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

M. O. Haq, L. L. Rusoff, and A. J. Gelpi, Jr.

Dairy Department, Louisiana Agricultural Experiment Station, Baton Rouge

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.

ported that antibiotic treatment of mastitis by intramammary infusion resulted in milk containing sufficient antibiotic to result in the production of inferior cheese as well as other dairy products.

The addition of a 4% level of a vitamin B_{12} supplement (3.3 mg vitamin B_{12} daily) to the ration of lactating cows also did not result in any increase in the vitamin B_{12} level of the milk when assayed microbiologically (*10*).

Further details of this work will be published elsewhere.

References

1. RUSOFF, L. L. *J. Animal Sci.*, **9**, 666 (1950).
2. BARTLEY, E. E., FOUNTAINE, F. C., and ATKESON, F. W. *Ibid.*, 646.
3. LOOSLI, J. K., and WALLACE, H. D. *Proc. Soc. Exptl. Biol. Med.*, **75**, 531 (1950).
4. RUSOFF, L. L., and DAVIS, A. V. *J. Dairy Sci.*, **34**, 500 (1951).
5. RUSOFF, L. L., DAVIS, A. V., and ALFORD, J. A. *J. Nutrition*, **45**, 289 (1951).
6. BELL, M. C., WHITEHAIR, C. K., and GALLUP, W. D. *J. Animal Sci.*, **9**, 647 (1950).
7. COLBY, R. W., RAU, F. A., and MILLER, J. C. *Ibid.*, 652.
8. BELL, W. B., *et al. J. Dairy Sci.*, **34**, 675 (1951).
9. KRIENKE, W. A. *Am. Milk Rev.*, **12**, 54 (1950).
10. SKEGGS, H. R., *et al. J. Biol. Chem.*, **184**, 211 (1950).

Manuscript received October 2, 1951.

Desmethylcolchicine, a Constituent of USP Colchicine[1]

Robert M. Horowitz and Glenn E. Ullyot

Smith, Kline & French Laboratories, Philadelphia, Pennsylvania

In purifying a batch of USP colchicine for biological studies we have found that the material contains an appreciable amount (*ca* 4%) of a second alkaloid, as well as minor amounts of other constituents. In view of this we believe that biological investigators using USP colchicine would be well advised to repurify the material.

Colchicine is generally purified by adsorbing the impure alkaloid on alumina and eluting the pure colchicine with chloroform (*1*). The column of alumina thus eluted often retains an intense yellow color. If methanol chloroform (1:99) is then used as the eluting agent a compound may be recovered (up to 4% based on the weight of impure colchicine) having the properties of desmethylcolchicine (one of the methoxyl groups in ring A demethylated). The evidence for this consists in the facts that the compound $C_{21}H_{23}O_6N$, (*a*) contains three methoxyl groups, (*b*) yields colchicine on treatment with diazomethane, and (*c*) gives a color with ferric chloride only after it has been heated in dilute HCl (presence of an enol ether).

[1] This investigation was supported (in part) by a research grant from the National Cancer Institute of the National Institutes of Health, USPHS.

TABLE 1

	Desmethylcolchicine	Substance C (2)
Melting point	176°–190°; 275.5°–277°	176°–182°
$[\alpha]_D^{22}$ ($CHCl_3$)	−143.6°* (C = 2) −152.0°* (C = 1)	−130.7°† (C = 2.0118)
λ (log ε)		
In alcohol	243.5 μ (4.47) 353 μ (4.21)	245 μ (4.54) 352.5 μ (4.27)
In 0.05 *N* alkali	249 μ 376.5 μ	250 μ 379 μ
Acetyl derivative mp	225°–226.5°	231°–233° (*2*) 225° (*3*)
$[\alpha]_D^{20}$ ($CHCl_3$)	−90.7° (C = 0.7)	−115° (C = 0.671)

* Dried at 155°.
† Dried at 50°.

Desmethylcolchicine is obtained as yellow prisms from ethyl acetate-ether containing a trace of chloroform. It turns to a glass at *ca* 176°–190°, recrystallizes at *ca* 200°–210°, and melts finally at 275.5°–277°. No chemical changes are involved in these transitions. The compound retains solvents and had to be dried to constant weight at 155° *in vacuo* before the following analytical data were obtained:

Anal calcd for $C_{21}H_{23}O_6N$: C, 65.44; H, 6.01; $3CH_3O$, 24.15.
Found: C, 65.42; H, 5.81; CH_3O, 24.14.

Santavý and Reichstein (*2*) recently reported the isolation of a number of new constituents from the seeds of *Colchicum autumnale*, including a desmethylcolchicine designated by them as "Substance C." Substance C gave the same reactions as the desmethylcolchicine described here. A comparison of the physical properties of the compounds and of certain derivatives is shown in Table 1.

Although the data for desmethylcolchicine and Substance C agree only fairly well in some particulars, the agreement of the absorption spectra in neutral and alkaline solution is good. We believe there is sufficient over-all correspondence to assume the compounds identical. It should be noted that a double melting point may have been overlooked in the case of Substance C.

The biological effects of desmethylcolchicine are now being studied.

References

1. ASHLEY, J. N., and HARRIS, J. O. *J. Chem. Soc.*, 677 (1944).
2. SANTAVÝ, F., and REICHSTEIN, T. *Helv. Chim. Acta*, **33**, 1606 (1950).
3. SANTAVÝ, F. *Pharm. Acta Helv.*, **25**, 248 (1950).

Manuscript received September 27, 1951.