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ILIA VEKUA'S 90TH BIRTHDAY ANNIVERSARY

The outstanding Georgian mathematician Ilia Vekua was born on April 23, 1907 in village Shesheleti, West Georgia. After finishing a secondary school in the West-Georgian town of Zugdidi in 1925, he moved to Tbilisi, the capital of Georgia, where he entered the faculty of physics and mathematics of Tbilisi State University. He graduated the university with honours in 1930 and, following the recommendation of Academician Niko Muskhelishvili, left Tbilisi for Leningrad (now Sankt Petersburg) to continue his education there as a post-graduate student at the USSR Academy of Sciences. His initial research was conducted under the supervision of the well-known mathematician A. N. Krylov. In Leningrad Ilia Vekua published papers on problems of torsion and bending of elastic bars [1, 2]. He also worked on the theory of propagation of electric waves in an infinite layer with parallel plane boundaries [3] and obtained the results which subsequently formed the basis of his thesis for the Candidate of Science degree.

After finishing the post-graduate course in 1933, Ilia Vekua returned to Tbilisi to work at his alma mater. He wholly devoted himself to scientific, educational and organizational activities. Ilia Vekua became an active participant in the famous seminar run by Niko Muskhelishvili. He delivered lectures on mathematical physics, calculus of variations, differential and integral equations and was one of the enthusiastic founders of the Mathematical Institute of the Georgian Branch of the USSR Academy of Sciences (now A. Razmadze Mathematical Institute of the Georgian Academy of Sciences). Ilia Vekua became the first scientific secretary of this institute (1933–1940) and later its deputy director (1940–1941). Simultaneously with these duties, he headed the theoretical geophysics department at the Geophysics Institute of the Georgian Branch of the USSR Academy of Sciences. In 1939 he was granted the Doctor of Science degree and was elected a full professor of Tbilisi State University. In the course of many years Ilia Vekua held a number of posts at the above University; in particular, he was dean of the faculty of physics and mathematics (1940–1944), prorector (1944–1947), head of the chairs of geometry (1940–1947) and higher mathematics (1947–1953). In addition to this, he was head of the applied mathematics department at the Tbilisi Mathematical Institute (1943–1951), head of the theoretical mechanics chair at the Transcaucasian Institute of Means of Communication(1939–1946).

In 1944, Ilia Vekua was elected a corresponding member of the Georgian Academy of Sciences and two years later a corresponding member of the USSR Academy of Sciences and member of the Georgian Academy of Sciences. In the late 40s, Ilia Vekua headed the mathematics and natural science department (1947–1950) and was academician secretary (1947–1951) of the Georgian Academy of Sciences.

In 1951, Ilia Vekua moved to Moscow where he was officially invited for permanent residence and work. Together with his outstanding colleagues and friends M. A. Lavrent'ev, I. G. Petrovskiĭ and S. L. Sobolev, he directed the research seminars at V. A. Steklov Mathematical Institute and M. V. Lomonosov Moscow University. At various times, he was head of a department at N. E. Zhukovskiĭ Central Aerodynamical Institute (1951–1952), deputy director of the Institute of Precise Mechanics and Computer Hardware of the USSR Academy of Sciences (1952–1953), head of the theoretical mechanics chair at Moscow Institute of Physics and Engineering (1951–1954), professor of the differential equation, chair at Moscow University (1952–1959), deputy–director of V. A. Steklov Mathematical Institute of the USSR Academy of Sciences (1954), member of the bureau of the physics and mathematics department of the USSR Academy of Sciences (1954–1959). In 1958, Ilia Vekua was elected full member of the USSR Academy of Sciences and was granted the honorary title of academician.

Ilia Vekua was the first rector (1959–1964) of Novosibirsk University. When living in Siberia, Ilia Vekua simultaneously combined several duties: he headed the theoretical department at the Hydrodynamics Institute of the Siberian Branch of the USSR Academy of Sciences (1959–1961), the mathematical physics chair of Novosibirsk University (1959–1964), and supervised the work of several scientific seminars.

After the USSR National Commitee on Theoretical and Applied Mathematics was formed in 1956, Ilia Vekua had been its permanent member, while in 1963 he became member of the National Committee of Soviet Mathematicians.

At the end of 1964 Ilia Vekua returned to Tbilisi, where he was elected vice-president of the Georgian Academy of Sciences (1964–1965) and head of the higher mathematics chair at Tbilisi State University (1966–1972). On his initiative and under his guidance, the mechanics department was organized (1964) at A. Razmadze Tbilisi Mathematical Institute, while at Tbilisi State University the problem laboratory of applied mathematics was set up (1966) to be shortly reorganized into the Institute of Applied Mathematics (1968). The latter institute is named after Ilia Vekua as he was its founder and remained its director and scientific leader (1968–1977) till the last days of his life. Throughout 1972–1977, Ilia Vekua was the second president of the Georgian Academy of Sciences after its founder Academician Niko Muskhelishvili.

Ilia Vekua was a member of the Academy of Sciences of the German Democratic Republic (Berlin), the Academy of Natural Sciences "Leopoldina" (Halle), the Academy of Sciences of Literature and Art (Palermo, Sicilian Academy of Sciences), the Polish Society of Theoretical and Applied Mechanics, the Danish Center of Applied Mathematics and Mechanics. He was a member of the General Assembly of the International Union of Theoretical and Applied Mechanics (IUTAM). Ilia Vekua was granted the titles of Honorary Doctor of Halle University and Honorary Senator of Jena University.

Ilia Vekua's research works cover various fields of mathematics and mechanics. Many of them are devoted to the theory of partial differential equations in which Ilia Vekua took a great interest. In the analytical theory of linear differential equations of elliptic type with two independent variables, an important part was played by formulas of general representation of solutions by means of analytic functions of one complex variable [105]. These formulas made it possible to widen considerably the field of application of the methods of the classical theory of analytic functions of a complex variable. Based on these studies, Ilia Vekua developed new methods for solving boundary value problems which enabled him to investigate a vast class of boundary value problems formulated in nonclassical terms. The method he proposed for reducing boundary value problems to singular integral equations is one of the most powerful means for studies in this field. Special mention should be made of a general boundary value problem for elliptic equations, which Ilia Vekua formulated and studied most completely. The well known boundary value problems of Dirichlet, Neumann and Poincaré are particular cases of this problem. Ilia Vekua derived the formulas of integral representation of holomorphic functions, which in the mathematical literature are named after him, and used them as an important tool in investigating the problem. The results obtained by Ilia Vekua were presented in his monograph [51] which was awarded the Stalin Prize and, subsequently, published in English [105].

Ilia Vekua is one of the founders of the theory of generalized analytic functions. The results he obtained in this field were collected in his monograph [79] which won him the Lenin Prize and was published in English [91] and German [95].

Ilia Vekua worked out several versions of the mathematical theory of elastic shells. The results of these studies were presented in his monograph [123] which was posthumously awarded the State Prize. The published English version [124] of the monograph is also available.

In spite of his grave illness, Ilia Vekua continued to pursue his scientific, teaching and organizational activities till the last days of his life. His last monographs [122–123] were published posthumously. In September 1976, at Ilia Vekua's suggestion, the IUTAM's

General Assembly decided to hold the 3rd International Symposium on the Theory of Shells in Tbilisi, Georgia. Ilia Vekua was appointed chairman both of the international scientific committee and of the national organizing committee. Preparations for the symposium were underway when the whole scientific world was deeply saddened by the untimely demise of Ilia Vekua on December 2, 1977. The symposium which the IUTAM held in Tbilisi in August 22–28, 1978, was dedicated to the memory of Academician Ilia Vekua.

R. Gilbert, G. Jaiani, G. Manjavidze

List of Main Publications of I. Vekua

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