News and Views.

THE address given by the Secretary of State for the Dominions and Colonies at the fourth session of the Imperial Conference is a further revelation of the growing popularity of scientific research as a theme for statesmen's utterances and an indication of their lost faith in ephemeral economic theories. The greater part of Mr. Amery's discourse was devoted to a survey of the problems of Empire development which await investigation and the steps which must be taken towards their solution. He announced that a very small committee has been appointed to consider what existing research organisations can do for the improvement of the production, transportation, and storage of Empire food-stuffs and raw materials required for manufacturers, what further support is necessary to make their work more effective, and what additional institutions are required. He reminded the Empire premiers that the standard of work of the agricultural departments of the Colonies and of the agricultural staffs of various private companies is no credit to the Empire, and that there is need for greater support for such institutions as the Imperial College of Tropical Agriculture at Trinidad and the Amani Institute in Tanganyika, to act as training centres for agricultural staffs and as an inspiration to all agricultural departments in the tropics. Out of the fund at the disposal of the Empire Marketing Board, further support has been given to assist the work of the Low Temperature Research Station at Cambridge, probably a grant will be made to the Fruit Research Station at East Malling, and the Imperial Bureau of Entomology has been allocated a contribution to enable it to set up a special laboratory for the breeding of beneficial parasites and their distribution as required to all parts of the Empire. Mr. Amery expressed his belief that incalculable results will follow the expenditure of money derived from a fund which can be freely allocated to the vital needs of research on Empire problems.

MR. AMERY might have reminded the Empire delegates that the British Empire is on its defence in the matter of scientific research. Great Britain has assumed the responsibility for the development of the illimitable potential resources of a large part of the world's surface. It possesses some of the finest scientific investigators in the world, but hitherto our statesmen have not performed the essential function of catalysts in bringing the knowledge of the latter to bear upon the problems of the former. Several other colonial powers, notably France, Belgium, and Holland, have given more scope and encouragement to the work of their scientific researchers than Great Britain, and a former colonial power, Germany, in the comparatively few years in which it was interested in colonial development, built up a corps of research workers in every field of scientific endeavour and a chain of scientific institutions which still commands the respect of the world. Mr. Amery's speech, it is hoped, will imbue the Empire premiers and other representatives with the same enthusiasm and appreciation for the need to apply science to the problems facing them as he and his able Under-Secretary, Mr. Ormsby-Gore, already possess. Elsewhere in this issue of NATURE appears the first of two articles referring to Mr. Ormsby-Gore's recently published report on West Africa, a report which can be commended to the Empire delegates for their most careful study. Therein is set forth in some detail the avoidable waste which occurs in this part of the British Empire in connexion with the production, storage, and transport of the products of the tropics, the avoidable waste of human endeavour and human life, the toll taken by insect pests on human beings, domestic stock and plants, the non-utilisation of natural resources, and the tremendous expansion of trade which would result if these problems were investigated by competent scientific workers.

BOTH Mr. Amery and Mr. Ormsby-Gore emphasise the need for co-ordination and dissemination of the knowledge accumulated by scientific investigators, to the end that science shall be applied generally throughout the Empire to the common problems of development. But neither of them realises, apparently, that the present machinery of administration is inadequate to this all-important task. Last year the Prime Minister raised great hopes by the announcement of the creation of a body charged with the responsibility of initiating research into imperial problems. These hopes have not been realised. The new body, the Civil Research Committee, was modelled on the Imperial Defence Committee; its deliberations are characterised by the utmost secrecy: even its findings and its reports on subjects of general interest are not made available to the public, and it has been overloaded with irrelevant problems. No scientific man was appointed to the Committee; its work has been farmed out to *ad hoc* sub-committees possessing no powers and commanding no funds. It bears no resemblance to the body suggested by Mr. Baldwin, and later by Lord Balfour during the House of Lords debate on the Report of the East Africa Commission—the Report which gave such prominence to the need for scientific research in Empire development. Perhaps Mr. Garvin's demand in the *Observer* of October 24 for "a Great General Staff for . . . the systematic accumulation and arrangement of knowledge—a greater Domesday Book showing clearly what works, enterprises, and scientific institutions are required to make the most of the resources of the Empire in every part," may have the desired effect. Mr. Garvin might have added that it is imperative that this general staff should be composed mainly of those who have been trained in the methods of science, appreciate the aims of science, and understand its language.

IN his inaugural address to the Institution of Electrical Engineers, delivered on October 21, Dr. W. H. Eccles presented a review of the present-day position of electrical industry in Great Britain, both in relation to its development and to the state of the industry in other countries. The conclusions he drew are in some respects unfavourable to British practice and he suggested certain necessary lines of

advance. Dealing first with electric supply, Dr. Eccles finds for the five countries, the United States, Canada, Germany, France, and Great Britain, taking only the larger undertakings which had collectively an output of 2000 million units or more in 1925, that the output in units per kilowatt of plant installed varied from 4500 for Canada to 2110 for Great Britain and 1820 for France. The low efficiency of the British undertakings is attributed to the smallness of the machines and stations and the rigid separation of the undertakings. The chief cause of the slow development in Great Britain appears to be the neglect of the principle of intercommunication. With a few large generating stations between which there is thorough intercommunication, each in turn can take the peak of the other's load. The size of each station need not then be so great and the efficiency of the whole undertaking is enhanced. In Germany there are four great zones the power of which varies from 400,000 kilowatts to 1,500,000 kilowatts, and these zones are now being connected into one national system. Similarly in France, the United States and Italy, but in Britain the largest plant capacity is that of the London Power Company, which is about 250,000 kilowatts. The use of electricity on railways was discussed, and it was pointed out that the electrification of main lines may not lower the cost of working; its chief advantage will lie in providing national intercommunication networks and in extending electrical facilities into areas which could not otherwise be made suitable for modern factories.

IT is satisfactory to note the growth in the use of electricity in the chemical and metallurgical industries pointed out by Dr. Eccles. There is a marked rise in the production of aluminium. In the case of sodium, we imported from Norway 41,860*l.* worth and exported 14,000*l.* worth in 1924; in 1925 the figures are 17,000*l.* for import and 28,000*l.* for export. Increases are also taking place in the production of ammonium sulphate and magnesium. Electricity in agriculture is backward in Britain. In Germany, 90 per cent. of the farms have an electric supply; in America there are 700,000 farms using electricity, but in Britain only 400 farms, *i.e.* 0·8 per cent., are supplied with electricity. One of the brightest points in the address refers to the export of submarine cable for telegraphy and telephony. The new type of cable loaded with permalloy (American) or mumetal (English) has rendered possible the transmission across the Atlantic of 2500 letters a minute. Of the 12,000 miles of this cable which has been ordered, all but one length is from British manufacturers. The positions of the telephone, telegraph and radio manufacture and services also come under review, and two appendices give details of the imports and exports of electrical apparatus and machinery for 1912, 1913, 1923, 1924 and 1925. The third appendix gives the export figures for the United States, Great Britain, and Germany for 1913, 1924 and 1925.

PERHAPS the most significant fact brought forward by Dr. Eccles in his address was that referring to research and invention. Dr. Eccles has obtained statistics of the patents granted in America, Germany, and Great Britain, the three principal electrical countries. The native inventors were in the case of America 89·2 per cent. of the whole number; in Germany 77 per cent.; and in Britain, 57 per cent. Of the electrical patents in America, 13·5 per cent. are of foreign origin, and in Germany the figure is 26 per cent.; in Britain 59 per cent. are foreign. This means that "in this intellectual side of industry we have a big adverse trade balance, for which, doubtless, we pay a correspondingly large annual tribute in money." Dr. Eccles insists again upon the folly of starving technical education and research, which must both be considerably extended, unless we are to "pay other nations to do the necessary brain work for us."

ON Monday last, October 25, a commercial high-speed radio telegraph service, utilising the principles of short-wave beam transmission and reception, was opened between Great Britain and Canada. This event followed the satisfactory completion of a preliminary seven days' test conducted by the General Post Office, during which the average speed of signalling was 600 letters per minute simultaneously in each direction. In England the transmitting station is situated near Bodmin and the receiving station near Bridgwater, while the corresponding stations in Canada are in the neighbourhood of Montreal. The stations at each end of this communication channel are similar in design, and they utilise a straight row of vertical aerials located in front of a similar row of wires forming the reflector; the resulting radiation is thus concentrated in the form of a beam directed towards the receiver. The wave-length employed is in the neighbourhood of 100 metres, and while the transmitting power is only 20 kilowatts, the effect of the reflectors at each end is to give a very much greater received signal strength than is obtainable with the usual type of aerial arrangement. Among the advantages possessed by this beam system for long-distance radio communication are the comparatively low capital cost of erection, economy of maintenance, freedom from atmospheric interference, and the possibility of very high signalling speeds. The combination of these advantages should result in the handling of a large volume of traffic at a cheap rate. The service now opened is the first of four similar beam circuits which will link Great Britain directly with Canada, South Africa, India and Australia. The completion of these 'point-to-point' services will, together with the high-power 'world-wide' station already in operation at Rugby, place Great Britain in the forefront of commercial radio practice.

THE news that Messrs. Brunner, Mond and Co., Ltd., Nobel Industries, Ltd., the British Dyestuffs Corporation, Ltd., and the United Alkali Co., Ltd. are about to fuse their interests and form a huge chemical combination on the lines of the German Dye Trust, was not entirely unexpected, owing to recent activity in the shares of some of these companies. Rumour had mated Brunner, Mond and Co. with the

Dyestuffs Corporation, but the adhesion of the other two companies to the alliance was not anticipated. Only in July last, Lord Ashfield told his shareholders that it was more than probable that the Corporation would co-operate, and possibly consolidate, with other large chemical undertakings. On October 22 the directors of the four companies announced in the Press the proposed formation of a new company to acquire their shares and to develop their businesses and resources on broad Imperial lines. Nobel Industries already controls thirty companies largely, but not exclusively, engaged in the manufacture of explosives; and Brunner, Mond and Co. has a controlling interest in such important undertakings as Synthetic Ammonia and Nitrates, Ltd., and the Castner-Kellner Alkali Co., Ltd. The aggregate authorised capital of the associating companies is 47,500,000*l.*, and their issued share capital is 38,225,714*l.* On October 22 the market value of the ordinary and deferred shares (24,918,753*l.*) was more than 40,000,000*l.*

SIR ALFRED MOND will be chairman of the new holding company, and Sir Harry McGowan, chairman of Nobel Industries, will be its president and vice-chairman. In a statement issued to the Press, Sir Alfred Mond emphasised the national and Imperial aspect of the combination. The existence of similar organisations on the Continent and in the United States has compelled the British manufacturers to combine their forces and present a united front to the rest of the world. The identity of the individual companies is not to be destroyed, but the board of the new company will act as a supervisory and connecting link between them, in finance and in policy. Modern mergers are not made to create monopolies or to inflate prices, but to achieve economy in effort and costs, and to provide insurance against market fluctuations. A combination such as that now contemplated will be able to finance, develop and explore many new potentialities in chemical industry, and so keep Great Britain in the front rank both as regards national safety and the supply of chemical products to a vast number of industries that depend upon chemistry. Few will disagree with Sir Alfred's remarks, although he did not mention certain disadvantages that sometimes result from the concentration of money and power in the hands of small groups.

ON October 22 a destructive earthquake occurred in the district of Alexandropol (or Leninakan) in Armenia. Three hundred persons were killed and twelve villages were badly damaged, but as communications in many places are interrupted, the full extent of the disaster is as yet unknown. Alexandropol is one of the most active earthquake-centres in the territory between the Black Sea and the Caspian, though it is surpassed in the frequency and severity of its earthquakes by two other centres, near Tiflis and Chemakha. On the same day three earthquakes were felt in California, only one of which was strong enough to cause slight damage. The interest of the shocks is due to their possible connexion with the San Andreas rift and the earthquake of 1906. Their centre was evidently some distance, perhaps a hundred miles, to the south of San Francisco.

SHORTLY after the announcement of the recent discovery of a skull of Pithecanthropus type at Trinil in Java (see NATURE, October 2, p. 491) private information from Washington made it appear likely that its importance had been overrated, and that the skull would not provide the data relating to the facial portion which anthropologists especially desired. Later news had not confirmed the first announcement that the skull was complete. It now appears that the find is not a skull but a cast in spongy stone of volcanic origin. Its appearance indicates that volcanic ash settled round the skull and, in time, the bone disappeared. The cast shows the frontal bone, the right and two-thirds of the left parietal bones, the upper part of the right and a little of the left temporal bones, and the supra-orbital ridge. It must be noted that the cast was not obtained *in situ* but from natives by whom it had been unearthed, so that the geological conditions of its discovery must remain in doubt. It is not easy to understand how a cast made in such circumstances, which normally would give the internal and not the external form, could show the characteristic supra-orbital ridge; but for the re-solution of this and other questions, the arrival of photographs must be awaited.

THE problem of peopling Australia is discussed by Mr. J. de V. Loder in an article in the October issue of the *Empire Review*. He quotes the late Lord Leverhulme's advocacy of black labour in tropical Australia as an opinion based solely on economic grounds, without consideration of the deeper sociological issues involved. It is not merely the desirability of excluding cheap labour that would undercut the whites, but the danger of introducing social, political, and religious ideals unacceptable to white civilisation, that are the real arguments in favour of the 'white Australia' policy. The suitability of the tropics for permanent white settlement by an increasing population has not been proved, and cannot be proved except by experiment. Modern science has done much to solve the problem, but there still remains a doubt as to the possibility of racial acclimatisation on a large scale. Mr. Loder thinks that the policy of keeping Australia for the white races is a justifiable gamble, and sees possibilities for white settlement in the hot dry regions of the north which are suited for sheep-ranching. In the hot wet regions he is less hopeful, and unfortunately for Australia these are the really productive and valuable parts of tropical Australia. In any event, there is little hope of attracting emigrants to such lands until the more temperate parts of Australia are filled.

ON October 9, H.R.H. the Duke of York opened the new X-ray Department in the Royal Infirmary of Edinburgh, which has just been completed at a cost of 52,000*l.* The new Department, which is about 160 feet long by 60 feet wide, contains a sunk basement and two floors. The basement contains a large motor generator supplying alternating current to the whole

of the Department, together with X-ray transformers, main control boards, and a workshop. Thus there is no moving machinery with its attendant rumble on the ground floor where all the X-ray rooms are situated (radiographic, screening and treatment). The deep therapy (250,000 volts) and superficial therapy sets are valve rectified. There are also a lecture and demonstrating hall, dark rooms, waiting and examination rooms, together with private rooms for the staff. On the upper floor, accommodation is provided for electrical and massage treatment, remedial exercises, radium treatment, and artificial sunlight treatment. Some features of the new building are designed with the view of furnishing the fullest protection for the operators against constant exposure to the X-rays. The walls are constructed of concrete slabs containing barium sulphate. These afford protection equivalent to 5 mm. of lead, as measured by the National Physical Laboratory, which has also inspected the completed Department. From the point of view of the X-ray Protection Committee's recommendations, the new Department is almost ideal, and it should prove a worthy model for future X-ray departments. The University has instituted a diploma, D.R.Edin., for which a candidate will take a suitable course in physics at the University and carry out practical work in the infirmary, the course extending over about a year.

AT the thirtieth annual meeting and annual foray of the British Mycological Society, held at Hereford on Sept. 27-Oct. 2, Dr. G. H. Pethybridge, president, gave an address on "Mycology and Plant Pathology." The British Mycological Society to some extent may be looked upon as an expansion and continuation of the activities of the Woolhope Naturalists' Field Club, which originated fungus forays more than half a century ago. The fungus flora of Britain is now fairly well worked out, and more attention might be paid to the ecology and bionomics of fungi. Tracing the development of plant pathology in Britain, we find that at one time mycology was regarded as of little or no importance in relation to the causation of plant diseases; fungi occurring in connexion with disease were regarded as the *result* of such disease, not the cause of it. Disease in plants is the consequence of disharmony between the plant and its environment. A parasite, if present, is part of the environment considered in its widest sense, and it must not be forgotten that both host and parasite are to some extent variable or unstable and that the fluctuating factors of the environment may influence the parasite as well as the host. However, the parasite—most frequently a fungus—is often the most important factor in disease production. Plant pathology in Great Britain is of comparatively recent growth. The possibility of the introduction of the Colorado beetle occasioned the passing of the first Act of Parliament dealing with the protection of crops; it was extended and amplified as the Destructive Insects and Pests Act in 1907 on account of the spread of the American gooseberry mildew. A small *ad hoc* inspectorate was then inaugurated by the Board of Agriculture. The greatest stimulus to the development of plant pathology has followed from the provision by the State of greatly increased funds through the Development and Roads Improvement Funds Acts 1909 and 1910, and afterwards through the Corn Production Acts (Repeal) Act of 1921.

AN appointment to a Beit Memorial Fellowship, of the annual value of 1000*l.* and tenable for five years, is to be made for whole-time research in tropical medicine; allowances will be given for travelling and laboratory expenses. Applicants must be of European descent and of degree standing in a university of the British Empire approved by the Trustees of the fund, and must state their proposed subject of research. Forms of application, obtainable from the honorary secretary of the fund, Sir James K. Fowler, at 35 Clarges Street, London, W.1, are to be returned on or by February 1 next. This fellowship is a noteworthy addition to the opportunities for research now available, and there is no doubt that it will lead to important contributions to our knowledge of health and disease in the tropics.

THE seventeenth annual Exhibition of Electrical, Optical and other Physical Apparatus arranged by the Physical and the Optical Societies will be held at the Imperial College of Science and Technology on January 4-6. It has been decided again to include, in addition to the well-established Trade Section, a Research and Experimental Section similar to that successfully initiated in last January. The groups in this section comprise: (*a*) Exhibits illustrating the results of recent physical research and improvements in laboratory practice; (*b*) effective lecture experiments; (*c*) repetitions of famous historical experiments. Offers of exhibits should be addressed to the Secretary of the Physical Society at the Imperial College of Science and Technology, South Kensington, S.W.7, not later than November 16.

THE People's League of Health, 12 Stratford Place, Oxford Street, London, W.1, has arranged two interesting series of lectures to be delivered during November and December at the rooms of the Medical Society of London, 11 Chandos Street, Cavendish Square, W.1. One series, on November 1, 8, 15, 22, 29, December 6, 13, and 20, deals with the mind in normal and abnormal subjects, and the lecturers are Dr. E. Mapother, Dr. E. D. Macnamara, Dr. N. Hobhouse, Dr. H. Crichton-Miller, Sir Maurice Craig, Sir Robert Armstrong-Jones, Dr. W. A. Potts, and Dr. A. F. Tredgold. The other series, on November 3, 10, 17, 24, December 1, 8, and 15, is on various aspects of diet and foods, and the lecturers are Dr. H. Campbell, Prof. Leonard Hill, Prof. Winifred Cullis, Prof. W. E. Dixon, Dr. J. Lewis Rosedale, Prof. Hugh MacLean, and Dr. R. Ll. J. Llewellyn. The lecture hour is 6 P.M.

A LICENCE under Section 20 of the Companies (Consolidation) Act, 1908, has now been issued by the Board of Trade to the Research Association of British Paint, Colour, and Varnish Manufacturers, which has been approved by the Department as complying with the conditions laid down in the Government scheme

for the encouragement of industrial research. The Secretary of this Association is Mr. J. B. Graham, 8 St Martin's Place, London, W.C.2.

IN the short notice of "Phototopography" by Mr. A. L. Higgins which appeared in NATURE of June 26, p. 889, it was stated that ground photographs had been used for surveys in Canada but not in other parts of the British Empire. The Surveyor-General of India points out that experiments with the photo-theodolite were carried out in India more than twenty-five years ago, and the method was utilised on the Mount Everest expedition. The ground photographs which are being taken this year in Kashmir will be utilised in conjunction with plane-table surveys. They will only cover a small area of the country. It was not the reviewer's intention to suggest that ground photo-surveying had not been tested in India or elsewhere, but that it had not been adopted for ordinary topographic surveys outside Canada.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A lecturer in physics at the Royal Dental Hospital of London, School of Dental Surgery—The Dean of the School, Leicester Square, W.C.2 (November 1). A head of the department of Leather Trades of the Port Elizabeth Technical College, South Africa—G. H. Penney and Co., 23 Lime Street, E.C.3 (November 8). A head of the mechanical engineering department of the L.C.C. School of Engineering and Navigation, Poplar—The Education Officer, T.1.a., County Hall, Westminster Bridge, S.E.1 (November 8). A chemist for tobacco work under the Egyptian Government—The Chief Inspecting Engineer, Egyptian Government, 41 Tothill Street, S.W.1 (November 12). An assistant lecturer (man) on education at King's College—The Secretary, King's College, Strand, W.C.2 (November 26). A professor of archæology in the University of Edinburgh—The Secretary, University, Edinburgh (December 31). An assistant chief entomologist, an entomologist and a mycologist under the Egyptian Ministry of Agriculture—The Under-Secretary of State for Agriculture, Ministry of Agriculture, Cairo (January 1). An expert in pisciculture under the Egyptian Government—The Royal Egyptian Legation, 7 Charles Street, Berkeley Square, W.1. A lecturer in physics and electrical engineering at the Handsworth Technical School—The Principal, Handsworth Technical School, Goldshill Road, Handsworth, Birmingham. A head of the mining department of the Barnsley Technical and Mining School—The Principal, Harvey Institute, Barnsley. A technical officer in the air-worthiness department, Royal Aircraft Establishment, South Farnborough—The Chief Superintendent, R.A.E., South Farnborough, Hants, quoting A. 130).

Our Astronomical Column.

RELATIVITY AND THE DAYTON MILLER EXPERIMENTS.—The issue of the *Nineteenth Century* for October contains an article on this subject by Prof. H. Wildon Carr. The article is largely of a philosophical character and emphasises the great change that relativity has brought about in our outlook on the phenomena of the universe. Interesting parallels are drawn with the Copernican revolution, and with the birth of philosophy in ancient Greece. There is also an explanation of the theory in non-technical language. Incidentally, Prof. Carr gives 5000 miles per minute as the earth's orbital speed: it should be 1110.

Referring to the system of dynamics accepted by Newton, Prof. Carr says: "It is now rejected as untrue in theory and useless in practice." This statement, however, needs qualification. The tables of the sun, moon, and planets that are still in use are based on pure Newtonian principles, save for an empirical increase in the motion of certain perihelia (adopted long before Einstein explained its cause) and an empirical term in the moon's motion (quite unconnected with Einstein). The most ardent relativist would not desire to supersede these tables, since the changes in them that would result from Einstein's law are absolutely inappreciable with our present means of observation.

The close of the paper deals with Dr. Dayton Miller's repetition of the Michelson-Morley experiment, but it describes him as still adhering to the theory of an ether-drag, which diminishes with increasing altitude. Dr. Miller made it fairly clear in his lecture at the Royal Institution some months ago that he no longer holds this view. He now considers that observations at all altitudes (including the original Michelson-Morley experiment) indicate an apparent change in the velocity of light depending on the sidereal time of observation. The change is only a small fraction of the orbital speed of the earth: it was suggested that the Lorentz-Fitzgerald contraction damps down the observable effect, but does not conceal it entirely. This tends to weaken the argument drawn by Prof. Carr for the non-existence of the ether, from the difficulties which he rightly puts forward as regards an ether-drag.

SOLAR ACTIVITY DURING 1925.—An account of solar observations made at the Astrophysical Observatory of Catania is published by G. A. Favaro in "L' attività del sole nell' anno 1925," in continuation of the series commenced in 1919. Observations for sunspots were made on 332 days in the year 1925, for faculæ 290 days, for prominences 194 days, and for the measurement of the height of the chromosphere on 140 days. Tables are given of the mean frequency of sunspots, faculæ, and prominences. Drawings also illustrate the chief disturbances of the year, the dates selected for sunspots being February 14, May 5, November 26, and December 27; those for prominences being February 24, June 17 and 18. The highest prominence recorded during 1925 occurred on February 24 with a maximum height of 211″, or about 153,000 km. The mean height of the chromosphere measured in the *C* line of hydrogen was 10″·9 or about 8000 km., the monthly means of the measures ranging from 10″·5 to 11″·7.

It is of interest to show in tabular form the rise of solar activity since the last spot minimum in 1923 as indicated by various observations.

Observation.	Place.	Year. 1923.	1924.	1925.
Daily sunspot frequency (groups and single spots) . . .	Catania	0·7	1·8	3·6
Wolfer's "Spot Numbers" .	Zurich	5·8	16·7	41·6
Daily spot areas [1] . . .	Greenwich	55	276	829
Days without spots . . .	Greenwich	171	97	19

[1] Corrected for foreshortening, in millionths of the sun's visible surface.