

O B I T U A R Y

ACADEMICIAN VLADIMIR ALEKSANDROVICH KISTYAKOVSKY

On October 19th, 1952, the death occurred, after a severe illness, of Academician Vladimir Aleksandrovich Kistyakovskiy, one of the founders of modern physical chemistry and a distinguished scientist who has enriched chemical science by many original and profound investigations and who has trained several generations of workers in science and technology. He was in his eighty-eighth year.

The beginning of V.A. Kistyakovskiy's scientific activities practically coincided with the birth of the theory of electrolytic dissociation, and his further work contributed in an exceptional degree to the development of several very important fields of physical chemistry, particularly electrochemistry.

V.A. Kistyakovskiy gave an original theoretical treatment of chemical reactions in solution and established laws relating to the capillary rise of liquids at their boiling points. The investigations of Vladimir Aleksandrovich on complex cations, on methods of determining electrode potentials, on the passivity and corrosion of metals, and in colloid chemistry, photochemistry, and stoichiometry; his formulas for latent heats of vaporization and for the dependence of vapor pressure on pressure at near the boiling point; and his various other works—all these will remain for ever in the treasure house of science.

The development of the film theory of the passivity of metals, which was originated by V.A. Kistyakovskiy in 1909, led him to the formulation in 1925, of an original film theory of metal corrosion, which has shown itself to be a reliable means of ascertaining the essential features of the complex phenomena of metal corrosion and has given clear indications of the directions to be taken by future investigations in this field.

At the basis of V.A. Kistyakovskiy's film theory lies the hypothesis that a metal surface in moist air is covered by a film. The structure of this film is different for different metals: it varies from a molecularly adsorbed layer to a layer of oxides, in the case of readily oxidizable metals. The transition of a metal from the passive condition (in which it has a continuous surface film of oxides) to the active state is associated with the appearance of pores in the film and is not conditioned necessarily by the complete removal of the oxide film from the surface.

The corrosion of metals in moist air and in solutions of electrolytes (if oxides can exist under the conditions under which the process is carried out) proceeds mainly on account of local currents flowing between parts of the oxide film, occlusions in the surface of the metal, and the metal itself. Oxygen and carbon dioxide serve as depolarizers for the local currents.

V. A. Kistyakovskiy regarded the rusting of iron in a profoundly dialectical fashion, treating it as a complex process in the course of which the local currents break up the film, forming pores. Molecular forces also free the metal surface from the film, causing the film to come away by bringing about its crystallization. On the other hand, electrical forces re-create the film in the bared places (by means of the process $n\text{Fe} + m\text{OH}^- \rightarrow \text{Fe}_n(\text{OH})_m + m\text{e}$). The process proceeds continuously: in effect we have disruption of the film, its crystallization, and erosion of the iron at the anodes of the local currents; and rust therefore accumulates.

The further advance of science, armed with new and ever more perfect methods of investigation, does not lead to the rejection of V.A. Kistyakovskiy's film theory of metal corrosion, but, on the contrary, leads to its consolidation and to a call for its further development.

V.A. Kistyakovskiy's investigations have always been devoted to the theoretical and experimental study of questions having great significance for the national economy of the U.S.S.R. He published more than 120 papers of the highest scientific importance during more than sixty years of scientific activity.

In 1916 V.A. Kistyakovskiy published the first Russian textbook on electrochemistry; it was packed with new ideas and original methods. In 1926, V.A. Kistyakovskiy's textbook, "Applied Physical Chemistry" was published.

The scientific services of V.A. Kistyakovsky were marked by his election in 1925 as Corresponding Member and in 1929 as Active Member of the U.S.S.R. Academy of Sciences.

In the Laboratory for Colloids and Electrochemistry and the Institute for Colloids and Electrochemistry of the U.S.S.R. Academy of Sciences (founded by V.A. Kistyakovsky and directed by him until 1939), Vladimir Aleksandrovich with his students and collaborators, carried out extensive investigations on metal corrosion and electrocrystallization. After the conversion of the Institute for Colloids and Electrochemistry into the Institute of Physical Chemistry of the U.S.S.R., Vladimir Aleksandrovich directed the Laboratory for Colloids and Electrochemistry in this Institute until his death, so acting as leader of scientific work on passivating films on metals and on the motoelectric phenomena of potential changes at electrodes resulting from their movement in electrolyte solutions.

Vladimir Aleksandrovich Kistyakovich began his activity as a teacher in 1897, at St. Petersburg University, where, for the first time in Russia, he gave lecture courses in electrochemistry and photochemistry. During his period at the St. Petersburg Polytechnical Institute, he instituted the first big laboratory in Russia devoted to work on physical chemistry and electrochemistry.

During his teaching career (1897-1934), Vladimir Aleksandrovich trained many hundreds of metallurgists and chemists, to whom he lectured on physical chemistry, electrochemistry, thermodynamics, and inorganic chemistry.

From 1934 to 1939, V.A. Kistyakovsky was a member of the Moscow Soviet of Worker-Peasant and Red-Army Deputies.

The government of the U.S.S.R. set a high value on V.A. Kistyakovsky's services to science and rewarded him on two occasions with the Order of Lenin.

Vladimir Aleksandrovich Kistyakovsky, scientist patriot, devoted son of the Fatherland, has, by his sixty years of scientific activity, and his forty years of fruitful work, devoted to the preparation of cadres of scientific and technical workers, shown an example of self-effacing and fruitful service to science and to the Fatherland.

The bright image of V.A. Kistyakovsky will live on in the hearts of all who knew him to the ends of their days. Vladimir Aleksandrovich Kistyakovsky's scientific ideas will, for a long time yet, continue to encourage the further development of physical chemistry, and his name will be preserved forever in the history of Soviet chemistry.