in the introduction of a system of rational forest management in India. He recorded his experiences and ideas in numerous reports, and he published a book on his "Reminiscences" of his activity in the Central Provinces. He was a great judge of character, and he succeeded in becoming the friend of those who served under him, while stimulating them to energetic action similar to his own. While at Nancy, he overcame in a short time the difficulties which had sprung up before his arrival, and his influence upon the students was highly beneficial; in return they loved and admired him. His younger son is a distinguished member of the Dehra Dun Research Institute.

CAPT. C. H. RYDER.

NEWS has come from Copenhagen of the death of Capt. Carl Hartvig Ryder, director of the Danish Meteorological Service, on May 3. He had been known to be suffering from rheumatism for some years and lately to find the cares of his official duty onerous; but, to us, the news of his death has come quite unexpectedly.

The Danish Meteorological Office is justly famous for the early production of Daily Weather Charts of the Atlantic Ocean, 1873 to 1876, by Capt. Hoffmeyer, sometime director, a work which was continued by the Danish Meteorological Office and Deutsche Seewarte jointly from 1881 until 1911, with the interval of August 1882 to August 1883, which was covered by the maps of the London Meteorological Office. In 1921 the International Committee expressed the desire for the charts to be brought up-to-date and Capt. Ryder had promised his aid. Further, with its relations to Greenland and Iceland, Denmark is one of the guardians of the farthest North, and for many years the Danish Meteorological Office has compiled all available information about ice in northern waters and published with great promptitude year by year reports thereupon.

Capt. Ryder, a naval officer, was appointed director in 1907 on the death of Paulsen. He became a member of the International Meteorological Committee in 1910 and was an indefatigable and most helpful member of that body, especially in regard to weather telegrams from Iceland. By nature he was disposed to work out meteorological progress on conservative lines: he realised that there was still much to be done in improving the data without which there are no adequate means of testing theories. His presence at future international meetings will be sadly missed by his colleagues.

NAPIER SHAW.

WE regret to announce the following deaths:

Dr. D. Duncan, formerly director of Public Instruction in India and principal of Presidency College, Madras, and biographer of Mr. Herbert Spencer, on May 18, aged eighty-three.

Dr. Hans Goldschmidt, the originator of the process for the preparation of chromium known by his name and of thermite, a mixture of aluminium and oxide of iron, used for welding iron and steel, and also in incendiary bombs, on May 20, aged sixty-two.

Prof. G. L. Goodale, professor of botany at Harvard University from 1878 until his retirement as emeritus professor in 1909, and president of the American Association in 1890, on April 12, aged eighty-three.

Prof. Immelmann, general secretary of the German Röntgen Society, in Berlin, on April 1, aged fifty-six.

Dr. A. Looss, formerly professor of parasitology in the School of Medicine, Cairo, a distinguished helminthologist, on May 4, aged sixty-two.

Mr. M. de C. S. Salter, superintendent of the British Rainfall Organisation, on May 21, aged forty-two.

Prof. A. G. Webster, professor of physics, Clark University, Worcester, Mass., known for his work on acoustics, aged fifty-nine.

Current Topics and Events.

WE learn from the Paris correspondent of the *Times* that the celebrations of the centenary of the birth of Pasteur commenced on May 24 with a reception by the French President at the Elysée. On the following day the principal ceremony was held at the Sorbonne, where a plaque was unveiled which bears an inscription recording the meeting between Pasteur and Lister in the Sorbonne on December 27, 1892. This tribute was arranged by the Association France–Grande Bretagne. A visit was paid by the President and the Minister of Education to Pasteur's birthplace at Dôle on May 26. M. and Mme. Vallery-Radot, descendants of Pasteur, have presented a bust of Pasteur, which was unveiled in the Galerie des Glaces at the Palace of Versailles on May 28, and the French President is to unveil the Pasteur monument at Strasbourg on May 31. A kinematograph film tracing the principal events in the life of Pasteur and giving a general idea of his scientific work was exhibited on May 24 to more than 3000 school-children in Paris, and considerable sums in aid of French laboratories have been collected by the sale of Pasteur badges in the streets. A new French 10-centimes postage stamp bearing the effigy of Pasteur engraved by Prud'homme has been issued to mark the occasion of the centenary. We hope to publish later an account of the celebrations by one of the British delegates.

As recorded in our columns, the late Arthur William Bacot, entomologist to the Lister Institute of Preventive Medicine, one of the most brilliant and original investigators in the field of medical entomology, lost his life a little more than a year ago in the course of an experimental inquiry into the rôle of the louse in the transmission of typhus. Several of Mr. Bacot's friends and colleagues have thought that some memorial of him ought to be established in the village where he resided and, before his appointment to the staff of the Lister Institute, carried out important medico-entomological researches. Mr. Bacot entered the ranks of specialist investigators from those of amateur naturalists and Nature students, and always attached the greatest importance to the teaching of Nature study in the elementary schools. His colleagues and friends believe that the

form of recognition which would have been most congenial to his feelings would be the provision of assistance to the authorities of the Council schools in his home (Loughton) in furthering the study of natural history. With that object, a fund has been opened—the Bacot Memorial fund. It is proposed that the interest on any money received—to be invested in the name of trustees chosen by the subscribers—should be devoted to the purchase of such pieces of simple apparatus such as collecting boxes, specimen cabinets, etc., necessary for the development of Nature study in a school. It is well known that in the present state of public finances it is difficult to obtain grants for such purposes from educational authorities, and that the availability of even a very small income makes a great difference to an enthusiastic teacher. Should any of Mr. Bacot's friends or admirers of his work who feel in sympathy with the proposal care to subscribe to the fund, subscriptions will be gratefully acknowledged either by the hon. treasurer, Mr. Hubert Baines, Bryn Mawr, Church Hill, Loughton, Essex, or by Dr. Major Greenwood, National Institute of Medical Research, Hampstead, N.W.3.

THE Jonas Laboratory for the mechanical testing of metals and the Edgar Allen Laboratory for magnetic investigations at the University of Sheffield were formally opened on May 3 by Sir Oliver Lodge. These laboratories have been equipped by means of two gifts of 5000*l.* each from the late Mr. Joseph Jonas and the late Mr. Edgar Allen respectively, accommodation being found in the existing buildings of the Applied Science Department of the University of Sheffield. The equipment of the Jonas Laboratory includes Armstrong-Whitworth machines of 85 and 50 tons capacity, with oil-pump and accumulator and a variety of extensometers, an Izod machine, and a new instrument for the detection of early slip in metals by electrical means. Special equipment for the study of fatigue has been provided, including a Haigh machine for alternating tension and compression, a modified Stromeyer machine for alternating torsion, and a modified Wöhler machine, the latter two having been designed and constructed in the department, and provided with optical devices for short-period tests. The instruments for the measurement of hardness include the ordinary Brinell machines, the small Brinell machine for tests with balls of small diameter, a scleroscope, sclerometers, and the Herbert pendulum instrument. There is also a series of instruments, optical and other, for determining the accuracy of standard gauges. The Edgar Allen Laboratory is specially equipped for investigations on the magnetic properties of steels and other alloys, and has been designed and arranged by Dr. T. F. Wall. Current of various voltages, direct and alternating, is supplied by cables to distributing boards around the room, and a special generating set has been installed for obtaining alternating currents of variable high frequencies. A powerful electro-magnet, capable of producing very intense fields, has been constructed in the department. The electrical instruments include a Duddell oscillograph, a variety of measuring instruments, vacuum thermo-junctions for small alternating currents, standard condensers and resistances, and magnetic instruments (Epstein square, fluxmeter, etc.). The equipment of this laboratory is exceptionally complete. On the occasion of the opening, a number of visitors inspected the laboratories, and Sir Oliver Lodge delivered an address on the value of research work in industry.

To commemorate the fiftieth anniversary of the foundation of the Institution of Electrical Engineers (under the name of the Society of Telegraph Engineers), the Council decided in 1921 to establish a Faraday medal in bronze to be awarded not more than once a year for "notable scientific or industrial achievement in Electrical Engineering, or for conspicuous services rendered to the advancement of Electrical Science, without restriction as regards nationality, country of residence, or membership of the Institution." The Council selected for the first award of the medal Mr. Oliver Heaviside, who, unfortunately, owing to ill-health, was unable to attend a meeting of the Institution to receive the medal, which was personally presented to him by the then president, Mr. J. S. Highfield, at Torquay on September 9, 1922. The second award of the medal was made by the Council to the Hon. Sir Charles Parsons, at the ordinary meeting of the Institution held on Thursday, May 10. Mr. Highfield, past-president, said that the name of Sir Charles Parsons stood first in the engineering world of to-day, and that there was, he thought, no one who did not know what a mighty work Sir Charles had done for the engineering of the last thirty or forty years. His name would be remembered in connexion with the design and development of that great engine for the production of power which we know to-day, the turbine. After Dr. S. Z. de Ferranti had also spoken of the work and of the great benefits that had come to the world as the result of Sir Charles Parsons's invention, the president, Mr. F. Gill, presented the Faraday medal to Sir Charles. In making the presentation, the president expressed the wish that Sir Charles would live many years in which to enjoy the very special position of regard and affection of all members of the Institution.

SUMMER time commenced in France on Saturday last, May 26, at 11 P.M.

SIR ARTHUR KEITH will deliver the twelfth biennial Huxley lecture at the Charing Cross Hospital Medical School on Wednesday, June 27, at 3 o'clock. The subject will be "Recent Advances in Science and their bearing on Medicine and Surgery." No tickets of admission will be necessary.

PROF. W. D. BANCROFT, professor of physical chemistry in Cornell University, New York, will deliver an address entitled "A Plea for Research" at the house of the Royal Photographic Society, 35 Russell Square, W.C.1, on June 5 at 8 o'clock.

BY the will of Sir James Dewar, who died on March 27, the University of Cambridge is to receive all his scientific apparatus in the chemical laboratory of the

University, and, similarly, the Royal Institution will receive all his apparatus in the Institution and the laboratory attached to it.

ON Wednesday, June 6, the Anglo-Batavian Society will entertain Dr. H. A. Lorentz, professor of physics in the University of Leyden, at dinner at the Langham Hotel, London, W., when Sir Walter Townley, chairman of the council of the Society, will preside. Among the guests who have accepted invitations for the dinner are Lord Haldane, Sir Frank Dyson, and Sir William Bragg.

EXAMINATION of candidates for the Associateship of the Institute of Physics will be held in London at the latter end of September next. Applications for entry must be received before June 30. Forms of application and copies of the papers set in 1922 can be obtained from the secretary, 10 Essex Street, London, W.C.2.

IT is stated in the *Times* that a wireless station is to be erected on Novaya Zemlya Island by the Russian authorities. The station will be situated by Matochkin Strait and will be in communication with North Russian and Siberian stations. The personnel will include, in addition to the wireless experts and meteorologists, a geologist and a zoologist.

THE seventy-ninth general meeting of the Institution of Mining Engineers will be held at Glasgow on June 12-14, and among the papers to be presented are "Coal-dust as an Explosive Agent," by Mr. G. H. Rice, and "The Recent Search for Oil in Great Britain," by Mr. H. P. Giffard. A summary will be submitted of the research work carried out for the committee on the control of atmospheric conditions in hot and deep mines. Excursions to collieries and works in the neighbourhood of Glasgow have been arranged.

AT the April meeting of the Franklin Institute, Philadelphia, the Howard N. Potts gold medal was presented to Dr. Albert W. Hull of the Research Laboratory, General Electric Company, Schenectady, New York, for his paper on "The Crystal Structure of the Common Elements," and the Edward Longstreth medal was presented to a representative of the Société Genevoise d'Instruments de Physique of Geneva, Switzerland, for the universal measuring machine produced by the company.

THE Association of Economic Biologists will hold its annual field meeting at Cambridge on Friday, June 15. The programme includes visits to the School of Agriculture, where investigations on animal nutrition and physiology will be demonstrated; to the National Institute of Agricultural Botany, where will be shown the field trials of agricultural crops, and to the University Farm and Plant Breeding Institute to see the investigations in progress on cereal hybridisation.

THE trustees of the Ramsay Memorial Fellowships for Chemical Research are prepared to consider, at the end of June, application for not more than two fellowships, one restricted to candidates educated in Glasgow. The fellowships, which are each of the annual value of 250*l.*, plus a grant of not more than 50*l.* yearly for expenses, are tenable normally for two years, but they may be extended to three years. Applications must be sent by, at latest, June 15, to Dr. W. W. Seton, University College, Gower Street, W.C.1.

AT the annual general meeting of the Linnean Society held on May 24, the following officers were elected: *President*: Dr. A. B. Rendle; *Treasurer*: Mr. H. W. Monckton; *Secretaries*: Dr. B. Daydon Jackson, Dr. W. T. Calman, and Capt. J. Ramsbottom; *Other Members of Council*: Dr. W. Bateson, Dr. G. P. Bidder, Mr. R. H. Burne, Prof. F. E. Fritch, Prof. E. S. Goodrich, Dame Helen Gwynne-Vaughan, Sir Sidney F. Harmer, Dr. A. W. Hill, Mr. L. V. Lester-Garland, Baron Rothschild, Dr. E. J. Salisbury, Mr. R. J. Tabor, Mr. T. A. Sprague, Prof. F. E. Weiss, and Dr. A. Smith Woodward.

IT is stated in the *British Medical Journal* that the Ontario Legislature has established a research chair for Dr. Banting, the originator of the idea that diabetes might be controlled by extracts of the islands of Langerhans, for which the name "insulin" had been suggested by Sir Edward Schafer a good many years ago, and under which it has now become a commercial product. The income of the chair, to which Dr. Best will act as assistant, will be 10,000 dollars a year. Dr. Banting intends to be present at the discussion on diabetes in the Section of Medicine at the annual meeting of the British Medical Association in Portsmouth.

THE first attempt to broadcast a picture by wireless telephony was made on May 24 at the London Station of the British Broadcasting Co. The experiment was made by Dr. Fournier d'Albe, who used a special code method adapted to a juvenile audience of "listeners-in." It being Empire Day, the picture chosen for broadcasting was a portrait of King George V. The picture was coded by dividing it into thirty horizontal strips and splitting up each strip into twenty squares. A letter was assigned to each square to indicate its average shading, and these letters were written out in thirty lines of twenty letters each. Each line was divided into four groups of five letters, and each group was dictated into the microphone in turn. The lines were numbered, so that mistakes could be easily avoided. The total time of transmission, with instructions, was twenty-two minutes, but it was found that the code message itself could be taken down in eight minutes. The picture was reproduced either by graduated dots on squared paper or on an ordinary typewriter, using letters of graduated size and making the line space equal to the letter space. Recognisable reproductions were made in from twenty to twenty-five minutes. In the complete method a special typewriter or "dot-writer" is to be employed.

NEWS has reached Copenhagen of the progress of Mr. Lange Koch's expedition to north-west Greenland. The *Times* reports that Mr. Koch wintered at Upernivik on Baffin Bay and in March 1922 left for

Cape York, where his survey began. He continued his work to about lat. 82° N., but was forced to abandon his project of charting Peary Land. A large tractor proved very useful for transport, and easily pulled over snow a sledge loaded with food supplies and ten barrels of petroleum. After several hundred miles it broke down and had to be abandoned. Progress then became difficult. A bad epidemic of influenza in the Cape York district has caused such heavy mortality among the Eskimo that it is impossible at present to start any expedition from that base. Mr. Koch intends to return to Denmark in the course of the present summer.

THE arrangements for the International Air Congress to be held in London at the Institution of Civil Engineers, Great George Street, London, S.W.1, on June 25-30, are now approaching completion. The papers to be presented cover every field of aeronautical development, and are thoroughly international in character, as contributions have been received from America, Belgium, Denmark, France, Holland, Italy, Spain, and Sweden, among other countries, in addition to Great Britain. Applications for membership of the Congress will be accepted up to Saturday June 9. A number of visits to various Government experimental and research establishments and Royal Air Force Stations have been arranged, and several of the leading aircraft and engineering firms have expressed their readiness to receive members of the Congress at their works. Communications regarding the Congress should be made to the International Air Congress, London, 1923, at 7 Albemarle Street, London, W.1.

Bulletin 54 S issued by Messrs. Watson and Sons (Electro-Medical), Ltd., Sunic House, 43 Parker Street, Kingsway, London, W.C.2, is a descriptive list of second-hand X-ray and electro-medical apparatus which the firm has for sale. Complete units for X-ray work are offered, in addition to numerous accessories, such as induction coils, Coolidge filament transformers, mercury interrupters, X-ray tubes, screens, and so on.

THE Medical Supply Association, Ltd., of Gray's Inn Road, London, now supply "Radio-Wave" receiving apparatus of all kinds, from a "junior" crystal set, up to a "Radio-Wave Plutocrat" receiver with a range of 300 miles. Modern radio sets are now so simple that no special education or skill is required to work them. Some of the sets also can receive the roughest usage without damage. The receivers made by the Association are of the approved type and the valve apparatus supplied is fully licensed. The lengthy list given of radio parts in their catalogue will be welcomed by amateurs.

MESSRS. LONGMANS AND CO. have in the press, for appearance in their series of "Manuals of Telegraph and Telephone Engineering," "The Inspection and Testing of Materials, Apparatus, and Lines," by F. L. Henley, which will describe the methods employed in the British Post Office in the inspection and testing of supplies of the various materials used in line construction, cables, telephone and Morse telegraph instruments, and furnish the inspector with a basis of sound information upon which to form a judgment in those cases where electrical, mechanical, or chemical tests are either not available or are not conclusive. In the same publishers' "Rothamsted Monographs on Agricultural Science" will appear "Manuring of Grasslands for Hay," by Dr. Winifred E. Brenchley of the Rothamsted Experimental Station.

Our Astronomical Column.

THE DIAMETERS OF SATURN'S SATELLITES.—Major P. H. Hepburn contributes a paper on this subject to B.A.A. Journ. for March. The only one that is large enough to measure with a micrometer is Titan, for which Barnard and Lowell agreed in finding a diameter of some 2600 miles, say 0·7″ in arc. Major Levin found 3500 miles by the eclipse of Rhea by Titan, April 8, 1921; probably the truth lies between the two. For the other satellites estimates can be made (1) from the masses determined by H. Struve, combined with assumed densities, and (2) from the stellar magnitudes of the satellites determined by Guthnick and at Harvard, combined with assumed albedoes. In practice each method was found to help the other; it was established that all the smaller satellites must have small densities, not much greater than that of Saturn itself, which is $\frac{1}{8}$ of the earth's density, or 0·7 of water. In particular, Mimas must have both low density and high albedo, and Major Hepburn suggested, half seriously, that it might be a gigantic snowball; he had in a former paper suggested that the Ring might be composed of ice crystals. The values of the diameters considered most probable are: Mimas, 300 miles; Enceladus, 450; Tethys, 700; Dione, 800; Rhea, 1000. Data are lacking for trustworthy estimates of Hyperion and Iapetus. As Jupiter's satellites have also low densities, some colour is given to the old suggestion that the outer parts of the solar system are built of less dense materials than the inner parts. It will be remembered that the inner satellites of Saturn are much the smallest bodies the masses of which have been determined gravitationally, hence determination of their densities throws new light on our knowledge of that of small bodies generally. Bodies that have never been in a molten state might well have interstices between their particles which would be filled up in a molten condition.

ANNUAIRE DE L'OBSERVATOIRE ROYAL DE BELGIQUE, 1924.—Publication of this well-known Annual was suspended during the War, but the present volume is a very successful effort to make up for the lost years. It begins with the ordinary calendar, astronomical, and tidal information for the year, all given in great detail, and then follows a full summary of astronomical progress since 1915; thus Wolfer's monthly sunspot numbers are given for six years; they show a clearly defined maximum in the middle of 1917. The stages in the dissolution of the great eclipse prominence of May 1919 are fully illustrated. A full account is also given of work on the polarity of sunspots, the magnetic field of the sun, and Einstein's theory, and the discussions to which it has led. There are, in addition, tables and detailed accounts of planetary, cometary, and stellar work during the six years dealt with. The volume is thus very useful as an index and guide to contemporary astronomical progress.