News of Science

Soviet Physiology

Following the International Physiology Congress in Brussels, Belgium, 30 July–4 Aug., four physiologists from the United States visited major physiological laboratories in Leningrad and Moscow. In the group were W. O. Fenn of the University of Rochester, C. F. Schmidt of the University of Pennsylvania, and F. A. Hitchcock and I of Ohio State University. We were received with cordial hospitality; we were given details on current physiological developments related to teaching and research; we were shown many phases of current experimental programs; and we were assured of cooperation in the exchange of publications and material for abstract notice. We enjoyed freedom of movement and photography, both in the cities and in rural areas, although it was found wise to use the helpful facilities of the Intourist Service Bureau for travel and interview arrangements. Interpreters were furnished, but we noted that most of the Russian scientists converse effectively in English, French, or German.

Soviet physiology is broadly approached but narrowly programmed. In the U.S.S.R. the discipline comprises the study of the way living things work from cells to societies, from microorganisms to man, and is medically oriented. It includes biophysics, biochemistry, cellular and comparative physiology, embryology, pathology, pharmacology, neurology, and psychology. However, it seems generally to be channeled into detailed extension of the Pavlovian canon. Plant physiology is oriented toward agriculture.

The organization of physiological teaching and research in the Soviet Union is complex. For medical students the subject is taught in the 80-some medical schools, which are independent of the universities. For those who wish to compete for a scientific position in physiology, training is available in the several physiology institutes or in the physiology laboratories of the Faculty of Biology at the University of Moscow. Thus in that institution's great new Biology Building there is the well-equipped and busy Laboratory of Animal and Human Physiology under dynamic Ch. Kostojanc, where studies are in progress on enzymo-chemical processes in nerve excitation and inhibition, and the Laboratory of Comparative Physiology of the Higher Nervous System under L. G. Voronin, where work is proceeding on the phylogenesis of "the analytico-synthetic activity" of the nervous system. At least half of the medical and graduate students are women.

The research institutes of physiology are maintained either by the Academy of Sciences or by the Academy of Medical Sciences. The latter is advisory to the Ministry of Health on drug evaluation, disease control, health promotion, and medical education and practice. Membership is by academy election for a 5-year term, with reelection on continued merit.

In Leningrad, the Academy of Medical Sciences operates the Institute for Experimental Medicine, where I. P. Pavlov (1849–1936) did most of his extraordinary work on reflex action. In Moscow it controls the Institute of Normal and Pathological Physiology, where V. N. Chernigovsky studies cortical representation of internal organs; the Brain Institute, where S. Sarkisov and his associates are examining interrelationships of structure and function in the cerebrum; and the Institute of Pharmacology and Chemotherapy, where V. V. Sakusov investigates cardiac glucosides in experimental myocarditis.

The Institute of Experimental Medicine in Leningrad, which was established in 1890, has 11 sections staffed by approximately 200 scientists and some 30 graduate students. It supports laboratories for general, comparative, and pathological physiology, microbiology, pharmacology, radiobiology, morphology and embryology, biochemistry, and biophysics. It is well equipped and has extensive grounds and buildings, including dormitories. In addition, there is a fine pedimented bronze tribute to the experimental dogs that are so carefully tended. It is at this institute that Pavlov's famous "isolation towers" are maintained for study of conditioned reflexes, and there is also a remarkable museum of his contributions and memorabilia.

At the Leningrad Institute for Experimental Medicine, the following studies are in progress: motor mechanisms in conditioned reflexes, under the director, P. S. Kupalov; the action of gangliolytic drugs on tissue metabolism, under S. V. Anichkov; the evolution of conditioned and unconditioned inhibition, under D. A. Birioukov; and the effects of temperature changes on nerve excitability in cold- and warm-blooded animals, under D. A. Nasonov. Findings were reported at the Brussels congress.

The Pavlov Institute of Physiology in Leningrad was established in 1950 under the auspices of the Academy of Sciences of the U.S.S.R. It is directed by Academician K. M. Bykov, and it includes a large laboratory building in the city as well as a well-arranged laboratory unit in the country at Kulteschi (Pavlov Village) that was designed by Pavlov and has dormitories and commodious animal quarters. The whole Pavlov Institute comprises 28 nicely equipped sections, with some 200 scientists and 700 technicians. There are two fair libraries. The purpose of the institute is to explore all aspects of Pavlov's teaching, with special reference to conditioned reflexes and corticovisceral functional interrelationships. Some of the recently reported studies from the Pavlov laboratories include cortical regulation of glandular secretion (under Bykov), cortical dynamic localization (under E. S. Airapetyants), tissue adaptation to chronic hypoxia (under E. M. Kreps), corticovisceral pathological factors in conditioned reflexes involving salivation (under F. P. Maiorova), reflex mechanisms involving gaseous exchange in the body (under A. D. Slonim), and neurological factors in silkworm reflexes (under E. Vladimirova).

A recent notable development in Soviet science is the establishment of an Institute of Evolutionary Physiology in Leningrad, which operates under the auspices of the Academy of Sciences and is directed by Leon A. Orbeli, well known for his contributions to cardiovascular physiology. A new building is under construction for this institute, which has been organized to search for physiological factors in the evolutionary process. Orbeli has many pupils working with him and has just issued the first of a series of volumes of his contributions with them. A new periodical devoted to evolutionary physiology is planned. Also, it is at this institute that A. G. Ginetsinsky is studying the influence of efferent nerves on kidney function in relation to phylogenetic factors.

In Moscow there is the Sechenov Physiology Institute, named in honor of Ivan M. Sechenov (1829–1905), the founder of Russian physiology and the man who set its course in describing cerebral inhibition of spinal reflexes. This institute is located in one of the many large buildings of the old part of the University of Moscow, across the Riding Academy Square from the Kremlin, where

Sechenov himself worked. It is under the direction of P. K. Anokhin, who, with 29 scientific associates, is studying "anticipatory reflexes" and "systemogenesis." Here there is also work on the role of the reticular formation of the brain stem in the transmission of unconditioned excitation to the cerebral cortex. The laboratories have excellent equipment and there is the usual evidence of good morale among the group.

The Academy of Sciences also supports a number of other independent physiology research laboratories in Moscow. Thus E. A. Asratyan has a special laboratory for studying the effects of extirpation of the cerebral cortex on vegetative and somatic functions. At the Institute of Biophysics, G. M. Frank, L. P. Kayushin, and R. G. Ludkovska are investigating the change in structure and mechanical properties of nerves during the spread of excitation. At the Institute of Higher Nervous Activity, V. S. Rusinov is conducting electrophysiological research on dominant areas of the higher nervous system. There is much work with elaborate electroencephalographic equipment. The conventional microscopic equipment that we saw was of high quality, and all of it was manufactured in the Soviet Union.

The Ukrainian Academy of Sciences maintains an extensive Biochemical Institute under A. V. Palladine. Here studies are in progress on the chemical and metabolic aspects of various functional portions of the brain, on brain metabolism during ontogenesis, and on brain metabolism during excitation, inhibition, and hypoxia. At the Institute of Animal Physiology of Kiev State University, P. G. Kostyuk is making intracellular recordings of end-plate potentials in repeated nerve stimulation. At the Physiology Laboratory of Rostov State University, A. B. Kogan is studying the interrelationships of conditioned reflexes, motor activity, brain potentials, and excitability of cortical neurons in chronic experiments on free behavior in normal animals. The Georgia Academy of Sciences maintains an Institute of Physiology at Tbilissi, under A. I. Roitbak, who is working on bioelectric phenomena in the cerebral cortex produced by various methods of stimulation.

Soviet physiologists are keen workers and thinkers, however closely they may be oriented toward the Pavlovian canon. They and their pupils have ready access to the world's major physiological publications. There is a comprehensive annual indexing program for biological literature, which is the basis for documentation in ordinary periodical publication. For a time during World War II many of the biological contributions from the U.S.S.R. appeared in English. The country's biological periodicals cover the conventional range. In general scientific literature, Soviet scientists seem partial to *Nature, Science,* and *Experientia.* Most of the physiology workers have small private libraries.

It is interesting that Soviet experimental work in the biological fields has little statistical control. In physical experimentation, on the other hand, it is as conventionally used as anywhere. However, animals are handled with extreme care and solicitude. Since most of the physiological work is repeated experimentation with the same animals, they tend to become pets of the workers. Thus with relative uniformity of experimental material there may not be the variation that necessitates statistical control. But philosophic factors may also be involved.

Soviet physiologists are capable and efficient in their technical work. They are generous in their personal relations, and they seem to be anxious to have their efforts known and appreciated. They would welcome the chance for correspondence and personal contact with American and other Western physiologists.

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Mathematics Teaching Essay Contest

Kappa Mu Epsilon, national honorary mathematics society, and the AAAS Science Teaching Improvement Program are cooperating in the sponsorship of an essay contest on "Opportunities in teaching mathematics in secondary schools." Satisfactory essays will be published in *The Pentagon,* official publication of Kappa Mu Epsilon. First prize in the contest will be $50. There will be second and third prizes of $25 and $15, respectively.

The Mathematics Teaching Essay Contest is planned to increase interest in the teaching of mathematics at the secondary-school level by encouraging undergraduate students in mathematics to consider the advantages of a career in secondary-school mathematics teaching. It is hoped that the preparation, as well as the reading, of the essays may attract good students with an interest in mathematics to enter the teaching profession. The importance of the ability to express oneself in writing, particularly on the part of teachers, should also be emphasized by such an essay contest.

Essays submitted in the contest should reach Prof. Carl V. Fronabarger, Southwest Missouri State College, Springfield, Mo., *no later than 1 Apr. 1957.* They must be not more than 1000 words in length and should be typed double-spaced on a good grade of paper. Four copies should be submitted by each contestant. Undergraduate and graduate students in mathematics are eligible to enter the contest.

The content of the essay should be as specific as possible and should point out the advantages of preparation for the teaching of mathematics at the secondary-school level. The essay may consider one or more of the special facets of the profession of mathematics teaching, or it may cover the general area as completely as the length of the essay will permit. The essays will be judged on accuracy and objectivity of the data presented, the degree to which the essay appears to be convincing in the case presented for mathematics teaching, and composition and neatness.

Bacteriophages in the American Type Culture Collection

Bacteriophages have become research materials of major importance in such fields as genetics, biophysics, and biochemistry as well as microbiology. It should be of considerable interest, therefore, that the American Type Culture Collection now maintains a collection of some 150 strains of bacteriophages and their host bacteria. Included among the hosts are the following genera of bacteria: *Azotobacter, Bacillus, Corynebacterium, Escherichia, Salmonella, Shigella, Serratia, Micrococcus, Staphylococcus, Streptococcus, Mycobacterium, Pasteurella, Pseudomonas, Rhizobium, Vibrio, Xanthomonas,* and *Streptomyces.* A complete catalog of the collection is available on request (2112 M St., NW, Washington 7, D.C.). Each phage strain and its host are sold separately for $4 plus shipping costs.

The collection has been built up by generous gifts from a relatively few donors, the greatest number of strains having come from I. N. Asheshov. The curator, W. A. Clark, is very anxious to obtain additional strains and will welcome gifts from any source. Donors should send both phage and host strain to the ATCC, together with literature references to the strain, history of isolation, host range, strain designations if it has been described under various names, and any useful information about preparation and preservation of phage stocks. In the case of temperate phages, the lysogenic bacterium and the indicator host should be sent as well as the phage stock.

Much of the earlier phage literature has little meaning today, because the phage strains concerned have been lost and, in most cases, cannot be related taxonomically with any strains now available. Until a usable phage taxonomy can be developed, it is essential that all phage strains that have been the subject of pub-