

the thermometer rose to 0°, but never exceeded that point; when not, the bulb of the thermometer, by the volatilising of the ice, was partly laid bare. As it appears by the detailed description of Dr. Carnelley's experiments in NATURE, vol. xxiii, p. 341, that the success depends for a great part on the size of the condenser, we have made another apparatus with a condenser of half a litre; the results we may obtain therewith will be related shortly.

We have also made some experiments on naphthalene. The pressure of the naphthalene vapour at the melting-point, nearly 80°, being ± 9 mm., as was found by a preliminary proof, it was expected that it would not be very difficult to obtain and to maintain a vacuum sufficient to observe the demeanour of naphthalene under similar circumstances as ice. The apparatus we used resembles in its principal features that we made use of in experimenting on ice; alone, the condensing surface was much greater. The thermometer bulb being imbedded in a cylinder of pure naphthalene 13 mm. in diameter, the thermometer was fixed in the axis of the glass tube, and this latter drawn out. A small quantity of water being brought in the tube, the pressure was reduced by means of an ordinary air-pump to 5 mm., and the drawn-out end of the tube melted through. In another instance the tube was several times filled with carefully-dried carbonic acid and exhausted, and lastly, when the pressure had been reduced to 7 mm., sealed. To remove the remaining carbonic acid and aqueous vapour a certain quantity of caustic potash and some pieces of oxide of calcium were inclosed in the tube. In what manner the tube had been prepared, the results when heat was applied, the upper part of the tube being cooled in a freezing-mixture or simply in snow, were always the same. The thermometer rose very rapidly to about 79°, and stayed at that point as long as no part of the thermometer bulb was denuded of naphthalene. At the same time the naphthalene sublimed very regularly, covering the sides of the tube next to the heated part with a beautiful layer of naphthalene crystals.

C. J. E. BRUTEL DE LA RIVIERE
A. VAN HASSELT

Assen (Netherlands), April 14

Sound of the Aurora

THE interesting communications which have lately appeared in your periodical regarding the supposed connection between "sound" and the "aurora" (NATURE, vol. xxiii, pp. 484, 529, 556), lead me to suppose that the following notes may be considered by you and your readers worthy of record. They were copied last autumn by myself from the Strangers' or Visitors' Book at the Hotel on the Äggischorn, and bore the date July 10, 1863:—

"Visit to the Col de la Jungfrau described: On descent surrounded by thunderclouds evidently charged with electricity. At 12.15 a sound similar to that made by a boiling kettle was heard to issue from one of the alpenstocks, and very soon a similar sound issued from all the bâtons. On shaking the hands similar sounds issued from the fingers. Observing that the veil of one of the party stood upright on his hat, one of the gentlemen and one of the guides, who had experienced prickly sensations on the crown of the head, removed their hats, when their hair stood up as if under a powerful electrical machine. Whenever there was a peal of thunder all of the phenomena ceased, to be speedily renewed when the peal was over. At such times all the members of the party felt severe shocks in the parts of the body which were most affected; and one gentleman had his right arm paralysed and rendered useless for several minutes. The clouds passed away and the phenomena finally ceased at 12.30. The guides with us were Joseph Marie Claret of Chamouni, and Smith of this house, and they were as much affected by the electricity as we were. At the top of the Col the aneroid barometer stood at 18'83."

I believe the above statement, clear and pointed as it is, was signed by the names of Watson, Sowerby, and Adams.

It will be seen that other phenomena are mentioned, in addition to the sounds heard in connection with the electrical ones, which are worthy of regard. I would, among other points, draw attention to the effect produced on the arm of one of the travellers, and should be glad to know from any of your correspondents whether they have met with other like results of electrical interference with the actions of muscles in mountain travelling.

I may mention in passing that in the same Visitors' Book at the Äggischorn Inn I found notes to the effect that the Jungfrau and the Aletschhorn were first ascended by a lady in August of the year 1863.

JOHN W. OGLE

30, Cavendish Square, W.

A PRESUMPTION as to the true character of the sound of the aurora is perhaps offered by the fact that to many persons a flash of lightning is accompanied by a distinct whishing sound. As this is simultaneous with the flash, and therefore evidently subjective, it seems to offer evidence merely of the close connection existing between the senses of seeing and hearing.

April 30

E. HUBBARD

Symbolical Logic

IN my recent letter on Symbolical Logic (see NATURE, vol. xxiii, p. 578) I said that Prof. Peirce's symbol of inclusion, as defined by him in his "Logic of Relatives," was equivalent to the words "is not greater than." This however is not quite correct; for though Prof. Peirce speaks of this symbol as equivalent to the words "is as small as," he also speaks of it as denoting "inclusion," and his illustration $f \prec m$ may be read, *The class f is included in the class m.* In my notation the analogous composite symbol $f : m$ may be read, *The statement f implies the statement m.* If for f in my notation we read *He belongs to the class f*, and for m we read *He belongs to the class m*, then my $f : m$ will coincide in meaning with Prof. Peirce's $f \prec m$; but this does not alter the fact that my f differs in meaning from his f , that my \prec differs from his \prec , and my m from his m . Mr. Venn, in his recent paper in the *Proceedings* of the Cambridge Philosophical Society, speaks of these distinguishing features of my method as unimportant, and he regards my definitions of my elementary symbols as "arbitrary restrictions of the full generality of our symbolic language." But Mr. Venn overlooks the fact that all accurate definitions are more or less arbitrary restrictions of language, and he also seems to me, in this particular case, to mistake *vagueness* for *generality*. Philosophical investigations that begin with *Let x = anything* commonly end with $x = \text{anything}$, a result which, whatever may be thought of its generality, does not add much to our knowledge.

HUGH MCCOLL

73, Rue Siblequin, Boulogne-sur-Mer, April 26

The Formation of Cumuli

THIS afternoon the air to a great distance above the surface of the earth has been filled with fluttering dry leaves. For some weeks no rain has fallen in this vicinity, and a cold northerly wind has prevailed. To-day, for the first time during the continuance of this cold and rather clear weather, the hill-sides having a southern exposure have begun to be sufficiently warmed to cause upward currents of air along their surface. The effect has been curious: piles of cumuli have formed persistently in certain quarters of the sky, and eddying masses of leaves caught up along the hill-sides have been falling apparently from the under surface of the dense masses of cloud. My attention was first caught by the fall of chestnut and other varieties of leaves, which must have traversed a long distance, as there are no trees of the sort near at hand in the direction from which the wind was blowing at the time. Whilst walking near an elevated ridge of ground an hour later it was my fortune to catch sight of a thick mass of leaves rushing directly up its side and pouring apparently into the bosom of a dark cloud which overhung the hill. This cloud remained almost stationary, although there appeared to be a lively breeze along its under surface, the leaves darting forward very swiftly. The entire phenomenon was quite interesting as affording an illustration of the method of formation of clouds of the variety named.

M. A. VEEDER

Lyons, New York, March 20

"The Oldest Ocean Post Office"

IN NATURE, vol. xxiii, p. 254, just received here, it is stated that in Magellan Straits there has been for some years past, chained to a rock there, a barrel from which passing ships take letters for the direction they are going in, leaving others for the opposite quarter; it is added that up to the present no abuse of the privileges of this primitive post-office has been reported.