course, not so intensively as in America or other countries.

Sorry to confess, I was unable until now to send you our literature including that which was published during the last few years. Perhaps I will have this possibility in the near future.

Such bits of information fairly well characterize the conditions under which Russian men of science are obliged to live and to keep the "light of knowledge burning," in anticipation of better days for science in Russia.

M. I. WOLKOFF

UNIVERSITY OF ILLINOIS

SCIENTIFIC BOOKS

Genetics, An Introduction to the Study of Heredity. By H. E. WALTER. Revised edition, pp. XVI + 354, 92 figs. The Macmillan Co., New York.

This revised edition of a book originally published in 1913 brings the elemental facts of genetics up to date, and meets at once a need for a popular presentation for the general reader as well as an introduction to the study of heredity for the beginning college student. The enormous progress in this field during the last ten years has necessitated eliminations, additions, and modifications in the former text.

About 82 pages have been added in the present edition, 50 of which form three new chapters. A new chapter on the "Factor Hypothesis" contains much material that was formerly discussed under "Old Types and New," but the rearrangement of materials places the subject matter in a more logical position and allows a distinct and important concept to be treated as a separate unit. Hereditary genes are here classified roughly as single or plural according to ways in which they determine the visible hereditary character. Of the plural genes, the discussion of genetic modifiers is the most important new subject, since modifiers play such a large part in present explanations for the results of selection. An entirely new chapter on the "Architecture of the Germ Plasm" reflects the most important advances made since the original edition was published, and deals with the conceptions and viewpoints based largely on the famous Drosophila experiments, such as linkage, crossing over, the chiasmatype theory, interference, and the arrangement of the genes. The author takes the point of view "that it has been possible in a single chromosome to determine not only the relative arrangement of over thirty genes but also to find out the relative distance between these genes." While the order of the genes may be determined readily, our conclusions as to distances between genes have perhaps outstripped the demonstrable evidence. If two linked genes show 1.5 per cent. recombinations, it still remains to be proved that the low percentage of crossing over is due to or proportional to a short distance between these genes on the chromosome, even in the so-called normal population. Possibly it may be, but there are other alternative explanations. To be sure, the possibility of an accurate localization of hereditary genes in their appropriate chromosomes is attractive and even astonishing. While the hypothesis is alluring, the implications are so grave and important, we must await conclusive proof. A new chapter on "Somatogenesis" points out the problem of biological differentiation which must take place between the invisible genes in the fertilized egg and the Mendelian characters as end products, for during this process many external and internal factors (including endocrines) come into play and contribute to the formation of the somatic characters as we see and study them in pedigreed cultures. The present chapter on "Determination of Sex" introduces much new and important material which was unavailable ten years ago, and substitutes for some of the former discussion which now has only a historical significance, such topics as polyembryony, sex-linked inheritance, nondisjunction of the sex chromosomes, secondary sex characters in relation to hormones, sex intergrades and the like. Excellent diagrams make clear at a glance the distinction between the cases where the males are heterogamic (producing two types of spermatazoa) and those cases in which the females are heterogamic (producing two types of matured ova).

Two radical changes occur in the rearrangement of materials in the new edition. A chapter discussing "Pure Lines and Selection" formerly preceded Mendelism but now more appropriately follows this subject because pure lines and selection can be interpreted best in terms

of Mendelism. The basic facts of cytology were originally treated in the second chapter but now follow the fundamental facts of Mendelism and prepare the way for an interpretation of the "Architecture of the Germ Plasm" according to recent researches.

To reduce mathematical formulæ to a minimum is a decided advantage to the lay reader to whom these are confusing; but it is perhaps disadvantageous for the college student, whom we seem to be shielding from even moderate mental effort by continually simplifying subject matter. Underlying all distributions of characters in assortative matings are certain elementary principles based on probabilities and the theory of simple sampling. When the student looks upon a Mendelian population in these terms, he has the advantage of a general fundamental law rather than the knowledge of an individual case. The general lack of this element in approaching genetic problems is perhaps more keenly felt than any other one thing. For example, the standard deviation is not used "since for mathematical reasons it is more accurate" (p. 27); but it is more convenient, and preferable to the average deviation because of its relation to probable error. Again, the sum of a set of observed frequencies should equal the sum of the calculated frequencies in any given series of observations, but they fail to do so in the table on p. 157. In discussing the practical applications the author states (p. 119) that "when ten differing characters are combined in the parental generation there would result over a million kinds of possible offspring among the hybrids of the second filial generation, $(3+1)^{10} = 1{,}048{,}576$." While such a hybrid would produce 2^{10} kinds of gametes which might combine in $2^{20} = 1{,}048{,}576$ ways, so many duplications of type appear that it is misleading to consider each combination as a separate "possible kind"; and in reality there would be only $2^{10} = 1{,}084$ different visible classes (phenotypes) and $3^{10} = 59{,}049$ classes differing in germinal constitution (genotypes). At some points, there seems to be confusion as to an exact definition of genotype. On p. 109, the author states that "There are then . . . nine different genotypes in any dihybrid cross," *i. e.*, 3^n where n = number of allelomorphic pairs. This definition agrees with the current usage, but is hardly consistent with the usage on p. 153 and p. 159. A number of minor errors which always occur in the most carefully prepared texts will without doubt be corrected in subsequent editions.

The revised edition maintains the same attractive and readable style of the original. The volume as a whole has a broad usefulness in the related fields of sociology, psychology, education and medicine. Many excellent new diagrams, remarkable for their lucidness and pedagogic value, help the reader to visualize complex groups af fact quickly. Even the experienced teacher of genetics will find the volume most suggestive and refreshing.

J. A. DETLEFSEN
UNIVERSITY OF ILLINOIS

SPECIAL ARTICLES

THE EMERGENCY FUNCTION OF THE ADRENAL

WE have recently obtained evidence of an emergency function of the adrenal. In some of this work we have confirmed Cannon[1] and his co-workers, who suggested an emergency function for the adrenal. Our method is a modification of Meltzer's[2] denervated eye reaction. The iris is made sensitive to epinephrin by removal of the superior cervical ganglion. Several days later, in order to eliminate central nervous influence, the ciliary ganglion is removed. We have made a study of sixteen cats by this method.

In most animals prepared in this way, stimulation of the moist pinna by rapidly repeated induction shocks will cause a good dilatation of the denervated pupil. Asphyxia for forty seconds will cause almost maximal dilatation. Exposure to cold (immersion in cold water) will usually cause a very decided dilatation after a few minutes, the rectal temperature decreasing meanwhile. As an illustration, a cat whose rectal temperature was 39.0° C. at the start and whose pupil was 0.13 in. in diameter showed the following changes:

[1] Cannon, W. B.: "Bodily Changes in Pain, Hunger, Fear and Rage." 1915, D. Appleton and Co., New York.

[2] Meltzer, S. J.: *Am. J. Physiol,* 1904, II, 37.