standpoint of the work give no excuse for even the most careless reader to carry away the notion that a deft manipulation of equations will *per se* ever solve a biological problem. On the whole the book is an interesting and suggestive introduction to the general subject of "mathematical biology."

RAYMOND PEARL

Archiv für Zellforschung. Herausgegeben von Dr. RICHARD GOLDSCHMIDT, München. Leipzig, Verlag von Wilhelm Engelmann.

Cytology has grown so rapidly within the last decade that it is already one of the important subdivisions of biology and the journals devoted to morphology and physiology are no longer able to provide for the publication of the constantly increasing output of research in this field. Furthermore in the study of the cell, which is the ultimate independent unit of all organic structure and function, the subdivisions of biology into botany and zoology, morphology and physiology, have less value than in the study of less general structures and functions; in the study of the cell all biological sciences come to a focus, the cytologist is not, or at least should not be, exclusively a zoologist, a botanist, a morphologist or a physiologist, but all of these combined. The scattering of cytological literature through the journals of all of these special sciences makes it much less accessible to the student of the cell and tends to emphasize distinctions which are here worse than useless. Finally the problems of cytology are of such general and fundamental interest that they well deserve and should well support special publications in this field.

Almost twenty-five years ago the late Professor Carnoy established the journal *La Cellule,* which has ever since continued to be published in beautiful and sumptious form; from the first, however, it was devoted very largely to the work of Carnoy and his pupils and its *raison d'etre* was the propagation of the views of a particular school. Of late there has been very urgent and increasing need of a general journal devoted exclusively to cytology and representing no particular school or propaganda. Such a journal is the *Archiv für Zellforschung,* edited by Dr. Richard Goldschmidt, of Munich, and published by W. Engelmann, of Leipzig. The first number of this journal appeared in February, 1908, and the first volume, consisting of four numbers, was completed in July of the same year; a second volume has appeared since then. Each volume consists of about 600 pages and 20 lithographic double-plates, with numerous text figures. The *Archiv* receives and publishes contributions in the German, French, English and Italian languages, supplies authors with 40 separata gratis, and pays an honorarium of 40 Marks per signature of sixteen pages for contributions of not more than four signatures. In paper, typography and illustrations the new journal shows the usual German excellence, while the character of the contributions is of a very high order, as is indicated by the following lists of contents of the first volume: Richard Hertwig, "Ueber neue Probleme der Zellenlehre"; G. Tischler, "Zellstudien an sterilen Bastardpflanzen"; A. und K. E. Schreiner, "Zur Spermienbildung der Myxinoiden"; Richard Goldschmidt, "Ueber das Verhalten des Chromatins bei der Eireifung und Befruchtung des *Dicrocœlium lanceatum;* Methodi Popoff, Experimentelle Zellstudien"; M. G. Sykes, "Nuclear Division in *Funkia";* J. Duesenberg, "Les divisions des Spermatocytes chez le Rat"; Kristine Bonnevie, "Chromosomenstudien"; M. G. Sykes, "Note on the Number of the Somatic Chromosomes in *Funkia";* Honoré Lams, "Les divisions des Spermatocytes chez la Fourmi (*Camponotus herculaneus*)"; Alfred Kühn, "Die Entwicklung der Keimzellen in der parthenogenetischen Generationen der Cladoceren *Daphnia pulex";* Vladislav Ruzicka, "Zur Kentnis der Natur und Bedeutung des Plastins"; R. Fick, "Zur Konjugation der Chromosomen"; Friedr. Meves, "Es gibt keine parallele Konjugation der Chromosomen!" R. Goldschmidt, "Ist eine parallele Chromosomenkonjugation bewiesen?"

The second volume is equally meritorious, and the abundance of such excellent contribu-

tions indicates how great has been the need for such a journal, and by the same showing this journal is one which no cytologist can afford to be without.

E. G. Conklin

BOTANICAL NOTES

CYTOLOGY, EMBRYOLOGY AND HISTOLOGY

Dr. Miyake's studies of "The Development of Gametophytes and Embryogeny of Cunninghamia" (*Bot. Mag.*, March, 1908) leads him to the conclusion that there is a close affinity between this genus and *Taxodium* and *Cryptomeria*. He suggests that these genera should be placed with the Cupresseae, "and that *Sequoia* and *Sciadopytis* should each constitute a family by itself."

Helen Dorety in studying "The Embryo of Ceratozamia" (*Bot. Gaz.*, June, 1908) in which there is but one cotyledon, subjected the young ovules to the action of a klinostat (thus neutralizing the effect of gravitation) and found that embryos grown under these conditions developed two cotyledons. These studies are continued in a later paper, "The Seedling of Ceratozamia" (*Bot. Gaz.*, September, 1908).

Here may be mentioned R. J. Pool's "Histological Studies in the Artemisia Formation" (*Univ. Nebr. Studies*, Vol. 8, No. 4), in which further facts are recorded in regard to the relation between the physical environment of plants and their internal structure. Especial attention was given to *Artemisia tridentata*, the "sage brush" of the Rocky Mountain region, a perennial, woody xerophyte, although some attention was given to twenty-four other species of plants which occur in the formation. Eight plates, including forty-two figures, accompany the paper.

In R. H. Pond's studies of the "Emergence of Lateral Roots" (*Bot. Gaz.*, Vol. 46, pp. 410–12) the author concludes that in *Vicia faba* and *Lupinus albus* they "push out from the central cylinder mechanically, and do not have a digestive action upon the surrounding tissue."

In the same number of the *Gazette* W. H. Brown's paper on "The Nature of the Embryo-sac of Peperomia" contributes additional facts to our knowledge of a genus of interesting plants. Among his results are the heterotypic division of the embryo-sac nucleus, and the mature sac with sixteen nuclei. Three fine plates add to the value of the paper.

We may note, also, Dr. Swingle's "Embryology of *Myosurus minimus*" (*Am. Nat.*, September, 1908) and L. L. Burlingame's "Staminate Cone and Male Gametophyte of *Podocarpus*" (*Bot. Gaz.*, September, 1908), both of which add somewhat to our knowledge of the plants concerned.

THE GRAPES OF NEW YORK

Some years ago the New York Agricultural Experiment Station began the publication of a series of comprehensive treatises on the fruits of New York, the first, devoted to the apples, being the work of Professor S. A. Beach. Now we have from U. P. Hedrick and his four assistants a thick quarto volume of nearly six hundred pages, and 101 full-page color-plates. The latter are remarkably fine, and were made by a four-color process in which four photographic negatives were made of each specimen, and from these four copper plates were made, and in the printing each plate was used for one of the four colors used, viz., red, yellow, black and blue. It is by far the best work of this kind that we have seen.

The volume is of much more than horticultural interest, and will be consulted by botanists who wish to know something of the relationship of the various kinds of grapes more or less commonly grown in the northern states. There is first an interesting account of the old world grape (*Vitis vinifera*), and of the many futile attempts to introduce it into North America east of the Rocky Mountains. Then follows a similar, but longer account of the American grapes and their introduction into cultivation. The next chapter on Viticulture in New York is devoted to the practical horticultural aspects of the subject, and this is followed by one wholly botanical in which twenty-three American species are described with much particularity. References