The Maunder Minimum and the variable Sun–Earth connection

by Willie Wei-Hock Soon and Steven H. Yaskell

World Scientific Publishing, 2004. ISBN 981-238-274-7, £57.00 (hbk); 981-238-275-5, £28.00 (pbk). Pp xviii + 278.

This is a fascinating and wide-ranging book which deserves to be read by everyone with an interest in the Earth–Sun environment, in global warming and climatic change and in the history of science. The price is beyond most undergraduates but it should be in college libraries. Wei-Hock Soon is at the Harvard-Smithsonian Center for Astrophysics (Yaskell's profession is not given), and the work has been scrutinised and contributed to by an impressive list of authorities, including Dr Mary Brück who supplied the background information on the Maunders. There is an exhaustive 15-page bibliography.

E. Walter Maunder (1851–1928) and his second wife Annie are of particular interest as founders and mentors of our Association, but known mainly for the study of sunspot distribution since the beginning of telescopic astronomy and the famous 'butterfly' diagrams which display the changing latitudes of the solar active areas during the 11-year cycle. Walter drew attention to the scarcity of sunspots from about 1645 to 1715 (and, incidentally, the disappearance of the aurora from European skies) but this was never investigated in his time. The term 'Maunder Minimum' is of recent origin, and in the last 30 years Jack Eddy and others have shown by carbon-14 levels that there have been about 10 such inactive periods over the last 7000 years, and no doubt there are more to come. The Sun has been warming up slightly since 1880 and its output fluctuates during the sunspot cycle.

History, literature and art seem to suggest that during the Maunder, and the earlier 'Spörer' Minimum, unusually stormy weather with severe winters occurred in the northern hemisphere. Was the Sun's inactivity responsible, or is the fluctuating solar output just one factor in the many variables involved in short-term and long-term climatic changes? The picture is so complex, with carbon dioxide levels, volcanic eruptions, changes in oceanic circulation, deforestation and of course the human pollution contribution. Surface temperatures have been fluctuating for thousands of years, as shown by ice-cores, pollen, faunal and isotope studies, and much more research is required to investigate to what extent the Sun's properties are driving these. Does global warming exist, and if so, are we really to blame?

Most of the book is devoted to these questions without, as expected, any firm conclusions, but it ends with a useful and non-mathematical summary on the modern view of solar magnetic mechanisms, and a short biography of the Maunders. There are no plates, only a few black and white photographs of indifferent quality, and an adequate index.

David Gavine

Dr David Gavine is Assistant Director of the Aurora Section. Now retired, he was a lecturer at Jewel and Esk Valley College in Edinburgh, where he was in charge of the Planetarium. Sadly, the College authorities recently had it removed.