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DEVELOPMENT OF ETHOLOGY IN THE U.S.S.R. (From a Report to the XXI International Ethological Conference)

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We have been asked: why do animal behavior researchers in the USSR call themselves ethologists? In fact, in addition to classic ethology, our work relies on the methods and concepts of Pavlov's physiology, comparative psychology and zoosociology. Such an approach is eclectic. The famous biologist-philosopher, A. A. Liubischev, wrote that eclecticism is a legitimate stage in the development of a complex, progressive theory. Eclecticism is that situation in which different concepts cannot yet be combined to form an unambiguous theory, but there is still a possibility that in due time contradictions would be eliminated. In this situation, all evidence contradictory to a theory would be freely discussed to stimulate a search towards a true synthesis.

The term "ethology" gained currency in the USSR from about 1965 onward when it came to be used by some zoologists of the older generation acquainted with ethological research in Western Europe. That the term "ethology" was widely adopted is explained by the influence of the theories advanced by Lorenz, Tinbergen, Eibl-Eibesfeldt, Chauvin, Leyhausen, Tembrock, Dewsbury, Manning and Hinde, whose research and books acquired a great popularity in the USSR. From that time, the situation developed rapidly, as zoologists came to see in the advances of ethology new possibilities for interpreting their own data, formulating new problems and the advantages resulting from the application of ethological methods. B. P. Manteifel and V. E. Sokolov were active leaders in promoting ethological research in the USSR. In 1972, a newly formed

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scientific organization held its first conference, which assembled 250 scientists from 45 institutions. The All-Union Ethological Conference in 1984 brought together as many as 1000 scientists from over 60 institutions. Today zoological conferences in Russia include at least one session on ethology, and many ethological papers are read.

Despite the fact that the development of ethology in the USSR was sudden and rapid, it had a firm basis in two traditions. The first tradition was the work of I. P. Pavlov and his pupils. It was Pavlov who identified the capability of animals to adapt to the most important feature of the surrounding world: time, i.e., the sequence of events. The founder of the Georgian school of behavior and physiology, I. S. Beritashvili, studied the ability of animals to learn another important regularity of the world: space, i.e., the location of objects. The principal scheme of his experiments was the development of conditioned reflexes in dogs when the feeding trough was situated in an adjacent room or behind a partition.

Another of I. P. Pavlov's collaborators was P. K. Anokhin, who as early as 1935 demonstrated the ability of animals to evaluate the results of their reactions and to correct their behavior accordingly. Aware of the complexity of behavior, Anokhin developed the theory of functional systems. The studies by Anokhin are being continued by his followers at both physiological and behavioral levels.

Physiological science in the USSR could perhaps have exerted more influence on the development of behavioral research in the USSR but for the following dramatic event. In 1950, the scientific session of the USSR Academy of Sciences and of the USSR Academy of Medicine took place. Obscurantists and careerists claimed that the trends of research carried out by Anokhin and Beritashvili contradicted Pavlov's theory. The viewpoints of the scientists who criticized Pavlov and assigned a minor role to conditioned reflexes in animal behavior were considered most unacceptable. Nevertheless, in some physiological institutes after a period of time, the studies of behavior were continued. The theory of conditioned reflexes remains the most important foundation for the study of animal behavior. D. A. Biroukov formulated the notion of "natural conditioned reflexes," which are formed after two or three combinations with conditioned stimuli and of the confirming conditioned reflex, which persists for a very long time. Examples are the defensive reactions in hares to the rustle of paper and in ducks to a slap on open water.

The second tradition was the naturalism that is characteristic of Russian zoology, with its deep knowledge of, and keen interest in, the study of animal habits, based on the work of V. A. Wagner, a specialist in spider behavior; A. N. Promptov who studied the behavior of birds; and N. N. Ladygina-Kots, who pursued research with primates during the first half of this century. It was this second tradition in zoology that evolved into Soviet ethology in the 1960's and the 1970's. A. D. Slonim and his associates studied innate and natural reactions in newborn ungulates and

TABLE 1
Behavioral Investigations in the USSR Reported at All-Union Ethological Conferences

Percentages of Papers on Various Topics	*Year*		
	1972	*1977*	*1984*
General behavior	23.6	28.0	4.3
Physiology and genetics of behavior	6.0	10.5	13.0
Ontogenesis	4.7	8.5	9.4
Communication and orientation	18.3	11.5	11.0
Species-specific behavior	21.8	23.0	22.7
Zoosociology	10.7	1.0	14.3
Interspecific behavior	3.4	2.5	4.3
Behavior and anthropogenic influence	4.7	5.0	8.8
Applied ethology	6.8	10.0	12.2
Total number of papers	147	203	492

predators, as well as behavioral ontogeny, including the transition of a newborn from dependence upon the maternal organism to independence in the external environment. Slonim and his school also studied thermoregulatory behavior.

Experiments involving a detour to obtain food were carried out by L. V. Krushinsky, who developed a theory of elementary reasoning activity. In experiments with many vertebrate species, Krushinsky and his associates studied the ability of animals to define the direction of the movement of bait seen through an opening in a screen. In another approach, the ability of animals to differentiate flat objects from volumetrical ones was investigated. Different species showed differences in the speed of learning the response required to solve the problem as well as in the ability to solve problems upon their first presentation. The latter, according to Krushinsky, is the most important indicator of the development of elementary reasoning activity.

Several physiologists are known for their studies of the zoosociology of apes. These are V. A. Kryajev, N. A. Tikh, and L. A. Firsov, who released chimpanzees on an island in Central Russia and observed the process of adaptation of the apes to the unusual ecological conditions. Similar studies are performed by V. G. Chaylian in the Institute of Experimental Pathology and Therapy in Sukhumi. He formed three free-ranging populations of apes living in natural conditions throughout the year on the Caucasian coast of the Black Sea.

Soviet ethology is being studied today in scientific institutes, universities, preserves and zoos. Table 1 presents only some past and present

research and we regret that we cannot report all of the research being done. The largest group of scientists works in the Severtsov Institute of Animal Evolutionary Morphology and Ecology of the USSR Academy of Sciences (about 70 persons); about 30 persons carry out investigations at the Moscow State University, and in the Institute of Cytology and Genetics, the Siberian Branch of the USSR Academy of Sciences there are about 20 persons doing ethological research.

Numerous studies concerned with the ontogeny of behavior were carried out at the Institute of Higher Nervous Activity in Moscow, such as on the ontogeny of bird behavior by S. N. Khayutin; the manipulatory activity of primates by K. E. Fabri, and in kittens by K. Shuleikina-Turpaeva.

Finally, the development of applied ethology in the USSR deserves mention. Approximately 200 scientists work with domestic livestock and there are many investigators engaged in research on game management, agricultural entomology, and fish behavior in the numerous institutes of fisheries in sea and inland water bodies.

In the field of behavior genetics, D. K. Belyaev, L. N. Trut and their colleagues, for more than a quarter of a century, studied changes in the behavior of foxes in the course of domestication. Since the ability to be domesticated and aggressiveness are the most general traits associated with the functioning of the hypothalamus-pituitary-adrenal-reproductive system, breeding for these traits brought about important changes not only in behavior but also in fertility, coat color pattern, shape of ears and tail, etc.

Another active laboratory is headed by D. S. Pavlov who is investigating the behavior of fishes in relation to water currents. They have achieved important results that are used in the design of waterways for fish to detour the dams of hydroelectric stations and to prevent the fish from getting into irrigation canals.