a similar recurrence of vicissitudes of climate may possibly be detected in still earlier periods of the earth's history. These are questions of the highest interest; the forthcoming expedition may do much towards their solution, and it is to be hoped that those now directing the scientific arrangements will not neglect an opportunity of such rare occurrence.

There is nothing to be said against the appointment of a zoologist and botanist, provided geology be not neglected; but if a third addition to the scientific staff should be impracticable, it would appear preferable that a good geologist should be instructed to look after the few small plants which may be added to those already known, than that the opportunity should be lost of throwing light on a subject which is acknowledged on all hands to be shrouded in the greatest obscurity.

Birmingham

SAMUEL ALLPORT

Upper Currents over Areas of Frost

HAVING been for many years engaged in the discussion of upper currents, I believe that I can contribute an item of information towards the solution of the question asked by M. De Fonville in *NATURE*, vol. xi. p. 193.

During many of the hardest frosts experienced in the West of Europe, moist southerly winds of mild temperature prevail on the extreme western coasts of the British Isles, and occasionally of France and Portugal; extensive areas of low pressure existing on the North Atlantic, and of high over Western and Central Europe; isobars running nearly S. and N., and gradients being steepest in the W. Under these conditions, often persistent for many days, cirrus-clouds travel almost invariably with upper currents from points between S. and W. in the extreme west, and commonly from points between S.W. and N.N.W. over the whole western portion of the area of frost.

A slight "backing" of the last-mentioned current is commonly one of the first local premonitions of the change of weather, and may often be detected by the observer before any apparent change has taken place in the atmosphere near the earth's surface, and even when the frost is temporarily becoming more intense.

But this rule is not invariable. I have several examples in which the upper current continued from N. or N.W. until the thaw had commenced; and in those instances the southerly wind, at each station as it reached it, appeared to spring up *first on the earth's surface*, and to be slowly communicated to the higher regions of the atmosphere.

And, on the other hand, the upper currents will occasionally "back," even to S.W. or S., when a local depression is advancing in the S.W. and about to pass to the S. of the observer; when, instead of a thaw, a fall of snow and an increase of frost will probably occur. Without the aid of telegraphic reports it is almost impossible beforehand to distinguish this occurrence from the advance of the general depression in the west.

On Jan. 1, 1875, the cirrus travelled from S.W. in the west, and from W. over England and France. Between this and the surface-wind were intermediate currents from S. points, of considerable velocity, and (as shown by the "silver thaw") of high temperature.

In frosts like that of Jan. and Feb. 1855, when the high pressures are in the north, cirrus travels almost invariably from W. or S. points over the area of frost.

It is remarkable that in no instance are cirrus-currents from easterly points accompanied by severe frost.

On the subject of the general laws of the upper-current circulation I cannot here enter; but I will mention, at the risk of a slight egotism, one out of many proofs of the utility of their study. Through the stormy summer of 1872, being constantly questioned by neighbours as to the probable coming weather, I posted a daily weather forecast on my door. In no instance did this prove incorrect, even as to the *hour* of a coming thunderstorm. And in all instances these forecasts were *principally* based on calculations derived from the observation of those upper currents which "weather prophets," *et hoc genus omne*, almost universally neglect.

W. CLEMENT LEY

Ashby Parva, Lutterworth, Jan. 20

Decomposition of Iron Pyrites

THE "curious phenomenon" described by Mr. Frederic Case (*NATURE*, vol. xi. p. 249) is by no means an uncommon one. It is due to oxidation, and the conversion of a portion of the pyrites into soluble sulphate of iron. This decomposition is

much aided by the presence of moisture; it is very doubtful whether it would occur at all in a dry atmosphere, and I suspect that the particular case in the Maidstone Museum, where the pyrites has thus crumbled, is near an outside wall, or otherwise exposed to humid influences. I have seen large heaps of pyrites thus decomposing at the foot of the troughs where coal-slack is washed before converting it into coke. The sulphate of iron used in the manufacture of Nordhausen sulphuric acid is commonly obtained by similar oxidation of pyrites, which is aided and economised in this case by previously roasting away a portion of the sulphur.

Mr. Case may easily test the above explanation by placing some of the crumbled pyrites in a small quantity of water, leaving it there for an hour or two, then filtering through blotting paper and evaporating the clear filtrate slowly to dryness. If I am right, he will find a residue of small crystals of sulphate of iron. A few drops on a strip of glass will be sufficient to show these crystals, if magnifying power is used; or the presence of a soluble salt of iron may be shown by adding a little ferro-cyanide of potassium to this filtered liquid.

W. MATTIEU WILLIAMS

WITH reference to a statement and inquiry put forth last week in your columns by Mr. Frederic Case, of Maidstone, respecting the decomposition of some iron pyrites, I beg to state that precisely the same effect took place with similar specimens exhibited in our museum many years ago. The cause is due, I understand, to the influence of air and moisture forming ferrous sulphate (green vitriol or copperas). In our case this salt appeared in abundant crystals, and was sufficiently strong to partially obliterate and destroy a contiguous manuscript.

Alnwick Mechanics' Institute

GEO. LINGWOOD

ON p. 249, vol. xi. is a query by Mr. F. Case as to the spontaneous decomposition of iron pyrites. I would suggest that the sulphur and iron of the mineral have been oxidised at the expense of the oxygen of the atmosphere in the presence of moisture. Some years ago I collected specimens of fossil wood, &c., from the London clay found in a deep well at the corner of Colchester Garrison. After a time my specimens were crumbling to powder, and were covered with light, silky crystals, which upon analysis proved to be *sulphate of iron*. Upon examining the clay minutely it was found to contain numerous golden spangles, exceedingly small, of native sulphuret of iron or iron pyrites, and the conclusion arrived at was that these spangles had absorbed oxygen and produced the crystals, and also rendered the specimens friable.

Dunstable

A. P. WIRE

OUR ASTRONOMICAL COLUMN

VARIABLE STARS.—(1). On the 19th of June, 1822, during the visibility of Encke's comet in the southern hemisphere, Rümker, who was then at Paramatta, N.S.W., compared the comet with a star which he judged to be between the fourth and fifth magnitude, but could not find in any of the catalogues. The sun set at Paramatta on this evening at 4h. 58m., and the comet was observed from 6h. 3m. to 6h. 46m. mean times, or from an altitude of 20° to 11°. An experienced observer as Rümker then was would not be likely to make any great error under these circumstances in estimating the magnitude of his comparison-star. Olbers in July 1824 first directed attention to it, as probably a remarkable variable star. He noted its occurrence in Harding's Chart as a seventh magnitude, and supposed it was inserted from an observation by that astronomer, who, as is well known, compared his maps with the sky; and further, he pointed out that it had been observed by Bessel in his sixty-third Zone, 1822, March 14, and then estimated also of the seventh magnitude. Rümker determined the position of his uncatalogued star, by reference to three neighbouring ones found in the "Histoire Céleste," and it agrees almost precisely with that given by Bessel's Zone. This object is No. 134 in Santini's Catalogue (Decl.—2°), where it is again estimated a seventh magnitude. It does not occur in Argelander's