

"Zoology at the Fisheries Exhibition"

IN your issue of the 20th ult. (p. 489) a direct challenge is made upon several points as to the veracity of my former letter. "The Writer of the Article" states what he terms certain "facts,"—the first being that I informed the jury of Class V. that certain corals under my name, 813 b, were in the case with Lady Brassey's corals, and formed part of that collection. I beg entirely to deny this. What I stated to one of the members of the jury in answer to his allusion to my exhibit was, that owing to my being so busy I was unable to exhibit my own corals, and that all my energies had been thrown into the arrangement of Lady Brassey's case. Whoever informed "The Writer of the Article" must have greatly misunderstood my statement. The second "fact" with regard to the opinion of experts I think I need not answer. Opinions may differ. With regard to "fact" three, that neither the series of corals in the British Museum nor those of the Challenger Expedition have been accessible for purposes of examination for some considerable time. It will be sufficient to say that my description and figures of Lady Brassey's corals were published in the *Annals and Magazine of Natural History*, vol. ix. No. 50, in February, 1882, some time after the publication of the volume of the Challenger Reports containing Mr. Moseley's monograph of the "Hydrocorallinidæ," and a considerable time after the specimens themselves were exhibited to public view in the galleries of the British Museum. Those specimens, together with the other corals of the general collection of the British Museum have only been withdrawn from public view within the last few months. BRYCE-WRIGHT

Organic Evolution and the Fundamental Assumptions of Natural Philosophy

By the principle of heredity we understand a tendency in an organism to reproduce in successive order the variations which appeared in its ancestors, the leaning being on the whole to fixity of direction: by the principle of variation the tendency of an offspring to vary in a degree more or less from its parents. Included in heredity, I suppose, are the tendencies to vary, as well as the actual succession of changes in the life-history of the ancestors of the organism: those tendencies to vary being conceived of as series of which some terms may modify or counteract others. If I am right in this description, it appears to me that heredity is an example of inertia acted on by a principle analogous to the first law of motion, and very closely allied with it, if indeed it is not the case that the laws of motion are special cases of wider principles or laws. Following the same line of thought, "variation" may be explained as action analogous to that of forces on a body drawing it from its straight line of motion or its rest. The forces (if I may use that term) which thus cause variations in any particular organism would be:—

- (1) The resultant of difference of conditions cooperating with
- (2) The resultant of inherited tendencies.

Again, answering to the second law of motion, we may perhaps assume that degree of variation is proportional to the forces acting, namely, proportional to the intensities of (1) and (2) above and to the correspondence or divergence of direction in which they tend. If the above hypotheses are accurate, we have, I think, an explanation of the possibility of protozoa, &c., remaining practically unchanged during great changes of conditions. For those genera which show a tendency to great variation in the individuals at the same time seem to present no fixed line of tendency. The result of heredity (as defined above) in these cases is not definite variation tending in certain fixed directions, but great individual or indefinite variability. And their phenomena of reproduction I think account in some degree for this.

On the same hypothesis we may explain, amongst other things, the plasticity of organisation of cultivated plants. One of the conclusions also that would follow would be that "reversion" would not happen except as a resultant of the tendencies in fixed directions having nullified each other, or having converged in the direction of reversion.

To carry the analogy further. Answering to the third law of motion, that action and reaction are equal and opposite, we may perhaps assume that alteration of some organs or properties in the organism, wrought by change of conditions together with heredity, brings about that modification of other properties or organs which Darwin spoke of under the name of "correlation."

I should feel indebted to any one who would point out any

mistake that I have made in this, or would show if the assumptions I have made are untenable. FREDERICK W. RAGG

Masworth Vicarage, Tring, September 25

Curious Habit of a Brazilian Moth

MR. E. DUKINFIELD JONES (*NATURE*, May 17, p. 55) may be interested to learn that the habit of *Panthera apardalaria*, which he describes, of sucking up water and discharging it simultaneously *ab ano*, is not confined to the moth noted by him, but is common to several other lepidopterous insects.

I have watched several species of *Callidryas* and *Pieris* both in Ceylon and Brazil, doing the same thing; also *Papilio Eri-thonius*, Cram, in the latter place, and its ally, *P. Demoleus*, L., at the Cape of Good Hope. I have seen the "white butterflies" in thousands, settling on the mud and damp places in the jungle paths, in all these countries, with their trunks thrust into the soil, drawing up copious supplies of water as if they were so many miniature Abyssinian pumps! The drops ejected were by no means "minute," were rather very large, and I should say 60 would much overtop the marks in a minim measure glass, or, roughly speaking, more than fill an ordinary teaspoon, said to equal sixty drops. I have somewhere (I forget where), among my fugitive writings, noted this fact: stay, I noted it once at least in the *Field* in 1873, February 7. A large moth (*Catocala*?), a fine "yellow underwing," visits the toddy vessels in Ceylon, and gets very drunk, not having joined the "blue ribbon" army, nor having the fear of Sir Wilfrid Lawson before his eyes! I suspect this fellow finds the liquor too good to eject so rapidly, but I have seen small moths of various kinds drinking ordinary sap, and ejecting it like the before-named butterflies.

British Consulate, Noumea, July 24

E. L. LAYARD

Meteors

DURING the month of August I watched the meteors from Logiealmond parish manse, Perthshire, but there the weather was most unpropitious for observing any celestial phenomena, so only a few were seen; whereas there in August last year I witnessed some gorgeous showers of brilliant meteors, which the readers of *NATURE* may recollect. Here in Paisley, on the last Sunday of August, about 11.50, a very large meteor blazed from due south to due east, with a long train, lasting for a minute, and keeping parallel to the horizon, nearly midway to the zenith. The month of September was unusually rich in meteors, but they were generally small and transient, and seemed to be very remote, some of them dashing straight up. A bright but momentary one shot up at right angles from the Pleiades. On September 24, at 10.55 p.m., a very peculiar meteor started from Aldebaran, and exploded in the head of Pisces, under the Square of Pegasus. It was dimly seen through a haze, with a long streak behind, giving unmistakable evidence of its large size; yet, though scarcely seen above its path, brightly shone the Pleiades, Aries, and the Square of Pegasus. On the 25th, at 11.56, a similar one, scarcely seen, sailed through a haze from Pisces to Altair, exhibiting a long trail of broad light, showing that it was a large one. September 30, at 0.12, a meteor considerably larger and brighter than Jupiter passed from the third bright star in Auriga (taking Capella as the first), and exploded close to the lower Pointer in the Plough, leaving a long train of reddish light behind it. On the night of the 29th and morning of the 30th, up to 4, the meteors were unusually large and of longer duration, and altogether more numerous than I have ever seen them in September. A few momentary meteors were seen on the night of September 30 and morning of October 1.

DONALD CAMERON

Mossvale, Paisley, October 1

The Uselessness of Vivisection

YOU will probably permit me to point out that it would be only reasonable for Mr. George J. Romanes to possess a little information on the subject he is dealing with before he accuses another of being "in a quagmire of ignorance and inaccuracy." The pamphlet against which he levels his abuse does not deal with physiology, but with surgical questions. My efforts have not been directed so much against vivisection as against the mendacious statements which have been made concerning advances in surgery alleged to be due to its practice. These have been used to hoodwink the legislature and blindfold

the public, and they deserve the utmost condemnation. If physiologists can make out a case for themselves, I for one am prepared to give it the utmost attention, but they must not bring to their aid false illustrations from a branch of science with which I think I may be permitted to say I have had a large experience.

LAWSON TAIT

Birmingham, October 6

It seems sufficient for me to observe, in reply to the above, that before writing my review of "Physiological Cruelty" I took the trouble to acquaint myself thoroughly with the latest edition of Mr. Tait's pamphlet.

GEORGE J. ROMANES

Breeding of "Hapale jacchus" in Captivity

MR. MOSELEY'S Marmosets (*NATURE*, vol. xxviii. p. 572) are by no means the first instance in Europe, or even in England. Edwards, more than a hundred years ago, recorded a case in Portugal; and Frederic Cuvier had three born in Paris in 1819 (*vide* Sir William Jardine's *Natural Library—Mammalia*, vol. i.). A relative of mine brought a pair of this species from Pernambuco in 1863, and kept them in his kitchen at Surbiton. In April, 1865, I was shown two living young ones which had been born a few days before. In the *Proc. Zool. Soc.* for 1835, births of marmosets of an allied species (*H. penicillatus*) have been chronicled as occurring in this country.

W. C. ATKINSON

Streatham, S.W., October 13

TELESCOPIC WORK FOR THE AUTUMN

WITH Mars, Jupiter, and Saturn so favourably visible in the sky during the ensuing autumn and winter months, we think it may be interesting to call attention to some of their more prominent features, and to ask amateurs and others who devote themselves to the attractive field of planetary observation to make a combined effort, not only to substantiate such facts as are already known with regard to the physical appearances of these bodies, but to endeavour to glean something new concerning them. For, notwithstanding the diligence with which these planets have been scrutinised in past years and the many curious facts that have been brought to light, it must still be confessed that there remains much to be done. Our knowledge is admitted to be extremely incomplete. The powerful instruments of the present day do not seem capable of rendering us efficient aid in this respect; indeed we shall find by a comparison of results that we owe most of our discoveries to telescopes of moderate aperture. The real explanation probably is that, with increase of aperture, definition, especially of the brighter planets, becomes less perfect. Faint markings are obliterated or seen unsteadily and uncertainly in large instruments owing to glare, the difficulty of getting a sharp, hard disk with so much light, and the constant undulations of the atmosphere. With moderately small instruments the conditions are in many respects more favourable. The image is sharply defined, and though the quantity of light may be somewhat deficient, there is an absence of glare and of that atmospheric interference which are inseparable from large apertures. Moreover, the eye is more capable of prolonged observation and is enabled to glimpse the faintest details on an image of moderate intensity. The deficiency of light in small instruments is therefore to some extent a recommendation when it is accompanied with extreme sharpness of definition and when the amount collected by the object-glass or speculum is sufficient to allow a power to be used which displays a fairly large disk without destroying the quality of the definition. Indeed one great desiderative in such cases is to utilise light and power in agreeable proportion, for this is a very essential requirement, which is, however, often neglected, and is frequently the source of disappointing experiences. Amateurs who are careful to consider these matters will be enabled, though their instruments may be of comparatively small reach, to do

much useful work in many departments of observation, and particularly in that relating to planetary markings.

With regard to Mars, high powers are very requisite because of the small diameter of the planet. Hence a fairly large aperture is necessary, for, unless the disk is considerably expanded, it is impossible to trace the chief features satisfactorily. In the case of Jupiter the use of high magnifying powers does not apply with so much force, the apparent diameter of the disk being greater. But this planet is a somewhat difficult object to define satisfactorily. The best telescopes will often fail to show the contour of the disk with desirable sharpness. Hence it is that this object with large apertures is troublesome and to some extent disappointing. This is certainly the case when we consider how efficiently and successfully small instruments perform upon this planet, and with what readiness the faintest and more minute of the details are distinguished. As to Saturn, the conditions are somewhat different. Here there is less light and the telescopic definition is better, so that large glasses possess an undoubted advantage.

The ensuing opposition of Mars is not a favourable one, but many of the most interesting and now well-known features of the planet may be observed in good instruments. The curious network of "canals," as discovered by Schiaparelli, and their duplication, as seen by the same observer during the last opposition, in the winter of 1881-82, should be looked for, as some doubts have been expressed as to the reality of these phenomena. The question is naturally asked, How is it that they are now seen with so much distinctness again and again with a refractor of only eight inches aperture, when large instruments have utterly failed to reveal them? Schiaparelli, it is true, works in a climate highly favourable to such delicate work, and his telescope, though comparatively small, is yet of the finest possible quality. But even with the prevailing conditions so eminently conducive to the attainment of such important results, it must still remain matter for surprise that, as the celebrated Italian astronomer himself put it, "the greater number of canals and of their pairs were observed with comparative ease whenever the air was still, and only a few cases required a special effort on the part of the observer."

These so-called canals appear from Schiaparelli's charts to be very narrow dark markings, running generally in straight lines, and often intersecting each other so as to constitute a perfect network about the equator and in the region south of it. Many of these lines were seen to be double in January and February, 1882, and the inference is that, as these duplications had escaped observation during the more favourable opposition of 1879, they are subject to periodical variations, or in any case represent phenomena of temporary character. They undoubtedly exhibit a most extraordinary arrangement, and such as naturally to call forth some amount of objectional comment from those who, though familiar with the telescopic aspect of the planet, have never seen it as Schiaparelli depicts it. In fact his delineations give a boldness and definiteness of outline in the smallest details which no other observer is able to corroborate. The extreme delicacy of shading and softness of outline so characteristic of many of the features of this planet as displayed in our best telescopes seem wholly wanting, and we have presented to us an elaborate complication of hard, dark lines which bear little analogy to our own impressions.

It has been suggested that many of these so-called "canals" are the edges of half-tone districts on the planet, and possibly this may be so in certain cases. But we must not forget that the eminent author of these important discoveries expresses himself very confidently as to their existence, for he has seen them repeatedly, and at times when the conditions were not favourable to the detection of such difficult markings. Probably something