

## News and Views.

LORD BALFOUR presided at the first meeting of the Imperial Conference Research Sub-Committee held on October 25. In his opening speech he re-emphasised the points made in Mr. Amery's address to the Empire delegates the previous week. Research is more important to the British Empire than to any other great power. The Empire in its different parts is confronted with a bewildering variety of problems of almost baffling complexity, the solution of which depends upon the success of the efforts of a considerable body of research workers and the effective co-ordination of their work. Reference was made to the co-ordinating machinery already developed, in which the Department of Scientific and Industrial Research, the Development Commission, the Medical Research Council, and the Royal Society participate. Much of the work undertaken by those bodies is of interest to the Dominions and Colonies, but it is an open question whether the existing machinery is adequate to the needs of the tropical countries of the Empire with their special needs and problems. Representatives of the Dominions followed Lord Balfour with accounts of the efforts being made in their respective countries to apply science to the solution of their particular problems, the representatives of Australia and New Zealand paying warm tributes to the assistance they had received from Sir Frank Heath during his recent visit. Mr. D. T. Chadwick said that the devolution of larger powers to the Provinces in India had been a serious obstacle to the effective co-ordination of research. Mr. Ormsby-Gore, who wound up the discussion, spoke of the isolation of the research workers in tropical colonies of Great Britain, their difficulties of inter-communication, and their dependence on the prosecution of research in the Dominions and Great Britain, and the more effective distribution of the results obtained. There is a scarcity of scientific investigators in the tropics, to remedy which he urged the provision of more highly paid posts such as would induce promising scientific workers to enter the Colonial Service.

At the third meeting of this committee Mr. J. W. Dulany gave an account of the progress of research work in the Irish Free State. He was followed by Sir William Clark, Comptroller-General of the Department of Overseas Trade, and Dr. A. W. Hill, who described respectively the functions of the Imperial Institute and the Royal Botanic Gardens, Kew, in connexion with Empire research. The reference made to the potentialities of the Imperial Institute as a co-ordinating centre for imperial activities in scientific research is welcome in view of the sceptical attitude of some of the Dominion representatives regarding its work and functions expressed at the meeting of the Imperial Conference held in 1923. The Institute has been persistently starved for funds, the contributions of the Dominions and the Tropical Colonies having been niggardly in the extreme; its scientific staff has met with every kind of discouragement for years, having been inadequately paid, given no

security of tenure, and forced to work with inadequate laboratory accommodation and equipment; and much of the work for which it was originally intended has been handed over to other bodies, *e.g.* the Imperial Entomological Bureau and the Imperial Mineral Resources Bureau. Nevertheless, it has a nucleus staff, the members of which have striven for years in the face of these various difficulties to investigate the problems in connexion with the utilisation of the plant and mineral resources of the Empire and to act as a clearing-house for Imperial researches. Properly endowed it could become a very important factor in the co-ordination of Empire research, and it is to be hoped that the awakening of the Dominions to the importance and meaning of scientific research means that they will be prepared to give this institution the support it deserves.

THE speech on Empire air transport by Sir Samuel Hoare, Secretary of State for Air, at the Imperial Conference on October 28, may be taken as giving the collective views of his engineering staff. It would be interesting to have individual opinions, and to compare their sum with their resultant. With regard to fighting forces, the need for aircraft is a *chose jugée*; every belligerent will acquire the most numerous and effective aircraft it can get, from its own or neutral industry, for scouting, bombing, and fighting. Civil air transport has been proved over so wide a range of conditions that its extension to an Empire network is practically a question of finance. Airship service in war seems to be ruled out by the restriction that an airship must never come within range of an aerodrome or an aeroplane carrier. With regard to civil transport by airship, the record of service is adverse to the hope that even lavish expenditure will maintain regular services over Empire routes, and a schedule of 2½ days to Canada, 5 days to India, 6 days to Cape Town, 11 days to Australia, and 13 days to New Zealand, seems to outrun present knowledge. The technical staff concerned is working hard to reduce the difficulties inherent in the design of these vast structures, lighter than the turbulent atmosphere which sustains and buffets them, but the increase of size and change of form, by which it is hoped to solve some of the problems, demands extrapolation far beyond previous experience.

FOLLOWING the address of the Secretary of State for Air to the Imperial Conference, interesting accounts were given by the Dominion premiers and the Under-Secretary of State for India of the development of the air services for which they are responsible. The progress which has been made since the last Imperial Conference appears to be most gratifying and opens up romantic possibilities. It was evident that these appealed strongly to Mr. Amery, who summed up the discussion. He drew a picture of the isolated white worker in the tropics making business calls in his own aeroplane and flying to a bungalow in the nearest hills for a week-end rest. He remarked

on the potentialities of the aeroplane in connexion with forest, fishery, and geographical surveys. The use of aeroplanes for the extermination of insect pests in the American cotton plantations area opened up the possibility of its extended use to the extermination of the tsetse fly in Africa. He struck a welcome note when he mentioned the discoveries which have been made from the air of long-forgotten cities, an old sacrificial way to Stonehenge, and archaeological treasures in Sind, remarking that the use of the aeroplane in archaeological research, one of the least material of researches, is not unworthy of the notice of the British Empire.

THE first department of anthropology in Australia has just been established in the University of Sydney. Funds for this purpose have been provided by the Commonwealth Government and the Governments of the various Australian States. Prof. A. R. Radcliffe-Brown, for some years past professor of social anthropology in the University of Cape Town, has been appointed to the new chair and took up his duties at the beginning of July. Provision has been made for including anthropology as a subject for the B.A. and M.A. degrees, and it is also proposed to offer a diploma in anthropology similar to that offered at Cambridge. Plans are being made for a special course of training in anthropology to be given at Sydney to cadets entering the Administration of the Mandated Territory of New Guinea. Special courses are also being provided for officials in New Guinea and Papua, missionaries and missionary students, and others who are unable to attend the University for a year and therefore cannot take the full diploma course. The Rockefeller Foundation has placed at the disposal of the Australian National Research Council a sum of money for anthropological research in Australasia. The funds to be released in any one year are to be determined by the amount contributed for anthropological studies from other sources with a limit of 20,000 dollars a year. The Australian National Research Council has appointed a committee on anthropological research to advise on the expenditure of these funds, and plans are now in active preparation for carrying out researches in physical anthropology and ethnology.

THE report on the excavations at Lubaantun, British Honduras, on behalf of the British Museum, recently presented to the Trustees, of which a summary appeared in the *Times* of October 28, makes interesting reading. It is more than likely that this site will prove one of the most important in Central America in its bearing on the obscure question of the origin and early history of Maya culture. Not only is the site the largest, but it is also probably the earliest of Maya centres. Its extent, and the number and size of its buildings, including the hillside terraces which aroused so much interest when first reported, demand a very high antiquity for the period of its inception. The work must have been continued over a very long time as well as required the efforts of a numerous and highly organised population. Further, the pottery and the plaques and figurines from surface finds correspond with the artistic style of "Early Maya" on such

early sites as Copan and Quirigua, obviously a product of a long period of development, so that when the lower strata at Lubaantun are excavated, discoveries illuminating for the early history of the Maya may be expected. In many respects the Lubaantun site has proved to be unique in Maya culture. Of the four styles of architecture found on the site, one style of building which employed huge blocks of stone, large enough almost to justify the title 'megalithic,' was not hitherto known in Central America, though it occurs in Peru; while a so-called 'in-and-out' style is new in American architecture.

SENATOR MARCONI gave a very interesting James Forrest lecture to the Institution of Civil Engineers on October 26, when he discussed radio communication, with special reference to waves of short wavelength—that is, to high-frequency waves. It is common knowledge that the ether is becoming very congested with radio waves of certain frequencies. It is necessary, therefore, in order to utilise radio communication to the utmost, to extend the range of commercial frequencies. It was first pointed out that many uses can be made of radio waves, particularly in controlling mechanisms such as targets, torpedoes, and aeroplanes at a distance. It is probable also that electric power will soon be transmitted through the ether over moderate distances. The difficulty that has to be overcome is to project the waves in a parallel beam so as to minimise the dispersion and diffusion of the energy into space. A few years ago, radio engineers were much more confident about their formulæ than they are to-day. Applying them logically, they found it necessary to use very large amounts of power and enormous and expensive aerial systems to ensure communication to great distances. Consequently the high working costs prevented any substantial reduction in telegraph rates. Senator Marconi said that the whole theory and practice of the art is being revolutionised. Until quite recently long-distance transmission was carried on exclusively by employing wave-lengths lying between 8000 and 30,000 metres (37.5 to 10 kilocycles per sec.) The Post Office Station at Rugby, for example, uses waves having frequencies of 16 kilocycles per sec. The total power used at this station is 1400 kilowatts. Many similar stations are operating in other parts of the world, their cost being of the order of 500,000*l.*

FOR the last ten years Senator Marconi, with the help of Mr. C. S. Franklin, has been experimenting with high-frequency waves. In 1923 and 1924 very satisfactory results with waves having 3260 kilocycles per sec. were obtained. It was found that the daylight range steadily increased as the frequency of the waves was increased, the absorption decreasing very rapidly the higher the frequency was made. These results, Marconi said, cannot be explained merely by refraction, as the signals received over world distances are thousands of times stronger than indicated by the refractive theory. The Australian tests showed that with 9370 kilocycles per sec. it was possible to communicate for more than 23 hours out of the 24. With these high-frequency

waves the dimensions of the aërials and reflectors are reduced proportionately and very little power is required. The Marconi Company has been given the contract to make high-frequency stations for Imperial communications. At the Bodmin station for communicating with Canada, thermionic valves generate the necessary high-frequency currents of 11,500 kilocycles per sec. Communication with Canada at the rate of 2500 letters per minute over the whole circuit has been maintained for hours at a time. With these waves 'atmospherics' interfere very little. Even thunderstorms in the vicinity of the receiving station only cause interference when they are inside the angle of the receiving reflector. The high-power low-frequency stations in Great Britain are receiving and transmitting to America at an average speed of twenty words per minute for 18 hours a day. The low-power high-frequency stations, however, can work at least five times as fast over the same distance and for the same time. We are yet a very long way from being able to utilise radio waves to anything like their full extent. Their range of usefulness can be very greatly extended, and this will occupy the attention of engineers for many years to come.

A VALUABLE survey of the development and present position of the chemistry of the proteins was afforded on October 28 to fellows of the Chemical Society, when Prof. S. P. L. Sørensen, of Copenhagen, delivered the Hugo Müller lecture. The work of Mulder, of Proust and Braconnot, of Liebig, of Cramer, and of Hopkins and Cole on the composition of protein substances was mentioned; Emil Fischer's view that they consist essentially of amino-acids united by  $-CO \cdot NH-$  linkings for many years formed the general foundation of all such researches, but recent work invites a modification of that conception. Prof. Sørensen is of opinion that conclusive evidence in favour of Troensegaard's pyrrole-ring structure is lacking, although it is clear that linkings other than those of the simple peptide type are present. It is, in fact, highly probable that some part of the nitrogen is present in heterocyclic structures, probably diketopiperazine rings. The observation, however, that none of the usual proteolytic enzymes attack diketopiperazine, whilst polypeptides are readily decomposed by erepsin, supports Abderhalden's contention that the diketopiperazine section of the protein molecule probably exists in a labile, tautomeric form, a consideration which the lecturer discussed in some detail. Further, he said, it is absolutely necessary to submit to closer examination the question as to how compounds having the assumed structure will behave towards proteolytic enzymes before attempting to reach decisive conclusions regarding the constitution of protein substances. Such investigations are being carried on by Waldschmidt-Leitz and his collaborators.

PROF. SØRENSEN turned next to the problem of the characterisation of individual proteins, in which small differences in the elementary composition are of relatively great importance. So, also, it is essential to distinguish between integral constituents and adherent or loosely-bound substances. Linderstrøm-

Lang has succeeded in obtaining casein fractions containing different amounts of phosphorus, naturally raising the question whether it is possible to prepare casein free from phosphorus, yet still able to give the rennin reaction. In egg-albumin the phosphorus content is practically constant, and that element appears to be intimately associated with the rest of the molecular complex; but only a small part of the coagulable phosphorus of the serum-proteins is precipitable by alcohol. Hence it appears that the phosphorus is but loosely associated with the serum-protein complexes. Purification of the two proteins concerned by precipitation with alcohol at  $-4^\circ$  gives results entirely in harmony with this conclusion. Prof. Sørensen's estimate of the molecular weight of the egg-albumin molecule is 34,000, corresponding with about 380 nitrogen atoms. By the application of electro-analysis to egg-albumin solutions, it is possible to reduce the phosphorus content to a value not far removed from that required if one phosphorus atom is present in such a molecule. Similar results have been obtained by long-continued storage in ice.

THE Zentralanstalt for meteorology and geodynamics at Vienna was founded in 1851, at the instance of the Vienna Academy of Sciences; the seventy-fifth anniversary of the Institute therefore falls this year, and at the suggestion of the Director, Dr. F. M. Exner, the Academy has celebrated the event by issuing a *Festschrift* dedicated to the Institute. The volume, of about 200 pages, contains 13 papers by Austrian and German geophysicists, among the authors being Ficker, Exner, W. Schmidt, A. Wegener, Defant, Conrad, and A. Wagner. Wegener describes observations of twilight bows and zodiacal light made in Greenland in connexion with J. P. Koch's expedition of 1912-13; the last twilight bow appeared to be produced by the atmosphere at a height of not less than 700 km., an elevation unparalleled among atmospheric phenomena except by the aurora. The other papers, too numerous to summarise, are mainly meteorological, but there is one relating to variations of seismic activity in regions of folding, and another on the influence of the earth's rotation on the course of rivers.

THERE are now two international organisations which deal with meteorology: the International Union of Geodesy and Geophysics and the International Conference of Directors. By mutual arrangement, the former concerns itself only with the scientific side of meteorology, while the practical application is left entirely to the latter. The Conferences of Directors are held every six years, and at each a number of Commissions is appointed to deal with various aspects of practical meteorology, membership of which is not limited to members of meteorological services. Eight such Commissions met in Zurich on September 13-20. The British representatives were: Dr. G. C. Simpson, president of the Commission for the Réseau Mondial; Lieut.-Colonel E. Gold, president of the Commission for Synoptic Weather Information; Dr. C. Chree, president of the Commission for Terrestrial Magnetism and Atmospheric Electricity; Sir Gilbert Walker;

Sir Frederic Stupart (Toronto); Mr. C. J. P. Cave; Mr. C. Stewart (Pretoria); and Mr. R. A. Fisher. Afterwards the International Meteorological Committee met in Vienna on September 23-28 under the presidency of Prof. van Everdingen (Holland). The following are amongst the chief decisions reached: A system of visual gale warning signals, for day and night, was adopted for all national services, and agreement was reached as to the conversion of velocities read on anemometers into Beaufort Numbers for weather telegrams. The International Cloud Atlas—prepared in 1895 by Messrs. Hildebrandsson, Riggenbach, and Teisserenc de Bort—has for some time been out of print; a new atlas is to be prepared which will contain a new set of photographs and the proposed changes, for the consideration of the Conference of Directors meeting in 1929. An anonymous donor has generously provided funds for the purpose. Throughout its history the International Meteorological Committee has had no permanent staff and no funds. All secretarial work and the publication of the reports of the meetings have been undertaken by one or more of the national meteorological offices. It has now been decided that the time has come to establish a secretariat to look after the records of the Conference, Committees, and Commissions, to arrange the meetings, and to publish the records.

SCIENCE Service, the endowed organisation that supplies scientific news to ephemeral publications in the United States, has made a new departure by issuing its "Weekly News-Letter" in printed form to individual purchasers. The copy before us contains sixteen pages (10 $\frac{3}{4}$  in.  $\times$  8 $\frac{3}{4}$  in.), more than six of which are occupied by matter relating to the Service and by 'fillers,' the arrangement being such that any article can be cut out without damaging any other. To facilitate the indexing of cuttings, each article bears a key-word above the title and a date at the end. The price is the very moderate one of 5 dollars per annum, or 10 cents per copy, but teachers, professors, librarians, and club-leaders may obtain each issue for 6 cents. The idea of penetrating the class-room is good, and the matter should be useful for enlivening the teaching of science and geography. In style, the articles and notes are crisp and restrained, and although in some articles the language could have been simplified, as a whole they are better written than the scientific news items that occasionally appear in our daily press. They are, however, somewhat marred by the headings, which betray the inaccuracy born of sensationalism and the love of alliteration. Thus, the title "Ice Cream from Crude Oil" is chosen for a description of recent work on the use of certain petroleum constituents as raw material for making edible fats and other natural products; and an article entitled "Fighting Forest Fires with Weather Service" contains nothing about combating fires, but is an interesting account of work undertaken by the U.S. Weather Bureau in forecasting atmospheric conditions that favour the occurrence and propagation of forest fires (which are stated to do 16 million dollars' worth of damage every year). In a country like

Germany, and to a less extent the United States, a publication of this kind should find a good market; in Great Britain, where scarcely a single scientific periodical is to be seen on a railway bookstall, or in a bookseller's shop, its chance of success would be very small.

THE opening meeting of the Illuminating Engineering Society on October 26 was, as usual, devoted to reports of progress and exhibits of novelties in lamps and lighting appliances, photometric instruments, etc. The summary of progress during the vacation presented by Mr. L. Gaster contained several interesting items of news, such as the references to the inclusion of provisions requiring sufficient and suitable lighting in the new Factory Bill now before Parliament, and to the formation of an Illuminating Engineering Society in Holland. The address also summarised experiences during Mr. Gaster's recent visit to the Continent, where illuminating engineering is being keenly studied. In view of the widespread propaganda on lighting and the efforts being made in all countries to develop the commercial exploitation of illuminating engineering, the need for the maintenance of a scientific and impartial attitude on the part of the illuminating engineering societies in the various countries was strongly emphasised. Another lengthy report, read by Mr. J. Y. Fletcher, surveyed progress in electric lighting during the past year. Afterwards there were a number of interesting exhibits. Developments in lighting on the railways were dealt with by Mr. S. G. Elliot (Underground Railways), and Mr. A. Cunningham (Southern Railway). A new form of daylight-factor meter was shown by Mr. H. Buckley of the National Physical Laboratory, Teddington, and the latest model of the Holophane Lumeter photometer by Mr. H. Allpress. Other exhibits included the new Sheringham reflector yielding a light visually resembling daylight in colour, the internally frosted electric incandescent lamps, and some pleasing forms of decorative lighting units of the enclosed type.

WITH the control over epidemic diseases which has been obtained in recent years, and with the increasing proportion of elderly persons in the population, cancer has come to be one of the most important killing diseases. On September 20 and the following days, an international conference, organised by the American Society for the Control of Cancer, was held at Lake Mohonk, New York State, and was attended by representatives from most European countries. The various papers and discussions brought out nothing of a very novel character, but they made clear the steady advance which is being achieved in diagnosis and treatment, and in an understanding of what cancer is. The results were issued to the public in the form of an agreed statement which should be helpful. The conference says that cancer (1) is not contagious or infectious, (2) is not hereditary, and (3) can, so far as is at present known, be controlled only by attention to personal hygiene and by early diagnosis and treatment. The interest and co-operation of the lay public have done much to

improve general healthiness; we may hope that equally good results will follow in dealing with cancer.

DR. RUDOLF ABEL, professor of hygiene, University of Jena, delivered two lectures under the Chadwick Trust on October 19 and 20, taking as his subject "The Development and Present State of Public Health in Germany." The lecturer first described the bad hygienic conditions formerly prevailing in Germany. It was only after the foundation of the German Empire in 1871 that practical care of health was developed, and the conversion of Germany from a mainly agrarian State into an industrial one, with the development of the towns that followed this change, took place without disaster, thanks to the improvements in sanitary conditions which had likewise been proceeding. Public Health administration and legislation were then discussed. The Medical Officer of Health in Germany is a State official paid by the State, but the cost of hygienic institutions and sanitary work is borne by the community. During the last fifty years the death-rate has diminished more in Germany than in England, so that now the two countries are nearly on a level. As regards infectious diseases in Germany, notification of and inquiry into the cases, isolation and disinfection, are very similar to those obtaining in England. The campaign against tuberculosis is carried on by means of dispensaries, visits to the family, sanatoria and hospitals, and by education of the people on a large scale. Venereal disease increased much during the War, but is being dealt with by free consultations and treatment. Alcoholism diminished during the War owing to shortage of alcoholic beverages, but has since shown a recrudescence and is being combated by licensing regulations, clinics, and temperance societies. Maternal and child welfare is being cared for by special legislation, and infant mortality is declining, though it is still higher than in England. Industrial hygiene has been regulated in detail by many legal enactments. Housing conditions are not good in German towns; there is much over-crowding and a great shortage of accommodation. Very much is also being done for the social welfare of the poorer classes.

PROF. W. J. HUSSEY, Associate of the Royal Astronomical Society, Director of Detroit Observatory, Ann Arbor, U.S.A., died very suddenly on Thursday last, October 28, in London, at sixty-four years of age. He had arrived from America a few days before, and was to have sailed the next day for South Africa, where he was to have set up a 27-inch telescope on a site to be chosen—probably Bloemfontein.

THE Norman Lockyer Lecture of the British Science Guild will be given in the Goldsmiths' Hall (by kind permission of the Goldsmiths' Company) on Tuesday, November 23, at 4 P.M., by Prof. J. S. Huxley, who will take as his subject "Biology and Human Life." Tickets for the lecture may be obtained on application to the Secretary, British Science Guild, 6 John Street, Adelphi, London, W.C.2.

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At the annual statutory meeting of the Royal Society of Edinburgh held on October 25 the following officers and new members of council were elected: *President*, Sir James Alfred Ewing; *Vice-Presidents*, Dr. W. B. Blaikie, Sir Robert Blyth Greig, Prof. T. H. Bryce, Prof. E. T. Whittaker, Dr. James Currie, Dr. A. Crichton Mitchell; *General Secretary*, Prof. R. A. Sampson; *Secretaries to Ordinary Meetings*, Dr. A. Lauder, Prof. W. Wright Smith; *Treasurer*, Dr. J. Watt; *Curator of Library and Museum*, Prof. D'Arcy W. Thompson; *New Members of Council*, Mr. J. W. Peck, Dr. J. Ritchie, Prof. R. Stanfield, Dr. A. L. Turner, Dr. G. W. Tyrrell.

THE sum of 400*l.* is allocated in each calendar year by the Institution of Petroleum Technologists to the advancement of research in petroleum technology and its basic sciences, and the Council is prepared to receive applications for assistance from this fund. Applicants proposing to engage in research in a university institution must be recommended by the professor under whom they propose to work. Applications from full members of the Institution require no additional support. Applications for grants from this fund must be received by the Secretary not later than December 1. Application forms may be obtained from the Secretary of the Institution at Aldine House, Bedford Street, Strand, London, W.C.2.

MESSRS. Automatic and Electric Furnaces, Limited, 173-175 Farringdon Road, London, E.C.1, inform us that they have a complete series of lantern slides, illustrating electric furnaces for hardening, tempering, carburising, annealing ferrous and non-ferrous metals, glass, etc., together with component parts of such furnaces, automatic temperature controls, and wiring diagrams, connected with various forms of circuits. These slides are available for the use of engineering societies and other technical associations.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—An assistant lecturer on electrical engineering at the Government Technical Institute, Insein, Burma—The Secretary to the High Commissioner for India, 42 Grosvenor Gardens, S.W.1 (November 15). A Physicist to the Radio-Therapeutic Department of the Cancer Hospital—The Secretary, Cancer Hospital, Fulham Road, S.W.3 (November 20). A mistress of mathematics and science in the training department of the Dow Hill Girls' School, Kurseong, Bengal—The Secretary to the High Commissioner for India, 42 Grosvenor Gardens, S.W.1 (November 27). A lecturer in physics in the Queen's University of Belfast—The Secretary (December 4). A junior technical officer at an Admiralty Experimental Establishment, with good practical knowledge of the design, manufacture and testing of wireless telegraph apparatus, and small alternating and direct current appliances—The Secretary of the Admiralty (C.E. Branch), Whitehall, S.W.1. An assistant chemist under the Empire Cotton Growing Corporation for soil investigations in the Sudan—Dr. E. M. Crowther, Rothamsted Experimental Station, Harpenden.