OBITUARY NOTICE.

HORACE TABBERER BROWN.

BORN *July 20th, 1848.* DIED *February 6th, 1925.*

H. T. BROWN was the posthumous son of Benjamin Tabberer and he assumed the surname of his stepfather, Edwin Brown of Burton-on-Trent, a banker, and in his leisure hours a naturalist of considerable attainments, who, by his sympathy and encouragement, exerted a great influence on the life of his stepson. At the early age of 12 Brown became interested in science. At the time he was receiving a grammar school education he realised that in chemistry he had found his *métier* and he devoted most of his time to acquiring knowledge in this direction. His interest in chemistry was fostered by Böttinger and Griess, who were then in Burton. In 1865 Brown became a student at the Royal College of Chemistry at Oxford Street, Hofmann still being professor there. One of the junior assistants at the College was Cornelius O'Sullivan and a fellow-student of Brown's was his lifelong friend Dr H. E. Armstrong.

After two terms at the College of Chemistry Brown entered in 1866 the brewery of Worthington & Co. His first scientific work was concerned with analyses of the Burton waters and the treatment of crude sewage. At the age of 25 he became manager of the whole of the manufacturing department, a post he occupied until 1889 when he was appointed a managing-director. As there was but little time to spare for laboratory work Brown selected John Heron as his assistant. The first fruits of this combination was a re-examination of the whole question of starch and its transformation. This work on starch was continued for many years in collaboration successively with J. Heron, G. H. Morris, J. H. Millar and others. In all some nineteen papers were published on this fascinating and intricate subject.

In 1883 Brown took up the study of geology, being led to it by some pressing requirements in connection with the water supply of Burton. The result of this work, which entailed a good deal of field surveying, was embodied in a paper on the Permian Rocks of the Leicestershire Coalfield. He appeared to have felt that too much of his time was being spent over geology in view of the many other problems which suggested themselves to him. The malting process in those days was completely empirical and Brown turned his exclusive attention to the physiology and anatomy of germinating seeds and their bearing on industrial malting.

In 1890 he and Morris published in the *Journal of the Chemical Society* their classical work on "Researches on the Germination of the *Gramineae*,"

a paper which he regarded as his most important and original effort. The results of this work were far reaching and it affords a good example of the manner in which a careful study of an industrial process can react on pure science. In 1893 Brown found that hop strobiles contained a diastatic enzyme and this fact was the starting point of his work connected with the chemistry and physics of assimilation in green plants. In 1893, with Morris, a paper entitled "A Contribution to the Chemistry and Physiology of Foliage Leaves" was read before the Chemical Society, and this was the last work carried out at Burton.

Not long after his arrival in London Brown engaged J. H. Millar as his chemical assistant and the work on starch and its products of transformation was continued, the results being published in a well-known series of papers in the *Journal of the Chemical Society*. Brown also at this time, in conjunction with the late Spencer Pickering, investigated the thermo-chemistry of carbohydrate hydrolysis, which afforded interesting results. With F. Escombe he studied at the Jodrell Laboratory, Kew, some of the outstanding problems connected with the germination of barley. The work on the assimilation of atmospheric CO_2 by green leaves was continued and this led to a study of the phenomena of the diffusion of gases and liquids. The work was of great, if not of fundamental, importance, since it showed how it was possible to account for the sufficiently rapid ingress of atmospheric CO_2 necessary for the formation of carbohydrate on the assumption that the interchange of gases between the leaf and the outer air took place only through the stomatic openings and not through the whole area of the epidermis, a conclusion also reached by F. Blackman by the aid of a series of very beautiful experiments. They also attempted to determine the mode of interchange of energy between the leaf and its environment and an endeavour was made to ascertain what proportion of the solar radiant energy is actually utilised by the chloroplasts in carbohydrate production within the leaf. The results were embodied in the Bakerian Lecture for 1905.

In 1901 Brown established the Guinness Research Laboratory in Dublin for the purpose of studying some of the more important problems connected with the brewing business of that firm. Much of the purely scientific portion of the work was printed for private circulation. Between the years 1907 and 1913 three papers were published in the *Journal of the Institute of Brewing*, on the "Nitrogen Question in Brewing," some of which had important technical applications.

It is significant of Brown's remarkable energy and spirit of enquiry that during occasional visits extending over a number of years to a fruit and wine farm he acquired for one of his sons in Cape Colony, he introduced modern methods for increasing the yield of deciduous fruits by artificial cross-fertilisation of the trees. He also succeeded in improving the methods of wine-making at the Cape and published an account of his investigations on this subject in the *Journal of the Institute of Brewing* (1914).

In 1908 he was appointed a member of the Royal Commission on Whisky and Potable Spirits, and in 1909, in conjunction with the late Sir Edward Thorpe, he investigated the method of determining the original gravity in beers. This enquiry involved a great amount of work in a number of breweries in different parts of the United Kingdom and the final results were published in a series of reports. Corrected tables for the determination of original gravity were constructed and their use became official. In 1918 Brown read his last paper to the Chemical Society on his work on Diffusion.

From the years 1870 to 1918 Brown published 90 papers and memoirs, not a few of them being regarded as classics. The value of his work was recognised and his election as a Fellow of the Royal Society in 1889 was the forerunner of a number of subsequent distinctions. He was awarded the Longstaff Medal of the Chemical Society in 1894, a Royal Medal of the Royal Society in 1903 and the Copley Medal in 1920. For a time he was Treasurer and afterwards Foreign Secretary of the Chemical Society, and only failing health prevented him from accepting the Presidentship of that Society.

JULIAN L. BAKER.