either writes extravagantly, or that, in describing the social, industrial, and other characteristics of the colony, they have allowed themselves to be unduly swayed by mere feeling. They have, of course, a good deal to say about the Maoris, and it is worth noting that each refers to habits and physical conditions which cannot but tend to hasten the decay of that interesting race. A strong liking for whisky is unfortunately characteristic of most Maoris, and Mr. Payton remarked that the state of drunkenness appeared to have a great fascination for them. "I once saw a Maori that I knew," he says, "walking up and down the veranda of an hotel, and looking very much disgusted about something. On my asking him what was the matter, he told me he had had thirteen glasses of whisky, and *couldn't* get drunk!"

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Solar Halo.

BETWEEN 1 and 2 p.m. of January 11, a solar halo, so remarkable as to deserve some notice in the columns of NATURE, was observed and sketched by myself and several of my pupils. The mock suns A, B, and D (see diagram below), appeared to be at the usual distance of about $22\frac{1}{2}^\circ$ from S, and the halo at E about the same distance from D.

A and B were quite bright, but D and E were nearly twice as brilliant, and blazed with gorgeous prismatic colours.

The parhelic circle—observed by Prof. William Ellis on April 1, 1886 (NATURE, vol. xxxiii. p. 535)—was very bright. It extended only from the mock suns A and B outwards from S to about 120° from the latter; and on the right branch of this circle was another mock sun (not shown in diagram) at the dis-

tance of about 90° from B. This last sun, as well as the visible portions of the parhelic circle, was formed of pure white light, and the latter was everywhere parallel with the horizon.

But perhaps the most remarkable part of the phenomenon was the forking of the arc cEd at the ends c and d , and the concave recurving of the arc aDb (convex to S at D) at the ends a and b . These forkings and recurvings were very distinctly visible at about 1.30 p.m., traced in fainter prismatic hues.

There was a light cloudy haze covering the southern two-thirds of the sky, while the remainder was clear. Calm moderate weather both preceded and followed the phenomenon for some days.

EVAN MCLENNAN.

Brooklyn, Iowa, U.S.A., January 14.

[The altitude of the sun is not given, but (according to Bravais) it must have been less than 30° , because of the extreme vividness of the tangent arc to the halo of 46° . This also accounts for the "recurved" appearance of the tangent arc to the halo of 22° . The apparent bifurcation of the halo of 46° is too rudely drawn to afford the means for a rigorous investigation. As sketched, it may be due solely to diversity of inclination (*balancement*) of the axes of the ice-crystals.—ED.]

Seismic Disturbance at Venezuela.

ABOUT the middle of November 1888, there was a notable seismic disturbance in several places of Northern Venezuela. On the 13th, at 4h. 30m. a.m., a rather heavy concussion was felt at Caracas, and eastward as far as Rio Chico, where it caused some damage. On the 17th, two shocks were noticed at Cumaná, viz. at 5h. 8m. a.m. and 2h. p.m. It is reported that their force diminished towards the east, so that they were scarcely perceptible at Carúpano. On the same day two shocks (1h. 45m. and 5h. 15m. p.m.) damaged in a somewhat serious manner a large number of houses at Guanare ($69^\circ 20'$ W. of Greenwich, $8^\circ 45'$ N. lat.); two more were felt at the same place on the 18th at 3h. p.m., and on the 19th at 1h. 10m. a.m. The ultimate sign of the paroxysm was observed at Caracas on the last-named day, a few minutes before five o'clock in the afternoon. The zone of disturbance extended from Carúpano to Escuque (63° to 70° W. of Greenwich), and embraced the whole mountainous part of Northern Venezuela. In some cases the wave-motion is said to have been plainly north-east to south-west; but the maximum of disturbance (first shock at Guanare) showed decidedly a direction from north to south, as results from the numerous cracks in damaged walls and the way in which free-standing objects were thrown off their bases. The clock at the telegraph station, which hangs on a wall running east to west, was likewise instantly stopped. Dr. Lisandro Alvarado, a physician who resided at Guanare, who communicated these facts to me, informs me at the same time that the cracks emerge in an angle of from 75° to 80° . It is therefore very likely that the centre of the shock was not far from Guanare towards the north, where the crystalline schists of the Cordillera break through the overlying clay-slates and Cretaceous rocks, which form the northern margin of the great plains or *llanos* of Venezuela. Guanare lies on the very edge of these plains (185 metres above the sea), where the Cretaceous formation rather abruptly is met by the extensive deposit of conglomerate which covers the plains. Any disturbance in the raised strata forming the southern slope of the Cordillera will thus manifest itself with particular intensity in the vicinity of this border-line. The whole disturbance belongs, of course, to the class of tectonic earthquakes, as, indeed, do all those which happen now and then in this country.

A. ERNST.

Caracas, January 6.

Opportunity for a Naturalist.

CAPTAIN JUAN PAGE, of the Argentine Navy, who is now in London, and read a paper on the exploration of the Rio Vermejo and Rio Pilcomayo at the last meeting of the Royal Geographical Society, has undertaken a new expedition for the survey of the Pilcomayo from the Paraná to the frontiers of Bolivia. Captain Page would be glad to give a place on the staff of this Expedition to a naturalist, who would thus have an opportunity of investigating the almost unknown fauna and flora of the Gran Chaco, through which the Pilcomayo runs. The Expedition will start from Buenos Ayres in June next, and be absent about six months. The naturalist would have to find his passage out to Buenos Ayres, and home, and his own equipment and collecting-materials, but on joining the Expedition would be free from charges. I should be glad to put any qualified person who might wish to avail himself of this excellent opportunity of exploring a most interesting country in communication with Captain Page.

P. L. SCLATER.

Zoological Society of London, 3 Hanover Square,
London, W., February 4.

Mass and Inertia.

DR. LODGE (NATURE, January 17, p. 270) seems to have misunderstood the bearing of my letter on mass and inertia (January 10, p. 248).

I was careful to point out that my remarks on the advantages of a force-time-length system of units had reference solely to *procedure in teaching*. Dr. Lodge, failing to observe this, objects to the suggestion because it does not immediately afford an absolutely permanent, universal unit of force. It was not intended to do so. Anyone who has learnt dynamics and attained clear ideas, appreciates the convenience of the *inertia*-time-length system for the purposes of the record. But the teacher's business is with those who have not yet learnt, but who, knowing nothing

yet of inertia, are—in this country, at any rate—already accustomed to pounds or ounces as the practical units of force. My suggestion is simply, “Don’t swap horses while you are crossing the stream.”

Dr. Lodge appears to object to my using the word inertia in the sense of the coefficient m . But he does exactly the same in his own book on “Mechanics” (p. 49) and the usage is, I think, quite common.

A. M. WORTHINGTON.

R.N.E. College, Devonport, January 26.

As a student and teacher of physics who has come much into contact with engineers and other artisans, I venture to say a few words on the vexed question of dynamical units now under discussion in your pages. It seems to me that it would be a distinctly retrograde step to adopt the proposals which Mr. Worthington makes in a recent number of NATURE. It would amount virtually to a return to the cumbrous and discredited system of units in use in British text-books of dynamics before the appearance of “Thomson and Tait,” and the introduction of the Gaussian units of mass, force, &c.

It is certain that, whether the word “pound” be properly used to denote a unit of force or not, a common usage of the term is to denote a certain quantity of matter—that which has the same gravity at the same place as the so-called standard of weight. This is a standard quantity of matter and is a constant. Now in dynamics the primary property of matter is inertia, and inertia alone. When we compare the masses of bodies dynamically, we compare only their inertias; and that the forces of gravity on different bodies are proportional to their masses we have from Newton’s pendulum experiment, &c. It seems natural and convenient, therefore, starting from this primary property of matter, to take the unit of mass as we find it defined, and give to that unit the unit of inertia. Then if the numeric of mass of a particle be m , of its acceleration dv/dt , the numeric of the inertia-reaction is $m \cdot dv/dt$ simply. The plan proposed by Mr. Worthington would introduce quite gratuitously the relation of his “unit of inertia” to the unit of mass, a relation which has been in the past—and would, I fear, be again—a great source of confusion to the student.

It is to be remembered, further, that the Gaussian system of units has been adopted by most civilized nations for practical electrical work. Certain units are constantly used in electrical engineering, which are simple multiples or submultiples of the various derived units in this system. It is too late in the day to change all this, and thereby run the risk of throwing things into the state of chaos from which with great labour and trouble they have been rescued. Hence the engineer, whatever units he uses for steam-pressures, &c., must, if he is taught dynamics at all, be taught how to express results given in gravitational units in terms of units independent of locality, or any other varying circumstance. It seems to me desirable, therefore, on the ground that the Gaussian system of units is in use in a great and growing department of engineering, to adopt it in our teaching at the outset. The true relations of other units is then got at once, and unfaillingly.

My experience as a student and as a teacher is all in favour of the system and nomenclature followed by the persons whom Prof. Greenhill (I think) called “precisionists.” Words are, of course, used in more senses than one in popular language; but if a popular word, such as “pound” or “weight,” is to be adopted for scientific use, a restriction of its meaning to one sense is absolutely necessary if confusion is not to result. This, at any rate, is the principle on which scientific nomenclature has proceeded hitherto. This precision in the use of terms is absolutely necessary in teaching, and confusion of thought cannot be avoided without it. Of course there is want of consistency—no teacher can be perfectly precise; but that is hardly an argument for throwing precision overboard altogether.

Methods of teaching, after all, must stand or fall by their results, and I should like to join my testimony to that of those who say from experience that the Newtonian method in its original simplicity, with the system of units which Gauss gave, and which has produced so great and far-reaching scientific results, is the best way of approaching the study of dynamics. Students properly taught in this way have no difficulties beyond those inherent in a confessedly difficult subject.

ANDREW GRAY.

University College, Bangor, January 28.

Use of Sucker-Fishes in Fishing.

WITH reference to Mr. Slater’s note in NATURE of January 24 (p. 295), on the use of the *Remora* in fishing, I would like to call attention to the use of sucker-fishes by the aboriginal inhabitants of Cuba. Ferdinand Columbus (“Churchill’s Voyages,” 1704, vol. ii. p. 616) says these people used the sucker-fish to catch both other fish and turtles. These fishes when tied “by the tail run themselves against other fish, and by a certain roughness from the head to the middle of the back, they stick so fast to the next fish they meet, that, when the Indians perceive it, drawing their line, they draw them both together.”

Lightcliffe, Yorkshire, January 26.

H. LING ROTH.

Remarkable Rime and Mist.

THE extraordinary rime described by your correspondents was also experienced here (at 425 feet above sea-level) in January.

Though not an unusual occurrence in severe weather, this has never been equalled in my recollection.

The freezing fog lasted three days, each succeeding one appearing to add to the thickness of the rime, which culminated on the 6th, when it was difficult to believe that the trees were not covered with snow. On that date I measured one of the sheaves of spiculae attached to a terminal shoot of a beech-tree, and found it very nearly $2\frac{1}{2}$ inches in length. This, of course, was rather exceptional.

E. BROWN.

Further Barton, Cirencester, February 1.

IT seemed to me scarcely necessary to mention the amount of what may be called, for the sake of brevity, “sooty matter,” in the rime referred to by Mr. Maw (p. 295). Some of the products of combustion are frequently restored to the ground without contact with water particles; but many are carried about in the atmosphere for a considerable time, and are returned to the earth through aqueous precipitation. I am not sure that the subject of the varying results of analyses of rain-water, obtained under various conditions of weather, has received the amount of attention which it deserves. The heavy rains of our summer thunderstorms seem to contain less sooty matter than is brought down in drizzling rain, when we have made the necessary allowances for direction and force of wind, hygrometrical and thermal conditions, type and quantity of previous rainfall, &c. This is probably due to the fact that rain-drops of the thunderstorm fall from the greater altitude and fall more vertically through the lower strata of the atmosphere. I should, however, like to learn from some readers of NATURE whether the larger rain drops may not also, from the motion of air which they produce, treat some of the particles of sooty matter with the kindly neglect shown by them to the midges. Snow (as, I suppose, most people have observed by the sense of taste, without chemical analysis) contains, when melted, more sooty matter than rain, and I should have expected the inhabitants (including, of course, the tobaccoconists) of certain localities on our globe to feel rational gratitude to those slanting flakes which, in their voyage through our air, cleanse it of its sooty particles at those seasons when we are most fertile in producing the latter. But the drifting fogs which traverse a considerable area of land where there are factories, chimneys, &c. (their water-particles moving in lines nearly concentric with the earth’s surface, and at no great height above it), should give the air a more thorough washing than is provided by the more common forms of precipitation. The ice-crystals produced by such fogs necessarily furnish, when melted, a maximum of sooty matter.

The letter from Mr. Lowe (p. 319) confirms what was anticipated, that the fog and rime were considerably less in the west of England than in the Midlands. It is perhaps contrary to the rules of good taste for me to criticize the words of so great an observer as Mr. Lowe, but is it not a contradiction of the laws which govern atmospheric phenomena, considering the great distance between true cirri and the fog described, to suppose that the upper surface of the latter “rapidly changed to cirri clouds”?

Speaking of mist, it is almost impossible not to refer to the very interesting article by Prof. J. H. Poynting, F.R.S. (p. 323). May it not be possible that the quivering so often seen in a summer haze is, after all, the result of evaporation, as Wordsworth, the poet of Nature, himself seems to have thought in his use of the word “steam,” in “The Excursion.”

ANNIE LEY.