HISTORY OF THE PHYSIOLOGICAL SOCIETY, 1876–1926

By Sir EDWARD SHARPEY-SCHAFER, F.R.S.
(*Professor of Physiology in the University of Edinburgh.*)

In the middle part of the nineteenth century Great Britain was far behind France and Germany in the development of Physiology. We had no pure physiologists and it was considered that any surgeon or physician was competent to teach the science. Indeed, long after this, the subject was in many medical schools left in the hands of a member of the hospital staff, usually a young man, who carried on clinical teaching as well. Hence, during a period of time when other experimental sciences were rapidly progressing, Physiology in this country could show no names worthy to be mentioned with those of Magendie, Bernard, Müller, Helmholtz, or Ludwig, to mention but a few of the brilliant physiologists of France and Germany. In one place only—University College, London—was a lamp kept burning; the lamp was that of William Sharpey. Although Sharpey had received a purely anatomical training, he had manifested his physiological leaning by his investigations regarding the action of cilia, and he early familiarised himself with the microscopic appearances of, and changes in, living cells, as well as with the structure of animal tissues. This led to his having a wider outlook than that of the pure anatomist of that day, and it was a happy event for the future of Physiology in England that Sharpey was invited to occupy the newly instituted chair of General Anatomy and Physiology at University College, London, in 1836. It is true that his lectures were largely anatomical, that he carried out no physiological researches, that he performed no experiments on muscle and nerve other than those which had been performed by Galvani half a century earlier, that he never possessed a kymograph (the working of which he would illustrate to his class by revolving on the lecture table what Michael Foster called his "dear old hat"), but he had a remarkable grasp of the problems of physiology and a singular power of imparting his conclusions to his audience. Recognising his limitations in the matter of experimental investigation, he was none the less ready to encourage others to undertake research and was prepared to afford opportunities for carrying out such work at University College—although, in the absence of any proper laboratory accommodation, opportunities were scanty.

But as the years progressed he began to feel that more should be done to encourage physiological work in this country, added to which he probably had the idea of the introduction of a successor to himself. He induced George Harley, then a rising physician, who had worked in Paris with Bernard, to start a class of Practical Physiology at University College[1]. But Harley, with a growing practice, soon found it impossible to continue this work. Sharpey then persuaded Michael Foster, a young man of about thirty, who had received his medical education at University College and Hospital and was engaged with his father in general practice in Huntingdon, to give up medicine and come to University College with the title of Professor of Practical Physiology. This appointment of Michael Foster proved a decisive factor in the history of Physiology in Great Britain.

Foster himself, although he had been Sharpey's medallist, had no special training in Physiology. He had a practical knowledge of Chemistry and Histology, and from visits to continental centres learned something of what was being done in France and Germany. Having accumulated certain physiological apparatus, including microscopes, he organised a course of practical instruction in a room which was allotted to him in the College, and which received the title of Physiological Laboratory. The course was not compulsory and was attended only by students who displayed a special interest in the subject and were willing to pay an extra fee. It consisted, as regards histology, of the examination of teased preparations of fresh tissues and of sections of organs made with a razor by chopping them on a glass slide, or, in the case of firmer tissues, by cutting them while held in a split cork. The chemical part embraced a study of the constituents of blood and serum, the spectroscopic appearances of hæmoglobin and its derivatives, the components of bile and urine, the phenomena of gastric and pancreatic digestion, the general properties of albumins, carbohydrates and fats. The experimental part was less complete, but the phenomena of nerve- and muscle-physiology were investigated in the frog, as was also the action of the heart and the circulation—the latter both in the frog and mammal.

It will be seen that the course, although elementary, was planned on a sound basis by Foster, who displayed that capacity for organisation which was to have so much influence later in the promotion of Physiology in Cambridge.

[1] Dr George Harley, F.R.S., was the first in this country to repeat the experiments of Brown-Séquard on the effect of extirpation of the suprarenal capsules.

In addition to conducting the course of Practical Physiology, Foster used to give occasional lectures, with demonstrations, to Sharpey's class in the large Physiology Lecture Room.

This development of Physiology in University College soon exerted its influence outside the walls of that institution. Other medical schools in London began to start instruction on similar lines, and independent workers, who were for the most part active clinicians—conspicuous amongst whom was Pavy of Guy's Hospital—were encouraged by finding their scientific work better appreciated than was possible when it had merely to pass the criticism of fellow-practitioners. Amongst clinicians who at this time began to take an interest in Physiology was Burdon Sanderson, who had been for some time established in London. Falling under the influence of Sharpey, who made arrangements for him to perform experimental work at University College, he there carried out (in 1866) a series of experiments on the effects of respiration on the circulation. But the apparatus which he used for recording blood-pressure had serious disadvantages, and indeed he must have soon recognised that for the conduct of such investigations a familiarity with laboratory methods is essential. He was more fortunate in his studies of the pulse under normal and clinical conditions and published his results in a small monograph which came out in 1867. The interest in Physiology which these studies displayed led to his being invited to become successor to Michael Foster.

This succession came about under the following circumstances. Professor George Murray Humphry, F.R.S.[1], then Professor of Anatomy in Cambridge, who took a broad view of medical education and was anxious for its development in his own University, recognised that the first necessity for this was the foundation of a chair of Physiology. But the project was not then practicable, nor did it become so for some time. However, Humphry, with the aid of Mr Coutts Trotter and of Mr W. G. Clark, who were influential Fellows, and of Dr, afterwards Sir, George Paget, K.C.B., Physician to Addenbrooke's Hospital, persuaded Trinity College to start the ball rolling by establishing a Prælectorship of Physiology in the College[2]. The duties of the Prælector were to give lectures in Physiology to students, not only of the College but of the

[1] Afterwards Sir G. M. Humphry. Humphry was the founder, in conjunction with Sir William Turner, of the *Journal of Anatomy* (1866) and in 1886 helped to found the Anatomical Society, of which he was the first President. He died in 1896 at the age of 76.

[2] The original suggestion came from George Henry Lewes and George Eliot, who were friends of W. G. Clark. Clark, who was elected Public Orator in 1857, was one of the editors of the newly established *Journal of Philology*. He died in 1878.

University in general, who might desire instruction in that subject, and to organise laboratory work in conjunction with the lectures in a room allocated for this purpose. On Huxley's suggestion Michael Foster was asked to occupy the position thus created. Accordingly in 1870 he transferred his activities from London to Cambridge, and Burdon Sanderson was nominated to the chair of Practical Physiology in University College, with the understanding that he would also succeed to that of Physiology on Sharpey's retirement, an event which took place in 1874[1].

Sanderson now relinquished his clinical appointments and henceforth devoted himself to Physiology, although continuing for some time his pathological work, chiefly on the communicability of tubercle[2].

Both Foster at Cambridge and Sanderson in London quickly began to develop their subject, and each became surrounded by a group of young and earnest workers, many of whom went sooner or later abroad for the special training necessary for physiological work, which could not yet be obtained in their own country. At these two centres were established two schools of Physiology which have sent offshoots to all parts of the Empire, as well as to the United States. Both schools owed their origin to the teaching and influence of William Sharpey, who is with justice to be regarded as the real founder of modern Physiology in this country.

With the growth of Experimental Physiology, and the sister science Experimental Pathology, operations upon living animals necessarily began to multiply, and before long a vigorous anti-vivisection agitation sprang up[3]. As the result of the agitation the Government of the day appointed in 1875 a Royal Commission (presided over by Lord Cardwell)

[1] Incidentally the writer here comes into the story. Having, along with Newell Martin, worked for some time with Foster at University College, both were invited to accompany him to Cambridge in 1870. Martin accepted the invitation and helped to found the Cambridge school of Physiology; he eventually migrated to Baltimore to take charge of the teaching of Physiology at the newly established Johns Hopkins University. The writer remained with Sanderson at University College as Assistant and Assistant Professor, and thirteen years later succeeded to the Chair, which he held for sixteen years, being himself succeeded in 1899 by E. H. Starling.

[2] This was carried on in a private laboratory overlooking a mews at 18 Howland Street (now renumbered), and later at the Brown Animal Sanatory Institution in Wandsworth, of which he was appointed the first Superintendent.

[3] It is not to be wondered at that the general public (ignorant of the fact that no science can advance without experiment and that, for a science dealing with life, experiments must be made upon the living subject; also not knowing that in the great majority of cases such experiments are performed painlessly under the influence of anæsthetics) was led, by the blood-curdling tales broadcasted by the anti-vivisection agitators, to voice a demand for the regulation or even the abolition of experiments on living animals.

to investigate the subject and to report and advise as to whether it was necessary to take legislative steps in the matter. The representatives of Physiology on the Commission were Huxley and Erichsen[1]. After hearing an interminable amount of evidence on both sides, the Commissioners eventually produced a Report, which, like all such Reports, was a compromise. Although they had not been presented with any irrefutable evidence that acts of cruelty had been perpetrated upon animals in this country in the pursuit of physiological or pathological investigations, they nevertheless agreed to recommend that the practice of vivisection should be regulated by Act of Parliament and that it should only be permitted to persons to whom a licence had been granted by the Home Secretary on the advice of certain responsible authorities. For special experiments which might involve pain or in which, for various reasons, anæsthetics could not be employed during the whole course of the experiment, special certificates limiting the number and defining the scope of such experiments were to be obtained and signed by the same authorities, the operation of these certificates being subject to the veto of the Home Secretary. In consequence of the Report of the Royal Commission and the knowledge that it was the intention of the Government to bring in a Bill dealing with the subject, it was evidently desirable for physiologists to form an association which might come into communication with the minister in whose hands the conduct of the Bill would be placed, with the view of modifying proposals which seemed to hamper unduly the progress of experimental medicine. Thus the anti-vivisection agitation was the cause of the formation of the Physiological Society. *Ex malo bonum!*

FOUNDATION OF THE SOCIETY

As a result of the events just narrated, the Physiological Society was founded by nineteen persons interested in Physiology who met at the house of Dr John Burdon Sanderson in response to his invitation. A facsimile of the invitation, as addressed to the writer, is appended[2].

[1] Sir John Eric Erichsen, F.R.S., Professor of Clinical Surgery at University College, and Surgeon to University College Hospital. Erichsen became the first Inspector under the new Act, and had, to assist him in the work, Dr George Vivian Poore, Assistant Physician and afterwards Physician in the same Hospital. On Erichsen's retirement Poore became Chief Inspector. He again was succeeded by Sir George Thane. On Thane's resignation Mr J. A. Giles was made Chief Inspector and still holds the appointment.

[2] The body of the letter is in Mrs Sanderson's handwriting.

49, QUEEN ANNE STREET.
W.

March 28th 1876

My dear Schäfer

It is proposed to hold a Meeting at my house at 5.30 p.m. on Friday next (31st) of a preliminary character, for the purpose of considering whether any, or what steps ought to be taken with reference to the Recommendations of Lord Cardwell's Commission. It will probably

also be proposed at the
meeting to form an Association
of Physiologists for mutual
benefit and protection.

Sharpey, Huxley, Foster,
Lewes and others, have pro-
mised to attend. I shall be
glad if you can come also

Yours very truly

J Burdon Sanderson

The proceedings of the meeting are chronicled in the first Minute Book[1] of the Society as follows:

At a meeting held on the 31st March, 1876, at 49 Queen Anne Street, Dr J. Burdon Sanderson in the Chair.

Were also present: Wm. Sharpey, F.R.S., Thos. H. Huxley, F.R.S., Michael Foster, F.R.S., Geo. H. Lewes, Francis Galton,

[1] This Minute Book was lost for more than twenty years, all attempts to discover its whereabouts having been unavailing. It was accidentally found by Sir Charles Sherrington in a cellar in the old part of the Physiological Laboratory at Oxford, amongst a number of loose papers; it seems to have been there since Burdon Sanderson's time. It is now the most valued possession of the Society.

F.R.S., John Marshal[1], F.R.S., G. M. Humphry, F.R.S., Fk. Wm. Pavy, F.R.S., T. Lauder Brunton, F.R.S., David Ferrier, P. H. Pye-Smith, Wm. H. Gaskell[2], J. G. McKendrick[3], E. Klein, F.R.S., E. A. Schäfer, Francis Darwin, Geo. J. Romanes, Gerald F. Yeo.

It was proposed by Dr Foster, seconded by Mr Lewes, and carried "That an association be formed under the name of 'The Physiological Society' for promoting the advancement of Physiology and facilitating the intercourse of physiologists."

It was proposed by Dr McKendrick, seconded by Dr Schäfer, and carried "That all persons attached to Physiology and anxious to promote its progress be eligible for membership; that Dr Yeo and Mr Romanes be requested to act as Secretaries *pro tem.*, and that the Secretaries *pro tem.* with Dr J. Burdon Sanderson, Mr Galton, Mr Lewes, Dr Pye-Smith, Dr Brunton, Dr Ferrier and Dr Foster form a Committee for the purpose of drawing up a Draft Constitution to be submitted to an adjourned meeting."

The minutes both of this and of the adjourned meeting are signed by Mr Lewes.

The adjourned meeting was held on April 26, 1876, at 37 Dorset Square (Dr Gerald Yeo's house). Professor Huxley was in the Chair; there were also present Sanderson, Ferrier, Foster, Brunton, Pye-Smith, Yeo, Galton and Romanes. The Draft Constitution was submitted, and after emendation adopted as the Rules of the Society.

FIRST RULES OF THE SOCIETY

I. This Society is called "The Physiological Society."

[The present rule says "shall be called": not an improvement on the original.]

II. The Society is instituted for promoting the advancement of Physiology and facilitating the intercourse of Physiologists.

III. The Society shall consist of not more than Forty members, all of whom shall be working physiologists.

[This number is now unlimited and the qualification has been abandoned: it was always a dead letter.]

[1] Should be John Marshall, a distinguished surgeon attached to University College Hospital, and an old pupil of Sharpey. He published a *Text-book of Physiology* in two volumes, largely based on notes from Sharpey's lectures. He was President of the Royal College of Surgeons 1883–88. He was elected an Honorary Member of the Society in 1882. He died in 1890.

[2] Should be Walter H. Gaskell.

[3] Professor of Physiology in Glasgow from 1876 to 1906. He died January 2nd, 1926.

IV. Men of distinction in Science who have contributed to the advancement of Physiology are eligible for election as *Honorary Members*. The number of Honorary Members shall not exceed five.

[It is now twelve.]

V. Honorary Members shall have the right of attending the meetings of the Society and taking part in the discussions.

VI. The Committee shall nominate candidates from names suggested by members to fill the vacancies which may exist in the Society.

[In view of the alteration in III, the latter part of this rule has dropped out.]

VII. The nominees of the Committee shall be balloted for by the Society at the Annual General Meeting.

[A second meeting for election of members has been added.]

VIII. One black-ball in three shall exclude.

[This is now more rigorous, viz. one in five; rather unnecessarily so, considering that only candidates selected by the Committee are balloted for.]

IX. One full week before the meeting at which the Ballot is to take place the Secretaries shall send to each member a ballot-paper containing the names of the candidates nominated by the Committee.

[Their qualifications and the names of their proposers are now added to the ballot-paper and the method of marking this is prescribed.]

X. Any member unable to attend the annual meeting can vote by sending his ballot-paper enclosed in an envelope, bearing his name, to the Secretaries on or before the day of Ballot. The Chairman shall open such envelopes and place the ballot-paper in the box.

XI. Each ordinary member shall pay an annual subscription of *ten shillings*. The charge for dining shall be additional.

[The subscription was raised to *one pound* in 1884, to *one pound five shillings* in 1888, to *one pound eleven shillings and sixpence* in 1890, and is now *two guineas*. But each member now receives the *Journal of Physiology* without additional payment.]

XII. The subscription is payable in advance and becomes due on the 1st of November.

[This has been changed to January 1st.]

XIII. Any member whose subscription is not paid within twelve months after it has become due shall cease to be a member of the Society.

XIV. Any ordinary member who has not attended at least one meeting during the year shall cease, *ipso facto*, to be a member, unless he shall satisfy the Committee that his absence arose from unavoidable circumstances.

[This became a dead letter and was eventually repealed.]

XV. The meetings shall be held on the *Second Thursday* in the months of November, December, January, February, March and May.

[Since 1884 the day of meeting has been changed to Saturday, and the number of meetings in the year has been increased.]

XVI. At each meeting one of the members shall, on the motion of one of the Secretaries, be elected to act as Chairman.

[This rule still holds good for General Meetings; but after the Society began to hold scientific meetings in laboratories it became usual for the head of the laboratory to act as Chairman.]

XVII. The duties of the Chairman shall be to control the order of proceeding, and generally to direct the business of the meeting.

XVIII. The meetings of the Society shall commence with dinner at six o'clock punctually. The Business shall commence at seven o'clock exactly.

Members not wishing to dine may join the meeting at any time after dinner.

[This rule is interesting as establishing the fact that the Society was originally intended to be a *dining club*. The early hour seems to have been prescribed to enable members residing in Cambridge to catch the last train back. The time for commencing dinner was afterwards changed to seven o'clock; in the existing rules nothing is said about a dinner. But one of these (XXVII) appears to assume that a dinner is still a part of the proceedings since it reads "Each member intending to be present at dinner shall send notice, etc.;

and if he introduce a visitor, must at the same time forward the name of the guest." A dinner is no longer necessary; but, although not specified in the existing rules, business matters are still almost invariably discussed after dinner.]

XIX. The Chairman shall vacate the Chair at eight o'clock, unless a motion to the contrary be put and carried.

XX. Each member shall have the privilege of introducing a visitor, whose name shall be entered on the minutes.

XXI. The Annual General Meeting shall be held on the Second Thursday in May, when the Secretaries' report and statement of accounts shall be laid before the Society.

[The Annual Meeting is now held in March, after October and January had been successively tried.]

XXII. At the Annual General Meeting two Secretaries shall be elected for the ensuing year, and also seven members, who, together with the Secretaries, shall act as a Committee of Reference and Nomination.

[There are now two Secretaries and a Treasurer, besides thirteen ordinary members of Committee. In addition the Chairman of the Editorial Board of the *Journal of Physiology* and the Editor of *Physiological Abstracts* are *ex officio* members of Committee. Since these two Journals have been acquired by the Society it has become necessary to appoint Trustees to hold property on its behalf. No provision of this nature is contained in the original rules, and the Society, not being chartered or incorporated, has hitherto been unable to accept gifts or legacies. The change was made in 1926.]

XXIII. Not more than five members of the Committee shall be eligible for re-election. [This is now ten.] Any member may suggest the name of a candidate to serve on the Committee by sending the proposed name to the Secretaries at least four weeks before the Annual General Meeting.

XXIV. One full week before the Annual General Meeting the Secretaries shall send to each member a balloting list containing the names of the Committee, together with the names suggested to fill the vacancies.

XXV. The Society shall elect the Committee by ballot (as in

Rule X): each member striking out at least two names [now three] from the Committee list, and prefixing a mark to those of the suggested names which he may wish to substitute.

XXVI. The Secretaries shall send to all the members of the Society notices of each meeting, and when possible the subject to be brought forward. Such communications as shall be thus notified shall have priority.

[Demonstrations now have priority over verbal communications at the scientific meetings which have since been established; the latter were not contemplated at the formation of the Society.]

XXVII. Each member intending to be present at the dinner shall send notice to that effect to the Secretaries on the Monday previous to the meeting. And in case he intend to introduce a visitor he shall at the same time forward the name of his guest.

XXVIII. If at any time the Committee shall be of opinion that the interests of the Society require the expulsion of a member they shall submit the question to a Special General Meeting, at which if two-thirds of the members of the Society vote (by ballot as in Rules IX and X) for the expulsion of the member in question, his subscription for the current year shall be returned to him and he shall thereupon cease to be a member of the Society.

The copy of these rules in the minute book is signed *5th May* 1876, *G. H. Lewes.*

Considering with what care the original rules were drawn up and the experienced men who framed them, it is curious that there should be no special provision for alterations. This defect has now been rectified; but before this was done alterations were frequently made, at any meeting and without special notice.

ORIGINAL MEMBERS OF THE SOCIETY

The next meeting was held on May 5th, 1876, at 18 Cornwall Terrace (Mr Romanes' house). Mr George Henry Lewes was in the Chair and the following were also present: Drs Sanderson, Power[1], Ferrier, Yeo

[1] Mr Henry Power, F.R.C.S., was Lecturer on Physiology and subsequently Ophthalmic Surgeon at St Bartholomew's Hospital. He edited Carpenter's *Physiology*, a monumental compilation which was in considerable demand at this time in consequence of the lack of less voluminous text-books. He died in 1911.

and Mr Romanes. At this meeting it was determined that the first Annual Meeting of the Society should be held on the 26th of the present month (May) and that the Rules should be printed and circulated amongst the following physiologists, "who shall be invited to become members and attend the next meeting of the Society." The list comprises two Honorary Members, Charles Darwin, F.R.S. and William Sharpey, F.R.S., and the following ordinary members: Francis Maitland Balfour (Cambridge), T. Lauder Brunton, F.R.S. (London), William B. Carpenter* (London), Richard Caton (Liverpool), Francis Darwin (Down), A. G. Dew-Smith (Cambridge), Thiselton Dyer (Kew), David Ferrier (London), Michael Foster, F.R.S. (Cambridge), Francis Galton, F.R.S. (London), Arthur Gamgee, F.R.S. (Manchester), Alfred H. Garrod* (London), W. H. Gaskell (Cambridge), G. M. Humphry, F.R.S. (Cambridge), Thos. H. Huxley, F.R.S. (London), E. Klein, F.R.S. (London), J. N. Langley (Cambridge), E. Ray Lankester, F.R.S. (Oxford), George H. Lewes (London), John Marshall, F.R.S. (London), Henry Newell Martin (Cambridge), Jeremiah McCarthy (London), Robert McDonnell, F.R.S. (Dublin), John G. McKendrick (Glasgow), F. W. Pavy, F.R.S. (London), P. H. Pye-Smith (London), Henry Power (London), Benjamin W. Richardson (London), George Rolleston* (Oxford), George J. Romanes (London), William Rutherford (Edinburgh), J. Burdon Sanderson, F.R.S. (London), Edward A. Schäfer (London), Gerald F. Yeo (London), C. Yule (Oxford).

Of the above names those marked with an asterisk are crossed out in the Minute Book, with the note "Refused to join." Dr Carpenter was, however, present as a guest at the inaugural banquet. He was elected an Honorary Member in 1882. Humphry resigned in 1877.

Mr Thiselton Dyer (F.R.S. 1880), born 1843, was Assistant Director of the Royal Gardens, Kew, and afterwards Director (from 1885 to 1905), in succession to Sir Joseph Hooker, whose daughter he married. He is now Sir W. T. Thiselton-Dyer, K.C.M.G., C.I.E.

Mr Jeremiah McCarthy, F.R.C.S., was born in Dublin, and graduated at Trinity College. He became Assistant Surgeon (1869), Surgeon (1883) and Lecturer on Physiology (1873 to 1893) at the London Hospital, from which he retired in 1898. He died in 1924, at the age of 88.

Dr George Rolleston (F.R.S.) was Linacre Professor of Comparative Anatomy in the University of Oxford.

Dr Benjamin W. Richardson (F.R.S. 1867) was a London

M. Foster. in the Chair –

Francis Galton H. T. Thiselton Dyer

[illegible] H. Newell Martin

[illegible] E. A. Schäfer

[illegible] W. H. Gaskell

[illegible] John G. McKendrick.

[illegible] Thelwall Brunton

[illegible] [illegible] F. Yeo –

A. G. Dew-Smith. J. Burdon Sanderson

E. Klein. J. N. Langley

A. M. Balfour Francis Darwin

R. Cotton

physician who wrote on physiological and pharmacological subjects. He introduced methylene chloride as a general anæsthetic and ether spray as a local anæsthetic. He developed—in an essay which received the Astley Cooper Prize (1856)—the conception that coagulation of drawn blood is due to escape of free ammonia, a theory which was demolished by Lister in his Croonian Lecture for 1863. He was knighted in 1893. He died in 1896.

Mr C. Yule was a Fellow of and Lecturer on Physiology in Magdalen College.

Most of the other original members are referred to elsewhere. Four are still living, namely, Sir W. T. Thiselton-Dyer, Sir David Ferrier[1], Sir E. Ray Lankester and the writer, but only the last mentioned has remained a member throughout.

INAUGURAL MEETING OF THE SOCIETY

The various meetings the proceedings of which have been chronicled above were of a preliminary nature. The next meeting was the actual inaugural meeting, which was appropriately celebrated in the customary English fashion by a dinner. This was held at the Criterion Restaurant, Regent—now Piccadilly—Circus, on Friday, May 26th, 1876. As it was not only the first meeting but the only occasion on which the members of the Society who were present signed their names in the Minute Book, it is interesting to reproduce the page.

It will be seen that they numbered twenty-two in all. There were in addition fourteen guests (who did not sign) including four foreign physiologists—Donders of Utrecht, Marey and François-Franck of Paris, and Lovèn of Stockholm. Amongst the guests of British nationality the outstanding names are those of William Bowman, William B. Carpenter and William Marcet.

William Bowman, F.R.S., afterwards Sir William Bowman, Bart., had distinguished himself early in his career by his epoch-making observations on the structure of striated muscle, on the intrinsic muscles of the eye, especially the ciliary muscle, and on the structure of the kidney and the relations of the Malpighian bodies to the tubules and of the blood vessels to both. By this time, however, he had given up purely scientific work, and had

[1] Sir David Ferrier was elected an Honorary Member in January, 1927.

specialised in ophthalmic surgery, in which he had a very considerable practice. Of high attainments, he was, nevertheless, possessed of a singularly gentle and modest disposition, and no one who had the honour of his acquaintance could fail to entertain an affectionate regard for him. Although no longer working at Physiology himself, he was a constant source of encouragement to younger workers. He did not join the Society as an ordinary member—he probably considered he was not sufficiently in touch with modern Physiology—but in 1882 was elected an Honorary Member, a mark of esteem he much appreciated. He died in 1892.

Dr William B. Carpenter, F.R.S., who probably declined the invitation to join the Society because he felt he could no longer regard himself as a physiologist, was at this time Registrar of the University of London. He was the author of the large work on *Physiology* already referred to as edited by Henry Power. In 1882 he was elected an Honorary Member of the Society. He died in 1886.

Dr William Marcet, F.R.S., subsequently joined the Society as an ordinary member (see p. 54).

The menu of the dinner is preserved in the Minute Book and does credit to the gastronomic abilities of the members.

After dinner the following toasts were proposed:

By the Chairman, "Her Most Gracious Majesty the Queen."

By Mr G. H. Lewes, "Foreign Physiologists," responded to by Donders and Marey.

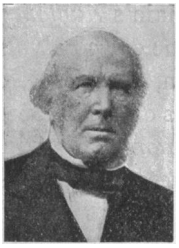
By Professor Rutherford, "Our Guests," responded to by Carpenter and Bowman.

The new-born Society was not itself toasted, but this omission does not appear to have hindered its development.

The only business done was the confirmation of the Provisional Committee as the Committee of the Society for the ensuing year.

FOUNDERS OF THE SOCIETY

Before proceeding to narrate the further history of the Physiological Society, it will not be uninteresting to furnish some description of those who were principally responsible for its formation. The portraits which accompany these descriptions were in most cases taken at about the time of the foundation of the Society. In a few instances it has been impossible to obtain these, and later photographs have been used.



WILLIAM SHARPEY[1] was born at Arbroath on April 1st, 1802[2]. His father was a native of Folkestone but was married to a lady of Arbroath, in Forfarshire. The father died before the birth of his son. The mother married again; her second husband was Dr Arrott, a practitioner of Arbroath, by whom William Sharpey was brought up along with several half-brothers and sisters. Sharpey was sent to Edinburgh University in 1817, when he was only 15 years old; he began by studying Greek and Natural Philosophy, but the next year he transferred to the Faculty of Medicine. In 1821, at the age of 19, he obtained the Diploma of the Edinburgh College of Surgeons. He graduated M.D. in 1823, having in the meantime pursued studies in Anatomy in London, and in Surgery in Paris (under Dupuytren). After graduation he spent another year at the hospitals of Paris and studied Natural History at the Jardin des Plantes. Eventually he decided to give up the pursuit of Medicine and devote himself to Anatomy and, incidentally, to Physiology. With the view of obtaining information on these subjects he spent several months travelling on the Continent, for the most part walking with a knapsack; he finally settled down in Berlin in autumn 1828. Here he worked under Rudolphi, dissecting assiduously for several hours a day. On returning to Edinburgh in 1829 he continued to engage in microscopical and anatomical researches and collected materials for illustrating a course of lectures. He established himself as an extra-mural Lecturer in 1831, and attracted large numbers to his classes. His chief work at this time was on the distribution and the action of cilia in the Animal Kingdom. His observations were published in the *Edinburgh Medical and Surgical Journal* and in the *Edinburgh New Philosophical Journal*, and later formed the basis of an article in Todd and Bowman's *Cyclopaedia of Anatomy and Physiology* published in 1836. As already intimated, when it was decided in 1836 to establish a separate chair of General (or Physiological) Anatomy and Physiology in University College, he was invited to occupy it, and continued to do so until 1874, when he retired in favour of Burdon Sanderson. His work during the early part of his tenure of the chair was chiefly microscopical and concerned with the structure of the tissues, especially the structure and development of bone—his observations on the subject form the basis of our present

[1] The name Sharpey seems to be rare: it does not occur in the London Post Office Directory.

[2] April 1st was also the birthday of William Harvey, who was born at Folkestone in 1578.

knowledge. They were published in the fifth edition of Quain's *Anatomy* —a book originally written by Jones Quain but at this time edited along with Sharpey by his better known brother Richard Quain, a celebrated anatomist and surgeon, the author of a folio on the arteries of the human body—finely illustrated by Maclise. The *Microscopic Anatomy* of Quain was re-written by Sharpey and is a monument to his powers of observation and description. He remained connected with the work as one of the editors until the time of his death.

Sharpey was on intimate terms with Kölliker, who began as a physiologist but having been invited to the Chair of Anatomy at Würzburg became the leading histologist of his day. It is to Kölliker that we owe the term "Sharpey's fibres," given to the perforating fibres of bone which Sharpey had described.

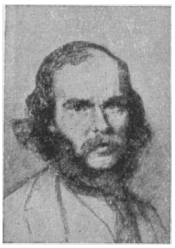
Sharpey himself gradually gave up original investigations and devoted himself to teaching and administrative work. He was a great teacher: all his pupils have testified to this[1]. He had the unusual gift of being able to recognise every student of his class and to remember the name of each one, although hundreds attended his lectures. Not only did he know them, but he took pains to learn all about them and could recall their circumstances and career even after many years.

Sharpey's personal qualities were such as to inspire his pupils and friends with esteem and affection. He had a gentle nature, a genial disposition and a sound judgment. He was devoted to the interests of the institutions with which he was connected, especially University College and the Royal Society. He spared no pains to promote the advancement of Physiology, and was full of encouragement to young men desirous of engaging in original work in that and cognate subjects. He knew and was known to everybody in the world of medicine and science. Wise in council, he exercised a very considerable influence on medical education, and was universally esteemed by members of the profession. The Sharpey Physiological Scholarship at University College was founded in 1870 as a memorial to him: he left to it a further endowment at his death. He continued to lecture until 1874, when he resigned the chair and was succeeded by Burdon Sanderson. He presented his valuable library to University College, spending the last years of his life in preparing a catalogue of the numerous books and pamphlets on Physiology and allied subjects of which it was composed. He was elected F.R.S.

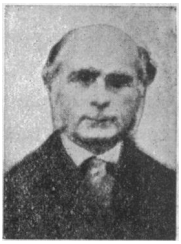
[1] Lister refers to him as "our great master" and writes "as a student at University College I was greatly attracted by Dr Sharpey's lectures, which inspired me with a love of physiology that has never left me."

in 1839 and acted as Biological Secretary of the Royal Society for nineteen years (1853 to 1872). He was also for many years a member of the General Medical Council.

He died in 1880 at the age of 78. His body was followed from University College to Euston for conveyance to Arbroath—in the Abbey Kirkyard of which he is buried—by a vast cortège of persons who desired thus to testify their affection and regret. He did not marry; his only remaining relative was his nephew, Major Colville, an army surgeon, who survived him but a short time.



George Henry Lewes was born in 1817, and was, except Sharpey, the oldest of the founders of the Society. He presided over more than one of the preliminary meetings and was a member of the first Committee. He began, although he did not pursue, the study of medicine, and incidentally acquired a special interest in Physiology. He is best known as an author and journalist. He was the first editor of the *Fortnightly*. His work on *The Biographical History of Philosophy* (1845) won for him a well-merited reputation which was greatly enhanced by the appearance of the *Life and Works of Goethe* in 1855. For this undertaking he was particularly qualified, having lived in Germany and being versed in German literature. His interest in Physiology and Natural History is shown in several of his subsidiary writings. He died in 1878. As is well known, Mary Ann Evans (George Eliot) the distinguished author, lived with him for twenty-four years; the constant encouragement and intelligent criticism which he furnished greatly aided the development of her literary genius. The George Henry Lewes Scholarship, founded by her at Cambridge, is a permanent memorial to his attachment to the science of Physiology.



Francis Galton, a grandson of Erasmus Darwin and cousin of Charles Darwin, was born in 1822, and was therefore 54 years old at the founding of the Physiological Society. He also was not a physiologist, although he had commenced the study of medicine at King's College, London; but he took deep interest in Physiology from its bearing on the subject of heredity. In 1840 he entered Trinity College, Cambridge, where he spent three years. He started life as a traveller and explorer in unknown parts of Africa, and only later took up what was to be the main

work of his life. His best known book, *Hereditary Genius*, was published in 1869. This was followed by several others of similar nature. Galton was one of the first to draw attention to the characteristic individuality of finger-prints and their immutability throughout life. His interest in Meteorology was manifested in an important work, *Meteorographica*, published in 1863: in this the first use of the term "anticyclone" occurs. The details of his biography and family history are to be found in an autobiographical sketch entitled *Memories of my Life*, and in the monumental biography (not yet completed) by Karl Pearson, the eminent mathematician, Professor of Eugenics in University College—occupant of a chair founded by Galton for the prosecution of study and research in Heredity, and endowed with his residual estate.

Galton was a delightful personality, the most modest and unassuming of men, and one of the most cultured. Always eager to acquire new knowledge, and himself primed with accurate information on the subjects which interested him, he would discuss them in such a manner as to put even the youngest scientific companion entirely at ease.

The Physiological Society was fortunate in reckoning Francis Galton among its founders. A member of the first Committee which was charged with drawing up the Rules of the Society, he took great interest in its formation, and frequently attended the dinners, on several occasions occupying the chair. Galton received the Gold Medal of the Royal Geographical Society in 1853. He was Secretary of the British Association from 1863 to 1868, but declined the Presidency. He was elected to the Royal Society in 1856, was awarded a Royal Medal in 1886; the Huxley Medal of the Anthropological Institute in 1901; the Darwin Medal of the Royal Society in 1902; a special Darwin-Wallace Medal of the Linnæan Society in 1908; and the Copley Medal of the Royal Society in 1910. He was knighted in 1909. He died in 1911.

THOMAS HENRY HUXLEY was born on May 4th, 1825, and would therefore be about fifty. He received his medical education at the Charing Cross Hospital Medical School[1], and, after qualifying, entered the Navy as Assistant Surgeon, being appointed to the "Rattlesnake," a vessel which was engaged in the years 1846–50 in surveying at first off South America and South Africa, and afterwards in Australia and New

[1] Where he was greatly influenced by Wharton Jones, who was at the time Lecturer in Physiology there. "I do not know that I have ever felt so much respect for anybody

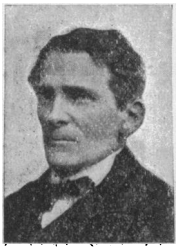
Guinea, especially charting the passage between the mainland of Australia and the Barrier Reef. During this voyage Huxley made numerous observations on the marine organisms which he observed and collected, his papers describing the results being accepted and published by the Royal and Linnæan Societies. He was recognised as a leading authority on the subjects they dealt with—especially the Cœlenterata—and on his return he was elected F.R.S. (in 1851) at the early age of 26. Soon after he was appointed Professor of Natural History at the Royal School of Mines: this office was subsequently merged into the Professorship of Biology in the Royal College of Science. In this capacity he continued to teach and to train teachers in Biology for many years. He also lectured for some time on Comparative Anatomy at the Royal College of Surgeons. His researches, although at first confined to Invertebrata, were soon extended to the Vertebrate sub-kingdom, and included important investigations in Palæontology and Anthropology. He had a remarkable power of exposition both in his lectures and his writings. His essays are models of composition: better English has never been written. As a public speaker he was without equal. President of the British Association in 1870, and Biological Secretary of the Royal Society from 1872 to 1883 (succeeding Sharpey in that office, and being himself succeeded by Foster), he was then elected President, an office he held for a short time only, being compelled by ill health to relinquish it in 1885.

Huxley was one of the first naturalists to recognise the importance of the Darwinian theory and was its most noted protagonist. The position he took up with regard to evolution involved him in many controversies with the exponents of what were then considered orthodox views as to creation. His antagonists in these controversies must frequently have regretted that they had ventured to enter the lists against him, for he was able to demolish their arguments by the accuracy of his knowledge—scientific, historical and biblical—so that they found their own weapons turned against themselves. Although a formidable controversialist in public, Huxley was in private a charming conversationalist. Ready to give advice and information when it was asked for, he was equally ready to receive information regarding any subject with which he was not familiar, and deprecatory in expressing opinions on matters regarding which he had no personal experience. The encouragement he gave to

as a teacher before or since" (*Life*, p. 20). Lister also came under the influence of Wharton Jones, after the latter had migrated to University College (*Lord Lister*, by Rickman J. Godlee, p. 16).

young workers in biological science secured for him the gratitude and affection of all who came under his influence. He died in 1895, full of honours and deeply regretted. His Life—by his son—was published in 1897.

It will be readily understood that Huxley's name was a tower of strength in support of the infant Physiological Society. Although the author of a small *Elementary Physiology*, in which the salient facts of Anatomy and Physiology were expounded with characteristic clarity, he was, strictly speaking, a morphologist, not a physiologist. He attended, and even presided at, several of the earlier meetings of the Society. In 1882 he was elected an Honorary Member.



JOHN SCOTT BURDON SANDERSON was born in 1828, the second son of a Northumberland squire; he passed his early life in country pursuits—hunting, shooting and fishing. His father became "converted" whilst his son was still young, and joined the Plymouth Brethren: as an eventual result of this change in his religious convictions, he could not reconcile it with his conscience to send his son to his own University (Oxford) on account of the religious tests then necessary, and John accordingly went to Edinburgh at the age of 19. Curiously enough, Michael Foster was prevented from entering the University of Cambridge as an undergraduate for a similar reason.

Although his father wished him to study law, he had no inclination to do so, but preferred medicine: in which subject he took his degree in 1851.

> Law was prominently in the family. John's grandfather, after whom he had been named John Scott, was Lord Chancellor Eldon; John's nephew is Lord Haldane, who has twice filled the office of Lord Chancellor. And his wife's brother, Lord Herschell, occupied the woolsack during one of Mr Gladstone's administrations.

At Edinburgh Sanderson came especially under the influence of the Professors of Botany (John Hutton Balfour), Anatomy (John Goodsir), and Physiology, or, as it was then called, the Institutes of Medicine (Hughes Bennett). After graduating he went to Paris where he spent several months, attending the hospitals, and studying Chemistry with Gerhardt and Wurtz, Embryology with Coste, and Physiology with Claude Bernard, whom he regarded as "the most inspiring teacher, the

most profound thinker, and the most remarkable experimentalist he had ever known[1]."

After his marriage in 1853 he settled in London, and joined the staff of St Mary's Hospital. He was for a time Lecturer on Botany, a subject towards which he always had a particular leaning, and about this time contributed to Todd and Bowman's *Cyclopædia* an article on "Vegetable Reproduction." In the following year he was elected Medical Officer of Health for Paddington; the duties of that office were anything but a sinecure, but he performed them conscientiously during twelve years. Long before the end of this time Burdon Sanderson's name had become well known in connection with Public Health work and especially with the causation of diphtheria and cholera. He had been appointed Assistant Physician both to the Brompton Hospital for Consumption and to the Middlesex Hospital, and besides this clinical practice was doing a large amount of inspection work under the Medical Officer of the Privy Council. He was even invited to investigate for the Government a serious attack of cerebrospinal meningitis in the neighbourhood of Dantzig; this was followed by an enquiry into the nature of cattle plague. His report on this affection was described by Koch as "the best etiological and pathological investigation of the disease that has been made." In spite of all this work he found time to engage in physiological research, and investigated for the Royal Medico-Chirurgical Society the causation of death by drowning and the means of attempting recovery. He was instrumental in forming the Clinical Society, which, like the Physiological Society, was born at his house in Queen Anne Street: it is now merged with many other societies into the Royal Society of Medicine. From 1870 he devoted himself to Physiology. His most notable work in that subject was on problems of electrophysiology (muscle, the heart, *Dionœa*): he continued to pursue these researches after he had retired from teaching. His career has been already in part dealt with in connexion with the history of modern Physiology in Great Britain.

Burdon Sanderson had a striking appearance and personality. No one could fail to recognise that he was no ordinary mortal. Somewhat gaunt in appearance, but with a clean intellectual face and a striking gentleness of manner, he must have disappointed the worthy anti-vivisectionists at Oxford, who were prepared, on his appointment there, to give him and his projected new laboratory an antipathetic welcome: but he soon became one of the most popular figures in the University. He was absent-minded to a degree; many stories were circulated about

[1] F. Gotch, obituary notice in *Proc. Roy. Soc.* vol. 79, 1907.

this trait in his character: some of them true. A certain number of men who afterwards attained distinction worked under him, but their number was insignificant in comparison with those attracted by Foster at Cambridge. For, although Sanderson was himself a strenuous worker, he appeared not to have the same power of instigating research as his Cambridge colleague. He was not an impressive lecturer. He seemed to find it difficult to put things into plain language and to give their proportional value to the several parts of a subject. He would take immense pains to explain his meaning, repeating much the same thing in other words, and leaving his audience still more bewildered. But everyone felt it a privilege to work with and study under him. He held the Jodrell Chair of Physiology at University College, London, from 1874 to 1882; the Waynflete Professorship at Oxford from 1883 to 1895, and the Regius Professorship of Medicine at the same University from 1895 until 1904. When he resigned this in consequence of failing health, he was succeeded by William Osler, whose claims he had strongly urged.

He was created a baronet in 1899. Elected F.R.S. in 1867, he was three times Croonian Lecturer to the Royal Society, and was Harveian Orator to the Royal College of Physicians in 1878, being awarded the Baly Medal in Physiology by that College in 1880, and a Royal Medal by the Royal Society in 1883. He was President of the British Association at its meeting at Nottingham in 1893. He died in 1905 at the age of 76.

A full account of his life is to be found in the Memoir which was commenced by his widow and completed after her death by his nephew and niece, Dr John Scott Haldane and Miss Elizabeth Haldane.

MICHAEL FOSTER, who was born at Huntingdon on March 8th, 1836, must be regarded as the actual "begetter" of the Physiological Society, although the meeting at which it was founded was held in Burdon Sanderson's house. To Foster, Physiology in this country largely owes its present position. His judgment of character—although not unerring—was generally accurate, as is indicated by the young men he collected round him at Cambridge and who assisted in founding the school of Physiology there. A considerable number of these appear in the list of persons who were invited to constitute the Society—and two of them were amongst those who attended the foundation meeting. Foster seems to have been at pains to ascertain the bent of mind of any pupil who decided to work at Physiology, and to encourage him to pursue

that branch of the subject for which he seemed best adapted. In this way, although he himself did not engage actively in research, he set Balfour to work on embryology, Gaskell on the vascular conditions relating to muscular activity, Langley on the functions of the sympathetic nervous system and their relation to the salivary glands, Newell Martin on problems connected with the mammalian heart, and Sheridan Lea on the chemistry of digestion[1]. Foster's success was, however, not due entirely to his influence over the younger Cambridge biologists, but quite as much to the power he had of influencing senior members of the University, who were not long in recognising that a prophet had arisen amongst them who would make the bones of biological science, which had become very dry in Cambridge, live again. These seniors were not by any means confined to Biology and their support must have given considerable encouragement to the new Prælector in his arduous task of building up a school of Physiology, and incidentally of Medicine, in the University. And he had, throughout, the loyal co-operation of Humphry.

It may be inferred from his achievements that Foster was a born organiser. Not the least of these achievements was the part he took in the formation of the Physiological Society. This was perhaps not a difficult task, and was rendered more easy by the fact that it received the support of such men as Huxley, Lewes, and Galton—none of them physiologists in the strict sense of the word, and all probably influenced in this connexion by Foster. Indeed most of the names which appear as the founders of the Society were, if not Foster's pupils, his close friends, and it was appropriate that he himself should propose the resolution forming the Society and should take the chair at the inaugural dinner.

Foster succeeded Huxley in the Biological Secretaryship of the Royal Society—an office he held from 1881 to 1903. (He had been a Fellow since 1872.) Working through the agency of the Physiological Society, he took a leading part in the establishment of the series of International Physiological Congresses—the first of which was held at Basel in 1889. Well known to all foreign physiologists, with most of whom he was on the most friendly terms, he was, at the Turin Congress in 1901, under the Presidency of Angelo Mosso, unanimously voted Honorary President

[1] Whether George Romanes first obtained inspiration from Foster for his investigations on Medusae is less certain. The subject seems to have suggested itself to him whilst convalescing from typhoid at Nigg on the Cromarty Firth, where his family had a summer residence, and where the opportunities for such observations were considerable.

of that and of all succeeding Congresses—a significant sign of his popularity in foreign physiological circles. In 1900 he was invited to deliver the Lane Lectures at San Francisco, and chose for his subject the History of Physiology—which was afterwards published in book form and has become the chief text-book on the History not only of Physiology but of Medicine in general. He was M.P. for the University of London from 1900 to 1906.

His *Text-book of Physiology*, which was first published in 1877, filled a real want; for at that time there was no book on the subject in the English language which could be described as in any sense authoritative. It rapidly went through three editions, each one an improvement on the other, and was justly popular, not only on account of the matter it contained, but still more by reason of the lucid and easy manner of exposition which was characteristic of the author. Later editions were less successful, partly because references to literature and even the names of discoverers were omitted, partly because the principle was adopted of delegating parts of the subject to others, so that the book became rather over-loaded with detail and was no longer the product of a single brain and therefore less suitable for use as a text-book.

A notable achievement was his establishment of the *Journal of Physiology* in 1878. Up to that time there was no Journal in the English language which was wholly devoted to Physiology. The *Journal of Physiology* filled a want which had been acutely felt, and immediately took a leading position as a medium of publication of original work.

The establishment of a Journal cannot be effected without pecuniary sacrifices—a difficulty which in this case was largely met by the liberality of a pupil and friend of Foster—A. G. Dew-Smith, familiarly known to his friends as "Dew." Dew-Smith was a man of considerable fortune, of high culture and singularly good taste. He occupied until his marriage the rooms in Nevile's Court which appertained to Foster as a Fellow of Trinity. They were charmingly furnished by the occupant, the walls being adorned with examples of Rossetti, Burne-Jones and other favourite artists of that day. Dew-Smith was one of the original members of the Society and was present at the inaugural dinner.

Another important service rendered by Dew-Smith to Physiology, and indeed to Experimental Science in general, was the establish-

ment of the Cambridge Scientific Instrument Co. which for many years was carried on almost entirely by him, although later he was aided in the management by Horace Darwin.

Even after it was started the running of the *Journal* presented financial difficulties, but eventually the Physiological Society was able effectively to subsidise it. In 1894 its management was taken over by Langley, who by thrifty administration and the increased pecuniary support of the Society converted it into a financial success. Since Langley's death in 1925 the *Journal* has become the property of the Society.

Michael Foster was of a genial disposition: cordial with all: very loyal to his friends. Partly on account of these personal qualities, partly by reason of his position as Secretary of the Royal Society, he exerted for many years an unusual influence in the scientific world. He built himself a house at Great Shelford, about three miles from Cambridge, on a bare spur of the Gog-Magog hills. A keen gardener and horticulturist, he surrounded it with a plantation and developed a charming garden in which he carried out experiments in hybridisation, by which his name is still well known in horticultural circles. He presided over the meeting of the British Association at Dover in 1889: on which occasion—for the first time—visits were exchanged between this and the corresponding French Association which met simultaneously at Boulogne. Few who witnessed it will readily forget the hearty manner in which Foster—*more Gallico*—saluted the French president on his arrival at Dover.

Foster was created K.C.B. in 1899, at the same time that a baronetcy was conferred on Sanderson. The double honour was celebrated by the Physiological Society by a dinner, which was held, at Foster's suggestion, at Richmond at the new Star and Garter, a poor successor of the famous old hostelry. It fell to the writer, as the next senior member, to occupy the chair and to propose the health of the two guests; their felicitous speeches in reply and the enthusiasm with which they were received more than made up for the deficiencies of the table.

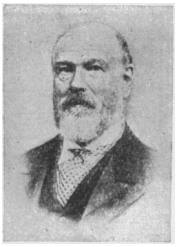
Michael Foster died on June 28th, 1907. On that very day he had made an excellent speech at a meeting in London of the British Science Guild, exhibiting his activity to the end.

A detailed account of his career, sympathetically written by his successor, will be found in the *Journal of Physiology*, vol. 35, 1907.

FREDERICK WILLIAM PAVY—born in 1829—was 47 at the time of formation of the Society. He was therefore one of the oldest of the original members, and in the early years of the Society took a prominent part in its proceedings, being frequently invited to take the chair at the dinner meetings. He received his medical education at Guy's and after graduating at the London University in 1852, went to Paris and worked for a time in Bernard's laboratory. In 1853 he became Lecturer on Physiology at Guy's Hospital and also Assistant Physician. He retained the lectureship on Physiology until 1877 when he became full Physician and Lecturer on Medicine. He was elected Fellow of the Royal Society in 1863. In 1886 he was Harveian Orator at the Royal College of Physicians, and in 1901 received the Baly Medal for Physiology. His physiological work was chiefly on the chemical side, and related especially to the origin and destination of the blood-sugar, including, of course, work on the glycogen and sugar of the liver. He was led to take a different view from Claude Bernard on the subject of glycogenesis, since he found that his results as to the relative amount of sugar in the blood of the portal and hepatic veins did not agree with Bernard's figures. Although in the long run it has become apparent that Bernard's hypothesis was correct—to the effect that the sugar absorbed after a meal is mainly stored in the liver as glycogen and given out little by little as required by the tissues—it must be confessed that Pavy was right in arguing that the considerable excess of sugar in hepatic blood found by Bernard was probably the effect of the operation employed to collect the blood. Pavy's own experiments, in which this factor was eliminated, merely exhibited differences which were at that time within the limits of experimental error.

All Pavy's scientific work was a model of thoroughness and earned a deserved encomium from his fellow-physiologists. On the occasion of his eightieth birthday in 1909 he was presented by them with a silver rose-bowl inscribed "From the Physiological Society in token of affection and admiration," a striking indication of the regard he was held in by his younger colleagues. He died in 1911, continuing to work until the last[1].

[1] An appreciation of Pavy's work and of his personal character (the latter by his friend and colleague Hale-White) is to be found in the *British Medical Journal*, Sept. 30, 1911, pp. 777–8.



PHILIP HENRY PYE-SMITH (F.R.S., 1886) was born in 1840. He received his early education at Mill Hill School and at University College, but went to Guy's for his medical course. He graduated at the University of London, with high honours in many of the subjects of the examinations—including Physiology and Comparative Anatomy. Having spent some time studying in Vienna and Berlin, he was appointed in 1865 Lecturer on Comparative Anatomy at Guy's and also for four years filled the post of Demonstrator of Anatomy. In 1870 he became Assistant Physician and took up the teaching of Practical Physiology and Histology. In 1873 he was made Lecturer on Physiology jointly with Pavy, and from 1877 sole Lecturer on that subject, holding this appointment until 1883 when he became Physician to the Hospital and (the next year) Lecturer on Medicine. He retired in 1899, when he was made Consulting Physician. He delivered the Lumleian Lectures at the Royal College of Physicians in 1892 and a "most scholarly" Harveian Oration in 1893. He died in 1914 at the age of 74.

Pye-Smith from the first took a keen interest in the foundation of the Physiological Society and was a frequent attendant at its meetings, often being in the chair. He was unusually cultured, being as much at home in the classics as in the natural sciences: a pleasant companion: sympathetic and kindly but endowed with a critical acumen which rendered his opinion on matters submitted to him of high value. The Society owes much to the advice and assistance rendered to it by him from its foundation until his death. His character is well described by his son (who was killed in the War) in lines written shortly after his father's death:

> "Scholar, physician, courteous gentleman, beloved of all that knew him!"

ARTHUR GAMGEE, who was born in 1841, studied Medicine in Edinburgh, where he took his M.D. degree in 1862. In point of age amongst the original members of the Society he comes nearest to Pye-Smith, having been 35 at the time of its foundation. He was at first an extramural Lecturer on Physiology in Edinburgh and Physician to the Sick Children's Hospital. At this time he began researches on hæmoglobin and the action of nitrites thereon. In 1872 he was elected a Fellow of

the Royal Society, at the age of 31. In 1902 he delivered the Croonian Lecture "On the Chemical and Physical properties of Hæmoglobin." In 1873 he was appointed the first Professor of Physiology in the Owens College, Manchester. To supply his own and other students with a text-book he translated Hermann's *Lehrbuch*, which was then the best elementary work on the subject. Besides teaching Physiology he was Physician to the Consumption Hospital in Manchester. In 1880 he published the first volume of an important work on *Physiological Chemistry*, but it was not until 1893 that the second volume made its appearance. In the early eighties Gamgee decided to devote himself entirely to medicine. Accordingly he removed to London and became Assistant Physician and Lecturer on Materia Medica at St George's Hospital. But before long ill-health compelled him to go abroad and he settled for some years in practice in Montreux. This he left in order to inspect and report on facilities for conducting researches in metabolism in European universities on behalf of the Carnegie Institute of Washington; but again took up practice in London when the report was finished. At this time he was working in Waller's Laboratory at the University of London with an apparatus for continuously recording the temperature of the human body: he was engaged in this investigation at the time of his death, which occurred whilst he was on a visit to Paris on March 29th, 1909.

In 1908 he represented the Royal Society at the celebration of the bicentenary of Albrecht von Haller at Bern, and presented an address drawn up by himself in excellent Latin and delivered in a fluent manner in the Italian style of pronunciation, producing a great impression on the assembled audience. Gamgee may certainly be described as a genius, but erratic. If he had kept to Physiology he might have been the first physiologist of the day—at any rate the first in biochemistry, which was the part of the subject he favoured. But he divided his energies between science and clinical medicine, and thus failed to achieve that high distinction in either, to which his intellectual powers seemed to entitle him. His simplicity of nature and kindliness of disposition endeared him to his friends and colleagues, who will always retain of him an affectionate memory[1].

[1] An excellent bibliography with a list of his published works is given in the *Lancet*, vol. 1, 1909, pp. 1141–45.

THOMAS LAUDER BRUNTON was born at Roxburgh in 1844 and graduated at the University of Edinburgh. He afterwards spent three years on the Continent (with Brücke and Rosenthal in Vienna, with Meyer in Berlin, with Kühne in Amsterdam, and with Ludwig in Leipzig) and at the end of his *Wanderjähre* was probably better acquainted with modern methods of Physiology and Pharmacology than anyone else in this country[1].

He settled in London and was appointed Assistant Physician and Lecturer on Materia Medica at St Bartholomew's Hospital in 1871, eventually becoming full Physician there. He was elected F.R.S. in 1874 at the age of 30. He devoted himself chiefly to Pharmacology. His early work was on Digitalis and the Nitrites. In 1885 was published his *Text-book of Pharmacology and Therapeutics*, which went through many editions. Although he continued to pursue research, he soon acquired a considerable practice and gradually gave up laboratory work: but he always remained helpful and sympathetic to other workers. He was knighted in 1900 and created a baronet in 1909. He died in 1916.

EDWARD EMANUEL KLEIN was born at Essek in Slavonia in 1844. He worked as Privat-Docent in the laboratory of Stricker, the Professor of Pathology in Vienna, who edited a well-known *Text-book of Histology* which was translated into English. The articles were by different contributors: one or two by Stricker himself, a well-known one on blood by Rollett (in which he promulgated the stroma-theory of the structure of the red blood-corpuscle, as against the membrane-theory, which was originally enunciated by Schwann and has now again been adopted, in a modernised form, by most physiologists), one on the spleen by W. Müller, one on the lymphatics and serous membranes by v. Recklinghausen (who was the first to make use of the silver-nitrate method to show the structure of endothelial membranes), and so on. To this work Klein contributed several articles. Sanderson made Klein's acquaintance on a visit which the latter paid to this country in 1869, and being in need of a histologist to co-operate with him in his work on tubercle, invited

[1] His assistance was, therefore, naturally invoked by Sanderson and Foster in the *Handbook for the Physiological Laboratory*, which they were preparing. This book was published in 1873 and was for a long time the only guide which English-speaking students had in their practical work.

him to London as his research assistant, obtaining also for him remunerative work from the Local Government Board. Klein's services were engaged to write the Practical Histology for the *Handbook for the Physiological Laboratory*: this part was illustrated with magnificent drawings, some of them—especially those from silver preparations of the lymphatics of serous membranes—singularly elaborate. The cost of reproducing these as wood blocks—the zinc process had not then been invented—was enormous, and must have severely taxed the eyesight of the engraver. Klein worked at first at Sanderson's private laboratory in Howland Street and also at University College; later at the Brown Institution, where he was made Assistant Professor. Subsequently (1873 to 1892) he lectured on Histology and Physiology at St Bartholomew's Hospital, and in 1902 became Lecturer on Advanced Bacteriology there. In 1879 he published conjointly with Noble Smith an *Atlas of Histology*. He was elected F.R.S. in 1875. The evidence he gave before the Royal Commission on Vivisection in 1875 was unfortunate, for as a foreigner he failed to appreciate the dignity of such a Commission and treated the enquiry with contempt. It was many years before he lived down the impression which his statements produced; they certainly conveyed an erroneous idea of his actual opinions on the matter. He died in 1925 at the age of 80: he had retired from active work for about ten years.

GERALD F. YEO was a young Irishman who had succeeded William Rutherford in 1874 at King's College, Rutherford having been appointed Professor of the Institutes of Medicine in the University of Edinburgh. Yeo was born in 1845 at Howth near Dublin. He studied medicine in Trinity College, Dublin, graduating M.B. in 1867, and M.D. in 1871, studying further in Paris, Berlin and Vienna. He was at first Assistant Surgeon at King's College Hospital as well as Professor of Physiology, and had taken the F.R.C.S., but soon relinquished surgery and devoted himself to Physiology alone. He worked with Ferrier on the subject of cerebral localisation in monkeys, and published papers on various other subjects. He also wrote a *Text-book of Physiology*, which had at one time considerable vogue. He was elected F.R.S. in 1889.

Yeo was typically Irish—pleasant and friendly but impetuous, and unyielding in argument, steadfastly declining to be "convinced against his will." As a result of his possessing the diploma of F.R.C.S. he was

almost constantly one of the examiners in Physiology for the Fellowship of the Royal College of Surgeons, since at this time the College refused to permit any but Fellows to hold an examinership. Nearly all the earlier records of the Physiological Society are in his handwriting, for it fell to his lot as the senior Secretary to keep the minutes. It must be admitted that he kept them but indifferent well. There is generally a very cursory account of the proceedings at the meetings: and in some cases no record of the business at all, although questions regarding the Vivisection Act were constantly under discussion during the first years of the Society's existence. But he was a favourite with everybody and was much missed when he retired from the Secretaryship and from the chair of Physiology at King's College, and went to live in Devonshire. He died in 1909 at the age of 64.

WALTER HOLBROOK GASKELL was born in 1847, and was therefore 29 years old in 1876. He had entered at Trinity College, Cambridge, in 1865 and took an honours degree in Mathematics. He then began medical studies, and was one of the first to benefit by the instruction of the new Prælector and to engage in original work in Physiology. In order to become familiar with modern methods he spent a year in the famous Institute at Leipzig presided over by Carl Ludwig, and there carried out an important research on the changes in the blood-vessels of muscle accompanying its contraction[1].

On returning to Cambridge Gaskell set himself the task of investigating the causation of the contraction of the heart, which at that time was generally supposed to be produced through the activity of intracardiac ganglia and nerves. By a long series of experiments, made chiefly on the heart of the frog and tortoise, he was able to show in a convincing manner that the contraction arises in the muscular tissue itself, inde-

[1] It was in many ways a peculiar advantage to work with Ludwig, not only on account of the genial personality of the Master, but by reason of the fact that the Leipziger physiologische Anstalt was, during the seventies of the nineteenth century, the centre of physiological activity in Europe. Ludwig attracted workers from all parts, so that those who had the privilege of conducting researches with him were also making the acquaintance of men who were in the future to become leaders in Physiology in their respective countries: *e.g.* Bowditch in America, Pavlov in Russia, Mosso, Luciani and Fano in Italy, Buchner in Bavaria, to mention but a few, and not forgetting the names of Ludwig's three chief assistants, Kronecker (for experimental physiology), Drechsel (for physiological chemistry) and Flechsig (for histology).

pendently of nerves or nerve-ganglia, and thus to establish the truth of the myogenic theory. This is the research with which Gaskell's name will always be intimately associated. It stands out as one of the landmarks of Physiology, although it was by no means the only piece of physiological work which he carried to a successful conclusion. He was led from the study of the course of the cardiac nerves to investigate the origin of vascular and visceral nerves in general, and was the first to give a clear account of the origin of the sympathetic from the spinal cord. His results were based both on anatomical and on physiological observations, and although they have been extended, they have never been called in question.

Somewhat later he was led to interest himself in a problem which is rather morphological than physiological, although he brought many physiological observations to bear upon it. The problem in question was no less than the origin of Vertebrata, which Gaskell believed to be from precursors belonging to an articulate type. According to him, the neural canal of the vertebrate, with its enlargement into the cerebral ventricles, represents the original alimentary canal of an articulate precursor, the ganglionic chain having grown around it and become evolved into the substance of the spinal cord and brain, whilst the present alimentary canal of the vertebrate is regarded as an entirely new formation, which developed with the retrogression of the original alimentary canal of the precursor. Gaskell brought forward a mass of evidence—embryological, comparative anatomical, histological and physiological—in support of his theory; but it has been ignored by most morphologists. His book, *The Origin of Vertebrates*, which gathered together the evidence he had been for years accumulating on the subject, was published in 1908.

Like Foster, Gaskell was a keen gardener. He built himself a charmingly situated house at Great Shelford, near that of his chief, and surrounded it with a beautiful garden to which the members of the Society were generally invited on the occasion of the meetings at Cambridge. He acted for many years as Treasurer of the Society. He was a member of the second Royal Commission on Vivisection (1906), having been chosen as one of the representatives of Physiology. He became a Fellow of the Royal Society in 1882. In 1883 he was made Lecturer in Physiology in the University of Cambridge. He became a Fellow and Praelector in Natural Science at Trinity Hall in 1889. He received the Marshall Hall prize in 1888 for his work on the Nervous System, a Royal Medal of the Royal Society in 1889 and the Baly Medal of the Royal College of Physicians of London in 1895. He died in 1915.

GEORGE JOHN ROMANES was born in 1848 at Kingston, Canada, where his father, the Rev. George Romanes, D.D., was then Professor of Greek; but the same year the family returned to England and settled in London. George Romanes was educated at a private school, from which in 1867 he went to Caius College, Cambridge. He took his degree in the Natural Sciences Tripos in 1870. Of all the young men who helped to launch the Society, Romanes was unquestionably the most brilliant. Possessed of outstanding intellectual power, he was both able and ready to uphold his opinions in matters relating to science, literature, art, politics, and even religion. He early came into prominence by his researches into the locomotor apparatus of Medusae (1873), and distinguished himself in the same year in an entirely different line with his Burney Prize essay on *Christian Prayer considered in relation to the belief that the Almighty governs the world by general laws*. In this essay he endeavours to meet the criticisms which had been brought against the efficacy of prayer by Tyndall, who suggested that it should be put to an experimental test in the wards of a hospital, and by Francis Galton, who argued that there was no evidence yielded by experience which seemed to render such efficacy probable. The essay is highly philosophical, and couched in orthodox phraseology: the fact that it was awarded the Burney prize is sufficient evidence of this. At one time in his Cambridge career Romanes had almost determined to take Holy Orders, but as his scientific education advanced, and his personal acquaintance with leading scientific men extended, his views on religion veered round to complete scepticism, or at least to pronounced agnosticism—which characterised most of the remainder of his life. But, towards its close, influenced probably by his familial and social environment, he again accepted the tenets of religious orthodoxy.

Up to 1873 he was working in Foster's laboratory at Cambridge; afterwards in Burdon Sanderson's at University College, when not engaged in conducting experiments on Medusae in Scotland. First Darwin's work, and later Darwin himself, had a great attraction for him, as he himself had for Darwin. He was a frequent visitor at Downe, and devised many experiments for the testing of some of the subsidiary theories which Darwin had enunciated, especially that known as "pangenesis." In 1892 he brought out the first, which proved also the last, volume of a book entitled *Darwin and after Darwin*, in which he deals at length with sexual isolation as contributing to, or even in certain instances supplanting, Darwin's

theory of natural selection. It was in this year that he had the first symptoms of his fatal illness in the form of a retinal hæmorrhage. He died in May, 1894, of cerebral hæmorrhage, at the age of 46. The story of his life has been given by his widow. Although, perhaps not unnaturally, tinged by a tendency to welcome his return to religious orthodoxy, it offers delightful reading; particularly is his correspondence with Darwin interesting.

With all his talents George Romanes had a simple lovable nature. He never concealed anything he might have in his mind, and even displayed in conversation an amount of self-appreciation of his own work and of his intellectual powers, which would have been characterised as vanity in most people, but in Romanes gave no offence, since it was a natural and unconscious part of his character. He was possessed of private means and did not need to undertake teaching for a livelihood, although as a lecturer he was eloquent, clear and convincing. At the time of the formation of the Physiological Society he was living in London. He was selected as one of the Secretaries of the new Society, and was afterwards appointed the first Treasurer. He became a Fellow of the Royal Society in 1879. He gave the Croonian Lecture "On the Locomotor Apparatus of Medusae" in 1875.

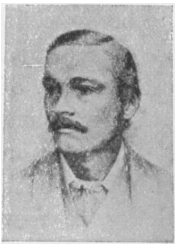
HENRY NEWELL MARTIN, who was born at Newry in 1849 and died in Yorkshire in 1896, has already been mentioned as having accompanied Michael Foster in 1870 from University College, London, to the University of Cambridge. He won a scholarship at Christ's College, of which he became a Fellow in 1874. In 1873 he gained the first place in the Natural Sciences Tripos. At Cambridge, besides his more strictly physiological work, he aided the Prælector of Physiology to conduct a course of Elementary Biology; he had assisted in a similar course at South Kensington under Huxley.

When the Johns Hopkins University at Baltimore, Maryland, was founded, the Trustees sought for someone who would be able to develop Physiology in the contemplated Medical School. An application was accordingly made to Foster—probably through Huxley, who had been invited over to open the new Biological Department—and Foster decided that Newell Martin would be a competent person to undertake the task. Martin was accordingly appointed to the Professorship of Physiology in the new University in 1876, and set to work early in 1877.

He was consequently not long connected intimately with the budding Physiological Society—although he retained his membership and his friendly relations with his colleagues in the old country. His importance in relation to the Society and to Physiology is that he formed a link connecting the physiologists of America with those of Great Britain—since his influence, as occupying the chair of Physiology in what was at that time the chief medical research centre of the States, was widespread. Indeed many of the older American physiologists have received their training either directly or indirectly from Newell Martin, who himself handed on the teaching he had received from Sharpey and Foster.

Newell Martin was the first to devise a method for investigating the isolated mammalian heart by means of the heart-lung preparation (which was afterwards to be so successfully developed by Starling), and the influence of temperature and other conditions upon it. On this subject he gave the Croonian Lecture in 1883. He was the author of numerous papers on Physiology and of some text-books—amongst others one on *Practical Biology*, which he brought out in conjunction with Huxley.

He resigned his chair in 1893 owing to ill-health, and returned to this country. As Michael Foster, in an obituary notice in the *Proceedings of the Royal Society*, remarked, "he has left behind him a memory which will not soon pass away." This was thirty odd years ago, and there are now not many British physiologists who knew him personally: those who did will certainly agree with this sentiment.



FRANCIS MAITLAND BALFOUR was the third son of James Maitland Balfour of Whittingehame and of Lady Blanche, daughter of the second Marquis of Salisbury. Arthur Balfour, now the Earl of Balfour, is his eldest brother. Frank was born in Edinburgh in 1851. His father died when he was quite young. He went to Harrow, and was fortunate to find there in one of the masters—George Griffith, well known as the Acting Secretary for many years of the British Association—encouragement in the pursuit of science. It is curious to read that when biological subjects were discussed at the school Scientific Society, Frank Balfour came forward as an uncompromising opponent of Darwinism, "little thinking that in after life his chief work would be to develop and illustrate the doctrine of evolution[1]."

[1] M. Foster, obituary notice in the Introduction to the *Collected Works* published in 1885.

In 1870 he entered Trinity College, Cambridge. Here he came under the notice of Michael Foster, who had just been made Prælector of Physiology: and who, with his fellow-examiners, at the scholarship examination the following Easter, had no difficulty in awarding the first place to Balfour. He soon began to make his mark at Cambridge. In the Natural Sciences Tripos in December 1873 he was second in order of merit: the first place being taken by his friend Newell Martin. Even before the Tripos he had, on the suggestion and with the encouragement of Michael Foster, begun investigations in embryology, commencing with the chick: the result of this work was published in the *Quarterly Journal of Microscopical Science* for July 1873. After taking his degree he spent six months at the Zoological Station in Naples, choosing as the subject of investigation the development of Elasmobranchs. His observations on this subject proved of great importance: they were published in a preliminary form at the British Association Meeting at Belfast in 1874 and in the *Quarterly Journal of Microscopical Science* in October of the same year. On the results of this work he was elected, on the advice of Huxley, to a Science Fellowship at Trinity. In 1875 he began lecturing on Embryology, and in the following year, in conjunction with Milnes Marshall, gave a systematic course on Animal Morphology as well. In 1878 his researches on the development of Elasmobranch fishes were published in the form of a monograph in one volume. The same year, at the early age of 27, he was elected to the Fellowship of the Royal Society. In 1880 and 1881 appeared his *Comparative Embryology*. This was a stupendous piece of work and occupied him for the best part of three years. By this time he had become the recognised authority on the subject of Embryology and in 1881 received a Royal Medal for his work. The same year he was chosen as one of the General Secretaries of the British Association. In the following year he received a pressing invitation to go to Edinburgh in succession to Sir Wyville Thomson, but decided to remain at Cambridge—with which and with London he had many and close personal ties. A new Professorship of Animal Morphology was now instituted specially for him at Cambridge and steps were taken to build him a laboratory. But in the summer of this very year there came to his colleagues and friends, like a bolt from the blue, the announcement of his death in an Alpine accident, which occurred on July 19th in an ascent of the Aiguille Blanche from Courmayeur. His body was brought home, and is buried at Whittingehame. It is difficult to give an idea of the distress and even consternation which was caused at the news. In the words of Michael

Foster, "the same lines came to the lips of all of us, so fittingly did Milton's words seem to speak our loss and grief—

> For Lycidas is dead, dead ere his prime,
> Young Lycidas and hath not left his peer."

Tall and well built, possessing an open countenance, with deep-set expressive eyes, a gentle demeanour, a remarkable strength of character and firmness in holding opinions, although modest in expressing them; a pleasant companion; exhibiting perfect courtesy and a ready wit—all these attributes endeared him to his friends. The Physiological Society may be proud that he was enrolled amongst its earliest members.

JOHN NEWPORT LANGLEY was another of the discoveries of Michael Foster. Born in 1852 at Newbury, he entered St John's College, Cambridge in 1871. He at first studied Mathematics and History, but presently changed his plans and devoted himself to Natural Science, obtaining a first class in the Natural Sciences Tripos in 1874. In 1877 he was elected to a Fellowship at Trinity. At first under Foster's influence, but soon in entire independence, he began his physiological work with a study of the action of pilocarpine on the heart (1875) and continued his investigations into the changes produced in secretions under the influence of nerves and drugs, which eventually led him to attempt the elucidation of the origin and course of the sympathetic and parasympathetic fibres (autonomic nervous system), a subject to which his colleague Walter Gaskell had already made important contributions. Gaskell's work on the subject was mostly of a morphological nature, Langley's was based on the results of physiological experiment. In the course of his researches on the salivary glands he not only investigated the functional activity of these organs, but added many new observations regarding their structure. He also made important contributions to the physiology of the central nervous system and of peripheral nerves and muscles. In all his work, whether on glands or blood vessels or muscle or nerves, Langley rarely relied upon the production of a graphic record. He was satisfied to set down exactly what he could observe with the unassisted eye. In this respect he resembled Claude Bernard, and differed from most physiologists. But the accuracy of his observations, like those of Bernard, was such that his statements of fact were never called in question.

He was elected F.R.S. in 1883: in 1892 he received a Royal Medal, in 1903 the Baly Medal of the Royal College of Physicians, and in 1912 the Retzius Medal from Sweden. He succeeded Michael Foster in the chair of Physiology at Cambridge in 1903. He died on November 5th, 1925, at the age of 73. But no one would have supposed that the alert well-set man with clear-cut features, greying hair, and steel-blue eyes, still so capable of strenuous work, had nearly attained that age. Langley's scientific career and work have so recently been the subject of an article in this *Journal* by Sir Walter Fletcher (March 1926) that it is not necessary to recapitulate what has there been given. Suffice it to say that from its formation in 1876 until his death there was no more active participator in the work of the Physiological Society than John Newport Langley.

FURTHER HISTORY OF THE SOCIETY

Resuming now the history of the Society from May 26th, 1876, the date of the inaugural meeting, it appears from the Minute Book that the first ordinary meeting was not held until November 9th of the year of foundation, although, no doubt, the Committee of the Society was meanwhile engaged in the examination of the Government Bill.

November 9th, 1876 (*at* 85 *Jermyn Street*). The first business recorded in the minutes is a resolution dealing with the certificate required for the demonstration of experiments for the purpose of instruction. The opinion was expressed that the description of experiments to be shown should be worded "in as general and comprehensive manner as possible."

The second business item is a resolution "that the Society should recommend to the Scientific Grants Committee of the Royal Society such researches in Physiology as it might be thought desirable and appoint a special Committee, with Dr Pye-Smith as Secretary, to report regarding the matter."

The members present at this first ordinary meeting were G. H. Lewes (in the chair), Balfour, Dew-Smith, Gamgee, Gaskell, Langley, Humphry, McCarthy, Pavy, Power, Brunton, Ferrier, Foster, Pye-Smith, Sanderson, Yeo, Schäfer. Three visitors are entered in the minutes as follows: "Mr Lea introduced by Dr Foster, Mr Vine introduced by Mr Langley, Mr Bruce introduced by Dr Sanderson[1]."

[1] In nearly all cases the names of those attending have been transcribed exactly as they are entered in the minutes. They are sometimes misspelt and are never in alphabetical or any other recognisable order. In most cases I have attempted to give an indication of

Mr Lea is Arthur Sheridan Lea (F.R.S. 1890) who was born in 1853. He obtained a First Class in the Natural Sciences Tripos in 1875. He entered Trinity College, Cambridge, but afterwards became a Fellow of Caius College, and Lecturer on Physiological Chemistry. His chief researches were on digestive and other ferments. He was the author of the part of Foster's Text-book of Physiology dealing with Physiological Chemistry, but is probably best known for his work on the pancreas with Kühne. He joined the Society in 1877 and for many years—until his health broke down—he was a regular attendant at its meetings. He died in 1915, after a long illness, much regretted by his colleagues and friends.

Mr Vine (*sic*) is Sydney Howard Vines (F.R.S. 1885), the distinguished botanist, at that time a Fellow of Christ's College, Cambridge: subsequently Sherardian Professor of Botany in the University of Oxford.

Mr Bruce is probably Dr Mitchell Bruce, who was at that time Assistant Physician to Charing Cross Hospital and Lecturer on Physiology in the Medical School attached to the Hospital, and is now Consulting Physician both to that Hospital and to the Brompton Hospital for Consumption.

This first ordinary meeting and all other meetings during the next two or three years were held at a hotel in Jermyn Street[1], where the Secretary (Yeo) engaged a room for the Society to dine. It must be remembered that the Society was founded as a dining club (see p. 10); so that the members, who all knew each other well, could discuss in an informal manner subjects which might concern them as physiologists. That the number of members of the Society was by the original rules limited to forty, of whom not more than half the number were ever likely to be present at one time, also tended to preserve for it the character of a dining club. Even at the present day, when the Society numbers about 400 members and has ceased to be a dining club, it carries on the tradition by frequent dinner meetings, and although there are meetings

the position and in some cases of the career of each individual. In many identification has been difficult, in some impossible; partly owing to misspelling in the minutes, partly because often only the surname has been given, and this has furnished no trustworthy clue to identification.

[1] The Waterloo Hotel, 85 Jermyn Street. It has long disappeared. It was here that Arthur Orton, "The Tichborne Claimant," had for some time his headquarters.

for scientific purposes alone, its non-scientific and administrative business is generally conducted after the dinner meetings, as provided for in the original rules of the Society.

In 1879 the meetings began to be held at the Café Monico in Tichborne Street instead of at the Waterloo Hotel, and continued to be held at London restaurants, with an occasional excursion to the "Star and Garter" at Richmond, a hostelry much beloved for its old associations by Michael Foster. With the establishment of the scientific meetings it became customary for the dinner to be held in the refectory belonging to the institution visited, or, at Cambridge and Oxford, in one of the Combination or Common Rooms.

December 14*th*, 1876 (*at* 85 *Jermyn Street*). At this the second ordinary meeting Dr T. Lauder Brunton was in the chair. Other members present were Pavy, Ferrier, Thiselton Dyer, Foster, Schäfer, Yeo, Pye-Smith, Klein, McCarthy, Lewes, Gaskell, Romanes, Langley and Dew-Smith. The visitors were Professor Allman introduced by Dyer, Sir Joseph Fayrer by Brunton, Mr Henry Nottidge Moseley by Klein, and Mr Butler by Langley.

Professor G. J. Allman (F.R.S. 1854) was at first Regius Professor of Botany in Trinity College, Dublin, but from 1856 to 1870 occupied the Regius Chair of Natural History in the University of Edinburgh. He was President of the Linnæan Society in 1874 and of the British Association in 1879. He died in 1898 at the age of 86.

Sir Joseph Fayrer, Bart. (F.R.S. 1876), was an eminent surgeon attached to the Indian Army, who greatly distinguished himself in the Mutiny at the Siege of Lucknow. He was a fellow-student and intimate friend of Huxley. He published important memoirs on the poisonous snakes of India, and worked with Brunton on the action of snake venom. He died in 1907 at the age of 83.

Mr Henry Nottidge Moseley (F.R.S. 1880), naturalist of the "Challenger" Expedition, was a Fellow of Exeter College, Oxford. He died in 1888 at a comparatively early age. He was the father of the brilliant young physicist, H. G. J. Moseley, who was born in 1887 and was killed at Suvla Bay in August 1915; his premature death is universally considered to have been one of the most calamitous results of the Great War[1].

At this meeting the Committee appointed to advise regarding Govern-

[1] See obituary notice by Sir Ernest Rutherford, in *Proc. Roy. Soc.* A, vol. XCIII, 1917.

ment grants presented its report. It may be of interest to give a list of the applications, which were as follows:

Mr Langley: The action of the sympathetic on the submaxillary gland. £30.

Mr Romanes: Observations on the locomotor system of the Medusæ. £50.

Professor McKendrick: Respiration in fishes. £100.

Professor Gerald Yeo: The relation between the duration of latency and that of contraction of various kinds of muscle. £30.

Professor Arthur Gamgee: The physiological relations of the elementary bodies. £80.

Professor Schäfer: For the wages of an assistant in his histological and embryological investigations. (Annually) £50.

Professor Ray Lankester: Personal. To recompense him for the time devoted to researches into (*a*) the Embryology of Invertebrata; (*b*) the natural history of the organisms concerned in putrefaction. (Annually) £200.

Professor T. Lauder Brunton: Physiology of certain compounds of nitrogen and the action of certain poisons. And for constructing an apparatus for administering chloroform to animals. £80.

The Committee presented a reasoned report. It shied at the applications for annual grants, and doubted the ability of Professor Lankester to carry on such extensive researches simultaneously. But the Society eventually agreed to support all the applications.

January 11*th*, 1877 (*at* 85 *Jermyn Street*). At this, the third meeting, Dr Burdon Sanderson was in the chair. Seven other members were present, namely, Pavy, Lankester, Schäfer, Romanes, Galton, Pye-Smith and Yeo, and two guests, namely, Dr Gayet of Lyons, introduced by Sanderson, and Mr Hart[1], introduced by Yeo.

The applications to the Government Grant Committee were again considered one by one, and the recommendations made at the previous meeting were endorsed, and ordered to be transmitted to the Secretary of the Royal Society.

February 15*th*, 1877 (*at* 85 *Jermyn Street*). At the fourth meeting Dr Ferrier was in the chair. The following members were also present:

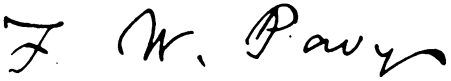
[1] Probably Mr Ernest Hart (see p. 47).

Sanderson, Romanes, Caton, Dew-Smith, Balfour, Yule, Pye-Smith, Dyer and Yeo. Mr Robert Lawson was introduced as a guest by Dr Ferrier. Only formal business was transacted.

The minutes of this meeting are signed

March 15*th*, 1877 (*at* 85 *Jermyn Street*). At this meeting, besides Professor Sharpey, the chairman, the following were present: McCarthy, McDonnell, Pye-Smith, Sanderson, Schäfer and Yeo. A committee was appointed, with Pye-Smith as Secretary, to consider a complaint from one of the members of the Society concerning the working of the Act 39 and 40 Vict. cap. 77.

The minutes are signed



May 10*th*, 1877 (*at* 85 *Jermyn Street*). This was the first Annual Meeting. Dr Pavy was in the chair. The following members were also present: Lauder Brunton, Ferrier, Lewes, Gaskell, Romanes, Schäfer, Dew-Smith, Dyer, Lankester, Pye-Smith, Sanderson, Marshall, Sharpey, Foster, Gamgee, Power, Klein and Yeo. The guests were Dr Putnam, introduced by Brunton, and Dr Coats, introduced by Ferrier.

Dr Putnam was probably the well-known American publisher.

Dr Joseph Coats was a distinguished pathologist, Professor in Glasgow University from 1894 until his death in 1899 at the age of 55. He was President of the Pathological Society in 1876 and of the Medico-Chirurgical Society in 1891.

The following were elected members: W. H. Allchin (London), G. F. Bettany (Cambridge), J. C. Ewart (London), A. Sheridan Lea, Henry Nottidge Moseley, William Stirling (Edinburgh), Sydney Howard Vines.

Dr Allchin, afterwards Sir William Allchin, was a former pupil of Sharpey and assistant to Michael Foster whilst the latter was Professor of Practical Physiology at University College. Subsequently he became lecturer on Physiology and physician to

Westminster Hospital. He was President of the Medical Society of London in 1901 and was Harveian Orator of the Royal College of Physicians in 1903. He died in 1911.

Dr James Cossar Ewart (F.R.S. 1893) was at this time Curator of the Anatomical Museum at University College. He afterwards became Professor of Natural History in the University of Aberdeen, and since 1882 has held the same post in the University of Edinburgh.

Dr William Stirling was at the time Assistant to Professor Rutherford in Edinburgh. Later he became Professor of Physiology in Aberdeen and subsequently occupied a similar position in the Owens College, Manchester.

The following were elected on the first Committee: T. L. Brunton, Michael Foster, G. H. Lewes, P. H. Pye-Smith, J. Burdon Sanderson, Henry Power and E. A. Schäfer. And as Secretaries: George J. Romanes, Gerald F. Yeo.

Dr Pye-Smith submitted the report of the committee on the working of the Vivisection Act, instancing cases in which certificates had been suspended or refused. It was resolved to instruct the Secretaries to submit to the General Medical Council a statement of the facts and to express the hope that they would take such action as might be expedient.

The minutes of this meeting are signed

November 8th, 1877 (*at* 85 *Jermyn Street*). At this meeting Professor Huxley was in the chair, and the other members present were Sharpey, Sanderson, Pavy, Power, Brunton, McCarthy, Pye-Smith, Foster, Allchin, Ewart, Klein, Yeo, Schäfer, Langley, Lea, Vines, Bettany, Yule and Romanes, besides two guests, Messrs Bullar and Simpson.

The method of examination in Physiology for the membership of the Royal College of Surgeons was discussed at some length, but no resolution was adopted.

December 13th, 1877 (*at* 85 *Jermyn Street*). The next meeting was presided over by Professor Burdon Sanderson, the following members

being also present: Sharpey, Power, Brunton, McCarthy, Ferrier, Yeo, Schäfer, and Romanes. Two guests are entered, namely, Dr Allen Thomson, introduced by Dr Sharpey, and Mr Geddes, introduced by Mr Shafer (*sic*).

Dr Allen Thomson, F.R.S., was a distinguished anatomist and embryologist, at that time Professor of Anatomy in Glasgow. He had previously been Professor of Physiology in Edinburgh, and was a life-long friend of Sharpey. He was one of the editors of *Quain's Anatomy*. He joined the Society in 1878 and was elected an Honorary Member in 1882. He died in 1884.

Mr Patrick Geddes was until recently Professor of Botany in Dundee. He had been a demonstrator in Professor Huxley's class of Practical Biology at South Kensington, and had transferred to University College, where he was Sharpey Scholar. Of late years he has become distinguished as a planner of cities, in India and elsewhere.

A committee was appointed to bring before the Home Secretary the effect of impediments thrown in the way of therapeutic experiment by the administration of the Vivisection Act, the committee consisting of Sharpey, Sanderson, Brunton, Gamgee, Foster, Pye-Smith and one of the Secretaries. This committee reported at the following meeting and recommended that the assistance of the Presidents of the Royal Colleges should be invoked to bring pressure to bear on the Home Secretary in connexion with the suspension of Dr Brunton's certificate.

January 10*th*, 1878 (*at* 85 *Jermyn Street*). At this meeting Dr Gamgee was in the chair. The attendance, as recorded in the minutes, is as follows: Sharpey, Sanderson, Foster, Lewes, Power, Ferrier, Brunton, Pye-Smith, Klein, Langley, Ewart, Romanes, Schaefer, Dyer, Lancaster (*sic*), Yule and Yeo.

It was decided to counteract the anti-vivisection agitation by the issue of publications or otherwise, as the Committee might decide, and authorisation was given to it to incur such expense as might be necessary.

February 14*th*, 1878 (*at* 85 *Jermyn Street*). At this meeting Mr Schäfer was in the chair and other members present were Brunton, Bettany, Klein, Lea, Pye-Smith, Sanderson, Vines and Yeo. A noteworthy visitor was Mr Sims Reeves, introduced by Mr Lea—but what attraction brought the great tenor to a meeting of the Society does not appear, nor is it recorded whether he obliged the company with a song. Other

visitors were Mr Page, introduced by Mr Schäfer, Mr Pye, introduced by Dr Brunton, and Dr Lambe, introduced by Mr Vines.

Mr F. J. M. Page was Sanderson's research assistant. He also conducted the course of Practical Physiological Chemistry at University College, and later lectured on Chemical Physiology at the London Hospital Medical School. He joined the Society in 1878. He died in 1907.

Dr Brunton informed the meeting that the Home Secretary had removed every restriction on his certificates and that therefore the action recommended at the meeting in December need not be taken.

March 14*th*, 1878 (*at* 85 *Jermyn Street*). The minutes of this meeting are of considerable interest. There were present Dr Robert McDonnell (in the chair), Caton, Foster, Sanderson, Ewart, Dyer, Lankaster (*sic*), Romanes and Yeo. And as guests Mr Ernest Hart, introduced by Foster, and Dr Howard (of New York), introduced by Yeo.

Dr Robert McDonnell (F.R.S. 1865) was an eminent Dublin surgeon, who had published papers dealing with the physiology of the liver. He filled the offices of President of the Royal College of Surgeons in Ireland and President of the Royal Academy of Medicine. He died in 1889 at the age of 61.

Mr Ernest Hart, afterwards Sir Ernest Hart, was for many years the editor of the *British Medical Journal.*

Dr Howard was the inventor of the method of artificial respiration known by his name.

It was reported that copies of Hermann's pamphlet and McDonnell's address *On the necessity of animal experimentation* had been procured, and it was agreed that "steps be taken for the distribution of them and other instructive essays on the subject."

A letter was read from Professor McKendrick pointing out the inconvenience to Scotch members of meetings on Thursdays. It was agreed to hold the next Annual Meeting on a Saturday and that another Saturday meeting should be held in October.

The Secretaries were directed to invite Dr Pye-Smith to co-operate with them in sending a letter to the Société de Biologie, expressing sympathy at the loss of their President, Claude Bernard. A copy of the letter, floridly worded (doubtless by Yeo; it is written from his club), is in the Minute Book, but the date has been omitted. It asks that the

Physiological Society may be permitted to contribute to any memorial raised to Bernard.

It was determined at this meeting that the Committee take into their immediate consideration the best means of celebrating April 1st, 1878, being the tercentenary of the birth of William Harvey. But there is no record that this resolution was acted upon[1].

May 18*th*, 1878 (*at* 85 *Jermyn Street*). This was the second Annual General Meeting of the Society. It was held at the Waterloo Hotel. The minutes relating to attendance read as follows: "Were present—Mr Galton in the chair, Drs Sanderson, Foster, McDonnell, McKendrick, Gamgee, Pavy, Power, Brunton, Ferrier, Klein, Pye-Smith, and Messrs McCarthy, Schaefer, Allchin, Ewart, Gaskell, Lea, Langley, Yeo. Visitors: The President Coll. Phys. Dublin, introduced by Mr Yeo, Dr Coats, introduced by Dr Brunton, Professor Dewar, introduced by Dr McKendrick."

Professor Dewar, afterwards Sir James Dewar, F.R.S., is the celebrated chemist, successor to Tyndall at the Royal Institution. He died in 1925.

At this meeting the date of the Annual Meeting was altered from May to October. It was further resolved that the number of ordinary members should be increased from "forty" to "fifty."

The ballot for members of Committee was then held, the following being appointed: Brunton, Ferrier, Foster, Pavy, Power, Pye-Smith and Sanderson. The election of new members was postponed to October. This minute is signed "P. H. Pye-Smith Oct. 12. 78."

The record of the minutes of the meeting of October 12th, 1878, which was to be the next Annual Meeting of the Society, is not to be found in the Minute Book, nor is there any record of the meeting in November, which was presumably held, and should have been signed by Dr Ferrier, who presided at the meeting of December 12th. *Six pages of the Minute Book have been cut out between the record of May* 18*th*, 1878, *and that of December* 12*th*, 1878. We have therefore no names of those elected as members in October. But from other evidence it would appear that they probably included F. J. M. Page, J. Priestley (of Manchester), and Allen Thomson. A similar incident is repeated in 1886 (p. 83).

[1] The tercentenary was, however, celebrated by a dinner at Caius College, Cambridge (Harvey's College), to which many members of the Society were invited.

December 12*th*, 1878 (*at* 85 *Jermyn Street*). At this meeting Dr Ferrier was in the chair; there were eleven other members, viz. Sanderson, Brunton, Pye-Smith, Lankester, Francis Darwin, Dyer, Dew-Smith, Romanes, Page and Yeo, and three visitors, viz. Mr Craik, introduced by Brunton, Mr Cheyne, by Yeo, and Mr Liversidge, by Dew-Smith.

Mr Francis Darwin (F.R.S. 1882), one of the original members of the Society, was the third son of Charles Darwin, born at Downe in 1848. He obtained a first class in the Natural Sciences Tripos in 1870 and afterwards studied medicine in London, and graduated M.B. but never practised. He was Lecturer and Reader in Botany in Cambridge from 1884 to 1904: was President of the British Association in 1908 and was knighted in 1913. He died in 1924.

Mr Craik is probably Mr Henry Craik, afterwards Sir Henry Craik, Bt., M.P. He died only this year (1927).

Mr Cheyne is now Sir William Watson Cheyne, Bart., F.R.S.

Mr Liversidge is Professor A. Liversidge (F.R.S., 1882) who was Professor of Chemistry in Sydney from 1873 to 1908. He died 26th September, 1927.

A resolution was passed recording regret at the death of Mr George Henry Lewes, "one of the Society's original members."

The minutes are signed "Francis Galton."

It was resolved to hold the meetings of October, January and May on Saturdays and the other meetings on Thursdays.

A new phase in the history of the Society now begins, although it is not yet seen in a developed form. A special afternoon meeting was called at King's College, London, on January 12th, 1879, to hear an address by Professor Arthur Gamgee on "Old and new experiments relating to Fibrin Ferments," with a demonstration of the "rapid coagulating action of a solution made by extracting washed blood clots with 8 p.c. NaCl solution" (Andrew Buchanan's solution). Eight members were present and one visitor.

January 12*th*, 1879 (*at* 85 *Jermyn Street*). The regular dinner meeting of the Society was held the same evening at the Waterloo Hotel, with Mr Galton in the chair. The other members present were Sanderson, Gamgee, Sheridan Lea, Dew-Smith, Romanes, Priestley, Page and Yeo, and one visitor, Dr Wolsely. The Secretary read a letter, which is preserved in the minutes, from the secretary of the Société de Biologie, acknowledging the receipt from the Physiological Society of £80 for the

Claude Bernard Memorial. Evidently thus early in its career the Society was in a sound financial position.

February 13*th*, 1879 (*at* 85 *Jermyn Street*). At this meeting, with Mr Henry Power in the chair, the attendance was small, viz. Sanderson, Ferrier, Allchin, F. Darwin, Dew-Smith, Dyer, Lankester, Moseley and Yeo. No business was transacted.

March 14*th*, 1879[1]. At this meeting, with Thiselton-Dyer in the chair, the other members present were Foster, Pye-Smith, Brunton, Ferrier, Dew-Smith and Yeo, and one visitor, Mr Harrison Cripps, the surgeon, introduced by Brunton.

It was proposed by Dr Foster and carried "That the meeting in May be held, as far as business [scientific, no doubt] is concerned, at King's College, and as far as other matters [gastronomic, no doubt] are concerned, at Richmond[2]."

May 10*th*, 1879 (*at Richmond*). This meeting was held at the Castle Hotel, Richmond, with Dr Sanderson in the chair: the other members present were Caton, Brunton, Pye-Smith, Foster, Balfour, Langley, Allchin, Lea, Dew-Smith, McCarthy, Power, Thiselton-Dyer, Page, Romanes and Yeo—and two visitors, Dr Timothy Lewis (who discovered *Filaria sanguinis hominis*), introduced by Brunton, and Dr Tschirjew (Russia), introduced by Yeo.

October 11*th*, 1879 (*at the Café Monico*, 15 *Tichborne Street*). This was the fourth Annual Meeting. Mr John Marshall was in the chair. The following members were also present: Sanderson, Foster, Ferrier, Pye-Smith, Thomson, Page, Ewart, Vines, Lea, Dew-Smith, McCarthy, Allchin, Dyer, Moseley, Lankester and Yeo, and four visitors, namely, Mr Alexander (probably the eminent Manchester metaphysician), introduced by Moseley: Mr Parker (Comparative Anatomist), introduced by Ewart: Mr Stewart (probably Charles Stewart, the Hunterian Professor at the Royal College of Surgeons), by Lankester: and Mr Groves, by Yeo. The Committee for the ensuing year was elected as follows: Ferrier, Foster, Gamgee, Power, Pye-Smith and Burdon Sanderson, with Romanes and Yeo as Secretaries. One new member was elected, namely, Mr Walter Pye.

Mr J. W. Groves was Yeo's Assistant at King's College, where he taught Histology. He joined the Society in 1880. Groves had

[1] Place of meeting not stated but probably 85 Jermyn Street.

[2] Apparently there was no scientific business, for only the gastronomic meeting is recorded.

been Secretary of the Medical Microscopical Society, which was established some time before, and had a few years of unobtrusive but useful existence. The formation of the Physiological Society, which included Histology amongst the subjects dealt with, rendered the continuance of a special Society unnecessary.

Mr Walter Pye was a Cambridge graduate, working in Foster's laboratory.

November 13*th*, 1879 (*at the Café Monico*). This meeting is the smallest yet recorded, consisting only of Dr Pavy in the chair, with Dew-Smith, Romanes and Yeo.

December 11*th*, 1879 (*at the Café Monico*). At the next meeting Mr Galton was in the chair, with the following attendance: Brunton, Klein, Lea, McCarthy, Romanes, Pye, Power and Yeo, and three guests, Messrs Meade Smith, J. F. Bullar and Mansell Moullin.

Up to this time the minutes have been in Yeo's handwriting but the next three are written by Romanes.

January 8*th*, 1880 (*at the Café Monico*). At this meeting Mr J. N. Langley was in the chair. Only four other members were present, namely: Lee (*sic*), Pye, Romanes and Yeo, with one guest, Dr Flood, introduced by Romanes. It was resolved that in future "gratuities to the waiters for attendance at the dinners should be paid by the Secretaries out of the Society's funds, in order that members dining with the Society should not be expected to pay anything additional to the cost of their dinners[1]."

February 12*th*, 1880 (*at the Café Monico*). At this meeting, with Dr Foster in the chair, seven other members were present, namely, Burdon Sanderson, Dew-Smith, Pye-Smith, Page, Yeo, Schäfer and Romanes. No business is recorded.

March 11*th*, 1880 (*at the Café Monico*). Mr F. M. Balfour was in the chair, and other members present were Sanderson, Yeo, Gaskell, Allchin, Bettany, Dew-Smith, McCarthy and Romanes.

McCarthy introduced as a guest Mr Bowkett "who exhibited to the meeting an ingenious piece of apparatus for recording diurnal variations of temperature of the animal body."

"It was resolved that a meeting should be held at Richmond,

[1] This custom has continued to the present day, in spite of resolutions to the contrary having been more than once adopted.

Surry (*sic*) on the 3rd of June, 1880, which should be regarded as an adjournment of the meeting previously arranged for May 8th."

June 3rd, 1880 (*at Richmond*). A meeting was accordingly held on that date at the Star and Garter with Dr Foster in the chair. The following members were also present: Pavy, Power, Langley, Dew-Smith, Lea, Schäfer, Moseley, J. Priestley, Pye and Romanes, and three guests, namely, Mr Coutts Trotter, introduced by Dew-Smith, Dr Young, introduced by Priestley, and Mr Bird, introduced by Moseley.

Mr Coutts Trotter was an influential Fellow (Vice-Master) of Trinity; a friend and supporter of Foster at Cambridge. He endowed the valuable Coutts Trotter Scholarship for Physiology or Physics, which has been held by many members of the Society, who have owed to it their first opportunities for conducting research-work.

Dr Robert Arthur Young was Lecturer on Therapeutics at the Middlesex Hospital Medical School and afterwards Physician to the Hospital. He joined the Society in 1894, and is still a member.

Mr Bird is Mr C. H. Golding-Bird, F.R.C.S., afterwards Surgeon to Guy's Hospital: now Consulting Surgeon. He joined the Society at the October meeting.

October 14th, 1880 (*at the Café Monico*). Dr Foster also presided at this the fifth Annual Meeting, the other members present being Sanderson, Pavy, Gaskell, Pye-Smith, Dyer, Dew-Smith, Schaefer, McCarthy, Page, Yeo and Pye. Mr Charles Roy was introduced as a visitor by Dr Foster, and Mr Adams Clarke by Mr Yeo.

Charles Smart Roy (F.R.S.), was a distinguished physiologist and pathologist. He was educated at Edinburgh, worked with Virchow and Koch in Berlin, with Goltz and Recklinghausen in Strasburg, and with Cohnheim in Leipzig. He was the first George Henry Lewes Student in Physiology (1880). When only 27 years of age he was appointed member of a Commission to report on Leprosy in India. In 1882 he was made Professor Superintendent of the Brown Animal Sanatory Institution in Wandsworth. He was Professor of Pathology in the University of Cambridge from 1884 to 1897, when he died, at the early age of 43. He was succeeded in the Chair by A. H. Kanthack (who had acted as his Deputy for three years). Kanthack died in the following year, also relatively young.

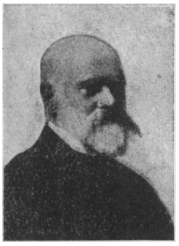
The Secretary reported the financial state of the Society to be "most satisfactory." The Committee was appointed as follows: Brunton, Foster, Gamgee, McCarthy, Pye-Smith, Burdon Sanderson and Allen Thomson. The following new members were elected: Jeffrey Bell, C. H. Golding-Bird, J. W. Groves, W. North, J. Parker (Science and Art Department, South Kensington), D'Arcy Power, Charles Roy and A. Waller.

Mr Jeffrey Bell was for many years Professor of Natural History in King's College, London.

Mr W. North was a Cambridge graduate who was at this time working at University College in Burdon Sanderson's laboratory.

Mr D'Arcy Power (now Sir D'Arcy Power, K.B.E.) is the eminent surgeon, attached to St Bartholomew's Hospital. He is the son of Mr Henry Power, one of the original members. D'Arcy Power has earned the gratitude of physiologists by collecting into one volume copies of all the known or supposed portraits of William Harvey.

Dr Augustus Désiré Waller (F.R.S. 1892), was the son of Augustus Waller, F.R.S., of "Wallerian degeneration" fame, and otherwise distinguished by his researches in connexion with the vasomotor nervous system and the migration of leucocytes.



This is the first time the name of A. D. Waller occurs in the minutes. From the first he took a prominent part in the affairs of the Society, and for several years officiated as Treasurer. He will long be remembered for the ingenuity of his methods and the energy with which he pursued any subject in which he became interested. He was successively Lecturer on Physiology at the London School of Medicine for Women, at St Mary's Hospital, and at the London University. His wife (Alice Palmer) materially assisted him in his work. Dr and Mrs Waller both died in 1922, within a few months of one another, to the grief of their friends, amongst whom the members of the Physiological Society and many foreign physiologists were included.

The first International Medical Congress to be held in London had been fixed for the August of 1881, and it was resolved "that the Secretaries be requested to communicate, on the part of the Society, to the physiologists of the Continents of Europe and America, the desire of the Society to welcome them cordially...and to assure each of them a

hospitable reception in London." The Secretaries were in the meantime directed to ascertain from each member what accommodation he would be likely to be able to offer, before a definite invitation was sent out.

Death of Dr Sharpey. The Secretaries were directed to communicate the following minute to the relatives of the late Dr Sharpey: "That the members of this Society desire to record their sense of the loss they have sustained by the death of a distinguished Honorary Member, the late Dr Sharpey, an event which has deprived Physiology of a true and devoted follower, and physiological workers of a wise counsellor and generous friend."

November 11th, 1880 (*at the Café Monico*). Dr Pye-Smith was in the chair. The other members present were Sanderson, Foster, Klein, Allchin, Ferrier, Roy, Waller, Langley, Power, Moseley, Groves, Romanes, North and Yeo—with Dr Marcet as Dr Sanderson's guest.

> William Marcet, F.R.S., was working in the University College laboratory in a room which was placed at his disposal by Dr Sanderson and, afterwards, by Dr Sanderson's successor. He was engaged at this time with researches on metabolism, investigated both by analysis of gaseous exchanges and calorimetry; he employed a specially constructed ice-calorimeter. He must be regarded as one of the pioneers in this important department of Biochemistry. He was at one time President of the Meteorological Society. Marcet joined the Society in 1886. He was present as a guest at the inaugural dinner in 1876. He died in 1900.

It was resolved on the motion of Dr Sanderson that the Society meet for scientific work at University College at 4 o'clock on the 9th December. Also that the ordinary meeting should commence with dinner at 6.30 o'clock instead of 6.

Inauguration of the Scientific Meetings of the Society

December 9th, 1880 (*at University College*). Accordingly on this afternoon the minutes record a special meeting for scientific work held at the Physiological Laboratory under the Presidency of Professor Burdon Sanderson. The attendance is thus recorded in the minutes:

"Were present Messrs Bettany, Brunton, Caton, Bell, Groves, Gamgee, Waller, Klein, Roy, Romanes, Sanderson, Schaefer, Lea, North, McCarthy, Page, Galton, Yeo; as visitors Drs Mahomet, McAlister and Ringer."

Mahomet is Dr Mahomed, a well-known London physician who wrote extensively on the pulse.

McAlister is now Sir Donald MacAlister, Bart., K.C.B. A distinguished Cambridge graduate, Senior Wrangler and First Smith's Prizeman, he was at this time Lecturer in the Physiological school at Cambridge. He is now Vice-Chancellor and Principal of Glasgow University, and President of the General Medical Council.

Ringer is Dr Sydney Ringer, F.R.S., best known as the discoverer of the isotonic solution of salts which bears his name. He was attached to University College Hospital as Physician, and was also Professor of Materia Medica, afterwards occupying the chair of Clinical Medicine. Ringer was at this time working in the Physiological Laboratory of University College, engaged upon his classical researches on the frog-heart. He became a member of the Society in 1884. He died in 1910.

The minutes also record that at this meeting Professor Schäfer showed specimens of living muscle and of muscle killed while contracting, Dr Klein showed sections of the submaxillary gland of the guinea-pig, Dr Roy exhibited a microtome for cutting sections of frozen tissues, Dr Waller demonstrated that about fifty stimulations per second produced in his own rectus femoris a tetanus the single contractions of which were not fused whereas the normal voluntary contraction produces a perfectly fused tetanus curve, and Mr Romanes described the locomotion of *Echinus*.

At the meeting for dinner in the evening the same members were present, with Dr Mahomed, Dr Sydney Ringer and Dr Vincent Harris as guests.

Dr Vincent Harris was attached to St Bartholomew's Medical School, in which he later taught Physiology. He was at one time Editor, with Morrant Baker, of *Kirkes' Physiology*, a favourite textbook of medical students: the precursor of the well-known work of Professor Halliburton which has become even more popular than the original "Kirkes."

This meeting is notable for two things, namely, first, the invitation to foreign physiologists[1], and second, because it marks the commencement

[1] The invitation is in the following terms:

Dear Sir,

We are directed by the British Physiological Society to invite you to become their guest during the meeting of the International Medical Congress in August next.

(if we except the small meeting at King's College on January 12th, 1879, which was not immediately repeated) of the special afternoon meetings for the demonstration of physiological work which were afterwards to become the most important feature of the Society. It was at first an understood thing that there should be no sort of publication of the work shown at these special meetings: they were to be private and confidential, and were instituted rather with the view of eliciting remarks and criticism of work in progress than with any idea of preliminary publication of accomplished research. Later it was resolved to print and publish any communication which members might desire. In this way the *Proceedings* of the Society were commenced, and were regularly published in the *Journal of Physiology*, the first of such publications appearing in volume IV, dated December 13th, 1883. Until available there, the lists of communications made to the Society will be reproduced here from the Minute Books.

It may be of interest to insert at this place a list of members in 1880, five years from the foundation of the Society. The dates of election of the newer members are given: the others are original members.

Allchin, W. H., London. 1877.
Balfour, F. M., F.R.S., Cambridge.
Bell, Jeffrey, London. 1880.
Bettany, G. T., Cambridge. 1877.
Brunton, T. Lauder, F.R.S., London.
Caton, R., Liverpool.
Darwin, Francis, Down, Kent.
Dew-Smith, A. G., Cambridge.
Dyer, W. T. Thiselton, F.R.S., Kew.

It is the hope of our Society that the Congress of 1881 will intensify by social intercourse the social feeling which already exists between foreign and English physiologists: and to further this object the Society is prepared to accommodate as many as possible of their foreign friends in private homes, of which the available number is, unfortunately, limited.

We therefore beg of you to be kind enough to let us know, at your earliest convenience, if the Society may expect the pleasure of receiving you as their guest.

We are, Dear Sir,
Yours faithfully,
Geo. J. Romanes } *Hon. Secs.*
Gerald F. Yeo }

The copy of the letter in the minutes is in Romanes' hand-writing. Forty copies were sent out; unfortunately no record has been kept of the persons to whom they were addressed.

Ewart, J. C., Aberdeen. 1877.
Ferrier, David, F.R.S., London.
Foster, Michael, F.R.S., Cambridge.
Gamgee, Arthur, F.R.S., Manchester.
Galton, Francis, F.R.S., London.
Gaskell, W. H., Cambridge.
Golding-Bird, C. H., London. 1880.
Groves, J. W., London. 1880.
Huxley, T. H., Sec. R.S., London.
Klein, E., F.R.S., London.
Langley, J. N., Cambridge.
Lankester, E. R., F.R.S., Oxford.
Lea, A. S., Cambridge. 1877.
Marshall, J., F.R.S., London.
Martin, H. N., Baltimore.
McCarthy, J., London.
McDonnell, R., F.R.S., Dublin.
McKendrick, J. G., Glasgow.
Moseley, H. N., F.R.S., Oxford. 1877.
North, W., London. 1880.
Page, F. J. M., London. 1878.
Pavy, F. W., F.R.S., London.
Power, Henry, London.
Power, D'Arcy, London. 1880.
Pye-Smith, P. H., London.
Pye, Walter, London. 1879.
Priestley, J., Manchester. 1878.
Richardson, W. B., F.R.S., London.
Romanes, G. J., F.R.S., London.
Roy, Charles Smart, London. 1880.
Rutherford, W., F.R.S., Edinburgh.
Sanderson, J. B., F.R.S., London.
Schäfer, E. A., F.R.S., London.
Stirling, W., Aberdeen. 1877.
Thomson, Allen, F.R.S., London. 1878.
Vines, S. H., Cambridge. 1877.
Waller, A. D., London. 1880.
Yeo, G. F., London.
Yule, C., Oxford.

January 13*th*, 1881 (*at the Café Monico*). Dr McDonnell in the chair. Were also present Klein, Ferrier, Foster, Sanderson, Yeo, D'Arcy Power, Gamgee, Pye, Roy, Dew-Smith and Romanes, and as guest Dr Cash.

It appears to have been necessary to arrange at a preceding meeting of the Society the place and date of special scientific meetings: we accordingly find a notice to this effect in the minutes of this meeting, King's College, London, being named as the venue.

The minutes of this and of the following meetings, up to and including that of August 5th, are in Romanes' handwriting.

February 10*th*, 1881 (*at King's College*). At this meeting Dr Caton was in the chair; other members present were "Sanderson, Foster, Pye-Smith, Klein, Ferrier, Gaskell, Roy, Dew-Smith, North, Bettany, Page, Groves, Bell, Lee (*sic*), Yeo and Romanes," and as guest, Dr Cash[1].

Demonstrations were given by Klein of microscopical specimens showing cell-structure, by Gaskell who showed "a remarkable and hitherto unobserved effect on the heart of stimulating the vagus nerve of the Frog. On using as the source of stimulation electrical currents too feeble to produce stoppage, the effect was shown to be a marked increase in the amplitude and power of the heart's action." Also by Roy who gave a demonstration, on a dog, of his oncometer, showing the effect on kidney volume of exciting the sciatic and vagus nerves and of injecting various diuretic substances[2]; and by Sheridan Lea, who "gave, on behalf of Langley, two demonstrations, (1) concerning the digestion of fibrin as effected by certain reagents, and (2) microscopical preparations of frog's liver exhibiting the effect of food and starvation on the liver cells."

The dinner meeting was also held at King's College, with Dr Caton in the chair, most of the above-named members being present, and, as guests, Dr Stirling[3], introduced by Lea, Professor Buchanan Baxter, by Yeo, Mr Watson Chain (*sic*), by Groves, and Mr Waters, by Foster.

A vote of thanks to Dr Yeo for the admirable manner in which arrangements had been carried out for this and the last scientific meeting was passed.

[1] Dr Cash is entered in the minutes as a member present, but he was not yet elected.

[2] The minutes contain a long account of this demonstration, and include a description of an apparatus used by Roy for artificial respiration devised by Mr Horace Darwin and constructed by the Cambridge Scientific Instrument Co.

[3] If this is Dr William Stirling it must be a mistake to include him amongst the guests, since he was elected a member in 1877.

On the invitation of Dr Foster it was decided to hold a scientific meeting at Cambridge in June (the meeting was actually held in July).

March 10*th*, 1881 (*at the Café Monico*). This meeting was only attended by four members. Dr Klein was in the chair: the others were Sanderson, Dew-Smith and Romanes. Evidently a dinner without a scientific meeting to precede it was not now very attractive.

July 9*th*, 1881 (*at Cambridge*). The following communications and demonstrations were given at the scientific meeting:

Dr Rutherford: The structure of striped muscle.

Dr Gamgee: The ferments of Papaia.

Dr Sanderson: A new and more compact form of Compensator.

Mr Page: An improvement in his gas-regulator (thermostat).

Mr Langley: The histological changes of the secreting cells of the stomach during action and repose.

Dr Gaskell: A demonstration of the trophic action of the vagus nerve on the heart.

Dr Roy: The rhythmic changes in volume of the spleen as recorded by his oncometer.

Dr Pavy: On hydrocarbons [fats].

Detailed abstracts of most of these communications are recorded in the Minute Book.

The dinner was held in the Hall of Christ's College. "Were present: Dr Foster (in the chair), Sanderson, Gamgee, Rutherford, Pavy, Power, Pye-Smith, Roy, Gaskell, Klein, Dew-Smith, Langley, McCarthy, North, Page, Waller, Vines, and Romanes. And as guests: Dr Latham, introduced by Dr Pavy, Dr Cash, introduced by Dr Roy, Professor Humphry, introduced by Dr Foster, Mr Ernest Hart, introduced by Mr Romanes, Mr Waters, introduced by Mr Dew-Smith, Mr H. Darwin, introduced by Dr Gaskell, Mr Cartmell, introduced by Mr Langley, Mr Salvin, introduced by Sanderson, Mr Thompson, introduced by Pye-Smith, Professor Newton, introduced by Vines, Mr Hill, introduced by Dr Gamgee."

Dr Latham was Downing Professor of Medicine at Cambridge from 1874 to 1894. In 1888 he was Harveian Orator, choosing as his subject "Blood changes in Disease."

Dr John Theodore Cash, F.R.S.; until recently Professor of Materia Medica in the University of Aberdeen. He was elected a member in October, 1881.

Mr Waters is W. Horscraft Waters, who was Demonstrator of Physiology in the Owens College, Manchester. He joined the Society in 1882 and died in 1887.

Mr Salvin is probably Mr Osbert Salvin, F.R.S., who was Strickland Curator, University of Cambridge.

Professor A. Newton, F.R.S., the eminent ornithologist, was Professor of Zoology in Cambridge. He died in 1907, aged 78.

Mr Horace Darwin (F.R.S. 1893), now Sir Horace Darwin, K.B.E., the youngest son of Charles Darwin, was for a long time associated with Dew-Smith in carrying on the Cambridge Scientific Instrument Company, of which he became Managing Director (p. 27).

Further arrangements were made as to inviting foreign physiologists to the International Medical Congress in August, 1881. It was decided to entertain all who had accepted, at dinner on August 8th in London (the date was afterwards changed to August 5th).

A discussion was raised as to the policy to be adopted with regard to the accusations made against physiologists by anti-vivisection agitators, Mr Ernest Hart being invited to give his opinion on the matter. Eventually, on the motion of Dr Sanderson, a committee was appointed to consider the question and report to the next meeting of the Society.

Dinner to Foreign Physiologists

August 5th, 1881 (*at St James's Hall, London*). The next record in the minutes reads as follows: "At an extraordinary meeting of the Society held at St James's Hall [Restaurant] on August 5th were present, Dr Foster in the chair[1], Pye-Smith, Ewart, McCarthy, Pavy, Power, Klein, Rutherford, Gamgee, Sanderson, Gaskell, Roy, Yeo, Schäfer, Langley, Waller, McDonnell, Lea, F. Darwin, North, Page, Groves, Huxley, Lankester, Dew-Smith and Romanes. There were also present as guests, Drs Watney, Harvey, Purser, Waters, Charles, Haycraft, Roxburgh, Stuart and Pike, as well as the following foreign visitors: Kronecker, Goltz, Ewald, Dastre, Morat, Lovèn, Grünhagen, Chauveau, Franck, Waldstein, His, Mayer, Lépine, Brown-Séquard, Bowditch, Jacobi, Wood, Preyer[2]."

[1] Foster was President of the Section of Physiology at the International Medical Congress. He gave a scholarly address on "The History of Physiology in England," which is published in the *British Medical Journal* for 1881, vol. 2, p. 587.

[2] Although all these names are entered in the minutes as "guests invited by the Committee," it is probable that only the foreign guests were so invited, the others having been guests of individual members of the Society.

Dr Herbert Watney was attached to St George's Hospital as Assistant Physician and Lecturer on Physiology. He worked in Professor Sanderson's laboratory at University College, and with Dr Klein at the Brown Institution, his chief work being on the structure of the Thymus.

Stuart is probably Anderson Stuart, at that time Assistant to the Professor of Physiology in Edinburgh, and afterwards Professor in Sydney University. He was knighted in 1914. He died in 1920.

Charles is either Arthur Charles, Professor of Physiology in Queen's College, Cork, or J. J. Charles, Lecturer in Physiology at St Thomas's Hospital medical school, probably the latter.

Kronecker is Professor Hugo Kronecker of Bern. Kronecker, after working with Helmholtz in Heidelberg, became Privat-Docent and Assistant in Ludwig's laboratory in Leipzig; and subsequently Professor Extraordinarius in Du Bois-Reymond's Institute in Berlin. He was appointed to the chair of Physiology in Bern in 1884. In 1895 the third International Congress of Physiology was held in his Institute (the Hallerianum). He was a frequent visitor to this country and a close friend of British physiologists who always found a hospitable welcome wherever he was installed.

Professor F. Goltz was the first Professor of Physiology in Strasburg after the war of 1870. A skilful investigator, he published a remarkable series of papers on the functions of the nervous system, several of which have become classical.

Professor C. A. Ewald was a physician in Berlin, author of a well-known book on digestion.

Professor A. Dastre is the well-known French physiologist, pupil of, and eventually successor to, Claude Bernard and Brown-Séquard. He died in 1917.

Professor J. P. Morat was Professor of Physiology in Lyons—he was also one of Bernard's pupils.

Professor Chr. Lovèn was Professor of Physiology in Upsala. He was present at the inaugural dinner in 1876.

Professor W. His, the well-known embryologist, was Professor of Anatomy in Leipzig.

Mayer was probably Sigmund Mayer, who became Professor of Physiology in the German University in Prag.

Dr Lépine, who had worked with Ludwig in Leipzig, was Professor of Medicine in Lyons.

Professor Brown-Séquard is the well-known physiologist,

successor to Claude Bernard at the Collège de France in 1878. He died in 1894.

Professor Henry Bowditch was for many years Professor of Physiology at Harvard. He worked with Ludwig and Kronecker at Leipzig—chiefly studying the conditions of action of the frog-heart. Although he did not himself produce a great deal of original work, yet, like Michael Foster at Cambridge, he had the valuable faculty of surrounding himself with active investigators whom he assisted by wise counsel and criticism. He died in 1911.

Dr W. A. Grünhagen was Emeritus Professor of Physiology in Königsberg.

Professor A. Chauveau was for many years Professor of Physiology in the great Veterinary College at Lyons. He subsequently occupied an important official position in Paris. He died in 1917.

Franck is probably Dr Ch. A. François-Franck, who was present at the inaugural dinner in 1876.

Dr William Preyer was Professor of Physiology in the University of Jena from 1888 to 1893. He was the author of a well-known monograph on Hæmoglobin (*Die Blut-Krystalle*). He was at this time interested in hypnotism, which he successfully practised on several of his colleagues at the Congress; but his efforts to hypnotise Yeo only served to exhaust the hypnotiser.

After dinner the Chairman first proposed the health of Her Majesty the Queen, and then the foreign guests, coupling the toast with the names of Drs Chauveau and Goltz, who responded. The Chairman next made a complimentary allusion to the presence of Dr Brown-Séquard, who also responded.

The report of the committee appointed at the last meeting to consider the subject of vivisection was adopted. It recommended the publication of a series of articles in a leading Review explaining the methods and aims of physiological research and the extent to which modern medicine is likely to be benefited by it, and suggested the names of leaders in the medical and scientific professions who might be asked to write such articles. Amongst these names were those of Sir James Paget, Sir William Gull, Sir Robert Christison, Mr Charles Darwin, Mr Huxley, Mr Lister, Dr Andrew Clarke, and Dr McDonnell. But nothing seems to have come of the suggestion.

A vote of thanks to the Chairman was proposed by Mr Huxley, which, having been unanimously carried, the Chairman briefly acknowledged.

October 15*th*, 1881 (*at the Café Monico*). This was the sixth Annual Meeting. "Were present, Dr J. Burdon-Sanderson in the chair; also Messrs Balfour, Page, Moseley, Langley, Vines, Gaskell, Roy, Klein, McCarthy, North, Ferrier, Waller, Groves, Lea, Power (d'Arcy), Pye-Smith, Foster, Marshall and Yeo, and as visitors, Dr Scott, introduced by Mr Vines, Dr de Watteville, by Mr Pye, and Dr Gowers, by Yeo."

Dr Scott is D. H. Scott, F.R.S., the eminent botanist.

Dr de Watteville was a well-known neurologist and electro-therapeutist. At this time he was working at Histology in Sanderson's laboratory at University College. He died in 1926.

Dr Gowers, afterwards Sir William Gowers, F.R.S., is the celebrated neurologist. He was Physician to University College Hospital and to the National Hospital for the Paralysed and Epileptic, Queen Square. He died in 1915.

The Treasurer reported a credit balance of £18. 8*s*. 6*d*.

The Committee for the ensuing year was elected, and also the following new members of the Society: Dr Reuben J. Harvey (Dublin), and Dr J. Theodore Cash (London).

It was stated that the dinner given by the Society on August 5th had cost £50; the Committee recommended that each member should contribute one guinea to meet this expense. This suggestion was adopted and the Secretaries were empowered to collect that sum from the members.

It was proposed by Dr M. Foster and carried that a committee consisting of Pye-Smith, Lauder Brunton and one of the Secretaries, should be asked to prepare a report on the working of the Vivisection Act, with an account of the obstacles which had been experienced in obtaining licences and certificates, and recommendations regarding any action which might be taken by the Society.

November 10*th*, 1881 (*at the Café Monico*). Dr P. H. Pye-Smith in the chair. Fourteen other members (Pavy, Foster, McCarthy, Cash, Roy, Klein, Sanderson, Dew-Smith, Bell, Schaefer, Lea, Page, Waller and Yeo) and two guests (Dr Conolly Norman and Mr Humphry) were present.

Mr Humphry is probably Professor Humphry of Cambridge.

It was decided, on the motion of Professor Foster, that of the two Secretaries Mr Romanes be requested to act as Treasurer, the secretarial duties being left to Professor Yeo.

The minutes conclude "After some desultory conversation on current topics the meeting terminated."

December 8th, 1881 (*at University College*). At a special afternoon meeting at University College demonstrations were given as follows:

F. J. M. Page (by means of the capillary electrometer): Strychnia spasms in the frog-gastrocnemius, with waves of eight per second, as described by Lovèn.

A. D. Waller: The effect of different ways of stimulating the muscles of his own leg.

Charles Roy: Two cardiographs.

W. North: An apparatus for analysing expired air; devised by Dr Marcet.

E. A. Schäfer: (*a*) A ready means of testing the reaction of blood; (*b*) The coagulation temperatures of serum-albumin; (*c*) A new inclined plane microtome; (*d*) A new accessory ligament of the malleus.

T. L. Brunton: A frog-heart cannula and cardiograph.

E. Klein: Microscopical preparations of Jacobson's organ and of nuclear division.

At the dinner meeting on the same date "were present Dr Sanderson in the chair, Ferrier, Brunton, Foster, Harvey, Bettany, Priestley, Waller, Klein, Schaefer, Page, Romanes, Bell, Groves, Roy, Dew-Smith, Yeo and McCarthy, and as guests Dr de Watteville, introduced by Waller, Dr Fitzgerald, introduced by Yeo, Professor Thane, introduced by Schaefer, Mr Dowdeswell, introduced by Klein, Mr Forbes, introduced by Burdon-Sanderson."

Professor Thane, now Sir George Thane, was for many years in the Chair of Anatomy in University College.

Mr George Dowdeswell was working with Klein and Sanderson on the subject of inflammation.

Working of the Vivisection Act

At this meeting the report of the committee on the working of the Vivisection Act, appointed on October 15th, was considered and adopted, printed copies of the Report[1] having been circulated to members. It would appear from this that there had been many instances of interference with work on the part of the Home Office.

[1] The Report is a long one. A copy is preserved in the Minute Book.

Three were selected as cases which might be brought to the notice of the Home Secretary, these being Professor Fraser's on the action of Borneo poison, Dr Brunton's on the treatment of snake bites, and Professor Lister's on means of stopping arterial hæmorrhage. But as the London Executive of the International Medical Congress was already in communication with the Home Office on the whole subject it was recommended that the Society leave the matter in its hands, affording all necessary information. A significant sentence occurs in the Report, namely, "that the Act is capable of being a protection instead of a hindrance if reasonably administered." The committee recommended "that workers in Physiology should only apply for such certificates as are necessary for their special purpose, that they should always be prepared to show their scrupulous attention to the provisions of the Act...and that they should never be deterred from applying for the necessary certificate by the chance or the certainty of its being disallowed."

January 12*th*, 1882 (*at the Café Monico*). Dr Lauder Brunton was in the chair; other members present were Ferrier, Roy, Gaskell, Klein, Pye, Groves, McCarthy and Yeo, and one guest (Dr Norman, introduced by Ferrier). It was arranged that the next meeting should be held at King's College and that it should be preceded by a scientific meeting.

The members having been informed of the death of Dr Reuben J. Harvey of Dublin, a recently elected member, a resolution was adopted recording the regret of the Society at the loss sustained by Physiology and by his colleagues and friends.

February 9*th*, 1882 (*at King's College*). The special meeting above referred to was held on this date. The following communications were made:

J. N. Langley: On the condition of the right side of the brain of the dog exhibited by Professor Goltz at the International Medical Congress, with macroscopic and microscopic drawings.

E. Klein: On the left side of the same brain, also showing drawings.

E. A. Schäfer: On the brain of the monkey exhibited by Dr Ferrier at the Congress, with sections and drawings.

T. Lauder Brunton: An apparatus for studying the effects of heat and cold on the circulation in the frog's lung.

F. Gotch: Tetanus curves, indicating effects of different strengths of stimulus.

F. J. M. Page (for Dr Ringer): Frog-heart curves.

W. North: Samples of food from Teneriffe.

J. N. Langley: Stages of secretive activity of the liver cells of the frog.

J. W. Groves: A freezing microtome.

G. F. Yeo: An apparatus for resuscitation of drowning persons, invented by Mr Graham Bell, of telephone celebrity.

This is the first mention in the minutes of Francis Gotch, who was born at Bristol in 1853, son of the Rev. Dr Gotch, a Baptist Minister and an eminent Hebrew Scholar, a member of the Board for the Revision of the Old Testament. Gotch was educated at Amersham Hall School and at University College. He had been Sharpey Scholar in Physiology and was at this time Assistant in the Physiological Laboratory of University College. When Burdon Sanderson went to Oxford in 1883 Gotch accompanied him and not only aided in organising the teaching there, but assisted in the electrophysiological researches which Sanderson was engaged in. In 1891 he was appointed to the Hull chair of Physiology in the newly constituted University of Liverpool *vice* Dr Caton, who for many years had been teaching that subject in the University College of Liverpool, but now gave this up in order to devote himself entirely to clinical medicine. When Burdon Sanderson in 1894 exchanged the Waynflete Professorship of Physiology in Oxford for the Regius Chair of Physic, Gotch was appointed to succeed him and held the post until his death in 1913. He was elected F.R.S. in 1892. He married a sister of Victor Horsley.

At the dinner meeting on the same day were present: Mr Henry Power (in the chair), Foster, Gamgee, Ferrier, Klein, Sanderson, Waller, Gaskell, Roy, Dew-Smith, Groves, Romanes, Langley, Moseley, Lankester, D'Arcy Power, McCarthy, North, Page and Yeo. No special business is recorded.

March 9th, 1882 (*at the Café Monico*). Dr Klein was in the chair: other members present were Foster, Sanderson, Roy, Gaskell, Cash, Dew-Smith, Bell and Yeo, and one visitor (Mr J. A. Scott, introduced by Yeo). It was resolved that the next meeting be held in July at Cambridge and be preceded by a special scientific afternoon meeting.

July 15*th*, 1882 (*at Cambridge*). The following communications were made at the afternoon meeting:

E. Klein: The infective powers of *Bacterium anthracis*.

W. H. Gaskell: The nerve mechanisms of the heart of the tortoise.

Th. Cash: An instrument for the graphic registration of the movements of the frog's heart *in situ*.

Ch. Roy: A new method of recording the motions of the mammalian heart-chambers.

H. Newell Martin: Method of sustaining the mammalian heart alive by artificial circulation.

The dinner meeting was held at "The Hotel" in Cambridge with Professor Michael Foster in the chair. There were seventeen other members present—Sanderson, Brunton, Gaskell, Cash, Klein, Pye-Smith, Roy, Vines, Martin, Dew-Smith, Golding-Bird, Groves, Francis Darwin, Page, Langley, McCarthy and Yeo—and six guests—Messrs Miles, Wooldridge, Evans, Scott, Gotch and Mekins. The meeting "expressed its cordial good wishes to Dr H. N. Martin [Professor in Baltimore since 1877, p. 36] who, for the first time, was present at one of the scientific meetings."

A resolution was passed thanking the Council of the British Medical Association for their support on the occasion of the prosecution of one of the members of the Society under the Cruelty to Animals Act.

The prosecution was that of Dr Ferrier for his work in conjunction with Professor Yeo on the brain of monkeys: Dr Ferrier not having taken out a licence to operate on living animals. It was, however, proved that the operations were entirely carried out by Professor Yeo, who was furnished with a licence, and the case against Ferrier broke down.

October 14*th*, 1882 (*at the Café Monico*). This was the seventh Annual General Meeting. Dr Pavy was in the chair. The following members were present: Sanderson, Klein, Roy, Gaskell, Waller, Brunton, Cash, Lankester, Foster, Lea, Dyer, Page, Bell, McCarthy, D'Arcy Power, Schafer, H. Power and Yeo. There were also three guests, namely, Dr Vignal, introduced by Brunton, Dr Delépine, introduced by Sanderson, and Mr W. T. Brooks, introduced by Yeo.

Dr Vignal was a distinguished French histologist.

Dr Delépine became Professor of Pathology in Manchester: he joined the Society in 1886, and died in 1921.

Mr Walter Tyrrell Brooks joined in 1885.

The Secretary reported (1) that the three scientific meetings held in the previous session had been most useful in promoting the objects of the Society; (2) (on behalf of the Treasurer) that the finances of the Society were in a very satisfactory condition; (3) that the Committee had decided that the rule according to which a member who had not been present at any meeting of the session should cease to belong to the Society "shall not be put in operation in any case"; (4) that Mr Francis Galton having expressed a wish to resign, the Committee had directed the Secretary to thank him for his previous support and to express regret at the receipt of his resignation; (5) that since the last winter session the Society had lost by death its brilliant Honorary Member, Charles Darwin[1], and its distinguished ordinary member, Francis Balfour[2]. [The adjectives in this resolution would perhaps have been more appropriately placed in the reverse order.]

With respect to (5) the draft of a resolution occurs in the Minute Book, written in pencil and nearly illegible, which probably expresses an attempt then and there to voice the feelings of the Society—an attempt which seems to have eventually been given up. The draft reads as follows: "The effect produced in the scientific world by the death of Charles Darwin is so universal and profound that any formal motion in reference to it by this little Society would appear to be superfluous, if not impertinent.

The actual loss to science by the untimely death of Francis Balfour may prove greater than that following the death of the great Darwin (which took place when he was at a mature age and had accomplished so great triumphs). No set of persons can appreciate this more than the members of this Society. But the sorrow felt by many of them to whom he was so dear a friend is too keen and their love for him too warm to bear expression in the words of a cold minute[3]."

It was agreed to alter Rule IV of the Society so as to enable the number of Honorary Members resident in Great Britain to be increased to six.

There is nothing said in the original rules in the Minute Book about residence in Great Britain. Rule IV simply states "The

[1] Died at Downe, Beckenham, on April 19th, 1882.

[2] See p. 37.

[3] Nevertheless, at the next meeting of the Society, on November 9th, a definite resolution regarding their loss was put on the minutes, although it was left to the Secretary to make the feeling of the Society known to the respective families.

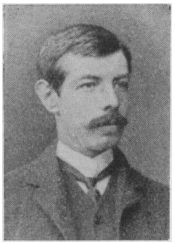
number of Honorary Members shall not exceed five." As a fact only two Honorary Members had been elected, Charles Darwin and William Sharpey, and both were now dead.

As already pointed out, there was no special provision for alteration of rules, and it appears to have been the practice to change a rule at any meeting and without previous notice. This seems to have been done on the present occasion.

The following were elected honorary members: Sir William Bowman, Dr William Benjamin Carpenter, Professor Thomas Henry Huxley, Professor John Marshall, Sir James Paget, Bart., Dr Allen Thomson.

Some of the letters acknowledging the honour have been preserved. That of Professor Huxley is characteristic. After thanking the Society he remarks: "I have been such a bad attendant that I deserve to be made a 'Dis-honorary' member—but my failure has not arisen from want of interest in the objects of the Society.

The following were elected ordinary members: Francis Gotch, Donald McAlister, George Dancer Thane, William Horscraft Waters, Leonard Charles Wooldridge. The officers and Committee were also elected.



This is not the first mention of Wooldridge in the minutes of the Society, for he was a guest at the Cambridge meeting in July. A brilliant young investigator, he early made a mark in Physiology, his work being chiefly on the chemical side. He is best known for his investigations into the phenomenon of blood-coagulation, which have become classical. He succeeded Pye-Smith as lecturer on Physiology at Guy's Hospital. He died prematurely, to the grief of his colleagues and friends, in 1889 (p. 90). His widow, who was the daughter of Dr Sieveking, a distinguished London physician, was afterwards married to Ernest Starling.

November 9th, 1882 (*at the Café Monico*). This was solely a dinner meeting. Dr Klein was in the chair. Sir James Paget, one of the newly elected Honorary Members, attended, and the other members present were Burdon Sanderson, Michael Foster, Roy, McAlister, Thane, McCarthy, Yeo and Priestley. There were three guests, namely, Dr Sprengel, introduced by Klein, Dr Horwicks, introduced by Priestley, and Professor Horwart, introduced by Foster[1].

[1] "Horwicks" and "Horwart" are probably misspellings, but this is as they appear in the minutes.

Sir James Paget, F.R.S., is the famous surgeon who was attached to St Bartholomew's Hospital. He was created a baronet in 1871, and was President of the Royal College of Surgeons in 1875 and of the International Medical Congress in London in 1881. He died in 1899[1].

Dr Sprengel (F.R.S. 1878) was a chemist and physicist, well known as inventor of a continuously acting mercury vacuum pump, and also for his discoveries of the picric acid explosives. He died in 1906.

December 9th, 1882 (*at University College*). At the afternoon meeting communications were made as follows:

A. D. Waller: Photographic records of galvanometer deflections.

F. J. M. Page and Burdon Sanderson: Photographic method of recording electrical changes.

E. A. Schaefer: Photographic record of changes in the volume of the frog's heart.

G. J. Romanes: Physiology of the Echinodermata.

Sydney Ringer: The effects of lime and potash on the frog-heart.

W. North: A new dynamometer.

F. Gotch: A modification of Fleischl's rheonome.

Ch. Roy: The mammalian heart.

At the dinner in the evening Dr Sanderson was in the chair. The other members present were Thane, Schaefer, Ferrier, Roy, Bell, Klein, Gaskell, North, D'Arcy Power, Page, Romanes, Golding-Bird, McCarthy, Gotch, Groves. There were also six guests, viz. Drs Mekins, Sainsbury, Walton, Messrs Fenwick and Laws, and Dr Acland.

"Dr Acland." It does not appear whether this is the distinguished Regius Professor of Physic in the University of Oxford who was made K.C.B. in 1884 and created a baronet in 1890 or his son Dr Theodore Acland, who afterwards joined the Society. He was introduced by Sanderson, and therefore it was probably the Professor, who had just succeeded in getting Sanderson to accept the Oxford Chair of Physiology. Sir Henry Acland was President of the General Medical Council from 1874 to 1887. He died in 1900.

[1] His *Life* was written by his son, Mr Stephen Paget, F.R.C.S., who was also Surgeon to St Bartholomew's Hospital but retired early from practice. Stephen Paget acted for many years as Honorary Secretary of the Research Defence Society and was a notable champion of experimental medicine. He died in 1926.

January 11*th*, 1883 (*at the Café Monico*). This was a dinner meeting. Dr Carpenter, one of the newly elected honorary members, was in the chair; there were seven other members present, viz. Klein, Waller, Pye-Smith, McAlister, Schaefer, Langley and Yeo. The only business transacted was a decision to hold the next meeting at King's College, and that it should be preceded by an afternoon meeting.

February 10*th*, 1883 (*at King's College*). At the afternoon meeting the following demonstrations and communications were made:

Ferrier: The brain of a monkey which was exhibited as deaf at the International Medical Congress in August 1881.

Brunton: A new 3-way stopcock for giving anæsthetics by the trachea.

Groves: A frog-trough for examining living tissues under the microscope.

Klein: Pink yeast torulae.

Watson Cheyne: Work on the tubercle bacillus.

Schaefer: Photographic tracings obtained with a new heart manometer.

Cash: Muscle curves from kittens.

Evans: Sections of spleen which illustrated the blood current in that organ.

Gaskell: The method of educating the tortoise ventricle to perform automatic rhythmic contractions.

Yeo: A tube of diluted blood which had been put up aseptically and still showed the two bands of HbO_2 after a period of five months.

At the corresponding dinner meeting Dr Sanderson was in the chair; the following members were also present: Pye-Smith, Klein, McCarthy, Cash, Gaskell, Roy, Foster, Lea, Gotch, Groves, Schaefer, Thane, Bell, and Yeo: besides six guests, Messrs Evans, Collins, Brooks, Herroun, Cheyne and Sibley. No business is recorded.

March 8*th*, 1883 (*at the Café Monico*). This was a dinner meeting. Dr Pye-Smith was in the chair and seven other members were present, viz. Klein, Allchin, Cash, Dew-Smith, Groves, Roy, Lea. It was resolved to meet on July 21st at Cambridge on the invitation of Dr Foster.

July 21*st*, 1883 (*at Cambridge*). A scientific meeting was held in the afternoon in the Physiological Laboratory. Were present: Professor

Foster (in the chair), Pye-Smith, McCarthy, Waller, Klein, McAlister, Lea, Yeo, Waters, Vines, Langley, Dew-Smith, and, as guests, Messrs Brooks, Sherrington, Evans, Humphry (probably Professor Humphry), Eve, Head, Herroun and Caldwell.

This is the first mention of Sherrington's name in the minutes, and although he appears again more than once as a guest, he did not actually join the Society until November 1885. He succeeded Yeo as Secretary in 1889.

Dr Henry Head (F.R.S. 1899) is the distinguished neurologist. He joined the Society in 1887 and was elected an Honorary Member in 1925. He was knighted in January 1927. He became physician to the London Hospital and to the National Hospital for the Paralysed and Epileptic, Queen Square.

Mr Caldwell was an embryologist who was engaged in investigating the development of Monotremes.

Mr E. F. Herroun was Demonstrator of Physiology at King's College, London.

The following communications were made:

W. H. Caldwell: The mode of using a new continuous mechanical automatic microtome. [This was the well-known "Cambridge Rocking Microtome," by the use of which a series of sections of organs or embryos embedded in paraffin could be cut and mounted.]

E. Klein: Microscopic specimens of stained bacilli in blood.

A. Sheridan Lea: The amylolytic ferment of the liver.

E. F. Herroun: A process of making urea from benzene, ammonia and air.

The dinner meeting was held the same evening at the Prince of Wales Hotel, Cambridge, Professor Foster in the chair, with the same members and visitors as were present at the scientific meeting. No business is recorded.

October 20th, 1883 (*at the Café Monico*). This was the eighth Annual General Meeting. Were present: Michael Foster (in the chair), Bell, Bettany, Cash, Dew-Smith, Gaskell, Gotch, McAlister, McCarthy, Page, Pavy, Pye, Schäfer, Vines, Waller, Klein, Roy, Yeo[1]. Also as guests, Dr Ringer, introduced by Mr Page, and Dr Mason, introduced by

[1] This seems to have been the only occasion on which our first Secretary attempted to arrange the names alphabetically. He nearly succeeded.

Dr Roy. The Committee and Officers and two new members were elected, namely, Professor Thomas R. Fraser and Mr Clinton T. Dent.

Professor Fraser, afterwards Sir Thomas Fraser, F.R.S., was Professor of Materia Medica in the University of Edinburgh from 1877 to 1918.

Mr Thomas Clinton Dent was Surgeon to St George's Hospital and Hon. Secretary of the Association for Advancement of Medicine by Research, to which the Home Secretary was in the habit of referring applications for licences and certificates under the Act 39 and 40 Vic. cap. 77. Dent was a distinguished traveller and alpinist; he was President of the Alpine Club from 1886 to 1889. He died in 1912, aged 61.

An opinion was generally expressed that there was sufficient material for a greater number of scientific meetings and the Committee was directed to take the matter into consideration.

November 8th, 1883 (*at the Café Monico*). Dr Pye-Smith was in the chair. The following members were also present: Foster, Roy, Klein, Groves, Bell, D'Arcy Power, Thane, Dent and Yeo—and one guest, Dr Curnow, introduced by Yeo.

Dr John Curnow was Professor of Anatomy in King's College, and later became Professor of Clinical Medicine. He died in 1902.

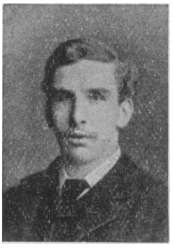
The report of the Committee on the subject of scientific meetings was read and adopted. The chief recommendations in the report were the addition of a fourth scientific meeting (at Oxford) and an occasional extra one in London: this would reduce the merely dinner meetings to three or even to two in the year.

The report also discusses the possibility of publishing the proceedings of the scientific meetings in the *Journal of Physiology* and suggests a close relationship between the *Journal* and the Society with a view to their mutual benefit and support[1]. Professor Michael Foster, the editor and proprietor of the *Journal of Physiology*, who was present, said there would be no difficulty in publishing the proceedings in the *Journal*, "at the expense of the Society." He suggested that they might be printed in sheets for use at the meeting at which the communications were made, and the sheets would then

[1] But forty-three years were to elapse before this union could be brought about.

be ready for insertion in the *Journal*. But since it was pointed out that the present subscription of 10*s*. 6*d*. could not possibly cover the expense involved, the matter was left over, and notice was given by Mr Groves of a motion to increase the subscription.

December 13*th*, 1883 (*at University College*). At the afternoon meeting communications were made by Sydney Ringer, Victor Horsley, J. McWilliam, W. D. Halliburton, E. A. Schäfer[1].



This is the first appearance of Victor Horsley's name in the Minute Book. A distinguished student of University College and graduate of the University of London, he became Assistant Surgeon and afterwards Surgeon to University College Hospital. He succeeded Dr Charlton Bastian as Professor of Pathology at University College. He made numerous observations and experiments on the thyroid, and, in association with Professor Schäfer, Dr Charles Beevor and others, upon the localisation of functions in the brain, working especially on monkeys and the higher apes. He became one of the chief neurological surgeons of the day and was the first surgeon to be appointed at the National Hospital for the Paralysed and Epileptic in Queen Square, Bloomsbury. Joining the Society in 1884, he took a prominent part in its proceedings. He was elected F.R.S. in 1886 and in 1894 received a Royal Medal for his work on the nervous system and on the thyroid. He was knighted in 1902. On the outbreak of the Great War he placed his services at the disposal of the military authorities and was given a commission in the R.A.M.C. He served in France, Egypt and India, and finally in Mesopotamia, where he died of sunstroke at Amarah on July 16th, 1916, in his sixtieth year, to the regret of all who knew him. His life, written by Mr Stephen Paget, is a fascinating story, told with the charm which Mr Paget put into all his writings and full of interesting personal details: the reader must go to this to understand what manner of man Victor Horsley

[1] Abstracts of these are given in the minutes. As they also appear in vol. IV of the *Journal of Physiology*, they have been omitted from this account. Abstracts of the communications made at all future meetings were, from now onwards, published in that *Journal* and were therefore generally omitted from the Minute Books. Somewhat later the titles of communications were again inserted in the minutes but there is considerable irregularity in this respect.

was—and how he came to take an active part both in medical and in general politics as well as in science.

J. McWilliam is Dr John Alexander McWilliam (F.R.S. 1916), Professor of Physiology in the University of Aberdeen since 1886. He had recently been appointed Assistant to the Professor of Physiology in University College, London, and was working at the nervous mechanisms of the eel's heart.

Dr W.D. Halliburton (F.R.S. 1891), whose name also now occurs for the first time in the minutes of the Society, was Sharpey Scholar in Physiology and succeeded McWilliam as Assistant in 1886. In 1890, on the retirement of Professor Yeo from the chair of Physiology in King's College, Halliburton was appointed to succeed him and held the post until 1925, when he retired and was succeeded by R. J. S. McDowall.

At the dinner meeting held at University College the same evening Professor Schäfer was in the chair: other members present being Sanderson, Foster, Jeffrey Bell, Thane, Klein, Pye-Smith, McCarthy, Cash, Romanes, Bettany, Golding-Bird, Page, and Yeo.

It was decided at this meeting that the offer on the part of the *Journal of Physiology* to publish abstracts of the proceedings of scientific meetings be accepted, and that the subscription be raised to £1; also that all meetings be held on Saturdays instead of Thursdays. The Committee was instructed to arrange for revision of the rules in accordance with these decisions.

January 19*th*, 1884 (*at King's College*). Mr Henry Power was in the chair at the dinner: other members present were Foster, Thane, Schäfer, Klein, Pye-Smith, Cash, Gaskell, Roy, Dent, Langley, Lea and Groves—and four guests, viz. Drs Mortimer Glanville, McWilliam, Sherrington and Sandford Moore.

Professor Yeo mentioned that his work had been obstructed by the Home Office, and Mr Clinton Dent informed the members that the Home Secretary was to receive a deputation from the Society for the Advancement of Medicine by Research on the question of withholding certificates.

March 15*th*, 1884 (*at Cambridge*). The following members were at the dinner, viz. Bell, Caton, Golding-Bird, Gotch, Langley, Lankester, Lea, McAlister, Page, Pye, Schäfer, Waller, Wooldridge, Cash, Gaskell, Pye-Smith, Roy, Sanderson and Yeo, with Professor Michael Foster in the chair. Two guests, viz. A. McAlister (Professor of Anatomy) and

E. F. Herroun, are mentioned in the minutes as being present, with the remark added by the Secretary "and many others whose names were not returned in accord with rule 21."

Alteration in the Constitution of the Society

The necessary alterations in the rules were discussed and passed[1]. The chief changes were the increase of the subscription to £1: one black-ball in five (instead of one in three) to exclude from membership: and the Annual Meeting to be held in November instead of October. But the most important change was the abolition of a limit to the number of members. In the original rules the limit was forty: in 1878 this number was raised to fifty: now it disappears, as does the qualification that all the members shall be working physiologists—a qualification which was from the first more honoured in the breach than in the observance.

The removal of the numerical limitation altered the whole character of the Society. While the membership was restricted members were personally, in many cases intimately, known to one another. At the Cambridge and Oxford meetings, those London and provincial members who were able to stay were hospitably entertained for the week-end by their University colleagues. On the Sunday there were generally boating or garden parties; for the latter, Cambridge especially offered unusual facilities, owing to the fine gardens attached to the houses of several of the members.

The London physiologists (with their ladies) were accustomed to have an annual picnic on the Thames. These excursions, when favoured, as was generally the case, with fine weather, formed delightful reunions. The provision for the picnics was made conjointly by the Professor and the Assistant Professor of Physiology at University College, or, to speak more truthfully, by their wives. After the migration of the Sandersons to Oxford the river excursions were for a time continued, the London and Oxford parties meeting half-way. But as the numbers of the Society increased, expeditions of this kind were no longer possible and the river-picnic dropped out[2].

[1] The rules as altered are entered in the Minute Book.

[2] It was revived for once when the International Medical Congress met in London in 1913 (p. 150). On this occasion the Physiological Society—which ran the Section of Physiology—invited its foreign guests to an excursion on the Thames; but in place of the small boats which used to serve for the old river excursions a commodious launch was boarded at Tilehurst and took the party up river to Whitchurch, returning for lunch to the Caversham Bridge Hotel. Re-embarking after lunch, the party proceeded down river to Shiplake, returning for tea to the Hotel. And then to London for dinner: a long but enjoyable day.