hosts has been collected and will be reported on elsewhere.

EDWARD G. REINHARD
UNIVERSITY OF SCRANTON AND
UNIVERSITY OF MAINE MARINE
LABORATORY

NOMENCLATURE OF GONAD-STIMULATING HORMONES OF PLACENTAL ORIGIN

WE have recently obtained evidence[1] indicating that the rat may be added to a growing list of mammals whose foetal placentae secrete some type of gonad-stimulating hormone. By combining the evidence which has been accumulated from the horse, human being, monkey, chimpanzee and rat[2] it becomes apparent that the natural function of these chorionic secretions is to prolong corpus luteum function during pregnancy, and there is indirect evidence that a similar mechanism is operative in the mouse, rabbit and hamster.[3] This concept has been obscured, however, by the fact that when administered to foreign species, the known substances display great differences in the type of gonadal response which they produce.

These gonadotropic substances which arise from or are associated with the products of pregnancy are known by terms that in most cases are ambiguous and unduly cumbersome. Certainly the policy of using the name of a body fluid to designate a hormone, as for instance "pregnant mare serum" or "the urine of pregnant women," etc., is an example in loose terminology. It seems to us that in view of the fact that these hormones have a common tissue source and exercise a homologous function, the introduction of a generic term would conform to the facts and afford a satisfactory basis for a sound nomenclature.

We therefore propose that the term *cyonin* (Gr. kuo – pregnancy + hormone + protein) be applied to all those hormones of chorionic origin and of protein nature which act to sustain a female sex hormone balance favorable to the maintenance of pregnancy. This word used in conjunction with the name of the animal in which the hormone occurs would apply to any mammals where such a substance might exist. Thus "human cyonin" would replace such terms as "pregnancy urine," "pregnancy prolan" and "anterior-pituitary-like hormone" and "equine cyonin" such terms as "pregnant mare serum" and "endometrial scrapings of the mare," while "murine cyonin" would apply to the recently described placental hormone of the rat. Should more than one hormone be active in a given species, then qualifying terms may be added.

E. B. ASTWOOD,
Rockefeller Foundation fellow in the Natural Sciences
R. O. GREEP
BIOLOGICAL LABORATORIES,
HARVARD UNIVERSITY

[1] E. B. Astwood and R. O. Greep, *Proc. Soc. Exp. Biol. and Med.*, 38: 713, 1938.

[2] H. H. Cole and G. H. Hart, *Am. Jour. Physiol.*, 93: 57, 1930; J. S. L. Browne and E. M. Venning, *Lancet*, 2: 1507, 1936; *Am. Jour. Physiol.*, 123: 26, 1938; R. E. Kirsch, *Am. Jour. Physiol.*, 122: 86, 1938.

[3] W. H. Newton, *Jour. Physiol.*, 84: 196, 1935; G. P. Heckel and W. M. Allen, SCIENCE, 87: 302, 1938; M. Klein, *Arch. Anat. Micr.*, 31: 397, 1935, *Arch. d'Anat. d'Histol. et d'Embryol.*, 18: 1, 1934 and *Proc. Roy. Soc.*, B. 125: 348, 1938.

SCIENTIFIC BOOKS

CRYSTAL PHYSICS

A Text-book on Crystal Physics. By W. A. WOOSTER. Cambridge: At the University Press; New York: The Macmillan Company. xxii + 295 pp., 108 diagrams, $4.00.

IT seems that ever since Laue's discovery of x-ray diffraction crystallographers have been too busy to present an up-to-date treatment of those physical properties of crystals which are determined by microscopic rather than molecular symmetry. The experimental physicist and engineer interested in such properties as elasticity and piezoelectricity had to refer to the authoritative but cumbersome "Lehrbuch der Kristallphysik" by Woldemar Voigt, which was published in 1910 and was never translated into English.

In the foreword to a new printing of Voigt's book in 1928 Professor von Laue stated that the phenomenological theory of crystals could be greatly simplified by using the notation for components of higher-order tensors which the general theory of relativity has introduced into physics. He concluded that "whoever wants to make an improvement in that direction will have to write an entirely new book. But who among present-day physicists would delve into this subject with as deep an affection as W. Voigt?"

Dr. W. A. Wooster, of the Department of Mineralogy at the University of Cambridge, has finally taken up the challenge. He can be assured of the grateful interest of physicists and metallurgists as well as crystallographers and mineralogists. The fact that Wooster's book is very modest compared to Voigt's both in volume and in price will increase its appeal. The book is intended primarily as a text-book for students at universities, and presupposes "a knowledge of the elements of physics, mathematics and crystallography." "A two-fold object has been kept in view

—to present the classical treatment of the physical properties of crystals in terms of tensor notation and also to indicate the lines of development of modern theoretical and experimental research."

In the preparation expected of the reader as well as in the choice of the material treated the standpoint of the *mineralogist* prevails perhaps more strongly than would be indicated by the title and the author's preface. The physicist among the readers will easily find the necessary crystallographic information elsewhere; but the dearth of mathematical training presupposed forces the author to forsake the elegance of treatment which he could give to his subject on a more solid foundation of mathematical physics. On the other hand, a reader who does not even know about scalar and vector products will hardly be able to comprehend at all the transformation theory of higher-order tensors.

The greatest asset of the book is the close correlation between theory and experimental results given at each step of the development. Wherever possible, it is shown how the amount of observed physical anisotropy is connected with the atomic structure type of the substance. Although for most physical properties such considerations are still in a semi-quantitative state they show most impressively how much our understanding of the properties of solid matter has been advanced by x-ray structure analysis. Experimental methods are explained in principle, but the limited space does not permit detailed descriptions. A fuller selection of references to experimental procedures would have been very useful.

The general plan of the book is to treat in succession the phenomena which are described by a second-order tensor, a third-order tensor and a fourth-order tensor, respectively.

Chapter I (14 pages) contains the fundamentals of tensor notation and the limitations imposed by crystallographic symmetry on properties described by a second-order tensor.

Chapter II (48 pages) is entitled "Homogeneous Deformation; Thermal Expansion and Plastic Deformation." Chapter III (31 pages) is devoted to heat conduction and thermoelectric effects. The treatment of these fields, to which the author has made important original contributions, is excellent; much of the material presented will be new to most physicists. Electric conductivity of metallic crystals is dealt with very briefly; electric currents in semi-conductors and insulators are outside the scope of the book.

In Chapter IV, 33 pages deal with para- and diamagnetism. Detailed consideration is given to the determination of molecular susceptibilities of aromatic compounds. Dielectric phenomena are treated in eleven pages. The account of the electric properties of Rochelle salt disagrees at various points with more recent experimental results, especially those of the Zurich school and of H. Mueller, of the Massachusetts Institute of Technology.

Chapter V (60 pages), "Some Problems in Crystal Optics," is not intended as a systematic treatment of that great field but rather as a critical appendix to existing treatises on mineralogical optics. A good account is given of the beautiful work of W. L. Bragg, Hylleraas and others on the calculation of double refraction from atomic arrangement.

In Chapters VI (35 pages), "Piezoelectricity," and VIII (44 pages), "Elasticity," the advantages of tensorial notation are most apparent. The specialization of the matrices of piezoelectric and elastic constants for the different crystal classes is carried through in a straightforward way for all except the trigonal and hexagonal classes; for these an outline of the rather complicated proof is given. The methods used in the experimental determination of piezoelectric and elastic moduli are discussed; however, there is no rigid treatment of any case of inhomogeneous deformation. The account of applications of piezoelectric crystals is on a quite elementary level; it comes rather as an anticlimax to the preceding complicated mathematical derivations.

Chapter VII (9 pages), "Pyroelectricity," does not entirely remove the confusion which has been created by the unfortunate terms "false" and "true" pyroelectricity. After discussing the electric charges produced on quartz crystals by non-uniform heating, Wooster continues: (p. 227): "When the temperature of the crystal becomes uniform the stresses are much reduced (though not zero) and hence the charges also become much less." In the opinion of the reviewer this statement is not correct. A *uniform* change of temperature will produce no *stress* at all in any crystal. For a crystal without a singular polar direction like quartz the thermal *strains* are of such symmetry that *no* electric moment results.

The magnetic analogue to pyroelectricity, ferromagnetism, is not treated at all, although in no field of modern physical research have considerations of crystal symmetry been more fertile.[1]

A book covering a territory on the borderline between two branches of science can not possibly satisfy *all* the demands of its various readers. Wooster's "Crystal Physics" can be recommended as a most valuable supplement to existing text-books on mineralogy and crystallography and deserves the attention of every one engaged in crystal research.

HANS VONR. JAFFE

WESLEYAN UNIVERSITY

[1] See for instance: F. Bitter. Introduction to Ferromagnetism, N. Y., 1937. Chapters V–VII.