
Proceedings of the Geological Society of Glasgow

Sessions 113 and 114

Published 1974

PUBLICATIONS

During the sessions the second two parts of volume 6, all four parts of volume 7 and two parts of volume 8 of the Scottish Journal of Geology were published and issued to members.

MEMBERSHIP

The membership of the society for sessions 113 and 114 was as follows.

	Session 113	Session 114
Honorary Life Members	4	5
Life Members	6	6
Ordinary Members	295	321
Associate Members	6	7
Junior Members	10	12
Institutional Members	5	6

At the end of Session 113 there were 324 members, since there was one resignation and also the death of one member. By the end of session 114 the membership was up to 352, taking into account the resignation of three members and the death of another two.

OBITUARY NOTICES

Stewart M. K. Henderson (1907-72) was a geologist turned administrator. He removed to Glasgow from Brighton in 1926, when he entered the University to graduate B.Sc. with Honours in Geology in 1930. He was then nominated to the Baxter Demonstratorship, and pursued research on which he obtained the degree of Ph.D. in 1934. His original work was initially in palaeobotany, in the description of plants from the Old Red

Sandstone of Callander; but when he applied himself to interpreting the Ordovician rocks of Girvan he entered a field that allowed him to make substantial advances in sedimentology. His mapping in difficult ground threw light on the sequence in greatly deformed rocks; and his analysis of sedimentary characters notably of the Ardwell Flags enabled him to discern and interpret what would now be called flame-structures, load-casts, slump bedding, convolute bedding, and other signs of high-energy and turbiditic transport, and to recognise a contrast between 'normal' conglomerates and breccias, greywacke conglomerates, and breccias formed by the lubricated slipping and fracturing of sediments in an unstable environment; and he recognised the possibility of a seismic triggering of submarine slides as a cause of some of the structures.

He was diverted from pure research when he was appointed to Kelvingrove as Keeper of Archaeology in 1935. Thereafter he devoted his life to promoting museum affairs in Glasgow. After service in the R.A.F. during the War he became in 1946 Keeper of Natural History at Kelvingrove, and in 1947 Director of the Museum. He succeeded Dr. T. J. Honeyman in 1954 as Director of Museums and Art Galleries for the whole of Glasgow. He finally retired in 1972. The high national esteem in which his organising and administrative ability was held was marked in 1970 by his election as President of the Museums Association.

T. N. George.

William Crawford Campbell (born 1887, died 1972) had a very ordinary education at the old City School which stood on ground now occupied by the University of Strathclyde. He was employed for 50 years as a clerk in a mining firm in Glasgow, except for four and a half years of the Great War in which he served throughout and was present on the outpost line on Armistice morning as a Company Sergeant Major of Infantry.

His interests were in the general principles and wider fields of geology which he regarded as his chief cultural subject. He accompanied Extra Mural Study Tours to Palestine, Greece, Oberammergau, Dublin, Durham and Ely. Mr. Campbell was a member of the Andersonian Naturalists and the Royal Philosophical Society. He never tired of praising Dr. Tyrell, who he said did not so much teach him geology as educate him.

Mr. Campbell had an intimate knowledge of bygone Glasgow and could discourse in his own unique fashion on many aspects of Scottish history. He had a fund of stories, humorous and illuminating, of places and personalities, from which he could draw like magic, one apposite to the particular conversation. His pawky humour and innate kindness will be missed by those who knew him well.

D. Jack.

THE SOCIETY LIBRARY

In 1972, only 15 of some 350 members borrowed books from our shelves, so the following paragraphs are intended to bring this useful collection of literature to your attention.

Books and British journals are housed in the Mitchell Library at Charing Cross. Access to our shelves is obtained by signing the Society 'book' at the librarians' desk at the far side of the reading area on the ground floor. You will be directed to the top floor, reached by lift. Our Library consists of two closed ranks of movable, metal, 'back-to-back' shelf units, amid many others; it is clearly identified. Any book may be borrowed, except one of a duplicate 'reference' set, labelled as such. There is no strict limit on the period of loan, but return of books within a few months is regarded as a normal courtesy. Loans should be entered in the appropriate book on a shelf of the unit facing the corridor. On leaving the building, ask the librarians to sign you 'out' of the book.

The contents of the Library are divisible into three groups.

1. Publications of I.G.S.

There is a large stock of Regional Handbooks, Sheet Memoirs and Bulletins, covering the whole of the U.K.

2. Books.

The Library houses about 500 books, old and new, covering a wide range of topics at various levels. The following is a sample:—

- 1822. "Outlines of the geology of England and Wales . . ." W. D. Conybeare and W. Phillips.
- 1836. "Geology and mineralogy". Rev. W. Buckland.
- 1858. "The Old Red Sandstone" (7th edn.) Hugh Miller.
- 1867. "Principles of geology" (2 vols.). Sir Charles Lyell.
- 1871. "Antidote against the unscriptural and unscientific tendency of modern geology . . .". P. M'farlane.
- 1967. "Geology for schools". J. T. Greensmith.
- 1968. "Pleistocene geology and biology". R. G. West.
- 1970. "Geological highlights of the West Country". W. A. Macfadyen.
- 1970. "Mechanism of igneous intrusion." G. Newall and N. Rast (Eds.).
- 1970. "Palaeogeophysics". S. K. Runcorn.

The Society purchases books regularly, and suggested acquisitions are welcome.

3. British journals.

The Society does not take as many journals as it did, so the following list, of journals received regularly at present, does not do justice to our stock of over a thousand volumes.

The Geological Journal; The Geological Magazine; The Journal of the Geological Society of London; The Journal of Petrology, Palaeontology; Proceedings of the Geologists' Association; Proceedings of the Royal Society of Edinburgh; Proceedings of the Yorkshire Geological Society.

Other journals, e.g. The Glasgow Naturalist, arrive sporadically.

Further facilities are offered under the terms of the '1967 Agreement' with Glasgow University Library.

- (a) access to our foreign journals, which are on permanent loan to Glasgow University Library (those volumes bearing the Society's bookplate may be borrowed by members);
- (b) the right to browse through all the geological section of the Glasgow University Library.

Members wishing to avail themselves of these facilities should present themselves at the enquiry desk on the ground floor (up the stairs from the entrance!) of the University Library. The geology section is on Floor 2 (reached by stairs or lift).

In conclusion, may I highlight particular benefits of the Library to members. 'Professional' members may find that the libraries of their institutions either do not possess a particular volume or that it is already on loan — the Society Library is an invaluable reserve. 'Amateur' members have the use of their own Library, and have access to the larger collections of the Glasgow University Library.

The libraries are there to serve you

Jeremy Hall, (Hon. Librarian).

PAPER

FISH AND TRACE FOSSILS FROM THE UPPER OLD RED SANDSTONE OF DUNBARTONSHIRE.

by P. Aspen.

The red sandstones that outcrop to the west and north of Dumbarton have been classified, on lithological and structural evidence alone, as being of Upper Old Red Sandstone age (Bailey 1925). Fossils have been found which confirm this age.

The fossils consist of **Bothriolepis** plates and the scales of **Holoptychius** (identified by Dr. S. M. Andrews), all of which

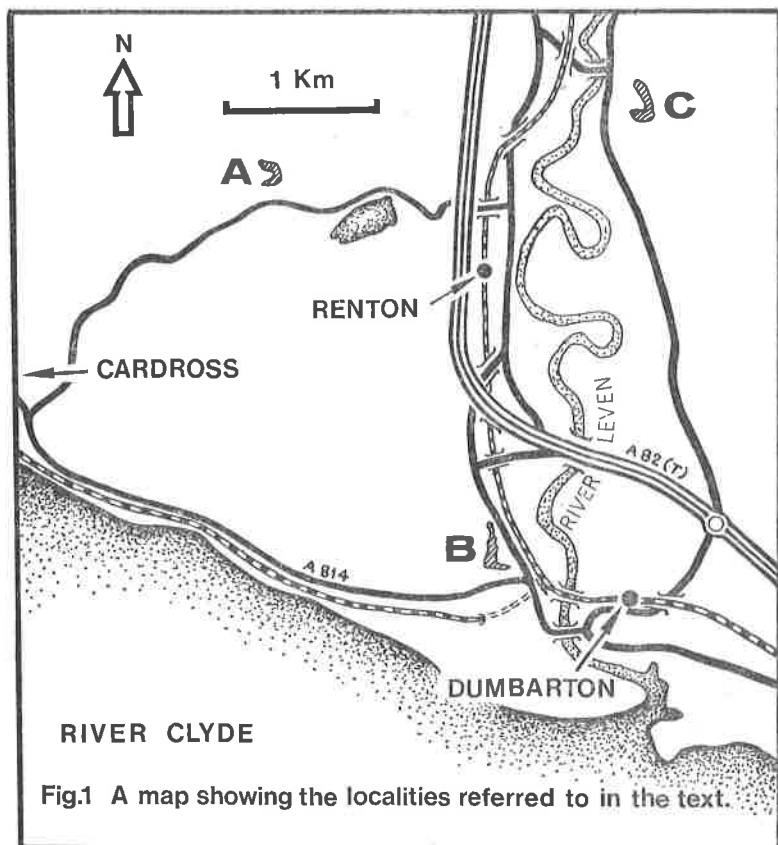


Fig.1 A map showing the localities referred to in the text.

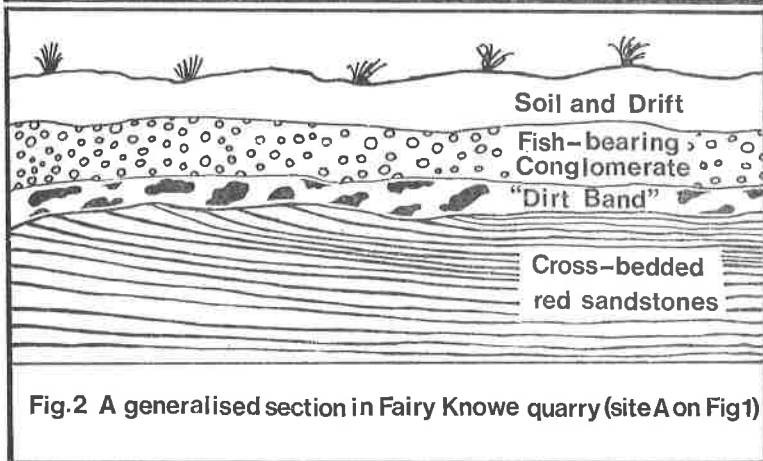


Fig.2 A generalised section in Fairy Knowe quarry (site A on Fig1)

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are disarticulated and worn. They occur in a red conglomerate 0.5 m. thick that overlies an impersistent dirt band and 2 m. of evenly bedded pale red sandstone, all of which dip 5° SE in Fairy Knowe Quarry, (A on Fig 1) 1930 m. WNW of Renton Station at NS 369789. The only other record of U.ORS fish in the western part of the Midland Valley comes from the Heads of Ayr (Miles 1968).

Trace fossils in the sandstones of Fairy Knowe Quarry consist of cylindrical pipes about 10 m.m. in diameter that cut across the sedimentary structures at right angles to the bedding planes. On bedding-plane surfaces the pipes end in domed tops, while below the discoloured sandstone of the pipes gradually merges with the surrounding red sandstones after 50 - 100 m.m. It is suggested that these trace fossils closely resemble the ichnogenus *Skolithos* of Haldeman (Hantzschel 1962) and also that the red sandstones may be partly marine in origin (Chisholm and Dean 1974).

Another type of trace fossil, found in Dalreoch Quarry at NS 288761 (B on Fig. 1) and Bonhill Quarry at NS 398797 (C on Fig. 1) consists of rope-like castings, 10-15 m.m. in diameter and several hundreds of millimeters long. The castings penetrate the bedding-planes in an irregular manner and are associated with extensive discolouration of the surrounding sediments, a habit consistent with that of the ichnogenus *Planolites* of Nicholson (Hantzschel 1962).

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SOCIETY MEETINGS (Session 113)

Held in the Geology Department, The University, Glasgow.

8th October, 1970

Mr. M. E. Badley, B.Sc., Miss M. Campbell, Mr. D. S. Henderson, Mrs. E. A. Inglis, Mr. M. McMillan, Mr. M. H. Smith, B.Sc., and Mrs. M. Sword, were elected as ordinary members of the Society. Miss P. Allison, Miss F. Lawson and Miss F. Sword as junior members.

Professor W. J. McCallien, University of the Gold Coast (Ghana) delivered a lecture entitled 'Some illustrations of Ghanaian rock structures'.

Sedimentary structures occur in Upper Palaeozoic rocks outcropping at intervals along the coast of Ghana from Accra westwards to beyond Takoradi. These varied and abundant structures were formed during and immediately after the accumulation of sediments in the shallow waters of the ancient seaway that separated the coast of the Gulf of Guinea from the shore of South America more than 300 million years ago. They occur essentially in sandstones and shales and point to a time when the sea floor of the region seems to have been very unstable and probably affected by earthquakes.

12th November, 1970 (Annual General Meeting)

Mr. W. A. Adam, Miss I. M. Allan, Mr. G. T. Bertram, Mr. D. R. Christison, Mr. R. L. Colquhoun, Mr. R. W. Cooper, Mr. D. A. Cumming, Mr. J. W. Fleming, Mr. D. S. France, B.Sc., Mr. G. R. Gardner, Mr. J. H. McInnes, Mr. J. G. Mackenzie, Mr. D. J. Millar, Mr. D. J. Morton, Miss S. Prickett, Mr. B. G. Purser, F.G.S., F.R.G.S., Mr. M. J. Russell, B.Sc., Mr. B. Seenan, Mr. I. R. Vann, Mr. R. M. White and Mr. P. Whitley were elected as ordinary members of the Society. Mr. J. Thomson was elected as a junior member.

The following office-bearers were elected:

Vice-Presidents:	Dr. A. G. McLean and Dr. N. Holgate
Members of Council:	Mr. P. Aspen, Dr. B. J. Bluck Mr. W. R. Flett and Mr. A. A. Percy.
Honorary Auditors:	Mr. D. Jack and Mr. J. A. Carrick.
Editorial Committee:	Professor T. N. George and Dr. N. Holgate.

Dr. A. C. McLean delivered his Presidential Address on 'The western edge of Scotland'.

The geological history and structure of western Scotland can be expected to reflect the origin and development of the adjacent parts of the Atlantic Ocean. Investigations carried out in the 1960's provide evidence of ocean-floor spreading from the Mid-Atlantic Ridge since early Tertiary times. The strip of oceanic crust to the west of the Rockall Plateau is 58 m.y. old and spreading has taken place at 1-2 cm. per year. The Rockall Plateau is composed of continental crust with sedimentary basins and Tertiary igneous centres. The Rockall Trough consists of oceanic crust with a thick cover of sediments but lacks the magnetic strip anomalies of the oceanic areas to the west. It

may be oceanic crust formed during the geomagnetically stable Kiaman Interval (Permian-Triassic) or the remnants of an even older proto-Atlantic.

Tertiary igneous activity at the western edge of Scotland is coincident with the initiation of the Lower Tertiary phase of ocean-floor spreading. It also triggered off further marked subsidence in the southern Irish Sea basin and the easterly tilt of Scotland is also probably related. Deep Mesozoic (?), fault-bounded troughs, found on the Scottish shelf, may have been produced by stresses associated with earlier spreading that formed the Rockall Trough. Their distribution to the south of Scotland, however, suggests that they are not related in a simple direct way to the continental margin but are part of a structure comparable to the Rhine Graben and its northerly continuation, and that it converges at a low angle with the continental edge on the western Scottish shelf. Stresses associated with the developing margin may have triggered off fault movements and igneous activity within an older structural zone. Carboniferous events in S.W. Ayrshire and the Firth of Clyde might, like the early Tertiary events, be associated with initiation of a phase of ocean-floor spreading.

10th DECEMBER, 1970 (Members' Night)

Mrs. J. Barnett, Mr. R. Clayton, Mr. W. R. Craig and Mrs. V. Hamilton were elected as ordinary members of the Society.

Short talks were given by the following members:

Mr. J. Hall: "Geophysical research around Mull".

Mr. J. Jocelyn: "A so-called 'Petriified Melon' in the Hunterian Museum: the origin of geodes".

Dr. J. G. MacDonald: "The Glasgow University Exploration Society's expedition to Finland in 1970".

14th January, 1971

Dr. E. N. K. Clarkson (University of Edinburgh), delivered a lecture entitled 'The visual apparatus of Trilobites — a system of evolution'.

Compound eyes occur in most arthropods but may have evolved independently from simpler systems in several arthropodan groups. Interpretation of the internal structures of trilobite compound eyes is difficult because of non-preservation and diagenesis but many primary structural details remain which can be seen with the scanning electron microscope.

Most trilobites eyes are holochroal; they have many small lenses lying under a common cornea. This type, with many

variations, was retained throughout the geological history of the trilobites. The schizochroal eye, with large separated lenses, is confined to the suborder Phacopina. This bears little resemblance to the eyes of any modern arthropod and there are no known intermediates between it and the holochroal type. Measurements of axial bearings of the large lenses of some phacopids indicates that form perception was not very likely.

Eye reduction occurred in many trilobites, as in present-day arthropods, but this can only rarely be related to the environment. Although remarkably advanced and highly developed organs the eyes of trilobites exhibit a fair degree of phylogenetic conservatism and lacked the evolutionary plasticity of modern arthropod eyes.

18th February, 1971

Professor F. H. Stewart, F.R.S. (University of Edinburgh), delivered a lecture entitled 'Science policy and the national organisation of scientific research (including geology)'.

Professor Stewart outlined the work of the Central Advisory Council which advises the Prime Minister and the Cabinet under the headings organisation, money, and how it is used. All the money is distributed through various bodies for the financing of scientific research. Earth sciences are financed through U.G.C. and the N.E.R.C. The U.G.C. receives block grants and finances 44 universities.

11th March, 1971

Dr. A. H. Stride (National Institute of Oceanography), on 'Changing ideas on continental shelf sediments'.

Difficulty has been experienced in the past in equating studies of continental shelf sediments with rocks from the geological past. Work on the shelf around the British Isles has revealed many drowned glacial deposits but has also shown that much of this sediment is being shifted by tidal movements. A variety of sediments occur according to the conditions such as the strength of currents and the effects of headlands, shoals and the edge of the continental shelf. The variability is now better understood and will provide good models for recognising similar conditions which have led to such deposits in earlier seas.

13th May, 1971

Special general meeting for purpose of ratifying the proposed constitution. A motion proposing adoption of the proposals was carried unanimously. This was followed immediately by an ordinary meeting.

Professor W. J. McCallien, D.Sc., F.R.S.E., was elected an Honorary member of the Society.

New ordinary members: — Jean M. Cameron, L.R.I.C., Roy Cotterhill, Anthony C. L. Rennie, LL.B., George R. Thomson.

Brief talks were given by leaders of two of the Society's forthcoming summer excursion leaders.

Lugton and Trearne	Dr. J. D. Lawson
Ardnamurchan	Dr. C. D. Gribble

Excursions 1971 (Session 113)

3rd April—Inchcailloch. **Leader:** Dr. B. J. Bluck.

24th April—Killoeter and Ben Bowie. **Leader:** Dr. J. G. Macdonald.

8th May—Innellan to Loch Fyne. **Leader:** Mr. D. France

22nd-24th May—Montrose. **Leaders:** Dr. M. Armstrong and Mr. I. B. Paterson.

12th June—Jedburgh (Joint Excursion with Edinburgh Geol. Soc.). **Leader:** Dr. C. D. Waterston.

26th June—Paisley Area. **Leader:** Dr. J. Hamilton.

5th-9th July—Ardnamurchan. **Leader:** Dr. C. D. Gribble.

24th July—Lugton and Trearne. **Leader:** Dr. J. D. Lawson.

11th Sept.—Corrieburn. **Leader:** Dr. G. E. Bowes.

SOCIETY MEETINGS (Session 114)

14th October, 1971

Mr. David Beavis was elected as an ordinary member of the Society.

Dr. Gordon Biggar (University of Edinburgh) delivered a lecture entitled 'Lunar geology and experimental petrology'.

The scale of major lunar surface features was related to familiar features on the earth e.g., some of the mare are smaller, some bigger than Ireland. The impact origin of the lunar basins resulted in the formation of complex breccias. The lava lakes filling the basins were later events.

Experiments left on the surface by astronauts still record information on the earth's polar wobble (and related earthquakes), continental drift on the earth, the lunar atmosphere, solar wind, meteorite impacts on the moon, moonquakes and on lunar heat flow.

Mare-type basalts are the most clearly identifiable rock types. Texturally, plagioclase, olivine, pyroxene and titaniferous

ores have crystallised together and experimental evidence at one atmosphere demonstrates that all commence to crystallize within about 20 C°. Chemically they are characterised by low Na₂O, high TiO₂ (up to 12%) and a reduced state such that all the iron is ferrous and chromium is substantially chromous. These rocks are interpreted as the last few percent of liquid left near the top of a lava lake after 80 or 90% had crystallized. The low level of sodium and other volatile elements is due to volatilization into the near-vacuum above the moon.

A second suite of rocks contains anorthosites, gabbroic anorthosites, anorthositic gabbros and norite (all with low levels of volatile elements). These rocks do not have compositions corresponding to known liquids. Addition of Na₂O and H₂O to replace the amount lost by volatilization, and the application of slight pressure, does result in compositions from which plagioclase, olivine and pyroxene crystallize at much the same temperature. The origin of these rocks is not yet clear.

11th November, 1971 (Annual General Meeting)

Messrs. J. R. Cook, S. W. MacDonald, M.A., J. L. Neaves, R. B. Probert, Mrs. A. Rodger, D.A. and Mr. J. A. Sutherland were elected as ordinary members of the Society, and Mr. P. M. MacDonald as a junior member.

The following office-bearers were elected.

Vice-President:	Dr. W. D. I. Rolfe
Librarian:	Dr. W. C. Allan
Publications Sales Officer:	Dr. D. F. B. Palframan
Editor of Society's Proceedings:	Dr. J. G. MacDonald
Excursion Secretary:	Mr. A. G. Edwards
Honorary Treasurer:	Mr. R. Powell
Honorary Auditors:	Mr. J. A. Carrick and Mr. D. Jack

The film 'Du Pelvoux au Viso' on the structure of the Western Alps was shown after an introduction by Dr. A. C. McLean.

9th December, 1971 (Members' Night)

Mrs. E. H. Black and Mrs. H. M. Simpson, B.Sc., D. M. Bertie and R. M. Corbet were elected as ordinary members of the Society. It was proposed and unanimously agreed that Miss E. R. Brock, M.A. should become an Honorary Member of the Society.

The following short papers were read by members:

Mr. J. Jocelyn—"The Burn Anne Pebble".

- Dr. W. G. Jardine—"Kiloran Bay, Colonsay: three dramatic days in the life of a beach".
- Mr. A. Herriot—"Preliminary notes on the dykes of SE Arran". "Preliminary notes on the thermal metamorphic aureole of the Lennoxton 'essexite'".
- Dr. W. D. I. Rolfe—"Rare fossil crustaceans recently collected from Kilmarnock and Whitby by members of the Society".

After the meeting the following exhibits were on display:

- Dr. J. G. MacDonald—"Ignimbrites".
- Mr. P. Aspen—"Fossils from the Cementstone Group and the Old Red Sandstone".
- Dr. W. C. Allan—"Some Czech minerals and moldavites recently obtained by the Hunterian Museum".
- Dr. W. D. I. Rolfe—"Skull of the dinosaur *Triceratops*—a fibreglass replica made in the Royal Scottish Museum. (From the Hunterian Museum)".

13th January, 1972

Mr. S. S. Brown, Mr. P. J. Browne, Mr. W. K. Burns, B.Sc., Professor O. Gates, Ph.D., Mr. N. M. Grant, Mr. H. McFadzen, Miss J. MacLean, Mr. G. Martin and Miss C. Murray were elected as ordinary members of the Society, Mrs. C. M. Cotterhill, B.Sc., as an associate member and Mr. D. Cotterhill and Mr. I. Cotterhill as junior members.

Dr. J. R. L. Allen (University of Reading) delivered a lecture entitled 'Experiments in Sedimentary Geology'.

Experiments are of four kinds according to Medawar. The Baconian or inductive type is a kind of play, since there is no expectation as regards the outcome. It has a haphazard but not unimportant role in geology. The Kantian or deductive experiment is unimportant geologically as it involves an alteration of the premises at the origin of a standardized argument. The Galilean or critical experiment is of great scientific importance since it sets out to provide a test of the logical sequences of an idea of hypothesis. Finally the Aristotelean or demonstrative type of experiment, is designed to increase our faith in an assertion or about some mechanism or process which cannot be studied easily or directly. Demonstrative experiments have exerted a strong influence in sedimentary geology, particularly in the development and wide acceptance of the concept of turbidity currents and in the processes operating in rivers. Critical experiments have also begun to play an important part in recent years,

especially in connection with the relationship between sedimentary structures and flow conditions. Experiments performed with geological problems in mind can deepen our insight into geological processes. Ideally they should be carried out hand in hand with field investigations.

10th February, 1972

Mrs. E. C. Matheson, M.C.S.P., was elected as an ordinary member of the Society and Mr. L. Matheson as an associate member.

Professor Alwyn Williams (Queen's University, Belfast), delivered a lecture entitled 'Aspects of skeletal growth in living and fossil invertebrates'.

Electron microscope studies of the lophophorate group of phyla show basic differences and similarities in the secretion of the skeleton. In all, the first formed layer of the exo-skeleton consists of a chitinous or a protein-chitinous coating (periostracum). This is the only exo-skeleton in the **Phoronida** and ctenostomatous bryozoans. In the remaining bryozoans and in all the articulate brachiopods the periostracum is underlain by a variably developed succession of carbonate crystallites. In both phyla the first formed (primary) layer is invariably composed of carbonate alone secreted as acicular crystallites normal to the periostracum, lenticles, or granules of calcite (or more rarely aragonite in bryozoans only). In some members of both phyla the primary layer is the only mineral shell developed, but in the majority of species it is followed by an equally distinctive secondary layer in which the carbonate units are separated from one another by inter-connected protein sheets. In most articulate brachiopods these carbonate constituents are long fibres with convex inner surfaces, each secreted by one cell. Such keeled fibres are also found in a minority of bryozoans, but in the great majority of living and extinct bryozoans and in the strophomenid brachiopods the secondary layer is composed of plates, tablets or blades (of laminae) which have always grown spirally and exhibit screw dislocation effects.

The study of the ultrastructure of fossils confirms the antiquity of these processes because fibrous and laminar shelled brachiopods are known in the Middle Cambrian, whilst the earliest known bryozoans display a full development of laminar pseudopunctate secondary layer.

9th March, 1972

Dr. Simon Sheppard (Scottish Research Reactor Centre) delivered a lecture entitled 'The origins of hydrothermal fluids; the stable isotope geochemist's approach'.

Hydrogen and oxygen isotope ratios in hydrous minerals and water vary in nature as a result of temperature-dependent exchange processes. The D/H and O_{18}/O_{16} ratios of present-day meteoric groundwaters are related to the isotopic composition of the oceanic reservoir and to their latitude and elevation. Since the oceans have remained essentially constant isotopically back to at least Cretaceous times isotopic variations in meteoric waters can be used as natural tracers in geological systems. In contrast the D/H and O_{18}/O_{16} ratios of hydrous minerals of mantle or deep crustal origin have very restricted ranges which are independent of elevation and latitude. Avoiding these regions where the isotopic ratios of deep-seated and meteoric waters overlap, we can distinguish between hydrothermal waters of deep-circulating meteoric origin and those of deep-seated or magmatic origin. Using examples from the porphyry copper deposits of the western U.S.A., waters of magmatic-hydrothermal origin were shown to be responsible for the earliest and highest-temperature alteration assemblages (K-silicate) and meteoric-hydrothermal fluids were dominant during the lower temperature sericitic and argillic alteration processes. Isotopic evidence was also presented for the large-scale interaction of heated meteoric ground waters with shallow igneous intrusions such as those on Skye.

Excursions 1972 (Session 114)

- 22nd April**—Pentlands, N. Esk Inlier. **Leader:** Dr. E. N. K. Clarkson.
- 6th May**—Ben Udlandh, Glen Orchy. **Leader:** Dr. P. R. Thomas
- 27th-29th May**—Ballachulish. **Leader:** Dr. D. R. Bowes.
- 3rd June**—Heads of Ayr (Joint Excursion with Edinburgh Geol. Soc.). **Leader:** Dr. F. Whyte.
- 10th June**—Keltie Water. **Leader:** Mr. A. Wilson.
- 8th July**—Craigmaddie Sandstone. **Leader:** Mr. A. Tait.
- 22nd July**—Loanhead Quarry and Bishopton Area. **Leader:** Dr. J. Hamilton.
- 16th Sept.**—Drymen and Rowardennan. Peat Boring. **Leader:** Dr. J. H. Dickson.

