MEMOIRS ON A. D. ALEXANDROV AND
HIS LENINGRAD GEOMETRY SEMINAR

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ABSTRACT. This is a tribute to Alexandr D. Alexandrov on the occassion
of the centenary of his birth.

In science, new stems grow only from a powerful root

1. FIRST ACQUAINTANCE

In 1937, enrolment in the Mathematics and Mechanics Faculty of Leningrad University (Mat-Mekh) was unusually high: 210 students. The "big Chemistry lecture hall" in the main building on the Neva embarkment hardly contained us. At the beginning, analytic geometry was taught by Professor A. R. Kulisher (1878–1937). But in September, he was already arrested and replaced by a 25 year old Professor Alexandr Danilovich Alexandrov (hereafter referred to as A.D.). An area in front of the blackboard in this hall was separated from the rest of the hall by a wooden barrier with a wicket for the lecturer. Once, deciding to play a joke on their professor, the students locked the wicket prior to his arrival. As he approached the wicket, A.D. looked at the audience, made a step back, jumped over the barrier and imperturbably started his lecture.

The subject was simple. But A.D. talked in passing about affine geometry and mentioned some unsolved problems. Strong students were interested and attracted by that. A.D. was a lecturer from science, from creativity, but not from routine teaching. A.D. could have fun, too. To a party of my fellow-students, A.D. came with his postgraduate students S. P. Olovyanishnikov (1910–1941) and I. M.

Liberman (1917–1941). All three were wearing tuxedo and cylinders. Out of the entertainments initiated by them, I remember the selection of the "Queen of the Ball." They lifted the "Queen" in her chair and carried her around the hall.

The two students achieved outstanding results. When coming from the battle front in 1941, they defended their theses but later were killed in the war. After the war, A.D. published their works and a story about their lives.

In my second year, A.D. lectured on Differential Geometry (this time, instead of an arrested Associate Professor V. I. Milinski) and taught a lab in my group of students. In the Department of Geometry, in contrast to Analysis, there was no established standard with respect to labs. A.D. suggested to all so inclined not to come for the labs but instead solve a series of difficult problems. A few of my friends and I accepted this suggestion and had the pleasure of discussing solutions with A.D. At the end of the third year, some of us had own results. The most creative of my friends was P. O. Kostelyanets (1920–1943). He had found a way of solving a problem that was raised by A. N. Kolmogorov (1903–1987) in *Russian Mathematical Surveys*. Kostelyanets perished in battle in 1944. His research was completed and prepared for publication by another student of A.D., Yu. G. Reshetnyak.

In the fall of 1940, by a Komsomol call-up, I (like many of my peers) transferred to a newly created Aviation Institute. We then joined the army, and, for 5 years, I did not see A.D.

In the late fall of 1945, as an ex-serviceman, I came back to Leningrad University and started immediately to attend the already functioning Geometry seminar led by A.D.

2. ALEXANDROV IN 1945

A.D. was a widely educated man. He was lucky with his learning environment. His father was the principal of a gymnasium and his mother was a honored Biology teacher. He had mastered German and English in his childhood. (AD. even wrote verses in English.) He had a subtle understanding of and love for classical music...

In the Physics Faculty, which he graduated from in 1932, his supervisor in Physics was an outstanding physicist-theorist V. A. Fok (1898–1974)) and in Mathematics— a geometer, crystallographer, algebraist and outstanding pedagogue B. N. Delone (1890–1980). In 1932, when A.D. started his work in the RIMM (Research Institute of Mathematics and Mechanics) at the Mat-Mekh, he already had some publications in Optics and had taken part in writing the book *Mathematical Foundations of the Structural Analysis of Crystals*.

A.D. was highly influenced by the books: *Space, Time and Gravity*' by V. A. Fok, *Methods of Mathematical Physics* by R. Courant and D. Hilbert, *Theory of Convex Bodies* by T. Bonnesen and W. Fenchel. He was also influenced by his acquaintance in the RIMM with S. Cohn-Vossen (1902–1936), a German refugee and a student of Hilbert who used visual methods in the theory of geodesics on surfaces.

Delone involved A.D. in mountaineering and A.D. acquired the state title "Master of Sports" in mountaineering. He also drew A.D.'s attention to the aforementioned book by Bonnesen and Fenchel. This book was issued in 1934 in German and briefly summarized results of the Geometric school of D. Hilbert (1862–1943) and H. Minkowski (1864–1909). It also put forth new fundamental unsolved problems.

As early as in 1936, A.D. advanced considerably the whole Minkowski's theory of mixed volumes.

The Leningrad Department of the Steklov Mathematical Institute (LDMI) was established in 1940, and A.D., then a doctor of physics and mathematics since 1937, became one of its first research employés. In 1938–1940, A.D. got his first results on convex surfaces. In particular, he proved that such a surface has the second differential almost everywhere and developed a general theory of additive set functions.

In spite of his desire to join the army, A.D., as a Doctor of Science, was not allowed to do so.

The years of evacuation of the LDMI to Kazan (1941–1944) were extremely fruitful for A.D. He suggested a visually-geometric approach to a series of problems and solved a part of the most difficult questions of the theory of convex polyhedra and convex surfaces. For these results, he received the Stalin prize for 1942. A.D. returned to Leningrad full of ideas and creative plans.

3. A.D.'s SEMINAR IN 1945–1952

The seminar started in the 1945–1946 academic year. In the beginning, the talks were given by A.D. himself. I remember, he familiarized us with such basic concepts as metric, arc length, shortest paths and geodesics, and also with concepts (introduced by him) such as upper angle, existence of a direction of a curve at its starting point etc. In this process, properties of the concepts and their possible generalizations were discussed in depth and problems were suggested. In the beginning, the audience was changing. These years, students of the second to the fourth year attended many seminars choosing a suitable program or a topic for their Master thesis. Eventually, the set of participants stabilized. There was created an atmosphere of equality of all speakers in the face of scientific truth independently of their ranks. This atmosphere encouraged free discussion. In contrast to many modern seminars (let alone conferences) where only final results are reported while the proofs are presented very briefly, in this seminar one could also discuss projects and various approaches to problems. The presented proofs were checked collectively. During breaks, A.D. organized games such as jumping lengthwise from standstill and lifting a chair in a stretched hand. A.D. always suggested to us the value of an independent learning and unity of the whole science. He stimulated our interest to a wide scope of topics of his area. When talking about methodology, he often pronounced the slogan: "Retreat to Euclid!", fighting for visual methods. He posed problems underlining their importance and estimating their probable complexity. In this process, as a joke, he told how his teacher, Delone, maintained colossal importance of each consequent problem; but when A.D. produced its solution, he heard: "Well, this is just a little thing. What is really important is the following question... ."

In 1946–1948, A.D. was writing the two books: *Intrinsic Geometry of Convex Surfaces* and *Convex Polyhedra*. He liked the style of Cohn-Vossen, who first described in his works the problems and results in a very accessible way and only then presented the proofs in detail.

Naturally, strong students, inclined to geometric thinking. clung to A.D. As years passed, the seminar was getting stronger and stabilized in 1952.

A.D. was famous for his exclusive scientific generosity. He granted topics and prospective ideas to his pupils. Mutual generosity became one of the features of this seminar. Openness of discussions made it easier for graduate and postgraduate students to choose topics for their theses and overcome difficulties arising from their immaturity in adjacent areas.

Friendly peer editing of publications of young participants of the seminar was also a common practice. Let me tell briefly about the participants who became Doctors of Physics and Mathematics (a rank higher than Kandidat).

4. ALEKSEY VASIL'EVICH POGORELOV (1919–2002)

In the very beginning of the meetings of the seminar, A.D. told with admiration about a young military man who came to him in 1945 for geometric problems and soon brought all the problems solved. That was Pogorelov, a Kharkiv student of the Physics and Mathematics Faculty of KhSU (Kharkiv State University) in 1936-1941, admitted in 1941 to the Zhukovskii Military Aviation Academy in Moscow who, along with his study in the Academy, attended the geometry seminar in Moscow University. Then he was an external post-graduate student of Moscow University and, after getting his Kandidat, a member of the Mathematical Institute of the Academy of Sciences of the USSR (Steklov Institute) working for his degree of Doctor of Physics and Mathematics. Formally, he was not an A.D's student. But the source of his outstanding geometric research lay in A.D.'s bunch of problems. It is not a coincidence that Pogorelov collected his results in a book entitled *Extrinsic Geometry of Convex Surfaces*, echoing the book *Intrinsic Geometry of Convex Surfaces* by A.D.

At every conference dinner or thesis defense banquet, Pogorelov, smiling merrily and facing A.D., pronounced a standard toast: "To my dear teacher!" (To that, A.D. replied once: "When drinking, you are together. But when getting the Lenin prize, you are alone!") A.D. appreciated Pogorelov very much and dreamed to win him over to Leningrad. For one term, Aleksei Vasil′evich even replaced A.D. for his lectures and, in 1955–1956, taught the whole academic year in Leningrad University. However, he returned then to his native Kharkiv.

In 1960, in Kharkiv, there was created an academic Institute of Low Temperatures. Its director B. I. Verkin (1919–1990) organized both physics and mathematics departments. In particular, the Institute has a "Section of Geometry." Pogorelov, who was a full member of the Russian Academy of Science and the National Academy of Sciences of Ukraine and a laureate of the Stalin and Lenin prizes, was its head just until his removal to Moscow. Members of this Section and Pogorelov's postgraduate students were frequent guests of the Leningrad seminar. Moreover, *Ukrainian Geometric Collection* willingly accepted papers of Leningrad geometers.

Pogorelov had not only outstanding geometric and analytical results but also some serious achievements in Engineering. He created a theory of supercritical deformations of thin shells and confirmed it by a series of laboratory experiments. This theory, reported in our seminar, was based on geometry and energy arguments. In 1970, Pogorelov became one of the fist researchers who suggested a new idea of construction of a turbogenerator with a superconducting energizing winding and took an active part in calculations and technical developments of industrial constructions of cryoturbogenerators. Unlike A.D. who liked to overcome difficulties

by looking at problems from a new point of view varying the very setting of the problems and using successful generalizations, Pogorelov preferred in Geometry a straightforward approach to the problems posed precisely before him.

5. YURI GRIGORIEVICH RESHETNYAK

As a juvenile, he found himself on the occupied territory. His family, having returned to Leningrad, lived in a very small room, and Yura studied in libraries. He saved time by finishing grades 9 and 10 in one year. A freshman in 1947–48, he was in the A.D.'s seminar since his second year. He studied all the subjects beyond their syllabi. He saved time again by completing the fourth and fifth year programs in one year. He was A.D.'s postgraduate student from 1951 to 1954.

I remember, at the defense of Reshetnyak's Kandidat thesis (on the integral geometry methods in the theory of curves), somebody said to his opponent S. M. Lozinskii (1914–1985): "I think you said that the thesis deserved a degree of Doctor of Sciences." Lozinskii responded: "I did not pronounce that. But I take this opportunity to say—yes, I think so." After his postgraduate study, starting from 1954, Reshetnyak worked in the LDMI. He traveled to office from Pulkovo where he lived in the room of his wife, an employee of the Pulkovo observatory.

Reshetnyak is exclusively conscientious not only in his own research but also when refereeing somebody else's works. He always notices shortcomings (and, out of his generosity, suggests corrections). If the error is gross, he writes to the author. Once, having noticed an inaccuracy in a paper of Academician S. L. Sobolev, he addressed him. In reply, Sergey Lvovich invited Reshetnyak to work in Novosibirsk, at the Institute of Mathematics of the Siberian Division of the Academy of Sciences which was then under construction. Reshetnyak accepted this invitation in 1957.

These days, Yu. G. Reshetnyak is an academician of the Russian Academy of Sciences and a Consultant of the Sobolev Institute of Mathematics in Novosibirsk.

6. YURI ALEXANDROVICH VOLKOV (1930–1981)

He lived in Kazan. In his school years, he suffered bone tuberculosis of an arm which prevented him from attending school. Therefore he educated himself by studying textbooks.

When a student of LSU, he spent all his time in the Public Library and, on Wednesdays, perusing the new acquisitions of the Library of the Academy of Sciences. He was perhaps the most well-read amongst A.D.'s students. Once at a conference, Volkov, then a third year student, instantly pointed to a crucial mistake of a venerable speaker on continuum mechanics.

After about a year, the same mistake was discovered by an academician, and the theory was revised. In the dormitory, he helped Physics students to write theses on quantum mechanics. After his graduate study, he remained at the Geometry Department as an assistant professor. He suggested to teach Mechanics students their courses in tensor presentation and give Mathematics students a course on the three mathematical methods of presentation of Quantum Mechanics. Unfortunately, these suggestions were ignored.

In the A. I. Herzen Pedagogical Institute (now University), he taught a special course on comparison of features of the existing texts (foreign inclusively) on geometry. When heading the Geometry Department in LSU (after Yu. F. Borisov's departure to Novosibirsk), he, together with D. K. Faddeev (1907–1989) and V. A.

Rokhlin (1919–1984), created the most closely coordinated curriculum between all Departments. (However, by the reasons of "simplification," this plan held only for two years.)

Volkov has many deep scientific results following the lead of A.D.'s school. In particular, he solved two important problems. On the path dreamed of by many geometers, he proved the existence of a convex polyhedron with a given development by constructing in an abstract class of objects an extremal problem for which the extremum exists by compactness and the extremal object is the desired polyhedron. He also solved a Cohn-Vossen problem, obtaining an estimate of the spatial deformation of a closed convex surface in terms of deformation of its intrinsic metric. Volkov was a modest and reserved man. As a post-graduate student, he avoided trips to A.D.'s dacha. When heading the Geometry Department, he shied away from coming to the Deans office. He prepared his courses perfectly but assumed that the students read the texts. Therefore some of his remarks were not understood by them. He examined his students attentively but with no rush. Students were afraid of him. But his postgraduate students adored him. He helped them skillfully to develop their knowledge, talking to them for hours in the evenings at his home. As generous as A.D., he gave them excellent themes. Here is a possibly incomplete list of his former post-graduate students (all of them having visited A.D.'s seminar): Mekhtiev, an assistant professor in Makhachkala; Dekster, a professor in Canada; Kagan was an assistant professor in the South-West Polytechnic Institute; Podgornova, an assistant professor in Tashkent; El-Etrebi (Saudi Arabia); Abu-Dhabi (Egypt); Nevmerzhitski works in St. Petersburg; Lifshits died in a car accident in 1976; Alekseeva, an assistant professor in the Wood Industry Academy; Kishukov, an assistant professor in Nalchik, Alexandrova; and Brumberg.

Remembering his orphanhood, Volkov was a very thoughtful father of his two sons. He died very young, leaving good memory in everyone who knew him.

7. IL'YA YAKOVLEVICH BAKEL'MAN (1928–1992)

He entered the seminar being a second year student in the1947/48 academic year. During his study, he learned not only from A.D. but also from S. G. Mikhlin (1908–1990), V. I. Smirnov (1887–1974), O. A. Ladyzhenskaya (1922–2004), and V. A. Rokhlin. A gifted student, he learned a lot and worked actively in the area involving geometry, partial differential equations, and functional analysis.

Three years after graduating from LSU, attending no postgraduate program, he became a Kandidat in 1954. He received the degree of Doctor of Physics and Mathematics in 1961.

Since 1955, he worked in the Herzen Institute. Since 1963, he headed the Department of Mathematical Analysis. After two separate departments, the Department of Algebra and the Department of Geometry, were formed in 1965, he headed the Department of Geometry. He showed himself as an energetic organizer, inspiring scientific research in the Department and launching his own seminar. He became a member of a ministerial committee on programs for pedagogical institutes, prepared and published together with other members of his Department a series of lecture notes for graduate courses. He published many articles and a monograph on geometric methods in the theory of Monge–Ampere equations which was a

further development of the works of A.D. and Pogorelov. He had many postgraduate students who occupied numerous positions in pedagogical institutes of various cities.

Bakel'man keenly felt some personal restrictions that grew stronger and stronger that time in Russia. He was not invited to a postgraduate program. He was denied membership in the Communist Party of the USSR (abbreviated further as Party or CPSU). When A.D. and Borisov left for Novosibirsk and the Geometry Department of the University was transferred to Volkov, A.D. invited Bakel'man to a position of professor. Even the vacancy was even officially opened for him. But the local Party bosses declined his candidacy. In 1973, he was forced to leave headship of the Geometry Department that was founded by him. He wanted to move then to the Petrozavodsk Pedagogical Institute but the administration there rejected him either. In 1978 he emigrated to the USA with his wife and son.

In the USA, he held a professorship at Texas A& M University, communicated with leading mathematicians, and participated in many international conferences. In 1992, he died tragically in an automobile accident. In 1994 in Texas there was an international conference in his memory.

The following persons were Leningrad postgraduate students of Bakel'man: Verner, a Doctor of Sciences (in the Herzen Institute), Kantor (in the Herzen Institute), Guberman (in Chernovtsy), Cherdak (in Odessa), Kim (in Khabarovsk), Dmitrieva (in Nizhniy Novgorod), Kalinin, Ehpshtejn and Yunolajnen (in Petrozavodsk), Unegov (in Ekaterinburg), Vereshchagin (in Murmansk), Sovertkov (in Nizhnevartovsk), Magomedov (in Makhachkala), Kolyadov (in Cherepovets), and Ponaryadova (in Syktyvkar). Many of them attended the A.D. seminar from time to time.

8. YURI FEDOROVICH BORISOV (1925–2007)

In school, he studied for a year at home due to a problem with his leg. Through vigorous training, he became a long distance runner and continued this training all his life. Also, he was a member of a university rowing team. Borisov took part in A.D.'s seminar since 1945. His Kandidat thesis (about metrized manifolds with an edge) was three times as thick as an ordinary one. A merry and thorough man, Borisov relieved the tension by a suitable joke like this: "The result of the work is attained in the result of the work as its result." Far from being touchy, he was a friendly smiling man whose presence created a light atmosphere of cheerful mood. He was A.D.'s postgraduate student in 1948–1951 and then worked in the LDMI. He became a Doctor of Sciences in 1962. He accompanied A.D. in his mountain trips.

When J. Nash and N. H. Kuiper (1920–1994) discovered an unexpected abundance of isometric deformations of surfaces which preserve their C^1-smoothness rather than just C-smoothness, Borisov conducted a subtle investigation of intermediate smoothness. He proved that such deformations exist in the classes $C^{1,\alpha}$ for $\alpha \leq \frac{1}{2}$ but do not exist for α close to 1. But he was unable to fill this gap. In this connection, he once pronounced this toast: "To failure!" Indeed, in research, failures are numerous but might lead to an important discovery.

In 1960, A.D., overloaded by his Rector's duties, passed headship of the Geometry Department to Borisov.

In 1963, Borisov together with A.D. left for Novosibirsk where he headed the Geometry Department of Novosibirsk University. He worked in the Sobolev Institute of Mathematics up to his death.

The Leningrad postgraduate students of Borisov are associate professors: Dutkevich in St. Petersburg State University, Frangulov in the Herzen Institute, and Rusieshvilli in Batumi. All of them were participants of the seminar.

9. VIKTOR ABRAMOVICH ZALGALLER

It is difficult to write about your own self. I was the secretary of the A.D. seminar. Upon graduation from Leningrad University in 1948, I was recommended for postgraduate study but rejected the offer for a few reasons. A. A. Markov (1903–1979), Director of the LDMI those days, offered me a position of a junior researcher. But in the fall, I. M. Vinogradov (1891–1983, Director of the RIMM) cancelled this arrangement, and I started to work (first, in a temporary and then permanent position) in the Applied Mathematics Department headed by L. V. Kantorovich (1912–1986). There, I developed the linear programming and computational methods of the most economical cutting of industrial materials. In this process, I attended plants and wrote with Kantorovich a book which was published in 1951. Its second edition appeared in 1972. I am proud that Kantorovich, when delivering his Nobel lecture had mentioned my name among his assistants.

A.D. was not inclined to deal with engineering problems and, when somebody asked him for an advice in this area, referred him to his students. By his recommendation, still a fifth-year student, I was a consultant in a military-oriented research institute. The topics were diverse. Here is an example of a nonmilitary problem: calculation of cylindric springs of varying rigidity. The problems of this sort were not discussed at the seminar. But outside the seminar, its participants dealt with such problems. Together with Volkov, we studied how to control a burhole by observations of its curvature and torsion. Together with Reshetnyak, we worked out calculation of the shape of rotors of spiral compressors and tools for their processing. Later, I wrote a booklet on the theory of envelopes.

I remember once, after I and Borisov consulted some engineer, he offered us money which we rejected. He said: "How can I reward you?" Then Borisov smiled and said: "Do you have an entrance-gate office? Erect a monument to us over there." All three of us laughed, and the question was closed.

I defended my Kandidat thesis on Geometry in 1951. But only in 1954, I was transferred to the Geometry Department after completion of editing the book *Mathematics, Its Content, Methods, and Meaning.*

A.D. commissioned me with finishing and presenting the theory of "two-dimensional manifolds of bounded curvature." This is a generalization of his geometry of convex surfaces which happens to be the closure of both the class of two-dimensional Riemannian manifolds and polyhedral surfaces. By compactness, many extremal problems are solved in this generalized class. Our joint. paper with A.D. on this issue appeared in *Transactions of the Steklov Institute* in 1962. Another volume of this research containing papers of some students of A.D. appeared later.

I got my academic degree of Doctor of Sciences not by defending a dissertation but on submission of a collection of my works. Later I proved completeness of the

list of convex polyhedra with regular faces which attracted attention of chemist-crystallographers in Moscow and the USA. This was one of the first works where computer calculations were a basis of a theoretical proof.

Later, I wrote books with Yu. D. Burago and articles on convex bodies, lectured in LSU as professor and worked in the LDMI/PDMI until 2000 (when I retired at the age of 79).

My postgraduate students were: Burago (Head of the Geometry Department of the PDMI), Stratilatova (died early), Fedotov (an associate professor at the Agricultural Academy), Trushina, Makeev (an associate professor of the Geometry Department of SPSU—St. Petersburg State University), and Kozlov (Doctor of Sciences, a tutor of the Geometry Department of SPSU).

10. REVOLT IVANOVICH PIMENOV (1931–1990)

As a child, he lived in Magadan. His father was a biologist, a specialist on raising foxes, and an apologist of Prince Kropotkin (1842–1921). He moved to Leningrad with his mother. He dreamed to become a historian.

Distrusting the humanitarian programs of those years, he entered the Mat-Mekh and was in the A.D.'s seminar since his 3rd year (1950/51).

A.D. said once that the nature is "omnipossible," i. e., if a nature-looking structure is logically possible, then the nature realizes it in some form. Pimenov became interested in relativity and its generalizations and started to work out the possible instances of space-time structures.

He was a dissident. In his second year in the university, he withdrew from the Komsomol—the Communist youth organization practically mandatory for everybody at age 14. (On this occasion, he was subjected to a psychiatric test.) We resisted his efforts to discuss politics at the seminar. After the university, when he worked in the Library of the Academy of Sciences and taught in the Library Institute, he wrote letters to the local members of Soviets (parliament) demanding their protests against sending troops to Hungary in 1956. Also, he involved his students in making leaflets with such protests for which he was arrested. His mother brought him scientific literature to his cell. The jail supervisor was very much surprised when Pimenov expressed his desire to stay by in a solitary confinement: "I always dreamed to have a private office."

For his mathematical articles composed in his labor camp (the LDMI refereed them), he was released and sent to work in the LDMI. Pimenov had a phenomenal memory. He had mastered 12 languages including Sanskrit, Latin, Czech and also studied Chinese. He was extremely industrious. For his 6 years in the LDMI, he published 20 papers, wrote a monograph *Spaces of Kinematic Type*, defended both his Kandidat thesis and his Doctor-of-Sciences thesis. At the same time, his works on history and labor camp memoirs were appearing in "Samizdat"—the underground publishers. Then he was accused in spreading "Samizdat" and arrested again. Owing to his knowledge of law, he managed to spoil considerably the career of his investigator. The court, where he got acquainted with A. D. Sakharov (1921–1989), sentenced him to exile in Syktyvkar, the capital of the Komi Autonomous Republic. There, Pimenov headed a computer laboratory in the Komi Affiliation of the Academy of Sciences. He was not allowed to teach undergraduate students, but he still had some graduate ones.

In the very beginning of 1990, Pimenov was elected a member of the Supreme Soviet of the Russian Federation from Komi. Until his death (he died of stomach cancer at the end of 1990), he worked actively in Moscow in a committee on the new state constitution. Pimenov was completely exonerated posthumously in 1991.

11. ALEXANDR MIKHAJLOVICH ZAMORZAEV–ORLEANSKIJ (1927–1997)

Zamorzaev was a team-mate of Borisov in a rowing team. Partly, he was an algebraist. He came to the geometric seminar as a second-year student. He was an A.D.'s graduate student from 1954 to 1957. I remember a seminar session where two professors, A.D. and D. K. Faddeev, explained the new graduate student how one can work out a complete classification of Belov's crystallographic groups . (These are groups of symmetry of discrete point sets in which some of these points have positive and some, negative charge.) Zamorzaev had carried out this task brilliantly and was awarded E. S. Fedorov's medal in 1973.

After his graduate study, he left for Kishenev where he later became a corresponding member of the Moldavian Academy of Sciences. A.D. especially appreciated that Zamorzaev created a scientific school for studying symmetries (color, spiral, multidimensional, and noneuclidean). Among many of his students in Kishenev, three became Doctors of Sciences: Makarov, Palistrant, and Lungu (heading for many years the Geometry Department of Kishenev University).

12. YURI EVELEVICH BOROVSKIJ

A somewhat eccentric man, he was in the seminar since 1951. Borovskij was independent in his choice of topics. He was a graduate student of A.D. in 1953-1956. Upon defending his Kandidat thesis, he inclined to algebraic geometry. In 1960, following Reshetnyak, he moved to Novosibirsk where he became a Doctor of Sciences. He did not have graduate students in Leningrad.

13. YURI DMITRIEVICH BURAGO

He attended the seminar since he was a fourth-year student (1956/57). In 1958-1961, he was a graduate student of Zalgaller. He authored many works in A.D.'s area and on the border of analysis and geometry. He is also a coauthor of a series of big monographs and surveys: with V. G. Maz′ya, on potential theory for domains with nonsmooth boundary; with Zalgaller, on geometric inequalities, on criteria of convexity, and on Riemannian geometry; and with M. L. Gromov and G. Ya. Perel′man, on Alexandrov's metric spaces. He is an inveterate motorist. After his graduate study, Burago works in the LDMI (now, after the renaming of Leningrad into St. Petersburg, PDMI). He has had the degree of Doctor of Sciences since 1968.

After the University had moved to Peterhof, the seminar convened in the LDMI. Upon A.D.'s transition to Novosibirsk, the seminar continued its work, and Burago gradually became its leader.

Burago is a participant of many international conferences, a member of the Organizing Committee of the annual geometry conferences in Oberwolfach (Germany). He heads the Department of Geometry and Topology of the PDMI and is a professor of the Geometry Department of the University.

Burago's graduate students are: Buyalo (Doctor of Sciences, on the staff of the PDMI); Ananov (a member of the St. Petersburg's Legislative Assembly); Dmitriev

(an associate professor at the Institute of Finance and Economy); Mostovskii (in Arkhangelsk); Perel′man (once in the PDMI, now freelance); and Petrunin (in the USA).

14. ALEKSEI LEONIDOVICH VERNER

He graduated from the Herzen Institute in 1956, was a graduate student of Bakel'man, and participated in A.D.'s seminar since 1954. He became a Doctor of Sciences in 1969. Verner took an active part in creating new school texts on geometry. Kolmogorov, dissatisfied with the practical aspects of the existent school texts, asked Pogorelov to write a text based on an excessive set of axioms. Independently, A.D. wrote in Novosibirsk some parts of a prospective course in school geometry. There were arguments between Pogorelov and A.D. Pogorelov chose a method under which the equalities were defined in terms of the length introduced axiomatically. That led to a compact presentation and quick passage to computations. A.D. considered unacceptable the hiding of the very process of measurement and regarded as basic not computations but visualization and logic. Upon returning to Leningrad, A.D. and Verner (together with a school teacher V. I. Ryzhik) created a set of texts on geometry for all grades—from 6th to 11th,—for both general schools and mathematically oriented schools.

In 1973, Verner took over from Bakel′man the headship of the Geometry Department in the Herzen Institute. For a few years, he was there Dean of the Mathematics Faculty. Many graduate students of Verner and B. E. Kantor attended our seminar. One of them, V. Oliker, is now a professor in the USA.

15. A.D.'S POSTGRADUATE STUDENTS FROM OTHER CITIES BY 1963

One of them, formally from the Pedagogical Institute, was A. Ya. Yusupov (1913–1990). He was Head of the Geometry Department in Bukhara. In 1949–1951, A.D. often visited Almaty to lecture for the graduate students of the Physics and Mathematics Faculty of Al-Farabi Kazakh National University (then Kirov Kazakh University). Some of them, E. P. Sen′kin, V. V. Ovchinnikova, M. E. Kvachko, and Pogodina, arrived to Leningrad in the fall of 1951. The first three became A.D.'s postgraduate students. Three more, staying in Almaty, became his extramural postgraduate students. They were V. V. Strel′tsov (Head of the Geometry Department in the Border-Guard Military School), D. Sh. Yusupov (Head of the Geometry Department in the Female Pedagogical Institute) and later—A. A. Zil′berberg (she worked after her graduation as an associate professor in the Almaty Border-Guard Military School and then in Moscow in the Moscow Civil Engineering Institute.

Two of A.D.'s postgraduate students were from Ukraine: Sobchuk (an associate professor in Chernovtsy) and Starokhozyaev. Two others was a married couple, Herbert and Brigitta Frank, from the East Germany. They graduated from LSU in 1957; then were on probation in their country, and, over 1959–1962, stayed in Leningrad as A.D.'s postgraduates. Later, Herbert headed the Mathematical Section of Humboldt University in Berlin. All of them either became regular participants of A.D.'s seminar or arrived to the seminar many times.

When the postgraduates from Almaty settled in Leningrad, the relations in the seminar became closer. There were some collective trips to A.D.'s dacha or to a forest for mushrooming.

I remember a banquet on the rented yacht *Neva* after the public maintenance of Strel′tsov's Kandidat thesis. We sailed to Peterhof and back, and the voice of a singing Pogorelov sounded above the quiet Gulf of Finland.

The leader among those from Almaty was Sen′kin. Independent since his childhood (orphan), gifted, athletic, and perspicacious, he could say: "Why do you think now about such and such a thing?" and his guess would occur correct. After his postgraduate study, he became an associate professor in LSU. The head of the Analysis Department once said: "Sen'kin is the only one amongst you who can really teach." Sen'kin helped his wife to write her Kandidat thesis on the glass grinding. In 1964 he moved to Kharkiv as his wife was from there. He worked there in Pogorelov's Department and taught in KhSU. His postgraduate student A. A. Borisenko is now a corresponding member of the National Academy of Sciences of Ukraine. However, Sen′kin expected from himself a greater success than he actually could achieve. He got depressed, stopped working, and died at early age in 1981. He hardly understood to what extent his success in Leningrad was due to A.D.'s influence.

Postgraduate student Ovchinnikova left in a year for Moscow. A.D. gave her a generous gift: he published with her an outstanding paper on the causes of linearity of certain transformations in special relativity.

Among those who did not stay in the seminar for long, I remember A. D. Epifanov and V. Ya. Kreinovich.

In these years, we tried to imitate A.D. Professor V. A. Tartakovskii (1901–1973) once told me: "You violate the commandment: 'Thou shalt not make unto thee any graven image.'" I still keep a photo of a group of the seminar participants made by Pogorelov in 1955. Standing are Borisov, Verner, Zalgaller, Sen′kin, A.D. himself, D. Yusupov, Reshetnyak, Bakel′man, Borovskii, and Pogodina. Reshetnyak made an inscription under the photo (expressed in verse):

They aren't coo-coos on a walk,
Not a company of crooks,
Not a group of alcoholics
Pooling money for little booze.
Neither dandies from a tailor,
Nor a patrol of NKVD.
This is just the school of hell
Headed by A.D. the Great.

(Here, NKVD is the KGB of Stalin's era. The Russian for "hell" is "ad.")

16. CONFERENCES AND GUESTS OF THE SEMINAR

From Moscow, N. V. Efimov (1910–1982) and his students É. G. Poznyak (1923–1993), V. T. Fomenko, É. R. Rozendorn, and I. Kh. Sabitov came often to A.D.'s seminar. From Kharkiv, Pogorelov came almost every year. Ya. P. Blank (1903–1988), L. A. Shor, Borisenko, and colleagues and postgraduate students of Pogorelov: A. D. Milka, Danilov, Lejbin, Danelich, Medyanik, and Sopov, also appeared in the seminar from time to time. The school of geometry "in the large" had been forming so under A.D.'s leadership. (This term emphasizes interest to

the global properties of geometric objects.) I do not remember how many All-Union symposia and conferences on geometry in the large took place. They were conducted almost each year and attracted many participants of the seminar and other mathematicians. I well remember the first symposium in Leningrad in 1958 and the third in Petrozavodsk (1967). (The venue was the same in 1969.) The second symposium was in Novosibirsk. Also I well remember a conference in Kiev in 1968. Other conferences took place in Kiev (1961), Novosibirsk (1963) and other cities approximately every other year. For the latest several years, they were organized in Rostov-on-Don.

In 1956, over the period of the III All-Union Mathematical Congress, among the guests of the seminar there was an outstanding German geometer W. Blaschke (1885–1962). Later A.D. was elected a member of the Accademia dei Lincei in Italy.

In 1961, a well-known American geometer H. Busemann (1905–1994) arrived at the IV All-Union Mathematical Congress; he also was a guest of the seminar. As a student, Busemann (almost the same age as A.D.) took part in preparation of the fundamental book by Bonnesen and Fenchel on convexity, and so he was an expert in A.D.'s area of research. He reviewed many publications of A.D.'s school for Mathematical Reviews. For the sake of that, he learned Russian and gave his talk at the Congress in Russian.

Later, many foreign geometers visited the seminar. Among them, I remember Wrubel (Poland), László Fejes Tóth (1915–2005, Hungary), Marie Moszyńska (Poland), and R. Sulanke (East Germany).

17. A.D. as RECTOR

A.D. was appointed the Rector of LSU by September of 1952. I remember he invited me then to his office and asked: "Do you think it makes sense for me to become the Rector?" I said no, you would waste your energy. A.D. responded: "But Lobachevskii was a rector!" He wanted to influence events and succeeded in many cases.

First of all, he supported genuine scientific schools in all faculties, promoted debunking false authorities, and nominated (even for administrative positions) real scientists. The Party leadership of LSU supported him in that. (The members of this Party committee loved A.D. and were proud of working with him after so many years.) A.D. also supported some arguable directions of research. He backed L. L. Vasil′ev (1891–1966) in parapsychology and L. N. Gumilev (1912–1992) in ethnic genesis.

There were two obstacles in the personnel area. From the Leningrad City Party Committee, he got politicized orders. A.D. stepped over them. Having that in mind, L. A. Verbitskaya (Rector of SPBU from 1994 to 2008), said at A.D.'s funeral that he had 4 Orders of the Red Banner of Labor and, also, 4 reprimands from the Party authorities (thus equalizing them to the decorations). Once, A.D. said about the Leningrad City Party Committee: "I warned them that they will have problems with me. For them, the university is buildings, but for me, it is professors." In spite of recommendations of the Leningrad City Committee, he invited to university positions some professors from the Academy, other institutes, and other cities. Also, there was a routine resistance from the bottom. Not everywhere we encountered professors ready to take part in renewing the academic life. I remember that, after

wasteful efforts to elect the Dean of Humanities where a bitter feud was in progress and nobody wanted to be dean, A.D. pronounced: "Dddamned professors... ."

A.D. took great care of true scientists as if he was responsible before history but authorities. Once he asked the University's photo laboratory to make portraits of two young mathematicians, Ladyzhenskaya and Pogorelov. Both of them became later members of the Russian Academy of Sciences.

Another of A.D.'s successes was a change in relations between the Rector and students. He refused to meet the parents of rejected high school graduates. But he willingly talked to these graduates themselves and, when he saw outstanding persons, arranged for their enrollment, sometimes even to the second year. Here are examples from the Mat-Mekh: G. Tsejtin (now a professor of the Faculty) and I. A. Ibragimov (an academician, Director of the PDMI from 2000 to 2007).

A.D. established wide contacts with the students, attended dormitories, gave talks at many faculties, and arranged question-and-answer meetings. He did not avoid sharp questions but answered in essence. Even to silly questions, he did respond (with humor). Once he was asked: "Who was the greatest scientist?" A.D. replied: "Well, in order to compare, we should choose a measure. Let, for instance, the measure of greatness be the number of years between the time of his discoveries and the time when they became commonly known. Then, Archimedes, probably, will be the greatest one. In essence, he could integrate. Though, if Jesus Christ was a real person, then that's him. He invented the morale of the communist society, but we are still far away from it."

Once he conducted an experiment with his postgraduates. By chance, he asked them questions on music, literature, the Bible, art, history, etc., and stated proudly: "Physicists answered the best!" As the Rector, he often traveled abroad and brought back excellent records of classical music. We often come to him after seminar to listen them. One of his big endeavors was not finished due to the economical situation in this country.

Around 1955, A.D. started his efforts in the most difficult task: arranging for a proper location of the University. Between the University and the Sjezdovskaya Line, there is a huge block of buildings of the Military Academy of the Rear and Transportation. The army was subject to a cut back that time, and the Academy was supposed to move outside of the city. A.D. achieved an agreement with the city authority that all these buildings would be occupied by the University. The faculties already started "division" of the buildings between themselves. But just at this time, the "Hungarian events" began. The government was scared, and the evacuation of the Military Academy was cancelled... At the same time, the Leningrad top architect (Kamenskij, I think) and his deputy Fomin, whom A.D. often contacted, worked on prospective planning of territories around the city. Fomin persuaded A.D. to accept the erection of new university buildings in Peterhof. "It will be like Cambridge. There will be dormitories for all students, including those living in Leningrad, good apartments for all university workers, fresh air, and their own yacht club. In 10 years, the city subway will go there." A.D., who had seen Cambridge, agreed. Unfortunately, the construction lasted many years, much longer than expected. The vegetable and oil storage-houses promised to be relocated were not moved. The number of apartments built for the University employees was insufficient. Moreover, half of them were given to the local people waiting for accommodation for a long time. Only 3 (out of 15) faculties could move to Peterhof. The dormitories were

too small, and more than half of the students had to spend daily 3 hours for their trip from Leningrad and back. The same was true of the employees. These days there is still no subway. Excellent class rooms are empty for the second half of the day: seminars have chosen to meet in Leningrad. Older professors leave teaching early. The number of high school graduates' applications per vacancy goes down. The Geology and Soil Faculty, whose building was under construction, refused to move to Peterhof...

Once, in the fall, visiting A.D., I told him how I waited for a train to Leningrad after my lecture on a very windy day. It did not stop because the train driver was catching up with his schedule. A.D., who was having his dinner, threw a plate on the floor and shouted: "You came to torment me, too!" His mother, still alive then, said: "Sashka, you are crazy!" He smiled, calmed down. In agitation, he repeated: "I believed them. I believed them."

A.D.'s research during his rectorship remained active. To gain more time, he left his headship of the Geometry Department. Though he skipped some seminars, he published in 1952–1963 thirty one original mathematical papers. (That is not counting abstracts of his conference talks, methodological and debatable articles, as well as many pieces of publicism.) Among these 31 papers there were two big series: "Uniqueness theorems for surfaces in the large" and "Research on the maximum principle." There were also a few articles on isometric deformations and a paper in German "On a generalization of Riemannian Geometry." The latter became a foundation of the theory of Alexandrov's spaces which is studied now by many geometers throughout the world. A.D. was a surprisingly industrial researcher, daily spending many hours at his desk. That time, I was finishing with him our *Two-dimensional manifolds of bounded curvature* and used his accurate diary notes of forties. Once, commenting on education, he told his students: "The personal example is an important tool of education. In my childhood, when I went to bed, I saw for a long time a ray of light from my father's office. It is this ray that educated me."

Let me tell two stories: on A.D.'s fight for genetics and on the destiny of a scientific school created due to A.D.'s support.

18. EPISODES OF FIGHT FOR GENETICS

After the war, there were many Party members among students. For a Party general meeting, a big hall on the Sjezdovskaya Line was rented. This was the hall where Lenin pronounced his sacramental phrase: "There is such a party." Dreaming about science, I was shocked by a squabble at this meeting. Professor I. I. Prezent (1902–1967) sharply criticized a dissertation. His main argument was: the bibliography contains more than a hundred foreign papers and only 14 Russian ones. Another professor objected: "Behind this dissertation there are 10 years of labor in the laboratory. While you, during these 10 years, didn't even come into the lab but intrigued only." Prezent shouted: "We will destroy you in any case. In our camp, we have Lysenko, whereas you have only Schmalhausen."

Soon after in 1948, the notorious session of the Lenin All-Union Academy of Agricultural Sciences took place (labeling genetics as pseudoscience).

A.D. refused to fire an excellent scientist Kolesnik who advocated genetics. (But Kolesnik had to leave his position of vice-rector for sciences.) Then A.D. organized the preparation of a textbook on genetics, authored by M. E. Lobashov(1907–1971), and published this text in the University. (For that, sneaking information against

A.D. was sent to the Central Committee of the Party.) A.D. defended genetics at academic meetings and conferences.

Under Khrushchev, Lysenko remained a favorite. But A.D. expelled Prezent from the university. He complained to the Ministry that A.D. fired him out by Anti-Semitic motives. The Ministry ordered A.D. to restore him. When Khrushchev arranged in Leningrad a meeting of the most active members of the Party emphasizing collective leadership, A.D. mentioned in the debates (as an example of his active position by the right of his knowledge of the University affairs) that he did not restore Prezent. Then Khrushchev asked a general nearby: "What do you do to those who refuse to follow the orders? – We execute them by a firing squad, Nikita Sergeevich. – You see..."

After that, A.D. restored Prezent but, in a month, there was a competition for his position, and he was not reelected.

For his support of genetics, A.D. got a reprimand that time and, much later, a decoration.

19. THE SCIENTIFIC SCHOOL OF V. A. ROKHLIN

Vladimir Abramovich Rokhlin (1919–1984) was born in a Caucasian region of Russia. His mother died in 1923, and he lost his father in 1937. In 1935, he entered Moscow State University (MSU). Many academicians consider him the most gifted mathematician of his generation. In 1941, he became a postgraduate student. Then he joined the Red Army as a volunteer. In an encirclement, he was wounded and underwent an operation on his legs. Germans took him in custody from a hospital. His fluent German allowed him to mislead Germans regarding his ethnicity. But then, he was arrested again. He was freed by our army and worked then as an interpreter in the army headquarters. After the war, he was sent to a detention camp for a "check up," where he was made not a detainee but a guard. In 1946, he was sent to Moscow where he worked in the LDMI and was a guide of (blind) Academician L. S. Pontryagin (1908–1988). He defended his thesis of Doctor of Sciences in 1951 and then was dismissed (probably due to his biography data). After that, he headed a department in Arkhangelsk, and then in Ivanov and Kolomna. From Kolomna, he went to Moscow every week to lead a seminar in MSU.

In fall 1960, on advice of Ladyzhenskaya, A.D. invited him to Leningrad. This bright scientist working in the fast developing Differential Topology and Ergodic Theory attracted like a magnet most gifted students and young faculties. An excellent lecturer on general and special topics, he expected from his graduate and postgraduate students exclusively hard work.

While the basic pedagogical method of A.D. was encouraging his students for early personal works with simple material, Rokhlin demanded that his students first mastered well a huge theoretical material. Only the strongest could bear such a load. For 26 years of teaching in Leningrad, Rokhlin had about 20 postgraduate students. Here are some whom I knew.

—Gromov who worked in the RIMM, then left refusing to work in Syktyvkar and emigrated. He is awarded with the Medal of the Best Mathematician of the USA, Wolf's prize in Israel (1993), the Lobachevskii medal (1997) in Russia, and the Abel Prize (2009). He is a leading professor of the IHES in France. He considers himself partly a student of A.D.

—Ya. M. Eliashberg is a professor in the USA.

—O. Ya. Viro is a laureate of an important Swedish prize. He heads a department in the USA and remains a member of the Scientific Council of the PDMI, where he once had headed a department.

—A. M. Vershik. He works in the PDMI and was the President of the St. Petersburg Mathematical Society for many years.

—N. Yu. Netsvetaev is today's head of the Geometry Department in SPSU.

—V. M. Kharlamov is a professor in France.

—N. V. Ivanov is a professor in France.

—V. G. Turaev is a professor in France.

—S. A. Yuzvinskij is a professor in the USA.

—S. M. Finashin is a professor in Turkey.

—I. V. Itenberg is a professor in France.

—Gluskina is an associate professor at Shipbuilding University.

—Abramov is an associate professor at the Economics Faculty of SPSU.

Education of many Petersburg mathematicians grew wider thanks to Rokhlin's transfer to Leningrad.

20. GROWTH OF THE UNIVERSITY

The example above shows the result of inviting just one scientist. But, under A.D, whole new parts of the University were created. At the Mat-Mekh there appeared the courses of improvement of mathematical education for engineers, a computer center, an Operation Research Department, and a Statistical Modeling Department. After moving to Peterhof, the RIMM grew considerably. Mechanics got spacious labs (only the wind-tunnel remained in the attic of a building on the Neva embarkment), and an observatory was built. The Physics Faculty, having left behind its crowded and mercury polluted rooms, got separate halls for the staff, the Physics Research Institute, and an experimental plant.

At the Economics Faculty there was created the Department of Economic Cybernetics. Before that, a one-time 6th year study (under Academicians Kantorovich and Yu. V. Linnik (1915–1972)) was arranged to prepare specialists in linear programming. This study yielded two academicians (A. I. Anchishkin (1933–1987) and S. S. Shatalin (1934–1997)) and a series of specialists who established appropriate programs in many economic universities. Similar changes took place under A.D. at many other faculties. Travels of professors to other universities for lecturing became a standard practice. Thus, in 1960, A.D. himself gave a "Rector's" course at Vladivostok University.

After A.D.'s departure for Novosibirsk, K. Ya. Kondrat′ev (1920–2006) became the Rector of LSU. In 1975 he was replaced by Corresponding Member of the Academy of Sciences V. B. Aleskovskii (1912–2006) who was a bureaucrat of science. First he ordered that no letter leave the University without his signature. That was just laughable: more than a thousand letters were sent each day. He had to cancel the order.

He brought to the agenda of the Scientific Committee a question of firing all professors older than 60. The Dean of the Mat-Mekh, Corresponding Member of the Academy of Sciences S. V. Vallander (1917–1975), vigorously objected to him. He called Vallander to his office, shouted at him and threatened to close the wind tunnel belonging to Vallander's Department. Vallander died of a stroke just after he

left Aleskovskii's office. The bright days of A.D.'s rectorship were over as standard bureaucratic authorities came to power.

21. PHILOSOPHICAL VIEWS OF A.D.

A.D. had been interested in Philosophy since 1946. After his death in 1999, I was startled with abundance of volumes of world philosophical literature in his office. These were volumes with many bookmarks. He worked hard.

The consistently materialistic views of A.D. on the science formed under influence of V. A. Fok. A.D. actively and fiercely defended relativity and quantum mechanics from the vulgar materialists of the type of A. A. Maksimov (1891–1976). A.D.'s views on the intrinsic connections of the distinct areas of science were wide and deep. When the second edition of the Great Soviet Encyclopedia was in preparation (and printed from 1949 to 1958), some draft articles on the issue were discussed. In Moscow (I think, in the Mathematical Society), A.D. gave a talk with subtle remarks on a draft article by Kolmogorov "Axiom." He did not get support from the audience. The listeners did not want to penetrate into the essence of the issue and perceived the remarks of young A.D. as a cock-fight attack on Kolmogorov "the Great." But Kolmogorov himself told A.D. later that, due to his criticism, he changed the article, and it became better.

When on a session of the Scientific Committee of the Faculty somebody Popov called on to restrict the teaching of such abstract subjects as Mathematical Logic, Topology, and Functional Analysis, then A.D. vigorously objected him. In these years in the USA there was published a book by R. Courant and H. Robbins "What is Mathematics?" It provoked certain methodological objections. The events like the notorious session of the Lenin All-Union Academy of Agricultural Sciences impended the Soviet mathematics. Instead of discussion, the Steklov Institute initiated the preparation of the book, *Mathematics, Its Content, Methods and Meaning*. (The plan was simple: while we write, things can change.) Of the three its scientific editors, A.D. was the most active. Not all academicians regarded seriously requests to write a chapter for the book. But A.D.'s chapters, "A General View of Mathematics" and "Abstract Spaces," and Malcev's chapter "Groups and Other Algebraic Systems" were very interesting. The work over the book was given a political touch: a draft edition (manuscript) was discussed in many seminars with mandatory shorthand record. The book (in 3 volumes) appeared in 1956, when, indeed, many things changed. Some chapters of this book have been translated into many languages.

In particular, the first chapter, by A.D., was translated into English 3 times (once in England and twice in the USA). These translations were sold out completely, and additional copies had to be printed.

The scientific community is inclined to form opposing camps. Once, in a philosophical seminar, Professor K. F. Ogorodnikov (1900–1985) responded to an opponent by the phrase which shocked me: "...but we will organize a proper social atmosphere and will not listen to your arguments." Phrases like that were difficult to pronounce in the presence of A.D. His speeches always directed the discussion towards the essence of the issue ignoring existence of any camps. This subjected A.D. to criticism from both sides, out of the argument: "those not with us are against us."

Once, such complete ignoring of the "camps" let him down. Normally, when he addressed the essence of a matter, this resulted in a support for a more progressive camp. But once, Academician B. M. Vul (1903–1985) asked him to speak in Moscow for physicists. A.D. was not warned about an atmosphere of expectation of an attack on Physics similar to that against Biology. Assuming that he spoke just to some interested specialists, A.D. ventured a criticism of the philosophical aspects of a posthumous volume of the works of Academician L. I. Mandel′shtam (1879–1944) edited by Corresponding Member of the Academy of Sciences S. M. Rytov (1908–1996). He also offended an interpretation of relativity by Ya. I. Frenkel (1894–1952). It looked as if he played into the hands of oppressors of physics. A.D. himself later explained that he was "provoked." Rytov achieved revenge many years later with his paper "The Cold Winter of 1953" in which he accused A.D. in preparing a background for an ideological attack on physics. Some physicists saw also an Anti-Semitism in his speech. Later, in Novosibirsk, members of the (nationalist) society "Memory" accused him similarly in Zionism because he defended Kolmogorov accepting the Wolf Prize, an international award granted by Israel, in 1980. That is what it could mean—to be above "two camps" and speak in essence.

22. DEPARTURE TO NOVOSIBIRSK

Ideologically, A.D. belonged to that part of the Russian intelligentsia which accepted the October revolution. In much the same way as Mayakovski who "plunged into Communism from the heights of poetry," A.D. accepted none but the ideals of communism. He did not become an "apparatchik"—a bureaucrat loyal to the authorities for material gains. For the latter, he was just a "fellow-traveler." His conflict with the Leningrad City Party Committee was unavoidable, and it started when the First Secretary of the Leningrad City Party Committee G. I. Popov chose to oppress the Leningrad science. A.D. wrote to the Central Party Committee about that. Just at that time, Popov was co-opted into the Central Committee. The consequences were prompt.

A.D. used to say: "There are 12 thousand people in the University. Hence, there is everything: talents, and criminals, and unavoidable emergencies." The authorities started to blame A.D. for these emergencies, and the file of his "mismanagement" grew thicker. I remember one of such cases. Students from Africa in a dormitory for men got angry because the dormitory keepers refused to let in their female friends in the evenings. They beat guards and a representative of the administration. A.D., by himself, went there and managed to stop the conflict. Nevertheless, he was blamed for this incident.

He was about to be removed from his position. In 1963, Corresponding Member of the Academy of Sciences of the USSR A. D. Alexandrov accepted the offer to fill the vacancy of a full member of its Siberian Division. He moved to Akademgorodok in Novosibirsk.

In Novosibirsk, A.D. worked for more than 20 years. Here, he created a large scientific school, and again was involved in Party activities. Once again, he fought the local Party committee and reactionaries, but I will let his Siberian students write about these years.

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