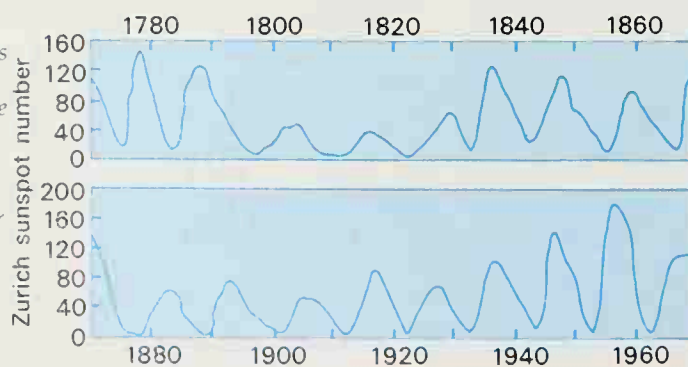


A false-colour image of the 1973 June 30 solar eclipse, which has been prepared to show the areas of equal brightness within the corona.

Fig. 4.2 right: The eleven year cycle of solar activity is well demonstrated by this plot of sunspot numbers in the two hundred years since 1770. Notice how the degree of activity is irregular over many cycles, indicating perhaps even longer overall cycles such as have been suggested by the American astronomer John Eddy.

Detailed records of sunspot numbers began in the seventeenth century and a mere glance at the data reveals a conspicuous cycle of solar activity whereby sunspots disappear and reappear with a period of 11 years (Fig. 4.1). The reason is not completely understood but this very regular repetition was at least comforting, suggesting a stable Sun. Recently, however, a careful study of data such as frequency of aurorae, the lack of coronal plumes during eclipses, and the radioisotopes in tree ring samples, showed strong confirmation of earlier work by



Edward Maunder questioning this stable situation (Fig. 4.2). He suggested sunspot records revealed that for a period of 70 years ending in 1715 virtually no sunspots were visible on the solar disc. This **Maunder minimum** is now thought to be one dip in a successive pattern. Research by the solar astronomer John Eddy suggests quite persuasively that the epochs of solar lassitude correspond to climatic conditions on the Earth such as the severity of winters in the northern hemisphere, average temperature depressions and glacial advance. It would appear that changes on the Sun are the dominant agent of climatic excursions lasting between fifty and a few hundred years. However, although controversy has long raged over the question of whether the solar luminosity varies and was the cause of the ice ages, the present consensus is that these are caused not by a change in the Sun but rather by a small and extremely long period wobble in the orbit of the Earth.

A considerable amount of recent research has concentrated upon the question of whether the Sun is altering in size, and conflicting opinions have been