

## SCIENCE IN THE U.S.S.R.

## PHYSIOLOGY

By PROF. E. D. ADRIAN, O.M., F.R.S.

University of Cambridge

IN the summer of 1935, physiologists from all over the world gathered in the U.S.S.R. to attend the international Congress held in Leningrad and Moscow. Though we knew that scientific men there were held in high esteem and that our president, the renowned Pavlov, had every privilege the State could grant, we were not at all prepared for the magnificence awaiting us and for the intense interest which the doings of the Congress seemed to arouse in everyone we met. Whatever our political colour, we had to conclude that in the U.S.S.R. scientific workers were genuinely regarded as estimable people to be encouraged at all costs.

Ten years later, the jubilee meeting of the Academy of Sciences of the U.S.S.R. has reinforced this impression. We have been dazzled as before by stately entertainment, but although the spirit of victory was in the air, the meetings of the Academy were not merely an overture to the military parade before the Kremlin. We celebrated the achievements of Russian science, past as well as present, in all its branches, in archaeology, linguistics and exploration as well as in aeronautics and chemistry. Clearly science and learning still hold an exalted position in the U.S.S.R. and the title of 'academician' carries more weight there than in any other country in the world.

What has science done to deserve such esteem? In the U.S.S.R., as elsewhere, it has played an essential part in the War, and the great development of the country would have been impossible without it. For the man in the street, the achievements of science may be measured by the 'metro' and the higher yield of agriculture; but the man in the street seems to read text-books on physics or astronomy (to judge by their sales), and it is evident that the respect for science owes something at least to the particular philosophy on which the State is based. Guided by this philosophy, the State is willing to spend very large sums on research institutes of all kinds and to keep large numbers of men of science working on problems of the more academic type in spite of the War and the shortages it has caused.

This is certainly its policy in physiology. The War has naturally focused attention on the nature of surgical shock, on blood transfusion and resuscitation, etc., but work on such problems as the chemistry of muscle and the development of functions in the embryo has continued, under difficulties of course, but with no lack of interest and official encouragement. Near Leningrad, where one in three of the inhabitants died of starvation in the siege, the large experimental station built for Pavlov at Koltushi is already a hive of activity. It has modern equipment and houses more than fifty scientific workers and many more technicians engaged on the problems of the nervous system. In the city itself, the large Pavlov Institute of Physiology is in full swing. In Moscow, work has gone on continuously in the research institutes directed by Academicians Orbeli, Lina Stern and Englehart. Many of the scientific workers in these institutes are women, but by no

means all, and many papers have been published during the war period, some concerned with war-time problems but the majority dealing with pure rather than applied physiology.

How far has this large-scale encouragement of science been justified by results? In physiology there have been few outstanding advances in recent years, in the U.S.S.R. or anywhere else. The result which justifies the policy has been the general raising of standards, in equipment, in training and in the quality of the work that is published. In 1935, as now, the senior physiologists were men of established reputation, pupils of Pavlov, Samojloff or Wedensky, but the juniors had little experience of physiology outside their own laboratories and could scarcely avoid some restriction of outlook. The training is now much more thorough, the libraries are better and there is far less reliance on traditional methods. The papers which are published reflect this improvement. The special features of Russian physiology remain. There is the same keen interest in the central nervous system and in the interaction of the different regulating processes of the body; but in addition there is the tendency to explore new fields with new techniques which has been characteristic of physiology elsewhere. A good example of this has been the recent almost simultaneous appearance of work on the electric response of the human eye from Moscow, Stockholm and Cambridge.

In the years to come, the U.S.S.R. with its large numbers of trained physiologists will have an output of research in that subject exceeding anything in Europe. There is little to criticize in the organization for this research. Whether the policy of large institutes with a pre-arranged plan is as good for physiology as it is for agriculture does not matter very much, for if it does not work it will be altered, as recent educational policy has been altered. On paper, the director of an institute may seem to have an uncomfortably large number of scientific workers to look after, but in fact he can probably trust most of them to look after themselves. The director has considerable power over his staff. Yet in any country the junior who disproves his professor's conclusions may find his position difficult, and there is no reason to think that these difficulties would be increased by the particular organization of the research institutes in the U.S.S.R. But the physiologists there have had one disability which, if it persists, will certainly check the rapid development of the science. In the past, only a few of them have been able to visit laboratories in other countries for study and research. During war-time, restrictions on movement are inevitable and we have all suffered from them. Until they are removed we shall not properly appreciate all that Russian physiologists are doing, and they will have no first-hand experience of our methods and ideas. We and they both need an exchange of students and professors in addition to the exchange of journals. But everyone is aware of this, and we have been so cordially received on our visit that it is hard to believe that the restrictions will remain. It is significant that the first international meeting of scientific workers has been held in the U.S.S.R. Those of us who had the good fortune to attend it cannot complain of any lack of co-operation. We shall only complain if we are not allowed to repay some of the kindness shown us by our hosts.