

ber 6, 1913) was observed during endomixis which in any way even suggested ribbon formation and a figure was given of this animal with the legend "An atypical form of macronuclear disintegration, slightly resembling the ribbon-like formation characteristic of conjugation."<sup>4</sup>

It is therefore interesting to record that the study of animals from this same pedigree culture (I) of *Paramecium aurelia* at about the 8900th generation (November, 1921) showed some cells successfully undergoing endomixis with macronuclear disintegration by ribbon formation and others by chromatin-body formation.

Thus it is clear that although all the data thus far at hand indicate that chromatin-body formation is the typical method of destroying the macronucleus in endomixis, nevertheless under certain unknown conditions the formation of chromatin-ribbons, until now regarded as diagnostic of conjugation, occurs in endomixis. This fact, of course, in no wise narrows the significant and crucial difference between endomixis and conjugation—the absence of synkaryon formation in the former and its presence in the latter.

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### Nutritive factors in plant tissues. V. Further observations on the occurrence of vitamin-B.

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In the course of our studies of the distribution of vitamins in plant products we have collected data regarding a number of important edible foods for which no information in this respect seems to be available at present, with the possible exception of indirect suggestions obtained by other than animal feeding trials. Our experiments, made with rats, supplement numerous earlier ones<sup>1</sup> conducted by the same technique and indicate that *asparagus*,

<sup>4</sup> Woodruff and Erdmann, loc. cit., Plate 4, Fig. 37.

<sup>1</sup> Osborne, T. B., and Mendel, L. B., *Jour. Biol. Chem.*, 1919, xxxvii, 187; xxxix, 29; 1920, xli, 549; xlii, 465.

*celery, dandelion, lettuce, and parsley* all contain noteworthy amounts of vitamin-B. The details of the investigation will be published elsewhere.

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**An experiment on the absorption of glucose given by rectum.**

By ROGER S. HUBBARD and DAVID C. WILSON.

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For many years it has been accepted by clinicians that glucose given by rectum is absorbed immediately into the blood, and surgeons constantly use such a procedure as a part of their post-operative therapy. Because of the difficulties attending the procedure there are comparatively few controlled experiments on the effect of glucose so administered in the literature. The effect of carbohydrate feeding on acetonuria has been clearly demonstrated by many experiments during the past few years, and it was determined to test the rectal absorption of glucose by studies of the effect produced upon experimental acetonuria.

The subject of the experiment (one of the authors, D. C. W.) was a man 5 ft. 9 $\frac{1}{4}$  in. tall who weighed 165 pounds, and whose basal metabolism, as measured by the portable Benedict calorimeter was 1700 calories. He received the diet recently discussed by Hubbard and Wright<sup>1</sup> for four days. This diet furnished 2,142 calories—twenty per cent. more than the basal requirement—and consisted of 54 grams of protein, 54 grams of carbohydrate, and 190 grams of fat. Ten per cent. of the calories in this diet are furnished by protein, ten per cent. by carbohydrate, and eighty by fat<sup>2,3</sup>. The total food intake was probably not sufficient for the needs of the subject.

Acetonuria developed gradually as shown in Table I, and on the fourth day of the experiment, before the acetone excretion had reached its highest level, an enema consisting of 300 c.c. of a 5 per cent. glucose solution was given. Table II shows figures for the morning of the day before the enema was given, for the speci-

<sup>1</sup> Hubbard, R. S. and Wright, F. R., *J. Biol. Chem.*, 1922, 1, 361.

<sup>2</sup> Zeller, H., *Arch. Physiol.*, 1914, p. 213.

<sup>3</sup> Shaffer, P. A., *J. Biol. Chem.*, 1921, xlvii, 449.