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

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 "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).

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.

of the usual numbers of individuals of normal size were born, but the young either starved to death or were killed by the mother. The difficulty was not characteristic of vitamin E deficiency but seemed attributable to lack of milk production by the mothers. It is striking that the females manifesting this apparent failure in lactation were almost all of the fifth generation on the stock diet. Cod-liver oil given in addition to the ration did not have a noticeably beneficial effect. On the other hand, when the above ration is used after weaning there results the same rapid growth already described.

The present communication does not invalidate the data of the previous publication but does call attention again to the differences in the nutritional demands for growth and for lactation. Moreover, in view of the wide use of the whole wheat-whole milk powder ration in its various modifications, our observations may be significant in calling attention to possible cumulative deficiencies in such restricted food mixtures for reproduction and lactation.

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SPECIAL CORRESPONDENCE

STANFORD UNIVERSITY SCIENTIFIC EXPEDITION

A SCIENTIFIC expedition in the interest of the geological sciences from Stanford University into the regions of Lower California and Sonora, Mexico, was made possible through the generosity of Mr. W. L. Valentine, member of the national board of the university. President Ray Lyman Wilbur officially sanctioned the expedition and actively supported its plans. The cooperation of both the United States and Mexican governments was obtained. All arrangements were made and permits secured through the proper official channels.

The party, composed of W. W. Valentine, E. R. Valentine, D. F. Hamelin and L. Wm. Wiedey, all of the Stanford University department of geology, left Los Angeles harbor in January aboard the yacht *Volador*, prepared to carry on for three months field exploration, shore collecting, dredging and bottom sampling. The itinerary scheduled visits at all places along the Pacific and Gulf of California shores of Lower California where favorable anchorages were obtainable. This plan was to be followed throughout, in so far as time permitted. Captain Putta, master of the schooner, possessed a fund of information about the entire region that was a constant source of aid during the progress of the exploration.

The expedition visited most of the large bays and many of the more interesting islands on the Pacific side of the peninsula. The gulf shores, previously having been little visited or explored in this manner, received greater study and attention. After reaching gulf waters and after frequent stops at some of the islands, the party sailed for Guaymas, Sonora, for supplies. Several localities adjacent to that seaport were visited before again crossing the gulf to La Paz. From this most beautiful Mexican village reconnaissance work was carried northward to San Marcos Island. Another trip to the Sonora coast and the seaport of Guaymas was necessary. From that point the expedition returned to the peninsula shore of the gulf at Santa Rosalia. It had been planned on the northward survey to return to the most interesting localities encountered, so frequent stops were made southward from that port. As had been the procedure throughout, runs from one locality to another were made during the night to have the maximum of daylight ashore. Upon reaching the Pacific side once more, fair weather lasted for only a short period and was followed by very severe northwest winds. After anchoring at Cedros Island local, heavy, but intermittent, rains fell about the base of the high peak at the southern end of the island. Few stops were permissible on the return to Los Angeles because of persisting strong winds. The last of March brought to a close much fruitful exploration.

During the expedition many formations were observed. Sediments little metamorphosed of pre-Cretaceous age were developed in a great thickness on Cedros Island. The Cretaceous strata near Ensenada, at Santa Catarina Landing, and on Cedros Island were in each case studied. The Eocene beds were accessible only at Santa Catarina Landing. Oligocene sediments were not recognized at any point. Miocene strata, very similar to those of southern California, are exposed in the vicinity of Turtle Bay and on Cedros Island. A shale facies suggestive of the so-called "Monterey shale" of California is found at both places. The Pliocene marine strata are everywhere abundant, notably on Cedros Island, at Turtle Bay, on Carmen Island, at Pulpit Point, at Conception Bay, on San Marcos Island (near Santa Rosalia) and at Santa Rosalia. In every case fossils were quite common. However, thicknesses of these Pliocene sediments seldom exceeded several hundred feet, in contrast to the many thousands of feet of such strata in southern California. Pleistocene faunas were secured at San Quentin Bay, at Rosarita Bay, at Magdalena Bay, at Pulpit Point and at Conception Bay. It may be explained that marine strata were the first object of our search. As a consequence, efforts were concentrated upon them.