

Extracts from *Proceedings of the Geological Society of Glasgow*

Session 8 (1865-1866)

Extracts from the Proceedings for 1865-1866 (Session 8)

Meeting held on March 22, 1866

Mr. JAMES FARIE, the Secretary, exhibited a specimen of "Wulfenite," or Molybdate of Lead, from the Lochantyre mine, near Gatehouse, Kirkcudbrightshire, a mineral which he believed to be hitherto unknown in Britain. Mr. Farie exhibited also, from the same mine, a specimen of Vanadate of Copper, new to Britain, and stated in recent works, such as Bristow's and Dana's, to be found only in the Urals.

The SECRETARY read a communication from Mr. James Croll "On the reason why the Change of Climate in Canada since the Glacial Epoch has been less complete than in Scotland". (*This paper can be seen [here](#).*)

In the Proceedings for the year 1866-1867 (Session 9) it was recorded that, at the meeting of February 7 1867, James Croll was elected an honorary associate.

Session 9 (1866-1867)

Extracts from the Proceedings for 1866-1867 (Session 9)

Meeting held on February 7, 1867

It was remitted to the Chairman and the Secretary to draw up a minute expressive of the great loss which the Society had sustained by the death of the late President, James Smith, Esq., of Jordanhill; and of the value of his scientific labours in the science of Geology, that it might be recorded in the Society's Minute-book; and that the Secretary should transmit a copy of it to Archibald Smith, Esq., of Jordanhill, son of the late President.

The CHAIRMAN delivered an Address on the scientific labours of the late President of the Society, James Smith, Esq., of Jordanhill. (*The text of this address can be read [here](#).*) *It is interesting to note that the minutes of the meeting on February 7, 1867 also record that it was on that date that James Croll was elected an honorary associate of the Society. The minutes of the meeting which took place just over two months later, on April 18, 1867, record that the following was one of the papers read:*

On the change in the Obliquity of the Ecliptic; its influence on the Climate of the Polar Regions and Level of the sea. By Mr. James Croll. The reading of this long and valuable communication was followed by some observations by the President and the Rev. H. W. Crosskey. (*The President referred to was Dr. John Young, Professor of Natural History at Glasgow University, who was elected on March 7, 1867 following the death in January 1867 of James Smith. More information about James Croll can be found [here](#) and his paper can be read [here](#).*)

Session 10 (1867-1868)

Extracts from the Proceedings for 1867-68 (Session 10)

Annual General Meeting held on October 3, 1867

The Secretary read a report on the state and progress of the Society for the past year, which showed that the members on the roll were, for 1867, 233— a satisfactory increase over the preceding year. The library had been largely increased by exchanges with Foreign and British societies; and, among other donations, Archibald Smith, Esq., of Jordanhill, had, with great liberality, presented the Society with one hundred volumes of geological works from the library of his late father, sometime President of the Society.

Meeting held on October 31, 1867

The PRESIDENT [Dr. John Young] paid a high tribute to his predecessor in office, the late Mr James Smith, of Jordanhill, and expressed his gratification at the erection of the Geological Survey of Scotland into a separate branch, under the directorship of one so competent as Mr Archibald Geikie.

[James Smith of Jordanhill](#) was President of the Geological Society of Glasgow from 1864 until his death (aged 84) in January 1867. A link to the account given to the Society by Rev. Henry W. Crosskey of James Smith's remarkable life can be found in the entry for Session 9 in the [extracts from the Proceedings for previous anniversary years](#).

Meeting held on February 6, 1868

Mr. J. WALLACE YOUNG exhibited sections of pitchstone from Arran by means of the microscope. Pitchstone to the unaided eye appears like a piece of bottle glass, but when sections are examined under the microscope beautiful needle-shaped crystals of pyroxene are observed in a colourless felspathic base.

Mr. JOHN SMITH exhibited a remarkably well-preserved crinoid from the carboniferous limestone, Beith. The specimen, evidently belonging to the genus *Phodocrinus*, showed the stem, calyx, and fingers all in position, a state of preservation in which crinoids are very rarely obtained in the carboniferous limestones of Scotland.

John Smith (1845-1930) was an active member of the Geological Society of Glasgow for 65 years. He devoted much of his life to the study of the geology, natural history and archaeology of Ayrshire. An account of the life of John Smith, written by Dr. Murray Macgregor, can be found [here](#).

Meeting held on February 27, 1868

Sir WILLIAM THOMSON, D.C.L., read a paper on "Geological Time". (*This paper can be seen [here](#).*)

Meeting held on March 28, 1868

ARCHIBALD GEIKIE, Esq., Director of the Geological Survey of Scotland, read a paper on "Modern Denudation". (*This paper can be seen [here](#).*)

[There followed] an animated discussion, in which Sir William Thomson, Professor Allen Thomson, Mr. John Young and the President took part, after which the Society adjourned till April 2nd.

Session 33 (1890-1891)

Extract from the Proceedings for 1890-1891 (Session 33)

Meeting held on January 16, 1891

Mr. JOSEPH SOMMERVILLE called attention to the death of a distinguished Honorary Associate of the Society, Mr. James Croll, LL.D., and paid a feeling tribute to the memory of the deceased gentleman. The Chairman said the members of the Society owed it as a duty to themselves, and to the memory of the deceased member, to adopt such a motion as that shadowed forth by Mr. Somerville. Dr. Croll had done much special and original work which was not yet fully recognised and acknowledged as it ought to be by the world of science. Mr. John Young, F.G.S., corroborated the Chairman's remarks and spoke of Dr. Croll's early association with Glasgow, and his first connection with the Society. The Chairman then moved, and Mr. Dugald Bell seconded, a motion that an expression of deep regret at the decease of Dr. Croll should be recorded in the Society's minutes, from which an extract should be forwarded to Mrs. Croll.

Session 34 (1891-1892)

Extracts from the Proceedings for 1891-92 (Session 34)

Meeting held on January 14, 1892

The HON. SECRETARY said that the Council had agreed that, subject to the approval of the members, a letter of congratulation to Sir William Thomson, President of the Society, on his accession to the peerage [under the title of Baron Kelvin], should be sent, and moved accordingly. The motion was unanimously agreed to.

A motion to devote £8 from the funds towards the purchase of books for the Library was made by Mr. James Thomson, F.G.S. Mr. John Wight, C.A., Hon. Treasurer, seconded, upon the condition that the expenditure should, if possible, be restricted to £5, and, with this alteration, the motion was agreed to.

Meeting held on February 11, 1892

Mr. JOHN MAIN, F.G.S., exhibited, by the oxy-hydrogen lantern, an extensive series of Photographs of the Moon's Surface, showing numerous evidences of Volcanic Action on a large scale, and also other views of corresponding terrestrial appearances. An interesting discussion followed, being taken part in by the Chairman (Mr. Young), Drs. Ross and Sloan, Messrs. Dunlop, Somerville, and other members.

Meeting held on April 14, 1892

Mr. M. BLAIR exhibited specimens from two large boulders near King's Cross, Arran. He remarked that the erratic blocks in this neighbourhood are very numerous, but are nearly all local, being traceable to Goatfell, 10 miles north, from which they must have crossed two deep valleys and a ridge. The two large blocks referred to are totally different from any Arran rock. From a description given by Professor Judd, in a paper on "The Secondary Rocks of Scotland" in the *Quart. Jour. Geol. Soc.*, of certain beds in the Island of Raasay, Mr. Blair thought that the rock might be found there *in situ*, and he had brought up the specimens in the hope that some of the members might be able to identify them. Prof. Judd's description is as follows:—"Conglomerates (formed of rounded or sub-angular fragments of white or purple quartzite, of Torridon sandstone, and of compact or sub-crystalline limestone) alternating with irregular lenticular beds of coarse micaceous sandstone, into which the conglomerates

insensibly graduate.” The CHAIRMAN said he would endeavour, through the good offices of the schoolmaster in Raasay, to obtain specimens of the rock *in situ*, so that they might be compared with these Arran boulders.

Session 58 (1915-1916)

During 1916, two papers were presented on the controversial topic of The Auld Wives' Lifts, a sandstone feature situated north of Glasgow; an excursion to the site also took place. The archive shows that the debate about The Auld Wives' Lifts continued within the society beyond 1916.

Extracts from the Proceedings for 1915-1916 (Session 58)

Meeting held on May 11, 1916

Mr. MACNAIR exhibited a series of specimens got from the ancient bed of the Clyde in the course of digging the foundations of the new Dalrnock Power Station. The specimens consisted of hazel nuts, twigs, and timber, and the epidermis of pearl mussels. The pearl mussels had lost all trace of the calcareous shell, through the action of percolating water, and only the chitinous epidermis remained, resembling dead leaves in brittleness and form. Mr. Macnair pointed out that the occurrence of such relics had been recorded about half a century ago in proximity to the present course of the Clyde, and there could be no doubt that they came from the same bed, which also contained human relics in the shape of dug out canoes.

Professor J. W. GREGORY then read a paper on " The Auld Wives' Lifts: a Pseudo-Megalithic Tor." [1] He described the position of the well-known stones and referred to the traditional explanation of their origin, which ascribes them to a trial of strength between three witches of the district. For long the stones had been regarded as an example of a cromlech erected by the race which has dotted the country with megalithic structures. Careful examination, however, had shown that the group is purely the result of natural processes of denudation isolating a portion of the gritty sandstone of the district which had been dismembered, and the fragments thrown into their present attitude by slipping along joints and bedding-planes. It was shown that this could be proved by the fact of the existence, on the lines of fracture, of prominences corresponding with hollows on the opposite block.

Mr. LUDOVIC M'L. MANN pointed out that although the erection of the blocks could not be ascribed to man and the structure differed in some respects from the typical cromlech, there could be no doubt that it had been adopted by the early inhabitants of the district. He believed that the upper surface of the capstone had been levelled by the prehistoric process of "knapping," and had then been sculptured, the traces being quite evident to the trained eye. Other evidence also showed that the district had been one of special interest to the early inhabitants, and was now of importance to the archaeologist.

1. Scot. Geog. Mag., vol. xxxii., pp. 279-82, 1916. (This paper can be seen [here](#).)

The second paper on the The Auld Wives' Lifts was presented at the December 1916 meeting of the society (during Session 59) by James Neilson, a council member. This paper was discussed at the February 1917 meeting and, as late as 1920, James Stark (another council member) published a paper which took the discussion further. Both of these papers were published in "Transactions of the Geological Society of Glasgow". (Details of how to access the Transactions can be found [here](#).)

Excursions in 1916

To the Geological Department of the University and the Hunterian Museum on Saturday, 18th March. The party was conducted through the Museum by Professor J. W. Gregory and Mr. W. R. Smellie, and numerous interesting specimens, including the type-specimen of *Apractocleidus teretipes*, were exhibited. The Laboratory of the Geological Department was also visited, and the methods of slide-making and the uses of various instruments such as the Goniometer, the Sclerometer, the Westphal Balance and so forth were demonstrated.

To Dalry, on Saturday, 15th April—Mr. G. V. Wilson, conductor. The volcanic neck near Holmbyre was examined. The material of the neck is a dark grey ash containing abundant crystals of biotite, fragments of various types of basalts and specimens of *Euphemus* and brachiopods such as *Productus*. The sections of the Upper and Lower Limestones on the Caaf Water were also visited.

To the Kames of Carstairs, on Monday, 24th April (Spring Holiday)—Professor J. W. Gregory, conductor. The party proceeded from Cleghorn to Stonebyres, where the pre-glacial valley of the Mouse Water was indicated, and then walked along the Kames to Carstairs. Sections, showing fluvio-glacial gravel and sand, were examined and the super position of the Kames on the boulder clay was pointed out.

To Bridge of Weir, on Saturday, 13th May—Mr. H. R. J. Conacher, conductor. The general structure of the district was explained by the leader, and then a visit was paid to a glacial pit north-east of the station, where Mr. Ludovic Mann discussed the probable origin of the gravels and their points of archaeological interest. The sections of volcanic rocks of Calciferous Sandstone age and the sediments of the Lower Limestone series, exposed in the Gryfe as far down as Crosslee, were afterwards examined and their leading features indicated.

To Dunfermline, on 23rd May (King's Birthday)—Messrs. R. Dunlop and P. Macnair, conductors. The party proceeded from Dunfermline Station to Woodmill for the purpose of examining the outcrop of highly fossiliferous shales which have been described by Mr. Dunlop (*Transactions*, vol. xv., p. 167, 1915). The party then visited the fine section in the Lower Limestone series exposed at Charleston and Mr. Macnair explained his correlation of the different strata with the Hurllet sequence in the West of Scotland.

To Gourock, on Saturday, 3rd June—Messrs. P. A. Leitch and J. L. Begg, conductors. Craigmushet Quarry was first visited and the keratophyric rocks noted, a number of minerals, including fluorspar, barytes, quartz, and tourmaline, being collected from the geodes. The section westwards along the shore, comprising Calciferous Sandstone sediments and Old Red Sandstone conglomerate, was then examined. Two volcanic necks near the Cloch were pointed out and also a fresh basalt of the Markle type in the quarry north of Lunderston Bay.

To the White Loch, on Saturday, 27th June—Dr. A. Scott, conductor. The dependence of the topography of the district on the underlying rocks was first indicated and then the party traversed the sequence of Calciferous Sandstone lavas from Patterton to the White Loch. The volcanic rocks seen included basalts of various types as well as more acid mugearitic and trachytic rocks. The basaltic plug of Duncarnock was examined and also the series of lavas south-east of Neilston.

To the Auld Wives' Lifts, on Saturday, 14th October—Professor J. W. Gregory, conductor. The party proceeded from Milngavie to the Auld Wives' Lifts, where Professor Gregory pointed out the evidence in favour of the view that the "tor" had been formed by the weathering, *in situ*, of a block of the local sandstone.

Session 59 (1916-1917)

Extracts from the Proceedings for 1916-1917 (Session 59)

Meeting held on February 1, 1917

For the background to the following extract, see the entry for Session 58.

The discussion of Mr. J. Neilson's paper on "The Auld Wives' Lifts" was continued. Prof. J. W. GREGORY pointed out that the structure shows a much greater resemblance to a tor than to a cromlech. He admitted the glacial moulding of the surrounding surface, but held that the amphitheatre was pre-glacial, as the direction of its drainage was across that of the ice. Mr. J. RENWICK maintained that the "Lifts" could not be classed as a dolmen, as the latter were erected for use as burial places and had much larger chambers. Similarly it could not be likened to a menhir, as the top stone could not be raised in the way the latter are supposed to have been erected. While the legends and superstitions show that the trilith had been used for religious purposes, it probably originated through the action of frost in the joint planes of the local sandstone. The absence of other blocks in the immediate neighbourhood is probably due to their use in building dykes, as there is good reason to believe that a very large block near the "Lifts" was broken up for this purpose a number of years ago.

Mr. NEILSON agreed that the hollow was natural, but objected to a pre-glacial origin for it, as a tor would certainly have been swept away completely during glacial times. The stones themselves are not glacial, and were erected by human agencies. With regard to Mr. Macnair's suggestion that the problem of its origin might be settled by excavations, in order to determine whether the rock surface on which the trilith rests was glaciated or not, he did not think that this was necessary, as it seemed a fair inference that the glaciated nature of the surrounding rock surfaces extended to that underlying the "Lifts."

Meeting held on April 12, 1917

Mr. G. V. WILSON read a paper entitled, "Notes on the Geology of Mull." A brief description of the structure of the island was given, and the distribution of the Pre-Kainozoic rocks pointed out. In Kainozoic times a great sequence of lava flows was poured out; in the north and west areas these are fresh olivine basalts, but in the south-east, within a circle passing through Salen, Craigmure, and Lochbuie, the basalts are much altered and baked. Within a smaller circle round the head of Glenmore lavas of the pillowform variety are also found. These are thought to have been deposited in the caldera of an old volcano. A few interbedded sediments occur sporadically through the whole lava series, and these include the famous plant-bed of Ardtun. This great series of lava flows has been folded into a set of anticlines and synclines in south and central Mull, but in the west it is flat, and gives rise to a terraced country. Large masses of gabbro and granophyre have also been intruded at various periods, some being probably connected with the folding, and others being definitely later. In central Mull large patches of volcanic breccia occur in the crater of the old volcano. Besides the large intrusive masses, central Mull is riddled with "inclined sheets," having a concentric arrangement, and dipping inwards at an angle of about 50 degrees. Two sets occur with slightly different foci, and the later can be seen cutting through the earlier. Another kind of concentric intrusion, "ring-dykes," is also found; these consist of vertical, circular dykes of gabbro and granophyre, which in some cases occur along fault-lines, good examples being seen near the head of Glenmore. In addition to the intrusions already mentioned, the whole area is cut by a great series of N.-W. and S.-E. basalt dykes, which may be regarded as the last phase of volcanic activity in the island. The paper was illustrated by a large number of lantern slides.

Session 83 (1940-1941)

The archive material for the war years is understandably rather sparse. The talk by Dr M. Macgregor on February 11, 1941 has obvious relevance to the war and the need for resources.

Extracts from the Proceedings for 1940-1941 (Session 83)

Meeting held on February 11, 1941

The President intimated that the Murchison Medal of the London Geological Society had been awarded to Dr. M. Macgregor and the Murchison Fund to Dr. J. Weir.

Dr. M. Macgregor gave an address on "The Ironstone Resources of Scotland." He pointed out that these had been fully investigated by the Geological Survey during the last war and were dealt with in volume XI of the series of *Special Reports on the Mineral Resources of Great Britain*. This volume, "The Iron Ores of Scotland," was published in 1920. Since then further research on potential resources had been carried out and was being prosecuted at the present time. The lecturer outlined the results so far obtained and gave an account of the mode of occurrence of the different types of iron ore found in Scotland, under the headings of sulphides, oxides, silicates and carbonates.

Session 84 (1941-1942)

Extracts from the Proceedings for 1941-1942 (Session 84)

Meeting held on October 11, 1941

This meeting was held in the Geological Department of the University and at its close members present were the guests of Professor and Mrs. Trueman at tea. (*Professor Arthur E. Trueman was the retiring president of the society.*)

The meeting was devoted to a series of exhibits and demonstrations arranged by various members: (a) wooden implements from old coal-workings near Law village, by Dr. M. Macgregor; (b) a map illustrating transcurrent faulting in oil-shale workings near Uphall, by Dr. W. Q. Kennedy; (c) coal with oil films, by Mr. H. H. Roderick; (d) natrolite and pectolite from Orrock Quarry, by Miss E. Melville; (e) a Lower Devonian trilobite with the rostral plate in position, by Mr. J. L. Begg; (f) ammonites from Morvern, by Miss R. M. MacLennan; (g) slides showing shell structure, by Professor A. E. Trueman; (h) cellulose peel sections of ammonites, by Dr. E. D. Currie; (i) minerals from the U.S.S.R., by Dr. G. W. Tyrrell; and (j) a series of photographs, by Dr. D. Leith.

Meeting held on November 8, 1941

A paper by Dr. M. Macgregor entitled "A Notice of John Smith," was read by title and Mr. Colin Leitch, B.Sc. then delivered an address on 'Roumanian Oil-fields,' in which he outlined the history of the Roumanian oil industry from 1918 up to the present time. (*The paper on John Smith can be found [here](#).*)

John Smith devoted much of his life to the study of the geology, natural history and archaeology of Ayrshire, where most of his life was spent. He was an active member of the Geological Society of Glasgow from 1865 until shortly before his death in 1930.

Session 108 (1965-1966)

Extract from the Proceedings for 1965-1966 (Session 108)

Meeting held on February 10, 1966

The President expressed the regret felt in the Society over the death of Dr. Murray Macgregor and the Society's gratitude to him, particularly for his work on the Transactions and, latterly, the Arran Guide.

Murray Macgregor (1884-1966) joined the Geological Survey in 1909. Throughout most of his life thereafter, he was involved in the survey of coal, ironstone, oil-shale, limestone, and of many other resources that were essential to the Scottish economy, especially during the two world wars and their aftermath; in particular, his work made a significant contribution to the development of the coal-mining industry. He is also celebrated for his work on the Carboniferous stratigraphy of Scotland.

His association with the Geological Society of Glasgow spanned 55 years; he was President of the society from 1926-29, and he was editor of the Transactions from 1937-58.

To the wider public, his name is well known through the 1965 "Excursion guide to the geology of Arran", of which he was the author.

Murray Macgregor's obituary was published in the Proceedings of the Geological Society of Glasgow for Session 108. It can be found [here](#).

Session 109 (1966-1967)

Extract from the Proceedings for 1966-1967 (Session 109)

Meeting held on March 9, 1967

The following papers were read by members:

'A temporary exposure in Quaternary sediments at Renfrew' by Mr. P. Aspen and Dr. W. G. Jardine. (*This paper can be seen [here](#).*)

'Arthropleura – a giant "centipede" from the Coal Measures' by Dr. W. D. Ian Rolfe (*Scott. J. Geol.* 3: 118-24).

'The explosion-breccia pipes near Kentallan' by Dr. D. R. Bowes (*Trans. R. Soc. Edinb.* 67: 109-43).

Meeting held on September 7, 1967 (Extraordinary Meeting)

Dr. Patterson ([Edward M. Patterson](#), *the society's president*) opened the meeting to a general discussion on the financial position of the society and the necessity for raising the subscription. Two main points emerged from this discussion. The first was a request for a widening of the qualification of Associate Membership, the second was for consideration to be given to any Member whose circumstances may warrant a reduced subscription.

The proposal to increase the subscription to £3 per annum was carried.

The previous subscription, held since 1960, was 30/- (£1.50), and so the new amount represented a 100% increase. Prior to the meeting, Dr Patterson sent a letter to all members giving a detailed justification for the increase. This letter, which contains a fascinating account of the society's subscription history and its financial situation in 1967, can be seen [here](#).

Session 133 (1990-1991)

Extract from the Proceedings for 1990-1991 (Session 133)

The annual **Members' Night** was held on 14 February 1991. The following illustrated talks were presented:—

Mr. A. Herriot – Refractometry for Beginners;

Dr. J.G. Todd – The Costa Del Clyde, 9000 B.C.;

Miss. R. McGill – North Island, New Zealand, a Geothermal Tour;

Miss. L. Ferguson – A Geologist in China;

Mr. A. McKelvie – The Hidden Depths of Kloof Gold Mine, R.S.A.;

Dr. T. Fallick – The Scottish Universities Isotope Geology Unit: what is it, and what does it do?, and

Dr. C. Burton – Jellyfish and other Monsters from Trearne Quarry.

Both before and after the talks, members had the opportunity to view the following exhibits in the laboratory beside the lecture theatre:—

A. Herriot – Refractometry - try for yourself;

C. Burton & N. Clark – Jellyfish and other Monsters from Trearne;

J.G. Todd – Fossils and Microfossils from the Clyde Beds at Linwood;

D. Hollis – Carboniferous Fossils from the Johnstone By-Pass;

J. Jocelyn – Selected Mineral Specimens and Thunder Eggs;

A. Roberts – L.A. Necker's 'Geological Map of Scotland, 1808';

M. Kennedy – Rocks and Minerals of Aberdeenshire, Part II, and

R. McGill – East Kirkton.

In addition, there were photographs and a video display relating to the Society's field trip of the previous summer to Durham and the north of England.

Session 134 (1991-1992)

Extracts from the Proceedings for 1991-1992 (Session 134)

Meeting held on November 14, 1991

Dr. Michael C. Keen (University of Glasgow) gave his Presidential Address to the Society. He spoke on "Global Events and Sea Level Changes".

The recent geological past has seen dramatic changes in eustatic (global) sea levels caused by the expansion and contraction of the polar ice caps. Whole continental shelves which were recently above sea level have been submerged during the past 10,000 years, giving rise to

some of the earth's most spectacular features such as the Great Barrier Reef of Australia. These eustatic changes are clearly related to climatic change, and study of oceanic cores has shown climatic cycles of varying duration known as Milankovitch Cycles* (20k, 40k, and 100k years). These are increasingly recognised in the geological record as small scale cycles (1-2 Ma). While they are readily explained in the context of a glacial world, such cycles are more difficult to explain in a non-glacial world such as existed during the Jurassic and Cretaceous. Larger scale cycles, which form the basis of sequence stratigraphy, have a duration of 2-3 million years and are difficult to tie in with climate. Repeated transgressive-regressive events are seen as large scale coarsening-upwards cycles believed to be eustatically controlled. The succession of biofacies can help in their recognition. Not all sea-level changes are of eustatic origin, however. The Messinian salinity crisis of the late Miocene affected the whole of the Mediterranean Basin, but was brought about by geographical changes related to plate movement; the closure of the Straits of Gibraltar brought about the desiccation of the basin, with sea level changes of several thousand metres. Major regressions have had considerable effects on the biosphere, and are considered to be one of the prime influences on faunal turnover. The mass extinctions the Permian/Triassic and Cretaceous/Tertiary boundaries were examined in this light.

**The existence of astronomically-related climatic cycles, in particular the eccentricity (100 ka) and precession (23 ka) cycles, was first proposed by [James Croll](#) in 1857, 60 years before Milutin Milankovitch published his more detailed theory.*

Excursion to East Kirkton Quarry and the Bathgate Hills, September 19 1992 (Leaders Dr. A. J. Hall and Miss R. McGill)

This excursion was planned in relation to the East Kirkton Symposium held in Edinburgh.

The Lower Carboniferous sequence exposed in the quarry and excavated by the Royal Scottish Museum is interpreted as that of a lacustrine deposit with a hot-spring influence within a volcanic terrain. Its fame stems from its unique early terrestrial biota. The Petershill Limestone, rich in marine fossils, was also visited as well as the nearby site of Hilderston silver mine.

More information about the Hilderston silver mine can be found [here](#).