

to that of crystals. Thus the virus preparations are in a sense doubly crystalline, for the components of the particles, in addition to the particles themselves, are regularly arranged. Their structure is more complicated than the anisotropic protein myosin but less so than pepsin. There is a spacing along the length of the particle of 11 A., and the virus seems to be composed of piles of sub-molecules with dimensions of 11 A. cubes. The spacings in the high-angle photographs are independent of the water content of the preparation, showing that even in solution the particles contain no appreciable amount of water. It is their internal regularity, lack of water and chemical simplicity that separate the viruses most sharply from the simplest recognized organisms.

Most of the work has been done with tobacco mosaic or closely related viruses, but some photographs have been taken of potato virus X and tomato bushy stunt virus. The last has spherical particles and crystallizes as rhombic dodecahedra, from which patterns were obtained with both high- and low-angle photographs. Each virus gives its own distinct pattern, and differences were even detected between related strains of the same virus, but the different viruses resemble each other more than any other type of proteins yet examined by X-rays. The differences found are of the order to be expected from a knowledge of the chemical, serological and physico-chemical properties of the viruses examined.

It is obvious that this work has opened up a field of research that promises to be extremely fertile. In virus research these techniques will be limited in their application by the difficulties of preparing most viruses, because of their small concentration in the host and their instability, in a form suitable for crystallographic studies. But with the extension of X-ray analysis to spacings as great as 1000 A. and the improvements in the electron microscope, particles of all sizes from bacteria to atoms become capable of direct examination, and a serious gap in our techniques for the examination of colloidal particles has been filled.

OBITUARIES

Captain T. A. Joyce, O.B.E.

THOMAS ATHOL JOYCE, who died at Hoveton, Norfolk, on January 3, was born in 1878, and was the eldest son of Thomas Heath Joyce, editor of the *Graphic* and the *Daily Graphic*. He was educated at Dulwich and Hertford College, Oxford, where he took his degree in 1901 and then studied Egyptology. He entered the British Museum as an assistant keeper in the Department of British and Medieval Antiquities and Ethnography under the keepership of Mr. (later Sir) C. Hercules Read. From the first he specialized in anthropology and was the first Museum officer to give his full time to the Ethnographical Collections including the American antiquities. He introduced considerable rearrangements in the Ethnographical Gallery, and prepared the greater part of the first "Handbook to the Ethnographical Collections", published in 1910 (second edition, 1925), which was essentially a condensed text-book of ethnology, liberally illustrated by specimens in the Museum. Thus he may be said to have laid the foundations of an Ethnographical Department as a distinct entity, destined, one may

hope, to take ultimate shape as an independent Museum.

Joyce's attention was at first devoted principally to Africa, and by collaborating with the late Mr. Emil Torday, he secured for the Museum a splendid and well-documented collection from certain tribes of the Belgian Congo, principally the Bushongo, which surpasses both in quantity and quality any other single collection from the African continent in the Museum. Together with Torday he prepared two important monographs of these tribes, "Les Bushongo" (1910) and "Les Basonge, etc." (1922), published in the *Annals* of the Musée du Congo Belge. Afterwards his chief interest shifted to the archæology of Central and South America, where it remained for the rest of his life. These studies were stimulated by his friendship with Sir Clements Markham and Dr. Alfred P. Maudslay, and resulted in a series of authoritative text-books: "South American Archæology", "Mexican Archæology", and "Central American Archæology", which appeared in quick succession in 1912, 1914 and 1916. These were pioneer books, which for the first time presented to the student and general reader in a handy and condensed form a great mass of archæological data, hitherto scattered in a variety of monographs in different languages and not easily accessible. Although no longer wholly up to date, they remain standard works of reference, and have not been superseded.

During the War of 1914-18 Joyce's services were transferred to the War Office, where he became hon. lieutenant attached to the General Staff in 1916, and captain in 1917, receiving the O.B.E. in 1918.

After the War, and following on Read's retirement in 1921, he became deputy-keeper of the new Department of Ceramics and Ethnography, and reorganized the ethnographical section. He arranged for the transfer of the magnificent Maudslay Collection of Maya plaster-casts from the Victoria and Albert Museum, and for their exhibition in a special room in the British Museum, while he prepared the official "Guide to the Maudslay Collection of Maya Sculptures from Central America", published in 1923 (second edition, 1938). Of a more popular character was his "Maya and Mexican Art" (*Studio*, 1927), a most informative and attractively illustrated volume.

Joyce had always wanted to do field work, but the opportunity was late in coming to him. However, during 1926-1931, he organized a succession of expeditions to British Honduras on behalf of the Museum, four of which he led in person. These produced a rich harvest of finds, particularly from the "Old Empire" sites of Lubaantun and Pusilhá, including a number of inscribed stone stelæ and a large series of pottery whistle figurines of a new type. Illustrated reports of these expeditions were published in the *Journal of the Royal Anthropological Institute*.

Ever since 1902 Joyce had been closely associated with the activities of this Institute, of which he was honorary secretary and editor during 1903-1913, vice-president, 1913-17 and 1923-25, and president, 1931-33. Throughout this period he devoted much time and energy to furthering the aims of the Institute, attended its meetings, and was a frequent contributor of original articles and reviews to its *Journal* and to *Man*. He took an active part in organizing the exhibition of "Indigenous American Art" at the Burlington Fine Arts Club in 1920, the catalogue for which was prepared by him.

He was president of Section H of the British Association in 1934, his address taking the form of an original piece of research into the origins of yerba maté or 'Paraguayan tea'. He contributed articles to the "Encyclopædia Britannica" and to a number of more popular serials such as Harmsworth's "Universal History of the World" and Hammerton's "Wonders of the Past", as well as to certain foreign scientific journals. He was honorary secretary of the Hakluyt Society in 1923. In 1938, at the age of sixty, he retired from the British Museum owing to ill-health.

In spite of his erudition in his chosen subjects of ethnology and American archaeology, Joyce carried his learning lightly, and his work was infused with an unaffected gaiety. Possessed of a happy and sociable temperament, and a ready wit, he never wearied of introducing students or visitors to his favourite subjects, or of trying to inspire in them a genuine interest in the collections under his charge; his influence led to a number of important benefactions, and was felt indirectly in many ways. As a foremost authority on all aspects of American archaeology he leaves no immediate successor in Great Britain.

It was with sincere sorrow that his many friends noted, during his latter years, the signs of failing health in a constitution never very robust. But while illness inevitably led to the curtailment of his scientific work, it never succeeded in quenching the indomitable cheerfulness of his spirit.

He is survived by Mrs. Joyce, herself a leading authority on the Latin American countries, though perhaps better known to the public under her maiden name of L. E. Elliott. He had three children by an earlier marriage.
H. J. BRAUNHOLTZ.

WE regret to announce the following deaths:

Sir William Bragg, O.M., K.B.E., F.R.S., director of the Royal Institution of Great Britain, and, during 1935-40, president of the Royal Society, on March 12, aged seventy-nine.

Prof. Lawrence J. Henderson, professor of chemistry in Harvard University, foreign secretary of the U.S. National Academy of Sciences, aged sixty-three.

Dr. George Senter, formerly principal of Birkbeck College, University of London, on March 14, aged sixty-eight.

NEWS and VIEWS

India

THE announcement made by Mr. Churchill in the House of Commons on March 11 that definite proposals have been formulated, and are being submitted to the leaders of Indian thought, for terminating the state of political unrest in that great country, will be welcomed on all sides. The Government made a pronouncement in August 1940 of the general principles upon which British rule in India was proceeding, indicating that full Dominion status would be granted as soon as possible after the War, under a constitution to be framed by Indians and acceptable to the chief elements of Indian national life, subject to the protection of minorities and to the fulfilment of Imperial obligations to the native States. This promise did not satisfy certain classes of opinion, and there has been bitter controversy, notably between the Congress party and the Moslem League. Reference has been made in NATURE on several occasions to the difficulties of the situation, and a noteworthy and constructive article on the subject by Sir Denys Bray, formerly Foreign Secretary, Government of India, appeared in NATURE of September 13, 1941, p. 301.

Mr. Churchill has now stated that the War Cabinet has agreed upon certain "conclusions for present and future action", based upon the general declaration already referred to, and Sir Stafford Cripps has volunteered to take these proposals to India. There he will strive to obtain the necessary assent to them from the chief parties of the country. In view of the grave turn taken by the War in the Far East, Sir Stafford will also consult with the Viceroy and Commander-in-Chief regarding the relation of these proposals to the defence of the country. The intervention of the War Cabinet at this critical juncture is a measure of the importance attached to the promotion of unity of purpose and action in India, and the outcome of Sir Stafford Cripps's mission will be awaited with keen interest.

Wheatmeal Flour and Bread

SPEAKING in the House of Lords on March 11, Lord Woolton, Minister of Food, announced that in order to reduce the very considerable tonnage of shipping used for the import of wheat into Great Britain, the Government has decided to increase to 85 per cent the ratio of flour from wheat milled in the country. From March 23 millers will be prohibited, except under specific licence, from manufacturing any flour other than wheatmeal flour, or some authorized speciality brown flour. This increased milling ratio entails the diversion of some of the products of wheat from the feeding of livestock to use as human food. But the change has been timed to take place when, with the approach of summer, it will not be necessary for the Ministry of Agriculture to change, from now until the end of August, the scale of rations of purchased feeding-stuffs allowed to stock and poultry feeders.

In order to absorb the stocks of white flour, no miller, factor, or importer will be permitted to deliver any white flour to any person other than a licensed baker, and then only providing that three times the quantity of national wheatmeal is concurrently delivered. Further, bakers will be authorized when producing national wheatmeal bread to include up to 25 per cent of white flour with the national wheatmeal. From April 6 it will not be permissible, except under licence, to sell any white bread, and a similar order referring to the use of flour in any other item of food will come into effect on April 20. Lord Woolton said that, while complete uniformity in the production of wheatmeal flour and bread is not possible, he is satisfied that we shall get a good bread, good in substance, good in texture, and agreeable to the palate. The composition and nutritive value of wheatmeal and similar bread have frequently been discussed in NATURE; attention may be directed especially to articles in the issues of May 31, 1941 (p. 665) and August 23, 1941 (p. 219).