

Pure and Applied Physics in the U.S.S.R.*

DIFFERENCE of language has had a large part in perpetuating international misunderstanding. The relations between Russia and western Europe have suffered exceptionally badly from this effect, as the Russian language is difficult and few non-Russians read it easily. The lack of accessible accounts of the aims and achievements of the U.S.S.R. in science has prevented western European scientific workers from acquiring a knowledge of facts upon which a sound valuation of Soviet ideals and efforts in science might have been based.

In order to acquaint scientific workers who do not read Russian with what has been done, and to improve the contact between those in Russia and the rest of the world, the Soviet scientific authorities have launched several scientific journals published entirely in western European languages. The *Physikalische Zeitschrift der Sowjetunion* was started in 1932, and its papers are published in German, English or French. They are devoted to researches in theoretical and experimental physics. In 1934 the journal of physical chemistry, *Acta Physico-chimica*, was started. This is the medium through which Frumkin, Semenov and other eminent physical chemists communicate their results to Western readers. *Technical Physics of the U.S.S.R.* dates from the same year.

The conduct of three first-class scientific journals in foreign languages is a heavy task. British men of science can easily imagine the extra labour they would have if they had to publish their papers in German, French or Russian. The difficulties of exact expression, proof correction, and other labours connected with publication are great enough in one's own language, and far greater in a foreign language. The Soviet authorities have decided that systematic publication in other languages besides Russian is helpful to Russian scientific workers in spite of the extra labour and expense. They have made it much easier for foreigners to follow what is happening in the U.S.S.R., especially in physics, technical physics and physical chemistry. The movement for conducting journals in foreign languages has been accompanied by increasing efforts to master these languages. Until recently, German was the second language of Soviet scientific workers. They formerly published a large number of papers in German journals. The political changes in Germany lessened the desire to publish in that country. These changes have stimulated the study of the English language. Many scientific workers who knew little English two years ago have already become fairly proficient. English should ultimately become the second language in Russia.

About three hundred journals of various sorts dealing with some aspects of technical physics are published in Russian. This development is a reflection of the growth of industrialisation. About fifty thousand workers with some degree of qualification are engaged in work which touches on technical physics. It is hoped that *Technical Physics of the U.S.S.R.* will assist foreign readers to appreciate both

the successes and the failures produced by all this effort. The Russians believe that their schemes of planning for industrial research, which can be gleaned indirectly from the choice of investigations revealed in their research papers, will be of interest, besides the reports of new facts. The journal deals especially with the physics of dielectrics, high voltage, high frequency, gaseous discharge, testing of materials, structural analysis, heat technology, applied optics, acoustics and high vacua.

The eleven numbers of the journal to hand contain several papers on the mechanism of the breakdown of insulation in cables. Inge and Walter have investigated the effects of the electric field on the decomposition of the oil in impregnated paper insulation. The change in the magnitude of the breakdown current with time has been studied, in order to discover the maximum potentials that may be used in testing cables without damaging them. They find this limit is about 22,000 volts per millimetre. Direct experiments on the insulating power of oil films between glass plates under pressure show that the insulating power per millimetre increases with decreasing thickness. They advise that the paper insulating tape should be as thin, and as tightly wound, as possible, in order to decrease the thickness of oil films. The application of external pressure to the cable increases the insulating power by decreasing the thickness of the films. Goldman and Wool find that chemical ageing in cable insulators is due to the formation of ozone and oxides of nitrogen, and recommend the use of atmospheres of nitrogen or the inert gases to avoid it.

There is a long series of papers on the important researches of Mandelstamm and his school on non-linear oscillations. These researches have led to the invention of a new type of dynamo which produces a current by varying the capacity of a condenser in a circuit containing a self-inductance. There is an account and illustrations of this remarkable machine in vol. 2, II-III. This sort of dynamo has advantages over the ordinary electro-magnetic dynamo, and may have an important industrial future.

Bontch-Bruewitch gives an account of the Polar Year observations made at Murmansk on the Kennelly-Heaviside layer. The *E* and *F* layers were observed in the polar regions during the summer solstice and for some time after. The *E* layer is less active than in temperate latitudes. Periods of complete cessation of echoes have been observed. These lasted from one minute to several hours. It is suggested that these are due to some sort of screen formed below the *E* layer, at a height less than 65 km. A relation between echo cessation and magnetic activity was observed, and it is suggested that the difficulty caused by magnetic storms of maintaining continuous radio communication over high latitudes may be partly attributed to the existence of the suggested absorbing layer.

The journal is produced in a good format. It is not confined to Russian contributors. The editors hope they will receive contributions from abroad, and thus contribute to the international co-operation of scientific workers in the acceleration of technical progress and the conquest of the material world.

* *Technical Physics of the U.S.S.R.* Editor: A. Joffe; Assistant Editor: S. Gutin. 1, I-VI (1934); 2, I-V (1935). Mezhdunarodnaya Kniga-Antiquariat, Kuznetski Most 13, Moscow, or W. H. Smith and Son, Ltd., London. Subscription 4.0 dollars per volume of six issues.