formation thus far received points strongly to that conclusion.

The skeletons of these three whales have been secured for the National Museum, and it is my purpose to publish something more in detail regarding them at a later date.

F. W. TRUE.

U. S. NATIONAL MUSEUM,
December 8, 1904.

THE VASCULAR BUNDLES IN AN APPLE.

IT is probably a matter of little significance or importance as to just how many vascular bundles may be found about the core of an apple or how they are distributed. I have seen quite a number of cuts in books and bulletins, but I have never seen one that was right. Any person can soon decide this matter to his own satisfaction, by cutting transverse sections of several varieties of apples and allowing them to begin drying for a few days, when the bundles may be seen sticking out prominently.

W. J. BEAL.

A GEOGRAPHIC DICTIONARY.

IN SCIENCE, November 11, 1904, p. 649, Mr. Cleveland Abbe, Jr., states that he is compiling a dictionary of topographic terms. It may, therefore, be well to draw the attention of him and your other readers to a 'Glossary of geographical and topographical terms and of words of frequent occurrence in the composition of such terms and of place-names, by Alexander Knox, B.A., F.R.G.S., * * * London: Edward Stanford, 12, 13 and 14 Long Acre, W. C., 1904,' price 12*s* 6*d* ($3), being a supplementary volume to 'Stanford's Compendium of Geography and Travel.' This work appears richer in ordinary geographic terms and components of place-names than in technical physiographic terms, and no references are given to literature.

F. A. BATHER.

## *SPECIAL ARTICLES.*

ASTER FORMATION IN ENUCLEATED EGG-FRAGMENTS OF CEREBRATULUS.*

MANY cytologists have accepted the view that the centriole (or centrosome) is a permanent and autonomous organ of the cell, but the direct proof or disproof of this hypothesis is very difficult, owing to the extreme minuteness of the centriole. The attempt to obtain decisive experimental evidence was first made (1901) by E. B. Wilson by shaking unfertilized eggs to pieces and subjecting the fragments to a salt solution. Asters capable of division, containing centrioles, appeared in a large number of the egg-fragments, including both those with and those without a nucleus. It is evidently highly improbable that all these centrioles can be considered as the offspring of preexisting ones, since it is an essential part of the centrosome hypothesis that the organ is primarily single, save when precociously divided into two. Wilson, therefore, came to the conclusion that some, at least, of the centrioles that appeared in such fragments must have been formed *de novo*. This conclusion has since been accepted by some writers, but attacked by others, partly on critical grounds, partly as a result of subsequent experiments in the same direction. A source of error in the experiment undoubtedly existed in the shaking of the eggs to pieces at random. Professor Wilson, therefore, suggested to me nearly two years ago to perform the crucial experiments of cutting the living eggs into two singly and treating the fragments individually. For this purpose the egg of *Cerebratulus* is particularly favorable, since before fertilization the first maturation mitotic figure lies at one pole, where it is seen very definitely in the living object as a clear space. By cutting off this part of the egg, one may be certain that the remaining portion contains no centrioles and, if centrioles appear in this portion of the egg, they must have been formed *de novo*.

I tried this experiment during the summers of 1903 and 1904, with results which are, I believe, decisive. The mode of operation was as follows: all the instruments and the female worm, from which the eggs were taken, were first thoroughly sterilized with fresh water so

* Abstract of a paper read before the meeting of the National Academy of Science, November 15, 1904. In this communication the term 'centriole' is used as equivalent to 'centrosome' in the original sense, *i. e.*, as the dividing and frequently persistent body at the center of the aster.

as to remove all danger of accidental fertilization. The eggs were then allowed to lie in sterilized sea-water for an hour and a half, during which time they showed no sign of having been fertilized. Individual eggs were then cut horizontally, one by one, into an upper nucleated fragment containing the maturation figure, and hence the two centrosomes, and a lower non-nucleated fragment. The latter was subjected to a solution of calcium chloride in sterilized sea-water. After an hour they were replaced in ordinary sterilized sea-water. As a result of this experiment, many, indeed almost all of the non-nucleated fragments produced asters, sometimes single, sometimes in large numbers (in one case more than a score of asters were observed in a single fragment). Many, practically all, asters contained centrioles. No cytasters developed in the control eggs allowed to remain in sterilized sea-water. Sections of the non-nucleated fragments thus treated showed that the asters and centrioles are identical in structure with those of an entire egg subjected to a solution of calcium chloride, while preparations of the corresponding nucleated half demonstrated the presence of the two original centrosomes. No other conclusion, therefore, is possible than that the centrioles of the non-nucleated half have been formed *de novo*. The experiment, I think, verifies the conclusion reached in Wilson's experiment, and is contrary to the negative result recently published by Petrunkewitsch. A detailed presentation of the evidence will be given hereafter.

N. Yatsu.

EARLIEST NOTICE OF AMERICAN PROBOSCIDEA.

The opinion is current and appears to be well founded that vertebrate paleontology in this country had its beginning in Thomas Jefferson's description of 'mammoth' remains from Virginia in 1787,* and of the bones of Megalonyx a dozen years later.

So far as scientific investigation goes, this is undoubtedly true, yet it is interesting to recall that fossil elephant remains have been known from the western world for a much longer period, and from Europe (Sicily) since at least the days of Empedocles of Agrigentum.

Not only was Columbus particularly enjoined by the Spanish sovereigns to bring back with him from America all manner of natural products, but in later years Hernandez, private physician to Philip II., and other distinguished functionaries were sent to Mexico for the special purpose of reporting upon the vegetable and zoological curiosities of the country. It was by these travelers, amongst the most prominent of whom besides the afore-mentioned were Oviedo, Acosta and Garcilaso, that fossil proboscidean remains were collected on the elevated plateaux of Mexico, Peru and elsewhere.

Detailed references are given in the second volumes respectively of Cuvier's 'Ossemens Fossiles' and Humboldt's 'Cosmos' to various old Spanish works in which these fossils were described as belonging to a race of human giants, the localities furnishing them being called '*Campos de Gigantes.*' The absurd discussions of '*Teutobochus rex*' in the early part of the seventeenth century are of interest only for revealing the crude state of natural science at that period. C. R. E.

*'Notes on the State of Virginia' (London, 1787).

## *CURRENT NOTES ON METEOROLOGY.*

TEMPERATURE IN CYCLONES AND ANTICYCLONES.

At the 1904 meeting of the British Association, Mr. A. Lawrence Rotch summarized the results of observations obtained at Blue Hill Observatory during 34 kite flights, at different seasons, in areas of high and low pressure, up to about 12,000 feet. The mean decrease of temperature, computed by stages of 1,600 feet, is nearly constant, averaging 1° F. in 376 feet of ascent. Whether the whole column of air in a cyclone is warmer than the corresponding air in an anticyclone (as the convectional theory requires) depends chiefly upon whether its initial temperature at the ground is higher than that of the anticyclone, which is usually the case. If the data obtained from kite flights on consecutive days be plotted for the same height, as was first done at Blue Hill in 1899, it is seen that up to the height of 12,000 feet it is generally warmer at all levels over