ing III in a high-boiling solvent, heating as such above its melting point, or by other treatments, so that the hitherto believed mechanism of thiochrome formation from thiamine was proved not to be correct.

Recently Sykes and Todd (*4*) attempted the synthesis of the same compound (III). Although they got the same intermediate (VII) from VI and potassium *N*-(2-methyl-4-amino-pyrimidyl-(5))-methyl-thiocarbamate, they failed to convert it into III.

References

1. ZIMA, O., and WILLIAMS, R. R. *Ber.*, **73**, 941 (1940).
2. MATSUKAWA, T., and IWATSU, T. *J. Pharm. Soc. Japan*, **70**, 28 (1950); *ibid.*, **71**, 455 (1951).
3. TOMITA, M., *et al. Ibid.*, **68**, 154 (1948).
4. SYKES, P. V., and TODD, A. R. *J. Chem. Soc.*, 534 (1951).

Manuscript received September 12, 1951.

A New Occurrence and Description of the Fossil *Arthrophycus*

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A new occurrence of the hitherto doubtful or unclassified fossil *Arthrophycus* is reported here. It was found last summer making up most of the west wall of an abandoned quarry in the Tuscarora on the north side of McKee Gap near Roaring Spring, Blair Co., Pa. The fossil occurs in tremendous profusion in a slabby, mottled, red-to-grey sandstone having a nearly vertical dip, near the Clinton contact. Fig. 1 shows a slab (with an 18-in. scale) removed from the wall. Fig. 2 is a closer view of another slab. The fossiliferous sandstone slabs, which are up to 2 ft thick, are separated by fissile, dark-grey shale, which is barren of *Arthrophycus*. The same fossil was found only sparingly in the lower Tuscarora near the Juniata contact at the crest of Tussey Mountain almost directly east of McKee Gap. Both localities are similar to other occurrences described for the Medina group.

The earliest description of this species is found in Amos Eaton's report of 1820 (*1*) where it is accurately described but not named, and is assumed to belong to the Vermes. In 1831 Richard Harlan (*2*) described the same fossil under the name of *Fucoides alleghaniensis,* or *F. brongniartii,* implying its algal origin. R. C. Taylor (*3*) in 1834 reprinted Harlan's report emphasizing the fossil's plant character, and again in 1835 reported in detail on the beds in which fucoids occur (*4*). T. A. Conrad (*5*) in 1839 described the specimen as *F. harlani.* The generic name *Arthrophycus alleghaniensis* was given by Hall in 1852, and H. R. Goeppert (*6*) somewhat later in 1852 named it *Harlania halli.* Finally, in 1893, Joseph F. James (*7*) decided that, according to accepted nomenclatorial procedure, the specimen's name *Arthrophycus alleghaniensis* (*Harlan*) *Hall,* as given by Hall, should be retained.

Admittedly, owing to the complete lack of internal structure, the classification of the specimen is problematical, yet its status as a plant seems to have been strongly indicated over one hundred years ago and time and again during the past century. Nevertheless

FIG. 1.

FIG. 2.

Arthrophycus in modern literature and textbooks is usually referred to as a fossil worm or as a worm burrow. Such references fail to consider the evidence for paleobotany, although the generic name *Arthrophycus,* meaning "jointed seaweed," has not been disputed.

The fossil usually consists of a stem ½"–¾" in diameter, dividing dichotomously, or frequently being multibranched (Figs. 1, 2). Its surface shows closely spaced rings that form distinct transverse ridges. Individuals are of variable length, some having been traced for 3 ft without interruption. The annular ridged pattern is incompatible with the idea of a worm burrow, and the great extent of its branches is incompatible with the idea of direct remains. It is quite possible that the annular ridges are relics of structures that served to strengthen the primitive plant in the shifting shore currents. The early Silurian was at best the dawn of our flora, and the structure of the fossil suggests a primitive hollow, cylindrical tube, possibly filled with cytoplasm.

Longitudinal and transverse sections, also surface polishing, have not revealed any surface structure or even epidermal structure of a single layer. In fact, the fossils are completely integrated with the matrix except for their surface form, so that they are probably casts. Their surface texture is usually finer grained than the rock matrix. These cylindrical "algae" may have been completely filled and replaced by sand and mud.

In correlating *Arthrophycus* with modern fucoids several similarities should be considered. *Arthrophycus* occurred in great masses, apparently in shallow water. Its attitude and structure would indicate that layers of plants were covered by subsequent layers, which would account for their entangled masses. Present fucoids similarly occur in matted profusion in the littoral zone, and shallow-water flora is often covered with sand or silt. Most of the evidence suggests floral origin of this fossil, and the botanical rather than the faunal character of *Arthrophycus* should be emphasized.

References

1. EATON, A. *Index to the Geology of the Northern States.* Troy, N. Y.: W. S. Parker, 211 (1820).
2. HARLAN, R. *J. Acad. Nat. Sci. Phila.,* **6**, 289 (1831).
3. TAYLOR, R. C. *Loudon's Mag. Nat. Hist.,* **7**, 27 (1834).
4. ———. *Trans. Geol. Soc. Penn.,* **1**, 5 (1835).
5. CONRAD, T. A. *Second and Third Annual Reports of the Paleontological Department of the Geological Survey, N. Y.,* 60 (1839).
6. HALL, J. *Paleontology of New York,* Vol. 2. *Organic Remains of Lower Middle Division of New York System.* Albany: Geol. Survey of New York, 5 (1852).
7. JAMES, J. F. *J. Cincinnati Soc. Nat. Hist.,* **16**, (2, 3), 82 (1893).

Manuscript received October 1, 1951.

Antibiotic Feed and Vitamin B_{12} Supplements for Lactating Dairy Cows

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Evidence is accumulating that aureomycin is of value to young calves, resulting in increased growth and reduced incidence of scours (*1–5*), although earlier work by Bell *et al.* (*6*) using steers, and by Colby *et al.* (*7*) with lambs, indicated adverse effects on feeding aureomycin to ruminants. The animals lost weight and showed anorexia and diarrhea.

No report has been found in the literature on the effect of supplementing the ration of lactating dairy cows with antibiotics or vitamin B_{12}. The present work concerns the feeding of a 1% level of an aureomycin,[1] tyrothricin,[2] or vitamin B_{12} supplement[3] to lactating cows over a period of 60 days without any detrimental effect to the animals or the milk, or any increase in the vitamin B_{12} content of the milk.

Four groups of 5 Holstein cows each were used. They received the regular LSU herd ration. Group I served as a control, Group II received 130 mg aureomycin daily, Group III received 130 mg tyrothricin daily, and Group IV received 0.83 mg vitamin B_{12} daily. All animals had good appetites and showed no evidence of diarrhea whether they were consuming the antibiotics or vitamin B_{12}.

Standard bacterial plate counts were made biweekly on the milk of each group, immediately after milking and after a 12-hr incubation period at 35° C. The results showed that the feeding of antibiotics had no affect on the bacterial flora of the milk. All milk samples developed lactic acid on incubation and produced a normal acid curd. This indicates that the antibiotics were probably not coming into the milk, or if present at all were of such a low concentration as not to interfere with curd formation. This is of interest, since several investigators (*8, 9*) have re-

[1] Courtesy Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y.
[2] Courtesy S. B. Penick & Co., New York.
[3] Courtesy Merck & Co., Inc., Rahway, N. J.