New York City Museum of Science and Industry

THE New York City Museum of Science and Industry was formally opened on the evening of February 11 in a novel manner. At 3.35 a.m. G.M.T. on February 12 (10.35 p.m. February 11, in New York), Sir William Bragg was seated in Faraday's old study at the Royal Institution before the table at which Faraday used to work; and he gave a short address to a distinguished gathering in the New York Museum, including Prof. Albert Einstein, Dr. F. B. Jewett of the Bell Telephone Laboratories, and the Mayor of New York. The American listeners then heard Sir William strike a match, with which he lit an old candle set in a candle-stick of Faraday's time; in a few instants, the entrance hall of the New York Museum was flooded with the light of two rows of mercury vapour lamps. The means by which this feat was accomplished provides an interesting demonstration of one of the many marvellous attainments of modern applied science which have resulted from Faraday's pioneer work of more than a hundred years ago. When Sir William lit the candle, the light was incident on a photo-electric cell, and the resulting electrical impulse was amplified and transmitted over telephone lines to the Post Office trans-Atlantic radio station at Rugby. The signal passing over the radio link was received at Netrong, U.S.A., by the American Telephone and Telegraph Company's station, and then re-transmitted by telephone line to the New York Museum of Science and Industry, where it was made to light a Westinghouse lamp of fifty years ago. The light from this lamp was picked up by another photo-electric cell, which in turn actuated the switches controlling the mercury vapour lamps flood-lighting the hall of the Museum.

In the course of his address, which was relayed in America by the National Broadcasting Company, Sir William Bragg referred to the first description of an ideal science museum and its uses, written by the American, Benjamin Thomson, Count Rumford, some hundred and forty years ago. The first attempt to carry out Rumford's plan was made in the Royal Institution of Great Britain, but was a failure. It remained for Sir Humphry Davy to see other opportunities for the Royal Institution and to mould its activities so that it became a school of research and a platform from which the results of scientific progress could be described to the public. Here worked Faraday, whose scientific discoveries have done more perhaps than those of any other man to influence modern thought and modern ways. It was very appropriate that the modern achievements of electrical science, the foundations of which were laid by Faraday, should be employed in the manner described above to open another science museum. The work of this museum would prove most valuable in interpreting for the common good the triumphs of the past and the hopes of the future in the realm of science. In conclusion, Sir William prayed that this new Museum of Science and Industry might go forward steadily and strongly in its task of education and conciliation, and help in its own way to lead men into the paths of unity and peace.

Radioactivity and Atomic Structure

THE Faraday Lecture to the Chemical Society was given at the Royal Institution on February 12 by Lord Rutherford. The title was "Radioactivity and Atomic Structure"; but Lord Rutherford, rightly, was less concerned with discussing the latest results in nuclear transformations than with giving a general account of the development of radioactivity in the past forty years, and relating its discoveries to the theories and ideas of the chemist. The personal note of the lecture was greatly appreciated by the audience. Lord Rutherford began by giving an account of his own work at Cambridge and Montreal in the early days, of the discovery of the emanating power of thorium, of the characteristic rate of decay of the emanation, of its odd power of 'exciting' or 'inducing' radioactivity in neighbouring solids, and the other work which led to the disintegration theory of Rutherford and Soddy in 1902–3. This was the first sustained attack on the chemist's concept of the atom as a solid and permanently stable structure, and the first hint that an explanation might be found some day for the existence of the periodic classification. He passed then to the great period 1911–13 when the nuclear theory of the atom was established, the group-displacement was put forward, and physicists and chemists were reluctantly compelled to believe in the existence of isotopes—at least for the heaviest elements.

WORK since the Great War both on the nucleus and on isotopes has gone from strength to strength. In 1919, artificial disintegration of light elements by one of the spontaneous disintegration products was clearly established. Great developments since then have become possible by the discovery of powerful electrical methods for producing streams of bombarding projectiles and by improvements in automatic methods for counting particles. In some cases, rare, but stable and already known, isotopes have been produced; in others, atoms have been artificially made which show both old and new forms of radioactivity. Concurrently with this work the mass-spectrograph has revealed the complexity of the majority of elements and determined accurately the masses of the isotopes. Some of these accurate results have been of great importance in establishing the principle of the conservation of energy in many nuclear reactions and generally in revealing the structure of the nucleus. Results like these have been a very notable contribution to one of the problems which Faraday, in his day, considered lay before chemists: "to decompose the metals, to reform them and to realize the once absurd notion of transmutation". Lord Rutherford ended by pointing out that much still remains to be done before we can hope to understand how atoms have been built up of elementary particles or grasp the significance of the relative abundance of the different atoms on our earth.

The Huxley Letters

IN the history of scientific thought there have been a few supreme occasions only on which scientific men have been compelled to enter the public lists

on behalf of a new idea. Each time the issue at stake has been fundamental—the acceptance or rejection of new knowledge, revolutionising our understanding of man's place in Nature. Each time the repercussions, arousing partisanship and controversy, have reverberated along the whole cultural front. Such a situation developed in the middle of the nineteenth century when the battle for evolution reached its climax, and Press, platform and pulpit resounded to the noise of strife. The centre of that struggle was, of course, T. H. Huxley, and his activities brought him into contact with the whole intellectual life of the period—scientific, literary, philosophic and religious. Probably more than any other man of that century, the threads of cultural life crossed him from all directions.

Two years ago, when Dr. Leonard Huxley died, there were found among his papers more than three thousand of his father's letters. A remarkable, and in many ways a unique collection, including hundreds of letters from Darwin, Lyell, Faraday, Francis Galton, J. S. Mill, Skeat, Lecky, Hæckel, Herbert Spencer, Bentham, Browning, Tennyson, Jane and Thomas Carlyle, Pusey, etc., they represent a veritable cross-section of cultural life at a critical epoch in history. The Imperial College of Science, in whose 'Huxley Building' he carried through most of his active work, is endeavouring to acquire this collection for the Huxley Museum, and in order to raise the necessary £2,500 is appealing to public subscription. The object is to maintain the collection intact and to house it in such a manner as to make it accessible to interested students of the period; for, once the letters are dispersed, the loss will be inestimable. It is in their unity that the collection exhibits one of its most valuable features. It is much to be hoped that the generation that has benefited so greatly from the result of Huxley's efforts will ensure that this necessary task is carried to a successful conclusion. Contributions should be sent to the Secretary, Imperial College of Science and Technology, South Kensington, London, S.W.7.

British Dependencies and Mandated Territories in Africa

ANY anxiety which may have been aroused by tentative suggestions relating to a future redistribution of Colonies and Mandated Territories in Africa, to which reference was made in NATURE of February 15 (see p. 249), should be dispelled, at least for the present, by the very definite pronouncement made by Mr. J. H. Thomas in the House of Commons on February 12, which stated in precise terms that no such proposals would be entertained. It is reported, however, that some misgiving is still felt in East Africa, and it is expected by leaders of the German movement in Tanganyika, according to a dispatch from the Nairobi correspondent of *The Times* in the issue of February 15, that Herr Hitler will make "a precise and firm demand within a few months". The same dispatch quotes from the *East African Standard* a passage to the effect that while the Colonial lands are theoretically the possessions of the Government, their future is not merely a matter for international negotiation. They are the inalienable homes of millions of people residing in, and developing them, who are wards of the British race. So far as concerns the Mandated Territories only, it might be argued on the other side that the mandate recognises these inalienable rights of the inhabitants, irrespective of the power in whose hands it may be vested. Past colonial history, however, and the conduct of administration by the mandatory powers since they accepted the responsibility, shows on an *impartial* view that under no Government, not even excepting the present administration of the Belgian Congo, of which too little has been heard, has so near an approach been made as in the British Territories to a complete adaptation of the methods of administration and of the efforts to develop the civic and social capacities of the individual to the cultural status of the African as revealed in the scientific study of his institutions.

The Galactic Nebulæ

MR. J. H. REYNOLDS delivered his presidential address to the Royal Astronomical Society on February 14, taking as his subject the "Galactic Nebulæ". At the moment, it may be said that the limelight of spectacular interest shines more strongly on the extragalactic nebulæ than on those nebulæ, more properly so called, which are to be found in our own system, although they present numerous features of great interest. They appear to be actual clouds, and are seen as dark patches in which the background of faint stars is partly or wholly obscured, unless the cloud is illuminated by an adjacent or interior star. If the illuminating star is of early type, the nebula shows a fluorescent emission spectrum excited by the ultra-violet light of the star; but if the latter is late in type, the nebula simply reflects the light. Among the galactic nebulæ are numbered the planetary nebulæ, which are now considered to have originated as gaseous shells emitted by novæ; but no planetary nebula has been found within eight degrees of the position of Tycho Brahe's very bright nova of 1572. Mr. Reynolds dealt with the nature of the dust which causes the colour excess of stars behind clouds and reflects the light of late type stars; owing to the low temperature of interstellar space, the material must be frozen solid, and may consist of particles of frozen water or solid ammonia.

Training of Industrial Physicists

AN informal discussion on "The Training of Industrial Physicists" was held under the auspices of the Institute of Physics in the rooms of the Royal Society on February 11. Among the 180 persons present were representatives of nearly every university and college in Great Britain and Ireland, of firms employing physicists, and of research associations and Government establishments. The fact that so many distinguished representatives attended is in itself a clear demonstration of the importance of the subject. The opening speakers were Mr. A. P. M. Fleming, of the Metropolitan-Vickers Electrical Co., Ltd.; Dr. W. H. Hatfield, of the Brown-Firth