

were suitably rewarded in the United States. He became Lowell lecturer at Cambridge; he was invited to give special courses of lectures at Columbia, Illinois, and elsewhere. He received the honorary degrees of D.Sc. at Harvard, Litt.D. at Clark, and LL.D. at Wisconsin. But throughout he remained a loyal British citizen and faithful to Cornell, refusing posts and honours that would have involved a change of nationality or a change of residence. He was offered, but declined, not only the chair of psychology at Harvard on Münsterberg's death, but also the presidency of Clark University, which became vacant on the retirement of Stanley Hall. As an Englishman, he could never be a candidate for admission to the U.S. National Academy of Sciences.

Though, however, so loyal as to nationality, Titchener's psychological sympathies ever centred around Wundt, in whose laboratory at Leipzig he had received his first introduction to experimental psychology. His attitude towards his students and his organisation of laboratory work were also typically German. His admiration for Wundt led him to translate into English the third edition of the "Physiologische Psychologie." Taking his manuscript to Germany, he found that Wundt was already issuing the fourth edition of this large work. Titchener set himself forthwith to make a translation of the fourth edition, only again to find on its completion that he had been overtaken by the fifth edition. Still undaunted, he began to translate the fifth edition, and he finally published a part of this translation. He also translated Külpe's "Outlines of Psychology." At the time of his death he was engaged on a work of his own, which he hoped to issue in the form of a "Systematic Psychology" in three or four volumes, the first of which he had practically completed before he passed away.

Titchener's married and domestic life was an exceptionally happy one. His home on Cornell

Heights was delightful to visit. He suffered from all the virtues and failings of an unusually emotional temperament. He was unduly sensitive to neglect or injustice, and he did not easily brook any disagreement from his psychological views, especially on the part of his students and staff. On the other hand, no one could surpass him in kindness and generosity to his friends. He spent practically all his time in the laboratory or in his home; he was so rarely seen in the streets that it became a standing joke as to how he passed from one to the other. During his last years he began to form a collection of Oriental coins, which with his usual thoroughness he made one of the finest in America, learning Arabic in order to be able to read their inscriptions. He was interested in music, and during the years 1896-98 he acted as professor in charge of music at Cornell University.

WE regret to announce the following deaths:

Sir John Denton, K.C.I.E., formerly chief engineer and secretary to the Government, Panjab Irrigation Branch, who was responsible for many of the great canal and irrigation schemes of the Panjab and Upper Burma, on Aug. 29, aged seventy-seven years.

Prof. J. Pulfrich, of the Zeiss optical works, Jena, the author of numerous publications dealing with his investigations with the spectrometer and refractometer, aged sixty-nine years.

Dr. Henry P. Talbot, for many years professor of analytical chemistry in the Massachusetts Institute of Technology, and a vice-president of the American Association in 1907, on June 18, aged sixty-three years.

Prof. Stuart Weller, professor of palaeontological geology in the University of Chicago, who specialised on the faunas of the Mississippi valley, on Aug. 5, aged fifty-six years.

Dr. William P. Wilson, formerly professor of botany at the University of Pennsylvania, and since 1894 director of the Philadelphia Commercial Museums, on May 12, aged eighty-two years.

News and Views.

THE Government scheme for linking up the Dominions with Great Britain by radio telegraphy has now been completed by the opening of the short wave beam stations in India. The fact that the Indian beam stations can work at high speed continuously for many hours during the monsoon period shows that the beam receiving aerials are little affected by atmospherics. The English transmitting station is at Grimsby and the receiving station is at Skegness, which are both in direct communication with the Central Telegraph Office of the G.P.O. in London. The corresponding transmitting and receiving stations in India are at Kirkee, near Poona, and Dhond, 48 miles east of Poona, which are both linked directly with Bombay. Transmission from Grimsby to India takes place on wave-lengths of 16.2 and 34.5 metres (about 18,500 and 8700 kilocycles per second respectively). At Grimsby a five-mast aerial system, quite distinct from the three-mast aerial system of the Australian service, has been built. The masts are

277 feet in height with a distance of 650 feet between them. They are erected in a straight line which cuts at right angles the great circle passing through Grimsby and Dhond. The reflector behind the active aerials focusses the waves in a south-easterly direction on to the receiving aerials in India. A similar system has been built at Kirkee to concentrate the waves in a north-westerly direction towards England. Within a few weeks' time the Marconi Company will inaugurate a commercial beam radio service between Great Britain and South America and also one with the United States. Experiments have proved that it is possible to carry on radio telephony simultaneously with high-speed radio telegraphy. There is every prospect, therefore, that before the end of next year, it will be possible for telephone subscribers in England to call up subscribers in any of the Dominions overseas.

THE celebration, on Aug. 30, of the golden wedding of Prof. H. E. Armstrong and Mrs. Armstrong was

made the occasion for the presentation to them of the portrait of Prof. Armstrong by Mr. T. C. Dugdale, exhibited in this year's Royal Academy. The presentation was made at a reception held at the house of Dr. Stephen Miall and Mrs. Miall, son-in-law and daughter of Prof. and Mrs. Armstrong. With the portrait was presented an illuminated album signed by the subscribers, among whom are a number of

leading workers in diverse departments of chemical science. We are glad to be able to reproduce a photograph of the painting (Fig. 1). The address which accompanied it reads as follows :

“PROFESSOR AND MRS. HENRY EDWARD ARMSTRONG : Your Staff and Students of Chemistry of former years greet you with affectionate regard on this happy occasion of your Golden Wedding. As they are scattered all over the world, only a comparatively small body of them can subscribe to this personal Letter of Greeting, but in so doing, and in endeavouring to honour their Chief and his Lady, they

know they are voicing the good wishes of all their Colleagues. They know, Professor Armstrong, that by your teaching, your breadth of vision, and your scientific use of the imagination, coupled with a sympathetic guidance and a real human understanding, you have inspired those who have been privileged to work with you to their lasting benefit. The consciousness of this grows with them ; so, with perhaps a pardonable pride, they have purchased your portrait in this year's Royal Academy to mark the present occasion. They ask your acceptance of this portrait for the period of your lives, earnestly trusting that such useful lives may long be spared. Eventually, however, they propose presenting it to

one of the London learned Societies in commemoration of a striking personality and as a lasting record of their appreciation and affection.”

The installation of receiving sets for broadcasting has familiarised many with the idea of what electricians mean by an ‘earth’. The subject is sometimes eagerly discussed by amateurs, and the difficulties

experienced by those who installed lightning conductors many years ago are again being considered. For earthing the conductors used for protecting electric light wires, the Institution of Electrical Engineers is carrying out experiments so as to enable a good method of earthing to be specified. In the *Electrical Review* for Aug. 19, some suggestions are made for improving the methods of earthing electric lighting systems used at both generating and substations. In this case a very large earth current may flow if a fault develop in the system and it is necessary to make the joints and connectors large, permanent, and

trustworthy. The resistance of the path in the earth varies with the composition and the moisture content. In dry weather it is often fifty times as great as in wet weather. Sometimes, when permanently damp soil cannot be reached, a pipe is run into the ground near the earth connexion and water poured into it in dry weather. It is known that the resistance of the ‘earth’ increases very rapidly at the freezing point. In Great Britain, however, it is unlikely that earth plates are likely to be buried in soil which is ever frozen. Iron pipes an inch in diameter can be used successfully to form an earthing system. Unless the ground is rocky, they can be driven into it until damp soil is reached. It is very seldom that a depth

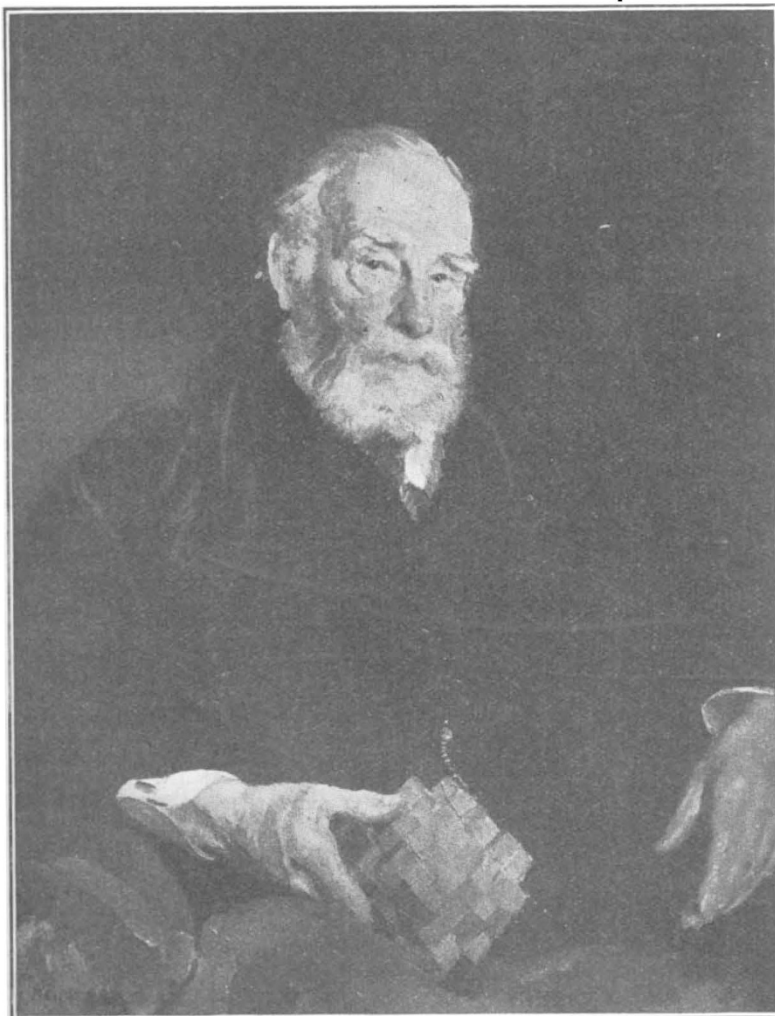


Photo.] FIG. 1.—Prof. Henry E. Armstrong, F.R.S. From a painting by T. C. Dugdale [Paul Laib.

of 20 feet is necessary. A number of these pipes about four feet apart and connected in parallel form a suitable earth for a supply network. Tests should be made to see whether the earth is capable of carrying the maximum possible 'fault' current. It is quite possible for an arc to form between loosely packed pieces of carbon and so melt the soldered connexions. Hence periodical tests should always be made.

THE rapid development of electric signs during the last few years has made many think that a more rigorous censorship of sententious texts and childish pictures is desirable. It shows the belief that advertisers have in the efficacy of continued repetition. In the July issue of *Progress*, published by the Allgemeine Elektrizitäts-Gesellschaft of Berlin, there are interesting articles on electric signs and the flood lighting of buildings. A successful method of attracting attention, which is rapidly becoming popular, is to have an instantaneous time indicator, the large figures giving the time being controlled by a master clock. Stress is also laid on the importance of arranging the signs so that they are visible in daylight. Neon tubes seem specially suitable for the purpose. They are rather expensive to buy, but the saving of electricity during the first year by their use more than covers their cost. There can be no doubt, however, that the appearance of a street at night can be improved by 'flooding' beautiful buildings in it with light. Examples of flood lighting have been familiar to dwellers in London for many years, and we think that they provide a pleasing and unobjectionable method of advertising. Some interesting photographs are shown in *Progress* of the effects that can be produced at no great expense by flood lighting. In particular we would mention the Cathedral and banks of the Rhine at Bâle. The flood lighting also of St. Mary's Church at Lübeck shows up excellently against the dark background. In Germany, many municipal authorities and tramway companies grant permission readily to shopkeepers and others to mount cheap projectors for flood light purposes on the tramway and lighting poles.

EVER since the last attempt to reach the summit of Mount Everest in 1924, Italian climbers have been planning an expedition with the same end in view. *The Times* reports that the plans of the Italian expedition are now complete. The expense is to be borne by the city of Milan and the expedition is to be organised by the Milan Alpine Club. The Italians propose to approach the mountain from the Nepal side, which will necessitate the approval of the rulers of Nepal. This has hitherto been refused for any attempt on Mount Everest. If the veto is not removed, the Italian expedition proposes to make its object Mount Godwin-Austen (K2) in Kashmir, which is about 28,250 feet in height, and is said to offer difficulties fully as great as those of Mount Everest.

DR. DOROTHY JORDAN LLOYD has been appointed director of research to the British Leather Manu-

facturers' Research Association in succession to Dr. R. H. Pickard. Dr. Lloyd has been a member of the staff of the Association since its inception and has published papers on the chemistry of gelatine. Dr. Pickard's services will be retained for a time as consultant-director.

It will be recalled that a Lister Centenary Exhibition was arranged at the Wellcome Historical Medical Museum, 54A Wigmore Street, in connexion with the centenary celebrations in London in April last. The Exhibition has already been visited by a large number of visitors from all parts of the world, and will remain open until Oct. 1.

THE July issue of *The Fight against Disease*, the journal of the Research Defence Society, contains a short obituary notice with excellent portrait of the late Prof. Starling, who gave unceasing support to the Society, and a report of the first Stephen Paget Memorial Lecture by Prof. Julian Huxley, entitled "Research and the Community." Quoting examples of the control of plant and animal pests by biological methods, of the breeding of strains of wheat immune to rust, and of the control of many human diseases, Prof. Huxley emphasised the importance of research to the whole community.

THE new Radiological Department of the Royal Infirmary, Edinburgh, was opened last October and is under the charge of Dr. J. M. W. Morison. A description of this department has been issued in the form of a brochure by Messrs. Watson and Sons (Electro-Medical) and will repay study by those interested in the lay-out and equipment of a radiological department, one of the most vital in the needs of a big hospital. There are others also to whom it may be of interest as showing the extent to which electro-technical invention is used by radiologists at the present time. The plans of the building are reproduced by courtesy of the architect, Mr. T. W. Turnbull.

THE Report of the Director-General (Mr. Robert Dick) of Public Health, New South Wales, for the year 1924, which has recently been issued, contains a report of the public health administration, communicable diseases and industrial hygiene of the State, and a report of investigations conducted in the microbiological laboratory. Dr. Badham describes an explosion in a sugar-refining factory which caused three deaths. The explosion was caused by the ignition of sugar dust, apparently by the breaking of the bulb of a portable electric lamp, while the men were clearing an accumulation of sugar dust from a dust-collecting system. A few explosions in flour mills caused in the same manner have been recorded.

THE Section of Geodesy of the International Union of Geodesy and Geophysics has recently issued Tome 2 of its *Travaux*, containing general reports prepared in connexion with the Rome assembly in 1922, though not then presented. They refer to the period 1912-1922, between the last meeting of the old International Geodetic Association at Hamburg, and

the Rome meeting of the new organisation, and may be regarded as continuing the triennial reports presented to its predecessor. The volume is of considerable size, the principal contents consisting of a comprehensive report on determinations of latitude, azimuth, and longitude, prepared by H. L. P. Jolly, research officer to the Ordnance Survey; a report by E. de Martonne on the 1913-1914 campaign of geodetic astronomy executed by the geographical survey of French West Africa; and a report by E. Soler, professor of geodesy at Padua, on relative measures of the intensity of gravity in all parts of the world. There are also shorter reports by G. F. Dodwell on radio determinations of longitude in Australia, and by J. de Graaf Hunter on deviations of the vertical.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A man or woman on the staff of the Association of Special Libraries and Information Bureaux to compile supplementary data for the "Aslib Directory of Sources of Specialised Information"—The Secretary, Aslib, 38

Bloomsbury Square, W.C.1 (Sept. 15). A lecturer in mining at the Denbighshire Technical Institute, Wrexham—The Secretary and Director of Education, Education Offices, Ruthin (Sept. 17). A temporary assistant lecturer in education at the University College of Swansea—The Registrar, University College of Swansea, Singleton Park, Swansea (Sept. 20). A deputy director of agriculture under the Government of the Punjab—The Secretary to the High Commissioner for India, 42 Grosvenor Gardens, S.W.1 (Sept. 24). An assistant examiner of Questioned Documents under the Government of India, with knowledge of chemistry, especially analytical chemistry, and of physics and photography—The Secretary to the High Commissioner for India, 42 Grosvenor Gardens, S.W.1 (Sept. 26). A mycologist for research at the Imperial College of Science and Technology on wood-destroying fungi—The Secretary, Department of Scientific and Industrial Research, 16 Old Queen Street, S.W.1 (Sept. 26). Civilian education officers of the Royal Air Force, with practical qualifications for teaching engineering subjects—The Secretary, Air Ministry, Adastral House, Kingsway, W.C.2.

Our Astronomical Column.

AN EXTREMELY MASSIVE MULTIPLE STAR.—The star 27 Canis Majoris has been examined spectroscopically by Dr. O. Strömgren, and found to be a most interesting quadruple system. His results, which are published in the *Astrophysical Journal*, vol. 65, p. 273, show that two independent spectra are visible. These are of types *B5ne* and *B8*, and correspond to the two principal components of the system, which have a period of revolution of 3.2 years. Each of these components has, in addition, a much shorter period, indicating the presence of invisible companions. The masses of the stars in this system are found to be unusually large, the minimum value of the total mass being 950 times that of the sun. The masses of the two principal pairs (*A+B* and *C+D*) are approximately equal, but the ratios *A/B* and *C/D* are not known. The mass of each star, however, must be in the average at least 238 times the solar mass. Attempts to attribute the line shifts to causes other than radial velocity are very unsatisfactory, and there seems at present to be no alternative to the acceptance of these enormous masses.

TABLES FOR EPHEMERIDES IN PARABOLIC ORBITS.—Some years ago a modification of the familiar equations, due to Gauss, that give the rectangular heliocentric coordinates *x*, *y*, *z*, was published; in this the coordinates are given in terms of $\tan v/2$ and $\tan^2 v/2$ multiplied by factors deducible from the elements of the orbit. Mr. Bengt Strömgren has calculated useful tables, which are published in *Meddelelser fra Kobenhavns Observatorium*, No. 58, and in *B.A.A. Memoirs*, vol. 27, Part 2. These give the natural values of $\tan v/2$ and its square, the argument being *M*, which is the interval from perihelion in days multiplied by q^{-2} . The values are given to five decimal places, so they suffice for fairly accurate ephemerides, but not for rigorous ones. They extend to 120° from perihelion; comets are seldom observed farther than this unless *q* is very small. The tables are designed for use with a calculating machine, and will considerably reduce the labour of forming an ephemeris.

STARS WITH BRIGHT IRON LINES.—Among the emission lines which are found in stellar spectra, the lines of iron occur more frequently than those of any other element except hydrogen. Stars in which these lines are found may be divided into four groups, namely, long period variables, peculiar stars of late types, stars of type *Bc*, and novæ. In the *Astrophysical Journal*, vol. 65, p. 286, Dr. Merrill gives lists of stars showing bright iron lines in the second and third of these groups, as well as discussing all the available information concerning them. One point of great interest which emerges from this discussion is the fact that only the lines of ionised iron appear as emission lines in the majority of stars. This is the case even in the low temperature stars which possess very strong arc lines in their absorption spectra. The only stars in which emission lines of the neutral atom occur are the long period variables, and even in these cases enhanced lines are also present. It also appears that bright iron lines are found mainly in stars near the two extremes (*B* and *M*) of the temperature sequence, being absent in types *A* and *F*.

REPORT OF THE ROYAL OBSERVATORY, CAPE OF GOOD HOPE.—The annual report for 1926 of the Royal Observatory, Cape of Good Hope, has just been issued. The meridian observations include all stars south of Decl. -30° down to mag. 7.5. Helio-metric observations of planets are also being made. Dr. J. Lunt, who has been using the Victoria telescope for stellar spectroscopy for thirty years, has now retired; a programme of stellar parallaxes with the instrument has been commenced. The Cape section of the Astrographic Catalogue is now almost complete, the last volume being in type. It is noted that the number of meridian observations and of solar photographs are in excess of any previous year. A new clock, Shortt No. 10, has been obtained from the Synchronome Co., and is working satisfactorily. A radio time signal is sent out daily for the use of shipping in South African waters; another one is distributed three times daily by the local broadcasting association.