News and Views

A New Type of Nuclear Reaction

ON p. 251 of this issue of NATURE, an account is given of recent investigations by Prof. O. Hahn, Prof. L. Meitner and F. Strassmann on the bombardment of uranium by neutrons. Prof. Meitner and Dr. O. R. Frisch have discussed the development and implications of these results in a letter which also appears in this issue (p. 239). Experimental confirmation of these conclusions, it is claimed, is announced in the following cable, dated February 3, received from R. D. Fowler and R. W. Dodson, of the Chemical Laboratory, Johns Hopkins University. "We have bombarded uranium nitrate in a three millimetre ionization chamber with deuterium neutrons and found that particles causing a very intense ionization, at least five times that from natural uranium alpha particles, are produced. Fast neutrons from one milliampere two hundred and fifty kilovolt deuterons produced thirty-five particles per minute. Placing paraffin around ionization chamber increases this to seventy counts per minute. We believe this to be confirmation of work of Hahn and Strassmann (*Naturwissenschaften*, Jan. 6; Frisch and Meitner NATURE [Feb. 11, p. 239—Editor]) in which activity ascribed to barium was found after neutron bombardment, and that these particles are barium ions of about one hundred million volts energy.

"We have also bombarded thorium oxide in similar ionization chamber, with deuterium neutrons. Fast neutrons in same intensity as above produce thirty intensely ionizing particles per minute. Paraffin does not increase the effect. We believe thorium is also disintegrated by fast neutrons into fragments of about one half thorium mass, having energies of about one hundred million volts."

Dr. W. D. Coolidge

THE Faraday Medal of the Institution of Electrical Engineers given annually "either for notable scientific or industrial achievement in Electrical Engineering or for conspicuous service rendered to the advancement of electrical science", has been awarded to Dr. W. D. Coolidge, director of the research laboratories of the General Electric Co., Schenectady. Dr. Coolidge was born in 1873, and educated at the Massachusetts Institute of Technology and at the University of Leipzig, studying especially physical chemistry. After holding certain academic posts, he joined the staff of the General Electric Co. in 1905, was promoted to be associate director in 1928 and in 1932 was appointed director of research. The name of Coolidge is associated with advances in many fields, but perhaps all his later work may be traced back to his important researches into the production of ductile tungsten, which revolutionized the design of electric lamps and had immediate applications in thermionic devices of several types. In the Coolidge X-ray tube, which was developed just before the Great War, the tube was evacuated as thoroughly as possible and the electrons necessary to produce X-rays were emitted by tungsten filaments heated to a suitable temperature. In this tube, for the first time, the X-ray worker was able by simple means to control separately the voltage and current applied to his tube, while the steadiness of running and constancy of X-ray output were much greater than had been possible with the earlier ionic type of tube. Later, Coolidge developed tubes capable of operating at tensions up to a million volts in which the electrons were accelerated in stages. Somewhat similar tubes were made of such a design that the electron beam, instead of being intercepted by a target and producing X-rays, passed through a thin window and gave rise to remarkable fluorescent, chemical and biological effects, the possibilities of which have not yet been completely explored.

Josiah Willard Gibbs (1839-1903)

ON February 11 the centenary occurs of the birth of the distinguished American physicist, Josiah Willard Gibbs. Born at New Haven, he was the son of Josiah Gibbs (1790–1861), professor of sacred literature in Yale Divinity School. He entered Yale College in 1854 and graduated four years later; he continued his studies there until appointed a tutor in 1863. The years 1866–68 he spent in Paris, Berlin and Heidelberg. In 1871, he was appointed to the chair of mathematical physics in Yale College, and this appointment he held until his death, which occurred at New Haven on April 28, 1903. Gibbs' first contributions to mathematical physics were two papers on thermodynamical problems published in 1873. These papers were followed by his memoirs "On the Equilibrium of Heterogeneous Substances" published in two parts in 1876 and 1878. This was translated into German by Ostwald and into French by H. le Chatelier. He also investigated certain problems in connexion with the electromagnetic theory of light and other subjects. He was a foreign member of the Royal Society, and in 1901 received the Copley Medal. He was also a corresponding member of the Paris Academy of Sciences. At the anniversary meeting of the Royal Society when the award was announced, Sir William Huggins, the president, said that Gibbs "was the first to apply the sacred law of thermodynamics to the discussion of the relation between chemical, electrical and thermal energy and the capacity for external work. To chemistry his most important result is the so-called phase rule, the law which governs the general case of complete heterogeneous equilibrium and which is applicable to chemical change generally".

Refugee Settlement in British Guiana

THE United States has offered to send an expert Commission to investigate the possibilities of refugee settlement in British Guiana, and the offer has been

accepted by the British Government, who have appointed additional members to the Commission. The terms of reference of the Commission are: To study and report upon the suitability and practicability of large-scale colonization in British Guiana for involuntary emigrants of European origin, from the physical, climatic and economic points of view; to estimate the approximate numbers that might be settled there (*a*) immediately, (*b*) over a term of years; to calculate the probable cost of such settlement: if mass colonization appears feasible, to recommend a general plan of settlement. The names of the members are: Dr. Edward C. Ernst, assistant director, Pan-American Sanitary Bureau (chairman); Colonel Howard U. Nicholas, United States Army Engineering Corps, Panama Canal; Dr. Joseph A. Rosen, Jewish colonization expert and agronomist; Mr. Emile C. Bataille, colonization expert with Canadian experience; Dr. Anthony Donovan, sanitary engineer; Mr. Desmond Holdridge, who has previous experience of the Colony (secretary). Sir Crawford Douglas-Jones, formerly Colonial Secretary of British Guiana; Sir Geoffrey Evans, formerly principal of the Imperial College of Tropical Agriculture, Trinidad, now economic botanist at the Royal Botanic Gardens, Kew. Dr. D. W. Duthie, agricultural chemist to the British Guiana Government, is being attached to the Commission for the purpose of advising and co-operating with the Commission.

Science and World Resources

THE December issue of *Fact* (No. 21. 6*d*.) contains a study "Science and World Resources" by Richard Palmer, which gives a comprehensive but readable survey of the way in which the world economy is changing under the impact of scientific advance. Mr. Palmer gives a dynamic picture of the way in which scientific discoveries and their technical development from synthetic dyes such as indigo and alizarin to synthetic rubber, the new textile fibres such as rayon and more recently 'Lanital' and 'Nylon' and the numerous synthetic resins or plastics, are influencing not merely the development of new industries or the displacement of old industries but also the distribution and availability of materials in the world, the location of industry, etc. Mr. Palmer's survey ranges over the whole field of materials, including beet sugar, alcohol, petroleum, coal, fertilizers, and light metals, and indicates admirably even to the non-technical reader the new freedom which the organic chemist is giving us and some of the possibilities if the new powers and opportunities are wisely used. Other chapters range over the possibilities in the way of power production which we owe to science and their significance in world economy, as well as the possibilities in agriculture and the way in which science has made it possible to improve working conditions and thus both industrial efficiency and the climatic or geographical zones within which effective production by human beings is possible. The essay provides an excellent background against which to discuss such current problems as those of raw materials and their bearing on the colonial question, the limits of self-sufficiency policies, sanctions, economic nationalism and the like. The realistic picture he gives enforces the necessity for strengthening, while there is yet time, our efforts to create a social and international order in which knowledge will be used to the full in the service of all mankind.

The Empire Service Broadcasting Station

Mr. L. W. Hayes and Mr. R. N. MacLarty presented an interesting paper to the Institution of Electrical Engineers on February 2. They first gave an account of how broadcast transmissions with short waves initially started at the Chelmsford works of Marconi's Wireless Telegraphic Co. in 1927. This gave intelligible reception at practically every place on the earth's surface at almost every period of the day and year. A serious difficulty that had to be overcome was due to the wide difference in longitude of the different Dominions and Colonies of the British Empire. For this reason, a transmission sent out at a given time in England would arrive at very various local times of the night and day in the different Dominions. Broadly, the aim of the service is to give listeners anywhere in the Empire a daily programme of about two hours' duration; the installation of the new broadcasting service started in 1933 practically does this. Earlier than this, reports received in the West Indies also gave a service at the same time in Western Australia, and the announcement of "London calling the African and West African Zones" was being heard simultaneously at night in Africa, in the early evening in South America and the West Indies, and at breakfast time in New Zealand. This showed that dividing the earth into geographical zones could cause confusion. Accordingly, the daily transmission from the Empire Station at Daventry was divided into five sessions: Transmission No. 1, Transmission No. 2, etc., in accordance with a time schedule, the programme from the first zone being recorded and then transmitted at the most suitable times to the other zones. In 1935, a sixth transmission was added, primarily intended for evening listening in western Canada, but serving also North America generally and giving an early morning service to India.

Conditions of Engineering Contracts

THE subject-matter of an engineering contract necessitates that the documents of which the contract is composed must make provision for contingencies and events of a special nature. In this respect, it has peculiarities not to be found in other forms of contract, and is often inevitably of considerable length. The Council of the Institution of Civil Engineers asked Mr. E. J. Rimmer to write a paper on the subject which will be discussed by correspondence until May 15. The Council gave the author of this paper a very wide discretion in the choice of the title and in the scope of the paper. He has wisely chosen to give a comprehensive survey of the whole subject of engineering contracts. Many engineering contract works are to be constructed in, or erected and fixed on to, land. They cannot, therefore, be rejected and sent back to the contractor