THE HISTORY OF THE PHYSIOLOGICAL SOCIETY (1876-1926).

A RECORD OF FIFTY YEARS.

COMPILED BY

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It is generally recognized at the present time that the British school of physiology occupies a foremost position in the biological sciences owing to the outstanding character and varied nature of the notable discoveries that have been made by many workers during the last thirty years. A very remarkable record of achievement stands to the credit of British workers in many departments of physiology, and amongst these may be mentioned the great advances made in our knowledge of the functions of the nervous system; the nature of the activities of ductless glands; the physiology of the circulation, both in relation to the central pump and also to the part played by the peripheral and capillary circulation; the phenomena of nutrition, including not only the question of vitamins, but also the action of minute quantities of inorganic salts and the action of the sun's rays; and, lastly, fundamental researches on muscular activity and contractility generally, together with investigations on the electrical phenomena accompanying the activities of living matter.

This great progress has been due not only to individual discoveries of interest, but has depended still more on the discoveries being of such a character as to lead to the enunciation of general principles, thus tending to remove from physiology the reproach sometimes levelled at the biological sciences, that they consist mainly of a catalogue of facts or observations. The conceptions we now entertain as regards integration in the nervous system, the chemical correlation of organs and functions by means of hormones, are outstanding examples of the remarkable progress made by physiological workers in the last few years. Such discoveries connote a great deal more than the mere record of certain interesting experimental results, and they open up vistas of great promise for the future. Sir Edward Sharpey-Schafer, who has himself played no small part in this progress of physiology during the last fifty years, has compiled the history of a society—the Physiological Society—that is not only very closely linked with this development of physiology in the British Empire, but has also exerted a notable influence on this science wherever it is cultivated. It may, indeed, be claimed that this society, founded only some fifty years ago, has had an even wider influence, as it has served as the model on which a number of other vigorous and younger societies have been moulded, and these, in their turn, have exerted no small influence on the progress of biological and medical science.

The Physiological Society owed its origin not only to the

awakening, after a long sleep, of physiological studies in England, under the influence of the inspiring teaching of William Sharpey at University College, London, but also, and very largely, to the anti-vivisection agitation that arose in the early seventies as a sequel to the commencing development of physiological investigations at that time. In 1875 a Royal Commission was appointed to inquire into these matters, and in due course reported, and subsequently an Act of Parliament was passed for the purpose of regulating experiments on living animals. In consequence of the report of the Royal Commission a meeting was held at 49, Queen Anne Street on March 31st, 1876, at the request of Dr. John Burdon-Sanderson, and was attended by nineteen persons interested in physiology, including Sharpey, Huxley, Michael Foster, George Henry Lewes, Francis Galton, G. J. Romanes, Francis Darwin, and two who happily are still with us, E. A. Schafer and David Ferrier. On the motion of Dr. Michael Foster, seconded by George Henry Lewes, it was resolved:

"That an association be formed, under the name of the Physiological Society, for promoting the advancement of physiology and facilitating the intercourse of physiologists."

The record of the work of the society during the fifty years of its existence, as shown by Sir Edward Sharpey-Schafer, reveals how admirably it has fulfilled the objects expressed in this resolution. It is only necessary to allude to two facts in proof of this. The records of the society show that every really notable discovery in physiology made by workers in this country during the last fifty years has, in the first instance, been brought before this society, and thus it has undoubtedly fulfilled its obligation in promoting the advancement of physiology. Further, the well-known spirit of camaraderie that inspires the working physiologists of this country is proof in itself of the good the society has done in "facilitating the intercourse of physiologists." In later years

this side of the society's activities was extended, with manifest advantage, far beyond the confines of these islands, and international relations were entered into and led to much friendly intercourse between foreign and British physiologists.

The great success of the society in achieving its aims was doubtless due to several causes; thus many of the men who played so large a part in its foundation were animated by broad views in biological matters, and were concerned in placing physiology on a secure basis as an independent science and not merely as a science ancillary to medicine. Huxley, G. H. Lewes, Francis Galton, G. J. Romanes, E. Ray Lankester, Thistlethorpe, are names of men distinguished by their work for biology, and all of these took an active part in the foundation and in the early work of the society. In Sharpey, Burdon-Sanderson, and Michael Foster the society had the support of the three men to whom the development of physiology in this country, both as regards teaching and as regards the inspiring of research, was

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mainly due. All three laid the foundations of modern physiology in this country in University College, London, where Sharpey was professor from 1836 until 1874, and Burdon-Sanderson, under Sharpey's influence, began experimental investigations in 1866 and succeeded Sharpey in the chair of physiology in 1874. Foster, who gave up general practice at the instigation of Sharpey, and because, as he once told the writer, he had come to the conclusion that no sane man could make a diagnosis in medicine—such were the contradictions of medical teaching in his time—became the teacher of practical physiology and histology in 1867. Subsequently (in 1870) he went to Cambridge, and there built up a school of physiology that has achieved results of the first importance, and even as early as 1876, when the Physiological Society was founded, had already amongst its workers such men as W. H. Gaskell and J. N. Langley.

Although the society was fortunate in having amongst its founders men of such wide outlook, of such outstanding intellectual ability, and of such remarkable personality, nevertheless this was by no means the only factor in determining its success. Much of this success is to be attributed to the rules and remarkable constitution of the society. Thus at the outset the membership was limited, and the members were for the most part active working physiologists, but they had the right to introduce guests.

It is also interesting to note that the society was originally intended to be a dining club, and one rule lays down that the meetings shall commence with dinner at the early hour of 6 p.m., later altered to 7. Another rule of some importance provided that at each meeting one member should be elected, on the motion of the secretary, to act as chairman. Hence the society never had an official head or president, and this may have had some influence in making the proceedings, even in later years, less formal than is usually the case in scientific societies. It has been the custom to adhere to the rule that all business of a formal nature should be transacted at the dinner meeting. The inaugural meeting, with Dr. Michael Foster in the chair, was held at the Criterion Restaurant on May 26th, 1876, and twenty-two members were present with fourteen guests. Amongst the latter were Donders of Utrecht, Marey and François Franck of Paris, and Lovén of Stockholm, together with William Bowman, W. B. Carpenter, and William Marcet. William Sharpey and Charles Darwin were the first two honorary members of the society, and Francis Galton, George Henry Lewes, and Francis M. Balfour all attended the first meeting.

In the first few years of the life of the society, as is seen from Professor Sharpey-Schafer's interesting narrative, the main business seems to have been to keep a watchful eye on the proposed legislation and on the administration of the Act regulating experimental work on living animals. Further, the society gave advice with regard to the allocation of the Government grants administered by the Royal Society for the furtherance of physiological research. In the records of these awards, preserved in the minutes of the society, it is interesting to see the recommendations as to grants that have enabled workers to carry through successfully researches that have become famous with the lapse of time. Thus in 1876 there is the record of a recommendation of a grant to Mr. G. J. Romanes to carry on "observations on the locomotor system of the medusae," and another with reference to work by Mr. Langley on "The action of the sympathetic on the submaxillary gland."

The international relations of the society were marked even in these the earliest days of its life, as is shown not only by the number of foreign guests often present at the meetings, but also by the minutes of the year 1878, which contain the record of a letter of sympathy addressed to the Société de Biologie on the occasion of the death of Claude Bernard. A resolution was also passed in this year recording regret at the death of George Henry Lewes, one of the original members, and one who took very great interest in the development of physiology in this country, and in whose memory the well-known George Henry Lewes studentship in physiology was subsequently founded.

In the years 1879 and 1880 a new development took

place that ultimately led to the full realization of the wishes of the founders as to the promotion of the advancement of physiology. In 1879 a special afternoon meeting was held at King's College 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 per cent. NaCl solution." This meeting was attended by eight members and one visitor. In 1880 the scientific meetings of the society were definitely commenced; the first was held on December 9th, 1880, in the physiological laboratory of University College, London, under the chairmanship of Professor Burdon-Sanderson. Eighteen members and three visitors were present, and amongst the visitors was Sydney Ringer, who at that time was actively engaged in his work on the action of inorganic salts on living tissues, especially the heart, that has made his name famous. He did not become a member of the society until 1884. From this time onward, scientific meetings were held in the afternoon prior to the dinner, at regular intervals, in the laboratories of colleges, medical schools, and at the Universities of Oxford and Cambridge. In later years such meetings were held further afield—for example, in Edinburgh and at many provincial universities—but wherever they were held they retained their fundamental and original characteristics, and it is to these, perhaps, rather than to anything else, that the society owes its most remarkable success in promoting the advance of physiology and thus fulfilling the aims, not only of its founders, but also those of all active workers in physiology.

The meetings of the Physiological Society have always been remarkable for the interest awakened in those present in the subjects brought forward for their consideration, and also for the freedom and candour of all discussions that took place. The remarkably "live" character of the meetings was due to many causes, but mainly to the following. Practically all members were actively engaged in prosecuting investigations of one kind or another, and the communications made to the society were generally of the nature of actual demonstrations of some experimental result recently obtained by the investigator. In fact, one of the rules laid down that demonstrations should always have priority over oral communications, and hence the meetings often consisted only of a series of demonstrations. Thus physiologists had often the opportunity of witnessing the progress of researches and not simply listening to the recital of a piece of finished work. Inasmuch as there was no published record of any discussion that took place, criticism was not only often remarkably free and outspoken, but still more often it was most beneficial, and many workers must look back with pleasure and thankfulness to the assistance they often received from others more experienced who witnessed and criticized their experimental results. Such was the friendly feeling amongst the members that no one hesitated to bring forward striking experiments obtained, it may be, at an early period of an investigation and before work had advanced to an extent sufficient to justify conclusions. No claims of priority were either advanced or allowed on the mere basis of these experimental demonstrations, and it is difficult to over-emphasize the valuable results that were obtained by the steady following of such methods. All the members felt that they were in active contact with the most recent additions to knowledge in the making, and this led to an enthusiasm for physiology that has had much to do with its progress during the last fifty years. At a later stage in the history of the society the rapid progress of physiology led to the publication by the society of short abstracts of its proceedings, and recently the control of the *Journal of Physiology* has become part of its work, and thus the influence of the society has been still further extended.

Sir Edward Sharpey-Schafer, in his full and interesting account of the society, deals not only with its work as a whole, but has greatly added to the value and interest of the record by including in it short accounts of biographical detail of a very large number of the members, and in the case of deceased members he has been successful in obtaining their portraits. In fact, the volume may be

regarded as a biographical dictionary of the physiologists of this country for the last fifty years, and must for this reason have a real permanent value, quite apart from its interest in many other respects.

The author has dealt with a subject of no little interest in the history of science and of scientific medicine in this country, and has shown in an attractive manner the profound influence that a working society, founded and conducted on sound lines, can exert on the advancement of science and the progress of knowledge.

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NATURAL CAPACITY IN THE POPULATION.

GALTON LECTURE BY MR. C. J. BOND.

THE Galton Lecture for this year was delivered at the Rembrandt Hotel, South Kensington, before the Eugenics Society by Mr. C. J. BOND, C.M.G., F.R.C.S., of Leicester, on February 16th. It was preceded by a dinner, which was presided over by Major LEONARD DARWIN, Sc.D. It was well attended, and the audience included many ladies. Among those present were the Bishop of Winchester, Lord Dawson of Penn, the Dean of St. Paul's, Dr. Fremantle, M.P., Dr. H. H. Dale, Secretary of the Royal Society; Sir Arthur Keith, F.R.S., President of the British Association; Sir William Beveridge, Director of the London School of Economics; Dr. C. S. Myers, F.R.S., Director of the Industrial Institute of Psychology; and the Right Hon. William Graham. The subject of the lecture was "The distribution of natural capacity in the population," and the conclusion to which the lecturer led up was that there was a need for a national stocktaking, or a census of the people which would reveal the mental qualities.

Racial Decline.

In the opening part of his lecture Mr. Bond contended that civilization and races, like individuals, passed through successive stages of growth, maturity, and decline. The life of a nation was the expression of hereditarily transmitted racial qualities of mind and body. This national life was renewed from below, and depended largely on the mental and bodily qualities of the citizens in the large middle section of society. Under modern conditions there was a strong and growing tendency for the lowest social groups—those including the mental defectives and individuals of a low mental grade, the habitual pauper, and the innately criminal classes—to contribute an undue proportion to the numbers of the population. Such a condition in social, as in individual, life was abnormal, and indicated the commencement of racial decline. Although racial decline was the direct biological effect of breeding from degenerate and inferior stocks, there was also an indirect sociological effect of much importance. The burden of the economic support of these degenerate groups was largely borne by the more capable citizens above, who were themselves thus handicapped in rearing their own families. If, in addition, the ability of these worthier citizens to bear this burden was also depreciated by inter-breeding with inferior stocks, a double injury was inflicted on the nation.

Evidence pointing to deterioration in the mental and bodily qualities of the British people was to be found in the numerous inquiries and official and unofficial reports which had appeared in recent years. The conclusion to be drawn was that there was an urgent need existing for a national stocktaking, or a census of the people which would reveal quality as well as numbers.

The fact that mental qualities, intellectual, temperamental and moral, would no doubt be of increasing importance in the civilization of the future made it essential to include these qualities in the proposed inquiry. Though the ultimate nature of neural, as of psychical, energy was unknown, yet something had been ascertained as to the conditions under which neural energy operated. That which was transmitted in heredity was the neural or physical mechanism of varying degrees of organization, through which, or in which, the psychical phenomena became manifest.

The Differential Birth Rate and Conception Control.

The essential points in regard to the relative fertility of different social groups in the population to-day from the eugenic standpoint were: (1) That the birth rate was lowest in the upper levels of society and in the professional and salaried groups in the large middle section of the population, and that

it rose as a descent was made to the ranks of unskilled labour. (2) This alteration in the previous normal incidence of fertility had grown rapidly in recent years. (3) It was operating on a very large scale, and must, if continued, have a very serious influence on the whole population. The practice of contraception was to-day more prevalent among the educated upper and middle classes, and less prevalent in the unskilled labour groups, while it was practically absent in the lowest degenerate sections of society. Birth control, then, as at present practised, was undoubtedly exercising a dysgenic influence on society. The remedy, however, did not consist in the curtailment of knowledge, but in its spread, on wise lines, to all sections of the population, poor as well as rich. This spread of knowledge in regard to birth control must also include instruction in the duty of adequate parentage in the case of married persons of sound stock and healthy constitution.

The Kind of Census Needed.

An inquiry into the distribution of natural capacity in the population should be included in the census schedule for 1931 by asking questions of genetic or racial importance as to size of family, etc., which were in the schedule for 1911, but were omitted in that of 1921. Certain data of genetic importance should also be added in the system of birth certification and registration. In addition to such information as could be obtained from a census of the whole population a more intensive inquiry might be carried out into certain representative samples taken from the children of school age, and from industrial workers, who might be examined under the Insurance Act at the time of entrance into industrial life, and periodically afterwards. The object of the inquiry must be to reveal quality as well as numbers, and to show in what sections of the population civic was associated with racial worth.

Eugenics and Medicine: Civilization of the Future.

Much advantage to eugenics (Mr. Bond continued) and to medical science would accrue if the interest and active co-operation of the medical profession could be enlisted in the study of genetic problems. Medical men possessed unrivalled opportunities for observing and recording the hereditary transmission of mental and bodily characters from parents to offspring and from generation to generation, but at present this valuable knowledge was largely lost to the nation. Medical science would also greatly gain by further research into the influence of the hereditary factor in disease. But in order to bring about this active co-operation between medicine, genetics, and eugenics a different outlook must first be established towards genetic problems in all bodies and institutions concerned with the education of medical students.

It might be objected that since no one knew what human civilization and human life would be like in the future, any attempt to produce, along eugenic lines, mental and bodily qualities suited to the future environmental conditions must necessarily fail. It might, however, be predicted that human evolution would proceed along psychical lines, and that the human environment of the future would be one in which brains counted for more than muscle. In such an environment intellectual and moral qualities, character, personality, and capacity for citizenship would be very important features in the equipment of the future citizen, and there would be no room, at any rate, for mental deficiency.

Practical Conclusions.

If such an inquiry or national stocktaking as was suggested should point to some deterioration in the population, then, among the remedial measures, the first place must be given to education. It was only by education along biological lines that a sound public opinion could be formed concerning eugenic problems, or that a racial conscience could be aroused. Segregation along biological lines must be brought about between the fit and the degenerate sections of society. The mentally defective groups, including the habitual pauper, the inebriate, and the innately criminal class, must be segregated during the reproductive period of life, while in some cases, after careful inquiry, expert advice, and judicial sanction, sterilization might be necessary.

Although man had grown but little in mental stature during historic times, there were encouraging signs for the future. The power to control not only the environmental conditions in the outside world, but also the quantity and eventually the quality of human life produced, would enable civilized man to change human nature and to raise mental and moral capacity to a higher level. But this artificial selection under human control must be of the right kind, and it must be exercised in the right way—namely, along lines calculated to promote true racial welfare. At the present time much legislation and many sociological methods for improving the conditions of life were not founded on sound biological principles. The aim of the eugenicist would be to bring about a wider outlook and a sounder public opinion concerning racial problems.