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

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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.

of swelling there appeared a total opacity of the lens cortex with degeneration of the cortical fibers, but the lens nucleus retained its crystalline transparency. It was clear that inadequacy of the basic milk diet had produced the disease, because it was lacking in other larvae from the same egg-masses fed on a series of synthetic beef muscle diets. Ten animals from the milk-fed groups had visible cataracts when changes were made in the rations. Increase of vitamin A or of vitamin G was ineffective in preventing development of the disease; nine new cases of the eye defect appeared. In another group of larvae fed on one of the milk-powder-casein diets, one case of cataract was developing when dietary addition was given. With purified cystine as food supplement and no change in the vitamin supply, the other members of this group remained free from the eye opacity.

ESTHER M. PATCH

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THE NORTHWEST CONIFEROUS CLIMAX

IN a recent note[1] the assumption is made that the coniferous climax of the Pacific Northwest can be attributed to the winter activity and hence the longer growing season enjoyed by the coniferous evergreens. The writer has no quarrel with the possible importance of length of growing season and consequent total growth as a factor in determining the climax forest (though Hemenway's evidence must be made quantitative as well as anatomical before the relative influence of winter activity on rate of growth can be properly evaluated), but does wish to protest the total disregard in the above note of other important ecological and physiological factors. Differences in longevity, seed production, resistance to injury and disease, and ability to germinate and survive under heavy shade and severe competition are some of the factors that must be considered along with rate of growth in any sound explanation of the resultant climax.

In the opinion of the writer, Hemenway is not justified, without due consideration of such factors, in assuming that the coniferous climax in the Northwest can be explained predominantly upon winter activity in the evergreen conifers.

I. T. HAIG

U. S. FOREST SERVICE
MISSOULA, MONTANA

REPORTS

APPROPRIATIONS FOR GRANTS-IN-AID BY THE NATIONAL RESEARCH COUNCIL

THE Committee on Grants-in-Aid of the National Research Council at its December meeting, out of 119 requests, made thirty-six grants for the support of research projects, as follows:

PHYSICAL SCIENCES

Mildred Allen, associate professor of physics, Mount Holyoke College, "the effect of tension on the electrical resistance of single crystals"; Richard A. Beth, assistant professor of physics, Worcester Polytechnic Institute, "detection of photon spin, in accordance with the quantum theory of light, by direct mechanical means"; John H. Clouse, professor of physics, University of Miami, "x-ray crystal structure"; J. M. Cork, associate professor of physics, University of Michigan, "nuclear disintegration under high potential"; Curtis R. Haupt, assistant professor of physics, Pomona College, "ionization of mercury vapor by electron impact"; Otto Struve, director of the Yerkes Observatory, and C. T. Elvey, assistant professor of astrophysics, Yerkes Observatory, "measurement of accurate contours of the absorption lines in B and A type stars"; Benjamin A. Wooten, professor of physics, University of Alabama, "energy distribution in certain nebulae and stars having continuous spectra."

ENGINEERING

H. Diederichs, director of the Sibley School of Mechanical Engineering, Cornell University, "heat transmission coefficients for steam in condenser tubes."

CHEMISTRY

John G. Aston, assistant professor of chemistry, Pennsylvania State College, "the heat capacities of simple organic compounds"; Simon Freed, instructor in chemistry, University of Chicago, "magnetic optic problems of crystals"; W. D. Harkins, professor of chemistry, University of Chicago, "the force constant for atoms of ordinary and heavy hydrogen in compounds"; W. George Parks, assistant professor of chemistry, Rhode Island State College, "the e.m.f. method for determining heats of dilution"; Milton J. Polissar, assistant professor of physics and chemistry, Armstrong College, "studies of chemical kinetics"; L. H. Reyerson, professor of chemistry, University of Minnesota, "preparation of gases of the methane series with the heavy isotope of hydrogen."

GEOLOGY AND GEOGRAPHY

George H. Anderson, research fellow in geology, California Institute of Technology, "alternations and replacements occurring in a granite batholith in the Inyo-White Mountain Range of California-Nevada"; Elmer H. Johnson, industrial geographer, Bureau of Business Research, University of Texas, "physical and economic characteristics of natural areas of the southwest Gulf region"; Christina Lochman, Chicago, Illinois, "the fauna of the Upper Cambrian Cap Mountain formation of Texas"; Edwin T. McKnight, associate geologist, U. S. Geological Survey, "igneous complex at Prospect

[1] Hemenway, SCIENCE, 78: 437.