

Bureau itself disappeared, an Office National and Institut Géophysique took its place.

Madame Angot survives him with a son and two daughters, whose families were the joy of the years of his retirement.

NAPIER SHAW.

DR. G. STANLEY HALL.

DR. G. STANLEY HALL, emeritus president of Clark University, Worcester, Mass., died on April 24, aged seventy-eight. Prof. E. W. Scripture, of the University of Vienna, has favoured us with the following appreciation of the significance of Dr. Hall's life and work.

In the middle of the 'eighties the fame of Dr. Hall as the pioneer of experimental psychology in America was talked of in the psychological laboratory of Prof. Wundt at the University of Leipzig. The Americans studying there at the time looked upon him as an enthusiastic disciple of Wundt, and were proud of the first American laboratory of experimental psychology which he founded at Johns Hopkins University. When in 1888 he accepted the presidency of the newly founded Clark University at Worcester, Mass., he made experimental psychology one of the chief departments. With the enthusiasm of a pioneer and with the inspiration of the German university system, he tried to introduce methods of research and instruction according to German ideals. He had a special knack for collecting around him men of the highest scientific gifts. The faculty at Clark University included Prof. Michelson for physics, Prof. Nef for chemistry, Prof. Franklin Mall for biology, and Prof. Donaldson for neurology. These departments became famous rapidly, in fact so rapidly that President Harper induced them all to go to the University of Chicago when it was founded. The *American Journal of Psychology* which Hall had started at Johns Hopkins University continued its work, and the *Pedagogical Seminary* was started.

Leaving the psychological work mainly to the younger men, President Hall's activities were now turned mainly to work in education. He became the inspiration for many investigators and teachers; so much so, that he was often looked up to with semi-religious adoration, which sometimes took the form of poems in his honour.

When Clark University was founded with the announcement that it was to introduce into America

higher methods of university work than had yet been known in the country, there was naturally considerable excitement, with enthusiasm on one hand and resentment on the other. The high ideal corresponded to the demands of the enterprising spirit of America, but it came into conflict with the traditional ideas of the American universities, which at that time were modelled chiefly on the English system of colleges for undergraduates. The very spark of rivalry introduced by Clark University served to set loose new forces in the older universities. Not many years afterwards it was said by a Harvard graduate that Dr. Stanley Hall had done more good for Harvard University by his stimulation than he could ever accomplish at Clark University itself. The gradual enlargement of the American universities into institutes for research received much of its impetus from Dr. Hall and his ideas. In this respect he succeeded as a great American educator, although it was impossible for him to make Clark University what he wanted it to be. This University never had the slightest chance to become a great institution like the older ones. It was situated in a town with none of the additional institutions for medicine, law, science, art, and technology which were necessary for its life. It did not have the vast funds of the old institutions and had no chance for collecting new funds.

Dr. Hall was a man of most charming personality. His addresses were marked by fluent and melodious delivery; it is said of him that every sentence was an instinctive work of art, and that he never put a word in an inharmonious place. His early work in experimental psychology was of scientific value. In his later work he showed full appreciation of and sympathy with the newer developments of psychology. He was one of the first to grasp the importance of Freud's psychoanalysis. His works in general psychology, on adolescence and senescences, have high value as monuments of American learning.

WE regret to announce the following deaths:

Dr. C. W. Andrews, F.R.S., of the British Museum (Natural History), on May 25, aged fifty-eight.

Sir Asutosh Mookerjee, formerly vice-chancellor of the University of Calcutta, founder-president of the Calcutta Mathematical Society, and twice president of the Asiatic Society of Bengal, on May 25, aged fifty-nine.

Current Topics and Events.

IN his speech while proposing the toast of "Science and the Empire" at the annual dinner of the British Science Guild on May 22, Lord Sumner must have been facetious in his selection of the gramophone, cinematograph, and motor-car as instances of scientific achievement and influence. When things of this kind are taken as typical examples of what science means to modern civilisation, it is no wonder that doubt is often expressed as to whether scientific progress has been worth while when regarded as a means of human development. Science means, however, much more than contributions to popular entertainment or mechanical movement; but its strength and its significance are commonly misunderstood in

high as well as in low places. The community in general does not appreciate the difference between a scientific investigator and the "wizard" inventor, and fails to distinguish between a communication to a scientific society and an announcement in a daily newspaper. So it comes about that Dr. Abrams' "sphygmobiometer," and Mr. Grindell-Matthews' "death-ray," are accepted by the daily Press as great scientific discoveries, while actual additions to natural knowledge, represented by scores of original papers read to scientific societies every week, are unregarded. A scientific or technical society is the proper place to submit claims which are alleged to have a scientific basis; and unless this has been done,

the scientific world is justified in declining to accept them, and to be suspicious of all mystery boxes or devices which have not been examined by bodies competent to express an opinion upon their construction and effects. Science signifies accurate knowledge and truthful testimony, and its methods are as applicable to social problems as they are to inquiries in the field of Nature. Mechanical and other industrial developments have been made possible by scientific discovery, but they have rarely been the purpose of it. All this is commonplace to scientific workers, but the public Press, with a few exceptions, knows nothing of science and is prepared to give publicity to assertions which it would not entertain for a moment if they concerned law or literature or finance. For these aspects of newspaper work, the services of competent editors are considered to be essential, but we still await recognition of the like need for scientific editors to offer guidance on matters relating to science, and to expose the sensational news which now so frequently passes for scientific truth.

DR. G. T. WALKER is about to retire, under the age rule, from his post of Director-General of Observatories, India, and will be succeeded by Mr. J. H. Field. On the retirement of Sir John Eliot, in 1904, the Indian Meteorological Department was reorganised, Dr. Walker being appointed to the Director-Generalship, and his tenure of the most important meteorological appointment in tropical countries will be memorable for his introduction of statistical methods into the difficult problem of seasonal forecasts. This problem had appealed strongly to Blanford and Eliot, and the latter had issued annual forecasts, which, however, were based on a method largely theoretical and empirical. The development, just before Dr. Walker went to India, of methods of research based on "correlation coefficients" put a powerful mathematical tool into his capable hands. Applying the new method first to the local factors used by Eliot in his empirical forecasts, Dr. Walker was led on to calculate correlation coefficients between monsoon rainfall and meteorological factors in all parts of the world, the results being described in a number of papers on "Correlation in Seasonal Variation of Weather," published in the *Memoirs of the Indian Meteorological Department*. As the final effort of his official service to meteorology, he has collected all the threads of his work together and published a memoir entitled "A Preliminary Study of World Weather" (*Memoirs of the Indian Meteorological Department*, vol. xxiv., part iv.), which is a mine of statistical information, containing well over 1000 coefficients of correlation between meteorological factors and a critical discussion of the reality of the various relationships found. The correlation coefficients are not as a rule very high; but Dr. Walker finds a coefficient between the monsoon rainfall of the Indian Peninsula (roughly south of a line joining Bombay and Calcutta) and certain pre-monsoon factors which reaches the high value of 0.73. As forecasts based on these factors can be issued for the coming monsoon on June 1 each

year, the importance of the relationship is obvious. Under Dr. Walker's direction valuable work has been done on solar physics by Mr. J. Evershed at Kodaikanal and on the upper air by Mr. J. H. Field at Agra.

PROF. S. KITASATO, the Nestor of bacteriology in Japan and one of the few surviving pioneers from the hey-days of bacteriological discovery in the 'eighties, has been created a Baron by the Emperor of Japan for his lifelong services to medical science. Prof. Kitasato was born in 1856, and as a young man came to Europe to study bacteriological methods under Koch when the latter became Director of the new Hygienic Institute in Berlin in 1885. During his five years' sojourn in Europe, Kitasato made numerous contributions to bacteriology, among which special mention may be made of his successful effort to isolate in pure culture, and by the use of anaerobic methods, the bacillus of tetanus—an organism previously seen and described by Nicolaier. On his return to Japan in the early 'nineties, the opportunity soon arrived to put in practice his acquired knowledge of method, in connexion with the investigation of plague. With Aoyama he was sent to Hong Kong to study the plague epidemic there in 1893-94. He and Yersin working independently had the good fortune to discover the causative organism, *B. pestis*, and further to demonstrate that plague infection was the cause of the antecedent or coincident rat mortality. In 1892 the Institute for Research in Infectious Diseases was founded in Japan with Kitasato as its Director. This Institute became a potent centre of bacteriological research in Japan and provided for that country its supplies of therapeutic sera and prophylactic vaccines. Prof. Kitasato has devoted much attention to the study of native diseases such as leprosy and tuberculosis, and by his own work and that of his many disciples has done much to foster the high reputation now enjoyed by the Japanese school of bacteriology. Prof. Kitasato was elected a foreign member of the Royal Society in 1908.

THE centenary of the birth of Lord Kelvin occurs on June 26 of this year. On that date, the Institution of Electrical Engineers, of which Lord Kelvin was thrice president, will hold a centenary *conversazione*. At the University of Glasgow, the Kelvin centenary will be celebrated on June 25, which is Commemoration Day. The honorary degree of Doctor of Laws will be conferred on Mr. Ramsay MacDonald, the Prime Minister, whose wife was a grandniece of Lord Kelvin. It will also be conferred on Sir James Bell, who as Lord Provost was chairman at the Jubilee Banquet to Lord Kelvin in June 1896, and on Dr. Alexander Russell, president of the Institution of Electrical Engineers, who is to give the Kelvin Oration. The Freedom of the City of Glasgow will also be conferred on the Prime Minister and on Sir Donald MacAlister, the Principal of the University. The official celebrations, in which practically every scientific and engineering society and institution in Great Britain will participate, will be held on July 10 and 11. This late date was

decided on so as to allow the many hundreds of foreign men of science and engineers who will then be in London the opportunity of participating. We note from the provisional time-table of the World Power Conference just published that on July 10 Sir J. J. Thomson will deliver a Memorial Oration on Kelvin. On the evening of the same day, the president of the Royal Society will give an official reception. On July 11 Lord Balfour will take the chair at the Kelvin Centenary Banquet.

It was reported in the *Times* of May 22 that President Coolidge had been treated for a cold by the inhalation of a chlorine gas mixture. Thus is put to good use a gas which was one of the first employed for its noxious effects during the War. The incident illustrates a principle which has a very general application, that substances which are poisonous in higher concentrations are useful in smaller amounts; in fact, not only the substances classed as poisons, which are used beneficially every day in medical treatment, but also others, the presence of which in the body is essential to its normal functioning, are toxic in quantities above a certain level. The use of chlorine gas for the treatment of colds was suggested by certain observations upon men employed in its manufacture during the War; it was found that these workers suffered less than others from influenza. Its mode of action is probably not a direct one upon the microbes in the nasal cavities, although this explanation has been suggested for the action of the fumes of nitrogen peroxide and sulphur dioxide in preventing influenza: these gases may make the secretions acid and so hinder bacterial growth. Chlorine, however, acts more probably as an irritant to the mucous membranes, producing an increased secretion from them, and this carries with it a host of white blood cells; both the cells and the secretion attack the micro-organisms, while the latter also washes them away mechanically. Possibly also the microbes find it difficult to penetrate through these secretions into the mucosa itself. Thus it is seen that the gas acts more by stimulating the natural defensive processes of the body than by a direct effect upon the microbes themselves, showing once again the extreme importance of the defensive mechanisms of the body itself in resisting bacterial invasion.

A LARGE audience gathered at the Imperial College on Wednesday, May 21, to hear Prof. P. Zeeman's lecture on "The Optical Effects of Motion," over which Prof. A. Fowler presided. After enumerating the various effects included under the title he had chosen, Prof. Zeeman proceeded to deal in detail with the so-called Fizeau effect, namely, that the direction of a ray of light in a refracting medium is independent of the motion of the medium with respect to the ether. This was first enunciated, perhaps on insufficient grounds, by Arago, and attributed by Fresnel to a convection of ether by the moving body. Fizeau afterwards confirmed Fresnel's calculation of the actual magnitude of the predicted effect. Fresnel, however, took no account of dispersion in the medium. A correction factor

was therefore necessary, and this was supplied by Lorentz in 1895. As a consequence, the experimental result of Fizeau no longer agreed with the revised calculated value of the convection coefficient. Prof. Zeeman thereupon undertook experiments on a large scale with the view of a more accurate determination. The principle employed was that of the Michelson interferometer. Experiments were made with both liquid and solid media—water, glass, and quartz—and the results, after many difficulties had been overcome, agreed in each case almost exactly with the calculated values of Lorentz. In the water experiment, tubes 6 metres in total length and 14 mm. in internal diameter were employed, and very clear interference fringes were obtained. Ingenious devices were adopted for measuring the velocities of the moving media, both liquid and solid. By means of an arrangement of linkages, velocities of 10 metres per second were given to glass and quartz plates, and accurately measurable displacements of the interference fringes were thereby obtained. An interesting fact revealed by the experiments was that the best optical glass was more homogeneous than natural crystals of quartz. In conclusion, Prof. Zeeman referred briefly to attempts which he had made to obtain evidence of the transverse Doppler effect required by Einstein's theory of relativity. He had so far been unsuccessful, but had hopes ultimately of obtaining a positive result. The lecture, which was well illustrated by lantern slides, was much appreciated.

THE second explosion (of ten tons of melinite) took place at La Courtine on May 23 at 8 P.M. (summer time) and the third (of five tons) on May 25 at 9 A.M. (summer time). A fourth was arranged for the evening of May 26. The detonation of the second explosion was more violent than that of the first, and this, it is suggested, was due to the greater resistance of the soil. It was heard somewhat differently from that on May 15, and was again clearly audible at Bordeaux. At Moulins (79 miles from La Courtine), the second explosion was heard, but not the first. No precise results were obtained by the listening post installed on the Eiffel Tower, but the instruments, which failed to indicate a disturbance on the first occasion, showed a marked deviation 18 min. 4 sec. after the second explosion occurred. This implies an average velocity of about 1086 feet per second. In the second explosion, the experiments on animals near the source were abandoned in deference to public opinion.

THE plans of an Oxford University Expedition to North-East Land, Spitsbergen, are published in the *Times*. The expedition, which has the support of the Royal Geographical Society and the Air Ministry, has secured in the Norwegian whaler *Polarbjörn* a most serviceable vessel for the work. A small Norwegian sealing sloop has also been chartered. A seaplane designed for Arctic work will be taken. It carries three men, with five weeks' provisions, a sledge, and a collapsible boat. The main object of the expedition is to conduct explorations on the ice-capped island

known as North-East Land, the interior of which has not been visited since A. E. Nordenskjöld crossed it in 1873. Attempts will also be made to penetrate the seas between Spitsbergen and the north-west of Franz Josef Land. This is generally a region of considerable ice congestion and has seldom been visited on this account, but there is no strong likelihood of any new land being discovered. If the present season proves to be as favourable an ice year as last summer the work of the expedition will be facilitated, and the use of the seaplane should result in some useful surveys. Captain Helmer Hansen, who was ice pilot of the *Fram* in Captain R. Amundsen's Antarctic expedition and one of the party which reached the South Pole, will accompany the expedition. Mr. G. Binney is the leader.

At a special meeting of the American Philosophical Society held on Friday, May 2, the City of Philadelphia through its Board of Directors of City Trusts made the following annual presentation of the John Scott Medal awards: To Prof. F. G. Banting, professor of medical research in the University of Toronto, who in 1920 and 1921 succeeded in preparing a potent extract of the experimentally atrophied pancreas which increased materially the life of depancreatized dogs by enabling them to retain larger amounts of sugar. In these researches there were associated with Dr. Banting, Drs. Macleod, Best, and Collip. To Dr. W. W. Coblentz, physicist of the U.S. Bureau of Standards, for his skill in the design and construction of thermopiles and radiometers of the highest sensitivity, with which he has measured the radiation of the fainter stars. To Prof. E. V. McCollum, professor of biochemistry, School of Hygiene and Public Health, Johns Hopkins University, who demonstrated in 1913 a growth-promoting vitamin in butter fat, the first of a long series of researches by him and his collaborators on the presence in various foods of other similar substances, promoting growth and maintaining health. To Dr. R. Modjeski, of New York City, for his skill in bridge designing. He is now chief engineer of the Delaware River bridge.

THE annual report of the British Science Guild for 1923-4 contains evidence of much activity in regard to publicity work. Last year the free distribution of publicity leaflets was begun, and the first two are reprinted in the handbook to the exhibits in pure science at the British Empire Exhibition. An experimental "Science News Service," under the direction of Mr. G. D. Knox, has also been instituted, and weekly articles on scientific subjects by experts have been published in the daily Press. The further development of this new venture is being considered. The Guild has also arranged for the broadcasting of several talks on scientific subjects and is co-operating with the British Association in the preparation of a list of science lecturers for the use of local scientific societies and other bodies. An important event in the immediate future is the conference on Science and Labour in the Modern State, proposed by the Guild four years ago and now to be held at the British Empire Exhibition on May 30 and

31. The joint organising committee is composed of influential members of the Guild and of the National Joint Council—a body representing the Trades Union Congress, the Labour Party, and the Parliamentary Labour Party. The conference is to be opened by the Prime Minister. Other matters that have received attention include the promotion of greater facilities to enable the Board of Education to concern itself with educational values rather than money-scrutinising duties; questions arising out of the British Empire Patent Conference of 1922 and amendments in international conventions relating to industrial property; and the issue of a new and revised edition of the Guild's Catalogue of British Scientific and Technical Books, which will contain more than 8000 titles, as compared with 6000 in the first edition.

THE annual visitation of Rothamsted Experimental Station, Harpenden, will be held on Wednesday, June 18, at 11.30 A.M., when the laboratories and field plots will be inspected and an account of the work in progress will be given.

THE gold medal of the Royal Astronomical Society, which has been awarded by the Council to Prof. A. S. Eddington, will be presented at the ordinary meeting of the Society on Friday, June 13, at 5 P.M., when the president will give an address setting forth the grounds of the award.

A MEETING of the Chemical Society will be held in the theatre of the Royal Institution (by kind permission of the managers) on Thursday, June 12, at 5.30 P.M., when the Faraday Lecture entitled "Atomism in Modern Physics" will be delivered by Prof. R. A. Millikan, of the California Institute of Technology, Pasadena.

AN examination of candidates for the associateship of the Institute of Physics will be held at the latter end of September next, but applications for entry must be received by the Secretary, 10 Essex Street, Strand, W.C.2, before the end of June. Application forms and copies of the papers set in 1922 and 1923 can be obtained from the same address.

THE fourteenth annual May Lecture of the Institute of Metals will be delivered in the hall of the Institution of Mechanical Engineers on Wednesday, June 4, at 8 P.M. by Dr. F. W. Aston, who will take as his subject "Atoms and Isotopes." Tickets of invitation can be obtained by sending a stamped addressed envelope to Mr. G. Shaw Scott, secretary of the Institute of Metals, 36 Victoria Street, London, S.W.1.

A PHYSICIST is required by the Directorate of Explosives Research, the Research Department, Woolwich. Candidates must possess an honours degree in physics, have a good knowledge of chemistry, with at least two years' experience in research. Written applications for the post, with copies of testimonials and references to any published work, should be sent to the Chief Superintendent, Research Department, Woolwich, S.E.18.

IN NATURE of February 9, p. 204, we quoted a newspaper correspondent's account of the discoveries of Fathers Licent and Teilhard in the Pleistocene

deposits of China. Father Teilhard now writes to correct some misapprehensions in this account, remarking especially that no remains of human skeletons of Pleistocene age have so far been found. Several Palæolithic floors, however, rich in worked quartzite and the fossil remains of Pleistocene mammals, have been explored. The small horse referred to is apparently a hemionus or wild ass, closely similar to that still living in Tibet.

At the meeting on July 3 of the Council of the Royal Society, applications will be considered for assistance from the fund recently donated by Messrs. Brunner Mond and Co. in aid of the expenses of scientific publications, as well as applications for aid from the Government Publication Fund. The donation of Messrs. Brunner Mond and Co. is limited to aiding publications in physics, chemistry, mathematics, and astronomy. Applications from recognised scientific societies will be received by the secretaries of the Royal Society; other applications should be put forward through a member of the Council. All applications should be received not later than June 26.

ACCORDING to *Science* the medals of the National Academy of Sciences have been presented as follows: The Agassiz Medal to O. S. Pettersson, of Sweden; the Henry Draper Medal to Prof. A. S. Eddington, Plumian professor of astronomy and experimental philosophy in the University of Cambridge; the Watson Medal to Prof. C. V. L. Charlier, director of the Royal Observatory and professor of astronomy in the University of Lund, Sweden; the Daniel Giraud Elliot Medal, for 1921, to Prof. Bashford Dean, professor of vertebrate zoology in Columbia University, New York; for 1922, to Prof. W. M. Wheeler, professor of economic entomology in Harvard University, and for 1923, to Ferdinand Canu, of Versailles, France.

THE following committee has been appointed to formulate a detailed scheme for individual tests of agricultural machinery for the consideration of the Ministry of Agriculture and Fisheries: Prof. W. E. Dalby (chairman), Mr. Thompson Close, Mr. F. S. Courtney, Mr. Henry Deck, Mr. Harry German, Mr. W. Harrison, Mr. B. J. Owen, Dr. T. E. Stanton. Mr. P. Barker, of the Ministry of Agriculture and Fisheries, has been appointed secretary of the committee. The committee is empowered to co-opt, for the purpose of inquiry into any particular class or classes of machine or implement, or into any particular form of test, such person or persons whose knowledge may be of assistance.

THE Council of the Royal Society of Arts has unanimously resolved to confer the Albert Medal for 1924 on the Prince of Wales, in recognition of services rendered to arts, manufactures, and commerce as president of the British Empire Exhibition and by his visits to the Dominions and India. The president of the Society, the Duke of Connaught, has approved the award. The Medal, which was founded in 1863 to commemorate the Prince Consort's presidency of the Society from 1843 to 1861, is awarded annually for "distinguished merit in promoting Arts, Manufactures, and Commerce."

ONE of the sessions of the Empire Textile Conference which will be held at the British Empire Exhibition, Wembley, during Whitsun week, will be devoted to a general discussion on "Physical and Physico-chemical Problems relating to Textile Fibres." This has been arranged jointly by the Faraday Society and the Textile Institute, and it will be held on Wednesday, June 11, from 2.30 to 6.30 P.M., in Conference Hall No. 4. The introductory address will be given by Dr. W. Lawrence Balls, and the programme of 12 papers includes contributions from all the leading laboratories in Great Britain and Ireland engaged in textile research. Full particulars may be obtained from the Secretary of the Faraday Society, 10 Essex Street, London, W.C.2, or from the Secretary of the Textile Institute, St. Mary's Parsonage, Manchester.

At the annual general meeting of the Institution of Civil Engineers, held on Tuesday, May 13, the following officers were elected for the year beginning in November next: *President*, Mr. Basil Mott; *Vice-Presidents*, Sir William Ellis, Mr. F. Palmer, Sir Archibald Denny, Mr. E. F. C. Trench; *Other Members of Council*, Mr. H. N. Allott, Mr. A. A. Biggs, Sir John Cadman, Sir Dugald Clerk, Col. R. E. B. Crompton, Mr. H. A. Cutler, Mr. W. W. Grierson, Sir Robert Hadfield, Sir Brodie H. Henderson, Mr. E. P. Hill, Mr. G. W. Humphreys, Sir Cyril R. S. Kirkpatrick, Sir Murdoch Macdonald, Mr. J. MacGlashan, Mr. J. P. Maxwell, Sir Henry Maybury, Sir John Monash, Mr. G. T. Nicholson, Dr. J. B. Porter, Sir Richard Redmayne, Sir Hugh Reid, Capt. M. H. P. Riall Sankey, Sir John Snell, Mr. W. A. P. Tait, Mr. J. D. Watson, Sir Alfred Yarrow.

A SHORT but useful catalogue (N.S. No. 13) of works on astronomy, physics, zoology, botany, and geology has reached us from Messrs. Wheldon and Wesley, Ltd., 2 Arthur Street, W.C.2. Some 260 books and serials are listed.

MESSRS. A. J. and A. G. Campbell, writing from Melbourne, raise some controversial questions of interpretation of rules of zoological nomenclature. We regret to be unable to find space for a discussion of the points to which they refer, and we suggest that their best course would be to lay any specific complaints before the International Commission on Zoological Nomenclature. We are unable to communicate directly with Messrs. Campbell, as they give no address in their letter.

MESSRS. AITCHISON AND CO., LTD., consulting ophthalmic opticians, have sent us an interesting and useful little pamphlet entitled "Sights of London." A simply written account of the optics of the eye appears on alternate pages, the remainder of the booklet constituting a guide to noteworthy places in London, to which is added folding maps showing the principal thoroughfares, underground railways, etc. The chief branch of the firm is at 428 Strand, W.C.2, from which copies of the pamphlet can be obtained free of charge.

AN English translation of the third German edition of H. von Helmholtz's "Treatise on Physiological Optics," edited by Prof. James P. C. Southall, professor of physics in Columbia University, and published by the Optical Society of America, is to be issued in three volumes, approximately in the same style as the original German edition, with the same illustrations, plates, etc. It is hoped that the first volume will be ready for distribution by June and the other volumes will follow. The edition is limited to one thousand copies. Orders can be sent to F. K. Richtmyer, Rockefeller Hall, Ithaca, N.Y.

AMONG the forthcoming books of the Cambridge University Press are volume 2 of the Life of Sir Francis Galton, by Prof. Karl Pearson, which will deal with the contributions of Sir Francis in middle life to geography, anthropology, psychology, and photography, and his earlier statistical researches. It will also contain his correspondence with Alphonse de Candolle, Charles Darwin, and Florence Nightingale; "The Earth: Its Origin, History and Physical Constitution," by Dr. Harold Jeffreys, in which will

be described the present position of knowledge concerning the physical constitution of the earth, the causes of mountain formation, and the nature of isostasy; and "Matter and Change," by W. C. D. Whetham, being an introduction to physical and chemical science.

MESSRS. OLIVER AND BOYD, Edinburgh, have in course of preparation a series of monographs on experimental biology, under the editorship of Dr. F. A. E. Crew, Animal Breeding Research Department, The University, Edinburgh, and Mr. D. Ward Cutler, Rothamsted Experimental Station. The purpose of the series is to provide authoritative accounts of the most recent investigations in the field of biological research, both pure and applied. The first volume of the series by Dr. Lancelot T. Hogben on "The Pigmentary Effector System" is now ready, and will be followed immediately by Dr. E. Ponder's on "The Erythrocyte and the Action of Simple Hæmolysins." Other volumes in actual preparation are by F. A. E. Crew, D. Ward Cutler, J. S. Huxley, J. Hammond, J. Brontë Gatenby, R. A. Fisher, G. C. Robson, and others.

Our Astronomical Column.

SPOTS ON VENUS.—The present very favourable evening apparition of Venus has been noted for an unusual number of observations of markings on the disc. One was seen in February by Dr. W. H. Steavenson: some others are noted in *Astr. Nachr.* 5286 by A. Nissen and A. Foch. On February 10 and on February 24 there were several distinct spots, some bright, some dark. There was a bright spot near the south pole, and another in the northern hemisphere crossed by a dark band which the authors regarded as a shadow of an upper cloud on a lower one. Conclusions as to rotation time are discordant. A. Nissen concluded that it was in the neighbourhood of $23^h 56^m$, but W. H. Steavenson saw no motion while he watched the spot, and favoured a longer period. The question is of such interest and importance that observers should utilise to the utmost any opportunities that may present themselves. The planet will again be well placed as a morning star after the inferior conjunction on July 1.

SOLAR ACTIVITY AND ITS EFFECTS.—While it is not yet possible to account in a satisfactory way for the influence of the sun on terrestrial magnetic and electrical phenomena, progress continues to be made in correlating events in the two regions. In the April issue of the Journal of the Meteorological Society, Dr. Chree compares sun-spot frequency with rainfall, temperature, sunshine, electrical potential gradient, and deviation of the compass for the years 1856–1922, and shows that while the connexion is undoubtedly close in the case of sun-spots and terrestrial magnetism, the evidence for any connexion in the other cases is very inadequate. In the March issue of *Terrestrial Magnetism and Atmospheric Electricity*, Dr. Bauer shows that while over the period 1901–1923 the electrical potential gradient increased with the sun-spot number, there are two periods about 1855 and 1889 for which the opposite is true. Mr. J. P. Ault shows that, during the eclipse of the sun on September 10, 1923, the usual daily variations in the earth's magnetic field were decreased as if

night-hours had been interposed among the day-hours. Mr. H. F. Johnson found that the potential gradient fell 15 per cent. and the electrical conductivity of the air rose 10 per cent. owing to the eclipse. These eclipse observations were made at various points of the path of totality from California to Guatemala by arrangement of the Department of Terrestrial Magnetism of the Carnegie Institution, Washington.

THE VELOCITY OF SOLAR PROMINENCES.—Dr. W. Anderson, in the *Zeitschrift für Physik*, March 28, suggests that the cause of solar prominences may be the hydrodynamical phenomenon which causes the action of the hydraulic ram. When a pipe in which a fluid is flowing is suddenly closed a high pressure is produced, so that if a small hole is left open the fluid will pass through it with a greatly increased velocity. Dr. Anderson considers that something like a head-on collision between two currents of gas in the lower layers of the sun may have a similar effect, producing an enormous pressure and driving a stream of gas up to and beyond the surface with very great velocity. The gas will be strongly compressed by the shock and will thus be heated and will radiate more than before the shock takes place. Fényi has observed the appearance of bright points in the chromosphere, and immediately afterwards a flame or small prominence appeared; this has been seen by other observers. Hydrogen prominences have been observed to last for days, and even for weeks; this may be due to the fact that the density of the gas forming them is only a little greater than that of the corona gas; the latter, Dr. Anderson considers, is probably almost pure "electron gas," and that of the prominences may be electron gas with more hydrogen, calcium, and other gases than are found in corona gas. Other causes may be concerned in giving the high observed initial velocities to the prominences, for example, the sudden development of inter-atomic energy. The source of energy of the prominences may be of the same nature as that which supplies the solar heat, but Dr. Anderson considers that his shock theory gives a sufficient explanation.