

of the Pacific at an informal meeting of the directors of the society held at the Students' Observatory, Berkeley; this was a momentous day for him. The main work undertaken at Lick by Adams was on the determination of the Moon's place by photography, but although he showed how this could be done successfully he did not follow it up on his return to New Zealand, mainly owing to lack of instruments.

Associations were again renewed when Adams, accompanied by his wife, joined the Crocker Eclipse Expedition led by Dr Campbell, to Wallal, Western Australia, for the eclipse of 1922 September 21. Here he was entrusted with the time signal and meteorological work of the expedition, as well as with the programme with the 40-foot camera. As a boy he had witnessed the New Zealand eclipse of 1885 September 8, and after the 1922 eclipse he was destined to lead the New Zealand expedition to Niuafo'ou Island in the Pacific for the eclipse of 1930 October 21. The party used a 19-foot coronagraph and a coelostat lent by the Society, and excellent photographs were obtained.

The effect of his long period as a surveyor showed itself in his astronomical outlook. He was more at home with a transit instrument and a computing machine than with any physical aspect of astronomy. His inclinations and talents were such that had he been given the opportunity he would have made worthy contributions to meridian astronomy. Computing comet orbits and ephemerides interested him greatly, and his contribution to this work is the use of the quantities P_x, P_y, P_z and Q_x, Q_y, Q_z for the heliocentric equatorial coordinates of a comet (*J.B.A.A.*, **32**, 231, 1922).

Many young astronomers owed their initial interest in astronomy, particularly on the computing side, to him, among them being L. J. Comrie, who became a professional computer. He showed a great willingness to make anything available to anyone who was interested in astronomy. In this manner, together with several enthusiastic amateurs of the time, he founded the New Zealand Astronomical Society in 1920; as Secretary over a long period and President on two occasions, he guided its destiny to within a few years of his death.

Through his efforts a 9-inch photovisual refractor was purchased by the Wellington City Council and an unpretentious but useful galvanized iron building known as the Wellington City Observatory was officially opened on 1924 August 26. He acted as Honorary Director for the whole of its existence and made the telescope available to anyone willing to use it. For many years he endeavoured to have a fund held by the New Zealand Institute (now the Royal Society of New Zealand), known as the Carter Bequest, used for its purpose of building a suitable observatory. With the help of many others inspired by him, his ambition was realized when the Carter Observatory was officially opened on 1941 December 20, replacing the old City Observatory. He became one of the original members of the Observatory Board.

For some years he was secretary and then a council member of the Wellington Branch of the New Zealand Institute; he also held office in the astronomical section of the same body.

He was a prominent Freemason, being initiated in Scinde Lodge, Napier, in 1898. Upon coming to Wellington he joined Aorangi Lodge, and was installed as Master in 1908. From 1910 to 1941 he acted almost continuously as secretary.

He was elected a Fellow of the Society on 1909 November 12.

I. L. THOMSEN.

CHARLES FREDERICK BUTTERWORTH was born on 1870 November 29 at Stretford, Lancashire, receiving his education in Manchester. He himself wanted to study chemistry but owing to the wish of his father, Francis Joseph Butterworth,

he entered the cotton trade instead, leaving school at the age of 15 and working his way up through all the grades of this business.

His astronomical interests must have begun early for he was a foundation-member of the Société Astronomique de France which was founded in 1887. It was not however until 1910 that he joined the British Astronomical Association and that his productive work as an observer began. His main interest lay in the observation of variable stars. At Poynton, Cheshire, he put up a 6-inch Grubb equatorial refractor (moved on his retirement in 1927 to Port St. Mary, Isle of Man), which was the instrument he used throughout, supplemented at times by a 10 $\frac{1}{4}$ -inch and a 15-inch reflector, though he only used these rarely and never after 1927.

His observations of Long Period and Irregular Variables communicated to the Variable Star Section of the British Astronomical Association between 1911 and 1941 amounted to just under 80,000. This series was particularly remarkable for the uniformly high proportion of early morning observations, a period during which most amateur observers find it difficult to be active owing to the calls of their professions. As a result he was able to achieve a much greater completeness in his observations than is granted to most. Herein too lies their special value, coupled with the great care with which they were made, the continuity in instrument and method and the stimulating example they afforded to others.

In addition to the above he was also a member of the Association Française d'Observateurs d'Etoiles Variables and sent to this organization a great number of observations of stars not on the programme of the British Astronomical Association.

It is a measure of his tenacity of purpose that during 30 years of observing he made on the average more than 10 light estimates a night—a very remarkable performance if all circumstances be considered and one which puts him quite in the forefront of English variable star observers.

For the above work he received in 1927 the first Abbot Silver Medal from the University of Lyons and in 1928 was awarded the Palmes d'officier de l'Académie by the President of France. In 1941 he was awarded the Walter Goodacre Medal and Gift of the British Astronomical Association.

From 1913 to 1920, as a member of the Spectroscopic Section of the British Astronomical Association, he contributed to its Journal several papers on work done with a 6 $\frac{1}{2}$ -inch prismatic camera on Mira Ceti, Comet Delavan (1913 *f*), γ Cassiopeiae, N Aql III (1918) and N Cyg (1920).

But astronomy was not his only interest. He was an extremely keen cellist and pianist and spent a great deal of time on chamber music, especially string quartets, having acquired a very fine set of old Italian instruments to ensure balanced tone in the ensemble. Ornithology too made its call on part of his time as did botany and geology. A yacht and the growing of roses were further occupations.

He died at Port St. Mary on 1946 September 22. He was twice married and leaves a widow.

In all he did his business-like habits and a very fine memory enabled him to achieve results above the average. If to his keenness in not wishing to lose a single night's observation we owe a great debt from an astronomical point of view there will be many who will have regretted not meeting in consequence one who so evidently had much to give.

He was elected a Fellow of the Society 1918 December 13.

W. M. LINDLEY.