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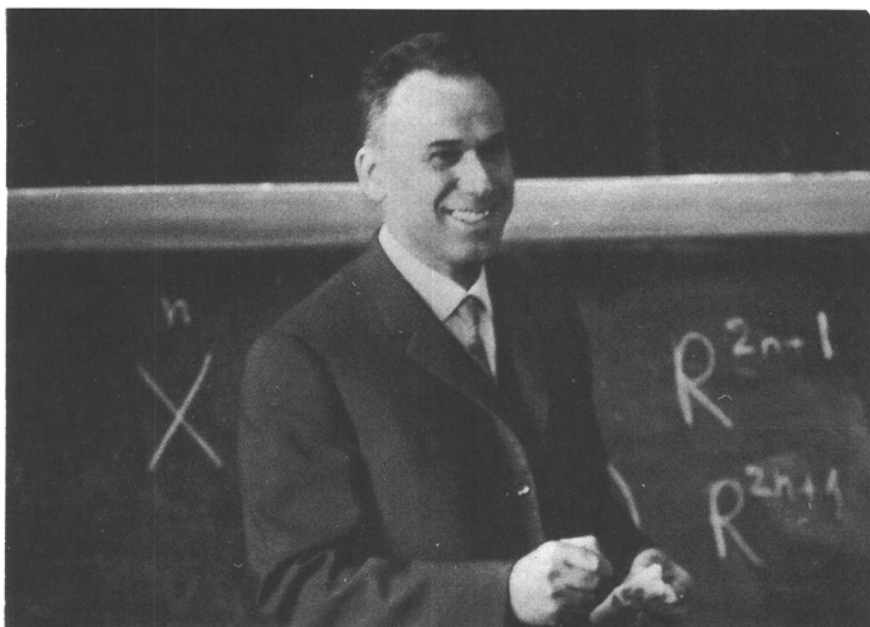
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Vladimir Abramovich Rohlin



Summer School on Geometry
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This volume is dedicated to the memory of V.A.Rohlin. He was an outstanding mathematician and an outstanding teacher of mathematicians. For the editors and authors of this volume, he was above all a very wise friend and mentor.

V.A.Rohlin was born in Baku on August 23rd, 1919. In 1935 he entered Moscow University, graduating in 1940. He was admitted to do graduate work there the same year, but in 1941 he joined the "opolchenie" (practically untrained infantry corps) and was sent to the frontlines. He was to experience all the hardships of the war years and the post-war years to the full. In 1946 V.A.Rohlin was back in Moscow. From 1947 to 1952 he worked at the Mathematics Institute of the USSR Academy of Sciences, defending his "candidate's" dissertation (Ph.D. level) in 1947 and his doctorate in 1951. From 1952 to 1955 V.A.Rohlin was professor at the Arkhangelsk Forestry Institute, from 1955 to 1957 at the Ivanovo Pedagogical Institute, from 1957 to 1960 at the Kolomna Pedagogical Institute (near Moscow). From 1960 to 1981 V.A.Rohlin was full professor at Leningrad University. He died on December 3rd, 1984. A more detailed exposition of his biography may be found in [1] and [2] ; for a bibliography of his work, see [2] , [3] , [4] and [1] .

V.A.Rohlin worked in various branches of mathematics. He was a conceptualizing mathematician in the sense that he valued the general viewpoint on subject matter and results above all and always sought to bring it into focus.

V.A.Rohlin's main research results are in ergodic theory, topology and algebraic geometry. In all these fields he obtained fundamental results, which had a profound influence on their further development.

V.A.Rohlin worked in topology in a period when that field was marked by events which transformed it drastically more than once. Clearly understanding the trends in the evolution of topology and the emergence of new methods, Rohlin attacked the sharpest outstanding problems in the field. V.A.Rohlin possessed a remarkable geometric intuition and a unique taste for visualizing geometric arguments. At the same time he took great pains to stress the power and necessity of algebraic methods.

Without attempting to give a comprehensive list of V.A.Rohlin's topological works, we will only mention some of his main results in the field. In later years it was perhaps his pioneering work (1951 - 1952) on the topology of three and four-dimensional manifolds, related to the computation of $\pi_{n+3}(S^n)$, which was to receive the widest recognition. In it he succeeded in calculating the three and four-dimensional cobordism groups, discovered the relationship between the signature of four-dimensional manifolds and their Pontryagin numbers, proved the invariance of signature with respect to cobordism and, finally, established the celebrated "Rohlin theorem" on the divisibility of a spin manifold's signature by 16. These results were published in four brief articles in Doklady Akad. Nauk SSSR. Because of their very succinct exposition, the depth and richness of these works was not fully understood by topologists at the time, although the main results were noticed at once and played an outstanding role in the further development of topology. We will not discuss this role here. We will only mention the recent book [2], which contains French translations of these Rohlin's papers, supplied with extensive comments, and related papers written in the seventies.

V.A.Rohlin's work in the second half of the fifties relates to cobordism theory and characteristic classes. In a joint paper with A.S.Schwartz, he established the PL-invariance of Pontryagin classes and gave their definition for PL-manifolds. In this work and related

ones the fundamental role of the signature in the theory of Pontryagin classes emerged. At the time V.A.Rohlin began his work on the homotopy invariance of Pontryagin classes, which was to play an important role in S.P.Novikov's proof on the topological invariance of rational Pontryagin classes.

In the late sixties, after his fundamental papers on entropy in ergodic theory, V.A.Rohlin returns to topology. In this period he is mainly attracted to the central problems of four-dimensional topology. He proves the "modulo 16" result which generalized his famous theorem and involves the **Arf** invariant of characteristic surfaces. In 1970 he obtains his estimate of the genus of smooth surfaces defining divisible homology classes of four-dimensional manifolds.

In the early seventies V.A.Rohlin initiated his study of topological properties of real algebraic varieties. Until then this field, despite certain interesting individual achievements, remained isolated from the general progress of mainstream topology. The turning point was due to the work of V.I.Arnold and V.A.Rohlin. It all started with D.A.Gudkov's conjecture on the disposition of the ovals of a plane real algebraic curve and its relationship with the topology of four-dimensional manifolds. V.A.Rohlin, using the newest methods from the topology of manifolds, proved Gudkov's conjecture and its generalization to manifolds of arbitrary dimension. In further papers V.A. Rohlin undertook a systematic study of the relationship between the real topology of a curve and its disposition in the complexification, which led to a new understanding of the basic problems of the topology of real algebraic varieties. He started the classification problem of real algebraic varieties up to rigid isotopy (following Rohlin, this is the term used for isotopies consisting of algebraic varieties) and introduced the topological disposition of the real part of a variety in its complexification into the formulation of the main classification problems.

Describing V.A.Rohlin as a mathematician, one cannot avoid saying at least a few words about him as author of mathematical papers. His exacting and refined style, his search for complete conceptual clarity of ideas, for the final accomplished formulation, his expressive language, as well as his meticulous and extremely punctilious attitude to historical questions - all this made his papers, reviews, lectures a unique example, a model for writing mathematical literature and invariably attracted numerous readers and listeners. He was always willing to spend great amounts of time to polish his exposition and get to the bottom of all his results; it is perhaps for this reason that his literary plans were always realized slowly. Exacting in his own work, he required high standard in the work of others, especially of his own pupils. It was always difficult to merit his praise for results, as well as their exposition, but his well thought out comments were always very much to the point.

V.A.Rohlin played an outstanding role in the life of the Leningrad mathematical community. When he came to Leningrad in 1960, no one was working in modern topology. In fact, no one even knew the subject. He transformed this branch of mathematics into an extremely popular one; his lectures attracted very numerous listeners, they were followed by students and professors alike. V.A.Rohlin made important contributions to the mathematics curriculum of Leningrad university in the sixties. For a number of years he headed the methodological commission of the Mathematics department. He was the first professor in the USSR to teach a compulsory course in topology, creating a novel system for teaching students topology. V.A.Rohlin's topological seminar was one of the most influential centers for the development of topology in our country. Its participants now work in many different branches of topology and geometry. V.A.Rohlin often proposed problems on which he was not actively working to his pupils. The papers collected in this volume reflect the character of the V.A.Roh-

lin Topological Seminar. Most of them were reported there in the years 1984-1986.

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