

India is the world's chief source of supply. Many of his papers in the *Records of the Geological Survey of India* also deal with petrographical problems, of which the most noteworthy are perhaps those on the mica-apatite-peridotite intrusions in the Bengal coalfields (1894) and on the origin and growth of garnets (1896). Holland also recognized early the essential identity of bauxite and laterite (*Geol. Mag.*, 1903). One of Holland's earliest papers, that on the Gohna landslip, Garhwal (*Records, Geol. Sur. India*, 27; 1894), recorded work that created a sensation with the Indian public. A landslip had thrown a dam across a Himalayan valley and created a large lake where there had been none before. Holland, who was sent to investigate, gave a middle date for the breaching of the dam and the depth to which it would be cut down when this happened. He also recommended the evacuation of the population endangered by the prospective floods some time in advance of his date. This was done, and the dam was breached on almost the exact date predicted. Holland also gave valuable advice in connexion with landslips in the hill stations of Naini Tal and Darjeeling.

The research for which Holland is best known to science is that described in his *Memoir* (28, Pt. 2, 1900) on the charnockite series, in which he described a peculiar series of granulitic rocks ranging in composition from acid to ultrabasic and forming an important part of the Archæan terrain of the Madras Presidency. The common denominator in these rocks is the presence of hypersthene; and for the type rock, a hypersthene-granite, Holland selected the name 'charnockite' after Job Charnock, the founder of Calcutta. Charnock's tomb is in St. John's Churchyard, Calcutta, and, as Holland discovered, is fashioned out of a block of hypersthene-granite brought from Madras. In Holland's view, all the members of his charnockite series are consanguineous and form a petrographic province of genetically related plutonic igneous rocks. Similar rocks have been found since in other countries, for example, Antarctica, West Africa and Uganda, and their origin has for many years been a matter of controversy. Whatever may be the final verdict on the origin of this interesting suite, there can be no doubt as to the importance of Holland's work thereon, and of the stimulus it imparted in many countries to the study of their hypersthenic rocks, and in India to that of the Archæan terrain in general.

Whatever Holland wrote, whether in official correspondence, or for publication, was precise and clear, and often trenchant. His presidential addresses to learned and technical societies never went into details, but always dealt with broad outlines, so that they were of widespread interest. In his earliest such address (that to the Mining and Geological Institute of India in 1906) he proposed a new scheme for classifying the geological formations of India, holding that the main divisions suitable for Europe, where stratigraphical nomenclature originated, were not suitable for Gondwanaland with its very different geological history. Thus came to be introduced the terms 'Aryan', 'Dravidian' and 'Purana', with Archæan at the base, for the larger subdivisions of the geological column in India. This interest in stratigraphical nomenclature caused Sir Thomas after his first retirement from India to write his "Indian Geological Terminology" (*Mem., Geol. Sur. India*, 43, Pt. 1; 1913), in which he was helped by the late Mr. G. H. Tipper (see *Nature*, June 21, p. 834), and of which a second edition appeared in 1926.

In his first address as president of the Geological Society of London (1933), Sir Thomas discussed "The Geological Age of the Glacial Horizon at the Base of the Gondwana Systems", showing that this horizon is one of the most important datum lines of the geological column. In his second address (1934) he took as his theme the ideal composition and minimum strength of a geological survey department if it was to be fully efficient. This address has been, and is likely in the future to be, of great use to directors trying to convince their Governments of the needs of their departments. In his address as president of the Geological Section of the British Association in Australia in 1914, Sir Thomas reviewed recent advances in developing theoretical conceptions regarding the interior of the earth that are of direct importance to geologists. In his address as president of the Association at Johannesburg in 1929 he discussed "The International Relationship of Minerals". Sir Thomas was greatly interested in the impact of the economics of mineral deposits upon national and international affairs, as was shown by this and other addresses, and as was summarized in a small book entitled "The Mineral Sanction as an Aid to International Security" (Oliver and Boyd, 1935), in which he showed, before the recent War, that if the British Commonwealth, the United States of America and the U.S.S.R. were to adopt a common policy on the export of minerals of use for munitions purposes to potentially aggressor countries, such as Germany and Japan, the outbreak of war could be prevented.

As will be judged from the foregoing, Sir Thomas Holland was a man of outstanding ability and energy. His worship of efficiency meant that he could not suffer fools, and that in his official relations his reactions to his colleagues and subordinates were mainly determined by his desire for efficiency, with handsome recognition of good work. But in private life Holland could be a delightful companion, especially as he was a good *raconteur* with an endless fund of amusing stories.

Holland married first, in 1896, Frances Maud (who died in June 1942), daughter of the late Charles Chapman, Deputy Commissioner in Oudh, and by this marriage he had one son (now Major-General John F. C. Holland) and one daughter (Margaretta, widow of Col. A. G. Shea); and secondly, in 1946, Helen E. Verrall, of Bramley, near Guildford.

L. L. FERMOR

Prof. F. Pavlíček

PROF. FRANTIŠEK PAVLÍČEK, who died on January 4 at the age of seventy-two, was one of Brauner's earlier pupils. Brauner and Pavlíček undertook in 1900 the revision of the atomic weight of lanthanum, and their results were eventually published in the *Transactions of the Chemical Society* in a lengthy paper. The figure they obtained, 139.04, is still accepted. Most of Pavlíček's later work was connected with mineralogy, fuel technology and thermochemistry, since he held appointments first at a technical college in Brno and later at the Příbram School of Mines in South-West Bohemia. These investigations, mostly published in Czech, relate to the calorific values of various coals (including local lignites) and the utilization of coal gas, industrial gases and coke in metallurgy. Prof. Pavlíček also wrote, in 1927 and 1931, the standard Czech work on the chemistry of coal. J. G. F. DRUCE