

ment with the Geographical Section, General Staff, War Office, where he acted as adviser on all matters of a geodetic nature. He remained in this appointment until 1936 when he retired on reaching the age limit. During this period he acted as one of the joint secretaries of the Colonial Survey Committee, now the Colonial Survey and Geophysical Committee, and in this way came into contact with surveyors from all over the Empire and with the problems that confront them, while his name became generally known as that of a geodesist of outstanding ability. He was also secretary of the Air Survey Committee from the time of its foundation in 1922, and he attended, as one of the British delegates, the various triennial assemblies of the International Union of Geodesy and Geophysics, that were held after the conclusion of the last war.

In 1931, as a result of a recommendation made at a Conference of Empire Survey Officers, it was decided to found a semi-official journal—the *Empire Survey Review*—in which articles and papers on survey and geodetic problems could be printed and circulated among Colonial and Empire surveyors. The editorship of this Review was offered to McCaw and he remained editor (and, it might be added, chief contributor) until the time of his death.

McCaw's ability and mathematical attainments were great and he was the author of numerous papers. Most of his writings are contained in official publications or in the pages of the *Geographical Journal* or the *Empire Survey Review*. His able report on the Trigonometrical Survey of Fiji has already been mentioned. He also had much to do with the preparation of reports and textbooks issued by the Geographical Section, General Staff, such as the "Report of the Measurement of an Arc of Meridian in Uganda," "Manual of Map Reading, Photo Reading and Field Sketching," etc. He also collaborated with F. A. Cazalet in the translation from the German of Dr. O. von Gruber's well-known book on *Photogrammetry*, which was published in 1922.

McCaw was a man of strong personality and great personal charm of manner. His mathematical skill and his mastery of all that pertained to his chosen subject became universally recognised and appreciated by his professional colleagues; his advice on all sorts of survey and geodetic problems was in constant demand, and, when asked for, was freely and generously given. Wherever he went he was liked, respected and admired, and he will be missed, and his death regretted, by a host of friends scattered all over the world.

He was elected a Fellow of the Society on 1906 March 9.

J. CLENDINNING.

THEODORE EVELYN REECE PHILLIPS was a son of the Rev. Abel Phillips and was born at Kibworth, Leicestershire, on 1868 March 28. He was educated at Yeovil Grammar School and at St. Edmund's Hall, Oxford, where he took his B.A. in 1891. In the same year he was ordained and became curate at Holy Trinity, Taunton. Taking his M.A. degree in 1894, he was appointed in 1895 to the curacy of Hendford, Yeovil, at that time his father's parish. Here he stayed until 1901, when he took a curacy at St. Saviour's, Croydon. In 1906 he became curate at Ashted, Surrey, where he remained until 1916, when he was appointed vicar of the neighbouring parish of Headley. Early in 1940 his health began to break down and he resigned the living in 1941 January. After little more than a year, spent in retirement at Walton-on-the-Hill, near Headley, he died on 1942 May 13, in his seventy-fifth year.

Phillips's astronomical career dates from the period of his first curacy. At that time he was already actively interested in meteorology, and in 1895 a member of his congregation, knowing of his scientific leanings, made him a present of a 3-inch Grubb refractor. By the following year he was in possession of a 9¼-inch altazimuth reflector and had started serious work on the planets. Later, while at Ashted, he replaced the 9¼-inch with a 12¼-inch Calver equatorial, and in 1911 erected there an 8-inch Cooke equatorial refractor (the Coleman telescope) which had been lent to him by the Society.

This instrument, with its excellent mounting and clock-drive, he found more suited to micrometrical work on the planets than the reflector, and with it he also embarked on a regular programme of double-star measures, the fruits of which are shown in a long series of communications, made annually to the *Monthly Notices*. This work was done with characteristic care and accuracy and, as regards the closer pairs, probably marks the limit of what can be usefully achieved in this direction with a relatively small instrument. He continued to use the 12 $\frac{1}{4}$ -inch, with the 8-inch, for the planets until 1927, when he substituted, on the same mounting, the 18-inch With reflector that had been lent to him some years earlier by the British Astronomical Association.

It is as a planetary observer and draughtsman that Phillips will be chiefly remembered. His work on Jupiter was especially outstanding, and was probably more thorough and extensive than that of any of his predecessors or contemporaries. For thirty-three years, from 1900, he directed the Jupiter Section of the British Astronomical Association, and the results of his work are to be found in the sectional *Memoirs* published during that period. In his study of the surface-currents of the planet he made more than 30,000 separate observations of the transit times of various markings, besides making regular measures of the latitudes of the belts with the micrometer of the 8-inch refractor.

Though the name of Phillips will always be particularly associated with Jupiter, his work on Mars was, in the opinion of many, at least as distinguished. He observed the planet at every opportunity during all the oppositions from that of 1896, and his drawings, made most skilfully with pencil and stump, were certainly among the most beautiful and accurate of those adorning the *Memoirs* of the Mars Section of the B.A.A. But the great majority of his sketches, of both Mars and Jupiter, remain unpublished in his manuscript note-books. Like his measures of double stars, they show the extreme limits attainable with moderate apertures by an observer of really high skill, and each is a model of what a planetary drawing should be.

In the midst of his work on planets and double stars, Phillips found time to make occasional estimates of faint variable stars; but he was not a regular worker in this field, and his outstanding contribution to variable-star astronomy consists of a theoretical investigation of the light-curves of about 80 long-period variables, published in the form of a Presidential Address to the British Astronomical Association in 1916. By this research, undertaken at the instigation of the late Professor Turner, he succeeded in demonstrating that the long-period variables tend to fall into two groups, as shown by harmonic analysis of their light-curves.

Phillips was not a serious or regular eclipse observer, but he went to Spain for the eclipse of 1905 August 30; to the U.S.A. for that of 1932 August 31; and to the Mediterranean for that of 1936 June 19. On all three occasions he was favoured with good weather conditions, but he was unlucky in Yorkshire in 1927.

Quite apart from his original contributions to Astronomy, both observational and theoretical, Phillips did much to popularise the science by the lectures which he gave in various parts of the country over a period of many years. He had a vigorous, almost dramatic way of presenting the subject, and his infectious enthusiasm was the means of bringing many a useful recruit to the ranks of the serious workers in astronomy.

Throughout his astronomical career he maintained his early interest in meteorology, keeping regular records of temperature and rainfall, which he subjected to harmonic analysis shortly before his death.

His contemporaries were not slow in recognising his merits and ability, and probably not a few would be inclined to regard him as in some respects the most distinguished amateur astronomer that our country has ever produced. Many well-deserved honours and appointments came to him in the course of his active career. He served almost continuously on the Council of the Society from 1911 until his death, was Secretary from 1919 to 1925, and President from 1927 to 1929. He was awarded the Jackson-Gwilt Medal of the Society in 1918, and in 1930 received the Goodacre Medal of the