The Foundation and Development of The Royal Philosophical Society of Glasgow

David Primrose

On the 5th November 1802, three Glaswegian gentlemen, John Roberton, William Douglas, and Peter Nicholson, acting on behalf of a number of others in the city who were 'interested in the prosperity of the Trades and Manufactures of their country', and anxious for 'the improvement of the Arts and Sciences' sent a circular letter proposing a meeting to discuss the establishment of a society for this purpose. Interested parties were requested to attend a meeting to be held four days later at the Prince of Wales Tavern in Brunswick Street. Twenty-two individuals duly attended and appointed a committee 'to draw up an outline of the principles of the Society' to be presented at the next meeting which was held on 16th November. Sixty persons met and subscribed to the setting up of the Glasgow Philosophical Society. Included in the 'principles' were a private meeting room and the creation of a library of scientific books.

One month later on the 8th December, the first council of four officials and twelve directors was elected, with an entrance fee of three guineas to join the Society and an annual subscription of 10/6 also being agreed. The first officials were William Meikleham (President), John Roberton (Vice President and also membership certificate no.1), James Laird (Secretary) and John Lindsay (Treasurer).

Sir,

A number of Gentlemen thinking that it would be of general advantage were a Society eſtabliſhed here for the diſcuſſion of Subjects connected ſolely with the *Arts* and *Sciences*, propoſe the following as an outline of the Plan:—That the Society ſhall meet once a-week during Winter and once a-fortnight during the remainder of the year, in ſome convenient place, for the purpoſe of exhibiting Models of Machinery, and of converſing together on any improvements that may have taken place or may be propoſed in the Arts and Sciences; and where thoſe who chooſe may have an opportunity of reading Eſſays on theſe Subjects.

Should the above Scheme receive your approbation, your preſence in the Prince of Wales' Tavern, on Tueſday firſt, the 9th. inſtant, at ſeven o'clock in the evening, to conſtitute the Society and to appoint a Preſes and Managers, is requeſted by the Committee named to carry the Plan into effect.

John Roberton.
William Douglas.
Peter Nicholson.

Glaſgow, 5th. Nov. 1802.

The original letter proposing the establishment of the Society.

Meikleham was then the professor of astronomy at Glasgow University but in the following year he was translated to the university's chair of natural philosophy (which he occupied until his death in 1846, being succeeded by William Thomson, later Lord Kelvin). Roberton was an ironfounder and the election of these two illustrated the close connection of 'town and gown' as well as emphasising the importance of science and industry for the future prosperity of the city. By the end of 1802, 31 had paid their dues and subsequently all except one of the original 60 became members. The membership certificate was designed by an engraver, James Haldane (member no.51)

At the first anniversary William Duncan succeeded as secretary and he was later to become the first Librarian. There were 67 members and £100 had been deposited in the bank. In 1804, new officials were elected, including an accountant, James Boaz as Secretary, an office he was to hold for almost 30 years.

John Roberton Esq:
No 1
The Philosophical Society of Glasgow:
instituted for the promotion of Science on the ninth day of November,
one thousand eight hundred & two has this day elected you a resident
Member. In Testimony whereof we the President, Vice President,
Treasurer, and Secretary, sign this Diploma and append to it,
the Seal of the Society.
Glasgow 5th Oct. 1832
P.
VP.
T.
S.

The Society's first membership certificate.

From the beginning it was intended that meetings would be held weekly in the winter and fortnightly in the summer and that members would present papers and exhibit models, artefacts, etc. However, attendances soon dropped off as many members had not prepared anything and on such occasions there was only general discussion. In fact, throughout the early years of the Society, membership fluctuated widely. (Membership at ten-yearly intervals is shown in the table in Appendix 4). There continued to be a steady trickle of new members but others dropped out, or did not renew their subscriptions. In 1806, only 36 members had paid their annual fee, while in 1810, 114 paid up members were listed. By 1820, the loss of members was a worry and it was decided to reduce the entrance fee to one guinea. This had little effect and by the 30th anniversary in 1832, membership had fallen to 47 which included six of the original members. However, the variety of occupations of these 47 members does shows how wide

the range of interest in the Society was at that time: academic, accountant, architect, baker, calenderer, chemist, cotton spinner, commission merchant, engineer, engraver, firemaster, glass maker, hat maker, iron master/founder, ironmonger, manufacturer, merchant, silversmith, spirit dealer, steelmaster, superintendent of works, surgeon, tallow chandler, teacher and yarn merchant.

One of the Society's problems had been the difficulty of finding a suitable meeting place for there was a general shortage of available places in Glasgow. The first meetings were held in the Assembly Rooms in Ingram St (subsequently the site of the Central Post Office) and then in 1806, a three-year lease was obtained from the Faculty of Physicians and Surgeons, for premises in the Surgeons Hall on the east side of St Enoch Square (later to be the railway station). There was talk of building a laboratory for experiments on spare ground behind it but, although the lease was renewed for a further three years, this did not materialise. In 1812 the Society leased premises in Smith's Court, 53 Candleriggs but being 'cold within, obscure outside and difficult of access', in 1816 the Society moved to 34 Virginia St and then again for two years to the south side of the Trongate. In 1820, a lease was obtained from the Glasgow Annuity Society, at Pratt's Court, 109 Argyll St for a more suitable room which had a gas fire and was large enough to be partitioned. This was the year in which a presentation of silver plate was made to Mr. Boaz 'for his valuable services as Secretary for 16 years'.

Membership and consequently, finance, continued to cause anxiety and at one meeting in 1831, although there was a membership of 47, only the president and secretary attended. The situation was precarious and dissolution was considered.

Anderson's University

In the meantime, discussions had been taking place with the recently completed university founded by John Anderson. It was agreed in December 1831 that this University would provide a life-

rent right to the use of its library and reading room for all of the paid-up members as well as the free use of a room for meetings. In return, the Society would transfer all of its property (including its library and £40 in cash) to the university. The use of the Andersonian facilities was a turning point for the Society and by 1840, membership had increased to 80. The library was again built up by the purchase of journals and books as funds permitted.

In 1845 the free use of a meeting room in the Andersonian was

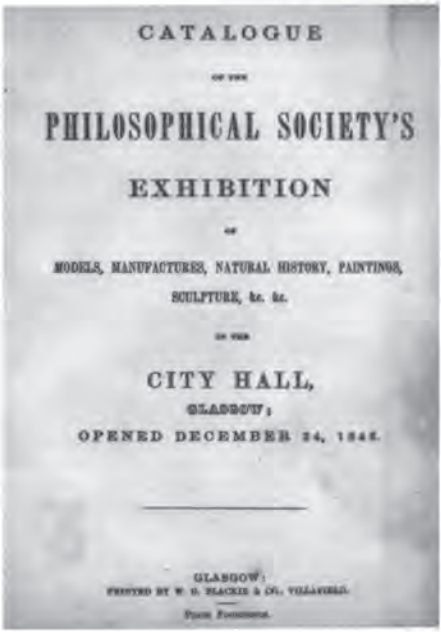
The President's Chair. On the headpiece, Minerva (representing both science and the arts) sits beneath a sunburst, her left hand on the Society's original logo, itself sitting on books and a compass. On the opposite side is the Glasgow coat of arms and a scroll containing the city motto, 'Let Glasgow Flourish'. The profiles on the left are probably William Meikleham and behind him, John Roberton, the first President and Vice President; the figures on the right are identified as 'Smith' and 'Simson'. The chair is presently in the safekeeping of the University of Strathclyde.

changed to the lease of a hall there and the Society spent £118 on fitting it out. This included the creation of a president's chair to be made from an approved design. The chair was later described as being made 'from oak from the beams of Glasgow Cathedral'. In 1868, the university required the hall for its own use and the Society was fortunate in being able to lease a hall in the new Corporation Art Gallery (latterly the McLellan Galleries) in Sauchiehall St.

In 1869, the membership situation was eased when the Sewage Association amalgamated with the Society and later that year, the Glasgow Architectural Association did likewise; members of both associations who were not already members of the Society were encouraged to join it.

Exhibitions

From time to time the Society held private exhibitions to which members and their scientific friends were invited. In 1845, the Society had joined with the City Council to bring to Glasgow an exhibition of 'works of Art from Paris' which had been bought by the Government and had been on show in London. These were shown in the Government School of Design in Ingram St and the exhibition was so successful that the Society decided to hold another over the


CATALOGUE

PHILOSOPHICAL SOCIETY'S

EXHIBITION

MODELS, MANUFACTURES, NATURAL HISTORY, PAINTINGS, SCULPTURE, &c. &c.

CITY HALL,

GLASGOW;

OPENED DECEMBER 24, 1846.

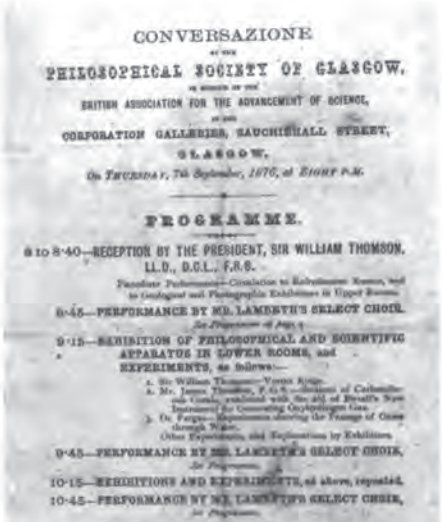
GLASGOW:

The catalogue of the Society's 1846 Christmas extravaganza.

Christmas holidays with the primary object being 'to interest the working classes'. This was opened in the City Hall on Christmas Eve, 1846 and ran for 17 days. There were free days and it was open on some evenings with the result that attendances reached almost 100,000. A surplus of £462.6.2 was realised and this was invested with the Corporation as the 'Exhibition Fund'. This was at the core of the Society's increasing solvency, to the extent that in 1852 on its 50th anniversary, general funds amounted to £346 16/- and in addition there was over £570 in the Exhibition Fund; ten years later, it had increased to over £900.

The British Association

In 1855, as a result of an invitation from the Society, the British Association for the Advancement of Science met in Glasgow. Over 2,100 persons enrolled for the meeting. There were eight different scientific sections and in total 349 papers were presented. The British Association met again in the city in 1876 when Sir William Thomson (later Lord Kelvin) was president, and the Society held a Conversazione and Exhibition in the McLellan Galleries in honour of the occasion. When the planning of this was being discussed by the Society, it was suggested that as part of the social programme



CONVERSAZIONE

PHILOSOPHICAL SOCIETY OF GLASGOW,

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,

CORPORATION GALLERIES, SAUCHIEHALL STREET,

GLASGOW,

On THURSDAY, 7th September, 1876, at EIGHT P.M.

PROGRAMME.

8 to 8·40—RECEPTION BY THE PRESIDENT, SIR WILLIAM THOMSON, LL.D., D.C.L., F.R.S.

8·45—PERFORMANCE BY MR. LAMBETH'S SELECT CHOIR.

9·15—EXHIBITION OF PHILOSOPHICAL AND SCIENTIFIC APPARATUS IN LOWER ROOMS, and EXPERIMENTS, as follows:—

Other Experiments, and Explanations by Exhibitors.

9·45—PERFORMANCE BY MR. LAMBETH'S SELECT CHOIR.

10·15—EXHIBITIONS AND EXPERIMENTS, as above, repeated.

10·45—PERFORMANCE BY MR. LAMBETH'S SELECT CHOIR.

The programme from the Society's 1876 Conversazione.

there should be a steamboat trip down the Clyde, at which another member volunteered that if this took place he would arrange to put on, as the boat passed the quarry at Furnace, 'one of the largest blasts which has yet taken place'. Prior to this in 1868, Dr F. H. Thomson had dwelt in his presidential address on a new explosive, invented by Nobel, called dynamite and discussed its relative safety. Sadly, however, in 1876 there was no official boat trip and thus no explosive display.

Incorporation

In 1879, the Society was incorporated under the Companies Acts of 1862, 1867 and 1877 as a company limited by guarantee (up to 5/- per member), and named The Philosophical Society of Glasgow. There was a new constitution, though the new articles generally repeated the regulations of the old Society. Honorary and corresponding members (see page 43 and Appendix 2) were continued and a new drive was made to encourage members to compound their annual subscription into a life membership. There was an increase of 100 members in that year, 25 of which were life memberships.

The new library and reading room.

New Building

For some time there had been a desire to have more permanent premises, a desire given impetus in 1878 by the Corporation's termination of the Society's lease of the McLellan Gallery. In conjunction with the Institute of Engineers and Shipbuilders, ground was purchased in Bath St on which to erect a three-storey building with a library and reading room on the ground floor and a large hall and council room on the first floor. There were also meeting rooms for the Sections. On the staircase landing there was a three-part stained glass window with the centre panel representing the City of Glasgow and on either side panels representing the Society and the Institute. There were living quarters in the basement for a caretaker as well as two large rooms and two fireproof safes. The architects were Thomas Watson and William Miller and it was completed in 1880 for a total cost of £7,987, shared equally with the Institute of Engineers. The Society took out a bond for £3,000 on the building. The annual accounts had been showing a reasonable surplus and in 1897, £300 of the bond was repaid.

Royal Charter and Centenary

In 1899, the Microscopical Society united with the Society. With the approach of the new century and the Society's centenary in 1902, there was renewed activity, particularly amongst influential members of the society to raise its profile. As a result, a Royal Charter was granted on 23rd August 1901 and the Society's name henceforth became The Royal Philosophical Society of Glasgow. In that year there were 365 new members. The Centenary was celebrated with a Conversazione and Exhibition in the new Kelvingrove Art Gallery, which was attended by over 3000 people, and by a civic dinner the following day. The remainder of the property bond was paid off in this year.

The Engineering Institute had been finding the building too small for both societies and it was agreed in 1906 that the Society

would buy out the Institute's interest in it for £4,000. The Institute would pay a rent to continue part use of the premises until it had built new premises. A new bond for £3,250 was taken out to help to pay out the Engineers. Reserves at this time amounted to almost £5,750.

Lady Members

The question of admitting women to the Society had been raised in 1902 when it was decided by the Council, after discussion, that ladies 'be not eligible for membership'. It was raised again in 1914 and the Council, having sought advice, decided that as membership under the Constitution was restricted to 'persons', this term did not include females! It was also stated that there was no objection in principle but that some members were likely to resign if women were admitted. However, it took another 14 years before the Council agreed unanimously to admit women, with the first being Miss Muriel Gray in November 1932, followed by Miss Elizabeth Stewart, Miss Anne Fyfe, Miss Hannan Watson and Dr Violet Roberton.

Financial Challenges

During the First World War, the membership total remained relatively stable although the annual accounts showed a modest deficit each year from 1915 onwards until 1925. The exception to this general pattern was 1920 when there were 208 new members and the accounts showed a small surplus.

In 1932 the membership was holding up at 968 but almost a quarter of these were life members and so did not pay the annual subscription. The cash situation was getting serious and there was a mounting bank overdraft. In 1938, the situation was eased by transferring the Exhibition Fund into the general funds, and £1500 was also transferred from the Graham Medal and Science Lecture Funds. The bond was repaid and the bank account was again in credit.

During the war years from 1939 to 1945, many members were on active service and by 1940, the overdraft had already reached £700. In 1945, the annual subscription was doubled to two guineas bringing an immediate cash benefit but at the cost of membership which fell steadily over the next few years: at the 150th anniversary in 1952, there were only 325 out of 500-odd members paying the subscription. The net assets were a little over £11,000 but this included the cost of the building at just under £8,000 and the cash prospects did not seem to be improving.

In the 1959–60 session, it was decided that it was no longer financially prudent to remain at 207 Bath St and in 1961, it was sold for £23,000. Thereafter, Society meetings were held at various places including both Glasgow and Strathclyde Universities, the Royal Colleges, Rankine House (183 Bath St) and the Mitchell Library. Since 1994–95, they have been held in Strathclyde University.

In 1981–82, the remainder of the Science Lecture Fund, amounting to £284 was transferred into the general funds and the accounts then showed a net assets value of £31,552. There had been a change in the investment policy and the net asset value had risen to £44,856 in the 1991–92 Accounts.

Early Records

When the Society was founded, the age of steam was just beginning and coal-gas and electricity had not yet come out of the laboratory. At that time Glasgow covered 1864 acres, all on the north of the river and the population was about 100,000 persons. It did not extend to the south of the river until the Gorbals was annexed in 1846.

There is no extant record of the details of most of the papers presented to the Society until the publication of *The Proceedings* from 1841. In the early minutes it is recorded that two books were to be kept, one for the minutes and one in which to write approved essays given by members. An essay book was purchased

in February 1803 and the minute for 26th December 1804 states that the essay given on 19th December. by Dr Watt (later President of the Society 1808–09) on *Piped Water into the City* was to be engrossed into the Essay book. The minute books record the topics and their authors, and there are also Council minutes but there is no trace of the book for the essays. In the first 25 years, many of the matters raised were of observations from nature and practical suggestions to assist industry, rather than laboratory and experimental science.

Topics Presented

The first paper was given on 5th January 1803 by the vice president, John Roberton, on *The advantages to be derived from heating cotton works, drying houses etc. on an improved plan* . . . . Heat came up again in 1807 under *On heating buildings by steam*, and again in 1820 when in *On heating churches*, it was argued that it would be better to keep them heated throughout the week rather than intermittently. The second paper to be delivered in 1803 was on *Roofing*.

Water Supply

This was a recurring topic for the Society. In the 1801 census, there were 30 wells in Glasgow for a population of about 100,000. At that time, water came from the river and from a few wells and springs and was distributed about the streets by water carts. In 1806 a paper was presented which proposed the piping of water from the river into the city. In 1810, when the Glasgow Water Company was building a water-works at Dalmarnock, Dr Watt proposed that an extensive area of low flat land (a holm) on the south side of the river should be used as a natural filter. This was accepted by the water company and a pipe was carried across the river bed to the holm. In 1822, Thomas Hall, the manager of the water company, described his fuel-saving invention which heated water in an insulated boiler during the night. Concern about the water supply continued until the building of the Loch Katrine

scheme which was advocated by members of the Society (Professor L. Gordon and Mr L. Hill) in 1845 and again in 1852 (Professor Macquorn Rankine and Mr J. Thomson). In December 1852 the Corporation appointed a civil engineer from London to advise on the best water supply for the city and some months later he advised that it should be Loch Katrine. Work began on the scheme in 1856 and there was an address to the Society that year on *The mode in which the water of Loch Katrine may be obtained of uniform temperature at all seasons.*

The Forth and Clyde Canal

The Forth and Clyde Canal had been opened in 1777 between Grangemouth on the Forth and Maryhill in Glasgow, and then to Bowling on the Clyde by 1790. It was of importance not only for the bringing of farm produce into the city but also for imports from Europe which entered the country via the port of Leith. In 1803, there was a paper on the saving of water from canal locks and in 1811, there was a description of a proposed construction for raising and lowering canal boats at changes of water levels. This was to be by means of a semi-circular watertight wooden frame which the boat entered, and the height was then changed by means of a lever and fulcrum system. In 1817, when the junction of the canal at Camelon with the Union Canal was projected, the Society received a communication and reports on the subject from Hugh Baird, who was the civil engineer in charge of the work. The joining up of the canal from Edinburgh was completed in 1822.

The River Clyde

As there were no railways in 1802, transport by water was important but at that time no ships of more than 100 tons could reach the Broomielaw. As a result, and because of the importance of imports of tobacco, cotton and sugar, the possibility of deepening the Clyde to allow larger vessels to reach the city came up repeatedly in Society presentations. In 1805, Thomas Telford

had just been commissioned by the City Council to make proposals for deepening the river. These were discussed by the Society with suggestions being made for modifications. The following year, Mr. Fleming gave a lecture, with illustrations, *On the means of rendering the Clyde navigable for large vessels to Glasgow.* Amongst the schemes contemplated was the formation of a lock and dry dock at Govan, the building of a quay on the south side and widening the river at the Broomielaw. In 1807 Dr. Watt had proposed that a large basin be made on the Clyde where the water could rise and fall with the tide and floats on the water could be connected to a system of wheels and ratchets to provide power for cotton mills and similar industries. Tidal wheels which were attached to the old London Bridge gave a practical example of tidal power (although a 1948 lecture on this topics showed how impracticable the Clyde plan would have been).

Also in 1807 there was a talk on how the Molendinar burn could be made 'navigable for small and fishing craft' as far as St Andrew's Square but this was not acceptable. At this time, the memory of the severe flood of 1795, which had flooded the merchants' warehouses, could have been an adverse factor. Mr. K. Mathieson was one of the original members (no. 30) and was a builder of many prominent buildings and bridges in Glasgow as well as further afield. He gave an early talk on widening the Glasgow Bridge over the Clyde.

Heating and Lighting

The production of coal-gas was still in the laboratory stage when in 1805, Mr. Lumsden gave a practical demonstration of heating coal in a cast-iron retort to produce gas; this was collected under water and then passed through a jet and ignited. Professor Thomas Thomson, who became president in 1834, recalled that in 1808 when he was a medical student at Edinburgh he walked to Glasgow to see the Tontine Hotel being illuminated by gas. Oil lamps were used for most domestic lighting and in 1814 a talk, illustrated by models, was given *On how to get better lighting from the*

use of less oil. In 1818, gas lighting was generally introduced into Glasgow, but condensation occurred on the surrounding glass bulbs and this was discussed at a meeting in 1821. Experiments with different shapes for the glass bulbs showed how the condensation could be reduced, but if the bulbs were overheated they might shatter in a shower of rain. Methods proposed for improving the illumination of the clock on the Tron steeple by means of reflectors were accepted by the City Council.

Electricity

In 1804, Mr Boaz gave a demonstration of his telegraph, which he had patented, and the members 'approved of the invention and of the ingenuity of Mr. Boaz'. In the following year, there was a practical demonstration of a galvanic apparatus and in 1822 there were various experiments with 'a powerful electric machine'. In 1845 'Mr Smith, late of Deanston' offered to write to Mr. Wheatstone 'to obtain an electrograph to be showed and explained', but the electric telegraph is not mentioned again until 1850. Electric light using a galvanic battery and a carbon arc was demonstrated in 1849 but the first local public demonstration of electric lighting was not until 1879 when six carbon arc lamps were installed in the newly built St Enoch's railway station. In 1881 there was a paper on *Electric and Photometric Tests of Swan's Incandescent Lamps.* The first electricity supply to the public was in 1884 and the subject came up-to-date in May 1888 when a member described how, in his country cottage, he had adapted an old windmill to charge batteries and run his electric light from them.

Printing

Another topic brought up in 1804, which helped to show the wide range of commercial interests of the members, was that of printing. At least two of the early members had print works. In 1805 there was a demonstration by a chemist, (and former engraver) Mr John Thomson, on bank notes and for this he used United States dollar notes to illustrate the use of different colours to

make forgery more difficult. His advice had been sought by the Bank of England who subsequently made use of it, but only after it had been shown by the bank to a London printer who had then patented it. Another member showed a banker's cheque which had five lines printed on one side using an acid medium and on the other side, lines printed with an alkaline medium, thus making attempts at alteration more easily detected. In 1820 a member showed a much improved self-inking machine which he had developed. The following year Andrew Smith, a Mauchline maker of snuff boxes, demonstrated his instrument for tracing drawings onto them. In 1822 one of the topics was *Calico-printing and Turkey-red dying*. In 1823, lithographic prints were shown in which the ink had been made by the member from coal tar. Another development was shown in 1844 in which a printing machine produced the letters as raised dots to enable the blind to read.

Armaments

There was still a state of war with France when the Society was formed and the battles of Trafalgar and Waterloo had still to take place. In 1806, a member proposed a naval gun made with two conjoined parallel barrels and a common explosive chamber. The barrels were then to be loaded with two cannon balls joined together by a chain which was intended to catch in the rigging of an enemy ship. In 1808, Mr Roberton (who may have invented the lathe) demonstrated different riflings of gun barrels which he had made, and how by elongating a musket ball it would travel further and more accurately. This led to the development of the bullet.

Pollution

Other early topics included ventilation in coal mines, the reduction of smoke in factory chimneys, and the design of a tobacco pipe which would reduce the amount of fumes produced in the room. On the smoke pollution of the atmosphere, it was observed that this was just as bad on Sundays when the factories were

closed because of domestic coal fires and because gas , which was less polluting, at that time cost ten times as much as coal.

Astronomy

Papers on astronomical topics had been few in the early years of the Society but with the building of a new observatory for Glasgow University at Horslethill (Dowanhill) in 1845, more interest began to be shown in astronomy. In fact, from the mid 1850s, there was a flood of papers from this field. In 1855, Professor Macquorn Rankine spoke on *The Azimuth of a Star* and the following year, there was a talk on *The Application of Photography to Meteorology*. In 1857, there was an evening on *The Gyroscope, the Precession of the Equinoxes and Saturn's Rings* and in that same year James Bryce gave the first of his lectures On the recent progress and present state of the sciences of meteorology and terrestrial magnetism. In 1859, Professor Thomas Thomson gave an account of *Recent Investigations on the Motion of Mercury by M. leVerrier*. (In 1860, M. leVerrier was one of the first Honorary Members to be elected). He also gave a talk *On the variation of the periodic times of the Earth and inferior planets, etc.* and *Sun Spots* was also a topic in 1860. In 1867 Professor Herschel was a regular speaker at the Society, addressing members in 1867, 1868, 1869 and 1871. Professor Grant's presidential address in 1871 was entitled *The Astronomy of the Nineteenth Century* and in 1874 Professor Forbes gave a lecture on *The Transit of Venus*. In 1876 Dr Muirhead spoke on *A Kinetic Theory of the Cosmos*, having spoken the previous year on *The Genesis of Atoms, Worlds and Sunspots*. In 1884 there was an address on the motion of the stars.

The Science Lecture in 1898 was given by Sir Robert Ball on *A Universe in Motion*. Such was the anticipated demand for places that the St Andrew's Hall was booked for the occasion and members of the public were also admitted for a small charge. Professor Archibald Barr, in his centenary address on 5th November 1902, recalled that the insignia of the Society commemorated a transit of the planet Mercury on the day when

the Society was founded. An eclipse of the Sun was described in 1906 and, as 1909 was the tercentenary of the invention of the telescope, this was a topic that year. In 1910 there was a paper on comets, in 1930 the discovery of a new planet named Pluto was reported and in 1937 the Astronomer Royal spoke about the building of a 200-inch telescope, which would increase the amount of visible space eightfold. *The Stratosphere* was a topic in 1942 as was physical cosmology in 1948. In 1965, there was a paper on the origin of the constellations but the real excitement was the exploration of the moon in 1966. After this in 1968 there was a discussion on *Space*.

Geology and Botany

In the early years of the Society, geological interest was exemplified by the fossilised branch of a tree from the quarry at Sauchiehall and by fossil leaves from a coal-pit at Rutherglen. In 1814, a member showed several 'beautiful specimens' of dry rot from his house and amongst other early botanical demonstrations were specimens of fern leaves from Bute. At other meetings specimens of geological, or entomological interest from abroad were also exhibited. In 1917, Professor Bower stated 'The University of Glasgow can claim the distinction of having supplied, during the nineteenth century four professors of Botany to her sister University of Edinburgh, and to Kew the first two directors of the Royal Gardens'. The second of these professors was Sir William Hooker who went to Kew and his son Joseph was a member of the Society. Joseph sailed on the *Erebus* as surgeon and botanist on her voyage to the Antarctic and in 1842 gave the Library a copy of his *Notes on the Botany of the Antarctic Voyage*.

Mensuration

There were several presentations on weights and measures. A paper was presented in 1822 by Mr R.Wallace, editor of the *Glasgow Mechanics' Magazine*, which discussed the relative merits of duodecimal, decimal and binary systems and he concluded in

favour of the last of these. Also that year, Mr Allan Clark 'exhibited his arithmetical machine making it perform addition, subtraction, multiplication and division. It consisted of 8 wheels, one for pence having 12 pins, or teeth, and one turn made a shilling. The second wheel had 20 pins, or teeth, so that one turn made a pound and there were 6 more wheels so that it could count up to £999,999 19/11'.

In a paper in 1910 on *The Proposed Compulsory Adoption of the Metric System in the U.K.*, Lord Kelvin is quoted as having a letter from James Watt from 1783 in which Watt advocates a decimal system, some seven years before it was adopted by France. In 1855 when the Ordnance Survey was producing a 6-inch-to-1-mile map of Glasgow, the Society petitioned the Lords of the Treasury to extend the survey to include parts of the counties of Lanark, Renfrew and Dunbarton.

Public Welfare

The condition of the poor in Glasgow was a matter of concern to many members and Dr Birkbeck, who was professor of Natural Philosophy and Chemistry at the Andersonian University, had been amongst the first to give lectures to a class of working men. However, when Robert Owen's scheme 'to ameliorate the condition of the poor' at New Lanark came up for discussion, it was decided that it would be impracticable. In 1826, there were several meetings on unemployment and benefit societies and there was much discussion on a scheme to resettle some of the unemployed in a coastal area where they could become self-supporting on fishing and agriculture. In 1840 'cheap and nutritious food' was advocated, whilst in 1886 Dr Glaister said 'vegetables when used should be thoroughly boiled'. In 1893 a minimum family 'living wage' of 24/- per week was proposed.

Transport

In 1818 and again in 1820, 'beautiful models' of Dr Stirling's patent hot air engine were exhibited and in 1829, it was proposed that

heated steam should be used rather than hot air. High pressure and rotary steam engines were discussed as was steamboat machinery. Modifications to valves and pistons were suggested as well as the use of dried compressed peat as a fuel. In 1828, Mr Burstall and his son showed a quarter-scale model of their patented steam carriage which had a double boiler, one inside the other. A steam-boat was again suggested for the Forth and Clyde canal and this was to come into service in 1832 carrying goods from Port Dundas.

The railways began in Scotland with the opening in 1831 of the Glasgow to Garnkirk line. In 1838 there was great enthusiasm for a proposal made to the Society from America to show 'a locomotive engine on a railway with cars attached, propelled by electromagnetism'. However, it was felt that this was outwith the scope of the Society and it was declined.

The uses of the hydraulic pump were described in 1844. There were several lectures relative to ships and in 1862 John Napier spoke on *The Sections of Least Resistance for Ships* ... (which came up again in the Kelvin Lecture of 1972).

Physics and Chemistry

After the initial enthusiasm for the Society wore off, attendances at meetings dwindled, and a change of direction was necessary for the survival of the Society. Fortunately, this was achieved by developing from 1831 direct links with the Andersonian University, and by men of exceptional ability such as Thomas Thomson, Professor of Chemistry at Glasgow University who became President of the Society in 1834. At the same time Thomas Graham, Professor of Chemistry at Anderson's University became Vice-President of the Society. Graham subsequently became Professor of Chemistry at University College, London and some years later, one of his pupils was Joseph Lister who became Professor of Surgery at Glasgow. The development of Sections in 1840 (see page 42) did much to stimulate interest and the publication of *The Proceedings* from 1841

gave a much more informative account of the progress of the Society.

Natural philosophy was becoming more scientific and technical, and more dependent on experimental evidence and less on speculation. In 1823 there had been a talk on the atomic theory of gases and in January 1825, Mr Archibald Burns gave an address in which he said, 'matter composed as it is of original molecules, or atoms, can be divided the same as the roe of a fish to the last pellet and is no longer divisible without destroying their nature or consistence'. In 1834 Professor Thomas Graham gave an innovative lecture on *The Modern Doctrine of Isomerism* and demonstrated this using different crystalline forms of the same substance. Some of the other topics discussed at this time were the distillation of wood, and weather forecasting. In 1838 Mr Griffin exhibited cheap chemical apparatus adapted to promote the introduction of the teaching of chemistry into schools. In 1840 the President gave an essay on *Acetone, Chlorine and Caffeine*. In 1868 in On a new plastic material, the speaker described a plastic material he had made by compressing under heat a mixture of sawdust and rubber. Plastics came up again in 1945 in *The Future of Synthetic Plastics*.

In 1878 a fund had been established to honour Thomas Graham by the award of a medal and the giving of a Science Lecture. The first Science Lecture was given the following year by W. C. Roberts on the subject of molecular mobility.

Public Health

From its beginning, medical members had been active in the Society and public health was a general concern, especially because of epidemics such as typhus, typhoid and cholera. The general vaccination of children for smallpox had only recently started under the Faculty of Physicians and Surgeons at their premises in St Enoch's Square when the Society met there in 1806. The prevention of disease by getting a cleaner water supply and by trying to improve ventilation have already been mentioned

and in 1834, a member demonstrated his apparatus for fumigating clothing by steam.

Sewage

In early 19th-century Glasgow, sewage was carted to open fields and then used as manure while liquid waste soaked into the ground or was carried by open drains into the river. Between 1842 and 1844, experiments were described using different manures for different crops. In 1885 a prominent member, Professor Ebenezer Duncan, gave a paper on *Manure Poisoning* which showed how recurring outbreaks of fever at a farm was related to the years when it used Glasgow manure and not farmyard manure.

After the Loch Katrine scheme provided piped water to the city from 1869, the City Council had passed a bylaw requiring the owners of tenements to provide water-closets, but this made matters worse by blocking such drains as there were. In 1868 there was a paper on the purification of sewage water by ammonia 'so as to sustain fish'. In 1869, the Sewage Society amalgamated with the Society and the following year, there was an essay by E.C.C. Stanford, a future recipient of the Graham Medal, on the action of house sewage on lead pipes which showed that this could produce a poisonous gas. In 1872, there was an essay on *The Drainage and Sewerage of Towns* and the next year there was one on *The Removal of Sewage*. In 1875, Dr William Wallace spoke on *The Germ Theory of Putrefaction*. Dr. Russell, the Medical Officer and a future President of the Society, said in an address on *Air and Water*, 'those who have visited the Glasgow Fair on a hot, calm July day or evening will have a vivid recollection of the abominable effluvium ... and that it was worse indoors'. This was followed in 1879 by the architect James Buchan on *House Drainage and Ventilation* and also by James Sellars in his Presidential address to that Section in 1882. He quoted Dr Russell when he said that

> on some 4700 acres are congregated some 566,000 human beings, with thousands of the lower animals ...

> Three-fourths of the population live in a house of one or two apartments ... so arranged as to exclude the sunlight, ... and a large proportion are hollow squares of stagnant air, ... and inside these are ash-pits and privies. It means that the mass of our excretions is so enormous, in relation to the earth and air space, that to get them removed from our house and precincts water carriage must be employed, and therefore our rivers and streams are loaded with the foulest refuse ... .

In 1878 there had been a paper on *Purifying Glasgow Harbour* and the next year another on the purification of water. In 1880 there was a paper which proposed three sewage purifying plants, which would be able to deal with the needs of half of the population. It was not until 1894 that the first sewage purification works was built at Dalmarnock and a similar plant was built at Dalmuir in 1904.

Cremation

The increasing population, which had exceeded 500,000 by 1880, and the increase in the death rate in Glasgow meant that the cemeteries were rapidly filling up. In 1887, Professor Duncan presented a paper on the relative merits of burial and cremation and two years later, the architect James Chalmers said that, 'If the western brow of the necropolis, or the site behind the Ramshorn Church (Ingram St) could be obtained, a crematorium of this character (described) would be one of the places of interest in Glasgow'. The Western necropolis had been opened in 1882 and the first crematorium was opened there in 1895.

Fires and Explosions

One of the early members was the city firemaster and the subject of fires was discussed from time to time. A kind of fire-escape consisting of a ladder with pulley and bucket attached to be placed

against the wall was proposed in 1830. The danger of inflammable clothing was emphasised in an address shortly after several children wearing crinoline dresses had died in a fire. In 1841, there was a paper on *Fires in Factories* and the design of buildings to include consideration of fire danger was stressed by the president of the Architectural Section in his address in 1883. In 1898, the City Medical Officer, Dr Russell, in an analysis of the causes of accidental deaths, gave building fires as the most frequent cause.

Explosions of boilers was an early theme in the developing steam age and the increasing industrial use of gas in furnaces with the need for the prevention of explosions was also brought to the attention of members. Ventilation in coal mines was discussed in 1816 and a safety lamp was described; this was just when Sir Humphrey Davy invented his lamp. The average numbers of deaths of coal miners from 'firedamp' had halved from 1 in 219 in 1851 to 1 in 425 when a Royal Commission on accidents in mines reported in 1881, but this still caused great concern. In 1886 Joseph Swan described an electrical safety lamp which he had invented for use in mines, and he felt it would not be too expensive for the mine owners to introduce.

Safety on Railways and at Sea

Safety in the development of railways and the prevention of disasters such as when trains collided, or brakes failed, led to many papers. The first brakes had been mechanical ones on each carriage and various modifications were proposed. In 1848 a self-acting brake was described and in 1875 a paper was given on compressed air brakes and a vacuum brake was recommended. At this time there was a Royal Commission on railway accidents and the Society petitioned the Queen 'to instruct the Commission to inquire into Continuous Brakes ... and to recommend that they be applied to the whole railway system of the United Kingdom'. It was not until 1904 that there was a paper and discussion on electric signalling on railways.

A paper in 1850 described the electric telegraph and in 1858

the President, Professor. William Thomson, gave a paper about *The Atlantic Telegraph* and his invention of submarine conductors for the cable. However, mechanical methods of 'on the spot' signals were still needed at sea and on land when in 1886 George Buchanan gave his paper on *A New Signal for River Piers and Railways* which proposed a mechanical arm the position of which indicated 'stop' or 'go'. Other suggestions for safety of vessels were a masthead light and signs at the entrance of harbours to indicate the depth of the water.

Gas and Electricity

In 1880 the Society held a large 'Exhibition of Apparatus for the Utilization of Gas, Electricity, &c.,' in the Burnbank Drill Hall and Grounds in Great Western Road. It was planned to last for four weeks but such was the demand that this was extended for another week. There were 84 exhibitors and almost 40,000 visitors were recorded. Although there was a financial loss of £675/10/-, which was met out of the 1846 Exhibition Fund, it was felt that it had been an overall success as the amount of business generated in the city was likely to be considerable.

There had been trials of low temperatures for the preservation of food and in 1883 the installation of electrical refrigeration in a Clyde ship, so that food could be imported, was described for the first time. This was recalled in the 1965 Kelvin Lecture. It was not until 1881 when Swan's Incandescent Lamps were shown to the Society that practical electric domestic lighting became a possibility, and in 1894 an address was given on using an electric dynamo for lighting a house. In 1897, a paper on the various methods of propulsion for tramcars came down decisively in favour of the electric dynamo. *Hydro-Electric Development in Scotland* was the subject of a lecture in 1946 and nuclear electric power in 1949.

Radioactivity and the Atom

Electric discharges in rarefied media was the subject of a talk in 1860 and there were addresses on electric sparks in gaseous mix-

tures with explosive results, and also on inert gases. The latter led on to mercury vapour and neon lamps as well as to the discovery of X-rays. Roentgen discovered X-rays in November 1895 and he sent a copy of his paper to Lord Kelvin who passed it on to Dr John Macintyre in Glasgow. On 5th February 1896, Dr Macintyre and J. T. Bottomley addressed the Society on *The New Photography* and showed the shadows made by X-rays produced with vacuum tubes. One month later, Dr Macintyre opened the world's first X-ray department in the Glasgow Royal Infirmary. Ultra-violet light and the discharges from uranium were demonstrated in 1897.

The century was ending having sown the seeds of vast scientific advances, with the knowledge and development of subatomic particles and energy probably of the greatest significance. In 1903, there was a centenary lecture on *The Electromagnetic Theory of Light* as well as one on *Experiments on Radioactivity* showing some of the effects of electrons. In 1907, Lord Blythswood spoke on his research with X-rays while two years later, the Graham Lecture was on the properties of uranium and radium. In 1913 the address was about the constituents of matter and in 1919, there was a paper on the *Liberation of Electrons by Light*.

Einstein's theory of relativity was the subject of an address in 1921 and the quantum theory was discussed in 1925 in *On the Atom and Radiation*. The Science lecture in 1933 was to be by Lord Rutherford and because of the occasion the question of renting the St Andrew's Hall and admitting the public was discussed but it was decided to restrict it to the Society and its guests and to hold it in its own premises. The subject was an illustrated lantern lecture on *The Transmutation of the Elements* and the overflow had to stand in the corridors. (Einstein and Rutherford were both elected Honorary Members in 1926.) In 1940, there was a paper on recent advances in atomic physics, in 1946 there was one on *The Release of Atomic Energy* which discussed fission and fusion while in 1964 a paper was presented on the atomic bomb. In 1949, Professor Gunn spoke on *Fundamental Particles* and this was

followed up in 1951 by *On the Glasgow Synchrotron*. Professor Higgs, who gave the Kelvin lecture in 1999, brought matters right up to date with *The Search for Fundamental Particles*.

Education

The Society had from its early days shown an awareness of civic responsibilities, one of which was education. In 1879, there had been a paper *On the Present Position of Scientific and Technical Education in Germany* and in 1884 there was a plea for the teaching of Higher Chemistry in Scotland. In 1901 there was a paper on the training of teachers in Scotland and in 1904, on *A Theory of Education*. There had also been occasional papers such as on the teaching of deaf-blind children and in 1905, *On the Examination of the Eyesight of over 3,000 Glasgow Schoolchildren*.

In 1906, there was a paper on 'social derelicts', and the following year, the Factory Surgeon deplored the wastage of skills when boys left school aged 14 but could not begin an apprenticeship until they were 16-years-old. Training schemes up to age 17 were advocated and the problem of juvenile employment came up again in 1910 when training in 'commerce' was proposed. There was a related plea in 1913 for university training for commerce and administration.

At the end of the war in 1918, Professor Graham Kerr spoke on *Science and Education*, but it took until the next war for the universities to be invited to emphasise the importance of education in science. In 1940, Sir Hector Hetherington spoke on this and in 1947, there was a resumé of education in the last 100 years. The importance of the post-war universities came up again in 1951 and again in 1964 when the teaching of science was emphasised. There were papers on the teaching of science in other universities in Europe and in the USA and in 1968, the subject was *The University of the Air* (later to become The Open University). The Christmas Lectures for Young People were started in 1930 and continued regularly until 1964.

Moral Philosophy

In addition to the predominance of science as a topic in education, there was an increasing interest in economics and moral philosophy including theism and religions. When the Glasgow University Adam Smith Chair had been founded in 1897, the Society had shown a special interest and had sent a letter to Andrew Stewart, its founder, to place on record 'their appreciation of his philanthropic, wise and patriotic action'. Smith was the topic in 1923 and 1993, Hume in 1950, 1974 and 1994, Nietzsche in 1952 and 1970, Jung in 1967, Sartre in 1970, Hegel in 1974 and Schopenhauer in 1977. In 1965, the Society sponsored a project to give philosophy lectures to schools and colleges of further education, and in 2001 the Society initiated prizes to the best pupils in the school certificate philosophy examinations.

Sociology

The legal framework of society was another recurring theme. In 1899 there had been a talk on punishment and in 1906, there was one on *The Social Reformation of Criminals*. In 1907, there was *Punishment and the Prevention of Crime* and the next year there was a paper on the causes of crime. In 1910, there was a talk on 'inebriates' and in 1911, the legal framework came up under *Lunacy*. In 1916, there was *Ethics of Advocacy*, in 1924 there was *Unemployment* and in 1925, *Citizenship*. In 1931 *Criminal Punishment Past and Present* started from old biblical times and was followed by a paper on the difference between *God's Law and Man's Law*. This led on to *Law and the Citizen* in 1936. Science and crime detection came in 1944, the history of Scots law in 1945 and sheriff courts in 1947. In 1950, women's prisons was a topic. The Kilbrandon Report on Law Reform was discussed in 1968 as well as censorship. In 1976, children's rights and in 1977, children's hearings were addressed.

Modern Medicine

In its first 100 years, the health of the community had been a

frequent topic with special reference to infections and epidemics, which could be related to a bad water supply, poor sanitation and overcrowding. Improvements were advocated for these conditions. The importance of mass vaccination and of antisepsis had also been established but in the 20th century medical science became more concerned with the individual. The production of better scientific instruments helped in both diagnosis and treatment. Developments in chemistry and biochemistry resulted in purified chemical products in place of crude botanical extracts and then therapeutics became a reality. The subjects of lectures started to reflect this progress. In 1923 there was an address on diet and vitamins, some of which were known to be necessary for health, but none had by then been identified. Similarly in 1936, the subject was viruses which were known to be so small as to pass through filters which would stop bacteria but could not be seen by the ordinary microscope. The electron microscope was described to the Society in 1941 and this contributed greatly to the study of viruses and to the subjects of genetics and of the changes to the cell in cancer. Cancer research was a topic in 1942 and there was *Genetics Today* in 1945 and *Cell Structure* in 1950.

Another topic addressed in 1945 was therapeutics which was developing rapidly with the recent discovery of penicillin, and there was a lecture on antibiotics in 1950. The Kelvin Lecture by Sir James Black in 2002 gave an overview of the developments in therapeutics with which he had been involved in the preceding half century and for which he had been awarded a Nobel prize. The 1939–45 war had led to a great increase in the need for blood transfusion and there was a talk on this in 1940 and on blood groups in 1945. The lecture on Joseph Lister in 1965 was a reminder of the progress which had taken place not only in surgery but also in anaesthetics. The first successful heart transplant had just been performed in 1970 when there was a talk on transplantation by Paul Bacsich who had spent some years in research on the prevention of organ rejection using corneal grafts.

Communications

Transport was another sphere which had made rapid progress in the 20th century. There was a railway network over the country but there was no adequate system of trunk roads and the demand for motor transport was increasing. In 1924 road transport was a topic and roads-versus-rail transport was discussed. In 1925, there was a paper on railway electrification and in 1932 on *The Economic Aspects of British Railway Transport.* The motor car had come of age when in 1926 there was a talk on the *History and Evolution of the Motor-car.* Air travel was an early interest for in 1904 there was an address on *The Stability of Flying Machines* while in 1919, there was a talk on modern aircraft developments. In 1931, Handley Page addressed the Society on *Lift and Stability in Aircraft Design* and in 1934 the inventor of the autogyro, de la Cierva, spoke on rotary wing aircraft. In 1951, there was a lecture on aeronautical research. *Science and Telecommunications* was one of the topics in 1949 and the global significance of the developments from this culminated in an address on *The Death of Distance* in the year 2000.

The Fine Arts

Apart from the professional and academic members, most of the early members were involved in industry and commerce and the fine arts only occasionally entertained them. On 24th December 1821, Mr Henderson exhibited 24 very fine Chinese coloured drawings, then Mr .Buchanan exhibited an ivory box 'beautifully turned', which had belonged to Graham of Gartmore. In 1822 in an essay on architecture, Mr Watt said, 'this City is much deficient in all that belongs to the intellectual sciences particularly those connected with the Fine Arts' and he went on to praise the government for the purchase and free exhibition of the Elgin and other marbles. One of the first members was John Geddes (no.68) of the Verreville Glass Works and there was a thriving pottery industry in Glasgow at that time. In 1829, there was a talk on the stained glass windows of York Minster and in 1840 on *The Art of Pottery*, and on the Caledonian Pottery in Delftfield Lane.

In 1870 Architecture was recognised as a separate Section and in 1887, Francis Newbery, the head of the Glasgow School of Art, spoke on the training of architectural students. History and Literacy became a separate Section and the Sections provided many talks such as *Standing Stones* and *Greek Thomson* (both in 1888). In 1865, it had been agreed that there could be occasional lectures on fine art. Music was the theme in 1871, when Herschel read the paper by his friend Helmholtz, on the vibrations of violin strings. In 1888, Thomas Machell demonstrated his new invention, the dulcitone, which he had based on tuning forks. In 1894, there was a paper on Italian art and in 1900 on the art of Florence. In 1918, there was a paper on *The Language of Poetry* and in 1927, the subject was *Mediaeval Music in Scotland.*

The Section on Fine Art and Architecture was formed in 1938 when James Bridie gave the address with a plea for the development of a national theatre. In 1941, a topic was *The Glasgow School of Painting.* In 1946, there was *The Orchestra*, in 1947, *Portrait Painting* and in 1949 *Drama.* In 1972, there was a lecture on the restoration of works of art and the annual Arts Lecture started in 1978 with Roger Billcliffe speaking on *The Furniture Designs of Charles Rennie Mackintosh.*

Variety of Interests

Members were encouraged to bring and exhibit 'natural or artificial Curiosities, Antiques, Models etc.' In 1821, Mr Ian Duncan brought an oil painting on wood supposed to be of Queen Mary 'which had been found when removing rubbish when building the cavalry barracks at Stirling Castle'. It was said to be well done and in a good state of preservation. Sometimes articles from the latest journals were read, such as Livingstone's travels in Africa or Captain Peary's journey towards the North Pole. Members produced meteorites and curiosities from South America. There was a description of a mammoth's skeleton from Philadelphia and in 1826, members were told of a village near Lake Erie which was lit by gas escaping from a crevice in the

ground. In 1828, there was an address on the eruption of Vesuvius while in 1848, Dr R. D. Thomson gave an account of his expedition into Thibet which detailed his successful attempt to reach the Karakoram pass.

The Library

When the Society started in 1802, the only public library in Glasgow was that founded by Walter Stirling on his death in 1791. He left a bequest of £1,000, his house and a collection of 804 books to found a reference library with free access to the public. The finance to continue this was totally inadequate and the great need for a scientific library in the city was emphasised at the initial meeting to form the Society.

In furtherance of this, John Roberton, the vice president, purchased 71 arts and science journals while on a trip to London in 1803 and followed this with another consignment in 1804. By 1811 journals taken by the Society included *The Philosophical Journal, Retrospect* and *The Repertory* (or to give it its full title: *The Repertory of Arts and Manufactures consisting of Original Communications and Specifications of Patent Inventions and a Selection of Useful Practical Papers from the Philosophical Societies of All Nations etc., etc.).* In 1831, when shortage of money led to a reduction in the purchase of books, the only one to be continued was *Repertory.* Many of the members were engaged in the developing industries and were involved in inventing new machinery and improvements to processes and parts of machines. They looked to patenting those with financial prospects and hence the need for *Repertory* and up-to-date scientific journals. That this was a continuing interest is shown in 1875 when a proposed new act 'relating to Letters Patent for Inventions' was under discussion in Parliament. The Society petitioned the House of Commons to reject it as they felt the existing legislation was better and in the following year, when the Patent Acts Amendment Bill was being discussed, they submitted 19 detailed amendments.

In 1812 the Regulations provided for a Librarian to be an additional member of Council, ex officio, and William Duncan became the first librarian. That same year it was decided by a majority to purchase *Rees Cyclopaedia* as each volume came out, in preference to the *Encyclopaedia Britannica*, though the latter was added later. It is interesting to note that Thomas Thomson who became president in 1834 had succeeded his brother as editor of the *Encyclopaedia Britannica* in 1796. Thomson's *Philosophical Annals* was added in 1814. Each year, additions were made to the Library as funds allowed. The catalogue of 1829 had 300 volumes of which 69 volumes were a complete set of *Repertory* from 1794 and another 68 volumes were of the *Philosophical Magazine* from 1798. 'General Works' included *Brewster's Dictionary* and *Hedderwick's Reference Book*.

In 1831, when the Society made the arrangement with the Andersonian University, all of its library was taken into the Andersonian library. It is likely that many of them would be included in the 500 books and other journals bought by the Society from the Andersonian library in 1840 for £45. By 1845 the total number of books was 750 miscellaneous volumes and 550 journals.

In 1853, the total had risen to over 2,000 volumes. This included over 260 journals from 110 other learned societies with which journals were exchanged, many in Europe, the USA, Canada, Australia and India. By 1869 the total was 4,831 volumes and the Library was insured for £2,000. In December of that year, when the Architectural Society amalgamated, their books were added to the Library. In 1871 the Society complied with a request from the University of Strasburg for a replacement set of the Society's *Proceedings* as their library had been destroyed by fire 'in the recent siege'. In 1873 the Astronomer Royal presented a set of the Royal Observatory's publications to the Library, some 114 in total.

When the new building in Bath St was completed in 1880, there was a separate room for the library. By 1903 the insurance

value of the books had risen to £4,900 plus £500 for the books which had been handed over by the Architectural Society when it amalgamated with the Society. In 1947–48, some books were sold for £750.

In 1961, when the building was sold, temporary accommodation for the library books was found in the Mitchell Library and in the Royal Technical College (the Andersonian Library). The books were sold in 1968–69 and the Andersonian Library paid £300 for a selection, with the rest going for sale by Thin's in Edinburgh (£500) and Sotheby's, London (£4,564).

The Proceedings and *Journal*

The Proceedings, which since publication in 1841 had been sent to every member of the Society and to many kindred societies, was discontinued in 1952 because of the cost. A new *Philosophical Journal* was published from 1964 and Dr John Lenihan who was Honorary Secretary from 1965 to 1975 had much to do with the success of this. In recognition of his contribution to the Society, he was elected Honorary Vice President. With mounting editorial problems and the difficulty of getting transcripts of the papers presented the *Journal* was discontinued in 1977.

The Sections

The Sections, which began in 1840, contributed very significantly to the success of the Society. Initially, there were four: Chemistry, Engineering, Physics and Natural History. Each Section had a leader and its own executive. As well as their own meetings, as the *Proceedings* show, their members frequently gave addresses to full meetings of the Society. Sections multiplied as interests developed, until in 1857 the 16 rather loose Sections were reduced to seven, covering Astronomy and Mathematics; the Mechanical Applications of the Principles of Physics; Engineering and Practical Mechanics; Theoretical and Applied Chemistry; Mineralogy, Metallurgy, Geology and Geography; Meteorology;

Zoology, Botany, Agriculture, Anatomy and Physiology; Economical, Educational and Social Statistics . In 1869, a Sanitary section was included with Statistics when their association amalgamated with the Society. In the same way in 1869 Architecture came in as a Section, to be followed by Archaeology. In 1873, Engineering and Shipbuilding was also formed into a separate Section. The Microscopical Society joined in 1899 to represent still another interest.

As interests changed and as national societies developed the only Sections still active by 1914 were Architectural; Geographical; Sanitary and Social Economy; Historical and Philological; and Mathematical and Physical. By the time the war was over in 1918, only the Historical and Philological had survived and Economic Science soon started again. The Biology Section was revived in 1922 and the Geography in 1929, but the latter was discontinued three years later, when it was also decided not to revive Architecture. In 1938, a Fine Art and Architecture Section was formed and the History Section was still meeting. The end came after 100 years when in 1940 all Sections were discontinued.

Honorary Membership

Provision for Honorary and Corresponding Membership is included in the first Regulations of 1802 and repeated in the first printed constitution in 1812. Persons nominated for Honorary Membership had to be of outstanding merit or to have given eminent service to the Society. This seems to have been awarded to local personages, or to deserving members when they moved away from Glasgow. Such were James Hunter (1818) when he moved to a chair in Edinburgh University, James Clelland (1822), the City 'Statist', who presented several volumes of his *Annals of Glasgow* to the Society, Sir John Sinclair (1822) having presented the Society's loyal address to George IV that year, was also made an Honorary Member. In 1829, Honorary and Corresponding Members totalled 13 which had risen to 47 by 1831.

In 1859 the Council agreed that Honorary Membership should also be awarded to 'distinguished men of science belonging to any part of the world' and the total number of these was not to exceed 20 at any one time. In 1860, 16 persons were elected under the new provisions as Honorary Members. There were six from the UK, three resided in Paris, three in the USA and one in each of Bavaria, Heidelberg, Leipzig and Wurzburg. The last person to be elected in this capacity was Professor F. O. Bower from Yorkshire in 1931. Between these years there were eminent people from all over the world: France, Germany, Russia, Australia, the USA, Canada, South Africa and India as well as from the UK. Of these the last survivor was Sir Chandrasekharan Raman who died in 1970. In 1965, the Principals of Glasgow and Strathclyde Universities were elected Honorary Members.

Corresponding members had to be resident outwith Glasgow. Existing members could be elected to this when they moved away, but it was also open to persons resident abroad. When Mr. Roberton returned from London in 1803 he proposed that Alex Tillich, the editor of the *Philosophical Magazine* be made a member, and this was agreed. He is shown as Member no.67. Alexander Johnston, a civil engineer was also elected when he moved to Dublin, and Andrew Smith from Mauchline was a Corresponding member. Overall the numbers were small and only four are recorded in 1874. One of these was A.S. Herschel on his departure to Newcastle.

Moving with the Times

In 1930, Dr James Knight, the Honorary Librarian of the Society, pointed out in a book on Glasgow and Strathclyde, that the prosperity of Glasgow had depended on the nearby coalfields and the Clyde. He wrote that '... the material advantages of the Clyde are long past, or are passing rapidly ...', and stressed that the future would depend more and more on non-material assets, including the character of the inhabitants. The Second World

War only delayed the decline in the heavy industries and the Society's activities reflected the changes. Service industries were represented more often in the programmes but the Graham Lectures on chemistry, which had started in 1879, and the Kelvin Lectures in physical sciences (from 1959–60) continued. Astronomy or another science such as botany, geology or geography was usually included. There were more social and ethical subjects and in addition to the 'Arts' lecture there was often another 'artistic' topic or a visit to a local centre of interest. Having reached its bicentenary, the Society has become an important part of the cultural life of the city with an annual syllabus of addresses by eminent speakers. However, the original concern for 'the prosperity of the Trades and Manufactures' is no longer evident but the 'Arts and Sciences' are still well represented.