

ness has its usual effect of facilitating the propagation of electric waves over great distances, but that there are portions of time during the period of greatest darkness at the receiving station when propagation is hindered. This minimum is not an accident, and was, in fact, not unexpected by me. It can be explained in some measure by a hypothesis which I have embodied in a paper and submitted to a learned society; but until the paper is published I feel precluded from discussing the phenomenon, and am writing to you merely to put the results of the observations on record.

I may add that Mr. Lempfert, of the Meteorological Office, has kindly informed me that there was not any trace of thunderstorm during the eclipse shown on the Daily Weather Reports of April 17 and 18. The distribution of pressure was not favourable for thunderstorms over the continent of Europe, though electric disturbances may have occurred in the low-pressure systems over the Spanish peninsula and the north of Norway.

W. H. ECCLES.

37 Chelsea Gardens, S.W., April 19.

Glazed Frost.

JUDGING from the letters recently published under this heading (*NATURE*, pp. 414, 447, 484, 516, and 550), the phenomena known in New England as "ice storms" are of rare occurrence in Old England. They are of frequent occurrence along the Atlantic coast of North America, and the conditions which produce them are well understood.

In W. M. Davis's "Elementary Meteorology" (1893), p. 294, they are described as follows:—"Regions of strongly variable temperatures are subject to occasional winter storms in which the precipitation occurs as rain, but freezes as soon as it touches any solid body, such as the branches of trees, or telegraph wires, or the ground. This happens when the ground and the lower air have been made excessively cold during a spell of clear anticyclonic weather, when a moist upper current in advance of an approaching cyclone brings clouds and rain. Serious damage is caused by breaking down over-weighted wires and branches at such times. Wires may be increased in weight ten to twentyfold, and twigs even more than a hundredfold." Hann describes the phenomenon under the term "Glatteis" in his "Lehrbuch der Meteorologie" (1906), p. 190.

In a recent study of New England ice storms made under the direction of Prof. A. Lawrence Rotch by Mr. Charles F. Brooks in a research course in Harvard University, he found that twelve such storms occurred each year in the average for the period 1886 to 1911, inclusive. For the various months the frequency of occurrence was in the following order: January, February, March, December, November, and April. He concluded that the essential and ever-present conditions accompanying ice storms were: (a) rain falling; (b) when the temperature of the lower air was below freezing; and (c) with an inversion stratum aloft in which the temperature was above freezing. He found that the raindrops coming from the relatively warm stratum aloft are cooled below their freezing point as they pass through the colder stratum beneath, but are not solidified before reaching the ground or exposed objects, on which they form an ice sheet. On December 13, 1895, rain continued to fall when the temperature of the lower air was but 9° F.

Data obtained in kite flights during ice storms at Blue Hill Observatory verify the presence of this inversion stratum aloft. On February 9, 1905 (see *Annals of the Astronomical Observatory of Harvard College*, vol. Iviii., part iii., p. 168), the temperature

decreased with height from 29.3° F. at the observatory, 195 metres above sea-level, to 27.6° F. at 702 metres, the wind being uniformly E.S.E. in direction, and the air saturated. At 885 metres, however, the temperature was 32.9° F., the wind direction S.E., and the humidity 100 per cent. The base of the relatively warm stratum from which the moisture came in the form of raindrops was apparently between the last two heights quoted. The drops were undercooled as they descended through the colder stratum beneath, but did not change to ice until striking the ground. A somewhat similar condition was observed in the last international kite flight, that of March 7 last. On that occasion the auxiliary kites added to lift the line became so heavily coated with ice that they pulled the leading kite down instead of aiding its ascent, thereby rendering the maximum height reached during the flight considerably lower than usual. On that occasion the air was practically isothermal from the summit of Blue Hill to 625 metres above sea-level, the temperature being about 30.8° F. Above the latter level, however, the temperature increased steadily with height, and was 36.8° F. at 874 metres, the maximum height reached by the leading kite. Rain falling from this relatively warm stratum was undercooled by its passage through the colder air below, and changed to ice upon reaching solid objects.

In the vicinity of the observatory, after the occurrence of recent ice storms, it is not uncommon for the ice to accumulate to a depth of an inch on all exposed objects, and on one occasion, February 14-16, 1909, ice formed to a thickness of three inches, and did not disappear until February 20. During such storms we are able to keep the anemometer in operation only by frequently dashing hot water over the revolving cups and the other exposed parts.

Blue Hill Observatory, ANDREW H. PALMER.
Hyde Park, Mass., April 2.

Animal Intelligence.

THE following incident may be of interest to readers of *NATURE*.

We have a black retriever dog, very well trained. She is kept chained in a kennel in the yard, to which a number of fowls have access. During the last few days a black hen nearly every day lays an egg in the kennel, the dog meanwhile sitting outside. Unless someone takes the egg out directly afterwards, the dog takes possession of it and eats it.

This curious proceeding raises the question whether the hen lays the egg in the kennel for the dog's benefit, and whether the dog for her own advantage allows the hen to enter the kennel without molestation.

M. N. W.

Frankland, St. Leonards, near Tring, April 19.

THE ECLIPSE OF THE SUN ON APRIL 17.

THE solar eclipse which occurred on April 17 appears to have been observed under ideal conditions all along the available track, and the question as to whether a *total* eclipse would occur is settled in the affirmative, for a totality of one-half to one second was witnessed in Portugal near Ovar.

No astronomical phenomenon of recent years appears to have attracted more general popular attention. Even the Lords Justices temporarily adjourned their sittings at the Law Courts in order to witness the unusual event.

A large number of well-known astronomers