
Proceedings of the Geological Society of Glasgow

Sessions 115 and 116 (1972-1974)

Published 1975

PUBLICATIONS

The second two parts of volume 8, all four parts of volume 9 and the first two parts of volume 10 of the *Scottish Journal of Geology* were published during the sessions and issued to members.

A new edition of the 'Excursion Guide to the Geology of the Glasgow District,' was published during session 115, with the help of a grant from the Royal Society. Under the editorship of Dr. B. J. Bluck, the excursion itineraries were updated and new excursions were introduced. The format was improved and the size cut down so as to fit the pocket. The new water resisting plastic cover also makes the guide ideal for field use. At a current price of £1.20, this publication was an immediate success, selling well, not only in local bookshops, but throughout Britain and indeed, Europe.

The second edition of the 'Excursion Guide to the Geology of Arran' also continues to sell well and represents excellent value at a price of 75 pence.

MEMBERSHIP

The new office of membership secretary was created during session 116, in order to keep up to date the Society's membership list, so that prompt action could be taken on changes of address, resignations, subscriptions and arrears. Paragraph 10 of the constitution would be more strictly adhered to, so that those with subscription arrears of two years would automatically be deleted from our membership list.

The state of membership at the end of each session was as follows:—

	Session 115	Session 116
Honorary Life Members	4	4
Life Members	6	5
Ordinary Members	303	335
Associate Members	6	10
Junior Members	21	32
	340	386

The total membership for session 114 was 352. The apparently anomalous figure of 340 for session 115 is accounted for by the larger than usual number of deletions of members in arrears. These were made as a result of the new system of keeping records.

OBITUARY NOTICES

William Robert Smellie, M.A., D.Sc., F.R.S.E., J.P., died at his home in Cove on 14th March, 1973.

He was born on 16th November 1885 in Mossend, Lanarkshire. From there he went via the local academy to Glasgow University after having served as a pupil teacher in the local school and at 17 years began his Arts degree and along with it completed his teacher training in Dundas training college. After graduating, he taught for 2 years and returned to the University to take his science degree with geology as the principal subject, and graduated with special distinction in the subject in 1911.

As the most successful student between 1908-1911 he won the McKinnon scholarship and the Baxter demonstratorship in geology, which he held until 1914, when he was appointed assistant curator in geology in the Hunterian museum. His work there was interrupted by 3 years military service. He published and read to the Royal Society in Edinburgh a paper on a new Oxfordian Plesiosaur, *Apractocleidus teretipes* collected from the Oxford Clay by Mr. A. N. Leeds and acquired by Professor Gregory for the Hunterian museum, where it has recently been spectacularly mounted for display by Dr. J. K. Ingham. It was in recognition of the thesis of a new genus combined with a series of papers on the geology of Bute and the Clyde basin that he was awarded his doctorate.

After the war, he joined the then Anglo Persian Oil Company as an exploration geologist, mapping hitherto unknown regions in Somaliland, Persia and Pusht-i-Kuh.

In 1923 he married Janet Douglas, herself a graduate of the University and with her went to Patagonia. It was there that the late Lord Cadman found he had all the business qualities

most geologists are supposed to lack and left him a free hand to use his judgment so that with luck and Scottish thrift the oil field flourished. He returned home in 1933 and except for one expedition to Venezuela at Cadman's request he did no more travelling.

He suffered indifferent health after working abroad but had a very happy retirement. Being a fine naturalist, his garden was at one time a bird sanctuary.

For the last eight years of his life his eyesight began to fail and gradually he could not write or read — an affliction he bore with cheerfulness. He recently received a letter from the secretary of the Royal Society of Edinburgh sending their felicitations on his having been on their roll of fellows for 50 continuous years.

Janet Smellie, M.A.

Tribute to Dr. William Robert Smellie — by Rev C. K. O. Spence.

Every now and then there comes upon the human scene a personality with that rare quality of unforgetfulness. Such a person was Bill Smellie, dear and delightful. How good to have known him, if even as I did, only for the last five years of his life.

Few can ever have crowded so much of worth and achievement into eighty odd years of living. A man of science and learning, geologist, explorer and adventurer; student of nature, lover of animals and a gifted horticulturist. His was the privilege to have been a student at Glasgow University during the halcyon years of the early decades of this century when as memorable a concentration of academic learning existed as could be matched by any University of the time. But men are remembered more for their humanity than for their learning, more for their compassion than for their achievements. The record of his scientific prowess will not go unrecorded but today I remember him as the man I knew, respected and held in great affection.

He had a wonderful sense of humour; everything he said and did had a chuckle and a kindly smile in it. He had that rare gift of summing you up within five minutes of meeting you, and although you knew that he saw right through you, faults and virtues alike, it was always a compassionate judgment. He made many a shrewd assessment of others in my presence but never once did I hear him say anything unkind or malicious. He loved people for what they were and not what they might be, and anyone who visited him in his home would not leave unrewarded for no visit was ever dull. His natural kinship with human beings was extended to his love of nature — birds, animals and flowers alike. All were his friends. The robins who fed from his hand all had splendid names; his dogs would rather have missed a meal than to have missed being with him. We live in an age much

prone to unconventionality in dress and custom which by its very predictability has become dull and tiresome, but he had that splendid eccentricity which was truly individual and unique. As like as not you might meet him in his garden or in the village wearing a poncho and with his parrot solemnly perched upon his shoulder, and you would be hard-pressed to know whether you, he or the parrot had enjoyed the meeting most.

He loved his home and family as they loved him, and the warmth and hospitality you found in their midst was impressive proof of something built upon goodly foundations.

For him life was something that was meant to be lived. Gifts and talents were his to be used for the benefit of others. His human relationships enriched all and harmed none.

Robert John Sym McCall, B.Sc., F.G.S. (1909-1973) was born in Falkirk and was educated there as well as in Paisley. He gained his B.Sc. with honours in geology at Glasgow University in 1931 under E. B. Bailey. After four years as demonstrator and research worker in the heavy minerals of soils, he joined the Anglo-Persian Oil Co. (now B.P.) and was posted to Persia (Iran) in June 1935.

During his early years in Persia, he was a member of two major reconnaissance surveys in the Zagros mountains and later led more detailed field surveys in the Zagros foothills investigating the Tertiary deposits of the S.W. Iranian oil-field area. He quickly became a leading exponent of Miocene-Pliocene stratigraphical correlation and structural interpretation. This he applied to his work as resident or well-site geologist at early exploration drilling in areas which have subsequently become giant oil-fields.

In 1951 he was transferred to Kuwait Oil Co. (jointly by B.P. and Gulf Oil Corporation) and a few years later to B.P.'s operations in East Africa, of which he finally became manager. After a brief spell in British Honduras, Bob McCall retired from B.P. after 25 years service, most of them overseas.

Until about 1970 he was employed by the United Nations as petroleum advisor in such widely separated countries as Guyana, Syria and the Philippines.

Bob McCall's career stretched from the days when geologists covered the ground by walking or riding and mapped topography and geology with plane-table and alidade, to those when geologists enjoyed the advantages of helicopters, land-rovers, aerial photographs and electrical recording of rock properties in boreholes. He adapted well to both, as witness the respect he earned from his seniors and the gratitude of his juniors for his unsparing assistance and advice.

His intention had always been to settle in his native country, but after the sudden death of his wife in 1970, he moved to

Kirkcudbright and then to London to stay with his twin sons and to be close to his married daughter. After a short illness in late 1972, from which he seemed to recover completely, he died unexpectedly in March 1973.

S. Elder.

Mr. Archibald Forrest, F.S.A. (Scot), the eldest son of a former provost of Lanark, was born near Lanark on 8th December 1884, and died after a short illness on 18th January 1974.

He came to Glasgow in 1905 and started his long and successful career as a butcher, in premises in Victoria Road, Glasgow. After the end of the Second World War he took his son, Robert, into partnership in the business and finally retired in 1960. He played an active part in the charitable and trade organisations associated with his trade, and was President of the United Fleshers Society in 1930 and Deacon of the Incorporation of Fleshers in 1932.

Throughout his life he was a keen motorist and acquired his first car, an Argyll, in 1913, and he only ceased driving at the age of 82! An enthusiast of the royal and ancient game, he played regularly on the links at Wester Gailles course in Ayrshire and in due course was elected club captain.

His interest in archaeology led to his election as a Fellow of the Society of Antiquaries of Scotland and he joined the Geological Society of Glasgow in 1944, becoming a keen and active member. He was a 'weel kent' face at Society meetings and excursions for almost 30 years and rendered sterling service as an auditor to the Society. He specialised in semi-precious stones and created what is possibly the finest private collection of cut and polished Scottish agates in Scotland today. He was a pioneer in the revival of the almost lost art of the lapidary in Scotland and was well known in lapidary circles in the U.S.A. which he visited, with Mrs. Forrest, on several occasions.

Archie Forrest was a quiet and courteous man, a good companion and a staunch friend. He was equally welcome and at ease in cottage or mansion and the older members of the Society will long remember him for his many small private courtesies and kindnesses.

He is survived by his wife with whom he celebrated his Golden Wedding in 1962 and his Diamond Wedding in 1972, and four of his five sons.

J. Stevens.

John Fleming, B.Sc. (1950-1972) was born in Glasgow on 12th October 1950. He received his early education at Hutchesons Boys Grammar School where he proved an able pupil. Though not an

outstanding sportsman he was a great competitor and particularly enjoyed tennis and swimming. In 1968 he entered the University of Glasgow, initially to study geography, but his interests were quickly diverted towards geology and he graduated with honours in this subject in 1972.

While at university he helped to organise and took part in several students geological society excursions and he joined the expeditionary society. In 1969 he was a member of the expedition to Norway and contributed an article on the near shore fishing industry to the report. The following summer he spent two and a half months in South Africa working for the Union Mining Corporation where he developed a strong liking for the exploration side of industrial geology. Elected leader of the geological party of the expedition to Iceland in his final year, he proved a competent and capable organiser.

Outwith his full university life he was a conscientious member of the Boys' Brigade in which he won the Queen's Medal and attained the rank of officer. He was always keen to impart his knowledge to younger boys and frequently gave talks and took excursions for the organisation.

In 1972 he graduated from university and was immediately employed by the Anglo Charter Corporation. His first posting was to Portuguese Angola where, a few days after arrival, on 10th November 1972 he was tragically killed in a motor accident. His death at the initiation of a promising career is especially sad and our sympathy is extended to the Fleming family.

G. Bertram.

PAPERS

First Graptolite from Lesmahagow Inlier

by E. N. Campbell.

While working on the collections in the Glasgow Museum and Art Gallery, I came across a graptolite (No. G74-10), labelled as coming from the "Silurian of Lesmahagow." A surprising feature is the lithology in which the graptolite is preserved: a fairly soft, greenish-grey, fine-grained silty sandstone or grey-wacke which weathers rusty-brown and is faintly laminated. On the base of the specimen there is a thin layer of greenish mudstone which has a sharp contact with the coarser material. Normally, graptolites would be expected in the finer-grained beds. It may be that a search in the coarser lithologies would reveal some useful specimens.

Dr. R. B. Rickards has kindly identified the graptolite. He states that it is "*Monoclimacis* sp. of the type found in the high Llandovery to low Wenlock." The straight rhabdosome has a total length of 53 mms., of which 33 mms. are preserved in the

round and the rest as an impression. The part preserved in the round has a constant width of 1.7 mms., and has 35 thecae. The presence of small fragments of two other rhabdosomes in the matrix shows that this specimen is not a totally isolated occurrence.

The famous **Jamoytius** horizon at Lesmahagow has been correlated, on the basis of the shelly fauna, with supposed Upper Llandovery to Wenlock beds in the Hagshaw Hills inlier (Rolfe & Fritz 1966). **Monoclimacis** is the first fossil of zonal significance to be found at Lesmahagow and, assuming that it came from a fairly low horizon, it strengthens the case for this correlation. It also means that it is now fairly certain that the succession in the four major Silurian inliers of the Midland Valley extends down at least as far as the top of the Llandovery (Lamont 1947, Rolfe & Fritz 1966).

References:

- LAMONT, A. 1947, Gala-Tarannon Beds in the Pentland Hills near Edinburgh, *Geol. Mag.* v. 84: 193-208, 289-303.
- ROLFE, W. D. I. & FRITZ, M.A. 1966, Recent evidence for the age of the Hagshaw Hills Silurian inlier, *Scott, J. Geol.* 2: 159-64.

Observations on the Tighvein 'Complex,' Arran.

by A. Herriot.

In the Arran Memoir, Tyrrell (1928) described the eastern part only of this complex, which lies in the south central part of the island. His description covered a few thin sills injected into Triassic sediments to the east. For the purposes of this paper the complex is taken as the dioritic, microgranitic and associated rocks which cap the plateau lying between Squiller and Gar' Bheinn in the north, and Glas Choirein and Cnoc Lean na Meine in the south (see Fig. 1).

Augite-diorite: Although the base of this component of the complex is exposed only in the streams northwest of Carn Ban (NGR NR 991262), the outer margin can usually be located with reasonable accuracy. There seems little doubt that the base is concordant with the underlying sediments, as was thought by Tyrrell. At all localities examined the lowest rocks contain xenoliths of fine-grained basic rock. From the vicinity of the Urie Loch southwards around the complex to the exposures southeast of Cnoc Dubh (1385 ft., NGR NR 988281) the basal rocks are augite-diorites, except in a stream 800m southwest of the Tighvein summit (NGR NR 998274) where the contact rock is xenolithic quartz-dolerite. Around the northern part of the complex the basal rocks are largely doleritic, as is well seen on

Squaller and Gar' Bheinn where the thickness is much greater than elsewhere. The xenoliths here range from vague 'ghosts' to clear angular fragments. They may be dispersed or abundant enough to give rise to 'igneous breccia.' The enclosing rock may be quartz-dolerite or granophyric felsite. The doleritic layer grades into the overlying augite-diorite, as can be seen especially clearly southeast of Cnoc Dubh. The diorite is seldom free of xenoliths.

The westward protrusion of augite-diorite southwest of Urie Loch is probably underlain by microgranite, and so it may be the remnant of a roof to the younger, more acid, intrusion. The three patches of basic rock which lie southwestwards from the Tighvein summit are parts of one sheet separated by erosion; they almost certainly overlie microgranite or microgranophyre. Their general attitude indicates a former connection with the augite-diorite to the southwest. The upper two masses are extensively veined by more acid material which is, at least in part, microgranite entirely similar to the adjacent intrusion. The vein material described by Tyrrell (1928, p. 143) seems more akin to the microgranophyre.

Tyrrell's petrographic description of the augite-diorite was based on the examination of a rock with chloritised pyroxene. Fresher material shows clinopyroxene to be a pale sub-calcic augite which is usually columnar. A moderately pleochroic hornblende is sometimes present and a few sections contain an optically negative olivine. Apatite, sometimes 'striated,' is a common, and often conspicuous, accessory.

Microgranite: The rock described by Tyrrell occupies only the eastern part of the area coloured pink on the 1:50,000 Geological Survey map. Practically no rock is seen in situ. Frost-riven debris is, however, locally abundant. Where contacts with the augite-diorite can be closely located, the more basic rock stands higher than the microgranite. The latter cannot, therefore, form a sheet overlying the former as shown on Tyrrell's section (op. cit. p. 134, Fig. 17).

Specimens collected just north of the Tighvein summit differ from the normal microgranite in containing a little fresh green clinopyroxene and clusters of zoned plagioclase crystals associated with quartz and augite. The latter may be the remains of xenoliths of augite-diorite.

Microgranophyre: Rocks quite different from the microgranite occupy the ground west and northwest of Tighvein. These, unlike the microgranite, are reasonably well exposed. Locally they give rise to marked features as, for example, 600 m. south-east of Cnoc Dubh (an area shown as occupied by augite-diorite on the Geological Survey map). Here a number of scarps, gently

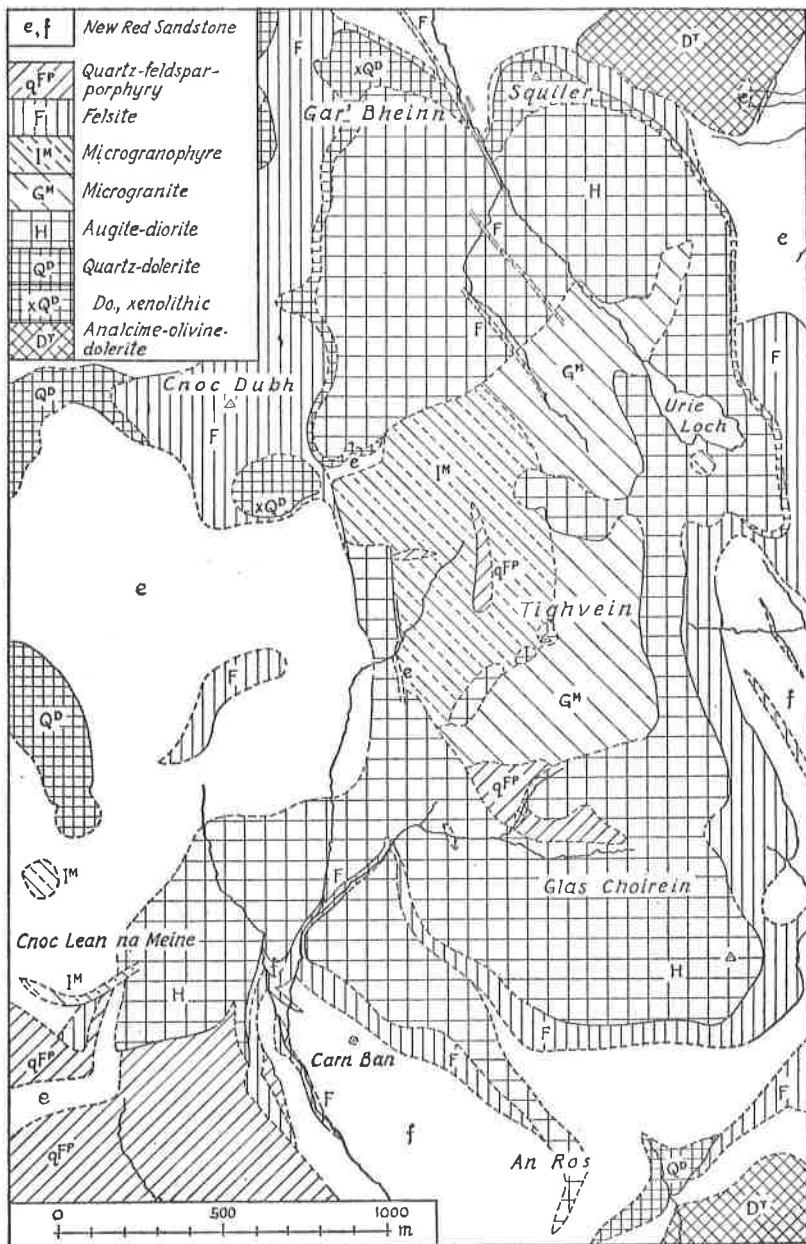


Fig. 1. Geological map of The Tighvein Complex.

curved, concave to the west and trending SSE suggest a sheeted structure dipping WSW at moderate angles.

The microgranite/microgranophyre contact falls in obscured ground. The mapped line is conjectural, but as it appears to be unaffected by the topography it is considered to be a steep contact. Some 400 m. ESE of Cnoc Dubh a small hollow in a coarse pink sandstone separates the xenolith-rich doleritic base of the augite-diorite from the microgranophyre. This sandstone, which almost certainly underlies the more basic intrusion, is truncated to the south by the more acid body. A narrow screen of sandstone seen in the stream 430 m. WSW of the Tighvein summit, runs south for some 100 m. separating microgranophyre from augite-diorite. To the north of the same stream the latter rock stands up as a broad dyke-like body, overlooking the microgranophyre on its eastern side. Steeply transgressive margins to the microgranophyre are indicated by these observations.

The predominant rock type is dark blue-grey when freshest, weathering with a white skin. Thin sections show microphenocrysts of euhedral, zoned plagioclase (andesine to oligoclase), often mantled by alkali-feldspar, and of a green clinopyroxene, brownish iron olivine and quartz, in a base of sodic plagioclase, alkali-feldspar, quartz, green prismatic clinopyroxene, altered olivine and ore, with a little apatite. The quartz and alkali-feldspar of the matrix commonly occur in delicate micrographic intergrowth. Microspherulitic varieties are also found. As in the case of the microgranite, glomeroporphyritic aggregates of zoned plagioclase and augite, perhaps of augite-diorite parentage, have been noted.

Microgranophyre also forms a dyke-like body on the southern shore of the Urie Loch, the small boss just south of the loch and the sheet on Cnoc Lean na Meine. The former two bodies are intruded into augite-diorite; the latter appears to be so at its eastern end.

Later Intrusions: The complex is cut by sheets and dykes of felsite and quartz-feldspar-porphyry, and by dykes of tholeiite and pitchstone. Of these mention is here made only of the sheets of felsite and porphyry. The two porphyry bodies northwest of Tighvein are flat-lying thin sheets; both are associated with features in the microgranite. The larger mass of porphyry south of Tighvein is probably emplaced along the augite-diorite/microgranite contact with an even base as microgranite is exposed in the small stream which crosses the porphyry (see Fig. 1). The attitudes of the felsite sheets in the southern part of the complex, especially north of Carn Ban, require further investigation. In the main they appear to be concordant. The columnar sheet along which the stream north of Carn Ban flows, dips at 15-20° to the northwest. The continuity of this sheet with that which

runs round the southern and eastern sides of the complex is doubtful. The evidence of fragments turned up by the operations of the Forestry Commission NNE of Carn Ban gives greater support to the Geological Survey map of 1910 than to later editions of the map.

Conclusions: The possibility that ring-dykes occur in the Tighvein complex was considered and rejected by Tyrrell. Tomkeieff (1961, p. 33) refers to a ring-dyke complex without, to the author's knowledge, supporting evidence. It is now thought that the complex consists of a concordant, thick sill of augite-diorite and associated doleritic rocks intruded transgressively and approximately centrally by microgranite and microgranophyre. The generally arcuate disposition of these more acid rocks could suggest that they are incomplete ring-dykes. The relatively straight boundary of the complex west of Tighvein could conceivably be controlled by a southerly extension of the fault which must bound to the east the Carboniferous rocks of the Slidery Water Head area.

Finally it should be noted that the augite-diorite (or quartz-augite-diorite) is, both mineralogically and chemically, closely related to quartz-dolerite. (Rao, 1958, p. 274, and Tyrrell 1928, pp. 141 and 147). Tyrrell considered the microgranite to have affinity with the felsites of his craignurite series. A similar affinity may hold in the case of the rocks referred to in this paper as microgranophyres. Tyrrell, however, suggested that the rock of the little boss south of Urie Loch could be a devitrified porphyritic pitchstone. The presence of a large body of similar rocks in the western part of the complex must render this suggestion suspect.

References

- RAO, M. S. 1958. Composite and multiple intrusions of the Lamlash-Whiting Bay region, Arran. *Geol. Mag.* 95, 265-280.
- TOMKEIEFF, S. I. 1961. Isle of Arran. No. 32 in *Excursion Guide Series*, Geol. Assoc.
- TYRRELL, G. W. 1928. *The Geology of Arran: Mem. geol. Surv. Scot.*

Geology of Greenock — The first recorded account.

Abstracts from the First Statistical Account of the Parish of Greenock, 1793, by the late minister of the parish, Rev. Archibald Reid, then the minister of Mauchline. Annotated by C. Gillen.

The following extracts from the first recorded account of the geology of Greenock are remarkably accurate in their vivid, if quaint, narrative style, written by a man who was not a

geologist, but evidently enjoyed walking in the hills and on the shore around Greenock and who was most observant.

“With respect to fossils, the parish of Greenock, as far as has been hitherto discovered, affords none that are in any way remarkable. Along the coast, freestone, mostly of a red colour, and sometimes beautifully variegated with regular spots of a light grey colour, occasionally intermixed with a great variety of what is called sea pebble, of different shapes and hues, is most common. The strata of this stone on the shore, and a great way above it, as if the vaults of caverns below them had some time failed, are very irregular, scarcely ever horizontal, but dipping or inclining at different angles in every direction, and chiefly towards the south. Limestone, though much needed for building, and improvement of coarse stiff grounds, has only been of late discovered, and but in small quantities; nor is it of the best quality, being mixed with a considerable proportion of sand. Further search, it is to be hoped, may be rewarded with better success. In the steep banks of some of the rivulets from the hills, and in a thick bed of schistus, there appears a thin seam of it, divided into pieces about the size of a man’s head, and of excellent quality. These, as they fall, (for the expense of ground and labour, would far exceed their value), are carefully collected, and used with good effect by the attentive farmer.”

This might nowadays be written as follows:—

The Old Red Sandstone rocks along the shore consist of bright red cross-bedded sandstones, containing grey reduction spots and with occasional lenses of conglomerate with a varied pebble content. There is a general southerly dip. Impure, sandy limestone occurs in small quantities, although inland a thin unit of concretionary limestone is found in a thick shale bed.

Schistus was an old word for shale, or any fissle rock. The reference to ‘vaults of caverns having failed’ is interesting for inland from the shore at Lunderston Bay the raised beach cliff does have some small wave-cut caves at its base, but more likely the author’s imagination is being used here to account for the cross-stratification. The limestone concretions referred to crop out in Rottenburn near Loch Thom and the grey and variegated shales there occasionally yield salt pseudo-morphs, plant remains and ostracods.

Rev. Reid had an eye for economic geology, as is evident from the next extract:

“Whether it would be advisable to make trial for coal in any part of the parish, those skilled in that business will be best able to determine. From the vast quantity used in Greenock and Port Glasgow, and annually exported by the merchants of both places, a mass of that necessary commodity would, it is evident,

be a source of great wealth to the proprietor, and a very great benefit to the inhabitants of these towns, and the places adjacent. In digging pretty deep wells, etc., there have occurred strata of earth, clay mixed with shells, sea sand, gravel, freestone, whin, etc., but no appearance hitherto of that valuable fossil. The hills, for the most part, seem to be a mass of whin, very compact and solid in some parts; in others, especially toward their summits, chinky and friable. In not a few places, the rocks seem once to have been in a state of fusion, and loose stones scattered here and there, exhibit so much the appearance of the cinders of a smithy furnace, that there can be little doubt of their having undergone, from time to time, the action of fire. What minerals the Greenock hills may contain, is not known. The deep chasms made in them by sundry rivulets, which, after heavy rains, descend in torrents, have been carefully examined. In the drought of summer, the loose stones, pebbles, and sand, in the channel of these streams, have been examined by the writer of this sketch; but excepting ironstone of a poor quality, which is frequently found, a little copper rarely in freestone, no metallic substance has been hitherto discovered."

Coal Measures are not found in Greenock, but the Calciferous Sandstone at Ashton does contain plant fragments and thin carbonaceous partings. The shells, sea sand and gravel referred to are boulder clay and late glacial or post glacial marine sands. The whin hills, of course, are the Renfrewshire Heights, part of the Clyde Plateau lava outcrop, and it is obvious from his description that the author imagined these to have been poured out over the surface.

Ironstone occurs as concretions in the Lower Carboniferous shales also, and the copper in freestone (basalt) is not uncommonly found as tiny specks in vesicles at the tops of lava flows (much more is recorded from Boylestone Quarry). It is interesting to note that 180 years ago Greenock had drought in summer. A further geological report appeared in the second statistical account of 1840, but this is less interesting, save perhaps for the list of minerals found in the vesicular lava:

"Thus we possess almost every member of the zeolite family: viz: analcime, stilbite, heulandite, and some beautifully delicate specimens of mesotype (a Na-Ca zeolite, intermediate between natrolite and scolecite — CG); also calcareous spar, quartz crystals, sulphate of barytes, prehnite, and rare but distinct specimens of a very fine greenish lithomarge (a clay mineral, related to kaolinite — CG)."

Greenockite had not been discovered at that time.

I wish to thank Mr. Hugh McIntyre of Port Glasgow for drawing my attention to these accounts.

SOCIETY MEETINGS (Session 115)

Held in the Geology Department, The University, Glasgow.

12th October, 1972

Mr. A. F. Bennie, Mr. C. V. Cook, Dr. B. G. Cooksey, Mr. I. W. Fergusson, Miss L. Laing, Mr. F. Owen, Mr. R. F. Smail, and Mr. J. E. Taylor, were enrolled as ordinary members of the Society. Mr. G. H. Baird, Mr. A. M. Gilfillan, Mr. R. B. Gilfillan and Mr. W. McLellan as junior members.

Professor J. G. Ramsay delivered a lecture on "**Deformation of Rocks in Geological Processes.**"

Recent research into the structure seen in naturally deformed rocks has focussed attention on the relationships of the original planar anisotropy and the finite strain ellipsoid. Explanations are now available for the development of folds and boudinage in terms of the instabilities set up during straining. Theoretical studies of progressive deformation have cast light on the complexity of the successive development of structures during natural deformations. Cleavage fabrics in the complex fan-like arrangements found in folded beds were explained and the use of new techniques of finite element analysis for recognising strain patterns by the use of digital computer methods was introduced.

9th November, 1972. (Annual General Meeting)

Mr. C. B. E. Cheales, Mr. D. R. Craig, Mr. J. Davidson, Mrs. P. Duchart, B.Sc., Mr. D. J. Graham, Mr. R. Graham, Mrs. E. Hardy, Mr. J. W. Hare, Miss S. J. Logan, Mr. J. F. S. Pearson, were enrolled as ordinary members of the Society.

Dr. Weedon, the President said that in an attempt to reduce the time taken up with the Annual General Meeting the council had decided that, where possible, the written reports of office-bearers would be circularised to members before such meetings.

The following office-bearers were elected:

- | | |
|----------------------|---|
| Honorary Secretary: | Dr. W. D. L. Rolfe |
| Honorary Librarian: | Dr. J. Hall |
| Assistant Librarian: | Mr. I. R. Vann |
| Members of Council: | Dr. C. J. Burton, Mr. C. Gillen,
Mrs. V. Hamilton, Dr. M. J.
Russell, Dr. P. R. Thomas, |
| Honorary Auditors: | Mr. D. Jack and Mr. J. A. Carrick. |

The film '**The Great Barrier Reef**' was shown after a short introduction by Dr. G. E. Farrow.

14th December, 1972

A Special meeting was held to make an amendment to the Constitution. Council wished to change the date of the Annual General Meeting to December because of the auditing of the Treasurer's accounts, which left very little time for the balance sheet to be produced for perusal at the November meeting. This motion was carried unanimously.

The ordinary meeting followed immediately at which Mrs. C. D. Bailey, M.A., Mr. A. R. Cameron, Mr. D. A. Paulsen, Mr. G. Ross, Mr. A. C. S. Swanson, Mr. C. C. Tannock and Mr. T. A. Walden, B.Sc., F.M.A., were enrolled as ordinary members.

The main business of the evening "**GOING FOR A SONG**" (a geological version of the BBC panel game) was by way of an experiment, and was due to the efforts of Dr. W. D. I. Rolfe, Dr. J. K. Ingham, and Mr. J. Addison. Dr Rolfe acted as Chairman. The panel of experts comprised Professor T. Neville George, F.R.S., Dr. A. C. McLean, and Dr. C. D. Gribble, and amateur members were represented on the panel by Mrs. E. H. Black and Mr. T. D. Nalsmith. Over twenty specimens were submitted to the panel for identification. Mrs. E. H. Black won with 48 points, and was presented with an engraving of Dumbarton Castle. Mr. T. D. Nalsmith scored 45 points.

11th January, 1973

Mr. R. R. Stobie was enrolled as an ordinary member of the Society. Vice-President: Dr. J. D. Lawson had been co-opted as Vice-President of the Society.

Dr. C. B. Cox (author of Hamlyn's 'Prehistoric Animals') of the Zoology Department, King's College, London, delivered a lecture on '**Migrating Mammals and Drifting Continents.**'

The problem of distribution of mammals, particularly marsupials, has long puzzled zoologists and palaeontologists. Acceptance of continental drift, in terms of plate tectonic theory, has provided a background against which to test various possibilities to account for the pattern of distribution. The problem is still complicated by uncertainties as to the times of origin of different groups of mammal and as to the precise timing of the separation of the continents.

8th February, 1973

Mr. N. E. Butcher, B.Sc., F.G.S., Mrs. E. Cowan, Mr. J. W. Hart, Mr. E. A. McInairnie, Mr. M. L. B. Miller and Mr. R. G. Ward, B.A., F.G.S., were enrolled as ordinary members of the Society.

Dr. A. S. Laughton of the National Institute of Oceanography, Godalming, Surrey, delivered a lecture on "**The North Atlantic and Plate Tectonics.**"

The theory of plate tectonics enables magnetic anomaly patterns over the oceans to be interpreted in terms of a stage-by-stage evolution of the oceanic crust. The evolution of the North Atlantic was complex since the spreading axis has shifted from time to time so that more than two tectonic plates need to be considered. The chronology and geometry of these changes has been deduced from the magnetic anomalies, from the sea floor topography, from deep drill holes in the ocean floor and from the geology of the bordering continental shelves.

1st March, 1973

This was a joint meeting with Edinburgh Geological Society at which the Celebrity lecture was given to an audience of over 350 people by Professor Sigurdur Thorarinsson of the Science Institute, University of Iceland.

"Tephrochronology and Recent Volcanism."

He described the tephrochronological method and outlined why there are special conditions for its successful application in Iceland.

Iceland's most famous volcano, Hekla, has played a central role in the tephrochronological studies in Iceland in general and in its application in volcanological studies. Hekla has been the country's biggest producer of tephra in postglacial times and its rhyolitic tephra-layers are the most widespread and important time markers in the postglacial soils of Iceland. Besides application in the studies of the eruption history of Icelandic volcanoes such as Hekla and Katla, tephrochronology in Iceland has been applied to studies of fluvial and eolian erosion, glacier oscillations, datings of icecores and periglacial phenomena, as well as pollenanalytical studies, archaeological studies and in the establishment of tephrochronological connections between Iceland and other countries. The lecture included spectacular films of various Icelandic eruptions.

8th March, 1973 (Members' Night)

Mr. A. H. Gunning, Mr. B. T. Harrold, Mrs. J. MacDougall, Mr. D. Morrison, Miss M. Paterson, Mrs. B. Roberts and Mr. K. Thomson were enrolled as ordinary members of the Society. Mr. D. Bremner, Miss P. Burke, Mr. J. Gray, Mr. J. Macpherson and Mr. J. H. Moreland were enrolled as junior members.

Short talks, illustrated by colour slides, were given by:—

Dr. B. J. Bluck and Dr. J. G. MacDonald — Iceland expedition 1972: sedimentary features of Markarfljot Sandur, and volcanic forms of Landmanalaugar.

Dr. D. R. Bowes — Grenville rocks of the Precambrian shield of Canada.

Dr. J. D. Bradshaw — A geological traverse across South Island, New Zealand.

Miss E. R. Brock and Miss E. M. Anderson — Canary Islands geology.

A. Herriot — Observations on the Tighvein Complex, Arran.

J. Jocelyn — Twinned zircons.

Society's Publications

The President drew the attention of members to an arrangement made by the Publication Officers of the Edinburgh and Glasgow Societies whereby members would be able to buy certain of their publications at special membership discount rates. The following publications would be available at meetings of the Society, but **not** by post:

	Full Price
Excursions Guide to the Assynt district	50p to members (60p)
Tertiary volcanic rocks of Ardnamurchan	35p to members (40p)
Carboniferous volcanic rocks of the Midland Valley	45p to members (50p)
Excursion Guide to Arran	65p to members (75p)
History of The Geological Society of Glasgow	£1 to members (£1.25)
Geology and Palaeontology of the Clyde area	32p to members (37p)
Geology of Loch Lomond (J. W. Gregory 1928)	10p

Future Guides issued by the Societies would also be made available to members at similar discounts. Profit would accrue to the Society only from our own publications, but it was thought that members would appreciate this extra service. The following additional publications had been obtained by our Publication Officer, Dr. D. F. B. Palframan, for the convenience of members:

Geological column (1st edition)	5p
The Story of the Earth (I.G.S.)	25p

The following exhibits were displayed after the meeting:—

P. Aspen — Fish, trace and other fossils from the Calciferous Sandstone of Dumbarton.

Dr. C. J. Burton — Tribolites of the European Devonian.

- I. H. Forsyth — Some recent publications of the Institute of Geological Sciences.
- Dr. C. D. Gribble — The Beinn an Dubhaich granite aureole.
- Dr. A. Hall and Miss V. Smellie — *Dithyrocaris* — a Carboniferous crustacean collected on the 1972 Society excursion to Kilbirnie.
- J. Jocelyn and J. Davies — Geological examples of stress patterns.
- Dr. M. C. Keen — Living and fossil ostracods.
- Dr. J. G. MacDonald — Recent volcanic products of Landmannalaugar, Iceland.
- P. Macdonald (Junior member) — Middle Old Red Sandstone fish from Caithness and Lower Palaeozoic shelly faunas from the Girvan district.
- Secretary — Society archives, including photographic album.
- A. Tait and Dr. G. Farrow — Resin impregnations of Recent sedimentary structures from the Solway Firth tidal flats.

EXCURSIONS DURING SESSION 115. (Summer 1973)

The Easter Excursion to Arran was attended by a party of 18 including 2 Open University students.

Alex Herriot with his long acquaintanceship with the island covered a great range of classic locations during the short visit, although his powers of persuasion were severely tested with the ripple bedded felsite at Blackwaterfoot.

The visit to the Loch Fyne area led by Scott Johnstone attracted a full bus load. In weather which got steadily worse during the afternoon, stops were made on Loch Lomondside to examine the steep foliation in the nose of the Aberfoyle Fold, at the diorite quarry on the Rest and the Green Beds near Ardkinglas. The Hells Glen slip was interpreted too literally by the coach driver when he drove the bus into a ditch, so plans to examine major landslips were curtailed and the party retired to the Arrochar Hotel.

The joint meeting with the Edinburgh Society with Mr. D. C. Greig of the IGS as leader was held at Dunbar where the Calciferous Sandstone and the Lower Limestone Groups are well exposed along the sea shore. Reminders of the commercial importance of the deposit were evident both in a well restored lime kiln on the shore and the presence of the Dunbar Cement Works in the background.

Drum Bay gave members an excellent opportunity to see how sedimentary structures are formed, in particular the part which marine animals play in creating the fossils of the next millenium.

Under the guidance of Dr. Farrow the party successfully negotiated the quicksands of the Nith Estuary and returned with a full complement.

Unfortunately the trip to Ardmore had to be cancelled but Dr. Thomas at very short notice led a most interesting excursion in similar rock formations in **North Renfrewshire**. Starting at the junction of the U.O.R.S. and the Carboniferous on the foreshore near Cloch Lighthouse, the party progressed up through a Ballagan type succession to the base of the Clyde plateau lavas.

The **Tayvallich** excursion gave members a chance to examine the Lower Cambrian rocks under the guidance of Dr. Harris and a party of research students from Liverpool University. A succession of relatively thin bands of igneous and sedimentary rocks with near vertical bedding was followed along the coastline. Although considerably deformed, the rocks still retain marked pillow structures in the lavas and evidence of graded bedding in the sediments.

The evening visit to the **Reactor Centre at East Kilbride** was very well attended and Dr. Pidgeon and his colleagues, Dr. Sheppard, Dr. MacIntyre and Mr. Jocelyn, demonstrated the various techniques used to date rock samples.

The **Campsies** trip was led by Dr. Macdonald to exposures in the Lower and Middle Markle Basalts which I believe he described as not normally seen, the reasons for which soon became apparent. However, in spite of the rigours of the climate and the heavy going the party had an enjoyable day and managed to limp to Kirkhouse Inn for refreshment.

The final excursion to the Highland Boundary Fault near **Balmaha** was led by Dr. Tremlett who presented new evidence on the faulting and displacement in the area which is now incorporated in the new Glasgow Excursion Guide.

Apart from the problems created by late cancellations — the Tayvallich Excursion incurred a loss of over £11.00 — the season was a successful one. This was due in large measure to the careful preparation and enthusiasm of the leaders to whom the Society extends its grateful thanks.

A. G. Edwards.

SOCIETY MEETINGS (Session 116)

11th October, 1973

Mr. D. C. Bailey, Mr. R. E. Bevins, Miss M. M. Bonn, Mr. D. Bremner, Mrs. D. J. Edwards, Dr. G. E. Farrow, Miss J. A. Horne, Dr. L. G. Jubb, Mr. J. Simpson and Miss J. S. Steele, were enrolled as ordinary members of the Society. Mr. G. King, Miss T. M. Lee,

Miss J. S. Smellie and Mr. A. Wylle were enrolled as junior members.

Professor P. C. Sylvester-Bradley of Leicester University lectured on 'Geology and the Origin of Life.'

There is now conclusive evidence to show that life originated as a result of long continued processes of chemical evolution. Early stages in this process may be studied experimentally, and show that the products, though not 'living' shared some of the characteristics of true 'life.' This stage in the evolution of life is termed 'protolife,' and can be preserved in fossil meteorites, and in volcanic environments. Although true life had already formed on earth more than 3,000 million years ago, it was 'procaryotic' and remained at a low level for much of the Pre-Cambrian. With the invention of sex in Proterozoic time, there was an evolutionary explosion, and a sudden increase in diversity.

8th November, 1973

Mrs. D. Baird, Mrs. H. R. Bell, Miss J. D. Fletcher, M.A., Mr. A. M. Jack, Mr. R. W. Law, Mr. I. B. McGeorge, Mr. J. MacKenzie, Mr. I. R. Miller, Mr. W. M. Primrose, B.Sc., Miss M. F. Rait, B.Sc., Dr. A. E. Shimron, and Mr. J. M. Williamson, A.C.C.A., A.C.I.S., were enrolled as ordinary members of the Society. Mr. R. Bell, Miss M. H. Cowie, Mr. D. J. Graham, Mr. I. K. Hodge, Mr. R. Jamieson, were enrolled as junior members of the Society and Mrs. M. D. Montgomery was enrolled as an associate member.

Dr. D. S. Weedon delivered his Presidential Address on "**Tertiary Igneous Rocks of Skye — a Review.**"

It is possible that igneous rocks of Skye have stimulated more petrological research than any other igneous suite within a comparably small geographical area; however, when coupled with the controversies regarding their nature and origins, they must indeed rate high for this petrological honour.

Stemming from the work of Macculloch, with his famous 1919 'Description of the Western Isles of Scotland,' in which he recognised that the gabbros and granites, basalts and felsites were a contemporaneous series of rocks, there arose subsequently considerable argument regarding the ages and origins of these rocks. Geikie, disagreeing with Macculloch, and subsequently with Judd on many points of discussion regarding these rocks, was answered by Judd: "The author agreed with Dr. Geikie on one point, namely, reluctance to enter upon this controversy . . ." However, he did.

Harker in his famous Memoir of 1904, apart from excellent mapping and petrological descriptions, laid down firm age relationships for the igneous rocks. Richey, in an outstanding paper to our Society on 'Tertiary Ring Structures' contradicted Harker in suggesting two centres for the Skye central complex,

and other authors subsequently have questioned Harker's theories.

Since 1945, many petrologists have involved themselves in the problems concerning the Skye igneous rocks, and their age relations and modes of origin have been constantly questioned.

13th December, 1973 (Annual General Meeting)

Mr. J. K. Archibald, Mrs. M. J. Blair, Mr. I. A. Cameron, Miss S. A. Colvin, Mr. R. T. Cumberland, Mr. E. U. Dunsmore, Mr. D. A. T. Harper, Mr. M. M. A. Hossian, Mr. D. I. M. Macdonald and Mrs. S. M. Pearce were enrolled as ordinary members of the Society. Mr. D. Cairns, Mr. A. Cowden, Mr. M. Ginesi, Miss U. M. Hubbard, Mr. J. McCafferty, Mr. D. McCartney, Mr. A. C. McElroy and Miss M. J. Owens were enrolled as Junior members.

The following office bearers and councillors were elected:—

President:	Dr. W. D. I. Rolfe.
Vice-Presidents:	Dr. J. D. Lawson and Dr. D. S. Weedon
Secretary:	Dr. J. G. MacDonald.
Membership Secretary:	Mr. C. Gillen, B.Sc.
Treasurer:	Dr. D. W. Powell.
Publication Sales Officer:	Dr. C. J. Burton.
Editor:	Dr. D. F. B. Palframan.
Editor of Society's Proceedings:	Dr. P. R. Thomas.
Councillors:	Mr. J. A. Carrick. Mrs. P. Duchart, B.Sc. Mr. I. Forsyth, B.Sc. Dr. R. Pidgeon. Mr. G. R. Thompson. Mr. J. M. Williamson, A.C.A., A.C.I.S.
Hon. Auditors:	Mr. D. Jack and Mr. R. J. M. Young, M.A.

The annual reports of council for the session 115 previously circulated to members, were unanimously approved by the Society.

The AGM was followed by **A Geological 'CALL MY BLUFF'**

The panel members were Professor T. Neville George, Dr. J. G. MacDonald and Mr. G. King, and their opponents, who were the winners in the game, were Mrs. Jane MacDougall, Dr. B. J. Bluck and Dr. D. F. B. Palframan. Dr. Rolfe presided over the panel.

A vote of thanks was accorded to those taking part for a most enjoyable and entertaining evening, and also to Mr. Addison and Drs. Ingham and Rolfe for having arranged the game.

Dr. M. J. McIntosh, of Glasgow University Library, had kindly laid out a display of geological dictionaries and glossaries for perusal after the meeting.

10th January, 1974

Mr. J. Harkins, Miss J. G. May, Mr. V. T. Budas, M.A., B.A., were enrolled as ordinary members.

Dr. Janet Watson, of Imperial College, delivered a lecture on '**Hebridean Tectonics through three billion years.**'

The Hebridean region is situated near the boundaries of two great crustal structures whose evolution has controlled its geological development. In late Precambrian and early Palaeozoic times, the region lay on the western border of the Caledonian orogenic belt. In Mesozoic and Tertiary times it lay on the eastern border of the newly-formed Atlantic Ocean. Much of the geological history of the Hebrides is bound up with that of those long-lived structures. The nature of the geological foundations established at a much earlier date during the formation of the Lewisian gneiss complex has also influenced its subsequent development. These foundations incorporate the oldest rocks known in Britain and provide a sample of crustal material formed some three thousand million years ago.

14th February, 1974 (Members' Night)

Mr. M. Abou-Ouf, B.Sc., Mr. R. M. Finnie, D.A., Mr. P. M. Hunt, C.S.S., D.A.S.S., Mr. A. W. Owen, B.Sc., and Mr. A. C. Scott, B.Sc., F.G.S. were enrolled as ordinary members.

Short talks were given by the following members:—

Dr. B. J. Bluck — The Exploration expedition to Morocco.

Mr. David Macdonald — Experimental mechanical destruction of mollusc shells.

Mr. E. A. McInairnie — An experiment in palaeoecology.

Dr. E. R. Inman — Geological postcards.

Mr. Iain Fergusson — Hornsfelsed Silurian from SE Sutherland.

Mrs. E. Anderson — Slides of Cape Town and Cape Peninsula, South Africa.

Drs. W. D. I. Rolfe and J. G. MacDonald — Camp Siluria 1973 (including a short cine film).

In addition a series of exhibits were displayed by:—

Mr. P. M. Macdonald — Fossils collected in the summer of 1973.

Dr. J. C. Burton — The geology of Alderney.

Messrs. A. M. and R. B. Gillfillan — Cephalopods of N.E. Yorkshire.

Mr. J. Jocelyn — Geodes from the Keuper Marl of Gloucestershire.

The Hunterian Museum — Exhibits of recent accessions to the collections, mainly presented by members of the Society and prepared by Mr. J. Addison, Dr. J. K. Ingham, and Dr. W. D. I. Rolfe.

14th March, 1974

Mr. A. B. Blaxland, B.Sc., M.A., F.G.S., Mr. R. A. Brooks, Miss L. Chearns, B.Sc., Dr. M. Fletcher, M.B., Ch.B., F.R.C.D., Mr. J. Mechie, Mr. J. N. Pirrit, A.R.G.H., Mrs. J. N. Stewart, Mr. J. E. Stirling, were enrolled as members and Mr. J. N. Sutherland was enrolled as a junior member of the Society.

Mr. David Jenkins, chief geologist with B.P. (U.K.) at Aberdeen, delivered a lecture on 'North Sea Oil and Geology.'

The history of North Sea oil and gas exploration was reviewed briefly and the methods of seismic exploration and drilling were described. The overall structure of the North Sea basin in relation to its tectonic setting was discussed following a description of the distribution and nature of the various stratigraphic units that occur within the basin.

EXCURSIONS DURING SESSION 116. (Summer 1974)

The season started well with a record return of booking slips and good attendance at the early excursions. The restriction of numbers for safety reasons on two of the excursions may have accounted for the initial good response rather than the advance payment of coach fares since this did not prevent numbers falling off at the end of the season.

The **Ardmore** excursion attracted a large party. Under the guidance of Dr. Bluck a range of sedimentary structures in the Old Red Sandstone were identified. At one of the few places in Scotland where the contact between the Upper and Lower O.R.S. can be seen, the differences were discussed.

At **Westfield open cast colliery** we were privileged to see a full scale vertical section through the deepest part of a sedimentary basin in the Fife Coal Measures on a vast working face cut by the Ochil Fault. Dr Mathewson and colleagues from the N.C.B. explained the mining strategy and Dr. Armstrong from I.G.S. identified the various strata. Ostracods and *Lingula* were found in the shale bands.

In adverse weather conditions Dr. Powell explained the inter-relationship of the Arenia with the pre-Caradocian ultra-basic rocks during a long traverse of the **Byne Hill**. After tea Dr. Bluck took us to the coastal end of the complex where chert and black shale are interbedded with lavas and ash visible on the shore and the cliffs behind.

The Joint Meeting with the Edinburgh Society gave us a rare opportunity to visit the **Igneous rocks of the Forth**. Landings were made on the Bass Rock, a phonolite plug and on Fidra, a basalt sill where as much interest was shown in the myriads of nesting sea birds as the spectacular columnar basalts, raised beach benches and natural arches. The I.G.S. fielded a strong team led by Mr. Eden with able assistance from Mrs. Thomson and Mr. Elliot.

Camp Siluria and its environs never fails to excite the interest of the fossil hunters. With Dr. Rolfe as leader the many finds were speedily identified and the merest fragments related to fully developed drawings in the reference literature.

Once again we were fortunate in having Dr. A. L. Harris to lead an excursion in the Upper Dalradian rocks. Several locations in the Highland Border Series were visited including the old slate quarries near **Aberfoyle**.

Mr. W. Tulloch of I.G.S. led the party over the oil shales and limestones of the Lower Carboniferous starting on the foreshore at **Queensferry Bridge**. The sedimentary structures were followed by teschenite and quartz dolerite sills and the excursion ended at Hound Point.

The closing meeting at **Oban**, was blessed with superb weather and a varied and interesting mixture of geology and archaeology. The joint leaders, Mr. G. H. Collins of I.G.S. and Mr. I. Fisher of R.C.A.H.T.S. have worked closely for many years in linking the ancient monuments of Argyll with sources of building stone. The presentation of the results of their combined researches on several sites they have studied was much appreciated.

Although support during the latter half could have been better, the season was reasonably successful and once again our thanks are due to the leaders whose time and effort was so freely given in leading the various excursions.

A. G. Edwards.

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