proper purpose of preventing or eradicating error and confusion in scientific discussion. That is to say, to make sure that what is referred to under a certain name by one man will be known to all others in that field by the same name. Not always, however, is precision profoundly served by rigid adherence to the rules of any system of nomenclature. Even the carefully planned International Rules of Zoological Nomenclature may cause inconvenience if not confusion if too strictly applied in every instance. As a possible example of this, consider the case of Nummulites, one of the most widely known fossils and invertebrates. It is not necessarily certain that convenience will be served and confusion avoided if the name of this form be changed to Camerina, on the ground that Brugnière in 1792 and not Lamarck in 1801 gave the first name to the fossil foraminifer. Similar instances arise from a strict application of the law of priority to stratigraphic names. The writer was recently interested in the nomenclature of a certain formation in the Appalachian Valley to which in good faith but at different outcrops eight separate names had been applied by seven workers, and the first name to be applied was the least used of the lot. Of the eight names given to this unit, obviously seven should be discarded, but why abandon the one most widely used in preference to the one least known?

For some time, the writer has been opposed to the practice of rigidly applying priority of designation in stratigraphic nomenclature, and he has been recently gratified to find that the U. S. Geological Survey is similarly opposed to too strict an application of this principle. The writer would like to propose what he would call the law of priority of adopted usage which, together with the established law of priority of designation, would apply to the determination of the proper names for stratigraphic units.

In other words, when (as in the case of the Shady dolomite) it is necessary to choose from a number of names applied to a rock formation one which is to serve as the future corrected name, the first term properly applied should be retained and the others discarded, *unless* by so doing that name which has gained the widest currency in geologic literature will thereby be abandoned in preference to an obscure term. In that case, let priority of designation be waived in favor of priority of adopted usage, lest confusion rather than precision be gained. The application of this proposal is neither strikingly new nor novel in current geologic practice, and it is hoped that it will be more widely adopted. Its application in zoologic nomenclature is worthy of consideration.

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DID JOHN NAPIER INVENT LOGARITHMS?

IN 1904 H. Poincaré published a letter under the heading "La Terre Tourne-t-elle?" in which he explained a point of view according to which the rotation of the earth can not be regarded as an established fact, but he emphasized at the same time the desirability of assuming that the earth does rotate, since this assumption is a fundamental harmonizing factor in our scientific thinking. Similarly, the heading of the present note aims merely to emphasize a point of view according to which one might be inclined to say that John Napier did not invent our common logarithms, since the nature of Napier's contributions becomes much clearer if it is viewed also from this standpoint.

The term logarithm itself, which Napier applied to his tables, points to a wide difference between the use he had in mind and our present common view of the main use to be made of logarithmic tables. The term logarithm means ratio number, and Napier's tables were invented with a view to their usefulness in working with ratios, especially with the equality of ratios, or proportions. Hence the fundamental laws that the logarithm of the product is equal to the sum of the logarithms of the factors and that the logarithm of 1 is 0 do not apply to his tables. These facts suffice to exhibit a very wide difference between his tables and our modern logarithmic tables and they seem to justify the heading noted above.

It is true that Napier expressed some views relating to logarithms which were not embodied in his tables, but these tables are commonly called the earliest logarithmic tables and the claim that Napier is the inventor of logarithms has been largely based thereon since the theory of logarithmic computation was developed by earlier writers, especially by N. Chuquet and M. Stifel. In fact, traces of this computation are found in Euclid's "Elements," and more explicitly in the work of Archimedes. If we regard the terms of the arithmetic series which Archimedes associated with a geometric series as the logarithms of the corresponding terms of the latter series it results that the logarithm of the product of two factors is equal to the sum of the logarithms of these factors diminished by the logarithm of 1, which is not 0, just as in Napier's tables.

It is, however, not our main object to prove here that the question noted in the heading should be answered in the negative, but to direct attention to another clear illustration of the general principle that many scientific questions which are commonly answered in the affirmative may be greatly clarified by considering also the negative thereof. Historical questions seem to be especially adapted to be presented in the form of disputations since the negative side of commonly accepted views is more likely to become clear when presented in this manner. Sometimes book reviews aim to throw additional light on questions considered by their authors by referring to views which would naturally lead to conclusions which do not agree with those expressed by these authors. From the standpoint of scientific progress such efforts do not seem to deserve condemnation.

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DINOSAUR TENDONS

WHILE engaged on an interpretation of certain lesions in the Pleistocene Sabre-tooth,[1] an examination was made of the histological structure of ossified tendons in two genera of dinosaurs. The material thus at hand was deemed worthy of closer description and illustration, and the account was published.[3] An unexpected result developing from such a study was the distinction of histological structure in the two genera: *Trachodon* and *Ankylosaurus*. Although Broili[3] had previously investigated the nature of the tendons in one of these genera and Weidenreich[4] has dealt with genetic and developmental factors, yet it seems not to have been previously noted that there are generic differences in the histological structure of the ossified tendons. In order to test that distinction it will be necessary to study many more tendons of several genera and families of dinosaurs in which such objects are preserved. If generic and family differences can be detected in the ossified tendons it will go far in establishing these groups as of long standing and based on fundamental features.

Dollo[5] and Brown[6] have discussed the occurrence, distribution and function of the ossified tendons among the various genera of dinosaurs in which they occur, but this phase of the subject needs revision.

An early paper by Lieberkühn[7] is of importance as dealing with the histological changes involved in the transformation of tendons into bone.

Seitz[8] has written the most ambitious account of the histology of fossil bone which has yet appeared, having studied sections of bone from the Permian, Triassic, Jurassic and Cretaceous reptiles, as well as three genera of Tertiary reptiles and four Recent genera. Seitz had in mind a contribution to ancient histology and made no attempt to determine generic or family distinctions in the histological features of bone, nor did he study any ossified tendons, so far as I can determine.

Broili[3] made an interesting beginning by comparing the histology of ossified tendons of *Trachodon* with a transverse section of the neural spine of one of the sacral vertebrae of the same species. Other comparisons should be made. I am sure Broili is mistaken in regarding the ossified tendons as "verknöcherte Muskeln," for ossification does not involve the sarcous portion of the muscle, but only its connective tissue sheaths. Similarly, many paleontologists confuse *tendons* and *ligaments*, which anatomically have different origins, different structure and different functions.

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MAY 28, 1929

[1] "Studies in Paleopathology," XX. "Vertebral Lesions in the Sabre-tooth, Pleistocene of California, Resembling the So-called Myositis ossificans progressiva, Compared with certain Ossifications in the Dinosaurs," *Annals of Medical History*, IX, no. 1, 91–102, 11 figs.

[2] "The Histological Nature of Ossified Tendons Found in Dinosaurs." American Museum Novitates, No. 312, 1928.

[3] F. Broili, 1922, "Ueber den feineren Bau der verknöcherten Sehnen (verknöcherten Muskeln) von Trachodon," *Anat. Anz.*, 55: 465. 5 figs.

[4] Franz Weidenreich, 1926, "Wie kommen funktionelle Anpassungen der Aussenformen des Knochenskeletts zustande?" *Paleontolog. Ztschrft.* 8: 34–44; 1923, "Ueber Sehnenverknöckerungen und Faktoren der Knochenbildung," *Ztschrft. f. Anat. u. Entwicklungs*, 69: 558.

[5] L. Dollo, 1886, "Note sur les ligaments ossifiés des Dinosauriens de Bernissart." *Archives de Biologie*, 7: 249–264, pls. 8–9.

[6] Barnum Brown, 1916, "Corythosaurus casuarius: Skeleton, Musculature and Epidermis." Bull. Amer. Mus. Natl. Hist. 35: 709–716, pls. xiii–xxii; 1917, "A Complete Skeleton of the Horned Dinosaur Monoclonius, and Description of a Second Skeleton Showing Skin Impressions," *ibid.*, 37: 281–306, pls. xi–xix.

[7] N. Lieberkühn, 1860, "Ueber die Ossifikation. 1. Die Ossifikation des Sehnengewebes," *Archiv. f. Anat. u. Physiol.*, 838.

[8] Adolf Leo Ludwig Seitz, 1907, "Vergleichende Studien über den mikroskopischen Knochenbau fossiler und rezenter Reptilien und dessen Bedeutung für Wachstum und Umbildung des Knochengewebes im allgemeinen," Nova Acta Abh. der Kaiserl. Leop.-Carol. Deutschen Akademie der Naturforscher, Bd. LXXXVII, nr. 2, 235–370, with 14 plates (quarto).

LACTATION VS. IMPROVED GROWTH IN STOCK ALBINO RATS[1]

A RECENT report from this laboratory[2] described unusually rapid growth in the stock colony of rats. The animals whose records provided the data for the study were born, for the most part, in the late summer and early fall of 1927. The ration consisted of a mixture of whole ground wheat two thirds, dried whole milk one third, calcium carbonate and sodium chloride each 1 per cent. of the weight of the wheat. Fresh lettuce was given daily and the lactating females received in addition nine grams of tested dried yeast per week. The dry ration is based on the Diet B of Sherman but differs in the smaller amount of sodium chloride and in the addition of calcium carbonate.

Beginning in the early fall of 1928 difficulty of reproduction was encountered in this colony. Litters

[1] From the Laboratory of Physiological Chemistry, Yale University, New Haven, Conn.

[2] A. H. Smith and F. C. Bing: *Jour. Nutrition*, 1, 179, 1928.