

SPEECH ON L. V. KANTOROVICH

S. S. Kutateladze*

UDC 51(09)

An extended version of the talk at the memorial session dedicated to L. V. Kantorovich on January 11, 2004 at the Euler International Mathematical Institute (St. Petersburg).

All present are much younger than L.V. and did not know L.V. in the prime of his genius. Recently, I myself was greatly impressed by his photograph of the mid 1930s – the detached face of a lone genius. Apparently, neither of us has seen him like this. . .

Evidently, L.V. was gifted. However, it is not enough to obtain a gift – one must be able to make use of it. Meanwhile, scientific gift is by far not all a man needs. Human matters are primary, scientific matters are secondary. L.V.'s archives contain his notes on self-instruction in dance technique. Yet we know that L.V. could not even walk straight and would take his companion by the arm for this reason. . .

The phenotype of L.V. and his inborn character obviously contain features that hamper successful work in science and are plainly incompatible with the art of “implantation” of one's ideas. I believe now that already in my youth I was subconsciously and unconsciously deeply impressed by this paradox of L.V.'s nature. In all respects I was able to comprehend at the age of seventeen, L.V. differed from the persons I knew as great scientists – Lavrentiev, Sobolev, Alexandrov, Khristianovich, Okladnikov, and many others of the then elite of Novosibirsk Akademgorodok. Unaccountably, they had a particular respect for L.V., and, probably, this phenomenon of an “ugly duckling,” who resembled none of them and was evidently esteemed by all of them, especially impressed me.

L.V. may seem unfortunate in the main issue, in what concerns the recognition of the main idea of his life, that of mutual penetration of mathematics and economics. However, this opinion is wrong. In spite of attempts at hushing up L.V. and his ideas, their triumph is in fact incontestable. It is abundantly evidenced by changes in the whole system of training of economists and ineradicable mathematization and informatization of economics, both in its functional and administrative aspects. . .

The contradiction between the incontestable success of L.V.'s ideas and his outward inexpressiveness and apparent impracticality is one of the important paradoxes left by Kantorovich. His life itself became a bright and mysterious humanitarian phenomenon.

His introversion, obvious in personal relations, was quite unexpectedly combined with public extroversion. The absence of eloquence, with the depth of logic and special polemical techniques. His inner and social freedom and self-sufficiency, softness, kindness, and exceptional modesty, with intentional severity and indefatigability, going, when needed, as far as employing the “death grip” method.

Speaking of L.V.'s self-sufficiency, I mean two important facts: L.V. almost never spoke of himself and extremely rarely addressed his friends and colleagues with small requests. I can count only three instances of this kind addressed to me. In 1969 or 1970, at his request, I translated into English his economic talk at the conference organized by L.V. in Novosibirsk. The last two requests took place almost twenty years later: already being in hospital, he asked me to look at his paper on general principles of functional analysis (he was working on it with V. M. Polterovich) and to become, together with M. K. Gavurin, the editor of the mathematical volumes of his collected works, published later in the series “Classics of Soviet Mathematics” by Gordon and Breach. The volume of economic works is still not published. . .

But as to instances of his attention and concern, many of us can count quite a number of them. Recently, preparing the publication of L.V.'s selected letters, I discovered that in a thank you letter after his trip to India for another title of honorary doctor, L.V. specially asked the Indian authorities to send me to Novosibirsk some papers of local researchers on Choquet theory, in which I was working at that time. Of course, L.V. never mentioned this episode to me. Needless to say, those around him (including myself) plagued him with various requests far more often. . .

The freedom of L.V. is not surprising – it resulted from his essence, mathematical gift. It is useful to bear in mind that Cantor's words that “the essence of mathematics resides in its freedom” admit the following corollary:

*Sobolev Institute of Mathematics, Novosibirsk, Russia, e-mail: sskut@math.nsc.ru.

“the essence of a mathematician resides (and manifests itself in) his freedom.” The kindness and softness of L.V. are apparently inborn features (one can refer to Luzin’s guess). The persistence and unrestrained determination of L.V. seem to be acquired traits, which L.V. had selected and cultivated quite deliberately and rationally.

The L.V. we did not know is a sensitive talented child prodigy “Lyonechka,” how his classmates called him up to his death; is a romantic, who had taken many decisions in his brilliant youth and abided by his choice for the rest of his life.

Mathematical congresses became milestones in L.V.’s life, having determined his choice of personal tactics and strategy of research.

The First All-Union Congress of Mathematicians took place in Kharkov, from 24 to 30 June, 1930 and counted about five hundred participants, including 14 foreigners. The most well-known of them were J. Hadamard, W. Blaschke, O. Blumenthal, A. Denjoy, S. Mandelbroit, É. Cartan, P. Montel. The congress was opened by O. Yu. Schmidt’s talk “The role of mathematics in construction of socialism.” This talk, fascinating and brilliant in form, is an instructive and typical example of methodological views of that period of our history. True theses on the interplay between mathematics and reality (“The independence of mathematics is a fiction”) were combined with typical ideological clichés of that time (“It is also wrong that modern mathematics abroad and here is a nonclass mathematics”). Such exaggerations could not depreciate the relevant appeal of O. Yu. Schmidt to the audience: “In the country where we construct socialism, where one must be able to count, it is necessary that this ability to formulate arising problems in mathematical terms, ability to address each particular problem being armed with a thorough scientific knowledge, ability to manage most economically and accurately, be a common property.”

L.V. himself spoke at the evening session entitled “Theory of functions and theory of series” on June 25. The chairman of the session was D. E. Men’shov, the talk was entitled “On projective sets.” At the same session, L.V.’s co-author E. M. Livenson presented the paper “On analytical operations over sets”; there were also talks by N. K. Bari and Yu. A. Goldovsky. The parallel geometrical session included the talks “Groups and knots” by N. G. Chebotarev, “On continuous algebraic fields” by L. S. Pontryagin, and “Four-dimensional movies (with film showing)” by B. N. Delone. In his memoirs L.V. observed that “it is difficult to compete with movies” and his talk was not a great success.

Among the plenary mathematical talks, the most outstanding was S. N. Bernstein’s lecture “State of the art and problems of the theory of approximations of functions of one real variable by polynomials,” notable for its depth and breadth. Undoubtedly, the talks by O. Yu. Schmidt and S. N. Bernstein had a great influence on the eighteen-years-old L.V.

The second congress took place in Leningrad from 24 to 30 June, 1934 (by the way, at that time the Leningrad State University bore the name of A. S. Bubnov). It counted about seven hundred participants. Reading the record of the opening session and other plenary sessions provides an instructive introduction into the atmosphere and traditions of that time. The congress was greeted by A. P. Karpinsky, the President of the Academy of Sciences, who immediately departed to welcome “Chelyuskintsy,” “famous heroes of Soviet Arctic,” who had just arrived in Leningrad.

The mathematical program of the congress was rather extensive and undoubtedly showed the great achievements of the Soviet mathematical thought of that period. L.V.’s studies were reflected not only in two parallel session talks “On conformal mappings of domains” and “On some methods of approximate solution of partial differential equations” given by him, but also in the survey plenary talk by V. I. Smirnov “Leningrad studies in analysis.”

The thirties of the last century occupy a specific place in L.V.’s research activities. It is then that he developed his methodology, a synthesis of theoretical and applied studies, a combination of most abstract mathematical ideas and concrete down-to-earth developments. These years witnessed sparkling fireworks of his ideas in functional analysis (ordered spaces, generalized functions, geometry of Banach spaces) and in approximate methods of analysis (variational method, approximate conformal maps, collocation). Finally, in 1939 he published the booklet *Mathematical Methods in the Organization and Planning of Production*, which not only established the creation of a new scientific discipline, linear programming, but opened L.V.’s research in mathematical economics.

The next, third congress of mathematicians took place more than twenty years later than the second one, in summer 1956.

Another state of the society, a new stage of the development of our science. And L.V. himself had come a long way from a mathematical child prodigy to a coryphaeus, who was among the ideologists of computational mathematics and nascent informatics.

At the third congress, S. L. Sobolev, L. A. Lyusternik, and L.V. delivered the keynote plenary lecture “Func-

tional analysis and computational mathematics.” Computational mathematics was positioned as the science studying finite approximations of general, not necessarily metric, compact spaces, with special emphasis on the immanent relation between functional analysis and applied mathematics.

The last congress L.V. participated in was the Fourth All-Union Congress, which took place in Leningrad from 3 to 12 June, 1961 (this was the last congress held). His talk was entitled “Problems of mathematical economics” and marked a new phase in his research activities – in subsequent years and for the rest of his life, mathematical economics was the main area of L.V.’s research. It is interesting that even in those years he emphasized that the most important task of mathematical economics is the “forecast of economic development (under the natural development of economy) and optimal control (under the planned development).”

L.V.’s life is the path of a scientist and a citizen, whose scientific work is inseparably linked with the fates of his fellows, with the idea of serving the true interests of one’s Fatherland regardless of any current ideological situation. Nowadays, this lesson is of major importance. Attempts at slandering or hushing up the life and legacy of L.V. are doomed to failure. Pygmies cannot hide a giant. . .

A genius of rationality in science, L.V. was ingeniously rational in the choice of his world line, his path in science. He showed to each of us an example of the best use of one’s own personal resources under various external and internal constraints. . .

Translated by N. V. Tsilevich.