A prosthetic portion of the mucin molecule is glycuronic acid. In vitamin A deficiency, a failure in the production of mucus can not be due to an inadequacy of protein, but it might be due to an insufficiency of glycuronic acid. There are apparently two sources of glycuronic acid available to the body, namely, endogenous sources synthesized from glycogenic amino-acids and exogenous sources present in food material. Very great importance must be attached to the exogenous sources under those conditions where the body demands glycuronic acid in larger quantities or at a faster rate than can be produced by endogenous metabolism.

In an attempt to throw further light on the mechanism of mucus production, means were instituted to deplete the glycuronic acid of experimental animals. Rabbits were placed on a diet of oatmeal and water. Three times daily, gradually increasing doses of menthol were administered by stomach tube. Menthol is conjugated with glycuronic acid, and the resulting menthol-glycuronate to a large extent is excreted in the urine. As soon as the dosage of menthol increased to the point where it demanded a larger amount of glycuronic acid than could be supplied by either exogenous or endogenous sources, signs of intoxication occurred. Animals surviving from two to four days show upon autopsy ulcerations in the stomach, pylorus, gall bladder, small and large intestine. These ulcers and erosions bear a marked resemblance to those occurring in vitamin A deficiency.

From studies of this sort, the impression has been gained in this laboratory that the fundamental cause of ulcerative and erosive changes in the gastro-intestinal mucosa is due to the presence in the body from any source whatsoever of toxins so constituted that in order for their detoxication they must be conjugated with glycuronic acid. The demands for detoxication evidently take precedence over the demands of mucin production, with the result that when there is a sufficient accumulation of toxins there will follow as sequelae erosion and ulcers in the gastro-intestinal tract. Since the conjugation of glycuronic acid and toxins occurs in the liver any impairment in hepatic function will predispose to an earlier appearance of mucosal damage. It appears that vitamin A is involved somehow in this mechanism. The evidence of Clausen[1] and others that the reserves of vitamin A or its provitamin are nearly, if not entirely, exhausted in septic diseases is not to be explained entirely on the basis of impaired absorption. The fact that it does not seem probable that all the benefit[2] enjoyed by vitamin A deficient animals when fed whole apple is due to vitamin A only is further evidence in this connection. More work is being done along this line and it is hoped that more information will be provided in the near future.

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[1] S. W. Clausen, *Jour. Am. Med. Asn.*, 101: 1384, 1933.
[2] I. A. Manville, A. S. McMinis and F. G. Chuinard, *Food Research*, 1: 121, 1936.

CONCERNING FOSSIL REMAINS OF LEGUMINOUS PLANTS

ONE feature of the symbiotic nitrogen fixation process of the *Leguminosae* which has received little attention is the possibility of finding fossil remains of these plants with patterns of root nodules. Perhaps the survival of nodules through fossilization is not likely, due to the fact that the nodules are vastly more perishable than the root. From the late Cretaceous and early Tertiary times, fossils of leguminous plants have been found but without any mention of the presence or absence of nodules. The very fact that the wide distribution of the *Leguminosae* parallels the age of great mammal development would seem to indicate that these plants have from very early times harbored the bacteria and thus have been active in the fixation of nitrogen. If plant remains with nodules could be found we would have a clue to the early soil-enriching power of these plants.

Knowledge concerning leguminous fossils with special emphasis on nodule formation would be of great interest. The authors would like to get in touch with paleobotanists who have had experience in studying these forms. It is hoped that some one in this field will report his observations.

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MORE ABOUT SCIENTIFIC ENGLISH

IN a recent note[1] Boring has pointed out that the proper use of English in scientific publications is a matter of good taste, good manners; and suggests that the verbosity and circumlocution exemplified by Urbach in a previous paper[2] are to be judged by such standards. With this point of view I agree. The purpose of English in science is to convey as clearly as possible facts and ideas from author to reader. The trouble with such a criterion is that it implies a certain level of taste which is obviously rather rare. If the literary taste of scientists were well developed, notes on scientific English would not be written.

Scientific phraseology has, however, become so stereotyped that it is possible to single out for general attention and abhorrence specific and often re-

[1] SCIENCE, 84: 457–459, 1936.
[2] *Ibid.*, 390–391.