stock, so that the full surplus may be taken for human use if desired.

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RESEARCH ON PHYSICAL CHEMISTRY IN THE U.S.S.R.

THE issue of *Zhurnal Fizicheskoĭ Khimii* (*Journal of Physical Chemistry*) 17: No. 5–6, 1943, released by the Academy of Sciences of the U.S.S.R. at the beginning of 1944, was received in this country a few days ago. This issue contains a review of the activities of the Karpov Institute of Physical Chemistry for the twenty-five years of its existence and carries an order of the Soviet government of October 20, 1943, decorating the institute, its director, Academician A. N. Bakh, and twenty-two co-workers for the proficiency and successes of their researches. Physical chemists will be interested in a bibliography given in that issue listing 825 publications of the Karpov Institute for the ten-year period 1933–1943, a substantial proportion of which are in English and German. The Karpov Institute comprises laboratories studying the following fields: (1) biological catalysis; (2) surface phenomena; (3) polymerization processes; (4) heterogeneous catalysis; (5) colloidal chemistry; (6) structure of matter; (7) chemical kinetics; (8) adsorption processes; (9) aerosols; (10) inorganic chemistry; (11) non-aqueous solutions; (12) solid and complex compounds; (13) x-ray; (14) physico-chemical methods of production control; (15) photochemistry; (16) technical electrochemistry; (17) a division exists known as the Kireev group.

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EDUCATION IN SCIENCE MUSEUMS; OR THE TEN PARTS OF THE FUNCTIONAL EXHIBIT

AS the influence of the common man increases in world affairs, the extent of his knowledge and understanding will influence the future of all peoples. He can guard against emotional exploitation of his prejudices by developing critical habits of thought. He can build a barrier against rash judgments and actions by assembling within himself an understanding of man and the world around him. The education of the common man, on whose shoulders may hang the future of humanity, is a challenge to all museums of science.

Museums may meet this challenge with the functional exhibit. It portrays significant facts while impressing critical habits of thought on museum visitors; it compares a familiar with a strange way of satisfying a basic human need; it reveals truths discovered in the scientific search for ways to satisfy basic needs; it rouses curiosity; it stimulates the visitor to do something constructive with his learning.

There are fewer than fifty fundamental discoveries, from which man derives the millions of articles he uses to satisfy three basic needs. So the story of human progress can be told within the space of any museum, and even within the space of a single room, when this story is told through functional exhibits.

At the entrance to a science museum, which tells the story of human progress in functional exhibits, the visitor meets something familiar, perhaps a coin, a button, a light, actively doing something he readily understands, and in which he can easily take part. Compared with the familiar object is an unfamiliar one, used by strange people to meet the same need. This comparison stimulates curiosity and proclaims the main theme of the museum to be systematic comparison, which is also the crux of scientific thinking. After this friendly introduction, which rouses curiosity, stimulates critical thinking and does not block thought with enervating awe, the visitor is told what lays before him in the museum, what the museum aims to do, and why it will do just that.

At the start a frame is presented into which the visitor can fit what he knows and what he will learn. The visitor is told why men learn, to better satisfy their basic needs, and how the museum aims to aid that learning, by comparing primitive and civilized ways of satisfying basic needs and by tracing crucial steps in the evolution of the more effective ways. The visitor is told how to proceed through the museum to benefit most fully from it, to look at one exhibit at a time and understand it fully before advancing. The visitor is told to pick out of each exhibit a crucial fact and compare it with what he knows; he is told to challenge anything that differs from his own experience, accepting nothing on unproved authority. He is told to approach each exhibit with thoughts about it and it alone, which is the objective or problem attitude that psychologists have shown, in systematic experiments, produces the swiftest solutions to puzzles and problems. He is told to look in each exhibit for two ways of satisfying a basic need, and after comparing them decide which is best, and why. He is told where, in exhibits and in libraries, he may find facts that will answer his questions.

At the start and at strategic places throughout the museum, the visitor may be confronted with a chart of basic human needs, raw materials, main transforming processes—the fundamental ideas, discoveries and inventions by which man has created useful goods—and the main habits, customs and institutions through which these goods are controlled and used to satisfy common human needs. This chart, summarizing the