

Davies and **Lleyn** by **P. J. Cattermole** and **M. Romano** provide a pair of closely linked areas, where rocks from the Precambrian to the Carboniferous display almost every geological phenomenon, and all in magnificent scenery. Southward yet, and in softer rocks, **Wes Gibbons'** guide to **The Weald** introduces Mesozoic and Cenozoic rocks and their contents in a series of excursions from Kent to Hampshire. Excursion 7 even includes a descent — presumably non-vertical — of Beachy Head to examine trace fossils and the fauna of the Lower Chalk. **C. H. Holland's Geology of Ireland,** although not an excursion guide, does provide extensive insights into Irish geology and the excellent maps, illustrations and reference lists will certainly lead you to the right outcrops.

To provide the background for looking and collecting we can offer a wide choice of books. **Igneous Rocks of the British Isles** edited by **D. S. Sutherland** gives a period by period account of the nature and distribution of the whole spectrum of igneous rocks, in which Scottish examples and where to examine them figure largely. As a change from fire, and with last winter in mind, it might be appropriate here to look at two books concerned with glacial geology. **D. Q. Bowen's Quaternary Geology** will explain the how and the why of glaciation and **The Geomorphology of the British Isles — Scotland** by **J. B. Sissons,** with its strong emphasis on the Quaternary, will translate theory into such local landforms as the Glasgow drumlins. Encouragement of a similar kind is provided for palaeontologists by **Ulrich Lehmann's The Ammonites,** a delightful look at life, love and death as they applied to these creatures. **W. G. Chaloner** in **Plants Invade the Land** does much the same, but in colour, for the early plants of the Rhynie Chert, complete with a strange botanical garden of specimens.

Finally, for purely indoor diversion, a sample ranging from the aesthetic to the bizarre. Under aesthetic I include **W. S. Mackenzie's Atlas of Rock-Forming Minerals in Thin Section** which, while appealing to the deeply interested student of petrology, is also a visual feast of colour and pattern and well worth a look. The aesthetic perhaps lingers in two further books which reveal the beautiful objects constructed by the microscopic forms of life. **J. R. Haynes** in **Foraminifera** and **B. U. Haq** and **Anne Boersma** in **Introduction to Marine Micropalaeontology** cover much of these topics, illustrating and explaining a field accessible to, although, rarely visited by, the amateur geologist. However, a suitable conclusion to any list of books, and putting us firmly at the bizarre end of the literary spectrum, must be **Bare Bones** by **Beverly Halsted** and **Jennifer Middleton,** exploring bone and like secretions in the form of everything from kidney stones and penis bones to the osteology of dinosaurs and the use of skulls as drinking vessels!

C. J. Burton

REPORT OF THE EDITORIAL BOARD

Volume 16 (1980) **Scottish Journal of Geology** was completed in 330 pages (31 papers). Volume 17 (1981) has three of its four parts out and ultimately will run to 306 pages (25 papers). The spread of subject matter and geographical areas covered has been as broad as usual. The lead time from the date of acceptance of a paper to that of its publication has varied in Volume 17 in the range of 5-13 months. Volume 18 (1982) will commence

with a Part of two items — a Glossary of Scottish Mineral Species and a review of the Petrology of the Tertiary Igneous Province.

In attempting to keep the costs to the two present societies down to a target average of £1,500 each per year, cost savings in the quality of the cover and in the one of double columns are being considered. A significant increase in the institutional subscription for Volume 19 (1983) will still be necessary to offset rising production costs.

D. K. Smythe

PUBLICATION SALES

I am pleased to report yet another successful session of publication sales. This year has been dominated by the sale of Geological Howlers of which about 1,800 have been sold since publication in July 1980. Even without the income from Howlers (£1446), sales on our other publications and from the Bookshop have increased from £1459 in 1979/80 to £1881 this year. This is due to the increase in price of the Arran and Glasgow Guides to £2.00 each, the recovery in sales of the Arran Guide from last session's low, and to the continuing success of the Bookshop.

It should be noted that the post and packing figures shown in Table I above is only part of the total cost for the year of £214.78. £143.33 has been paid directly by the Treasurer and a further £48.59 will appear in the accounts for the current session.

Finally I look forward to another profitable year with the Society's latest publication — "Glasgow Building Stones" by Judith Lawson.

Colin Farrow

LECTURES 1981-82 (SESSION 124)

The first meeting of the 124th session was held on Thursday 8th October 1981 when **Professor D. R. Bowes** (University of Glasgow) gave a lecture on **"Early Proterozoic sulphide mineral deposits in Central Finland and their plate tectonic setting".** He described the major deposits of copper, zinc and nickel in a NW-trending belt through central Finland with sub-economic molybdenum-copper deposits nearby. A sea-floor exhalative origin is proposed for the copper and zinc deposits, which are now polyphase deformed and at amphibolite facies of metamorphism. The nickel deposits are associated with peridotites in layered igneous bodies formed at an oceanic spreading ridge. Other copper deposits are associated with volcanogenic assemblages with island-arc affinities while the molybdenum-copper deposits occur in granites and are of porphyry-copper type.

The belt of sulphide deposits was interpreted as generally corresponding with an early Proterozoic suture zone resulting from collision of the "Russian plate" to the NE into a series of volcanic island arcs, resulting in the development of the Svecokarelian orogen. The sulphide deposits with ophiolitic affinities occur within a thrust nappe and their close geographical association with other sulphide deposits was the result of ocean closure 1900 m.y. ago.

In November **Professor D. L. Dineley** (University of Bristol) lectured on **"The Old Red Sandstone continents and the early evolution of the fishes."**

During late Silurian and early Devonian times N. Atlantis and Angaraland (Siberia), China, and the Gondwanaland continents provided import-

ant non-marine environments for the early vertebrates. They were, however, widely separated and the Agnatha in particular evolved differently in each area. The placoderm and boney fishes appear as more cosmopolitan communities similar in each region. Possible pathways for their migration between such widely separated areas as Greenland, China and Antarctica were discussed in the light of world geographical changes during the Devonian period.

In December, after the A.G.M., there was a quiz devised by the president who managed to produce some extremely obscure questions (and answers!). The prize for most correct answers was won by **Andrew Burton,** a junior member of the society. Afterwards there was a cheese and wine party.

The fourth meeting, in January, was given by **Dr B. J. Upton** (University of Edinburgh) who gave a lecture on **"Early Tertiary Volcanism in N. E. Greenland".** He described how the early Tertiary volcanic rocks in east Greenland between 74-76°N constitute a coast marginal igneous province remote from the main east Greenland Province south of 70°N. Here Mesozoic basin formation was succeeded by crustal rupture and eruption of "flood basalts" across a Mesozoic-pre Mesozoic terrain together with emplacement of a major sill swarm. Later rifting gave rise to a dyke swarm and a large central volcano. The latter (Myggbukta Complex) is a newly discovered Tertiary centre showing comparatively shallow erosion. Compositionally the entire succession exhibits a striking change from early "depleted" tholeiites to later K-rich magmas. The latter may have been associated with the intrusion of the Jan Mayen plume.

The February members night included the following short talks:

Dr M. Russell — "Hydrothermal chimneys from the East Pacific Rise and the Irish Carboniferous ores".

Mr S. Wood — "New fish, crustaceans, and other fossils from the ferous of Bearsden".

Mr J. M. Allan — "Foyaite and monchiquite from the type localities of Foia and lealdas de Monchique, Algarve, Portugal".

Dr M. Pye — "Much ado about nothing".

Dr G. P. Durant — "Geological diving in the Westmann Islands, Iceland.

Dic Larter — "Experimental simulation of structures in strike-slip fault zones".

Mr N. Butcher — "The early geology of the Isle of Wight".

Dr J. G. MacDonald — "Features of the volcanic geology of Tenerife".

Mr I. W. Fergusson — "Convection and layering in magma".

The following exhibits were on display:

Mr J. M. Allan — 1. "Thin sections of foyaite and monchiquite from their type localities.

2. "A thin section of the rare mineral celsian feldspar from Aberfeldy".

Mr M. Simpson — "Oligocene mammals and crocodiles from the Isle of Wight".

Dr J. G. MacDonald — Specimens collected on the Extra-mural excursion to Tenerife".

Dr C. J. Burton — "New books from the Society's Library".

Mr N. Butcher — "An exhibit on the early geology of the Isle of Wight".
Dr G. Durant — "Rocks from the 1981 expedition to Iceland".
Dr J. K. Ingham — "A re-discovered Ordovician fauna from the Highland Border Group at Aberfoyle".
Mr S. Wood — "New fish, crustaceans, and other fossils from the Carboniferous of Bearsden".

The sixth meeting, in March, was a lecture given by **Dr C. W. Deegan** (I.G.S. Edinburgh) on **"Tertiary Sediments of North West Europe"**. Dr Deegan reviewed the nature and age of Tertiary rocks around the UK concentrating on the most complete sections of the North Sea. The sequence in the North Sea basin can be subdivided into genetic packages of sediments whose boundaries are related to changes in the geometry of the basin. It was suggested that many of these changes can be correlated with events in the evolving North Atlantic to the North-West and the Alpine orogen to the south.

On the 22nd April **Dr P. W. G. Tanner** (University of Glasgow) gave a lecture on **"The Geology of a Sub-Antarctic Island"**, an extremely topical subject as the island in question was South Georgia. He reviewed recent advances in the study of the Mesozoic geology of the southern Andes, Scotia arc and West Antarctica. The new work provides an integrated picture of the history of this sector of the Pacific margin of the Gondwana supercontinent in which fore-arc, magmatic and back-arc terranes can be identified. Attention was then focussed on the sub-Antarctic island of South Georgia which provides a case study for understanding turbidite sedimentation with a Mesozoic back-arc basin and the mechanism by which the sedimentary basin was later destroyed, leading to both underthrusting and partial obduction of the floor.

The lecture was illustrated with superb photographs of South Georgia.

The final lecture of the session was also very well illustrated when **Dr J. P. M. Syvitski** (Bedford Institute of Oceanography, Dartmouth, Nova Scotia) talked on **"Fjords"**. Dr Syvitski, who has done a considerable amount of oceanographic research in Canadian fjords gave a general talk on the many aspects of their geology, geomorphology and biology.

CELEBRITY LECTURE 1982

The celebrity lecture this year was given by **Professor D. L. Turcotte** (Cornell University) in Edinburgh on **"Mantle Convection Plate Tectonics and Geological Processes: Some Recent Developments"**.

EXCURSIONS 1981 (SESSION 123 — continued from the previous issue)

Mrs Nancy McGregor, the excursion secretary would like to extend a very heartfelt vote of thanks to all the very numerous people who have helped in countless ways with the excursions. They are too numerous to mention by name but their help is very deeply appreciated.

Yorkshire Coast 26th-28th September 1981 (Leader: Dr M. Keen)
by Nancy McGregor

The last excursion of the year was a weekend spent on the North Yorkshire coast. A party of 16 stayed at the Victoria Hotel in Robin Hood's Bay, the hotel proving most spacious and comfortable.

Heavy rain marred the start of the excursions but the weather improved somewhat as the weekend progressed. A good start was made at Ayton Quarry; Scarborough viewing the corals of the Corallian Series and Oolitic limestones and a quick trip into a rapeseed field provided gastropod fossils in abundance. Further along the coast at Cloughton Wyke we saw an impressive sequence of sandstones, shales, clays and sandstones in the Upper Deltaic Series in the Middle Jurassic. Many plant and animal remains were found despite the incoming tide. The evening provided a beautiful meal, a quite spectacular view and a good giggle with friends.

Sunday saw the group on a windy but dry Robin Hood's Bay. Specimens of pyritised bivalves and belemnites plus other fossils were collected and we had a close look at the Lower Jurassic sequences of ironstones and shales. The afternoon was spent making a trip along the clifftops at Filey. Only the braver members tackled the difficult descent to the point.

On Monday we visited the Lower Jurassic at Ravenscar. This was a beautiful day and we had an excellent view of the Robin Hood's Bay dome, the Peak fault and various alum, ironstone and old jet workings. The foreshore provided abundant ammonites and bivalves including *Pecten.*

In all, a most enjoyable weekend was spent with the most congenial lecturer who was remarkably good humoured in answering our questions, a good hotel with excellent meals and pleasant company. What more could one ask for?

EXCURSIONS 1982 (SESSION 124)
Dalry 8th May 1982 (Leader: Mr M. Yuill)
by Nancy McGregor

Ayrshire is a right bonny place
So full of interest for us to trace
The history of Glengarnock town
From Dusk Water fault to the River Doon.

The Garnock Valley so quiet and so proud
Was once so vibrant, industrious, loud
All that remains are the quarries and tips
Limekilns and reminders of iron band pits.

Mr Yuill our leader, he knows all the spots
And jaunty the pace that he often trots
Into this quarry and then a halt
Till we view with delight an unusual fault.

A mussel band here and a coal seam as well
Was that the Blackhall? It's hard to tell
Till we look at the facies and then there's no doubt
By the position of the bivalves lying about.

We really are lucky in all sorts of ways
To have such a keen member whom I can praise

Our trips down to Ayrshire so frequent and full
Are due to the interest of our Mr Yuill.

Long may he continue to lead our fair group
And long may the members continue to troop
To Ayrshire so bonny on days that are cool
To enjoy the wide knowledge of our Mr Yuill.

BUILDING STONES OF GLASGOW 13th May 1982 (Leader Dr J. Lawson)
by Betty Black and Anne Rogers

On a warm May evening a dozen members armed with little green books went walkabout in the centre of Glasgow with Dr Judith Lawson who, before we left North Frederick Street offered some trenchant comment on current architectural trends. The lack of any projecting features on facades has resulted in dirty weathering streaks, splendid examples of which we noticed on the travertine slabs of the Glasgow College of Building and Printing.

By contrast, the buildings in George Square showed a great variety of 19th century architectural ornament including string courses and cornices which also had a protective function. Seven or eight types of cream sandstone from quarries around Glasgow were used in these buildings and those on the west side of the Square, built of Dunmore sandstone, showed very little weathering after over a hundred years. Still in the Square, we examined the granite pedestals of the statues, being more concerned with the phenocrysts than with the famous.

West George Street showed a variety of facings on recent buildings — red granite from Finland on the Standard Chartered Bank, Durham freestone on the upper storeys of the Bank of England and at ground floor level a cream coloured gneiss from Brazil. The Clydesdale Bank with its Argentinian interests had its cladding of Argentinian granite finished in contrasting textures.

We were serenaded vinously outside the Royal College of Music and Drama while we admired the cross bedded red sandstone then tried to visualise the cream sandstone St George's Tron Kirk being built at the beginning of last century in the middle of an area largely given over to quarrying.

As we loitered by the Estoril Marble facade of Mappin and Webb we decided to prolong the excursion and moved rapidly along St Vincent Street, taking in granites and gabbros in great variety and whizzed uphill to West George Street. Ashley House, looking as though built of "badly made concrete" (Dr Lawson's words) repaid closer scrutiny, being of highly fossiliferous Portland Roach in which moulds of bivalves and turreted gastropods could be clearly seen.

Only fast fading light brought a most interesting and enjoyable evening to a close.

FACIES AND FAUNAL VARIATIONS IN THE LOWER CARBONIFEROUS OF THE GLASGOW AREA 22nd and 24th May 1982 (Leader Dr G. Farrow)

The main object of this excursion was to contrast the depositional environments of the Hurlet (Dockra) and Blackhall limestones. To this end, the following localities were visited:

1. Arrotshole, East Kilbride (619553).
2. Hessilhead Quarry (379532).
3. Trearne Quarry (372533).
4. Lugton Old Mill Quarry (392525).
5. Auchenmade Quarry (343486).
6. Bannock Burn (756880).
7. Touchadam Abandoned Quarry (758906).
8. Corrieburn (683782).
9. Blairskaith Quarry (595753).

OSSIAN STEEP BELT 11th-12th June 1982 (Leader: Dr P. R. Thomas)
by R. McNicol

Rain fell heavily when six members left Glasgow for Bridge of Orchy by minibus at 4 o'clock on Friday, 11th June. At Bridge of Orchy the party boarded a train of the West Highland Line which took them to Corrour Station in the remote and scenic West Central Highlands where the excursion to study the Ossian Steep Belt was to take place. At the Loch Ossian Youth Hostel other members and colleagues joined the party; some of the group preferred to camp nearby on the shore of the Loch.

At 8.30 a.m. on Saturday morning the group of 12 set off for Beinn na Lap, a 3066 ft high mountain which was the focal point of the excursion. The weather was cloudy, windy with light rain and cold on the higher ground but no one seemed to take much notice of this because of the prospect of a challenging day ahead. This challenge arose because the rock outcrops to be examined had not yet been analysed conclusively and these were to be of special interest to the professional structural geologists who comprised more than half the party.

The first exposure examined was located some 1200 ft above Loch Ossian and was to be the start of a fascinating series of discussions and critical examinations during which geological structures a few millimetres across were mentioned in the same breath as major structures over 20 miles in length.

The area around Loch Ossian has yet to be mapped in detail but in 1974 two new features of major importance to Highland geology were found — the Ossian Steep Belt — a possible root zone to the Central Highland Nappe structures and the later Beinn na Lap antiform. Polyphase deformation phases could be seen in this controversial zone near the top of the Grampian Moine. This was a rather unusual excursion as the experts in this branch of geology outnumbered the less informed, of whom the writer was one! However, this did not prevent the former from willingly and patiently explaining the principles of polyphase deformation and the like, to the latter, whenever such questions arose.

As the excursion drew to a close and the party came off Beinn na Lap it was good to see that the weather had changed to being bright and sunny. This was an excellent excursion for its geology, the good company and for providing an illuminating insight into the work of the structural geologist in his study of the enormous forces and deformations that occur within the crust of the earth.

Dr Iain Allison expressed thanks to the leader Dr Peter Thomas on behalf of the party and the Society.

FALKIRK DISTRICT 26th June 1982 (Leader Mr M. A. E. Brown)
by Alex Hall

We had been told to bring our "wellies" and we certainly needed them as, quite apart from water from above, we spent some our time wading through slurry.

After meeting our leader, Mr Brown, near Kincardine Bridge, we drove to Devilla Quarry, Kincardine (MS 975 915). In the open cast quarry we saw Passage Group (Namurian) sediments. These are mainly high silica (98%) content sandstones which are used by United Glass Ltd for the manufacture of bottles etc., at their Alloa and other plants. The sandstones are said to be fluvial deposits, but in the opinion of some members they could be deposited by braided streams.

The rock is broken down to reasonable boulder size and put through a crusher to reduce the size to under six inches and fed by conveyor to the main plant where, after coming through a ball mill it is fed by a steep conveyor to an oil-fired fluid bed where it is raised to 110°C and leached by sulphuric acid to reduce iron and other impurities. It is then thoroughly washed. As the aim of the plant is to produce good quality silicon at a reasonable cost control of moisture content and temperature are important at each stage of the process.

Environmental aspects have not been forgotten, pH of waste water is controlled and the slurry is passed through settling tanks and the water reused in the process. The silt fills old quarried areas which are returned to forestry use. This is so successful that it was noted that pines had self-seeded on areas which had not yet been given a top soil cover.

Our second visit was to Roughcastle Opencast site (NS 853 801), but before the geology Mr Brown told us not to start our lunch as, by courtesy of Dyson Refractories Ltd we were to be offered refreshments. Somewhat suspiciously we entered the Site "Office" with windows bricked up against the vandals — hardly the Cafe Royal. Shortly, however, the "refreshments" — not the statutory tea and biscuits — arrived. Hot pies, sausage rolls, sandwiches and (dare I say it on these hallowed pages) beer arrived, in such quantity that not even a geological party could demolish it completely.

We then carried on to the Opencast quarry in Lower Coal measures (Westphalian). Although Dyson Refractories are primarily interested in

the seat-earths between the Glenfuir Coal and the Colinburn coal, these would not be worth site contractors recovering without the income from the coal. The seat-earths consist mainly of fireclay with a relatively high alumina content (29-44%) in the form of kaolinite. They are taken to the brickworks which we visited to see the mixing, pressing and firing of firebricks. Unfortunately the requirement for the product has been reduced over the years, particularly because of the change from open hearth to electronic arc furnaces in the steel industry.

Our next visit was to the River Avon at Muiravonside Country Park. As the Avon was high due to recent heavy rainfall, exposures were not accessible, but the Castlecary Limestone at the top of the Upper Limestone and an old limestone adit were noted. On our walk round the Park the Midland Valley Quartz-Dolerite Sill was seen.

Despite fairly wet weather we were all invigorated by the excellent leadership of Mr Brown and the representatives of the companies we visited. Mr Brown said he had chosen the Falkirk area after having discovered that the Edinburgh Society had covered most of their area except Falkirk. It was clear, after what seemed too short a day outing that much remains to be seen.

NORTH PENNINES (Leader: Dr R. C. Wright)
by Ken Smith

At the beginning of July a party of eight led by Dr R. C. Wright of Liverpool University visited a variety of exposures in the Shap, North Lakeland and Pennine foothill areas of Cumbria.

The excursion commenced with a visit to the Shap Granite Quarry which provided excellent sections of orthoclase rich granite with subordinate minerals of pyrite and molybdenite. The effect of the intrusion was then examined in two further exposures, one being the Shap Blue Quarry where metasomatic mineralisation produced garnet and pyrite veining and the other in a nearby stream section which showed the contact with the neighbouring andesite. At Shap Wells, a little further from the contact zone, a striking unconformity was apparent between basal carboniferous conglomerates and the underlying Silurian Brathay Flags. Just below the Shap Summit a structural sequence of Silurian rocks was traversed revealing sharply folded grits and mudstones. Current bedding, ripple surfaces and what were thought to be trace fossil surfaces were identified and used to consider the depositional environment.

A day was devoted to the Permo-Trias of the Eden Valley and the Cross Fell Inlier. Brockram Beds with their angular, fossiliferous Carboniferous Limestone pebbles hinted at a very short transportation path.

On to the foothills and at Murton Pike Silurian rocks of the inlier area could be seen in relation to the scarp slopes of the Carboniferous Limestone which forms much of the Pennines. From a vantage point the faulting over a wide area could be traced and in the distance the contrasting effect of the Whin Sill was just discernable.

Further north in the inlier badly preserved specimens of the trilobite

Illaenus were found and not too further on from there at Knock Pike a quarry exposure of contorted, columnar Ignimbrite provoked lengthy discussion on the subject of bedding plane evidence. The day concluded by collecting samples of Satin Spar (gypsum) from a nearby mine.

Day three commenced with a ramble over the Borrowdale Volcanics of Eycott Hill. Typical of these well-exposed andesitic lavas are the large phenocrysts of twinned bytownite. As well as the vesicular tops to the flows there was also evidence of flow brecciation. At Mungrisdale an exposure of Skiddaw Slates comprised mudstones: sandy laminations showed cleavage to be parallel to the bedding. It was reasoned how the multiphase deformation could be regarded as in dispute. The most energetic part of the excursion followed with an ascent of the east facing slope of Carrock Fell to examine the graded contact between the Gabbro and Granophyre rocks of the area. Few made it to the actual exposure but samples were retrieved and brought down for the less spirited to see. High up the Caldew Valley at Mosedale the party looked at the mineralisation produced within the Skiddaw Granite aureole.

Alas call of duty prevented your correspondent from enjoying a further day of magnificent Lakeland geology. Truly a most excellent extended weekend's geology.

CAMBUSLANG MARBLE

by Judith Lawson

It may not be realised that at one time the Glasgow area had its own "marble" which was used to a small extent as an ornamental stone. This was the Cambuslang Marble of which it was said in 1845 (Statistical Account, p.423) "there is a handsome mantelpiece at Chatelherault near Hamilton, and in the College Library at Glasgow . . .". Chatelherault, designed by William Adam for the Duke of Hamilton and built in about 1732, is a hunting lodge in Hamilton High Parks. Built of pinkish yellow sandstone, quarried locally, it is at present, together with its garden, being extensively restored. In the course of clearing debris from the near derelict buildings some fragments of the mantelpiece were discovered which show the original character of the stone very well.

This Cambuslang marble is in fact a highly fossiliferous musselband which occurs locally in the upper part of the Productive Coal Measures, between the Pyotshaw and Ell coals. Between Cambuslang and Bothwell Castle the horizon is a thin coal and musselband ironstone while in Cambuslang and towards Stonelaw it is a clay band 6″-18″ thick full of *Carbonicola* (Clough *et al* p. 104). It is usually grey but may occasionally have a reddish tinge. It was formerly worked near the Kirkburn in Cambuslang. Most of the pits there were owned by the Duke of Hamilton who presumably decided to use it in his hunting lodge at Chatelherault.

References

1845 The New Statistical Account of Scotland. Volume VI Lanarkshire.
1925 C. T. Clough *et al.* The geology of the Glasgow District 2nd ed.

A NEW EXAMPLE OF A MINERALISED ZONE IN THE CLYDE PLATEAU BASALTS OF THE LOWER CARBONIFEROUS IN THE GLASGOW REGION. Gribble, C. D., Downs-Rose, K., Halden, N. M. and Park, A. F. (Dept. of Geology, University of Glasgow).

An extension of the M8 motorway to bypass Port Glasgow has involved excavations into the Clyde Plateau Basalts (G.R. 348 742). A plan of the road-cutting and a cross-section, based on on-site mapping and borehole information is given in Fig. 1. The cross-section, which runs approximately E-W, suggests that four lava flows are present, with an apparent dip of about 7° to the west.

The lowermost flow exposed (No. 1 in Fig. 1) is a porphyritic basalt with phenocrysts of plagioclase occurring in a fine grained matrix of magnetite, feldspar laths and clinopyroxene. It has a thick amygdaloidal top on which is developed a thin red bole. Flow 1 is overlain by a dark basalt (flow 2), probably of Jedburgh-type, consisting of a fine-grained matrix of magnetite, feldspar and clinopyroxene with rare plagioclase phenocrysts. This basalt, which is about 14 metres thick, is separated from a similar one above (flow 3) by a thin (1-2 metres) zone of highly mineralized breccia. To the west of the cutting a fourth flow may be present, indicating that flows 2 and 3 are of similar thickness. It should be emphasised that the mapping was carried out in September 1981 before the cutting was completed and its final configuration attained. At this time access for the purposes of mapping and collecting was ideal.

Examination of the minerals present in the brecciated zone between flows 2 and 3 was carried out by some of us (KD-R, NMH & AFP), and the minerals identified using X.R.D. techniques. The minerals identified include stilbite and analcime, with quartz and calcite present in lesser amounts. The stilbite exhibits its distinct "sheaf-like" habit (cf. Goodchild 1903) with often excellent crystallographic form suggesting growth into cavities within the breccia (plate 1a). Occasionally laumontite-leonhardite is observed growing within endomorphs after analcime, suggesting replacive crystallization (Plate 1b).

Mineralized zones are common within the Clyde Plateau Basalts, and one such zone is exposed at Boyleston Quarry, where it also occurs at the boundary between two lava flows. This type of mineralisation probably represents a late stage hydrothermal event during the cooling of the lavas when hot waters, probably containing CO_2, percolated through the already solidified lavas, altering their primary mineralogy and releasing elements to form low temperature secondary minerals (Allan 1973, p. 42).

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Goodchild, J. G. 1903. The natural history of Scottish zeolites and their allies. *Trans. Geol. Soc. Glasgow*, supplement **XII.**

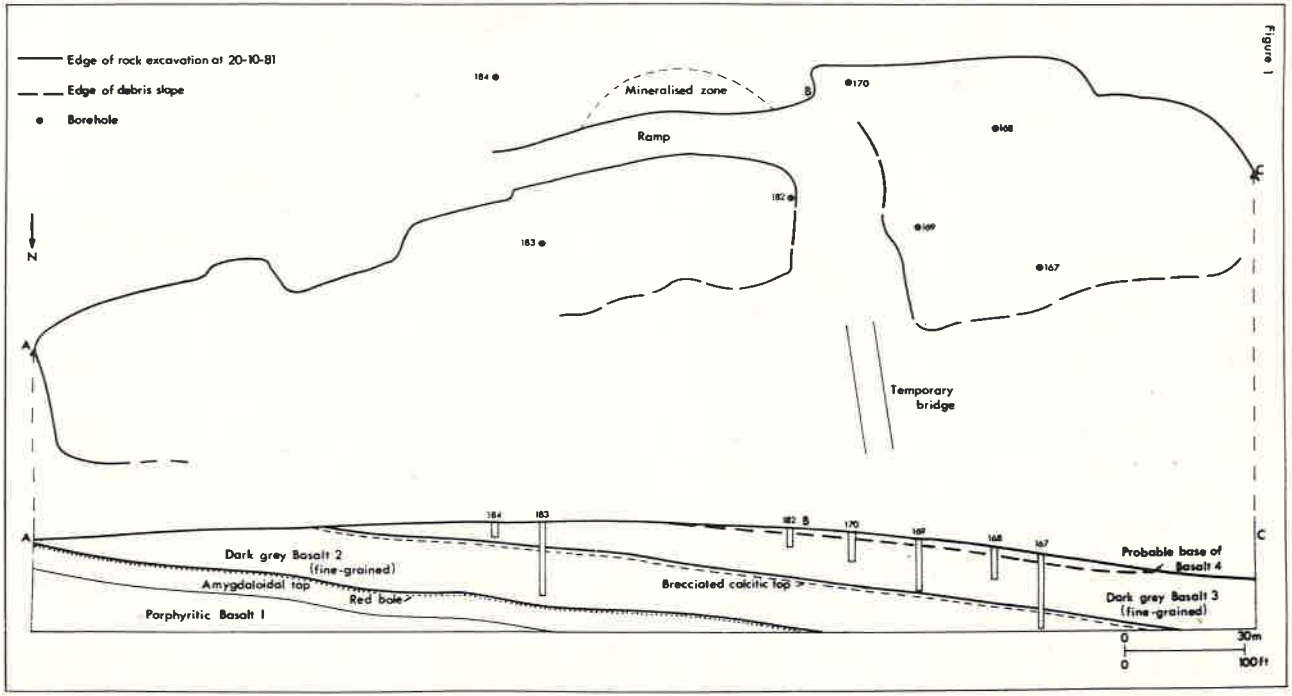
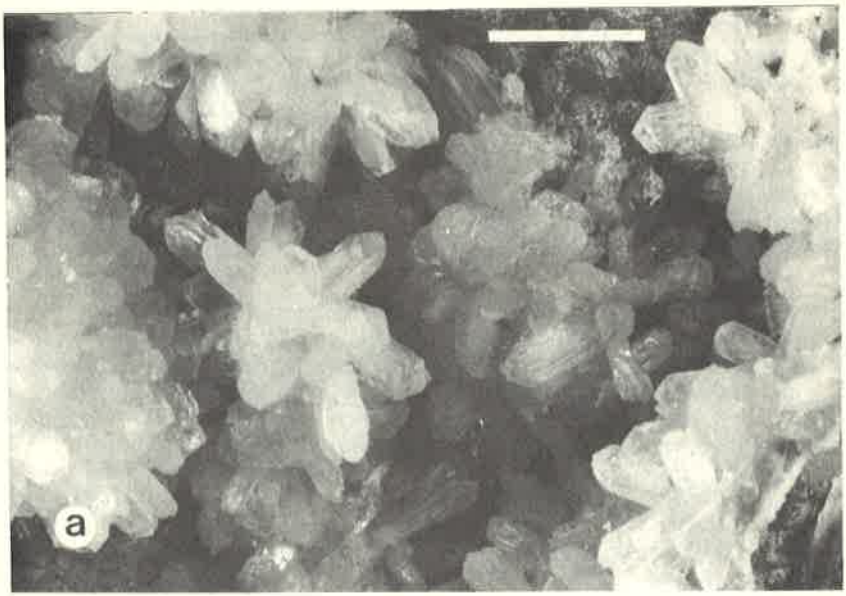

Edge of rock excavation at 20-10-81
Edge of debris slope
Borehole
N
Mineralised zone
Ramp
Temporary bridge
A
B
C
184
183
182
170
169
168
167
Dark grey Basalt 2 (fine-grained)
Amygdaloidal top
Red bole
Porphyritic Basalt 1
Brecciated calcitic top
Probable base of Basalt 4
Dark grey Basalt 3 (fine-grained)
0
30m
0
100ft

Figure 1


a

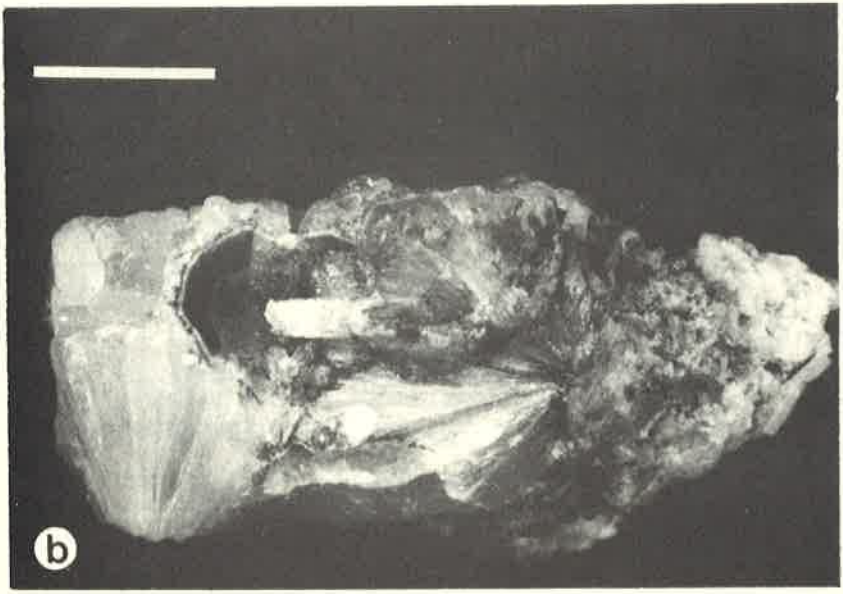

b

FIGURE CAPTIONS

Fig. 1 Schematic representation of the road cut during September 1981.
Plate 1a Stilbite showing distinct "sheaf-like" habit.
Plate 1b Laumontite-leonhardite crystal within analcime endomorph.
Scale bar in 1a and b is 1cm.

GEOLOGICAL SECTION AT NABB HILL, TELFORD, SHROPSHIRE

by Judith Lawson

A new section of road linking the A518 and A442 near Telford, Shropshire, included a cutting through variously coloured, much-faulted Carboniferous sediments. The cutting needing a retaining wall, it was decided to make a feature of the underlying rocks in the wall. A local artist, Mr Kenneth Budd, discovered a source of cheap tiles and the wall was finished, under his direction, with these. The tiles follow the lines of the original strata which include coal, shale, sandstone and conglomerate but with a brighter colouring. The wall is about 650m long and over 10m high at its maximum point and is certainly an eye-catching and unusual geological feature for the new town.

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