In conclusion the administration of guanidine to persons with myasthenia gravis appears to be a rational procedure. In our brief experience guanidine has caused a marked improvement in muscle strength without the production of any untoward symptoms in a patient with the disease. We have been able to maintain a more even level of improved function than was possible with prostigmine. Further experience with the use of this drug will show whether the use of guanidine is any real advance in the treatment of myasthenia gravis.

A. S. MINOT
KATHARINE DODD
SAMUEL S. RIVEN
DEPARTMENTS OF PEDIATRICS AND MEDICINE
VANDERBILT UNIVERSITY HOSPITAL
NASHVILLE, TENN.

THE EXISTENCE OF MERCERIZED CELLULOSE AND ITS ORIENTATION IN HALICYSTIS AS INDICATED BY X-RAY DIFFRACTION ANALYSIS

WHILE making an x-ray study of the large, single-celled, marine plant, *Halicystis*, the presence of mercerized cellulose and certain unusual features regarding its orientation were found, a preliminary report of which would seem of interest prior to the publication of a more extended investigation pending the collection of fresh material next summer.

There are two polymorphic crystalline forms of cellulose (native and mercerized) which may be distinguished by their x-ray diagrams. In the native form, cellulose gives three principal x-ray diffraction rings corresponding to interplanar spacings of 6.1, 5.4 and 3.95 Å. If cellulose is regenerated from solution or liberated from its compounds with sodium hydroxide or certain other strong-swelling reagents, the native spacings are replaced by new spacings of 7.4, 4.45 and 4.0 Å. These latter spacings are associated with the hydrated or mercerized form.

The 7.4, 4.45 and 4.0 Å lines, and also three other outer lines characteristic of mercerized cellulose, may be identified in the x-ray diagram of *Halicystis*. There is also present a line not associated with cellulose, corresponding to the approximate spacing of 12.5 Å.

All samples of plant cellulosic membranes heretofore subjected to x-ray diffraction analysis show the cellulose to exist in the native form. For this reason the existence of diffraction rings in *Halicystis* corresponding to those of the mercerized form is of special interest. Whether or not this mercerized condition is specific for *Halicystis* is not known, since comparatively few of the lower plant membranes, or membrane constituents other than cellulose, have been subjected to x-ray analysis. The mercerized cellulose pattern was identified in three species of *Halicystis* (*grandis*, *ovalis* and *Osterhoutii*) obtained from different localities.

The orientation of cellulose in *Halicystis* is also unusual. With the x-ray beam perpendicular to the membrane surface, the 7.4 Å line is missing, and the 4.45 and 4.0 Å lines give a random oriented pattern; with the beam parallel, the 7.4 Å line is present as two arcs. This indicates that at any particular point in the membrane the 7.4 Å crystallographic planes are oriented parallel to the membrane surface, while the *b* axes of the crystallites (*i.e.*, the direction of cellulose chains) have a random orientation in the plane of the membrane. The non-cellulosic material has an orientation similar to that of the cellulose, as indicated by the fact that the 12.5 Å line is absent with the x-ray beam perpendicular, and present as two arcs when the beam is parallel to the membrane.

The structure of *Halicystis* is of special interest when compared with that of the similar, single-celled marine plant, *Valonia*, which has been the subject of considerable x-ray work.[1] The x-ray pattern of *Valonia* is that of native cellulose. Furthermore, the 6.10 Å crystallographic planes of *Valonia* are oriented parallel to the membrane surface (similar to *Halicystis*), while the *b* axes are oriented parallel in two sets which make an angle of approximately 80° to each other in the plane of the membrane (unlike *Halicystis*).

The present x-ray work was carried out in conjunction with the microscopic and microchemical studies of Farr[2] on the same samples.

WAYNE A. SISSON
CELLULOSE DEPARTMENT,
CHEMICAL FOUNDATION,
BOYCE THOMPSON INSTITUTE

WATER-SOLUBLE DERIVATIVES OF P-AMINOBENZENE-SULFONAMIDE (SULFANILAMIDE)

THE low water-solubility of sulfanilamide suggested that related compounds of greater solubility might be of higher therapeutic efficiency because they would be absorbed and circulated more quickly; thus smaller doses could be administered.

For the purpose of this study a series of sulfonic acid compounds of p-aminobenzene-sulfonamide were prepared.[1] In the present work only those compounds

[1] Sponsler, *Nature*, 125: 633, 1930; *Protoplasma*, 12: 241, 1931; Astbury, Marwick and Bernal, *Proc. Roy. Soc. London*, 109B: 443, 1932; Preston and Astbury, *Proc. Roy. Soc. London*, 122B: 76, 1937.

[2] W. K. Farr, Paper presented before the Physiological Section of the American Association for the Advancement of Science at the Indianapolis meeting, December 28, 1937.

[1] This synthesis was carried out by the Laboratories of The Farastan Company, Philadelphia, Pennsylvania.