

an increase in the *c* axis but not altering the lengths of the *a* and *b* axes, is, according to Sir William Bragg, "the cause of plasticity". The same structural arrangements also explain the remarkable property of 'base exchange' of some derivatives of montmorillonite clays (zeolites).

To sum up, the structures of the chief clay minerals shown in Table I enable clear, reasonable and simple explanations of the chief properties of clays to be formulated. Many details remain to be added, because it is difficult to obtain perfectly pure materials and because of the complications

due to the numerous substitutions which are usually present. Now that the general structure of clays has been so clearly elucidated, it should not be difficult to fit the details into their proper places.

All who are interested in the molecular structure of clay, whether theoretically or in connexion with the manifold uses of this very important material, should be very grateful to Sir William Bragg for his masterly solution of a problem which has, for so long, baffled many men of science.

A. B. SEARLE.

¹ *Z. Krist.*, 97, 216 (1937).

Obituary Notices

Sir R. F. Johnston, K.C.M.G., C.B.E.

WE regret to record the death of Sir Reginald Fleming Johnston, formerly commissioner for Wei-hai-wei and a distinguished Chinese scholar, which took place in Edinburgh on March 6 at the age of sixty-four years.

Johnston, who was educated at the University of Edinburgh and Magdalen College, Oxford, where he obtained a second class in the Final Honour School of Modern History, entered the Civil Service of the Hong-Kong Government in 1898 as a cadet. After serving as private secretary to the Governor and acting clerk to the Council and Assistant Colonial Secretary, he was appointed in 1904 secretary to the Government of Wei-hai-wei, then held under lease by the British Government. He remained there until 1919, when his special and profound knowledge of China and the Chinese led to his appointment as tutor to the Manchu Emperor P'u Yi, now the ruler of Manchukuo. This appointment came to an end with the flight of the Emperor in 1924. In 1926, Johnston was appointed secretary to the British Indemnity Delegation, and in the following year returned to Wei-hai-wei as Commissioner, his appointment coming to an end with the transfer of the territory to the Chinese Government. On his retirement, when he was already a C.B.E. and C.M.G., he was promoted to K.C.M.G.

On his return to England, Johnston accepted the chair of Chinese at the School of Oriental Studies in the University of London, an appointment which he held from 1931 until 1937.

As a Chinese scholar, Johnston's knowledge of the language and the people, of their ways of thought and their beliefs, was exceptionally wide, deep and sympathetic, although in this last respect it was distinctly perceptible that his understanding grew and mellowed as time went on. When he left Hong-Kong for Wei-hai-wei, he had already acquired no little insight into the widely varied conditions of life and the character of the peoples of the Far East. He made two extensive journeys of which the first in 1902 traversed Tonking, Yunnan, the Chinese Shan

States, the States of the Upper Laos and the plain of eastern Siam, ending at Bangkok. A later and more ambitious journey occupied nearly a year, during which Johnston lived for the most part in close touch with native life. This journey was described in "From Peking to Mandalay". On his transfer to Wei-hai-wei Johnston found himself in the Province of Shantung in close touch with the springs of all that is most traditional and changeless in the life of the Chinese peasantry. His studies here bore fruit in his scholarly and informative "Lion and Dragon in Northern China" (1910). This was followed in 1913 by his "Buddhist China", a sympathetic study of Chinese religious belief and philosophic thought, while his "Letters to a Missionary" (1918) affords a contrast in its trenchantly critical tone. "Twilight in the Forbidden City" (1934) records his experiences as tutor of the Emperor, whom he visited in Manchukuo in 1935, before proceeding to Mukden for the purpose of studying the archives of the Manchu.

Major F. G. Jackson

MAJOR FREDERICK GEORGE JACKSON, the Arctic explorer who died on March 13, was born in 1860 and educated at Denstone College and the University of Edinburgh. Attracted by an open-air life, he spent some time on a Queensland cattle ranch before the Arctic regions attracted his attention. A few months on a whaler in the Greenland Sea whetted his appetite and he offered his services to Nansen for the voyage of the *Fram*. But the *Fram's* complement was full and so Jackson decided to organize his own expedition. His plan was to attempt to reach the Pole by sledging north from Franz Josef Land, beyond which he, among others, believed that there existed a land which Payer, in 1873, had called Petermann Land.

In order to test equipment and to gain experience, Jackson decided first to undertake a winter journey in Arctic Russia. He began with a journey through the little-known Waigatz Island and then, failing to achieve his plan of exploring Novaya Zemlya, he