

gave his time to teaching and research in vegetable physiology. The results of his experience in this direction appear in the well-known manual of "Practical Physiology of Plants" by himself and the late E. H. Acton, published in 1904; and he also brought out a stimulating work upon the "Elements of Botany," designed for the medical course in elementary biology. Though not what would be called an eloquent lecturer, Darwin always aroused great interest in the subjects that he taught, and by his great kindness of heart, by his clear understanding of the difficulties of a student, and by the minute and painstaking care that he devoted to their explanation, he won the affectionate esteem of many generations of undergraduates.

During this period Darwin published his first paper on the transpiration of plants, and so entered the field which was to include his major experimental work. In this paper, with R. D. Phillips (1885), he introduced his own particular form of the potometer for measuring the rate of uptake of water by a cut shoot so expeditiously that several readings might be taken within a minute. In 1893 there followed an attractive piece of work upon the growth of large gourd fruits, recorded by a weighing mechanism designed by his brother Horace Darwin. This demonstrated the extent to which the fruit, on the plant, might actually lose weight when the leaves associated with it were transpiring water actively. In 1897 he described a quite new instrument—the horn hygroscope—for investigating the rate of transpiration from living leaves. This ingenious device made use of the strong curvature of a shaving of horn when one side is exposed to more humid air than the other. It can be applied to leaves on the plant with the minimum of disturbance; and Darwin's big paper of 1898, entitled "Observations on Stomata," contains an extensive study of the effect of external conditions on the rate of transpiration made with this hygroscope.

In 1911, in association with Miss D. F. M. Pertz, Darwin described yet another simple instrument for studying transpiration. His porometer measures, not the water vapour given off from the leaf, but the openness of the stomata, since it determines the rate at which air can be drawn through the pores of the stomata under a standard suction. It can be attached to leaves upon the plant; and it has been widely used by subsequent investigators.

The other field of physiology in which Darwin specialised may be considered as an extension of his early studies at Down on the movements of plants. He published a certain amount of experimental work in support of the localisation of sensitiveness to the factors producing curvature of growing organs, and he was a staunch exponent of the statolith theory of "geo-perception."

Darwin's greatest service to science, perhaps, was the "Life and Letters of Charles Darwin," a biography which may rank with the best that have ever been written. It gives the clearest possible picture of Charles Darwin as a man and as an enthusiastic student of science, tracing in a masterly way the gradual development of his views upon evolution and upon other subjects, while at the same time keeping the actual author of the work in the background, and leaving his character to be traced only from the general style, and the occasional references in letters. A con-

tinuation, or expansion, of this work was later published as "More Letters of Charles Darwin" by Francis Darwin and A. C. Seward.

President of the British Association at Dublin in 1908, Darwin devoted his address to the subjects of his own researches, especially bringing forward his since little accepted hypothesis of unconscious memory or habit in the development of plants and their movements. He received honorary degrees from his own University and also from St. Andrews, Dublin, Liverpool, Sheffield, Brussels, Upsala, and Prag. He served twice upon the Council of the Royal Society, and was its foreign secretary from 1903 until 1907, and vice-president 1907-8. He was knighted in 1913. A keen musician, and a kindly host with a strong sense of humour, Darwin was regarded with affectionate respect by great numbers of people.

#### MR. F. J. BRODIE.

MR. F. J. BRODIE, who entered the Meteorological Office in April 1869 and retired in December 1919, after fully fifty years' service, died on August 29 in his seventy-third year. He was principal forecaster for many years, and was essentially a forecaster of the old type, basing his predictions strictly on past experience, with a thorough grip of weather changes and their controlling features, whereas the present-day forecasters work on a somewhat more strictly scientific basis.

Mr. Brodie was for many years an active fellow of the Royal Meteorological Society, and he contributed numerous papers to the Quarterly Journal of the Society, dealing chiefly with fogs and gales; "Prevalence of Fog in London, 1871-1890," and "Prevalence of Gales over the British Isles, 1871-1900," being of especial importance. He was a prolific worker and writer, communicating regularly to *Symons's Meteorological Magazine*, now the *Meteorological Magazine* issued by the Air Ministry. He was the principal forecaster throughout the War, the period involving much responsibility, and the especial duties required were at times ill supplied with necessary meteorological data, and under such conditions Mr. Brodie's long training and experience were of the utmost value. He continued his official position until two years after the age limit. Mr. Brodie's health failed considerably during the last two or three years of his life. He was greatly respected by his colleagues, and many who were associated with him in the early days of the Meteorological Office, as well as those working with him in more recent years, can testify to his amiability of character and his willingness at all times to help forward the development and better understanding of meteorology.

WE regret to announce the following deaths:

Prof. A. A. Friedmann, Director of the Central Geophysical Observatory of Russia, on September 16, aged thirty-seven years.

Prof. Andrew Gray, F.R.S., emeritus professor of natural philosophy in the University of Glasgow, on October 10, aged seventy-eight years.

Dr. C. F. Sonntag, prosector to the Zoological Society of London, on October 10, aged thirty-seven years.