

as bacteriostatic, since it seems to consist essentially in an inhibition of growth. It is probable that this parallelism between the bacteriostatic and the bactericidal activity of the dye, so clear cut in the case of gentian violet, does not hold in the case of acid fuchsin and sodium chloride. The evidence thus far gathered would indicate that the mechanism by which growth is inhibited may be entirely different from the mechanism by which organisms are killed.

128 (1875)

On the method of macronuclear disintegration during endomixis in *Paramecium aurelia*.

By LORANDE LOSS WOODRUFF and HOPE SPENCER.

[From the Osborn Zoölogical Laboratory, Yale University, New Haven, Conn.]

In the original studies¹ of the nuclear phenomena involved in endomixis, it was found that macronuclear disintegration, both in *Paramecium aurelia* and *Paramecium caudatum*, was effected by the elimination of spherical chromatin-bodies from the macronucleus, instead of by the transformation of most of the macronucleus into long tangled chromatin-ribbons such as occurs during conjugation in these species. Regarding *Paramecium aurelia*, it was stated that the "differences between the macronuclear changes during conjugation and during the process (endomixis) are only morphological; on the one hand, the macronucleus forms 'wurstförmige Schlingen,' while on the other, the macronucleus eliminates its chromatin by extruding it in the form of spherical bodies."²

This contrast proved valid not only in Woodruff's pedigree race³ (I) of *Paramecium aurelia* in which endomixis was discovered, but also in animals from such diverse sources as Germany and Ohio. Only one cell (*Paramecium aurelia*, I), 4087th generation, Decem-

¹ L. L. Woodruff and Rhoda Erdmann, *Journ. Exper. Zoölogy*, 1914, xvii, 425-517. Erdmann and Woodruff, *Journ. Exper. Zoölogy*, 1916, xx, 59-97.

² Woodruff and Erdmann, loc. cit., pp. 438-39, and 444; Plate 1, Figs. 9 and 11; Plate 2, Fig. 14; Plate 3, Fig. 32.

³ Woodruff, *Biological Bulletin*, 1917, xxx, 51-56.

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."⁴

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.

129 (1876)

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

By THOMAS B. OSBORNE and LAFAYETTE B. MENDEL.

[From the Laboratory of the Connecticut Agricultural Experiment Station, and the Sheffield Laboratory of Physiological Chemistry in Yale University, New Haven, Conn.]

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 ones¹ conducted by the same technique and indicate that *asparagus*,

⁴ Woodruff and Erdmann, loc. cit., Plate 4, Fig. 37.

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