

suspended. Below this, on the floor of the cave, was a boulder, firmly embedded in the earth, and unaffected by the ice; this constituted my fixed point, a line being cut on it to correspond with the centre of the bob. In this way any movement of the staves with the ice could easily be measured off. The following are some of the results obtained, and I would draw special attention to the fact that, although the valley narrows considerably towards the snout end of the glacier, and in consequence one would expect an increase in the flowing speed, the observations prove a decrease in speed to nearly one-third. Movement in cave from August 1 to September 18, or forty nine days, max. '354 in., min. '093 in., mean '176 in. per day. (The surface movement taken at side of glacier, three-eighths of a mile from snout, up the valley, amounted to '516 in. per day.) End of glacier receded in the same time 19 ft., or 4'65 in. per day. Ice advanced 8½ in.; total loss in length 18 ft. 3¼ in., or nearly 4'5 in. per day. I must add that the point of observation was fixed at 40 ft. from the entrance, as beyond that and further in the cave the floor formed part of the glacier, and no fixed station could be found. Also, the surface friction of the ice on the shore—both at the side of the glacier, where the surface measurements were made, and at the cave—was considered about equal, and could therefore not account for the great difference of movement.

HUGO LEUPOLD

November 10

### Arctic Research

WITH reference to a letter in your number of this week (NATURE, vol. xxv. p. 53), in which it is stated that the Arctic shores trending north with a *western* aspect, are most encumbered with ice, and that those with an *eastern* aspect are most free from ice; I beg to suggest that, in order that your readers may not be misled on a point of geographical interest, you would do well to insert the following extract from the writings of Sir Edward Parry:—

"I will mention a circumstance which has particularly forced itself upon my notice in the course of our various attempts to penetrate through the ice in these regions; which is that the eastern coast of any portion of land, or what is the same thing, the western sides of seas or inlets, having a trending at all approaching to north and south, are, at a given season of the year, generally more encumbered with ice than the shores which have an opposite aspect. The four following may be adduced in illustration of this fact, and cannot but appear somewhat striking when considered in viewing a map which exhibits the relative position of the shores in question.

"It is well known that, in the extensive northern sea reaching from latitude 60° to 80°, bounded on the east by Lapland and Spitzbergen, and on the west by Greenland; the whole of the latter coast is blocked up by ice throughout the summer, so as to make it at least a matter of no easy enterprise to approach it, while the navigation of the eastern portion of that sea may be easily performed without difficulty, even to a very high latitude, and at an early part of the season. A second equally well-known instance occurs in the navigation of Davis Strait, which, from about Resolution Island, in latitude 61½°, to the parallel of at least 70, is usually inaccessible as late as the month of August, and a great deal of it, in summer, is not accessible at all; while a broad and navigable channel is found open on the eastern side of the strait (that is, on the western coast of Greenland) many weeks before that time. We experienced a third and very striking example of this kind in coasting the eastern shore of Melville Peninsula in the years 1822 and 1823, the whole of that coast being so loaded with ice as to make the navigation extremely difficult and dangerous. Now, on the eastern side of Fox Channel, there is reason to believe, as well from the account of that navigation in 1631, and that of Baffin in 1615, as from our own observations, that there is little or no ice during the summer season. The last instance of the same kind which I shall mention is that of Prince Regent's Inlet, and of which the events of this voyage furnish too striking a proof, the ice appearing always to cling to the western shore in a very remarkable manner, while the opposite coast is comparatively free from it.

"These facts, when taken together, have long ago impressed me with the idea that there must exist in the Polar regions some general motion of the sea towards the west, causing the ice to set in that direction, when not impelled by contrary winds or local and occasional currents, until it butts against those shores which are actually found to be most encumbered by it."

I need only add that all subsequent observation has confirmed the accuracy of Sir Edward Parry's general rule; to which of course there are exceptions caused by the action of local currents and winds.

CLEMENTS R. MARKHAM

21, Eccleston Square, November 19

### Curious Formations of Ice

DURING a botanical expedition recently made to Gangotri Glacier I noticed, early on the morning of October 6, some very beautiful and curious formations of ice, which must have been formed during the previous night. It was freezing hard when I left my camp, after an early breakfast. The small pools beside the river were completely frozen over, and the smooth boulders of granite were coated with thick flakes of ice, which greatly increased the difficulty and danger of walking. Ascending a steep grassy slope (a favourite feeding-ground at this time of the year for barhal, or Himalayan sheep), I found the ground clothed over with small masses of pure white ice, very like mushrooms at a distance; I cannot give a better description of their general character than to liken them to a certain kind of thin, wafer-like cylindrical biscuit, which is sometimes eaten as an accompaniment of ices, only they were pure white and not cylindrical, but rather funnel-shaped, the larger opening being uppermost. In most cases there were two to four of these funnels, forming clusters round the lower portion of the stems of a species of *Polygonum*, which was abundant in this part of the valley, in an extremely dried-up condition. I should be glad to know if this curious kind of ice structure has been observed elsewhere.

Saharanpore, N.W.P., October 31

J. F. DUTHIE

### Meteor

A MAGNIFICENT purple meteor was observed here on November 15, at 5h. 54m. p.m. G.M.T., by the Rev. A. Corti and one of the assistants of the Observatory. When first seen below  $\beta$  Aurigæ it was not very bright, but as it was passing through the constellation Lynx its brilliancy increased until it outshone Jupiter. Its shape was at first round, but, when it had passed near  $\phi$  Ursæ, it burst into three pieces between  $\gamma$  and  $\chi$  Ursæ, the largest of the three pieces being closely followed by the other two, which were as bright as first-magnitude stars. They all disappeared, near  $\eta$  Ursæ, the total arc described being more than 70°. The meteor was visible for seven seconds, and left a long train, which soon disappeared. The velocity of the meteor decreased gradually as it approached its bursting point.

S. J. PERRY

Stonyhurst Observatory, Whalley, November 17

AT a quarter to five yesterday afternoon, when the sun had scarcely set and no star was visible, I and another inhabitant of this place saw a large blue meteor issue from a height of twenty degrees above the north-west horizon, and fall in a sharp curve for, say fifteen degrees, until it disappeared behind some woods. In falling it scattered large fragments behind it, but retained its nucleus, beside which Mars looked quite sickly. How vivid must the meteoric light have been!

M. L. ROUSE

Sunnymead, Chislehurst Common, November 21

I OBSERVED a fine meteor last night at 1'3 a.m. It came into sight so closely in the neighbourhood of a brilliant white star, which I took to be Sirius, that, as it shot in an apparent straight line, or segment of a very large arc, across the sky, midway between Orion, then due south, and the horizon, the momentary illusion to the eye was that the star, which it equalled in magnitude and brilliancy had left its place and travelled west.

Bregner, Bournemouth, November 18

HENRY CECIL

ABOUT 5.45 on the evening of the 15th inst. a meteor, larger than Jupiter, but not so bright, appeared under Capella, and took a horizontal course, till it disappeared at about the same distance below the terminal star in the tail of Ursa Major. I never saw so long a flight. Twice in its course it disappeared or became very faint. Near the end it broke into two, the second part following the former. At any computation of its distance its flight in the upper regions of the atmosphere must have been in an enormously extended path. My son, who was with me, conjectured that its disappearance might be owing to its passing