made his case in one respect so strong as it might be. In the passage "nunc ignes sæpe flammati *caducas culminum cristas* superjecto favillarum monte tumulabant" (as the edition which I follow has it) he translates *culmina* "roofs," and again in the parallel passage of Avitus. I think it more likely to mean summits (of mountains), and to refer to the formation of one or more new cones in the hill country.

My reason for this may be given in the words which I used in the paper above named—"though Sidonius is inclined to bombast, he scarcely seems equal to a flight like this. . . . In the parallel passage in Avitus, the reference to Isaiah ii. 10, 19, 21, and Luke xxiii. 30 appears too clear to allow any other meaning than mountain-top to be assigned to *culmen*." To this I may add that the ridge-roofs, *cristæ culminum*, would be those least likely to be broken by a shower of ashes, and the ridges would be the part where the smallest quantity of ashes would rest.

T. G. BONNEY

St. John's College, Cambridge

## Force and Energy

REFERRING to Mr. Brooke's article in NATURE of the 13th on Force and Energy, I would suggest that though it is quite true that heat is a "mode of motion," this is probably not true of magnetism and static electricity. Heat is molecular *motion*, magnetism and static electricity are molecular *tensions*.

I would also remark that the term "radiant heat" ought to be discarded as misleading. Radiant heat is not a kind of heat; it is quite distinct from heat, but it is nearly identical with light. We ought to introduce the word *radiance*, and then we get to this statement:—All rays of radiance have more or less heating power, and some of them have also the power of producing the sensation of light. But the fact that only some rays, and not those which have the most heating power, produce the sensation of light, belongs rather to the retina than to the rays.

Mr. Brooke thinks the proposition that the sum total of energy in the universe is unchangeable is incapable of proof. I do not speak as having any authority, but it seems to me that if this is not true the conservation of energy cannot be universally true.

JOSEPH JOHN MURPHY

## Pelagic Fish-Nest

SEEING an extract from NATURE with reference to the nest of the pelagic fish, allow me to inform you of the discovery of what I presume to be a similar nest in lat. 25° N., long. 65° W., whilst on a voyage between Buenos Ayres and New York last January. I had improvised a drag-net out of a barrel hoop and a biscuit bag, to fish up for examination the straw-coloured floating gulf-weed, which covered the sea in long lines and patches between 20° and 32° N. lat.; and one day there came up in the net a mass of weed compactly woven by strong, white, silky fibres into a round ball of about ten inches in circumference. The surface of this ball was covered with a network of these fibres, to which large numbers of glassy eggs, about the size of partridge shot, were attached. The eggs were transparent, and their cases very tough. The only living inhabitants of the ball were one or two small shrimps and a small crab, who was carrying his own particular egg-sac.

Another curious fact I am tempted to mention. About 200 miles from Cape Frio, the sailors caught a dolphin, which had in its stomach twenty pieces of coal, varying from a large walnut to a marble in size, together with the heads of four iron nails about an inch in length each. I am tolerably certain that these articles had not been thrown from our vessel, but they did not appear affected by the internal wear and tear, however long they might have been digesting.

GEORGE J. HINDE

Toronto, Canada West, May 18

## Why are Red Sandstones Red?

I HAVE lately been interested in the reply to this question given by Prof. Ramsay, and stated by Prof. Geikie in his recent edition of "Jukes's Manual of Geology" (pp. 567, 568). But the explanation, viz., that the red colour is derived from the precipitation of red (consequently anhydrous) peroxide of iron in inland seas, appears to me to give rise to this other question—Why should the precipitated peroxide be anhydrous, and not hydrous and brown, as is the case with limonite, which is found deposited in marshes, ponds, and lakes?

I have tried some experiments in precipitating the peroxide of iron from a solution made as saturated as possible by long boiling of water or oxide of iron (obtained from a natural spring), common salt, and finely divided sulphate of lime (these last two minerals being found to accompany the red rocks), filtering hot, and allowing to stand till cold. For want of experience in these matters, probably, I have not yet succeeded in obtaining any red colour.

I have, however, to-day fallen on a paper describing a similar experiment to account for the presence of anhydrite in the Stassfurt mines. In this case it is stated that the *anhydrous* sulphate of lime was obtained on evaporating a concentrated solution of gypsum and rock salt.

I should be glad to learn whether the attention of any of your readers has been drawn to this question, and whether they have succeeded in obtaining (under conditions analogous to those of an evaporating inland sea) a precipitation of the red colouring matter.

A YOUNG GEOLOGIST

## Mounting of Thermometers

I HAVE experienced precisely the same inconvenience as that mentioned by Mr. Whipple in NATURE last week.

I several times removed the outside case of a thermometer such as he describes, and took every precaution to dry the air before replacing the packing, but the moisture in the tube persistently reappeared. It then occurred to me that the amount of moisture was out of all proportion to the quantity of air confined, and that the mischief arose from the packing not being air-tight; and fresh damp air was thus continually finding its way into the tube, and depositing moisture. Accordingly the tube was again removed, and after drying carefully, I replaced it, and pushed in the india-rubber packing about an eighth of an inch. The intervening space was filled up with common putty, which was made to assume a conical form round the thermometer stem. After being left for a day or two to harden, the putty was painted over with two or three coats of sealing-wax dissolved in alcohol. This thermometer has been constantly exposed on the grass for about four months, and though I purposely took no means to dry the air in the case, not the slightest inconvenience from a deposition of moisture has since been experienced.

REGINALD BUSHELL

Hinderton, Neston, Cheshire, June 17

## A Few Millions

IN your reprint of Prof. Mayer's paper, entitled "Acoustical Experiments" in NATURE for May 9, 1872, there occur some strange numerical errors, which perhaps it will be well to point out, lest some of your readers should make use of the numbers given at the end of the paper without previously testing them. After describing his experiments, he proceeds:—"We will now examine the analogical phenomena in the case of light:—Let fork No. 1, giving 256 vibrations a second, stand for 595 millions of millions vibrations a second, which we will take as the number of vibrations made by the ray $D_1$ of the spectrum." Taking the velocity of light as 185,300 miles per second, and the wave-length of $D_1$, as given by Angström, at 0·00058950 millimetres, gives 5,058,700,000,000,000 vibrations per second, or a little more than five thousand millions of millions, instead of a little less than six hundred millions of millions vibrations per second, as given by Dr. Mayer. But to proceed—"Then fork No. 3 will represent 590 millions of millions vibration per second," this should be 594 millions of millions vibrations, "which give a wave-length ·0000042 millimetres longer than $D_1$." This again is not quite right, even according to Dr. Mayer's own showing; it should be ·00000495 of a millimetre longer than $D_1$. Dr. Mayer then goes on to say that such a wave-length nearly corresponds with an iron line situate ·42 div. below $D_1$ on Angström's chart; and "we saw that fork No. 3, giving 254 vibrations a second, had to move toward the ear with a velocity of 8·734ft., to give the note produced by 256 vibrations per second emanating from a fixed point; so a star sending forth the ray which vibrates 590 millions of millions a second will have to move toward the eye with a velocity of 28,470 miles per second to give the colour produced when ray $D_1$ emanates from a stationary flame." This again, according to Dr. Mayer's own method, should be 1,557 miles, or less than a nineteenth of the velocity given by him.

Instead of involving ourselves in millions of millions, and the translation of millimetres into English miles, it seems simpler to avoid the calculation of the number of vibrations per second, and to get at the required velocity by a simple rule-of-three sum, thus: As the emitted wave length is to the difference between the observed