

worm, or a plodder, or a crank. But the truth is that, just as individuals have duties to perform to their country, so have countries duties to perform to the civilized world. It is the duty of every nation to participate in the discovery of the laws of nature, to ascertain the cause of disease, to enhance the powers of man, and to widen the range of his vision. What does Britain do to fulfil this duty? She still has great workers, it is true; but their work springs from themselves, and not from the nation. The country does not perform the duty referred to. It has become like a tradesman who has reached great wealth by the exercise of inferior arts, but who spends it on amusements, pleasures and the ostentation of charity, without sparing a penny for higher objects. This figure may at least be reached as a rough integration of the general complex formulæ of our present condition. Behind all there is a shadow: for nations, like individuals, must remain efficient.

EFFECT ON THE PROPAGATION OF ELECTRIC WAVES OF THE TOTAL ECLIPSE OF THE SUN, AUGUST 21, 1914

THE committee for radiotelegraphic investigation of the British Association for the Advancement of Science calls attention to the fact that the forthcoming total eclipse of the sun affords an exceptional and important opportunity of adding to existing knowledge of the propagation of electric waves through air in sunlight and in darkness, and across the boundaries of illuminated and unilluminated regions. The eclipse will be total along a strip extending from Greenland across Norway, Sweden, Russia and Persia to the mouths of the Indus. In Russia the duration of totality will be a little more than two minutes.

There are two main points calling for investigation during the eclipse. In the first place, the propagation of signal-bearing waves through air in the umbra and penumbra will probably obey laws different as regards absorption and refraction from those obeyed in illuminated air. In the second place, the strength, frequency and character of natural electric waves, and of atmospheric discharges,

may vary. The variations may occur either because the propagation of natural waves from distant sources is facilitated or impeded by the eclipse, or, possibly, because the production of natural electric waves or atmospheric discharges is for some unknown reason affected by the eclipse.

These points have previously been investigated to only a slight extent. The observers of signals during the solar eclipse of April 17, 1912, nearly all agreed that the strength of the signals was greater during the eclipse than an hour before or after. There was only one special observation of strays during the same eclipse, when very pronounced and remarkable variations were recorded during the passage of the shadow-cone across Europe.

To investigate the propagation of signals across the umbra it will be necessary to arrange for wireless telegraph stations on either side of the central line of the eclipse to transmit signals at intervals while the umbra passes between them. This transit of the umbra occupies about two minutes. It is thus very desirable that the Scandinavian and Russian stations should transmit frequently throughout several minutes before, during and after totality. But stations other than those favored by their proximity to the central line should endeavor to keep a complete record of the variations of signals during the eclipse. Stations in Europe west of the central line and stations in the Mediterranean and in Asia Minor may find noticeable changes in the strength of signals, particularly long distance signals, between the hours of 10 A.M. and 3 P.M., Greenwich time; and it is probable that the stations of India and East Africa, and ships in the Indian Ocean, may feel the effect of the penumbra in the afternoon. On the other hand, ships in the Atlantic, and fixed stations in Eastern Canada and the United States, will probably be affected by the penumbra in the early morning. At Montreal the eclipse (partial) is at its greatest phase at 5:52 A.M. standard time. It is possible that the eclipse may have some influence even when it is invisible.

The investigation of strays is of as great

interest as that of signals. So far as is yet known, the natural electric waves reaching wireless telegraph stations in latitudes higher than 50° appear to travel mostly from the south. Thus the greatest changes produced in strays by the eclipse will probably be experienced at stations in Scandinavia and Russia, to reach which the waves must cross the path of the umbra. At the same time changes of some kind are to be expected in other districts than these, and it is therefore desirable that statistical observations of natural electric waves be made all over the world, and especially at places within an earth quadrant of southern Russia. It is also desirable that meteorological observations, including those of atmospheric ionization and potential gradient, should be at the disposal of the committee when considering the records of strays and signals.

The committee proposes to prepare and circulate special forms for the collection of statistics of signals and strays, especially within the hemisphere likely to be affected by the eclipse; they will endeavor to make provision for the transmission of special signals at times to be indicated on the forms; and they will offer for the consideration of the authorities controlling stations near the central line a simple program of work. The discussion of the observations, and the comparison with meteorological data, will be carried out by the committee; and digests of the statistics, together with the conclusions drawn from the analysis, will be published in due course.

The committee would be greatly aided in the organization of this investigation if those possessing the necessary facilities and willing to make observations during the eclipse would communicate with the honorable secretary, Dr. W. Eccles, University College, London, W. C., at the earliest possible date.

THE NAPIER TERCENTENARY CELEBRATION

JOHN NAPIER'S "Logarithmorum Canonis Mirifici Descriptio" was published in 1614; and it is proposed to celebrate the tercentenary of this great event in the history of mathe-

matics by a congress, to be held in Edinburgh on Friday, July 24, 1914, and following days.

The celebration is being held under the auspices of the Royal Society of Edinburgh, on whose invitation a general committee has been formed, representing the Royal Society of London, the Royal Astronomical Society, the town council of Edinburgh, the faculty of actuaries, the Royal Philosophical Society of Glasgow, the universities of St. Andrews, Glasgow, Aberdeen and Edinburgh, the University College of Dundee, and many other bodies and institutions of educational importance.

Through the favor of the editor of *SCIENCE*, the president and council of the Royal Society of Edinburgh have now the honor of giving a general invitation to mathematicians and others interested in this coming celebration.

The celebration will be opened on the Friday with an inaugural address by Lord of Appeal Sir J. Fletcher Moulton, F.R.S., LL.D. (Edin.), followed by a reception given by the Right Honorable the lord provost, magistrates and council of the city of Edinburgh. On the Saturday and Monday the historical and present practise of computation and other developments closely connected with Napier's discoveries and inventions will be discussed. A memorial service will be held in St. Giles' Cathedral on the Sunday.

Among many who have expressed a warm interest in the celebration and who hope to take part in the congress, may be mentioned Professor Andoyer, Paris; Professor J. Bauschinger, Strassburg; Professor Hume Brown, Historiographer Royal for Scotland; Professor F. Cajori, Colorado, U. S. A.; Professor G. A. Gibson, Glasgow; Dr. J. W. L. Glaisher, Cambridge; Professor Lang, St. Andrews; Professor Macdonald, Aberdeen; Professor E. Pascal, Naples; Professor Karl Pearson, London; Professor Eugene Smith, New York; Professor Steggall, Dundee; Professor Whittaker, Edinburgh.

Merchiston Castle, the residence of Napier, has long been occupied by the well-known public school, which draws pupils from all parts of the British empire. The governors of