Notes from abroad

PHYSICS IN THE USSR

The following translation is of a speech purporting to have been given by Professor D. N. Nasledov, acting director of the Physio-Technical Institute of the USSR Academy of Sciences, at the Ninth Leningrad Party Conference during discussion on "The Report on the Activities of the Committee of the All-Union Communist Party (Bolshevik) of the City of Leningrad". The speech was printed in the June 2, 1950 issue of Leningrad Pravda.

The level of ideological educational work in the scientific research institutes has been low until recently. The Marxist-Leninist theory was studied but little, and many were indifferent to manifestations of idealism and cosmopolitanism.

In our Physio-Technical Institute of the Academy of Sciences of the USSR in Leningrad for a long time idealistic thoughts were openly expressed and feasibility of a fruitful application of the Marxist method to the natural sciences was denied. These idealistic errors permitted by some scientists were not subjected to a deep and earnest criticism and they were not opposed by vigorous materialistic thought, exposing the various attacks of our enemies abroad against the advanced Soviet science of physics.

The spreader of these idealistic assertions was Professor Frenkel, who had a negative attitude toward dialectical materialism and in his writings sometimes acted as a loud-speaker for the opinions of the bourgeois physicists.

At the academic councils of the Physio-Technical and Polytechnical Institutes the opinions of Professor Frenkel were subjected to sharp criticism.

The result of this criticism was that Professor Frenkel admitted his ideological errors and in his declaration stated that he had come to the conclusion that the Marxist-Leninist theory in the natural sciences and particularly, in the science of physics, is of foremost importance. Professor Frenkel has promised to correct the admitted errors in all his subsequent work and to rewrite some of his textbooks in the materialistic spirit. We regard this declaration as a great achievement of the work of our Party organization, which found the way to set such a prominent scientist as Professor Frenkel on the right. Our duty in the future is to help Professor Frenkel not to stray any more.

Recently there has been completed in the Physio-Technical Institute the big job of organizing studies of the Marxist-Leninist theory. We created a network of philosophical seminars which included all scientific workers of the Institute.

The Academic Council of the Institute has also greatly changed the character of its work. At the meetings of the council questions have begun to be discussed which are connected with the fierce struggle on the ideological front now raging in the science of physics. Creative brigades have been been formed, which have been busy studying the two basic fields of modern physics with regard to which bourgeois critics have uttered so much idealistic nonsense. What I say refers to quantum mechanics and the theory of relativity. We hope that these creative brigades will be able in the very near future to publish some works directed against the bourgeois perversions in these most important fields of physics.

As a result of the work of our Party organization and of the help of the City and the District Committees of the Party, the cooperation of scientists in production has been considerably strengthened. However, in spite of all this, there are several shortcomings in the Institute. Thus,

for example, we consider that not everything is well with scientific criticism. Up to the present the scientific works published by the Institute have not always been subjected to painstaking and deep critical consideration.

I should like to avail myself of my being on the rostrum of the Conference to say a few words in regard to conditions in the Leningrad Polytechnic Institute, of which I am a professor. There is no doubt that the Polytechnic Institute is of tremendous importance for the preparation of our technical personnel.

In spite of the fact that the Polytechnic Institute is one of the oldest schools of higher technical education and that it prepares an enormous number of specialists in the most varied fields, its laboratory basis is in a difficult position. For several years past the laboratories of the Polytechnic Institute have been built up very little and the result is that the new technique created in the Soviet Union during the past decade is very poorly represented in the laboratories of the Institute.

The buildings of the Institute are in bad condition; some of them have not yet been repaired.

The Polytechnic Institute takes an active part in the development of Soviet science and technique, and strengthens its bond with production, but it could do incomparably more if its material basis were given more attention.

It seems to me that in this respect we are entitled to expect that the City Committee of the Party will give attention to the situation of the Institute and will help us to achieve a substantial change of conditions.

Comrades! Soviet physics, particularly during the last ten years, has proven its might. No one can have any doubt now that our physics is in the true meaning of the word an advanced science. Even if some shortcomings are found, even if there are some scientists who allow some errors, still that can in no wise define the countenance of our Soviet physics, and the fact that our physics is in the true meaning of the word an advanced science is proven by the record speed with which it solves problems which have great significance for the economy of the country.

Soviet physicists, like all Soviet scientists, understand and appreciate the care of the Party, and the care of the greatest scientist of our epoch, our leader and teacher, Comrade Stalin. And we fully comprehend that it is exactly for the reason that we are guided by such a genius of humanity as is Iosif Vissarionovich Stalin, that Soviet scientists and technicians have succeeded in so rapidly creating new and advanced techniques.

I think that I express the thoughts and desires of all our Leningrad physicists if I declare that the Soviet physicists will be in the future, as heretofore, among the first ranks of the creators of the new Soviet technology, which will many times amaze the whole world with the greatest attainments. These achievements will help us in a very short time to complete the building of Communist society in our country.

To him, to the leader of peoples, to Comrade Stalin of the great Party of the Bolsheviks we are grateful for those unusual conditions for the development and growth of Soviet science which now exist in our country. (Applause.)

Books

Communication Theory

THE MATHEMATICAL THEORY OF COMMUNICATION. **By Claude E. Shannon and Warren Weaver. 117 pp. University of Illinois Press, Urbana, Illinois, 1949. $2.50.**

Some fifteen years ago, a very bright young student came to the authorities at MIT with an idea for a theory of electric switching dependent on the algebra of logic. The student was Claude E. Shannon, now of the Bell Telephone Laboratories, and his idea has blossomed into a career of studying communication from the point of view of switching. In this, his scope has taken him from one side of communication engineering to the other, although always with a point of view favoring the discrete rather than the continuous. Together with Warren Weaver of the Rockefeller Institute, Dr. Shannon has summed up his views on communication engineering in the book I am at present reviewing.

The first part of the present book represents the development by Dr. Shannon of a theory of the measurement of communication and of the amount of information both in the presence of noise and in its absence. The fundamental idea dominating the work is that of the amount of information as negative entropy. This idea was also developed at about the same time by the author of the present review, but against a background in which continuous communication theory played a more direct role, and discrete communication theory a less direct role than in the work of Shannon.

The second part of the book is a comment by Dr. Weaver on the present state of communication theory, and on the nature of communication channels. It is more philosophical and less concrete than the work of Dr. Shannon, but fills an important place in the literature. The general rise of the theory of communication during the war occurred in more than one quarter subject to the sympathetic direction of Dr. Weaver, and it is an excellent thing to see his continued interest in the philosophical side of the projects he directed. The net result of the work by Drs. Shannon and Weaver (a work whose origins were independent of my own work, but which has been bound from the beginning to my investigations by cross influences spreading in both directions) is that the theory of communication is a branch of statistical mechanics. Thus the inability of a system of communication to produce in the end more recoverable information than has gone into it is a part of the theory of the second law of thermodynamics. This appears in the beginning to be rather a forced analogy, but to those of us who have tried to pursue this analogy into the study of the Maxwell Demon, it is much more than that, and is a clear statement of physical rather than purely intellectual identity. This larger field is one in which much work re-