made, and for the first time we will have data subject to common scrutiny and evaluation. "In the home" studies of children can also be made, and the exact terms of their emotional and social growth can be described. The trouble with this field is that it is, as one astute friend described it, a "night-school science"—that is, a body of facts and concepts created in practice by hard-worked clinicians who wrote their papers in the evening. This history has its great merits but also its flaws. The field of psychoanalytic researches should be adopted by the university and the research institute, but we had better hurry while the subject matter is still in the public domain of science. What was it that someone said about a fabulous foundation?

JOHN DOLLARD
Department of Psychology, Yale University

Surgical Procedures on the Gastrointestinal Tract of Animals in Preparation for Chronic Experiments. E. N. Speranskaya. Academy of Medical Sciences, U.S.S.R., Moscow, 1952. 64 pp. (in Russian). Illus.

Pavlov's research on gastrointestinal physiology that earned him the Nobel prize in 1904 was based on the concept of the organism as one indivisible homeostatic unit. In order to study normal functions of various digestive glands, Pavlov devised a number of surgical procedures on dogs that made it possible for him to conduct investigations under chronic conditions.

"Acute experiments," wrote Pavlov in 1902, "give a satisfactory answer to a very limited number of problems; in most cases the operated animals differ so markedly from the normal—often in respect to the very function that forms the subject of the investigation—that the latter loses its meaning and becomes fruitless." He therefore devised surgical methods "by means of which one can prepare the animal in such a manner that, after recovering from the after-effects of surgery, it could serve for observations, as faultless as possible, on this or that gland." [Physiological surgery on the digestive tract I. General methodology." *Ergeb. Physiol.* **1**, 1 (1902). Reprinted in Russian in I. P. Pavlov, *Studies on the Physiology of Digestion.* Acad. Med. Sciences, Moscow, U.S.S.R. (1952), pp. 315–316.]

Moreover, Pavlov was convinced that "animals operated according to these methods represent excellent instructional material. For this reason we think that college physiological laboratories need such animals as much as they do the most important physiological equipment."

The booklet contains detailed and succinct descriptions of the surgical techniques devised by Pavlov for his chronic experiments. The numerous line drawings are excellent and should enable any competent physiologist or surgeon to perform the same operations successfully. The author includes instructions on pre- and post-operative care of the animals as well as on the special instruments and equipment required for the procedures.

Among the techniques described are those related to establishing chronic fistulas of the salivary glands, esophagus, stomach, gall bladder, pancreas, and intestine as well as procedures for isolating Pavlov and Savich-Brestkin gastric pouches.

The use of such animal preparations for chronic experiments and observations by students in medical and veterinary courses in physiology and pharmacology might represent a significant step toward the integrative approach to medical education and practice. One can hardly expect students to gain a realistic knowledge of normal physiological processes and of physiological homeostasis by limiting their observations to the reactions of organs isolated from integrative nervous and endocrine influences or by recording responses of animals subjected to anesthetic agents and acute surgical trauma. Observations on unanesthetized animals prepared for chronic experiments may help to bridge the gap between cell and organ physiology and the physiology of the organism as a biological unit.

Such chronic animal preparations should also find useful applications in connection with the screening of drugs used to influence secretions of various digestive glands.

SAMUEL A. CORSON
Department of Physiology and Pharmacology, University of Arkansas School of Medicine

Reports on Progress in Physics. vol. XVIII. A. C. Stickland, Ed. The Physical Society, London, 1955. £2 10s, nonfellows; 27s. 6d, fellows.

Research results in physics are now being published at a rate of about 1000 papers a month. (*Physics Abstracts* contained 11,693 entries in 1954.) The contributions of the Physical Society toward organization and synthesis of the many discoveries of physicists are continued in this volume. Like its predecessors, volume XVIII contains a group of papers, each one of which is a careful survey of experimental and theoretical findings during the past few years with respect to some aspect of physics.

The opening article, "The displacement of atoms in solids by radiation," by G. H. Kinchin and R. S. Pease, is a discussion of effects of radiation on structure and composition of solids. Quoting from the paper's introductory section, "Much of the current interest in these irradiation effects has been aroused by the need to understand and mitigate them in materials used in nuclear reactors. . . . However, with the increased understanding of the role of defects in crystalline solids, considerable interest has also been aroused by the possibility of the controlled introduction of defects by irradiation, which can have valuable application." Readers will be interested in finding the late H. G. Wells, in the novel *Tono-Bungay* (1909), among the early writers cited on irradiation effects in solids.

In the second article, B. T. Price discusses, in "Ionization by relativistic particles," the theories of "the relativistic increase of energy-loss by ionization and of the density effect" and also the relevant experimental evidence and its comparison with theory. J. L. Symonds contributes a paper on "Methods of measuring strong magnetic fields." In a paper on "Theory of radiation," J. C. Gunn gives a survey discussion of quantum electrodynamics, with some attention also to meson field theory. E. W. Lee writes on "Magnetostriction and magnetomechanical effects." This paper is followed by one on "Electrostriction," by H. F. Kay, in which "Single crystals are . . . discussed . . . in detail. . . . Similarly the more complicated ceramic materials are dealt with."

A survey of "Magnetic cooling" is contributed by E. Ambler and R. P. Hudson. Experimental methods and the properties below 1°K of paramagnetic salts and of other materials are discussed. Also, cascade demagnetizations and continuous cooling cycles and the achievement of spatial orientation of atomic nuclei by magnetic cooling are described. The paper, "Paramagnetic resonance II," by K. D. Bowers and J. Owen, is complementary to one in volume XVI by B. Bleaney and K. W. H. Stevens. Paramagnetic resonance data are collected in the paper for "crystalline solids containing ions of the transition groups, and those parts of the theory necessary for an understanding of the results are presented in a fairly simple way." J. D. Craggs and C. A. McDowell write on "The ionization and dissociation of complex molecules by electron impact."

In the final paper of the volume, entitled "A survey of field theory," a group of lectures given at the University of Birmingham in December 1954 are now published. The names of the lecturers, R. E. Peierls, A. Salam, P. T. Matthews, and G. Feldman, speak for the authoritativeness of the paper. The survey is intended for the "non-specialist," and although it therefore is not as detailed in