

ence of myosin in mitochondria and chloroplasts does not rule out a mechanical energy-conversion mechanism in these organelles.

The general thesis that motile systems have some properties in common is a valuable one, but so little is known about their comparative chemistry that restrictive definitions should be avoided. Even the term contractile proteins carries mechanistic implications. In my opinion, the older term "mechanochemical systems" is preferable, because it focuses attention on the central problem—the conversion of chemical bond energy, usually in the form of adenosine triphosphate, into mechanical energy. The ability of a protein system to do mechanical work at the expense of chemical energy is the most satisfactory criterion to use in defining such

systems. It is difficult to apply, since the system must be obtained in an asymmetric form, but the uncritical use of the viscosity response of a crude protein extract can lead to needless confusion. Furthermore, some of the systems described, such as the Na-K dependent adenosine triphosphatase, are probably not like actomyosin and should not be included as mechanochemical systems. In this case chemical energy is used to do work against an electrochemical gradient. Presumably protein systems are capable of carrying out several kinds of energy conversions, the mechanochemical type being an important, but not the only, example.

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Some Biological Mechanisms of Behavior

Progress in Physiological Psychology. Vol. 1. ELIOT STELLAR and JAMES M. SPRAGUE, Eds. Academic Press, New York, 1966. 299 pp., illus. \$9.50.

Frontiers in Physiological Psychology. ROGER W. RUSSELL, Ed. Academic Press, New York, 1966. 277 pp., illus. \$8.50.

It is just 100 years since Wilhelm Wundt inaugurated a new formal discipline by changing the title of his course at Heidelberg to "Physiological Psychology." The new field—devoted to the study of biological mechanisms of such aspects of behavior as attention, perception, learning, and memory—made slow progress for many decades. Techniques were lacking to record or influence directly processes taking place deep within the body, and especially within the brain. With the development of such techniques in the last quarter century, physiological psychology has spurted ahead.

Textbook writers have recently been trying to catch up with the rapidly expanding field. Whereas there was only one textbook of physiological psychology in wide use a few years ago, half a dozen have appeared in 1966 and 1967. So diverse are the problems and techniques and so rapid is the progress that writing textbooks in this field is unusually difficult and is almost bound to be a thankless task; even the most successful textbooks are doomed to be soon out of date. One attempt to provide continuing up-to-date coverage of this field is found in certain chapters

of the *Annual Review of Psychology* and the *Annual Review of Physiology*.

An attempt devoted exclusively to this field was inaugurated in 1966—*Progress in Physiological Psychology*. The plan of the editors is to present each year six to eight papers, some being brief, authoritative accounts of the current state of a special field, others presenting new and unpublished investigations, and still others providing critical and speculative evaluations of concepts in the field. As new topics are covered in succeeding years, it is hoped that the whole breadth and depth of physiological psychology will be represented. Only the field of sensory mechanisms will be excluded, since this is being covered by the series *Contributions to Sensory Physiology* (also published by Academic Press), edited by W. D. Neff, but perceptual mechanisms will be included. Authors will come from other biological sciences as well as from psychology.

The six topics of volume 1 indicate some of the scope intended for this series: electrophysiological correlates of transaction and storage of information in brain tissue; concepts of attention and experimental approaches to attention through electrophysiology; effects of sensory deprivation on brain and on behavior; the anatomical locus of reinforcement of behavior; physiology of thirst; and functions of the limbic system of the brain in initiating and suppressing behavior. Three authors are physiologists and three are psycholo-

gists. Such a distribution of topics and authors should help to foster communication among members of the various disciplines that contribute to physiological psychology. Each of the present authors is well known for research in the area that he treats, and each goes beyond a simple review to comment and speculate on problems and concepts. The standard of exposition is high, carefully chosen references are given for each chapter, and indices of names and topics are provided. Volume 2 of this series is now in preparation.

Almost as if to start the foregoing series off with two volumes, R. W. Russell has edited *Frontiers in Physiological Psychology*. The treatment of topics is rather similar, and a few of its seven chapters even overlap somewhat (but not extensively) those in *Progress in Physiological Psychology*. A rather different topic, biochemical substrates of behavior, is covered in an excellent review by the editor. Both volumes can be recommended as providing authoritative accounts of main areas in current physiological psychology.

In the years to come the series begun by Stellar and Sprague should continue to provide a valuable source for both students and investigators. It should also provide a record of advances and, one hopes, a stimulus to further progress.

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Books Received

Advances in Astronomy and Astrophysics. Vol. 5. Zdeněk Kopal, Ed. Academic Press, New York, 1967. xii + 355 pp., illus. \$16.

Advances in Mathematics. Vol. 2, fasc. 1. Topological planes. Helmut R. Salzmann. Academic Press, New York, 1967. 60 pp., illus. Paper, \$3.95.

Advances in Morphogenesis. Vol. 6. M. Abercrombie and Jean Brachet, Eds. Academic Press, New York, 1967. viii + 331 pp., illus. \$15.

Advances in Protein Chemistry. Vol. 22. C. B. Anfinsen, Jr., M. L. Anson, John T. Edsall, and Frederic M. Richards, Eds. Academic Press, New York, 1967. xviii + 443 pp., illus. \$18.50.

Amphibians and Reptiles of Great Smoky Mountains National Park. James E. Huheey and Arthur Stupka. Photographs by Isabelle Hunt Conant. Published with the cooperation of the Great Smoky Mountains Natural History Association, University of Tennessee Press, Knoxville, 1967. xii + 98 pp. \$3.

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