

## News and Views.

THE choice by the British Association of Sir William Bragg as its president for the Glasgow meeting is a particularly happy one. His genial personality, simple yet charming style of exposition—an especially important qualification in view of the great tradition behind the inaugural address—and his connexion with one of the greatest advances of scientific knowledge in our time, fit him pre-eminently for the presidential chair. Those who had the privilege of hearing his first Friday evening discourse at the Royal Institution after his return from occupying (1886–1908) a chair at the University of Adelaide, and while Cavendish professor at the University of Leeds (1909–1915), when physicists were still struggling to understand the true nature of X-rays and inclining rather to a corpuscular than to the electromagnetic undulatory explanation, will remember how clearly the position was set forth (as afterwards in 1912 in his book "Studies in Radioactivity"), and how the advent of some great impending discovery was foreshadowed which would clear up the mystery. It was not long in coming. For in the same year, 1912, that the book was published, occurred the famous discussion in the rooms of Dr. von Laue at Munich—where the University at that time included in its scientific coterie Röntgen, Groth, Sommerfeld, and Ewald—which resulted in the epoch-making experiment being tried by the two assistants, Friedrich and Knipping, of passing X-rays through a crystal and receiving the issuing rays on a photographic plate. Not only did this successful experiment fulfil the suggestion of Dr. von Laue, that the differently orientated parallel series of planes of atoms composing a crystal should act as a space-grating towards X-rays, which latter on reflection should afford some indication of the crystal symmetry, but also at once decided that the X-rays were of an undulatory nature, with wave-lengths of the same order as the dimensions of the chemical atoms.

THE time was indeed ripe for this pioneer experiment, the forerunner of all the subsequent immense work on the X-ray analysis of crystals. For crystallographers had settled in detail the types of symmetry possible to crystals, together with their space-lattices and point-systems (regarding the atoms as points), and had even got so far in the cases of definitely related (isomorphous) compounds, as to determine the relative volumes and dimensions of the unit cells of these three-dimensional lattices. Immediately after the publication of the first results of the Laue method, Sir William Bragg, then our leading authority on X-rays, took up the investigation, and, by devising a new spectrometric method in which the photographic plate was replaced by an ionising chamber mounted like the telescope of a goniometer, converted the qualitative results into actual measurement of the spacing of the parallel planes of atoms corresponding to each of the chief crystal faces, thereby fixing the absolute dimensions of the lattice-cells and the distances separating contiguous atoms, from centre to centre. The location of the atoms in

the structure, and the number of molecules, if more than one, contained in each cell, followed naturally.

DURING his tenure (1915–23) of the Quain chair of physics in the University of London, Sir William Bragg published a brilliant series of papers in which the structure of a large number of crystallised substances was unravelled, at first mostly simple binary compounds, but afterwards more complicated substances, including several organic compounds. Still more recently, at the Davy-Faraday Laboratory of the Royal Institution, after Sir William had succeeded Sir James Dewar as Fullerialian professor (1923), the list has been considerably extended, with the aid of an able school of research workers which he has gathered around him. Moreover, it is especially interesting that his distinguished son, Prof. W. L. Bragg, should also be carrying on the good work in the Department of Physics at the University of Manchester, after having assisted in numerous papers in clearing up the theory of this remarkable action of X-rays with regard to crystals. The joint book of father and son, "X-rays and Crystal Structure," now in its fifth edition, is a worthy record of the combined results achieved.

SEPT. 3 is the bicentenary of the birth of the well-known British manufacturer, Matthew Boulton, the partner of Watt and one of the leading industrialists of the eighteenth century. Boulton was born in Birmingham, and at the age of twenty-one years he became a partner in his father's business of trinket making, which ten years later he inherited. His marriage in 1762 with Ann Robinson, of Lichfield, brought him a fortune of £28,000, and the same year he began the building of the historic Soho iron works. By 1767 his turnover was no less than £30,000 per annum. He had by then become acquainted with Watt, and from that acquaintanceship sprang the partnership which made Boulton and Watt the great pioneer firm of steam-engine makers and mechanical engineers. Soho Foundry became the training ground for the new profession. The two men were strangely unlike in temperament, and nowhere could Watt have found another better fitted to further his efforts and support him in bringing the new steam engine into use. With an optimistic outlook on life, endless tact and perseverance, a sound judgment of men and unusual powers of organisation, Boulton possessed a wide knowledge of the world and its industries. The partnership began in 1775. In the next ten years Boulton had raised and expended no less than £40,000 before the steam-engine business began to pay, and Watt himself afterwards wrote "that to his friendly encouragement, to his partiality for scientific improvements and his ready application of them to the processes of art, to his intimate knowledge of business and manufactures and to his extended views and liberal spirit of enterprise, must in a great measure be ascribed whatever success may have attended my exertions." Boulton himself made great improvements in the art of coining, while his scientific attainments led to his election to the Royal Societies of

London and Edinburgh. He died in 1809, ten years before Watt, and his grave is, like Watt's, in Handsworth Church.

UNDER the auspices of the University of Berlin, a 'Ferienkursus für Ausländer' was held in the Physical Institute on July 2-21, the object being to bring before research workers outside Germany the latest results and—to some extent—the speculations of theoretical physics. How greatly this idea was appreciated may be gauged by the fact that an audience of seventy-five, representing fifteen different nationalities, listened to the lectures which had been arranged. The visitors were welcomed at the opening session by the Rector of the University and by Prof. Max Planck. Very unfortunately, Prof. Einstein was ill, and therefore unable to deliver his promised lectures. The speakers and their subjects were as follows:—Prof. v. Laue, theoretical optics and X-rays; Dr. Reichenbach, space-time theory; Prof. Schrödinger, wave-mechanics; Dr. Ladenburg, dispersion; Prof. Hettner, radiometer: breadth of spectral lines; Dr. v. Mises, probability: aerodynamics; Dr. Becker, electron theory of metals; Dr. v. d. Pahlen; stellar statistics; Dr. Bothe, radiology; and Dr. Czerny, infra-red research.

OPPORTUNITIES were afforded during the meeting for seeing something of the original work in progress in laboratories of the University of Berlin, under the guidance of Profs. Nernst, Wehnelt, Pringsheim, and Dr. Lange, whilst a large party availed themselves of the invitation to visit the Reichsanstalt and to listen to an interesting account of its history by Prof. Paschen. This constituted the first course of its kind ever attempted in Berlin, and was regarded in some respects as an experiment. It is difficult to imagine that it could have been more successful either in its scientific value or in the organisation for the comfort and convenience of those who came from considerable distances to hear the words of wisdom. Perhaps in future years similar courses may be arranged in other branches of knowledge. Meanwhile, all who had the chance of being present at the first 'Ferienkursus' this summer departed under a deep debt of gratitude to their hosts for such an opportunity of hearing from the authors themselves of the latest advances which they have made in theoretical physics.

As an effort towards the co-ordination of the extensive new information regarding the geology of Asia, a discussion has been arranged during the British Association meeting in Glasgow on Tuesday, Sept. 11, upon the structure of Asia. The first paper, by Prof. F. E. Suess, of Vienna, "The European Alts and their Correlation with the Asiatic Structure," will explain some modifications which he regards as necessary in his father's synthesis of Asia. Prof. D. I. Mushketov, director of the Russian Geological Survey, will contribute an account of the recent work of Russian geologists in Eastern Turkestan. The remarkable results obtained in Persia and Mesopotamia by the staff of the Anglo-Persian Oil Co. will be announced in a paper, "A Contribution to the Stratigraphy and Tectonics of the Iranian Ranges," by Dr. H. de Bökch,

Dr. G. M. Lees, and Mr. F. D. S. Richardson. Prof. G. B. Barbour, of the University of Peking, will give an account of the work by himself, the Chinese Geological Survey, and of the American geologists, Prof. Berkeley and Mr. Morris, during the recent Mongolian expedition, dealing with the mountain structure of north-eastern Asia. Prof. J. W. Gregory will summarise recent work in south-eastern Asia. It is hoped that Prof. Brouwer will speak on the mountain structure of the East Indies, Prof. Boswell on some recent views regarding the cause of the Asiatic movements, and Sir Thomas Holland and Mr. W. D. West on work by the Indian Geological Survey on the structure of the Himalaya.

MANY interesting facts are brought out in the Registrar-General's Statistical Review, 1927, Part I. (Medical Tables), dealing with vital statistics of Great Britain, which has recently been issued (London: H.M. Stationery Office, price 15s.). The birth-rate for the year 1927 was 16.6; this is the lowest birth-rate recorded since the establishment of civil registration in the country, the lowest rates previously being those for 1918 (the last year of the War), and 1926, which were 17.7 and 17.8 per 1000 population respectively. The death-rate was 12.3 per 1000 population, which is slightly higher than for any year since 1922. The rise affects the two sexes almost equally, and was due to a severe epidemic of influenza in the March quarter. The deaths of infants less than one year of age were equal to 70 per 1000 births, being the same as for the previous year. Thus the two years 1926 and 1927 have the lowest infant mortality rate on record except only that for 1923, which was 69. The mortality from the infectious diseases differed little from that for the previous year, except that the deaths from influenza numbered 22,263 and were equal to a rate of 567 per million living, which is the highest recorded since the great epidemic of 1918-19. The death-rate from cancer was 1376 per million population, or 14 per million higher than in 1926, and was the highest crude death-rate yet recorded. Increasing use is being made of lysol and coal gas as means of self-destruction; whereas the registered deaths by lysol and coal gas poisoning in 1919 were 7 and 213, in 1927 they increased to 361 and 994 respectively.

THE bird sanctuaries in the Royal Parks in and about London have now been established for nearly six years, and during that time they have been effective in increasing the numbers of nesting birds in certain much-frequented places, and in focusing the interest of many people upon the varied bird life of a great city. The Annual Report of the Committee on Bird Sanctuaries, Royal Parks, England, for 1927, shows that the Committee is not neglecting the condition of the shrubberies, a vital matter if the nesting and sheltering of the birds are to be kept at a high frequency. This and the replacement of worn-out nesting boxes completes the active efforts of the Committee as here recorded. The remainder of the report consists of separate accounts of the bird life of each of the great parks, by various observers. Many of the observations can only be regarded as

trivial, but on the whole they indicate that both summer visitors and nesting birds were scarcer in the sanctuaries in 1927 than in previous years. A word may be said about the format of the report. It is duplicated by a type-writing process on paper of foolscap size, so that instead of being kept for reference it is more likely to be thrown into the waste-paper basket when read. Many visitors to the parks would appreciate this guide to the bird inhabitants, were it printed in a size suitable for library shelves, for one of the chief interests of the annual reports must always be the comparison of one year's results with those of its predecessors. The cost of printing might well be lessened by the reduction of some of the special reports, and the bird sanctuaries should afford opportunities for very attractive illustrations.

AN apposite illustration of a reference to the connexion between twins and the sky among primitive people in our Calendar of Customs and Festivals under date Aug. 18 (see NATURE, Aug. 11, p. 224) is contained in a dispatch from the *Times* correspondent at Buluwayo which appears in the issue of Aug. 17. Two cases were before the Courts on the previous day in which natives were tried for the murder of twins in accordance with native law. It was stated that the native belief was that to kill twins was to secure a good rainfall. The accused were not the parents but the grandparents and a mother-in-law; but in one case the mother acquiesced, nor had she fed the children since their birth as it was against native law. Sentence of death was passed, but the judge stated that it was not likely to be carried out. It may be remembered that a case of human sacrifice during a drought to secure rain occurred a few years ago in one of the South African tribes, when the son of a chief was killed. The present case differs in some respects. It was customary among most African tribes that one or both of twins should be killed at birth, especially if they were girls. This, however, was a rain charm in the sense that it was intended to *avert* the misfortune, especially drought, which their birth entailed. The Rev. H. Junod records that among the Bathonga, a tribe of north-east Rhodesia, twins, who were called the Children of Heaven, though no longer killed, required that not only the mother but also the community should be protected from the evil effects. Twins being specially connected with heaven, their birth prevented rain from falling. It was therefore essential that they should be buried in wet ground. In time of drought, water was poured on their graves, and if they had been buried in dry ground the Bathonga even went so far as to dig up the bodies and rebury them near the river.

THE monthly review edited by the Verband Deutscher Elektrotechniker and two other German institutions, the English edition of which is called *Engineering Progress*, gives in the March issue an excellent description of the huge Klingenberg electric power station near Berlin. The entire number of the journal is devoted to a description of the station, the object being, it is stated, to emphasise the importance of high-class engineering work in the sphere of electric power

supply. The power station is situated on the Rummelsburg lake on the outskirts of Berlin and covers an area of fifty acres. It borders on the River Spree, from which even during a hot summer ample cooling water can be obtained. The thermal efficiency of condensing turbines increases with the degree of superheating and in a less degree with the pressure of the steam. On the other hand, the durability of the materials is affected by very high temperatures. A temperature of 400° C. (570° F.) has been chosen at the turbine, the temperature at the boiler outlet being 410° C. The pressure in the boiler is about 500 lb. per sq. inch and in the turbine about 460 lb. By preheating the air before it enters the furnace, it is calculated that an annual saving of about £10,000 per machine is effected. Pulverised coal firing is adopted. An interesting novelty is the drying of the coal by steam, each dryer being sufficient for 25 tons of coal per hour. The pulverised coal is conveyed by means of pipes to the boiler-house, the longest pipe being 1150 feet. Each steam turbine has a capacity of 80,000 kilowatts. The electric energy is generated at 6 kilovolts, is converted to 30 kilovolts and supplied to the networks of greater Berlin. A striking feature of the station is a very lofty building containing the administration offices. It has ten storeys, and on the top of the building are three large water tanks capable of supplying the station with water. In this building are recreation rooms for the station staff, a lecture hall, and a telephone exchange.

By an Order of the Committee of Privy Council, Prof. Robert Muir, Sir John Herbert Parsons, and the Right Hon. Sir Charles Philips Trevelyan, Bart., M.P., have been appointed members of the Medical Research Council into the vacancies caused by the retirement of Prof. Georges Dreyer, Sir Archibald Garrod, and the Right Hon. William Graham, M.P. The new appointments become effective on Oct. 1.

THE one hundred and ninth annual session of the Swiss Society of Natural Sciences is being held at Lausanne on Aug. 30-Sept. 2. The programme includes general lectures by Prof. E. Bosshard (Zurich) on the past and future of the wholesale chemical industry; Prof. P. Termier (Paris) on recent impressions of travel; Prof. M. Askanazy (Geneva) on achievements and aims in the study of tumours; and Prof. A. Reymond (Lausanne) on the occult sciences in antiquity, a methodological study.

THE Council of the National Institute of Agricultural Botany has awarded the Snell Memorial Medal for the year 1927 to Prof. Paul A. Murphy, professor of plant pathology at University College, Dublin. The medal is given annually to mark eminent work in the sphere of potato husbandry, and it has been awarded to Prof. Murphy in recognition of his valuable contributions to the study of the virus diseases of the potato.

WE have received from Messrs. H. K. Lewis and Co., Ltd., of Gower Street and Gower Place, London, W.C.1, a selection from the "Catalogue of Medical Works" published by them; also a pamphlet entitled

"Eighty-Four Years, 1844-1928," reviewing the activities of the firm since its foundation. These include the publication of many works of medical and scientific interest by well-known authors; a book-selling department, which includes an agency for the supply of standard American and continental works; and a second-hand book department, which contains one of the largest collections in Great Britain of standard and recent works in medicine, surgery, technology, and general science, scarce books when not in stock being advertised for without charge. Finally, there is the circulating library, which contains about 30,000 volumes in all branches of medicine and the allied sciences, as well as books of general scientific or philosophic interest. Attached to the library is a reading and writing room for the convenience of subscribers.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A forestry inspector, Department of Lands and Agriculture, Irish Free State—The Secretary, Civil Service Commission, 33 St. Stephen's Green, Dublin (Sept. 4). A full-time lecturer and demonstrator in anatomy at the University College of South Wales and Monmouthshire—The Registrar, University College, Cardiff (Sept. 7). A lecturer in engineering science for automobile engineers at the Polytechnic, Regent Street—The Director of Education, The Polytechnic, Regent Street, W.1 (Sept. 7). An assistant lecturer and demonstrator in electrical engineering in the University of Sheffield—The Registrar, The University, Sheffield

(Sept. 14). A pathologist and lecturer in pathology in the St. George's Hospital Medical School—The Dean of the Medical School, St. George's Hospital, S.W.1 (Sept. 15). A professor of physiology in the Patna Medical College—The Secretary to the High Commissioner for India, General Department, 42 Grosvenor Gardens, S.W.1 (Sept. 19). A professor of mechanical engineering in the Bengal Engineering College, Sibpur—The Secretary to the High Commissioner for India, 42 Grosvenor Gardens, S.W.1 (Sept. 19). The Radcliffe Crocker Travelling Scholarship in Dermatology of University College Hospital Medical School—The Dean, University College Hospital Medical School, Gower Street, W.C.1 (Sept. 30). The William Julius Mickle Fellowship of the University of London—The Academic Registrar, University of London, South Kensington, S.W.7 (Sept. 30). A permanent physicist to the Cancer Research Committee of the University of Sydney—The Registrar, The University of Sydney, Sydney, N.S.W. (Nov. 15). A professor of tropical medicine at the Calcutta School of Tropical Medicine and Hygiene—The Director, School of Tropical Medicine and Hygiene, Central Avenue, Calcutta. A pathologist and bacteriologist under the Kensington Board of Guardians—The Clerk to the Board, Guardians' Offices, Marloes Road, Kensington, W.8. Civilian education officers in the Royal Air Force Educational Service, preferably with practical qualifications for teaching engineering subjects—The Secretary, Air Ministry, Gwydyr House, Whitehall, S.W.1.

### Our Astronomical Column.

WHAT BECOMES OF THE STARLIGHT?—This is the title of an interesting article by Prof. H. N. Russell in the *Scientific American* for August. Prof. Russell points out that, on the old conception of boundless space, by far the larger portion of the energy poured forth from the stars would seem to be dissipated in the form of ever-widening and ever-weakening waves. On the conception of re-entrant space, the waves would, after making the circuit of space, go over the same ground again. The question is examined whether the wave energy, which is now considered to come from the annihilation of matter, may possibly be built up into matter again. It is shown that this involves some difficult conceptions. The energy required to form a hydrogen atom would be spread through some 400 cubic feet of space. A reference is made to Dr. Millikan's suggestion that the cosmic rays investigated by him result from the union of 28 hydrogen atoms to form a silicon atom; "it is not easy to see how the 28 electrons and 28 protons can all get to the same place at the same time." But it must be remembered that knowledge of the structure of the atom is only a quarter of a century old, and it is to be hoped that the future may reveal solutions of these difficult but fascinating problems.

DOUBLE STARS MEASURED AT JOHANNESBURG.—Vol. 14, part 4, of the *Annals* of Leyden Observatory contains the measures of double stars made with the new 26½-inch refractor and the 9-inch refractor at the Union Observatory at Johannesburg, by W. H. Van Den Bos, between the dates 1925.6 and 1928.2. The search was a systematic one, the sky south of

decl.  $-19^{\circ}$  being swept over, and all stars examined down to the limiting magnitude 9.0 of C.P.D. The result for the region at present covered shows that one star in 16 is double within Aitken's limit of distance, which is 5" between magnitudes 6 and 9. The power used in sweeping was 420, and the observer notes that he was able to detect the duplicity of stars too close to divide with this power by the blurred character of the diffraction image. The sweeps were made without previous consultation of double-star catalogues, so that the search is quite unbiased, but some known objects might be missed through being near periastron. Several cases of wrong identification in previous catalogues are noted, and it is suggested that in such cases the first to give the right identification has the claim to the discovery.

There are a large number of very close pairs in the catalogue, and many of these are likely to show orbital motion within a few years. Close pairs with equal magnitudes need continuous watching, otherwise there is danger of confusing the quadrants. It is stated that Doberck and Dawson have done this in the case of  $\gamma$  Centauri, and that the period is only half that given by Dawson.

A very interesting triple system is C.P.D.  $-30^{\circ} 181$ ; the wider pair has moved through  $110^{\circ}$  since its discovery by Burnham; the brighter star has a closer companion, discovered by Dawson, the period of which is stated to be less than five years, which is probably the shortest of all visually discovered binaries. The present catalogue contains 141 pages, there being about 11 pairs on each. They are mainly between  $-19^{\circ}$  and  $-30^{\circ}$ , but there are several outside these limits, Castor being included.