

secondary maximum followed at 8h. on May 16. It does not seem possible to associate the disturbance with one or other individual spot, but rather with the group as a whole. In this connection it is of interest to note that minor magnetic disturbances occurred on April 18 and March 21. Some years ago Mr. Maunder showed that magnetic storms tend to recur at intervals of about twenty-seven days, which corresponds to the time taken for the sun to make one rotation relative to the earth. If this sequence is continued we may expect a further disturbance on June 9, when the spot group, if still visible, will be in the same relative position on the sun's disc as on May 13, when the storm commenced.

The general relation between the diurnal variation of the earth's magnetic elements and the sun-spot cycle cannot be doubted. It is better termed the *solar* cycle, for it is well known that the solar prominences, the faculæ and flocculi, and the shape of the corona vary also with the sun-spots in the same eleven-year period. The causes,

however, of this terrestrial and solar relation are still obscure, and the magnetic storms in particular offer other difficulties on account of their anomalous occurrence, although on the whole they follow the sun-spot curve. The theory which in general seems best to fit the observed facts is that which assumes a directive stream of charged particles ejected from a restricted area of the sun, most probably in the region of a sun-spot. Opinions differ as to the exact nature of the stream and as to its action on meeting the earth. It is, of course, admitted that such a stream, though it may be a requirement, is not the sole factor in the production of a magnetic storm, the energy of which is to be traced to the earth's own magnetic system, and ultimately to the earth's rotation.

At Mount Wilson Observatory the magnetic polarities of sun-spots are now investigated daily. It will be interesting to see whether this group of spots is associated with exceptionally strong or otherwise abnormal magnetic fields.

Obituary.

DR. G. B. LONGSTAFF.

DR. G. B. LONGSTAFF died on May 7, after a long period of failing health, at his residence, Highlands, Putney Heath. Dr. Longstaff was born on February 2, 1849, and educated at Rugby and at New College, Oxford, where he obtained a scholarship and a first class in natural science. At a very early age his attention was attracted to the study of insects, mainly through the influence of his uncle by marriage, William Spence, of "Kirby and Spence's Introduction to Entomology"; and he was already recognised as one of the most energetic and successful of the younger lepidopterists of his time, when a regrettable accident in the second term of his residence at Oxford, which resulted in the loss of an eye, put an end to his activities in this direction for many years. His later career at St. Thomas's Hospital, where he was awarded the Mead medal, was highly distinguished, and in later life, besides taking an active part in philanthropic and municipal work, he represented Wandsworth on the London County Council for fourteen successive years.

Much attention also was devoted by Dr. Longstaff to the scientific aspect of statistics, and his well-known work on this subject ("Studies in Statistics") was published in 1891. His long-dormant interest in entomology was revived by a tour in India and Ceylon in the winter of 1903-4; and in later years flying visits were made by him to almost every accessible part of the world in company with his accomplished second wife (*née* Mary Jane Donald, well known as an authority on recent and fossil mollusca). The energy and acumen with which insects were collected and observed on these trips may be estimated by the

fact that Dr. Longstaff enriched the museum of his old university by at least 14,000 specimens, and the value of this generous contribution is greatly enhanced by the full and accurate data attached to every one of them.

The gratitude of all entomologists is also due to Dr. Longstaff for the finely illustrated and most pleasantly written narrative of these collecting trips which appeared in 1912 under the title of "Butterfly Hunting in Many Lands." The numerous and valuable observations on the bionomics of the butterflies met with in the regions visited—their flight, resting habits, seasonal forms, mimicry, and sexual scents, to which last-named subject Dr. Longstaff devoted special attention—are embodied in the last chapter of this fine book, which is supplemented by an equally valuable series of papers on the same questions by the late Fritz Müller, here presented for the first time in English.

Dr. Longstaff was a highly appreciated member of many learned bodies, and had been vice-president of the Royal Statistical Society and of the Entomological Society of London; and the loss of his commanding presence and genial address at their meetings will long be regretted by his fellow-members, as well as by his numerous friends in private life.

WE notice with much regret the announcement in the *Times* of the death of DR. EDWARD B. ROSA on Tuesday, May 17, at the age of fifty-nine years. Dr. Rosa had been connected with the U.S. Bureau of Standards since 1901, and from 1910 onward he held the position of chief physicist at the bureau.