

No. VI.—**The Geological Society of Glasgow: 1858-1958.**

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It is only fitting that the Centenary Volume of our *Transactions* should contain some account, however brief, of the history and activities of the Society during the past hundred years. Fortunately, copies of the comprehensive Jubilee Volume published in 1908 are still available and readers interested will find there a very full history of the first fifty years set out under such subject headings as: Origin and early history; Review of fifty years' work in the various fields of geological research; and Biographical Notices of prominent members. The present paper is intended merely to draw attention to some of the more important aspects of the Society's activities.

The inaugural meeting, held on the 17th of May, 1858, was convened by a small group of enthusiastic amateur geologists who wished to see a separate organisation established which would "unite into a recognised body all the friends and advocates of geological science residing in Glasgow and surrounding districts and would encourage and cultivate geological science generally". It was not the first time that such a project had been envisaged. There is at least one record of a Glasgow Geological Society in 1840, although this would appear to refer to a temporary committee of local geologists set up in connection with the meeting of the British Association held in Glasgow in that year. There was certainly a Glasgow Geological Society in existence from April, 1850 to January, 1851, with James Smith of Jordanhill as Honorary President and with John Craig as President up to October, 1850.

The origin of our Society, like that of similar associations and institutions in the city, may be said to have had its roots in the movement for adult education which followed upon the rapid growth of Glasgow as an industrial and commercial centre during the first half of the nineteenth century, when the population rose from about 77,000 in 1801 to about 329,000 in 1851. This movement derived its initial impetus from the desire of many of the skilled artisans and mechanics to share in the growing

body of general knowledge. Most of these had little or no formal schooling<sup>1</sup> and were eager to take advantage of the facilities offered for further education outside working hours through lecture-courses, discussion-groups and excursions held under the auspices of recognised teaching institutes. A pioneer in this movement was Dr. George Birkbeck (1776-1841), appointed professor of Natural Philosophy in the Andersonian University in 1799, who gave lectures and demonstrations to journeymen and mechanics on subjects relating to their particular crafts. Although Birkbeck left Glasgow in 1805 the influence of his teaching remained and his Mechanics' Class, as it came to be called, continued as a notable and popular feature in the life of the city. In 1823 came the foundation of the Mechanics' Institute, established by members of the Mechanics' Class in a new home in Ferguson Street, Cowcaddens, and with a separate organisation. From being at first largely utilitarian, the movement for adult education soon widened its scope to include lectures and lecture-courses on a variety of subjects falling within the category of general knowledge. Natural History, which then included geology, had its own devotees and in time found a place in the organised courses of instruction provided. It may be recorded, for example, that in 1855 some members of the Mechanics' Institute successfully petitioned the governing body to have a regular lecturer on geology appointed. The lectures given at this time both in the Andersonian University and in the Mechanics' Institute may be said to represent the first serious attempts to provide popular and systematic courses of instruction in the science.

<sup>1</sup> This certainly applied also to many of the members of the Society during its earlier years. Thus John Craig (1796-?1880), whose name occurs several times in these notes, had barely six months schooling before being apprenticed to the weaving industry at the age of seven; in later years he was successively a school-teacher in Shotts and Airdrie, geological surveyor in Glasgow, and lecturer in geology at various Mechanics' Institutes in Lanarkshire. David Robertson (1806-1896) attended school for one year but from the age of eight until he was twenty-four was first a herd laddie and latterly a farm servant. In later years he was associated with H. W. Crosskey in their joint researches on the post-Tertiary fossiliferous beds of the West of Scotland and contributed to the Second and Third Catalogues of Western Scottish fossils. The importance of Robertson's work for the advancement of natural history and geology was recognised by the conferment in 1895 of the honorary degree of LL.D. by Glasgow University. James Thomson (1823-1900), who gained for himself a reputation as an authority on Carboniferous corals, had little or no formal education and from an early age until he was 24 worked long hours as a boot-maker in Kilmarnock before taking up an appointment as commercial traveller in Glasgow.

Another type of organisation which took part in the advancement of adult education is represented by the mutual improvement societies formed by the younger adherents of some of the city churches. It was from one of these that our Geological Society actually stems, namely, the Young Men's Society attached to Free St. Peter's Church.<sup>1</sup> The minutes of this Society record:—

“Within the Session-house on the evening of Friday, 30th April, 1858, was held a special meeting of Free St. Peter's Young Men's Society —— The Chairman having stated his ideas regarding the members forming themselves into sections for the study of ‘natural science’ during the summer recess, and several members having supported them, two sections (botanical and geological) were resolved upon. The organisation of each to be distinct and separate from that of the Society”.

Those members who elected to support the geological section held later meetings on May 5th and 10th and finally, as already stated, the inaugural meeting of the Glasgow Geological Society took place in the vestry-room of Free St. Peter's on the 17th of May.

The newly-formed Geological Society soon attracted to its ranks a growing number of enthusiastic recruits. Whereas less than a dozen attended the inaugural meeting the membership rose to ninety within a year and had increased by 1860 to one hundred and eighty-seven. Among the early difficulties encountered was the finding of a suitable centre where the meetings could be held and where the projected library and museum could be housed. For five years the Society had no central quarters and met, as occasion required, in various buildings throughout the city, including the Athenaeum,<sup>2</sup> the Religious Institution Rooms, the Merchants' Hall in Hutchison Street, and the Mechanics' Institution, then at 38 Bath Street. In May, 1863, it secured accommodation in the Andersonian University<sup>3</sup> in George Street and in 1880 removed to its present quarters in the Royal Philosophical Society's building. No suitable display space for the museum collection of fossils and rocks was available, however, and this material was disposed of in 1899 to Glasgow Corporation and placed in the Kelvingrove Museum of

<sup>1</sup> Situated at 53 Mains Street, now Blythswood Street.

<sup>2</sup> In Ingram Street; founded in 1796 for the purpose of providing assembly and concert rooms.

<sup>3</sup> Founded 1796; in 1877 the name was changed to Anderson's College.

Science and Art. The Library, constantly added to by gifts, by purchase or by exchanges with corresponding Societies at home and abroad, reached in course of time almost unmanageable proportions and is now largely curated and housed in the Mitchell Library.

Eleven field-outings, the first three of them to the Campsie District, were held during the summer of 1858. Since then excursions to places of geological interest have been a regular feature of the Society's activities.

#### PUBLICATIONS

The first publication of the Society was John Young's paper on the "Geology of the Campsie District", issued in 1860. The Jubilee Volume (p. 51) notes that this paper "although headed *Transactions of the Glasgow Geological Society* does not bear any further reference markings, as if the editor was not at all sanguine of having any more *Transactions* to publish". If so he was quickly disillusioned and by 1863 the policy of publishing in Parts and Volumes was established. Archibald Geikie's comprehensive and classic paper "On the Phenomena of the Glacial Drift of Scotland" appeared in that year as Volume I, Part 2, and a revised edition of Young's Campsie paper, issued in 1868, became Volume I, Part 1. It may be noted that between 1860 and 1863 the name of the Society was altered to Geological Society of Glasgow.

A full list of the publications of the Society is given in Table 1 (p. 138). This Table shows that between 1860 and 1958, sixty Parts (23 Volumes) of the *Transactions* have been published, the equivalent of one Part every twenty months. Since 1865 the Minutes of the Society's meetings have formed, under the heading *Proceedings*, an integral portion of the *Transactions*.

TABLE I

Transactions of the Geological Society of Glasgow

Year	Transactions		Pages		Year	Transactions		Pages
1860	(Vol. I)	(Part 1)	5-45	Note 1	1907	Vol. XIII	Part 1	1-132
1863	Vol. I	Part 2	1-190	Note 2	1908		Part 2	133-282
1865	Vol. II	Part 1	1-96		1909		Part 3	283-432
1866		Part 2	97-176		1910	Vol. XIV	Part 1	1-86
1867		Part 3	177-318		1911		Part 2	87-198
1868	Vol. III	Part 1	1-214		1913		Part 3	199-374
1869		Part 2	215-396		1914	Vol. XV	Part 1	1-120
1871		Supplement	1-104	Note 3	1915		Part 2	121-296
1871	Vol. IV	Part 1	1-108		1916		Part 3	297-438
1873		Part 2	109-234		1916	Vol. XVI	Part 1	1-114
1874		Part 3	235-346		1917		Part 2	115-328
1875	Vol. V	Part 1	1-172		1920		Part 3	329-446
1877		Part 2	173-340		1922	Vol. XVII	Part 1	1-168
1879	Vol. VI	Part 1	1-156		1925		Part 2	169-348
1882		Part 2	157-306		1927		Part 3	349-486
1883	Vol. VII	Part 1	1-232		1928	Vol. XVIII	Part 1	1-246
1885		Part 2	233-464		1928		Part 2	247-360
1886	Vol. VIII	Part 1	1-212		1931		Part 3	361-651
1888		Part 2	213-386		1932	Vol. XIX	Part 1	1-224
1891	Vol. IX	Part 1	1-240		1935		Part 2	225-372
1893		Part 2	241-470		1937		Part 3	373-536
1895	Vol. X	Part 1	1-178		1940	Vol. XX	Part 1	1-120
1896		Part 2	179-422		1942		Part 2	121-248
1898	Vol. XI	Part 1	1-152		1945		Part 3	249-364
1898		Supplement	1-134	Note 4	1947	Vol. XXI	Part 1	1-156
1900		Part 2	153-336		1951		Part 2	157-394
1902	Vol. XII	Part 1	1-144		1954		Part 3	395-528
1903		Supplement	1-68	Note 5	1956	Vol. XXII	Part 1	1-112
1905		Part 2	145-272		1957		Part 2	113-204
1906		Part 3	273-424		1958	Vol. XXIII	Centenary Volume	

NOTE 1—"Geology of the Campsie District" by John Young; first published 1860; revised and re-published as Vol. I, Part 1 1868; 3rd edition, largely re-written, 1894.

NOTE 2—"Phenomena of the Glacial Drift of Scotland", by A. Geikie; 2nd edition, 1868.

NOTE 3—"The Carboniferous Fossils of the West of Scotland, their Vertical Range and Distribution", by John Young; with a "General Catalogue of the Fossils and their Mode of Occurrence", by James Armstrong.

NOTE 4—"Glacial Deposits of Ayrshire", by John Smith.

NOTE 5—"Natural History of Scottish Zeolites", by J. G. Goodchild.

Other publications of the Society are:—  
 1873 "Upper Silurian Brachiopods from the Pentland Hills",  
 by Thomas Davidson, F.R.S., F.G.S., Honorary Member  
 Geological Society of Glasgow. 21 pp. 4to, with 3 Plates.

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- 1876 "Catalogue of Western Scottish Fossils", by James Armstrong, John Young and D. Robertson, compiled for the Meeting of the British Association held in Glasgow; incorporates the Supplement to Volume III of the *Transactions* (1871).
- 1904 "The Geology and Palaeontology of the Clyde Drainage Area". Edited by J. B. Murdoch.<sup>1</sup> 169 pp. This volume was a re-issue, with corrections and additions, of the geological and palaeontological portion of the handbook on the "Fauna, Flora and Geology of the Clyde Area", prepared for the meeting of the British Association in Glasgow in 1901.
- 1908 "History of the Geological Society of Glasgow, 1858-1908; with Biographical Notices of Prominent Members". Edited by Peter Macmair and Frederick Mort. 304 pages.
- 1958 Geological Excursion Guide to the Glasgow District. By D. A. Bassett.

#### THE FIRST FIFTY YEARS

From the outset of its career the Society played an important role in providing, first, a forum for discussions and, second, a medium for the publication of papers. This short note on its activities is not the place to attempt a review of the legacy of research in local geology bequeathed to it by workers during the first half of the nineteenth century, although that might well prove an interesting subject to develop. It is partly covered by Sir Archibald Geikie's address on "The Pioneers of Geology in the Glasgow District" given at the Jubilee Meeting of the Society in January, 1909 (vol. 13, 391-408). Certainly much information, although necessarily of a local, general character in the main, regarding the geology of the Glasgow district had already been acquired by the middle of the century. Only a few illustrative examples can be given here. James Smith (1782-1867), by his series of striking researches on the raised shell-bearing Arctic clays of the Clyde estuary between 1836 and 1839,<sup>2</sup> opened a new chapter in the story of the "Drift" deposits of Scotland. It may be recalled that at that time the boulder clay or till covering so much of the lowland areas was generally

<sup>1</sup> There were no less than 20 contributions to this volume.

<sup>2</sup> Smith was President of our Society from 1864-1867. His collected papers were reprinted in 1862 in his book entitled "Researches in Newer Pliocene and Post-Tertiary Geology".

attributed to the result of violent, cataclysmal floods, or, alternatively, to the slower action of marine currents. From 1840 onwards, however, these theories were discarded in favour of the glacial origin of boulder clay as a product of land-ice, although many geologists continued for a time to regard it as due to detritus-bearing, drifting icebergs and ice-rafts. Thus, Archibald Geikie, in the prefatory note to his paper "On the Phenomena of the Glacial Drift of Scotland" was able to write: "In company with nearly every geologist in this country, I was in the habit of regarding the striations on the hills of the opener parts of the country, as for instance in the valley of the Forth, as due to the abrading force of icebergs, by whose operations also the boulder clay was held to have been transported over the surface of the submerged land. ——— It was not until the summer of 1861 that I finally abandoned the attempt to explain the origin of the rock-dressings and the boulder clay by the action of icebergs".<sup>1</sup>

A very considerable body of knowledge regarding the solid geology of Glasgow and the West of Scotland had already been built up by the time our Society came into existence. Glasgow, situated on the western edge of the great Lanarkshire coalfield, offered many opportunities for the study of the Carboniferous rocks, particularly in the numerous quarries and coal-pits that were opened out or sunk throughout the district. John Craig's prize essay "On the Carboniferous Formation of the Lower Ward of Lanarkshire", published in 1839 in the *Transactions of the Highland and Agricultural Society*, may be said to have laid the broad foundations of our knowledge of the stratigraphy and contents of the Carboniferous rocks. The sub-divisions he adopted — Upper Old Red Sandstone series, Upper or Fresh-water Coal series, Lower Coal and Carboniferous Limestone series, Old Red Sandstone series — can be readily correlated with those used to-day. Craig's results were also communicated in 1840 in a paper to Section C at the memorable meeting of the British Association in Glasgow in that year, and it was at the same meeting that Ramsay exhibited his geological model of the Island of Arran. By 1850 John Young of Campsie district fame had become a recognised authority on local geology and

<sup>1</sup> It may be noted that the view that boulder clay was a "true marine sedimentary deposit" was advocated in papers in our *Transactions* as late as 1894 (vol. 10, Part 2, pp. 263 *seq.*).

in 1855, when the British Association next met in Glasgow, was chosen to prepare an exhibit of rocks and fossils characteristic of the district. The exhibit included a series of eurypterids from the Lesmahagow district shown by Robert Slimon. For this meeting also James Bryce (1806-1877) prepared under the title "Geological Notices of the Environs of Glasgow, the Shores of the Clyde, and the Isle of Arran" a short guide for the use of the visiting geologists. This little book, greatly expanded, was re-issued in 1859 as "Geology of Clydesdale and Arran".<sup>1</sup>

With this general background of research it is not surprising to find that the members of the newly-formed Society were specially attracted to the study of the Glacial and post-Glacial deposits and of the Carboniferous rocks, more especially from the palaeontological aspect. The pioneer work of James Smith, to which reference has already been made, was continued by H. W. Crosskey and D. Robertson in a series of papers on "The Post-Tertiary Fossiliferous Beds of Scotland" published in the *Transactions* between 1867 and 1873 (vols. 2, Part 2 to vol. 5, Part 1). These papers were described by Sir Archibald Geikie (vol. 13, Part 3, 1909, 407) as "a monument of patient skill and accuracy, and as contributions of the highest importance in the interpretation of the history of the Glacial period". Important also, from both the scientific and economic stand-points, were the investigations initiated by James Croll and carried out by James Bennie on the evidence for deep, drift-filled, pre-Glacial channels. Bennie's paper "On the Surface Geology of the district around Glasgow, as indicated by the Journals of Certain Bores" (vol. 3, Part 1, 133-148) represented a new approach to the problem of the evolution of the physiographic features of the district, a problem which has engaged the attention of many later workers but on which the last word has certainly not been said.

In the case of the Carboniferous rocks it may be noted that of the forty-four contributions to the first Part of Volume 2 (1865) nearly half deal with exhibits and descriptions of fossils. Special importance attaches to R. W. Skipsey's paper "On the Discovery of Carboniferous Limestone fossils in the Upper Coal Measures to the East of Glasgow" (52-53). Skipsey's Marine Band, as it came to be called, is now a recognised and wide-

<sup>1</sup> Later editions appeared in 1865, and again in 1872 with the title "Geology of Arran and the other Clyde Islands".



spread index horizon in the Carboniferous succession. Mention may also be made of W. Grossart's contribution "On the Upper Coal Measures of Lanarkshire" (vol. 3, Part 1, 1868, 96-113) in which details of the various beds and their fossil-contents were carefully set out. Additions to the growing body of knowledge of Carboniferous stratigraphy and palaeontology continued to be made by members of the Society, mainly by such workers as John Young, James Armstrong, D. Robertson, James Thomson and Robert Craig. In 1871 there was published a Supplement to Volume 3 of the *Transactions*, entitled "On the Carboniferous Fossils of the West of Scotland" and compiled by Young and Armstrong. The work involved in this must have been one of immense labour and its value may be gauged by the fact that the issue was soon exhausted. This First Catalogue, as it came to be known, was followed by the "Catalogue of the Western Scottish Fossils", prepared by Armstrong, Young and Robertson for the meeting of the British Association in Glasgow in 1876. This later Catalogue was more comprehensive than the earlier one, covering as it did the whole of western Scotland from Skye and Raasay in the north to Girvan and Moffat in the south.<sup>1</sup> A Third Catalogue was prepared for the British Association meeting in Glasgow in 1901 under the editorship of J. B. Murdoch and was re-issued by the Society as a special volume in 1904. To this volume, entitled "Geology and Palaeontology of the Clyde Drainage Area" there were some twenty contributors, nearly all members of the Society.

It may also be noted that many specimens collected by members of the Society were described and figured by outside workers. In this connection reference may be made to the paper "On the Entomostraca of the Carboniferous rocks of Scotland", by T. R. Jones and J. W. Kirkby (vol. 2, 213-228), and to T. Davidson's "The Carboniferous System of Scotland characterised by its Brachiopoda" (in the *Geologist* for 1859-60), a paper which the author dedicated to the Society.

These brief notes would certainly not be complete without some reference to the work carried out by members of the Society on the Silurian rocks of the Lesmahagow district. It has already been pointed out that Robert Slimon exhibited specimens of fossil eurypterids at the meeting of the British

<sup>1</sup> There were many contributors to this volume, including Robert Slimon, W. Grossart, James Bryce, Robert Craig, James Thomson and others.

Association in Glasgow in 1855. Simon's work was later followed up by J. R. S. Hunter who contributed to the *Transactions* the following papers dealing with the Lesmahagow Silurian:—

"The Silurian Rocks of the Logan Water, Lesmahagow" (vol. 7, 56-64).

"Three Months' Tent Life amongst the Silurian Hills of Logan Water, Lesmahagow" (*ibid.*, 272-278).

"Notes on the discovery of a Fossil Scorpion (*Palaeophonus caledonicus*) in the Silurian strata of the Logan Water" (vol. 8, 169-170).

Interest in these beds was stimulated by the discovery of a complete fossil fish (*Thelodus*) in the upper reaches of the Logan Water by James Young of Lesmahagow in 1896 and as a result of this discovery and of the work of the Geological Survey collectors in 1897 the first "Camp Siluria" was established by members of the Society on the banks of the Logan Water in 1899. In the following year the camp was shifted to a new site on the Birkenhead Burn. For a summary of the results of this work reference may be made to the paper by P. Macnair on "Camp Siluria" in volume 12 of the *Transactions* (203-213).

The discovery of the famous Fossil Grove at Whiteinch is recorded in two papers: "Notes on a section of Carboniferous strata, containing erect stems of fossil trees and beds of intrusive dolerite, in the old whinstone quarry, Victoria Park, near Whiteinch", by J. Young and D. C. Glen (vol. 8, 227-235), and "Note on the nature of the fossil trees found at Whiteinch", by R. Kidston (*ibid.*, 235-236). Kidston also contributed an important paper to the *Transactions* in 1891 entitled "On the Fructification and Internal Structure of Carboniferous Ferns in their relation to those of existing genera, with special reference to British Palaeozoic species" (vol. 9, 1-56).

During the early years of the Society a number of important papers dealing with some of the fundamental problems of dynamical and physical geology were contributed to the *Transactions*, notably by Sir William Thomson (Lord Kelvin from 1872) and Sir Archibald Geikie. Papers by Sir William Thomson,<sup>1</sup> who was President of the Society for the long period of 21 years, include:—

"On Geological Time" (vol. 3, 1-28).

"Of Geological Dynamics" (*ibid.*, 215-240).

"Influences of Geological Changes on the Earth's Rotation" (vol. 4, 311-313).

<sup>1</sup> See "Lord Kelvin's Contributions to Geology", by J. W. Gregory (vol. 13, 170-186).

"Geological Climate" (vol. 5, 238-250).

"The Internal Condition of the earth; as to Temperature, Fluidity, and Rigidity" (vol. 6, 38-49).

"Polar Ice-caps and their influence in changing sea levels" (vol. 8, 322-340).  
while among Archibald Geikie's contributions the following may be noted:—

"On the Phenomena of the Glacial Drift of Scotland" (vol. 1, part 2, 1-190).

"On the origin of the present scenery of Scotland" (vol. 2, 4-12).

"On Modern Denudation" (vol. 3, 153-190).

"Recent Researches into the History of the Deposits known as Old Red Sandstone (vol. 5, 276-281).

"The Latest Volcanoes of the British Isles" (vol. 10, 179-197).

"The Pioneers of Geology in the Glasgow district" (vol. 13, 391-410).

The two following papers should also be mentioned: "On Denudation in Scotland since Glacial Times", by James Geikie (vol. 3, 54-74) and "On the Change in the Obliquity of the Ecliptic, its influence on the Climate of the Polar regions, and level of the sea", by James Croll (vol. 2, 177-198).

TABLE 2

*Presidents of the Society from 1858-1908*

<i>Name of President</i>	<i>Elected</i>
James P. Fraser, F.R.S.E.	7th October, 1858
John Scouler, M.D., LL.D.	6th October, 1866
James Smith, F.R.S.	6th October, 1864
Professor John Young, M.D.	7th March, 1867
Sir William Thomson, LL.D., F.R.S., etc.	8th February, 1872
Sir Archibald Geikie, F.R.S.	9th November, 1893
Professor Charles Lapworth, LL.D., F.R.S.	9th November, 1899
R. H. Traquair, LL.D., F.R.S.	14th November, 1902
B. N. Peach, LL.D., F.R.S.	9th November, 1905
Professor J. W. Gregory, D.Sc., F.R.S.	12th November, 1908

THE SECOND FIFTY YEARS

In this brief review of the activities of the Society it is only possible to refer to a few of the contributions that have appeared in the *Transactions* during the period 1908-1958. These may be most conveniently set out under the same categories as were used in the Jubilee Volume: Physical and Dynamical Geology; Petrology and Mineralogy; Stratigraphy; Palaeontology; and Glacial Geology.

I. PHYSICAL AND DYNAMICAL GEOLOGY

Under this heading attention may be drawn to P. Macnair's paper on "The Physical Conditions under which the Old Red Sandstone rocks of Scotland were deposited" (vol. 17, 105-145), to M. A. Peacock's account of "Recent Lines of Fracture in the Faeroes in relation to the theories of Fiord Formation" (vol. 18, 1-26) and to J. W. Gregory's studies of some of the western sea-lochs, viz. :—

"The Age of Loch Long, and its Relation to the Valley System of Southern Scotland" (vol. 15, 297-312).

"Sea Lochs of the Outer Hebrides" (vol. 18, 27-39).

"The Geology of Loch Lomond" (vol. 18, 301-323).

Papers also dealing with the evolution of the existing topography are represented by Gregory's discussion of the formation of corries (with special reference to those of the Campsie Fells (vol. 15, 84-98) and by Professor T. Neville George's "Drainage in the Southern Uplands: Clyde, Nith, Annan" (vol. 22, 1-34). Earthquake phenomena in Scotland are described in the following:—

"The Glasgow Earthquake of 14th December, 1910", by J. W. Gregory (vol. 14, 89-114).

"Recent Scottish Earthquakes", by G. W. Tyrrell (vol. 19, 1-41).

"Catalogue of Recent Scottish Earthquakes, 1916-1949", by A. T. J. Dollar (vol. 21, 283-361).

Geophysical investigations are represented by the accounts of magnetic surveys carried out on ore-bodies in Skye and Tiree by Professor J. T. Whetton and J. O. Myers of Leeds University (vol. 21, 237-277). Two important papers by Professor A. Holmes have also appeared in the *Transactions*: "Radioactivity and Earth Movements" (vol. 18, 559-606) and "Construction of a Geological Time Scale" (vol. 21, 117-152). In the sphere of igneous geology reference may be made to R. W. Van Bemmelen's "The Cause and Mechanism of Igneous Intrusion: with some Scottish examples" (vol. 19, 453-492), to J. E. Richey's comprehensive account of "Tertiary Ring Structures in Britain" (vol. 19, 42-140), to J. G. C. Anderson's paper on "The marginal intrusions of Ben Nevis; the Coille Lianachain Complex; and the Ben Nevis Dyke Swarm" (vol. 19, 225-269), and to W. R. Flett's "Contact between the Granites of North Arran" (vol. 20, 180-204).

2. PETROLOGY AND MINERALOGY

The Glasgow district is notable for the abundance, variety and stratigraphical range of its igneous rocks. Dr. G. W. Tyrrell has made a special study of these and as a result of his detailed investigations has published in the *Transactions* a series of papers which have added enormously to our knowledge of the field-relations and petrography of a wide variety of types, both extrusive and intrusive. His more important contributions are listed below:—

- "A new Occurrence of Picrite in the Ballantrae district and its associated rocks" (vol. 13, 283-290).
- "Classification of the Post-Carboniferous intrusive igneous rocks of the West of Scotland" (vol. 13, 298-317).
- "Petrology of the Auchineden district, Kilpatrick Hills" (vol. 13, 337-343).
- "Petrology of the Kilpatrick Hills, with notes on the Scottish Carboniferous basalts" (vol. 14, 219-257).
- "Petrographical Sketch of the Carrick Hills, Ayrshire" (vol. 15, 64-83).
- "Igneous Geology of the Cumbrae Islands" (vol. 16, 244-274).
- "Igneous Geology of the Ayrshire Coast from Doonfoot to the Heads of Ayr" (vol. 16, 339-363).
- "A Further Contribution to the Petrography of the Late-Palaeozoic igneous suite of the West of Scotland" (vol. 18, 259-294).
- "A Boring through the Lugar Sill (vol. 21, 157-202).

The following papers by other workers dealing with West of Scotland igneous rocks may also be listed:—

- "Notes on the Intrusive Rocks of West Renfrewshire", by P. A. Leitch and A. Scott (vol. 16, 275-289).
- "The North Ayrshire Sequence of Calcliferous Sandstone Volcanic Rocks", by J. E. Richey (vol. 18, 247-258).
- "The Classification of Scottish Carboniferous Olivine-Basalts and Mugearites", by A. G. MacGregor (vol. 18, 324-360).
- "The Igneous Geology of Central Ayrshire", by V. A. Eyles, J. B. Simpson and A. G. MacGregor" (vol. 18, 361-387).
- "The Teschenite-Picrite Sill of Saltcoats", by E. M. Patterson (vol. 21, 1-28).

Papers dealing with the igneous rocks of the Clyde islands include:—

- "The Pitchstones of South Arran" (vol. 15, 16-36) and "A Composite Sill in Glen Cloy, Arran" (*ibid.*, 140-150), by A. Scott.
- "The Tertiary Composite Sill of South Bute (*ibid.*, 121-139) and "The Igneous Rocks of Bute" (*ibid.*, 334-373), by W. R. Smellie.
- "A Composite Intrusion at Bennan, South Arran", by J. W. Harrison (vol. 17, 173-180).
- "The Pitchstone Porphyry of Penrioch, Arran", by P. J. Robinson (vol. 18, 295-299).

"Dykes and Associated Intrusions of the Island of Bute", by H. J. W. Brown (vol. 18, 388-419).

The most important contribution under the heading of mineralogy is Professor K. C. Dunham's paper on "The Age-Relations of the Epigenetic Mineral Deposits of Britain" (vol. 21, 395-429).

### 3. STRATIGRAPHY

Papers dealing mainly with stratigraphical problems may be subdivided under the following headings: Old Red Sandstone; Lower Carboniferous; Upper Carboniferous; Permian and Triassic; Highland areas.

Into the first of these categories falls the paper by E. M. Patterson on "The Old Red Sandstone Rocks of the West Kilbride-Largs District, Ayrshire" (vol. 21, 207-236) and his supplementary "Notes on the Tectonics of the Greenock-Largs Uplands and the Cumbræes" (*ibid.*, 430-439).

Papers dealing with the stratigraphy of the Lower Carboniferous rocks are:—

"The Stratigraphy of the Limestones lying immediately above the Calciferous Lavas", by P. Macmair and H. R. J. Conacher (vol. 15, 37-50).

"The Carboniferous Sediments around Strathaven", by R. G. Carruthers (*ibid.*, 151-166).

"The Hurlet Sequence in North Ayrshire" (*ibid.*, 200-248) and "The Hurlet Sequence in North Lanarkshire" (*ibid.*, 387-409), by P. Macmair.

"The Lower Limestones of Renfrewshire and North Ayrshire", by R. G. Carruthers and J. E. Richey (*ibid.*, 249-264).

"The Carboniferous strata below the Top Hosie Limestone in North Ayrshire", by J. E. Richey (vol. 17, 204-232).

"The Lower Limestone Group near Drumclog, Lanarkshire", by J. E. Richey (vol. 21, 49-60).

The Upper Carboniferous rocks of the Glasgow district are dealt with in the paper by W. R. Smellie on "The Sandstones of the Upper Red Barren Measures to the east of Glasgow" (vol. 14, 258-278); in M. Macgregor's description of the "Garriongill Section at Overtown, near Wishaw" (*ibid.*, 279-290) and in the account of the "Upper Carboniferous Rocks of Arran", by D. Leitch (vol. 20, 141-154). Papers dealing with the Lower Carboniferous of the south of Scotland include:—

"The Carboniferous Rocks of the Solway", by J. Smith (vol. 14, 30-59).

"The Lower Carboniferous Rocks between the Rivers Esk and Annan, Dumfriesshire", by A. E. M. Nairn (vol. 22, 80-93).

"The Lower Carboniferous Outlier of Kirkbean, Kirkcudbrightshire", by G. Y. Craig (*ibid.*, 113-132).

A general account of the Scottish Carboniferous is given in M. Macgregor's paper entitled "Scottish Carboniferous Stratigraphy" (vol. 18, 442-558).

The Permian and Triassic Rocks form the subject matter of the following papers:—

"Economic and Petrographic Geology of the New Red Sandstones of the South and West of Scotland", by R. Boyle (vol. 13, 344-384).

"Permian and Triassic Rocks of Arran", by J. W. Gregory (vol. 15, 174-187).

"The Annan Red Sandstone of Dumfriesshire", by J. Horne and J. W. Gregory (*ibid.*, 374-386).

"The Permian Breccia of Arran", by B. H. Barrett (vol. 17, 264-270).

"The Triassic Rocks of the Annan Basin" by B. H. Barrett (vol. 20, 161-179).

*Highland areas* (including Mesozoic rocks).—Into this category fall the following papers:—

"Notes on the geology of the Tarbert district of Loch Fyne", by W. J. McCallien (vol. 17, 233-263).

"The Structure of South Knapdale", by W. J. McCallien (*ibid.*, 377-394).

"Preliminary account of the Post-Dalradian geology of Kintyre", by W. J. McCallien (vol. 18, 40-126).

"General Geology and Physiography of Morven", by J. F. Scott (vol. 18, 149-189).

"The Sequence in Islay and Jura", by J. W. Gregory (*ibid.*, 420-441).

"A Synopsis of the Mesozoic rocks of Scotland", by G. W. Lee and J. Pringle (vol. 19, 158-224).

"On the relationship of the Green Conglomerate to the Margie Grits in the North Esk, near Edzell; and on the probable age of the Margie Limestone", by J. Pringle (vol. 20, 136-140).

"The stratigraphical order of the Dalradian Schists near the Highland Border in Angus and Kincardine", by J. G. C. Anderson (*ibid.*, 223-237).

"The Dalradian Rocks of Arran", by J. G. C. Anderson (*ibid.*, 264-286).

"The Kinlochlaggan Syncline", Southern Inverness-shire", by J. G. C. Anderson (vol. 21, 97-115).

"The Liassic Sequence in Morvern", by Rhona M. MacLennan (*ibid.*, 447-455).

"The Status of Certain Lewisian Inliers", by J. Sutton and Janet Watson (*ibid.*, 480-502).

#### 4. PALAEOONTOLOGY

Contributions to the Society's *Transactions* under this heading include the three Presidential Addresses listed below:—

"The Meaning of Orthogenesis", by A. E. Trueman (vol. 20, 77-95).

"A Review of recent work on the Permian non-marine lamellibranchs and its bearing on the affinities of certain non-marine genera of the Upper Palaeozoic", by J. Weir (*ibid.*, 291-340).

"The Mode of Life of Certain Goniatites", by Ethel D. Currie (vol. 22, 169-186).

Other papers on palaeontological subjects fall into the three categories of (1) those dealing with Carboniferous fossils other than the non-marine lamellibranchs; (2) those dealing with fossils from the Ordovician of the Girvan district; and (3) those dealing with the non-marine lamellibranchs of the Carboniferous.

Papers included under the first category are:—

- "Fossil Amphibia in the Kilmarnock Museum, previous to the fire of 1909", by R. Dunlop (vol. 14, 60-64).
- "On Zonal work in Lower Carboniferous rocks", by R. G. Carruthers (*ibid.*, 65-73).
- "On the distribution of *Posidonomya corrugata* Ether. jun. in the Carboniferous Limestone of the Glasgow district", by P. Macnair and H. R. J. Conacher (*ibid.*, 309-322).
- "Notes on the discovery of fossil Chitons in Fife; with photographs and drawings of all the fossils found in the section", by R. Dunlop (vol. 15, 167-173).<sup>1</sup>
- "The Horizon of the type specimens of *Dithyrocaris tricornis* Scouler, and *D. testudinea* Scouler", by P. Macnair (vol. 16, 46-60).
- "Some British specimens of *Ulocrinus*", by F. A. Bather (*ibid.*, 207-219).
- "Thomson's Genera of Carboniferous corals", by J. W. Gregory (*ibid.*, 220-243).
- "On Carboniferous Crinoids from Fife, with notes on some localities and provisional lists of specimens", by J. Wright (*ibid.*, 364-392).
- "The Fauna of Skipsey's Marine Band", by Ethel D. Currie, Catherine Duncan and Helen M. Muir-Wood (vol. 19, 413-452).
- "Revision of the Scottish Carboniferous Pleurotomariidae", by Eirllys Grey Thomas (vol. 20, 30-72).

Papers on Ordovician palaeontology include:—

- "*Trinucleus* in the Girvan area", by J. L. Begg (vol. 18, 607-609).
- "The Drummuck Group, Girvan; a stratigraphical revision, with description of new fossils from the lower part of the Group", by A. Lamont (vol. 19, 288-334).
- "Palaeontological evidence of the age of the Craighead Limestone", by F. R. C. Reed (*ibid.*, 340-372).
- "On the genus *Cyclocystoides*, with the description of a new species from the Ashgillian of Girvan", by J. L. Begg (vol. 20, 21-29).
- "Cephalopods from the Drummuck Group of the Girvan district", by C. Teichert (*ibid.*, 103-115).
- "Two new Trilobites from Girvan", by F. R. C. Reed (*ibid.*, 260-263).
- "Some new fossils from the Girvan district", by J. L. Begg (vol. 21, 29-47).
- "Some new Girvan Trilobites", by J. L. Begg (*ibid.*, 362-370).

<sup>1</sup> The section referred to is in the shales above the Hurlet Limestone exposed in the Lyne Burn a little below Woodmill Bleachfield, about a mile south-east of Dunfermline Lower Station. See also Dunlop's paper "Notes on the Chitons of Woodmill" in vol. 17, 75-76.



Papers dealing with the non-marine lamellibranchs of the Carboniferous rocks:—

- "The *Carbonicola* Fauna of the Midlothian Fifteen Foot Coal: a study in variation", by D. Leitch (vol. 19, 390-403).  
"The Basal Fauna of the Zone of *Anthracomya modiolaris* in the Coal Measures of South Ayrshire", by D. Leitch, R. G. Absalom and S. M. K. Henderson (*ibid.*, 404-408).  
"*Naiadites* from the Lower Carboniferous of Scotland; a variation study", by D. Leitch (vol. 20, 208-222).  
"The *Carbonicola* Fauna of the Ovalis Zone in Scotland", by Rhona M. MacLennan (vol. 21, 75-96).

### 5. GLACIAL GEOLOGY

Papers dealing with problems in the glacial history of Scotland are represented by:—

- "The Polmont Kame and on the Classification of Scottish Kames", by J. W. Gregory (vol. 14, 199-218).  
"The Parallel Roads of Loch Tulla", by C. J. Gregory (vol. 17, 91-104).  
"The Moraines, Boulder Clay and Glacial Sequence of South-West Scotland", by J. W. Gregory (*ibid.*, 354-376).  
"Dating of the Ice Age in Scotland", by G. de Geer (vol. 19, 335-339).  
"Rhu (Row) Point — a Readvance Moraine", by W. J. McCallien (vol. 19, 385-389).  
"The Leven Valley, Dumbartonshire", by M. Macgregor (vol. 20, 121-135).

### TABLE 3

#### *List of Presidents of the Society from 1908 to 1958*

<i>Name of President</i>	<i>Elected</i>
John Horne, LL.D., F.R.S.	9th November, 1911
Professor J. W. Gregory, D.Sc., F.R.S.	12th November, 1914
R. Kidston, LL.D., F.R.S.	8th November, 1917
Professor Peter Macnair (Anderson's College), F.R.S.E.	11th November, 1920
G. W. Tyrrell, Ph.D., F.R.S.E.	8th November, 1923
Murray Macgregor, M.A., B.Sc., F.R.S.E.	11th November, 1926
J. E. Richey, M.C., B.A., F.R.S.E.	14th November, 1929
Professor E. B. Bailey, M.C., M.A., F.R.S.	10th November, 1932
J. L. Begg, F.R.S.E.	14th November, 1935
Professor A. E. Trueman, D.Sc.	10th November, 1938
J. Weir, D.Sc., F.R.S.E.	8th November, 1941
B. H. Barrett, M.A., B.Sc.	9th November, 1944
J. G. C. Anderson, M.A., D.Sc., F.R.S.E.	13th November, 1947
Professor T. Neville George, D.Sc., F.R.S.E.	10th November, 1949
Ethel D. Currie, D.Sc., F.R.S.E.	13th November, 1952
Professor T. Neville George, D.Sc., F.R.S.E.	10th November, 1955

The résumé given in the preceding pages will serve to illustrate the variety and importance of the many contributions to the advancement of geological knowledge that have appeared in the *Transactions*. In their totality they offer a record of achievement in fundamental research of which the Society may well be proud. In spite of financial difficulties which at times delayed printing, it has been able to carry out, since its inception, an extensive programme of publication, and its *Transactions* have long been recognised as of international importance in the literature of geology.

In the long history of the Society two features deserve to be singled out for emphasis. Its foundation was wholly due to the inspiration and foresight of amateur geologists, and amateur workers were mainly responsible for guiding it during its early formative years. A full account of their varied activities is given in the Jubilee volume of 1908. To these pioneer members the present generation of Glasgow geologists is under a deep debt of gratitude. They clearly recognised and energetically undertook two main tasks. The first of these was to examine and correlate the evidence to be obtained from natural sections, from quarries and excavations and from borings and colliery shafts; the second was to use this evidence in establishing the geological structure of the country around Glasgow and in interpreting its complicated geological history. That they were supremely successful in these tasks the records of the Society clearly show. The contributions they made to our knowledge of the detailed stratigraphy, palaeontology and topographic evolution of the Glasgow district form the foundation of all present-day research.

A second feature in the history of the Society that should be emphasised is the close and harmonious relations that have long existed between it and the University. This association may be said to have begun in 1859 when John Young was appointed assistant curator of the Hunterian Museum, then situated in a building behind the old college in the High Street. Still closer ties were to follow. Professor John Young of the Chair of Natural History, under which geology was included, was President of the Society from 1867 to 1872, while Sir William Thomson of the Chair of Natural Philosophy, occupied the same position for the long period of twenty-one years, from 1872 to 1893. Since the establishment of a Chair of Geology at the University in 1904, successive members of the teaching staff in

the Geological Department have taken a prominent part in the affairs of the Society and contributed many important papers to its *Transactions*.

This short note on the history of the Geological Society of Glasgow may perhaps fittingly end with the words used by Sir Archibald Geikie in his Jubilee Address to the Society in 1908, when, as an Honorary Member of forty-five years' standing, he expressed this wish: "May the Geological Society of Glasgow long live as a vigorous centre of geological activity, may its membership and resources steadily increase and may its publications continue to maintain and to augment the reputation which they have already gained."