

occurrence as upon the theory of physiological selection we should have antecedently expected. Looking to the great sensitiveness of the reproductive system, to the many and the varied causes which affect it, to the frequency with which these causes must have been encountered under Nature, to the fact that whenever a collective variation occurs of the kind which induces physiological selection it must almost certainly leave a new species to record the fact—looking to all these things, the only real difficulty is to explain why, if physiological selection has ever acted at all, it should only have done so at such comparatively rare intervals, and therefore have produced such a comparatively small measure of result. If my critics had adopted this line of argument I should have experienced more difficulty in meeting them. But, as the case now stands, it seems enough to remark that I do not know of any way in which an adverse criticism admits of being more thoroughly exploded, than by showing that the difficulty which it undertakes to present is the precise opposite of the one with which an author is in his own mind, and at that very time, contending.

"Seeing how remarkable has been the misunderstanding displayed by such competent readers as Mr. Wallace and Mr. Seebohm—a misunderstanding on which they both found their only objection to my theory—I should have been compelled to suppose that my paper failed in clearness of expression, were it not that (as above shown) they have disregarded the literal construction of my sentences. Nevertheless, it is probable enough that I may not have sufficiently guarded against a misunderstanding which it never occurred to me that any one was likely to make. For I supposed that all readers would have perceived at least that the main feature of the theory is what my paper states it to be—namely, that sterility with parent forms is one of the *conditions*, and not always one of the *results*, of specific differentiation. But, if so, is it not evident that all causes which induce sterility with parent forms are comprised by the theory, whether these causes happen to affect a few individuals sporadically, a number of individuals simultaneously, or even the majority of an entire species?"

GEORGE J. ROMANES

Meteor of December 28, 1886

THE meteor referred to by your correspondent "J. M. H." (NATURE, January 6, p. 224) was also observed at Bristol at 10h. 28m. The path was from $95^\circ + 9\frac{1}{2}^\circ$ to $106\frac{1}{2}^\circ - 6^\circ$. A train of sparks was thrown off from the nucleus as it slowly fell.

Comparing the apparent course of the meteor as recorded at Sidmouth and Bristol, it is evident that its radiant-point was at about $77^\circ + 30^\circ$, near β Tauri. It belonged to a shower which appears to have a very extended duration, and has been specially referred to, with diagrams, in NATURE, vol. xxxi. p. 463.

This recent meteor affords unmistakable proof that the radiant near β Tauri continues active until the end of the year. The relative paths at Sidmouth and Bristol show that the meteor was about 97 statute miles high at its first appearance over a point in the English Channel some 28 miles off the Isle of Wight. Moving with a very slight inclination west of north, it disappeared 10 miles south-west of Niton, Isle of Wight, when 39 miles high. It traversed a path of 62 miles at an inclination of 69° to the earth's surface.

The duration of the meteor was about three seconds, so that its velocity appears to have exceeded 20 miles per second, which is greater than that of a body moving in a parabola, though the difference may quite possibly have been induced by observational errors. As regards visible effect, the meteor can lay no claim to the dignity of a fire-ball, but it is one of considerable interest as belonging to the remarkable display of β Taurids.

Bristol, January 7

W. F. DENNING

The Production of Ozone

I SHALL be much obliged if you can inform me through your paper—

(1) What apparatus would be most conveniently and easily worked by ordinary persons for the production of ozone in a room? I have tried a four-cell Smee's battery with a Siemens' ozone tube. This produces the required quantity of ozone, and works well in the hands of people used to scientific apparatus, but the general manipulation (especially as regards keeping the battery in working order) is above most people.

(2) Is there any battery you know that would give good

results and be easily worked by people wholly unused to scientific apparatus (domestic servants for instance)? The quantity required is what would keep the air of an ordinary sitting-room, say $18 \times 16 \times 11$ feet so charged, that ozone would be always just sensible to the smell.

I see by the advertisements of the hotels in the Engadine, that the air in their corridors is kept constantly ozonised. (3) Could they adapt their electric light dynamos for this purpose? (4) If so, how?

I may say I have no "trade purpose" in making these queries. I am a sufferer from phthisis, and find relief in the inhalation of ozone, but I want an apparatus that I could leave to my servants to manage.

W. H.

"Brading," Madeira Road, Bournemouth

JOHN ARTHUR PHILLIPS, F.R.S.

BY the sudden death of this chemist and metallurgist on the 5th inst. geology loses one of its ablest leaders in a department where the labourers are not very numerous here, and at the same time one of the kindest and most helpful among the students of science. Mr. Phillips was born in Cornwall, and among the metalliferous rocks of that county began the scientific researches which he has since prosecuted with so much success. Having early shown his taste for mining and metallurgy, he was sent to obtain his training in these subjects at the École des Mines of Paris. As far back as 1841 he began to contribute papers to the scientific journals. His early essays were almost wholly devoted to chemical and metallurgical subjects. His studies among the Californian gold-fields, however, led him to investigate wider questions in physical geology. By degrees he turned into the domain of petrography, and for the last sixteen years it has been mainly in that branch of science that his original researches have been carried on. His papers on the eruptive rocks of the south-west of England are admirable illustrations of the value of the union of chemical and mineralogical qualifications in petrographical inquiry. Most of his time during the last two or three years had been devoted to the production of large and important treatises. Of these his volume on "Ore Deposits," published in 1884, has taken its place as a standard English work of reference. At the time of his death he was busy with the preparation of a new edition and expansion of a work on "Metallurgy," which he had published when still a young man. In this task he had associated Mr. Bauerman with himself, in whose competent hands the volume is sure to see the light in a form worthy of its author's reputation. Those who were personally acquainted with Mr. Phillips, while they lament the loss to science which his sudden death has inflicted, mourn still more the extinction of a life of singular simplicity, earnestness, and kindness. He was a large-hearted and open-handed man, fond of taking every chance that came in his way of doing a good deed and helping every one to whom his help could be of service.

BOTANICAL FEDERATION IN THE WEST INDIES

IN the nearest of our tropical colonial possessions, which comprise the group of islands generally known as the West Indies, the dominant industry for the last hundred years has been that of the sugar-cane. Sugar and rum are indissolubly connected with these islands, and, under the circumstances which existed fifty years ago, there is no doubt that lowlands in the West Indies were better suited for the remunerative culture and growth of the sugar-cane than any other plant. Owing to a variety of causes, among which the abolition of slavery and the extension of sugar plantations in other lands are the chief, sugar-growing in the West Indies has suffered numerous reverses of fortune. Latterly, the difficulties of planters