

Woodworth, Harvard University; Professors George A. Garratt and Samuel J. Record (chairman, and secretary of the association), Yale University. About 20 other members of the association assisted in the work, which had its beginning at a conference of wood anatomists at Cambridge, England, in August, 1930.

With the backing of the association, the committee did not hesitate to make old terms more specific or to discard and replace names that were considered inappropriate or misleading. Thus *bars* and *rims* of *Sanio* are replaced by *crassulae*; *pits with cribiform membranes*, by *vestured pits*; *interxylary* and *intraxylary phloem*, by *included* and *internal phloem*, respectively; *conjugate cell* by *disjunctive cell*; *intermediate* or *substitute wood fiber*, by *fusiform wood parenchyma cell*. Among the various new terms are *pit-pair*, *pit annulus*, *blind pit*, *vasicentric tracheids*, *perforation plate* and *tylosoid*. There are precise definitions of *middle lamella*, *primary* and *secondary cell walls* (the committee does not recognize a *tertiary wall*), and of the different types of parenchyma and of pore arrangements. More than 100 of the terms have already been adopted as standard for the International Association of Wood Anatomists.

The report has been reprinted as a pamphlet of 12 pages, including notes and explanations, and may be obtained from the Yale School of Forestry for 10 cents apiece for single copies, with special discounts if ordered in quantities of 10 or more. Eleven hundred copies have already been sold.

SAMUEL J. RECORD

AUTOGAMY IN PARAMECIUM AURELIA

THE first intimation of orderly, deep-seated reorganization processes in *Paramecium aurelia*, apart from conjugation, was given by Woodruff and Erdmann.¹ Since that time, numerous researches have shown the wide-spread occurrence of rather profound internal readjustments, without cell fusion, in other species of ciliated protozoa.

This preliminary note records the occurrence of autogamy in the life history of several different races of *Paramecium aurelia*. Autogamy, as it has been worked out during the past three years—both from mass cultures and from animals bred in daily isolation cultures—is the counterpart, in a single individual, of the complex nuclear changes which are effected during conjugation. In the latter process two animals come together, and, following three maturation divisions of the micronuclei, gamete nuclei are formed. Two of these fuse to form a synkaryon

which gives rise to a new nuclear apparatus. The old macronucleus, which has degenerated, is thus replaced by a new one of micronuclear origin.

In autogamy, the same type of reorganization as conjugation is effected by a single animal. At the time of the first micronuclear division in autogamy, the two small micronuclei increase tremendously in size, develop an elongated, thin, crescent-like form and later transform into large metaphase spindles. Two other divisions follow, whereby the gamete nuclei are formed. Since these three divisions are the exact duplicates, as far as can be determined, of those formed in conjugation, they are interpreted as meiotic divisions. Two of the gamete nuclei of the single animal undergoing autogamy fuse to form a synkaryon. This divides twice to produce four nuclei. Two of them become macronuclear anlagen while the other two remain small and undifferentiated, the two functional micronuclei. The macronuclear anlagen are distributed to two daughter cells at the time of the first cell division, at which time the micronuclei divide. The old macronucleus disintegrates, at about the time of the formation of the gametic nuclei, by elaborating a skein of chromatin-ribbons. This skein later divides transversely into a large number of sausage-shaped fragments which round up and are eventually resorbed into the cytoplasm. In autogamy, then, a new nuclear apparatus is reconstituted from the activity of a synkaryon produced by the gamete nuclei of a single individual.

Preliminary observations on *Paramecium caudatum* and *P. multimicronucleata* suggest the occurrence of autogamy in these species also.

Since autogamy involves maturation and fertilization and hence may be regarded as a sexual process, its genetic consequences—the introduction of heritable variation into the species—would be expected to be of the same order as those of conjugation.

In addition to this sexual process of autogamy, bringing about a drastic cellular reorganization, evidence has been accumulating as to the existence of a purely asexual reorganization process in *P. aurelia*, in which the macronucleus alone is involved. Further details of both processes will be published shortly.

WILLIAM F. DILLER

DARTMOUTH COLLEGE

CATARACT AS A RESULT OF DIETARY DEFICIENCY IN LARVAL AMBLYSTOMA TIGRINUM

IN larvae of the tiger salamander being reared on a series of highly purified milk-powder-casein diets, the lenses of the eyes turned milky-white in mid-larval life and passed through stages like those of "senile" cataract of the cortical type. At the stage

¹ L. L. Woodruff and Rh. Erdmann, "Complete Nuclear Reorganization without Cell Fusion in *Paramecium*," *Jour. Exp. Zool.*, 17, 425-518, 1914.