

Babcock and Wilcox boilers, supplying steam to seven generating sets. The dynamos were coupled directly to Willans central-valve high-speed engines. Three sets were designed to give 500 amp. at 100 volts and four sets 500 amp. at 200 volts. Vibration troubles were avoided by fixing the sets to massive concrete foundations kept clear of the buildings.

Meters were rented to customers and the current was distributed by bare copper strip conductors fixed to porcelain insulators in subways in the

streets. To ensure continuity of supply, a large battery of accumulators was installed. Current was supplied to a certain number of houses in 1886, by 1887 the company was making a profit, and later on another station was erected at Chapel Place, Knightsbridge. As the demand increased, a still larger plant was built at Wood Lane, Shepherd's Bush. This was put into operation in 1901, and soon afterwards the original steam plants in Kensington and Knightsbridge were shut down.

Obituary.

MAJOR T. F. CHIPP.

IN writing an account of the life and labours of those who truly may be said "to have finished their course", after having enjoyed the allotted span and seen the fruit of their work, there is, despite the sadness, an element of satisfaction and the fitness of things. But in the case of one of much promise, suddenly removed in the prime of life and with every prospect of a distinguished and useful career in the future, feelings of grief and sadness predominate and render the task of writing any adequate tribute both painful and difficult.

The tragically sudden death of Major Thomas Ford Chipp, assistant director, Royal Botanic Gardens, Kew, is such a case. Born on Jan. 1, 1886, he died on Sunday evening, June 28, at 9 P.M., shortly after returning to his house. Chipp was thus in the prime of life, tall, strong, vigorous, always happy and cheerful, filled with enthusiasm for his work, and deeply interested in the many duties which fall to the lot of Kew's assistant director. Through his varied colonial and War experiences he had gained a wide knowledge of men and affairs, and in addition he was a man of sound judgment and commendable tact; he was endowed with a very pleasant personality, which, during his nearly nine years' service at Kew as assistant director, had endeared him not only to his scientific colleagues but also to all the student gardeners and the whole of the Kew staff. In the larger botanical world both at home and abroad he was highly esteemed, and this was clear at the International Botanical Congress held last year at Cambridge, and is also borne out by the many letters which have reached Kew. The untimely death of a man of his calibre and powers, when men of this type are all too rare, is a greater loss than Kew has ever before been called upon to bear. His death will be equally a very severe loss to the botanical work of the Empire centred at Kew.

Chipp was the son of Edward Thomas Chipp, chief constable of Gloucester. He received his early education at the Royal Masonic School, Bushey, and there he quickly developed his taste for natural history and served as secretary to the school natural history society. This inclination towards science led him to look to horticulture for a career, and, after a period of service in the gardens of Syon House, he entered Kew in 1906 as a student gardener. After a few months in this capacity, he was selected, owing to his marked ability, for one

of the temporary technical assistant posts in the herbarium, where he remained until 1908. During this period he prepared himself, in his spare time and with very limited means, for the B.Sc. examination, University of London, which he passed in 1909 with honours in botany. He then received an appointment as demonstrator in botany at Birkbeck College, and in 1910 was appointed an assistant conservator of forests in the Gold Coast. Before proceeding to West Africa, he spent a year studying forestry in Germany and the Federated Malay States.

In 1914, Chipp was appointed assistant director of the Botanic Gardens at Singapore, but the War starting while he was in England *en route* for the Straits Settlements, he at once sought permission to rejoin his territorial regiment, the 8th Middlesex, in which he had held the rank of captain. With his regiment he proceeded to Gibraltar and afterwards to France, where he served continuously until 1919, being ultimately attached to the staff with the rank of major, and was awarded the Military Cross. In 1919 he went to Singapore to take up the post of assistant director to which he had been appointed five years earlier.

Chipp's good work while assistant conservator of forests in the Gold Coast had been duly noted, and in 1921 he accepted the invitation from the Gold Coast to be deputy conservator of forests in the colony. His career both at home and in the colonial service had naturally also been closely followed at Kew with interest and appreciation, and on the retirement of Sir David Prain in 1922 and the promotion of the present director, Major Chipp was invited to occupy the vacant post of assistant director of the Royal Botanic Gardens, Kew, and assumed office on Aug. 1, 1922.

Chipp was never idle, and his first scientific contribution of importance, "A Revision of the Genus *Codonopsis*", was made to the Linnean Society of London in March 1908. His university studies and forestry training during the next few years prevented him from carrying out any original work of importance, but on reaching the Gold Coast he soon produced the very useful "List of Trees, Shrubs and Climbers of the Gold Coast, Ashanti and the Northern Territories", in 1913, and a similar "List of the Herbaceous Plants and Under Shrubs" in the following year. Shortly after his return to the Gold Coast, in 1921, he published a "Forest Officers' Handbook of the Gold Coast,

etc." (1922), which won him the London degree of Ph.D. The War period naturally precluded any possibility of scientific activities, but it is characteristic of Chipp's unbounded energy that, directly he took up his duties at Singapore, he set to work and contributed many articles to the *Gardens Bulletin* of the Straits Settlements; among the more important of these are his papers on "The Fungi of the Malay Peninsula".

When he became assistant director at Kew, in 1922, Chipp used any spare moments for carrying on the researches he had initiated during his second period of service in West Africa, and published some useful papers in the *Kew Bulletin*. He became a recognised authority on vegetation studies, and was honorary secretary of the British Empire Vegetation Committee. In this connexion he edited, with Prof. A. G. Tansley, the very valuable book, "Aims and Methods in the Study of Vegetation" (1926), which is recognised as the leading book on the subject. To this book he contributed the chapter relating to the tropical countries. As honorary secretary of this Committee, he devoted much labour to reading, digesting, and reviewing numerous publications relating to the vegetation and ecology of the Empire. His more recent book, "The Gold Coast Forest: a Study in Synecology", published in 1927, is a valuable contribution on original lines. This work formed his thesis for the degree of D.Sc.

At the beginning of 1919, Chipp was sent to Cyprus and the Sudan by the director of Kew, on the invitation of the respective Governments, and the reports on his visits were of great value and highly appreciated. While in the Sudan, he was able to ascend the scarcely known Imatong Mountains, on the Uganda border, making a careful study of the flora and bringing home large collections. An account of the botany of the region was published in the *Kew Bulletin* in 1929, and a more general account of his tour, entitled "Forests and Plants of the Anglo-Egyptian Sudan", appeared in the *Geographical Journal* for February 1930.

Chipp was co-secretary, with Mr. F. T. Brooks, of the Fifth International Botanical Congress, held at Cambridge last year. The organisation of this large Congress and the subsequent editing of the various reports entailed a vast amount of labour for the secretaries, and the perfection of the arrangements, and the smoothness with which the heavy programme was carried through, showed again the care and thoroughness which appeared in all Chipp's work. The preparation and publication of a new International Address-book of Botanists, decided upon by the Congress, was entrusted to an international committee consisting of Major Chipp, Prof. Diels of Berlin, and Dr. Merrill of New York. A great deal of the work of collecting information, and all the labour of final collation and the arrangements for publication, had been almost completed by Chipp with his usual ability just before his death, and the work is now in the printer's hands.

Early last year, after attending the French Government celebrations in Algeria, Chipp was invited to accompany Mrs. MacIver's expedition into the Central Sahara, and made a careful study of

the vegetation; his account of the scientific work of the expedition will be found in the August number of the *Geographical Journal*.

Chipp by his extensive travels in northern and western Africa had thus become one of the recognised authorities on the botany of this extensive region. His last paper, "The Vegetation of Northern Tropical Africa", which is about to be published in the *Scottish Geographical Magazine*, was delivered in the form of lectures given in March last at Edinburgh, Dundee, Aberdeen, and Glasgow. His untimely death is thus not only a great loss to Kew but also to botany. He was indeed a man whose like it will not be easy to find.

A. W. H.

BARON KITASATO, FOR.MEM.R.S.

By the death of Prof. Kitasato on June 14, Japan has lost its foremost bacteriologist and the medical world one of its most successful workers.

Kitasato made several discoveries of first-rate importance. In 1889 he cultivated, for the first time in a pure state, the bacillus of tetanus, and clearly demonstrated the pathology of the disease, lockjaw, to which it gives rise. In 1890, Kitasato, conjointly with Emil Behring, made the great discovery of antitoxin in the blood of animals immunised against tetanus toxin, and thus laid the basis of serumtherapy. In 1894, Kitasato discovered, isolated, and cultured, for the first time, the bacillus of plague, and in a very exact manner and in an incredibly short time worked out the chief features of this organism so completely as to leave little for his successors to do on the pure bacteriology of plague. Kitasato published many other researches in German and Japanese. In all of his works available to readers of European languages he had always something fresh, and his results, obtained by exact methods, well recorded, have stood the test of time.

Shibasaburo Kitasato was born in December 1852 in the Kumamoto præfecture on the island of Kiushiu. He died in his seventy-ninth year. He studied medicine at Tokyo and graduated there in 1883. He was early a man of promise and (1885) was sent by the Japanese Government to Europe to study bacteriology and epidemiology. He settled at Berlin in the Hygienisches Institut under Robert Koch, then in the zenith of his powers. Kitasato remained six years with Koch. He was a man of exceeding diligence and worked in a room by himself all day and every day. He soon made himself master of the very exact bacteriological technique elaborated by Koch, and he owed a good deal of his subsequent bacteriological successes to his training in Berlin. During the German period of his life, Kitasato published a long series of bacteriological researches. They were almost uniformly good and some were brilliant. Kitasato set himself problems, performed the necessary, often laborious, experiments for their solution, made the correct inferences, and set out his results in model form for others to study and repeat. There was nothing 'woolly' about his work.