

refer to the Bermudas as affording a good example of this action: there, will be seen a great extension of the reefs on the north-west side, and reefs are forming on the south-west—the Challenger and Argus Banks; and it should be noticed that these are on the edge of the Gulf Stream, and also that there are considerable eddy currents here which would cause a constant supply of food to be brought to these parts of the islands; whereas the conditions round the other parts of the islands are not so favourable, and consequently there is no extension of the reefs.

I have been much puzzled by the curious formations of coral reefs in the harbours of Suakim and Massana and also round the island of Key West; and I have been unable to account for the peculiarities in the shape of the fringing reefs except by an hypothesis such as the above, in these cases the tidal currents taking the place of the ordinary currents.

DAVID WILSON-BARKER.

The Earthquake in Lancashire.

ON Sunday, February 10, at 10.40 p.m., there was felt here a shock as of a heavy falling body, which caused the windows to rattle loudly. Two or three seconds later a second thud-like shock was felt of somewhat greater intensity than the first. This was followed by gentle but distinct tremors, lasting, perhaps, twenty or thirty seconds more. The weather was calm at the time; the heavy snow-fall had just ceased; barometer rising after the considerable depression which had occurred during the day. The sounds appeared to come from the north-east, as if a heavy body had fallen outside a window having that aspect. Several other persons name the same quarter as that whence the sounds seemed to proceed, and in one instance, in a room having several aspects, there was a distinct statement that the north windows were the first to shake, then those in the south-west, thus indicating a possible line of movement. In most cases no direction was noted. Persons down-stairs thought something had fallen above, those in the upper stories rushed down to see what had happened below. Others, again, felt surrounded by the unwonted movement. A heavy slip of snow from the roof seemed to occur, as first thought, to most, then a colliery explosion—there are two coal-beds near—and finally an earthquake.

The chief physical effects observed here, beside the general vibration, were a violent shaking of windows, the rattling of glass and crockery, such as bed-room ware. Suspended gashades and pictures on walls swung as if with the wind. The doors of rooms and cupboards opened and shut, one or two ornaments fell from their brackets, and the floor is described as “rising.” Most of those who slept were awakened, and seemed to suffer more alarm than those who had not retired. The movements had apparently been more severely felt by them, and they describe their beds as “rocking,” and themselves being almost thrown out. None of our telephones were affected. Substantial buildings seemed less affected than those less solidly built. The various observers quoted were all in a good position to note what occurred.

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Can Animals count?

UNDER this heading, Sir John Lubbock, in his recent interesting book on “The Senses of Animals,” gives several instances of apparent counting in the case of insects. He says:—

“One species of *Eumenes* supplies its young with five victims, one ten, another fifteen, and one even as many as twenty-four. The number is said to be constant in each species. How, then, does the insect know when her task is fulfilled? Not by the cell being filled, for, if some be removed, she does not replace them. . . . In the genus *Eumenes*, the males are smaller than the females. . . . In some mysterious manner the mother knows whether the egg will produce a male or a female grub, and apportions the quantity of food accordingly. She does not change the species or size of her prey; but if the egg is male, she supplies five, if female, ten, victims. Does she count? Certainly this seems very like a commencement of arithmetic.”

Now, it seems to me that this can be explained in a far simpler and more probable manner than by supposing that insects have any power of counting. I think we may safely consider—

(1) That a certain *average amount* of food is required in each case.

(2) That a certain *average time* is required by the insect to collect this food.

(3) That the eggs of the insect follow one another at a *certain rate*, over which she has little or no control.

(4) That the eggs which are to produce *males*, being smaller, take less time to form, and follow at shorter intervals, than do those which are to produce *females*.

Now take the case of the *Eumenes* which provides ten victims. She makes the cell, and goes on adding caterpillars until the egg comes to maturity and is laid, and the cell finished off. She then repeats the process, laying the egg when it comes to maturity, as before; the interval between the laying of one egg and the next being long enough, on the average, to provide ten victims, or in case the egg is to produce a male, the smaller interval only allows of five being provided.

There is thus no need to credit the insect with any power of *counting*, or of knowing beforehand anything about the sex of the eggs. It is merely another instance of the perfect way in which, by the process of evolution, means are adapted to ends.

The same explanation applies to the cases mentioned on pp. 254-56 of “The Senses of Animals.” The bee laboured to fill the cell (in which a hole had been made so that the honey ran out again), until, “when she had brought the usual complement of honey, she laid her egg, and gravely sealed up the empty cell: . . . in some mysterious manner the bee feels when she has provided as much honey as her ancestors had done before her, and regards her work as accomplished.”

I should suggest that the bee merely goes on bringing honey until the *egg is ready*. She then starts another cell, and goes through the same routine until the next egg is ready, and so on; the average amount of honey collected being proportional to the interval between the laying of one egg and the next. According to the theory of evolution, this interval is just sufficient for enough food to be provided for the use of the grub.

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Weight and Mass.

MR. ANDREW GRAY need only turn to p. 355 of the current number of *NATURE* to find an example of an engineer's dynamical terminology, and it would tend to some useful result in this interminable discussion if he would point out in what manner the language of the engineer must be modified to suit the requirements of the *precisionist*. We find on p. 355 “the working pressure is 175 pounds per square inch,” “the total weight of the engine in working order is 37 tons,” “probably having about 30 tons useful weight for adhesion,” and so on.

Let Mr. Andrew Gray point out what he considers the errors of the engineers. Ought the engineer to say, “the working pressure is 175 pounds weight (or pound weights?) per square inch,” “the total mass of the engine is 37 tons,” “probably having about 30 tons useful (? mass or weight) for adhesion.”

On former occasions in this controversy I have attempted to elicit definite expressions of opinion on the terminology of similar definite actual dynamical problems, but hitherto without success.

A. G. GREENHILL.

Woolwich, February 12.

Detonating Meteor.

MR. MAXWELL HALL'S letter on this subject is of considerable interest. When the great meteor-shower of November 11-15 was traced to the orbit of the comet of 1866, it was natural to suppose that the fine fire-balls which occur about this period belong to the same series. Plainly, however, the Jamaica fire-ball recorded by Mr. Hall had a southern radiant far distant from that of the well-known Leonid shower. The same thing was noticed in the case of the shower of aërolites which fell in France on the 13th of November, 1835, the motion being south-east to north-west; and in many other instances in which fire-balls or aërolites were observed within this period the phenomena seem to agree best with a southern radiant, though the descriptions are not as full as we could desire. It thus appears highly probable that almost coincident in time with the well-known Leonid shower there is another shower, rich in fire-balls and aërolites, proceeding from a southern radiant. I hope it will be watched from southern stations in future.

W. H. S. MONCK.

Dublin, February 15.