

been "Creative Chemistry", which for a decade has held its own among the best sellers. Among his other works are "Easy Lessons in Einstein", "Science Remaking the World", "Keeping Up with Science", "Chats on Science", "Sermons of a Chemist", "Great American Universities", "Plots and Personalities", "The Spirit of American Education", and "Six Major Prophets". He contributed prolifically to magazines, newspapers, and reference works, including the new edition of the "Encyclopædia Britannica". During his eight years as director of Science Service he trained a group of young writers in the ways of popular presentation of science, and these will now carry on his work.

PROF. HEINRICH BECKURTS.

DR. HEINRICH BECKURTS, who resigned the chair of pharmaceutical and food-stuffs chemistry at the Technische Hochschule at Brunswick in 1925, died suddenly on Sept. 15 at Bartgeheide, near Hamburg. From the *Chemiker-Zeitung* we learn that Prof. Beckurts was born at Brunswick in 1855. He graduated at Jena, and in 1877 was appointed an assistant at the Institute of Pharmaceutical Chemistry at Brunswick, where in 1885 he was elected to the newly founded chair, which he retained for forty years. At the same time his former chief, Dr. Robert Otto, who had been professor of general and pharmaceutical chemistry, remained as director of the laboratories. On the retirement of Otto in 1899, Beckurts became director of the pharmaceutical chemical institute, and shortly afterwards the title of Geheimer Medizinalrat was conferred upon him. This title he held until his death.

In spite of the fact that Beckurts remained throughout his career in his native place, he soon achieved a world-wide reputation. It was largely owing to his connexion with the State Department of Health that an institute for the investigation of foodstuffs and of water was founded at Brunswick. The project received at first no financial aid from the State, and it was not until 1900 that his long-cherished wishes were fulfilled. The new institute was designed not only for the training of pharmacists, but also for the official investigation of foodstuffs. During his professorial career, Beckurts devoted himself to the training of students of pharmacy, and the number of candidates who passed the qualifying examination increased very rapidly as the years progressed. His administrative abilities received special recognition on his seventieth birthday, when the title of 'Honorary Senator' of the Technische Hochschule was conferred upon him.

Beckurts found time amongst his multifarious duties for considerable experimental and literary work. His numerous researches, which dealt principally with alkaloids, sulphones, nitriles, and propionic acid, were usually published in the *Archiv der Pharmazie*, which he edited in conjunction with E. Schmidt of Marburg, or in the *Apotheker-Zeitung*, which was established at his suggestion. He also published a work on analytical chemistry for pharmaceutical chemists, and for many years he issued the *Jahresbericht für Pharmazie, Pharmakognosie und Toxicologie*. In collaboration with Dr. B. Hirsch he published a "Handbuch der praktischen Pharmazie", and with Dr. O. Lüning he remodelled Mohr's well-known treatise on volumetric analysis.

News and Views.

THE celebration, not only in the United States, but also in Amsterdam, Rome, and other places, of the fiftieth anniversary of the production by Mr. Thomas A. Edison of his first incandescent electric lamp was a remarkable tribute to the great inventor, now in his eighty-third year. The principal gathering took place at Greenfield, the village constructed by Mr. Henry Ford on his estate at Dearborn, Michigan, to which has been transported the laboratory in which Mr. Edison worked so long at Menlo Park, New Jersey. In the re-erected laboratory, in the presence of President Hoover and many distinguished guests, on Oct. 21, Mr. Edison repeated his historical experiments which resulted in the completion of his first successful lamp. During the celebrations, an account of which was broadcast, Mr. Hoover voiced the nation's appreciation of "men who have that originality of mind and that devotion to industry to carry scientific thought forward in steps and strides until it spreads comfort in every home". The village of Greenfield is to be a part of a great museum of Americana, an object lesson in American progress, which Mr. Ford is inaugurating in connexion with the Edison Institute of Technology.

It is a pity that the celebrations in honour of Mr. Edison and 'Light's Golden Jubilee' should

have been marred by the extravagant claims made for him in connexion with the incandescent electric lamp. In the *Scientific American* for November, Mr. Ford is reported to have said that Edison "by his invention of the incandescent light contributed more to the progress of the world and the comfort of his fellow beings than any other man". The world acclaims Edison as one of the greatest of inventors, but it is not true to say that it recognises him as the founder of the electric lighting industry. It will be remembered that the Institution of Electrical Engineers in Great Britain commemorated the fiftieth anniversary of the invention of the incandescent lamp by Sir Joseph Swan on Dec. 20 of last year. 'A résumé of the historical facts on which the claim is founded is given by K. R. Swan in the *Electrician* for Oct. 25. In a recent biography of Edison by G. S. Bryan, Edison is credited with the invention of the 'squirted' filament which gave such stimulus to the more general use of incandescent lighting in the early days. This vital improvement in the manufacture of carbon filaments was due, however, to Swan, who invented it so far back as 1883. It seems a pity that history should be so garbled. In Great Britain the practical manufacture of the incandescent carbon filament lamp owes little to Edison; it was based entirely on Swan's work. Moreover, Mr. A. A.

Campbell Swinton has pointed out on several occasions that the first patentee of the method of 'flashing' used in making carbon lamps was Mr. Lane Fox Pitt.

At a meeting of the Council of Management of the British Science Guild, held on Oct. 17, the following resolution was passed relating to the constitution of the Royal Commission on the Civil Service recently appointed: "That having in view the circumstance that the State directly conducts, under its own management, important and highly scientific and technical undertakings, such as the telegraph and telephone services, and also recognising that science has to-day a very important bearing upon so many of the problems dealt with in and by Government Departments, the Council is greatly disappointed to find that the Royal Commission on the Civil Service recently set up by His Majesty's Government does not include among the members a single man of science or one engaged in the application of science to the needs of the community. The Council records its emphatic protest at the omission to appoint upon the Royal Commission a due proportion of members familiar with national aspects of pure and applied science, particularly in view of the fact that an urgent necessity exists at the present time for a complete and impartial review of the status and functions of the considerable body of scientific and technical experts forming part of the Civil Service." The Council also adopted a resolution urging the Government to appoint a Royal Commission on the Post Office with the view of considering the separation of the telegraph and telephone department on one hand from that of the mails on the other, in order to secure the efficient development of the electrical communication services.

THE problem of increasing size in heavier-than-air flying machines is largely one of a conflict between two contending factors. The structural weight increases roughly as the cube of the dimensions, while the lifting capacity, depending as it does on the wing area, increases only as the square. Advance, therefore, in this direction depends largely on the low aerodynamic resistance qualities of the exposed parts and on progress in design of the power unit. The flight over Lake Constance on Oct. 21 of the 12 engine flying-ship *Do. X* appears to mark a distinct advance on previous work of this description. With 169 persons on board, including 10 of the crew, the ship rose from the water in about 50 seconds, carrying fuel for a flight of 750 miles, and landed after a trial run lasting nearly an hour. The machine is said to have weighed almost 52 tons, but it was not fully furnished. This preliminary test stamps Herr Dornier's ambitious effort as a complete success, and this monster flying boat as, broadly speaking, a practical machine.

From the few figures available it appears that, when fully equipped for a 500 mile flight, the *Do. X* has a disposable load of 16 tons at a cruising speed of 100 m.p.h. Herr Dornier's achievement really consists of the fact that he has succeeded in building a very large flying boat in which the proportion of structure weight to total weight is about what is considered ordinarily feasible in other machines.

There are, however, certain consequent disadvantages. An alighting speed of 90 miles an hour as against 60 miles an hour for most British boats is very high, implying as this does almost a full minute of running before rising; and coupled with a heavy h.p. loading of 18-19 lb., it would indicate that there is little reserve for adverse water conditions. Thus, when fully loaded, she would require to operate from relatively sheltered waters under prepared conditions. There is little reason to doubt that if the greater margin of safety insisted upon in Great Britain were to be sacrificed, corresponding advances could equally be achieved.

THE president of the North-East Coast Institution of Engineers and Shipbuilders this year is Mr. L. E. Smith, chairman and managing director of Smith's Dock Co., South Shields, a business which was established in 1768, and is mainly concerned with ship-repairing. Mr. Smith's presidential address on Oct. 25 was therefore devoted to ship-repairing, which is as old as shipbuilding itself. The earliest slipway for ships was probably that near Phalerum, in Greece, constructed about the fifth century B.C.; the first English dry dock was that built at Portsmouth in 1494, by order of Henry VIII. Early dry docks were closed by embankments of piles and clay, and it took weeks to 'undock' a ship. Reminding his audience of the important work done by ship-repairers during the War, Mr. Smith referred to the great changes taking place and the growth in the size of ships. Though there are plenty of building berths, he thinks that there will soon be a great shortage of docks.

OF recent developments in shipping, the oil tankers and motor-ships are most notable. From Lloyd's Register Book it appears that in 1909 the gross tonnage of oil tankers was 789,000; in 1929 it was 7,071,000. Also, during the last ten years, the tonnage of ships built and fitted with steam reciprocating engines has fallen from 2,633,000 to 853,000, the tonnage of ships with steam turbines from 1,051,000 to 209,018. The total tonnage of motor ships in 1909 was negligible; in 1919 it was 752,000, and in 1929, 6,628,000. Though great problems confront the shipbuilding world, it is, Mr. Smith said, "the admitted fact that Great Britain has at last regained the commanding position she always held before the War both in the shipbuilding and ship-repairing world, and she has been able to do so almost entirely owing to her highly efficient organisation and very low cost of production".

THE October issue of the *Journal of Philosophical Studies* contains the report of a lecture entitled "Beyond Physics" delivered by Sir Oliver Lodge on July 26 at the fourth ordinary general meeting of the British Institute of Philosophical Studies. After an appreciative criticism of Prof. Eddington's Gifford Lectures, there follows a philosophically important attempt to find a permanent physical basis for life and mind. While admitting the impossibility of the transmission of anything substantial or energetic with a velocity faster than that of light, Sir Oliver Lodge is not prepared to grant that velocity through the ether is meaningless, and he even suggests that such a velocity may hereafter be observed by using as a frame of reference the rare cloud of interstellar matter

which recent advances have detected. The ether or space is regarded as stationary in respect of locomotion and as the seat of tremendous rotational energy. At places where group waves are formed, we get material particles and locomotion.

SIR OLIVER pointed out that waves can exist which travel faster than light, but they are mere forms which convey no energy and are therefore unable to affect instruments. The energy is all associated with the groups, which subserve the functions of matter. Experimentally, then, we can deal only with the groups. But what of the component waves which give rise to the groups, which interact with them, which are in fact the very condition for the group's existence? They have no energy of their own, but they achieve results which would not otherwise be achieved. Now life is just such a guiding and directing principle, and the bold hypothesis is advanced that these constituent waves of excessively high frequency may be the physical basis, though not in the least a material basis, for an idealistic interpretation of the universe in which life and mind are supreme. How spontaneity and free will can be given a physical basis Sir Oliver Lodge does not fully see, but he maintains that it is not in a postulated defect in the law of causality for small particles, for chance is no way to aim at freedom nor do the laws of probability apply to the individual. The point of view here briefly summarised is so novel and has such implications that it is worthy of careful consideration even should it prove to be untenable.

SIR THOMAS PURVES, the Engineer-in-Chief of the British Post Office, delivered his inaugural address on electrical communications as president of the Institution of Electrical Engineers on Oct. 24. The audience included not only a large gathering at the Institution's headquarters on the Victoria Embankment, London, but also similar gatherings at the local centres of the Institution at Manchester, Liverpool, Birmingham, Glasgow, Leeds, Newcastle, Cardiff, Southampton, and Portsmouth. Transmitters and loud speakers were fitted at each place, so that speech from any point was reproduced at all other points. The occasion furnished a demonstration of an interesting innovation in the British trunk telephone service known as 'Conference Communication'. This facility, which is now available to the public, enables conferences and discussions to be carried on by joint participants assembled at several different places. In the course of the proceedings, speakers at all the centres took part, and their speeches were clearly heard at all the other centres.

In his presidential address, Sir Thomas Purves gave a very interesting résumé of the tremendous advances that have been made in systems of electrical communication during the last few years. Seven years ago it was only possible for the British telephone user to communicate with Paris and Brussels. To-day anyone can speak from any telephone in Great Britain to nearly ninety per cent of the telephone stations of the world. In seven years' time the number of automatic exchanges in the central London business area will have increased from its present value of

21 to 100. This rapid increase has to be made without interrupting the continuous service which every subscriber expects. Luckily, the difficulties and mishaps that have arisen during the last few years are much fewer than had been anticipated. England was practically the only country in the world which had an appreciable number of trunk telephone circuits before the advent of the telephone valve repeater. These circuits had a limit of about 200 miles, and the weight of copper used in them was about 300 lb. per mile. The harnessing of the electron has made possible the use of light gauge cables containing about 30 lb. of copper per mile, and these cables will work through valve repeaters to at least 14,000 miles. The Post Office station at Rugby can telegraph to any properly equipped ship in any of the oceans of the world. The trans-Atlantic radio circuits connecting London and New York enable the millions of telephone users in America and Europe to communicate with one another. The stability of the service across the Atlantic depends mainly on the 'long wave' service, but there are two, and there will soon be three, short wave services in addition. The combination of these services ensures practically a 100 per cent continuity of service. They also enable sudden heavy demands to be met. Language difficulties between America and continental nations are the main source of trouble.

At a meeting of the Newcomen Society held on Oct. 23, a paper by Mr. L. F. Loree of New York was read dealing with "The First Steam Engine in America". Copper ore had been discovered on land belonging to Arent Schuyler of New Jersey about 1714, and for thirty or forty years mining was carried on vigorously, the ore being sent to England to the Bristol Copper and Brass Works. Smelting and refining were not permitted in the colonies, and the export of machinery from England to the colonies was forbidden. By 1748 the mine shaft had been sunk so far that water gave very serious trouble. News having reached America about the Newcomen steam engine or 'fire engine', Colonel John Schuyler, through his agent, ordered an engine from the Hornblowers of Cornwall and, accompanied by Josiah Hornblower (1729-1809), this engine, the very first erected in America, was taken across the Atlantic in the *Irene*. It was shipped in June 1753, but it was not until March 1755 that the engine-house had been built and the engine erected ready for use. Of its subsequent history, its partial destruction by fire, its repair twenty-five years later, and of the acquisition by the Smithsonian Institution of one-half of what is supposed to be the original cylinder, Mr. Loree gave an interesting account. He described Hornblower, who became an American citizen, as a man of simple tastes, courtly bearing, and commanding presence, and said that he served as a member of the Legislature and occupied other public offices. Buried in the grounds of the Belleville Reformed Church, his tomb has recently been restored by the American members of the Newcomen Society, who have also erected a memorial to this "pioneer in the use of steam in the western hemisphere and a foremost promoter of our American industrial civilisation".

THE small-pox which is now somewhat prevalent in Great Britain (131 cases were notified in England and Wales in the week ended Oct. 12), being of a mild type, is apt in early cases to bear so close a resemblance to chicken-pox that diagnosis becomes exceedingly difficult. A 'flocculation test', first devised by M. H. Gordon, and suggested by him as a means of differentiating the two diseases, is the subject of a report by W. L. Burgess, J. Craigie, and W. J. Tulloch (Med. Res. Council; *Special Rep. Series*, No. 143. London: H.M. Stationery Office. 1s. 3d. net). A 'vaccinia serum' is prepared by treating rabbits with vaccine material, and this serum mixed with an extract of the crusts from the patient gives flocculation when the crusts are derived from a small-pox case, but not if derived from chicken-pox or other diseases. Cases of small-pox (53 cases), chicken-pox, vaccinia, and other conditions occurring in Dundee and elsewhere, were examined by the authors, 93 cases in all, and in every instance in which the test could be carried out satisfactorily, the results obtained by it were in complete agreement with clinical findings and epidemiological inquiry.

It is significant of the activity in anthropological studies of the Bernice P. Bishop Museum of Honolulu, that the valuable series of monographs which are appearing as *Bulletins* of the Museum are now being issued at frequent intervals and cover an increasing range in the Pacific area. Among recent issues are an extended study of Tongan society by Mr. Edward Winslow Gifford, one of the Bayard Dominick Expedition series in which a number of monographs by different members of the Expedition have already appeared, a valuable study of the archæology of Tonga by W. C. McKern in the same series, and a study of Lau Island, Fiji, by Mr. A. M. Hocart, the outcome of a stay of four years in Fiji, which bears witness to the industry and powers of observation of the author. Mr. Hocart is not the only British author represented in the series.

BULLETIN 63 of the Museum at Honolulu is by Prof. F. Wood Jones and is entitled "Measurements and Landmarks in Physical Anthropology". The reason for its inclusion in the series is not obvious, and indeed its value to the anthropologist at large is such that it may perhaps be regretted that it should have been published in a form in which it may escape the notice of many to whom it would be of value. It is intended as a guide for both the laboratory and the field worker. Prof. Wood Jones in fact has selected a series of the twenty measurements for the use of the field worker which he considers most significant, having in view also the conditions under which the measurements will be taken. The author has described the measurements of the living and the skeleton in great detail, and each part is dealt with at some length. In view of the consideration now being given to the character and method of anthropometric measurement and the suggestions recently submitted to the Royal Anthropological Institute by Miss M. L. Tildesley and transmitted by that body for the consideration of the Committee on Anthropometric Measurements of the Congress of Anthropology of the Institut International de Paris, we hope that Prof.

Wood Jones' work will not be overlooked by the physical anthropologists in England and on the Continent.

MR. J. J. JOICEY has presented to the Department of Entomology of the British Museum (Natural History) the whole of his collection of butterflies from South and Central America belonging to the subfamily Theclinae, amounting to between five and six thousand specimens and including eighty-eight types. Many of the latter represent species of very considerable rarity. The butterflies of this subfamily, of which the few British representatives are known as hairstreaks, are mostly small in size, but are noted for the extraordinary brilliance of their colouring. The Department of Geology of the Museum has acquired the Buckman collection of fossil Brachiopoda and ammonites. This numbers about 25,000 specimens, mostly brachiopods, and nearly all from the English Jurassic rocks. It is the bulk of the material collected by the late Prof. James Buckman and his son, the late Sidney Savory Buckman. The former had unique opportunities for collecting, since he lived in the south-west of England when the early railways were being made, and this involved not only the opening of the railway-cuttings, but also the quarrying of local stone for bridges, etc. His son studied and collected from the English Jurassic strata all his life and acquired a specialist's knowledge of brachiopods and ammonites. He did not stop at mere classification, but developed interesting theoretical considerations both in palæontology and stratigraphy. Another important recent purchase for the same Department is a large portion of the skeleton of a rhinoceros, *Diceratherium cooki*, from the locality in Nebraska which yielded the skeleton of *Moropus*, purchased lately. The specimen represents an adult animal, rather larger than a Shetland pony. The diceratheres are distinguished from all other rhinoceroses by having the paired nasal horns placed side by side, instead of tandem. They arose in North America and migrated to Europe: bones and teeth have been found in France.

THE provision of national parks has made great progress in Canada. Apart from the enormous Wood-Buffer Park in the Peace River district, there are more than thirty thousand square miles of national and provincial parks in which no land is for sale and no concessions are allowed. Great care is taken of the wild life, and hunting and trapping are prohibited. Roads and trails are made for visitors, but the natural scenic features are not interfered with. Sites for residential purposes are leased but not sold. The National Parks Service of the Canadian Department of the Interior has published a number of hand-books on several of the parks in the Rockies and Selkirks. The books are well supplied with photographs and maps and give an excellent idea of the value these parks must have as centres of recreation and sanctuaries of wild life.

At the annual statutory meeting of the Royal Society of Edinburgh, held on Monday, Oct. 28, the following officers were elected: *President*: Prof. Sir E. A. Sharpey-Schafer; *Vice-Presidents*: Em. Prof. W. C. McIntosh; Prof. Sir Robert W. Philip, Prof.

J. Graham Kerr, Prof. W. Wright Smith, Prof. Francis G. Baily, Prof. T. J. Jehu; *General Secretary*: Prof. R. A. Sampson; *Secretaries to Ordinary Meetings*: Prof. C. G. Darwin and Dr. James Ritchie; *Treasurer*: Dr. James Watt; *Curator of Library and Museum*: Prof. D'Arcy W. Thompson; *Councillors*: Prof. J. H. Ashworth, Prof. E. Taylor Jones, Dr. J. B. Clark, Prof. F. A. E. Crew, Prof. J. Montagu F. Drummond, Mr. D. A. Stevenson, Prof. H. W. Turnbull, Em. Prof. Sir James Walker, Dr. James Drever, Mr. A. H. R. Goldie, Dr. R. A. Houstoun, The Hon. Lord Sands.

THE auction sale to be held by Messrs. Sotheby and Co., at 34/35 New Bond Street, W.1, on Nov. 4-7, should be of special interest to many readers of NATURE, seeing that on the first two dates will be offered many important works formerly the property of Sir E. Ray Lankester and Sir William Thiselton-Dyer. The Lankester collection is particularly rich in first editions—among which we notice Darwin's "The Origin of Species" and "The Descent of Man", Galton's "Natural Inheritance", and thirty-four volumes by H. G. Wells, many autographed. The Thiselton-Dyer collection includes a complete set of the *Kew Bulletin*, long runs of "Flora Capensis" and "Flora of Tropical Africa", and the first edition (black letter) of Lyte's translation of Dodoens' "A Nievve Herball".

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A headmaster of the Wandsworth Junior Technical (Day) School—The Secretary, Technical Institute, Wands-

worth, S.W.18. (Nov. 9). An assistant lecturer in engineering at the Bath Municipal Technical College—The Director of Education, Education Office, Sawelose, Bath (Nov. 9). An assistant pathologist at the Mount Vernon Hospital, Northwood—The Secretary, Mount Vernon Hospital, 7 Fitzroy-square, W.1 (Nov. 9). A director of Public Health and Medical Services under the Government of Southern Rhodesia—The Secretary, Office of the High Commissioner for Southern Rhodesia, Crown House, Aldwych, W.C.2 (Nov. 15). A pathologist to the Royal Hospital and demonstrator of pathology in the University of Sheffield—The Registrar, The University, Sheffield (Nov. 16). A lecturer in pathology in the University of Sheffield—The Registrar, The University, Sheffield (Nov. 16). A public analyst of the Harcourt Butler Institute of Public Health, Rangoon—The Secretary to the High Commissioner for India, General Department, 42 Grosvenor Gardens, S.W.1 (Nov. 23). An assistant lecturer and demonstrator in geography in the University of Leeds—The Registrar, The University, Leeds (Nov. 25). A Geoffrey Duveen travelling student in oto-rhino-laryngology in the University of London—The Academic Registrar, University of London, South Kensington, S.W.7 (Dec. 31). A full-time lecturer in the Electrical Engineering Section of the Engineering Department of the Halifax Municipal Technical College—The Principal, Municipal Technical College, Halifax. A laboratory assistant for the Medical Department of the Government of the Uganda Protectorate—M/1720, The Crown Agents for the Colonies, 4 Millbank, S.W.1.

Our Astronomical Column.

Mars.—*La Science Moderne* for September contains an article on Mars by A. Nodon, president of the Astronomical Society of Bordeaux. He reproduces several drawings made by E. M. Antoniadi at Meudon and J. Comas Sola at Barcelona. A description of the temperature measures of Menzel, Coblentz, and Lampland leads to the conclusion that the conditions are likely to be suitable for the presence of vegetation, and that the various tints observed in the darker regions of the disc are compatible with this view of their nature. Some of the drawings show numbers of small round dark markings, the positions of which appear to change between one opposition and the next. It is noted that snow or frost on the ground can be distinguished from cloud or mist in the air by the greater permanence in the position of the former. There are some speculations about the future of the earth; it is suggested that in the distant future the ocean may have largely disappeared, and the height of the mountains have been greatly diminished by denudation, which would bring about a resemblance to the present condition of Mars.

Greenwich Observations, 1927.—There are two novel features in this annual volume. First, the time service has been derived from observations made with a small reversible transit instrument instead of using the transit circle as heretofore; the time derived from the transit circle appears to be that of a meridian about 0.10 sec. to the east of it. The cause of this is supposed to lie in the determination of collimation; the aperture in the central tube of the instrument, through which the south collimator is viewed from the north one, is crossed by radial bars, which seem to have some effect on the character of the image.

The collimation errors adopted for the last half of 1927 varied from 1.44" to 1.05"; it is found that if 1.65" had been used throughout, the results would have agreed with those of the small transit.

Another change is in the method of reducing the moon observations; Brown's longitude of the moon is in error by some 6" in the mean; owing to the eccentricity of the orbit, this causes varying errors in the individual observations. An estimated value of the mean error of longitude for the year is formed, and the time for the moon to go through this arc is multiplied by the rates of motion in R.A. and declination at each observation. Improved tabular places are thus formed for comparison with the observations. When the mean error of longitude for the year is formed from these, the constant that was removed must be put back. Another special feature of this volume is a comparison of magnetic storms and sunspots from 1874 to 1927. The great magnetic storms are on the average accompanied by large spots not far from the centre of the disc. There is a semi-annual wave in the frequency of magnetic storms; the maxima are near March and September, the months when the earth is farthest from the sun's equator.

Occultation of Jupiter by the Moon on Oct. 28, 1928.—This phenomenon was well observed at Johannesburg with the 26½ inch refractor and two smaller instruments (*Union Obs. Circ.*, No. 79). Satellite III. took 3.5 sec. to disappear, II. 1.5 sec., I. 2.0 sec. I. appeared to have the greatest surface brightness. Jupiter appeared very dim beside the moon; it was described as "a grey ghostly disc" with indefinite limbs.