

ALL-UNION CONFERENCE ON POLAROGRAPHY

I. Orient

The Fourth All-Union Conference on Polarography took place in Alma-Ata from September 30 to October 4, 1969; it was convened by the Scientific Council on Analytical Chemistry of the Academy of Sciences of the USSR, by the Institute of Chemical Sciences of the Academy of Sciences of the KazSSR, and by the Kazakh State University. Three hundred three delegates from 125 organizations and 41 cities took part in the conference. Two hundred eighty-three papers were presented, and the number of authors of the papers was 467, which bespeaks the multitude of creatively working polarographers.

For the conference, a reporter type of work was adopted. Leading polarographers were commissioned to give general lectures concerning the material of the papers presented. After each report, there was discussion. In all, there were 28 such lectures, and 90 people took part in the deliberations. This form of work was approved and adopted for subsequent All-Union conferences. For regional conferences the former system of authors' papers is retained. A few contributions were included in the program of the conference which did not relate to the topics of the general lectures; these papers were concerned with the application of factorial design in amalgam stripping polarography (V. G. Khudaiberdiev), amalgam stripping potentiometry on a mercury film electrode (V. A. Igolinskii), the application of computer methods in polarographic equipment (I. Ya. Éberling), and others.

Yu. S. Lyalikov, A. G. Stromberg, V. F. Toropova, S. I. Sinyakova, Kh. Z. Brainina, N. S. Chovnyk, and O. A. Songina presented general lectures on the following topics: new apparatus and methods in polarography, theory and practice of amalgam stripping polarography, the polarography of complex compounds, catalytic currents in the polarography of inorganic compounds, film polarography, polarography in melts, and solid electrodes in polarography.

Special sessions and papers were devoted to the theory and practice of the analysis of organic compounds. Ya. P. Stradyn', S. G. Maïranovskii, L. G. Feoktistov, and S. I. Zhdanov presented lectures on the connection between structure and reactivity of organic compounds, the polarography of benzenoid hydrocarbons, and other topics.

There was broad discussion of equipment for polarographic analysis being developed and brought out (All-Union Scientific-Research Institute for the Analysis of Ferrous Metals, the Rostov Works, and the Kazan Aviation Institute).

Lectures were heard and discussed on the terminology of polarographic methods (B. Ya. Kaplan), on the nomenclature of reagents for analyses (Yu. I. Vainshtein), and on the utilization of Soviet works on polarography in worldwide publishing (I. M. Orient).

There was discussion of the problems existing in expressing the sensitivity attained in individual polarographic techniques and methods. It was noted that the diversity of sensitivity criteria met with in the papers of different authors impairs the comparison of the results of these papers.

In assessing the sensitivity of polarographic methods, it is recommended to compute the detection limit on the basis of a statistical treatment of the results of determinations of concentrations close to the limiting concentration. Proof is required for the absence of systematic errors. Sensitivity must be expressed as the minimum weight of test substance, which, under the conditions envisaged in the given method, can be determined with a given variational coefficient.

In the resolution adopted by the conference, the main directions for the development of polarographic methods are marked out: the development of generalized theories for direct and inverse methods, studies to raise the sensitivity and accuracy of the analyses, and comparison of the results of polarographic measurements with kinetic and thermodynamic parameters for reactions occurring in the bulk of the solutions and in the amalgams.

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In the field of the polarography of organic compounds, the necessity was noted of developing work directed toward creating a general theory of organic polarography, and of working toward establishing a quantitative link between electrochemical parameters, the electronic structure, and the spatial structure of molecules. Polarographic data must be used in selecting the conditions for the electrosynthesis of organic compounds, as well as for the electrochemical generation of free radicals and nonradicals.

In the field of instrumentation it was recommended to mass-produce the PPT60-16 ac polarograph, the UPÉ-6124 universal electronic polarograph, and the building-block systems "UNIPOL" and "OVERPOL", as well as to produce an experimental set of ÉLP-8 oscillographic polarographs and of instruments for stripping polarography in the design of the Tomsk Polytechnic Institute.

The creation of a continually active commission on electrochemical methods of analysis was deemed desirable in order to coordinate the scientific work in polarography, to point out the need for taking steps in the development of the various methods of polarographic determinations, and to standardize the electroanalytical terminology.

It was resolved to convene the next, i.e., the Fifth All-Union conference, in 1972 in Kishinev, to be devoted to the fiftieth anniversary of polarography.