

lower molars of the tubercular-sectorial types¹; in fact, I think, we cannot do better than accept Prof. Cope's generalisation,² if not as a definitely established theory, at all events as an excellent working hypothesis, "that the superior molars of both ungulate and ungulate mammalia have been derived from a tritubercular type; and that the inferior true molars of both have been derived from a tubercular-sectorial type." These, indeed, are the types which occur most constantly amongst the earlier fossil forms, and the most primitive living representatives both of the Marsupials and Placentals. The Pro-mammalia, when they first arose as a small group struggling amongst their reptilian and amphibian rivals, very possibly adopted some method of feeding for which teeth of these or similar patterns were well adapted. Subsequently, with increasing number and divergence, just as in the pentadactyle limb some digits have been lost and others become unduly developed, the tritubercular teeth have been modified to suit various needs; with this difference that, although digits are not easily added, new cusps often have arisen in the course of adaptation.

Oxford, April 21.

E. S. GOODRICH.

Zoological Regions.

WITH reference to the paper of Mr. Wallace in NATURE (vol. xlix. page 610), I agree with Mr. Wallace's aim and with his estimate of the importance of the subject.

A naturalist, who deals with a single large genus as Pedicularis, makes his own map, showing the distribution of the species and his own view of the lines of descent of his sections in geologic periods. He cannot do this on a map showing the division of the world into six biologic regions according to the Mammalia in them. Or, at all events, none of our monographers, so far as I know, has done it. The difficulty in dealing with a whole natural order is still greater.

The consequence is that, if some other botanic writer wishes to compare the distribution of Pedicularis with that of some allied genus, or to give a view of the distribution of the sub-order to which Pedicularis belongs, he cannot make any use of the results of the Pedicularis monograph without taking it all to pieces and re-arranging the whole material. This is in every case a laborious, in many cases an impossible task.

I therefore agree with Mr. Wallace that we require a division of the globe into "areas absolutely defined, easily remembered," so that, after the monographer has treated his genus or order in natural regions, he may also "tabulate" his facts on these standard areas; in order that his numerical results may be (at least in the rough) accessible for immediate use by others who may not have time (or sufficient special knowledge) to get up the monograph.

It is evident that Mr. Wallace has overlooked my paper on biologic regions and tabulation areas in *Trans. Linn. Soc.* vol. clxxxiii. [1892] (B) pp. 371-387. Otherwise he could hardly have written (NATURE, vol. xlix. p. 612) that his regions readily enable us to tabulate the distribution of a group (and many other statements). In my paper I have pointed out that where I know, as in the case of many Sikkim plants, the exact boundary line of distribution of many species, I cannot tell whether these should be tabulated in Wallace's Region 1, or in his Region 3, or in both. The number of species which are in this predicament is so great that by exerting a choice how I would tabulate them I could bring out any result that might be wished. The more accurately I know the distribution of a species the more impossible is it for me to tabulate it on Wallace's map. And the more perfectly a region is biologically laid down (with peninsulas, islands, &c.) the more impossible it is to use it as an "area" for tabulating on. But, I must not trouble you with a recapitulation of my paper above cited, to which I refer Mr. Wallace and others who may be interested.

C. B. CLARKE.

Kew, April 30.

The Earthquakes in Greece.

THE severe earthquake felt in Greece on April 27 at 9.20 p.m. was observed in Birmingham by the aid of a delicate bifilar pendulum, with which observations are now being made

¹ In a former paper, "On the Fossil Mammalia from the Stonesfield Slate" (*Quart. Jour. Micr. Sci.* xxxv. 1894), I brought forward some additional evidence in favour of this theory.

² "On the Trituberculate Type of Molar Tooth in the Mammalia" (*Proc. Am. Phil. Soc.* 1833), and "Origin of the Fittest."

on behalf of the Earth Tremor Committee of the British Association. This instrument, designed by Mr. Horace Darwin, and made by the Cambridge Scientific Instrument Company, is described in the Report of the Committee presented at the Nottingham meeting last year.¹ I may merely mention here that a tilt of the ground in an east-west direction is magnified about 3000 times by the rotation of a mirror about a vertical axis; and that the image of a fine wire in front of a movable gas-jet, after reflection by the mirror, is observed in a fixed telescope in the passage outside the cellar in which the pendulum is erected.

Shortly before 8 p.m. (Greenwich mean time), I went down to take the usual reading, and found the image of the wire moving slowly from side to side of the field of view, showing that the ground was rocking gently backwards and forwards, the time of a complete pulsation being from twelve to fourteen seconds. It was difficult under the circumstances to make any exact measurements, but the maximum east-west component of the tilting cannot have been less than a quarter of a second. The pulsations were first observed at 7h. 59m., and my impression is that the range slightly increased until 8h. 3m. It then rapidly diminished, being about $\frac{1}{30}$ of a second at 8h. 12m., and never less than $\frac{1}{100}$ of a second until 8h. 28m., after which the pulsations ceased to be perceptible.

The time given by the newspaper correspondents is, I suppose, Athens time, and corresponds to 7h. 45m. Greenwich mean time. The interval between the occurrence of the earthquake and the arrival of the pulsations in Birmingham was therefore not greater than 14m., and, the distance traversed being roughly 1550 miles, it follows that the average velocity of the pulsations cannot have been less than 1.84 miles per second.

Gillott Road, Birmingham, May 1.

C. DAVISON.

"Vermes."

I WISH to enter a protest against the continued use of the word "Vermes" as a term of systematic significance with the same value as "Mollusca," "Arthropoda," &c. Linnæus used the term to include all soft-bodied invertebrates—*i.e.* everything then known except the Arthropoda (his "Insecta") and Vertebrata. Then Lamarck employed the word in a much more definite and unexceptional sense, to include the parasitic worms, the Chætopoda being separated as "Annelida." But what do modern writers mean by "Vermes"? Why, it has nearly as indefinite a limit as that given to it by Linnæus, for it is used to include almost any invertebrate animal—never mind its structure—which does not fit in the Mollusca, Arthropoda, Echinoderma, Cœlentera, or Protozoa. In fact, the term, as employed in such authoritative publications as the *Zool. Record*, *Zool. Jahresbericht*, &c., as well as by Jackson in "Forms of Animal Life," and in Lang's text-book, &c., embraces all, or most, of the following groups of animals:—Cestoda, Trematoda, Planaria, Nemertina, Archannelida, Chætopoda, Hirudinea, Gephyrea, Polyzoa, Brachiopoda, Nematoda, Acanthocephala, Rotifera, Sagitta, Echinoderes, and sundry other small worm-like forms, and even Balanoglossus, and occasionally Chætodermata and Neomenia.

I do not intend to enter into the classification of this heterogeneous assemblage of forms, nor need I do more than refer to the fact that definite terms with scientific limitations are in existence under which the members of the assemblage can be (and are) grouped.

I am perfectly ready to admit that "Vermes" may be a useful descriptive term, if used to imply a certain general form of body, as opposed to some other groups; but I do wish to urge the abolition of it from text-books or titles of papers by well-known zoologists. That the eradication of the word presents considerable difficulties, I am aware; since it is not in England alone that "Vermes" still holds sway, but in all the European countries the equivalents "Vers," or "Würmer," &c., are employed with a more or less equivalent indefiniteness. Nevertheless, several such terms *have* been abolished, and no one nowadays would think of speaking, even in a popular, still less in a scientific work, of "Radiata" or "Zoophytes" or "Infusoria," in the antique significance of these words.

Oxford, April 18.

WM. BLAXLAND BENHAM.

¹ An account of a new and improved form of the pendulum will appear shortly in NATURE.