

1.5 million volts, and a larger apparatus is under construction with which they hope to obtain a potential of 15 million volts to apply to a large vacuum tube. Brasch and Lange have applied high momentary voltages to a discharge tube by using an impulse generator.

A new and ingenious method of multiple acceleration has been devised by Lawrence of the University of California with which he has already obtained protons of energy 1.5 million volts by using a potential less than 10,000 volts. The transformation of lithium has been examined at this high energy using a proton current of about a thousandth of a micro-ampere. It is hoped to develop this method so as to obtain protons of energy as high as 10 million volts or more.

Even if these new projects prove successful, the speeds of particles produced by their aid are much smaller than those observed for the very penetrating radiation in our atmosphere, where electrons and protons of energy from 200 million to 2,000 million volts are present. From the experiments of Anderson in Pasadena and Blackett and Occhialini in Cambridge, it seems certain that these very swift particles are very efficient in causing the transformation of nuclei, probably in novel ways. Strong evidence has been obtained of the production of a new type of positively charged particle which has a mass small compared with that of the proton. This may prove to be the positive electron, the counterpart of the well-known negative electron of light mass.

Obituary

DR. C. A. BARBER, C.I.E.

WITH the passing on February 24 of Charles Alfred Barber is severed a link with the past, for he belonged to that old school of scientific investigators who were the first to turn their attention to the problems lying behind development in tropical agriculture. When he gained his first acquaintance with it, there was an awakening to the fact that a harvest does not necessarily follow planting. In the East, Ceylon had gained experience from coffee; in the West, Harrison and Bovell had pointed the way to a healthier growth of cane.

This, as yet dim, appreciation of the need for investigation, led to Barber's first appointment in 1891 as superintendent of agriculture in the Leeward Islands where, however, his stay was brief, for the post was abolished in 1895. In 1898 he was appointed Government botanist, Madras, and, as director of the Botanical Survey of Southern India, commenced to complete the flora of southern India. But here, as in the West Indies, the need for investigation of the economic crops was slowly gaining recognition and his attention was soon diverted to the study of cane and crops in general. These were the days before the Royal Commission of 1896 had led to the establishment of the Imperial Department in the West Indies and before the organisation of an agricultural service in India. It is to Dr. Barber, not least among the pioneers of this period, and to the practical benefits of his work, that the present-day scientific worker in this field largely owes his security in a firmly established service scattered throughout the tropical parts of the British Empire.

During this earlier period, Barber found time to carry out a detailed investigation of the haustoria of sandal and other plants for which he was awarded, in 1908, the degree of Sc.D. of the University of Cambridge. But the earliest economic problem to receive attention was that of the sugar cane disease which was creating anxiety in Madras. In 1912, when the Cane-breeding Station was

opened at Coimbatore, the selection fell on him for the post of sugar cane expert, and his field of investigation was extended to cover the whole of India. The problem that faced him was unique. The main cane tract of India lies outside the tropics where, for climatic reasons, the plant forms no viable pollen. Seedlings had to be raised outside the tract and no mean questions of testing and introduction were raised. There was the further fundamental question of the parental type to be used to impart the resistance to frost and drought necessary for success. Through a detailed study of the Northern Indian canes he was attracted to Katha, a hardy Punjab cane, and its similarity to *Saccharum spontaneum*, the wild Kans. He was led to use this wild plant as one parent and, by crossing it with a Noble cane, raised seedlings of which Co.205 remains as testimony to his originality of thought. In its wider aspect his study led him to a classification of the Indian canes, to which he ascribed a dual origin. Again it is a tribute to his insight that this classification, based on a morphological study, has required so little modification from the later Dutch cytological investigations.

Original, too, was Barber's recognition of the importance of the root in the economy of the plant and of the need for a detailed study of the root system. For his services to India he was created a C.I.E. in 1919 on retirement and, in 1931, was awarded the Maynard Ganga Ram prize for Indian research.

Born in 1860 at Wynberg in South Africa, Barber came to England at the age of ten years. After five years' service in the Manchester and Liverpool District Bank, he entered Christ's College, Cambridge, of which he became a scholar. In 1889 he was appointed University demonstrator in botany and, before proceeding to India, served on the staff of the Royal Engineering College, Coopers Hill, where he succeeded the late Prof. H. Marshall Ward.