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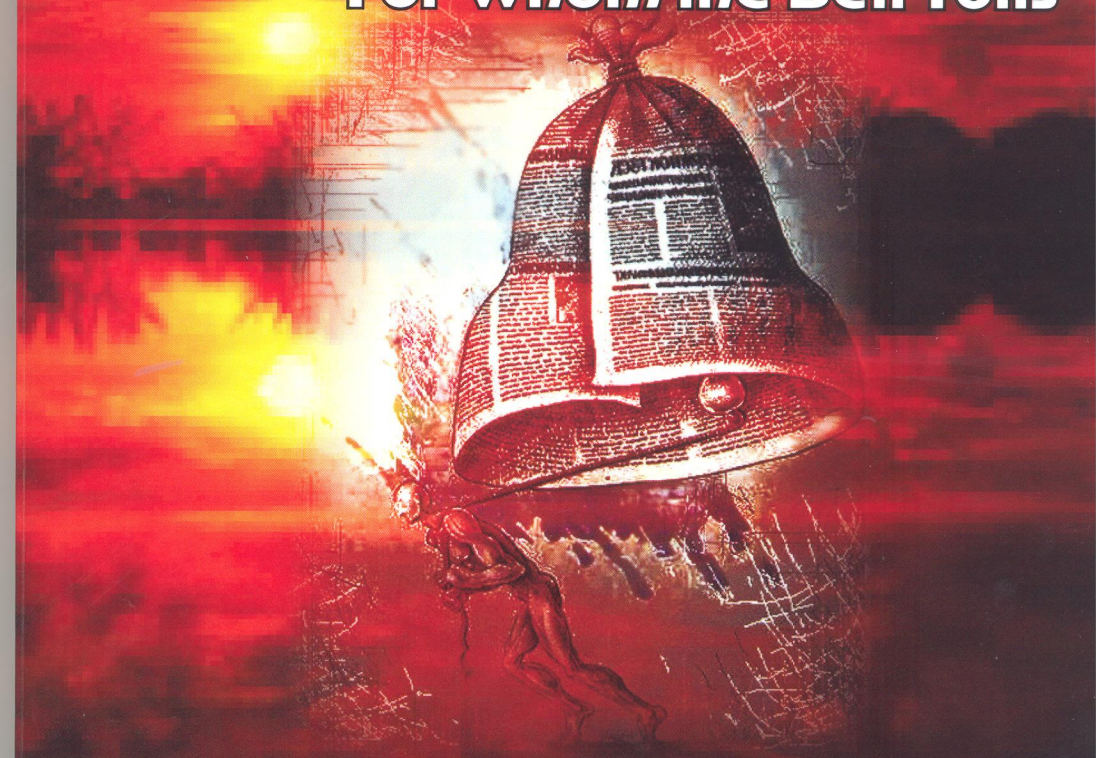
THE REFORM OF THE RUSSIAN ACADEMY OF SCIENCE: POSSIBLE CAUSES AND CONSEQUENCES OF THE REFORM – For Whom the Bell Tolls



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RUSSIAN ACADEMY OF SCIENCE

Possible causes and consequences of the reform For Whom the Bell Tolls

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The Academy of Science in Russia was being created for the fulfillment of the most important national tasks, and was reformed in the past to solve new national tasks and challenges which were appearing over the course of time

Due to the above role of the Academy of science, Russia made several significant historical breakthroughs. If Russia had continued without these advances the projected future advancements of Russia would have been dubious. Today, Russia faces the task of rebuilding positions which have been lost during the last years, in order to begin again concretely, and not only with a verbal promise to modernize the country. The authors hereby present an analysis of the government reform of RAS and offer their view as to the means required in attaining a reformation.

The Creation of the St. Petersburg Academy of Science in 1724 was directly connected with reformation activity instigated by Peter I. Can it be true that the 290 years of demolition of the Russian Academy of Science is connected with the names of

present government officials of Russia? If the demolition has been taking place over the past 290 years, the current government of Russia could not have participated in that long of a time span

Dedicated to our childrens and grandchildren.
Whit hope for their future in Russia

Never send to know for whom the bell tolls; it tolls for thee.

Ernest Miller Hemingway
«For Whom the Bell Tolls», 1940

Preface

Stanislav Lem, in his book “Sum of Technology” (“Summa Technologiae”) (in the 60s) foresaw rejection from scientific research concerning “the whole front”, activities decay in the range of spheres, decrease of the social status of scientists and a decrease of influence of science on the society by the end of XX.

Science of the XX Century was called upon to decide on two main tasks: the creation of weapons and the creation of new commodities and services. The rapid development of Physics, Chemistry, Mechanics, Information Science, and Mathematics was initially connected to the creation of new types of weapons.

However, after the creation of the system of strategic weapons work in this direction came to be limited in a natural way by a set of circumstances: as soon as an opportunity surfaced which could cause an unacceptable damage to those considered to be enemies, the relevant work stopped being a motivation for fundamental research and all investigation fell into a purely engineering and technical category.

Apparently, one of the most important functions of science in the near future will consist in forecasting and foreseeing industrial and non-industrial disasters [Perez Peraza and Libin, 2012], the cost of covering damages

has reached tens of billions of USD in the 21st Century alone.

New technologies, the creation of micro machines, gene engineering, research of neuronal networks, neurobiology, neurochemistry and stand-alone generations lead mankind to a new level. One of the most important projected achievements of science in the 21st Century will become the opening of the manner in wich coding, transmission, data processing algorithm of the nervous system and the biochemical analysis of consciousness function.

A serious computer analysis of the world economy and social processes and the development of methods of their long-term forecasting lies ahead. And of course, serious changes in the educational system in most countries of the world are also foreseen in the near future.

Against the background of all these serious tasks lying before Russian science and society, the RAS reform was undertaken without advising the academic community and was conducted by a couple of high ranking officials which seems extremely strange.

By destroying and not reforming the Academy, ideologists from the government do not understand that through their reforms, they are destroying Russia itself.

According to RAS member, O. Figovsky: “Fundamental science should be preserved above all

else. If we fail to do this, in the near future this foundation will bear such heavy losses that in order to make up for the decrease in the number of scientists we will have to invite scientists from developing countries and Russia will become a secondary country as far as technology and science are concerned. Today, we are discussing ways to avoid this outcome which would mean the stagnation of science, but very soon it might appear that there will be nothing to discuss. ” [Figovsky, 2013].

Authors have tried to analyze the reasons behind the RAS reform and its possible results. It is very important to mention, that one of the authors (Jorge Perez-Peraza) is most aware of the problems of the scientific citations: he is the arbiter of many very reputable scientific journals. It is also important to make known, that Professors Igor Libin and Jorge Pérez-Peraza are well-known scientists in the field of space physics, helioclimatology and the history of science.

The other authors we would like to mention here are Dr. Kudryavtsev, Dr. Oleynik and Mgr. Surikova-Camu, both experts in the field of applied mathematics and economics, education and the social sciences, respectively

Let us understand that together we will we manage to preservere with todays intellectual reserves regardless of the reforms.

Evgeny Treyger,

As Boris Shtern put it in his essay “Why science is required”: «It stands to reason that the society is interested in the development of science. What about the power? If minions are in power, then they are far from needing science and it is rather counter-indicative viz. it is challenging to keep intellectuals on a tight leash. They will never admit this, but have the inner feeling of class extraneity concerning science and quietly despise it. Apparently this is one of the underlying motives, contributing to the notorious RAS reform bill».

Usually, the government at least understands the role of science in the development of technologies. But they often think that they can dispense with it and everything can be bought. It is cheaper to buy off-the-shelf technologies than to develop what is considered to be costly and conventionally disloyal science. They may be cheaper, but the issue is that without scientists, foreign technology cannot go into operation in the

country. Over time, it would be necessary to hire foreign specialists for operating high-technology equipment, since the country would cease to nurture their own specialists.

According to the work «Map of Mineral Resources – Search on the Territory of Russian Science» [Intermediate results of the project "Natural science experts corps" www.expertcorps.ru (2007 – 2012)] today Russian Science has an array of problems, however, aside from scientific research, it (science) plays the civilizing role in the country, for Russian education and culture.

More than half of the entire Russian scientific community is concentrated in the Russian Academy of Sciences.

The reforms proposed by the government will lead to the degradation of this "greater half", and a generation will be required to restore it later on.

Why did the Russian government start the RAS reform realizing in advance that it would set the entire scientific community against it and not only the Russian scientific community?

Is it true that the government did not realize that they would strengthen the opposition by its unpopular reforms?

Well, by strengthening the opposition one can lose everything. Is it possible that the government's instinct

for self-preservation did not take any action by alienating the most creative part of the Russian society?

What benefit did the current Russian government see in the reforms they made?

What, on the whole is the essence of mutual relations between the current Russian government and Russian science?

Let's try to understand.

Saint-Petersburg Mint. Authors S. Yudin and I. Eger
On the front side portrait of Empress Catherine II and inscription "B.M. Catherine II. Emperess and Autocrat

of all Russians" On the back side is Genius sitting on the cloud decorating the monogram of Peter the Great, on the background is the façade of the Academy of Sciences and the inscription "Peter's plantations shall blossom with it", on the edge is the inscription "Jubilee of the Academy of Sciences - 1776"

1. Government and science. In contemporary societies there exists the generally accepted dogma concerning the independence of scientists from the government, although, when we come to think of it, the technologies that were profitable were the ones that were really independent from the government. Practically all the outstanding engineering inventions were the result of private initiative and only then, with the passing of time, used by the government.

As Boris Shtern put it: «Science is not the motor of technology. Technology is not of any interest by itself. Different technologies are obtained as a by-product, and not as an objective. The objective of science is the perception of the world and self by mankind. The motivating force of science is its pioneering instinct, which is composed of inquisitiveness, the urge to be the first and persistency in overcoming obstacles, which life provides to mankind with. People are also ted by the inner beauty of science». All of the above, in this case, are not just empty words.

Why is science is required? There are two existing reasons: secondary and basic.

The secondary meaning consists precisely of the engineering output of science. Technology is not its objective, but sometimes the application of scientific results come in handy, and we get electrical engineering, radio communications, atomic energy, computers, modern medicine etc. These secondary «by-products» of science have already covered all the past and future expenses which it generated.

But technology does not exist without basic science; therefore the destruction of fundamental science will inevitably lead to the destruction of technology.

There are a multitude of research areas, which shall never be of practical use. They have another purpose: it is the method, by which the human race continues to develop, improve and accumulate experience; these consist of both education and promotion of culture in the society.

Largely, this is precisely why, as early as the renaissance period rulers, the elite patronized and supported scientists by helping their research in every possible way.

We shall not delve into the causes of this phenomenon, but shall only note the fact that as a rule, the more qualified the scientist, the closer he or she was to the government and both enjoyed and benefited of the (government's) confidence, often combining research activity with essential state duties.

The poet and scientist Callimachus Konstantin Lukitis (famous Greek mathematician and astronomer) was advisor to Suleiman the Great.

Tycho Brahe (Danish astronomer, astrologist and alchemist during the Renaissance era) was advisor to the King of Czech lands and Emperor of the Holy Roman Empire Rudolf II.

Astronomer and mathematician Johannes Kepler was a court mathematician of Rudolf II.

The distinguished scholar Galileo Galilei was the teacher the sons of Kozimo, ruler of Florence.

The distinguished thinker Francis Bacon was the Prosecutor General of England, mathematician and founder of analytical geometry.

Rene Descartes was the military head of France, Isaac Newton was the Head of English Chancery etc.…

The first academy in the world (in modern understanding) viz. the Academia Secretorum Naturae (Academy of nature's secrets) was founded in 1560 by the Neopalitan aristocrat Giambattista della Porta, and as early as 1563 the Duke Cosimo Medici founded the Accademia delle Arti del Disegno in Florence, and Galileo Galilei was a member of this academy.

With a helping hand as far as creativity from the Italian rulers the model of the Academy of Sciences took root in Europe. The oldest scientific academy of Italy Accademia dei Lincei ("Academy of the Lynxes") was founded in 1603 by the aristocrat Federico Cesi .In 1660 the Royal Society of London was established

by Carl II. In 1666 the French Academy of Sciences was founded. In 1700 Frederick I founded the Prussian (Berlin) Academy of Sciences. In 1724 Peter I founded the Petersburg Academy of Sciences, in 1847 the Vatican established the Pontifical Academy of Sciences….

On September 30, 1783 the Imperial Russian Academy of Sciences was founded by Catherine II as per the name, given to the Director of Saint Petersburg Academy of Sciences by the princess Dashkova regarding the decree: «On establishment of the Russian Academy».

"The example of two great representatives of the Enlightment era viz. Frederick II and Catherine II certify as to the might of science for strengthening and the prospering of the empire. Both the rulers were personally interested in science and maintained relations and personal correspondence with the leading scientists of the world. Both used science to transform their empires that were very inferior at the time of their ascendance to the throne, of the leading empires of Europe"
[http://www.novayagazeta.ru/society/59556.html].

The social status of scientists at this time was uncommonly high: Scientists become one in rank with the aristocrats and in State government as well.

Voltaire maintained correspondence with Catherine II, Leibnitz with the Princess of Hannover Sofia, with her daughter Sofia-Charlotte, Queen of

Prussia, and Caroline Ansbach, the future Queen of Britain. He combined his career of a scientist with his career as a diplomat and fulfilled the post of the Chancellor of Hannover.

Huygens maintained correspondence with Jean-Baptiste Colbert, who founded the French Academy. «The catastrophic effect of the absence of patronage on the part of the government can be easily seen by noting the example of Spain. At one time a great power during the XVII-XVIII centuries it did not provide patronage to science and there was no science in Spain, and its greatness faded away» [http://www.novayagazeta.ru/society/59556.html].

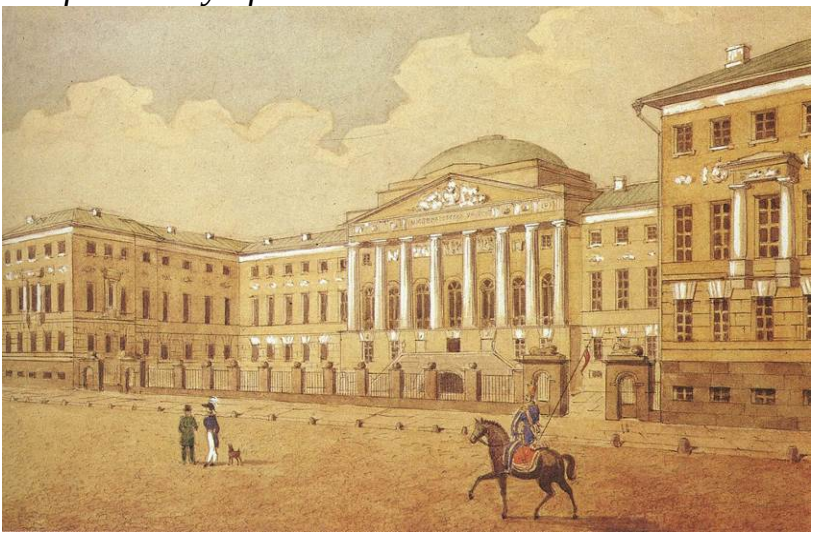
Under no circumstances would European fundamental science have developed had the rulers in power not been scientists in a majority of the cases or, at least admired scientists.

Commemorative Medal «Peter the Great Emperor. The founder of the Academy, 1725» (private collection)

Kunstkamera (Russian Academy of Science, St.Peterburg)

Catherine II visits M. V. Lomonosov
Author of painting: P.F. Borel

Imperial Russian Academy of Sciences was established on December 30, 1783 by the initiative of the Director of Academy of Sciences Princess E.R. Dashkova



The building of the Imperial Russian Academy of Sciences

Today, the building of the Imperial Russian Academy of Sciences - the Russian Academy of Arts

Russian Academy of Science, Moscow

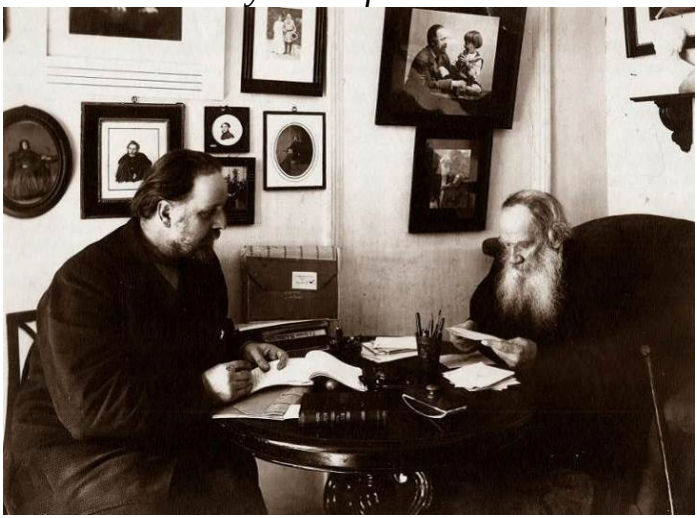
Great Gold Medal of Catherine II
(Free Economic Society of Russia)

Gold medal of Russian Emperor Nikolai I
On the reverse "Imperial Saint-Petersburg Academy of Sciences. 29 December 1926". Author Fyodor Tolstoy
(private collection)

Great Gold medal of RAS named after M.V. Lomonosov,
awarded for outstanding achievements in the field of the sciences and humanities. The reformers did not deserve it.

The Russian scientists, members of the Russian Society of Naturalists, 1868 (private collection of G. Gofman)

XIX Century elite of Russian science



L.Tolstoy and I. Chertkov

Academician V.I. Vernadsky with his assistants left to right: V. Karandeyev, G. Kaspiarovich, V. Vernadsky, A. Fersman, P. Aleksat Photo Archive Fersman Minneral museum

Ya. Frenkel, S.I. Vavilov, Maks Born, V. Kondratiev, D. Frank, P. Kaptsa

Academician A.N. Nesmeyanov (the President of the USSR Academy) presents the Award to academician V. Obruchev, 1953

President of the USSR Academy of Sciences, famous mathematician and academician M. Keldysh with the second astronaut in the world G. Titov and General Designer academician S. Korolyov (right to left)

Professor Simon Shnol known biophysicist, a legendary figure of the Russian science, the historian of Soviet science, author of "Heroes, villains, conformist domestic science". But let's revert to the history of the Russian Academy of Sciences...

In short, the history of the Russian Academy of Sciences can for the time being be divided into four periods: Petersburg (Russian) Academy of Sciences (1724-1917), Russian Academy of Sciences (1917-1925), USSR Academy of Sciences (1925-1991) and Russian Academy of Sciences (1991-2013):

• 1724 – Petersburg Academy of Sciences was established in Saint Petersburg by order of the Emperor Peter I by the Decree of the Ruling Senate of 28 January (8 February) 1724;

• 1747 – Imperial Academy of Sciences and Arts;
• 1783 – Imperial Russian Academy of Sciences;
• 1803 – Imperial Academy of Sciences;
• 1836 – Imperial Saint Petersburg Academy of Sciences;
• 1917 – Russian Academy of Sciences;
• 1925 – USSR Academy of Sciences;
• 1991 – Russian Academy of Sciences was reconstituted by the Decree of the President of the Russian Federation on November 2, 1991 as the higher research institution of Russia.

The era of Peter I had brought many transformations in the Russian scientific and cultural life. The most important measure taken in the development of science was the organization of the Academy of Sciences. The preparation for this to occur was made from the first years of Peter's rule. Negotiations for this purpose were held by the most influential representatives of Western European science and philosophy.

On January 13, 1724 Peter I signed at the Senate «Definition about the Academy» and draft of organization of the Academy (its first charter). According to the Decree the Academy was made responsible for theoretical as well as practical objectives: Development and propagation of useful practical knowledge.

At the same time the Petersburg Academy of Sciences, in contrast to the Western European Academies, was to become not only a research institute, but also an educational institute. The combining of research and educational functions in one institute was defined by the country's imminent needs. A university and Gymnasium were founded at the Academy for resolving educations tasks.

The Academy, as a research institution, was divided into three schools: Mathematical, Physics and Humanities. The Mathematical School included the departments of Theoretical Mathematics, Astronomy, Geography and Navigation, to which Peter attached particular importance. The Physics School also included the departments of theoretical and experimental Physics, Anatomy, Chemistry and botany. The Humanities School was limited to the departments of eloquence and antient history, law and ethics.

The syllabus of the Academy was not copied from other (foreign) Academies, but was entirely independent, dictated by the requirements of the countries rapid development. In contrast with the foreign academies, which essentially summarized research work performed by other institutions, research work in Russia was performed within the walls of the Academy itself.

Research work was performed at the Geography Department, Library, Kuntscamera, Physics cabinet, Astronomic Observatory, Chemical laboratory,

Anatomic theatrd and Botanical gardens. The highest research authority was the Academic Assembly (Academic Conference). Apart from research, the academics were obliged to popularize science in the form of courses for students and daily delivery of at least one lecture.

A huge amount then of 24.912 RUR per year was allocated for maintenance of the Academy. The Academy was given the right to elect its president and the right to award academic degrees.

Regular meetings of the Academic Conference began to be held from August 1725 on. Doctor Laurentius Blumentrost was appointed as the first President of the Academy. He invited foreign scientists upon the order of Peter I who was concerned about the conformity of the Academy's activity to international standards: Mathematicians Jacob German, Nikolai and Daniel Bernoulli, Christian Goldbach, physicist Georg Bilfinger, astronomer and geographer Joseph De L'Isle, historian Gerhard Muller and Leonhard Euler.

Beginning in 1840 Russian scientists worked at the Academy viz. mathematician V.E. Adadurov, poet V.K. Trediakovsky, geographer S.P. Krasheninnikov, and genius of the Russian and world science M.V. Lomonosov.

Commemorative Coin «Mikhail Lomonosov. 1711-1765»

Lomonosov was a chemist, physicist, astronomer, geographer, mineralogist and geologist. Lomonosov, the outstanding experimenter and engineer, possessed a broad philosophical approach to science and boldly elevated general science information into the well-knit physics-philosophical system. The atomic theory was laid as the basis by Lomonosov for explaining creation. Lomonosov was the first to discover the «Universal law of nature» viz. the law of conservation of matter and movement.

Lomonosov strived to relate his theoretical research with practice: He hurried to transfer the results of laboratory research to production. He tirelessly insisted on prose and poetry as related to the practical tasks of science. Lomonosov also contributed no less to the field of mineralogy, geology, mining, and metallurgy.

The appearance of new research disciplines, playing a huge role in our time, like physical chemistry, optics etc., is related to Lomonosov.

Lomonosov became the main inspirer of the entire work of the Academy of Sciences. He clearly defined its basic tasks in serving Russia and in the development of the Russian culture.

In the XVIII Century, the Russian Empress Catherine II, aspiring to depict herself as the continuer of the actions of Peter I who invited scientists from abroad, along with leading representatives of European science: Mathematician L. Euler, Physicist I. Euler, Natural Scientists P. S. Pallas and K. F. Wolf, Botanists S.G. Gmelin, I. Gertner, Astronomist G. M. Lovits, Physicists L. Yu. Kraft, Chemist I.I. Georgi and several others.

Thanks to the efforts of the Chairman of the Russian Academy Princess E.R. Dashlova, appointed by Ekaterina, by 1800 the Academy was now comprised of Russian scientists (A.P. Protasov, S.K. Kotelnikov, S.Ya. Rumovsky, M. Sofronov, G.V. Kozitsky, I.I. Lepekhin, P.B. Inokhodtsev and I.I. Isleniev, M.E. Golovin, N.Ya. Ozertsovsky, V.F. Zuev, F.P. Moiseenkov, N.P. Sokolov, A.K. Kononov, V.M. Severgin, Ya.D. Zakharov, S.E. Guriev, A.F. Sevastiyanov).

The extremely talented Russian designer and inventor I.P. Kulibin also worked at the Academy as did Euler's student the mathematician

S.K. Kotelnikov was in-charge of Kunstcamera and the Library, delivering public lectures on Mathematics and Physics, and was a member of the Russian Academy, which prepared the Explanatory Dictionary of the Russian Language.

The Natural Scientist N.Ya. Ozertsovsky taught Russian Literature, was a member of the Russian Academy and *Liberal Economic Society*, and was on the medical board. I.I. Lepekhin was in charge of the Botanical Gardens of the Academy of Sciences, and was the secretary of the Russian Academy. Many academics wrote textbooks, were engaged in translations, edited academic publications, worked on the calendars etc.

At the end of XVIII and the beginning of XIX centuries, due to organization of the network of universities and scientific societies, the functions of the Academy changed, and its activity began to be oriented towards research.

In 1803 the new charter was adopted that defined the functions of the Academy as a leading scientific institution in the country, comprised of the departments of: Physics, Mathematics, History and Philology.

In the 1920's a special building was built in Saint Petersburg for the Academy. On the 1st of January of 1839 the Pulkovo Astronomical Observatory was opened, which immediately took the leading place in global astronomical science.

The beginning of the XIX Century became a new bright stage in the history of Russian geographic research. In the first half of XIX Century the Russian government organized about 50 large sea expeditions, in which, as a rule, the natural scientists of the Academy participated.

The remarkable event in the development of geographic research was the discovery of Antarctica by the expedition of F. F. Bellinsgauzen and M. P. Lazarev (in 1820).

The research by the members of the Academy viz. outstanding scientists M.V. Ostrogradsky and V.Ya. Bunyakovsky developed methods for the analysis and solution of mathematical physics and mechanics problems. The discovery of non-Eucledean geometry by the genial Russian mathematician. N.I. Lobachevsky served as the success criterion of Russian science during these years.

P.L. Chebyshev was one of the foremost mathematicians of the XIX Century, who created new directions in mathematical analysis, theory of functions, the theory of probability and the theory of numbers. The greatest contribution of P.L. Chebyshev was also the creation of the famous Petersburg Mathematical School, whose representatives were A.N. Korkin, E. I. Zolotarev, A.A. Markov, A.M. Lyapunov, and V.A. Steklov. From that time onwards, Russia became one of the world leaders in mathematics.

Of great importance was the development of fundamental problems of aerodynamics that were the works of N.E. Zhukovsky and S.A. Chaplygin; astronomy - V.Ya. Struve, F.A. Bredikhin and A.A. Belopolsky. Included in the history of science are the following: Discovery of the Electric Arc by V.V. Petrov; research of E.Kh. Lents, who formulated the law of thermal effect of currents, B.S. Yakobi invented galvanoplastics and the electric motor. A.G. Stoletov and P.N. Lebedev carried out fundamental research regarding the electromagnetic processes.

The phenomenal achievement was the invention of the radio by A.S. Popov in 1895. The second half of XIX Century is characterized by the blossoming of chemical science in Russia. Substantial contribution to it were made by: D.I. Mendeleev, the founder of the periodic system of chemical elements, N.N. Zinin, founder of the organic chemist school and A.M. Butlerov, founder of the theory of chemical structure.

At the turn of XIX-XX Centuries Russia gave the world such names as, D.I. Ivanovsky, discoverer of viruses, I. I. Mechnikov, one of the first Nobel laureates, who discovered the cell mechanisms of immunity, I. P. Pavlov, Nobel laureate, who discovered conditioned reflexes. The works of V.I. Vernadsky laid the groundwork for new sciences viz. geochemistry, radiochemistry and radiogeology. His teaching on the biosphere and the noosphere today play a big role in the resolution of environmental problems.

During the entire history of the Russian Academy of Sciences several attempts were made to reform it, aside from all the main reforms that have been made during the last hundred years.

Immediately after the revolution (in 1918) an attempt was made to convert the Academy of Sciences into an association of scientific institutes, but after the protests by eminent Russian scientists, the Academy was kept as the system of research institutes under the name of: Russian Academy of Sciences.

The Academy of Sciences was constituted by the Decree of the Central Executive Committee and Council of People's Commissars of the USSR on July 27, 1925 on the basis of the Russian Academy of Sciences (before the February Revolution, it was known as the Imperial Saint Petersburg Academy of Sciences).

During the first years of Soviet Russia, the institution academy of sciences was perceived as extremely dubious and of a closed and elite scientific formation. Nevertheless, in 1925 the 200th anniversary of the Academy was solemnly celebrated. The new charter was adopted on this date. The famous scientist, geologist A.P. Karpinsky became the first President of the USSR Academy of Sciences, who had until then occupied the post of the President of the Russian Academy of Sciences.

The attempts to establish state and party control over the earlier independent Academy began in the

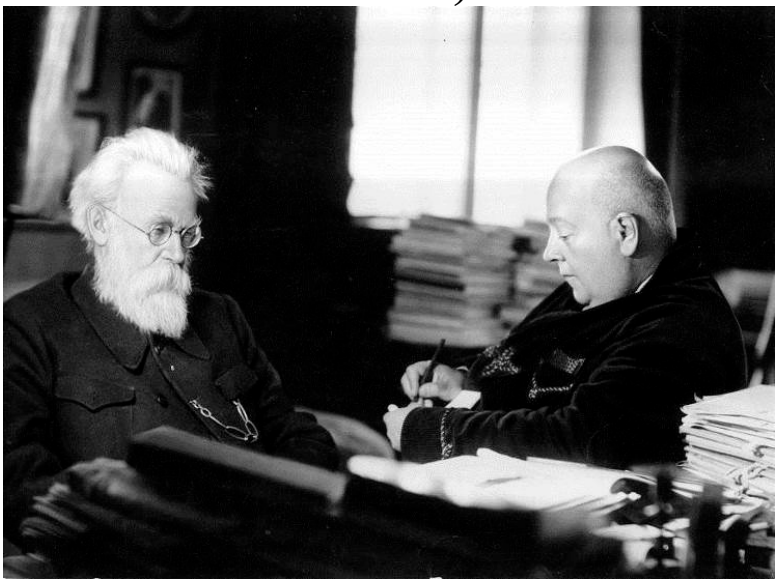
middle of the 1920's: In 1925 the Academy was subordinated to the Council of People's Commissars of the USSR. In 1929 about 128 regular staff (from among 960) and 520 redundant (from among 830) staff members were dismissed, after which the party and government authorities established total control over the Academy.

In 1930 due to the reorganization of the Soviet government the Academy of Sciences was transferred to the control of the USSR Central Executive Committee In 1933 the USSR Academy of Sciences was transferred to the control of the Council of People's Commissars of the USSR. In 1934 the presidium of the Academy and 14 scientific institutes were transferred from Leningrad to Moscow.

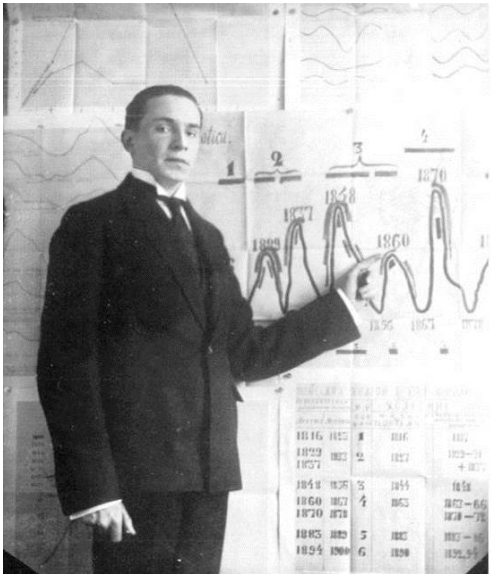
About 80 scientific institutes with approximately 2,000 scientists were part of the system of the USSR Academy of Sciences. By 1940 there were approximately 150, and about 4,000 scientists. By 1985 the USSR Academy of Sciences was comprised of around 330 scientific institutes, where 57,000 research scientists worked, with the total number of staff in all the institutes numbering 217,000 people. The fellows and corresponding members of the USSR Academy of Sciences added up by then to 274 and 542 people.

Alumni of the Academy of communist education
(1918?)
(private collection)

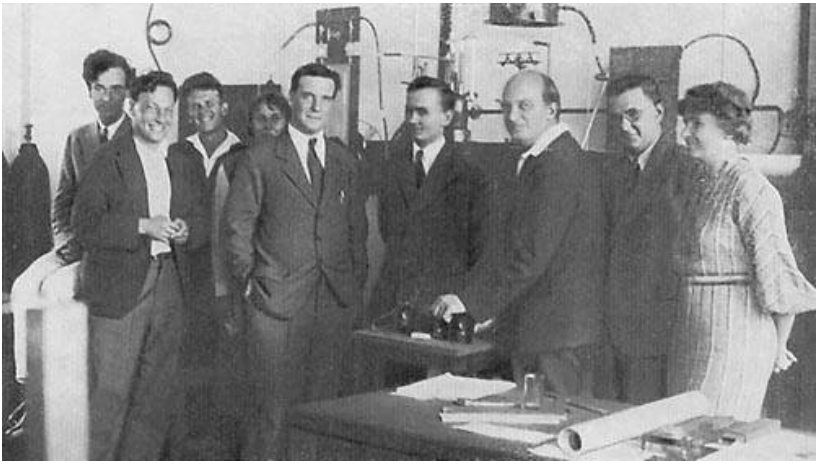
Educational courses in the Red Army (I. Libin private collection)



Academicians V. Vernadsky and A. Fersman. Moscow, 1941



Famous Russian scientist A.L. Chijzhevsky reports work on the "Echo of space storms"



P.L. Kapitsa (fifth from the right) at the laboratory of L.V. Shubnikova (third from the right). L.D. Landau extreme left, 1937

L.D. Landau was one of the few, who was not afraid of visiting P.L. Kapitsa during his years of disgrace, 1948

Academician A.F. Losev (in the center) with relatives and students

Expedition on the liner "Griboedov". Group of participants of the Soviet expedition on the liner "Griboedov". First to the right in row 1 - S.E. Khaikin, 4th - G.A. Ushakov, 4th to the left in row two V.L.

Ginzburg, 9th - B.M. Chikhachev, 2nd to the right in row 3 - I.S Shklovsky. (I. Libin private collection)

N.S. Khrushchev (center) and academics S.A. Hristianovich (second from right) and M.A. Lavrentiev (far right) next to the layout of the Novosibirsk Akademgorodok [http://mechmath.ipmnet.ru/mech/biography/Hristianovich/]

The next cardinal reforms of the USSR Academy of Sciences were made in 1961 by N.S. Khrushchev, when the academic institutes, engaged in applied research, and were transferred to the jurisdiction of the industrial ministries and state committees. (As a consequence of the reforms the Engineering Sciences Division was abolished and part of the research institutes were transferred to the industry, for example, Radium Institute or Mining Institute).

The Academy met these reforms with well known resistance. In connection with the conflict between N.S. Khrushchev and the Academy at the end of 1961, Khrushchev promised to dissolve the Academy, to which the then President A.N. Nesmeyanov replied: «Well, Peter the Great opened the Academy, and you are closing it». As a result, the Academy was given the organizational supervision of science, resolution of fundamental scientific problems and the development of the most important engineering projects.

After 1991, subsequent to the short-sighted state policy, many prospective scientific programs and developments were closed down, and financing of science was curtailed drastically. Since 1990 the number of scientists, who left the country, reached almost 800,000.

In 2002, resolutions were adopted for the transition of the country towards innovative developments and the Russian President V.V. Putin approved of the financing schedule of Russian science up to 2010. In September 2004 the Russian Ministry of Education and Science for the first time approved the concept of the Ministry's participation in the management of science asset complexes.

As a result of protests by RAS, in February 2006 the joint "Concept for modernization of the structure, functions and financing mechanisms of Russian Science" was signed. The amendments to the legislation "On science and state scientific and

engineering policy" entered into force on December 8, 2006. The RAS reforms in 2006 influenced the staff strength of the organization. Work places were reduced by 6% (2006), and in 2007-2008 by another 14%.

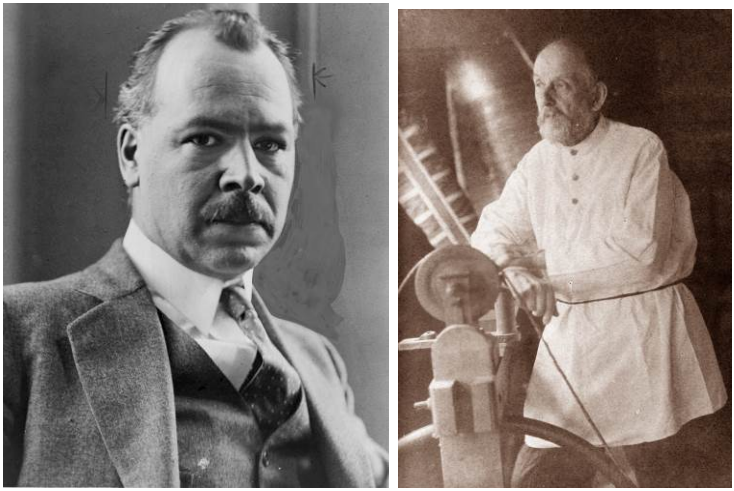
On February 27, 2008 the fundamental research program 253 billion Roubles worth of financing for a period of five years was approved, and The Academy obtained the right to determine the priorities of scientific work. However, the financial flow management was transferred to the coordination council represented exclusively by authorities. Eighty nine research organizations, fifty eight organizations for scientific service and the social sphere were abolished in 2008 - 2012.

«After radical changes in our country in the 1990's, the Academy of Sciences, perhaps even fortunately, did not change. Reforms are required in the new economic, political conditions, but they have to be carried out by evolution, and not by revolution. Revolutions take place in science itself, but they should not take place in the management of science» [Iosseliani, 2013].

The Academy of Sciences was founded in Russia for the purpose of performing the most important national tasks. It was reformed, as a rule, for resolving new tasks and challenges facing the country. In the course of its entire history, the Academy of Sciences had created the scientific basis for the country's and society's development and provided research support

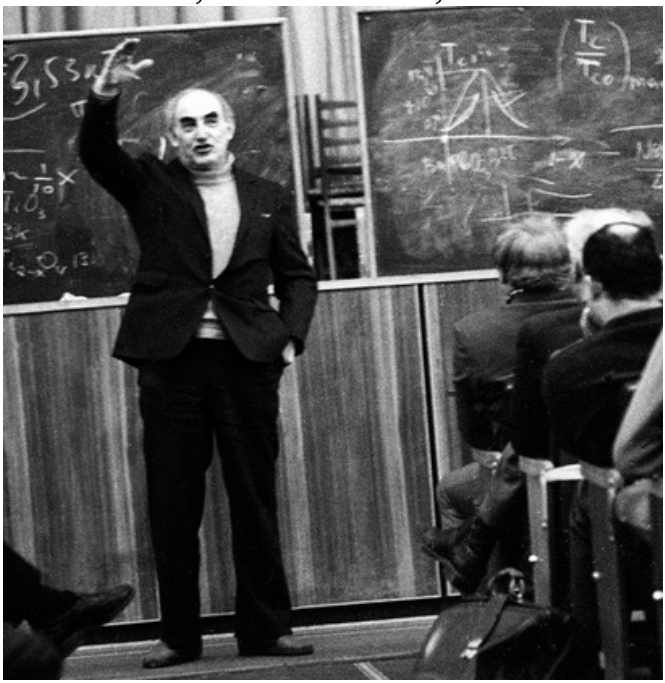
for the country's modernization, which in turn, provided the country with development.

Thanks to this role taken by the Academy of Sciences, Russia made several powerful historical breakthroughs, «without which the future existence of Russia could have become dubious». During the time of Peter and Catherine II the country became a European power. In the Soviet period, Russia was victorious in the outcome of the Second World war and became the second world power.



Academician N.I. Vavilov and K.E. Tsiolkovsky (on the right)

F. Jolio-Curie, I.V. Kurchatov, D.V. Skobeltsin



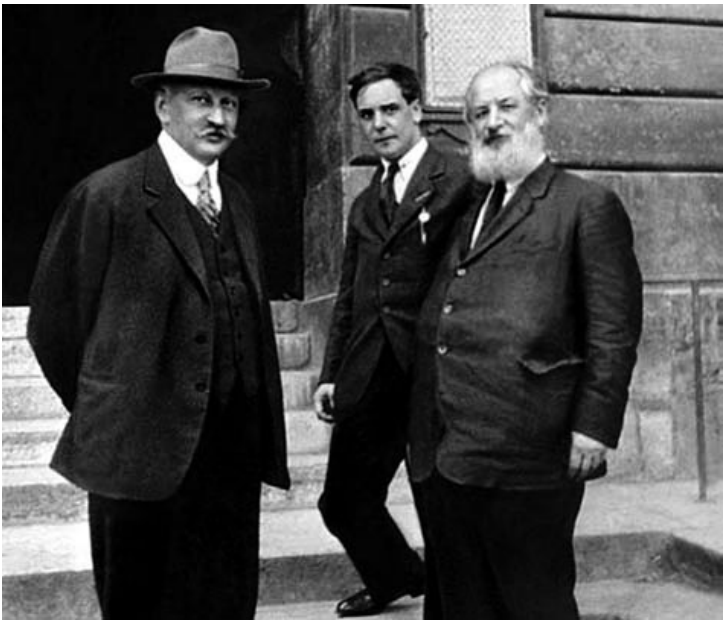
Academician V.L. Ginzburg at the seminar in FIAN

(I. Libin private collection)

Participants of the RAS expedition on the research vessel "Academic Kurchatov" (40 trip, I. Libin private collection)

Soviet and American geophysicists in Honolulu (Research vessel "Academic Kurchatov", I. Libin private collection)

Meeting participants at Pulkovo, 1998 (private collection)



A.F. Joffe, P.L. Kapitza and A.N. Krylov (left to right)

Prominent Soviet nuclear physicist, President of the USSR Academy – academician A.P. Alexandrov.

Today Russia faces the task of restoring the position lost in past years, with which it could have been possible to again begin a real, and not verbal accelerated modernization of the country.

Our science is still alive perhaps because according to the figurative expression of Isaac Newton, "stands on the shoulders of giants, preceding us", viz. Great Russian scientists, constituting the glory of world science:

Bernoulli, Daniel (1700-1782) - physicist, mechanical engineer and mathematician, one of the founders of kinetic theory of gases, hydrodynamics and mathematical physics.

Euler, Leonhard (1707-1783) - mathematician and mechanical engineer, who made fundamental contributions to the development of these sciences: Physics, Astronomy and several applied sciences

Lomonosov, Mikhail (1711-1765) - first russian scientist - world class natural scientist, encylopedist, chemist and physicist.

Popov, Nikita (1720-1782) - astronomer

Inokhodtsev, Pyotr (1742-1806) - astronomer

Petrov, Vasily (1761-1834) - experimental physicist, electrical engineer.

Severgin, Vasily (1765-1826) - chemist and mineralogist.

Lobachevsky, Nikolay (1792-1856) - mathematician, founder of non-Euclidean geometry.

Struve, Vasily (1792-1864) - one of the founders of stellar astronomy.

Yakobi, Boris (1801–1874) - physicist, academician.

Dahl, Vladimir (1801–1872) - scientist, writer and lexicographer, compiler of the "Explanatory Dictionary of the Living Great Russian Language".

Ostrogradsky, Mikhail (1801–1862]) - mathematician and mechanical engineer.

Lents, Emily (1804–1865) - physicist.

Pirogov, Nikolay (1810–1881) - surgeon and anatomist, natural scientist and pedagogue, founder of battle-field surgery, founder of anaesthesia.

Soloviev, Sergey (1820–1879) - historian

Chebyshev, Pafnuty (1821-1894]) - mathematician and mechanical engineer.

Butlerov, Alexandr (1828–1886) - chemist, founder of the theory of chemical structure of organic substances.

Sechenov, Ivan (1829–1905) - physiologist, scientist-encylopedist, psychologist, pathologist, toxicologist, cultural specialist, anthropologist, natural scientist, chemist, physical chemist, physicist, biochemist, evolutionist, instrument builder, military engineer, pedagogue, humanist, educator, philosopher.

Bredikhin, Fyodor (1831-1904) - astronomer

Botkin, Sergey (1832–1889) - physician and philanthropist

Mendeleev, Dmitry (1834-1907) - scientist-encyclopedist: chemist, physicist, technologist, geologist, meteorologist,

Stoletov, Alexander (1839-1896) - physicist.

Kluchevsky, Vasily (1841–1911) - historian.

Timiryazev, Kliment (1843–1920) - natural scientist, physiologist, physicist, science historian, translator, publicist.

Mechnikov, Ilya (1845–1916) - biologist (zoologist, immunologist, physiologist and pathologist)

Karpinsky, Alexander (1846-1936) - geologist.

Zhukovsky, Nikolay (1847–1921) - mechanical engineer, founder of aerodynamics

Lodygin, Alexander (1847–1923) - electrical engineer, inventor.

Pavlov, Ivan (1849–1936) - one of the most authoritative scientists of Russia, physiologist, founder of science on higher nervous activity; founder of the largest Russian physiological school; Nobel laureate in medicine and physiology

Sklifosovsky, Nikolai (1836–1904) - author of works on battle-field surgery.

Stoletov, Alexander (1839-1896) - physicist.

Umov, Nikolay (1846–1915) - physicist, philosopher.

Yablochkov, Pavel (1847–1894) - electrical engineer, military engineer, inventor.

Filatov, Nil (1847–1902) - doctor, founder of Russian Paediatric School

Kovalevskaya, Sofia (1850-1891]) - mathematician and mechanical engineer.

Fyodorov, Evgraf (1853–1919) - crystallographer, mineralogist and mathematician.

Belopolsky, Aristarkh (1854–1934) - astronomer and astrophysicist

Markov, Andrey (1856–1922) - mathematician, academician, who made big contributions to the probability theory, mathematical analysis and theory of numbers.

Tsiolkovsky, Konstantin (1857–1935) - development of the theory of jet apparatuses movement in space.

Lyapunov, Alexander (1857-1918]) - mathematician and mechanical engineer, academician

Popov, Alexander (1859-1905) - physicist and electrical engineer, inventor.

Zelinsky Nikolay (1861–1953) - chemist

Vernadsky, Vladimir (1863-1945) - natural scientist, thinker and philantrophist of XX century, one of the representatives of Russian cosmism; founder of biogeochemistry.

Steklov, Vladimir (1863-1926) - mathematician and mechanical engineer.

Krylov, Alexey (1863-1945) - mathematician and mechanical engineer, shipbuilder

Ivanovsky, Dmitry (1864–1920) - plant physiologist and microbiologist, founding father of virology

Lebedev, Peter (1866-1912) - physicist-experimentalist

Chaplygin, Sergei (1869–1942) - mechanical engineer and mathematician, one of the founding fathers of modern hydro- and aerodynamics

Tikhov, Gavril (1875–1960) - astronomer, established for the first time in the world that the Earth on observation from space was blue in color. Subsequently, as is known, this was confirmed by the photographs of our planet from space.

Ioffe, Abram (1880-1960) - physicist.

Florensky, Pavel (1882-1937) - philosopher

Fersman, Alexander (1883–1945) - geochemist and mineralogist, crystallographer and geologist

Shubnikov, Alexey (1887–1970) - physicist, crystallographer

Vavilov, Nikolai (1887–1943) - geneticist, botanist, plant breeder, geographer

Tupolev, Andrey (1888-1972) - aircraft designer

Chayanov, Alexander (1888–1937) - economist, sociologist

Vavilov, Sergey (1891–1951) - physicist, founder of school of sciences for physical optics in the USSR

Shmidt, Otto (1891–1956) - mathematician, astronomer, explorer of the North

Berg, Aksel (1893-1979) - radio-physicist

Frenkel, Yakov (1894 – 1952) - theoretical physicist

Kapitsa, Peter (1894-1984) - physicist.

Tamm Igor (1895–1971) - physicist, Nobel laureate 1958

Semenov, Nikolai (1896–1986) - physicist and chemist, founder of chemical physics

Chizhevsky, Alexander (1897–1964) - scientist, one of the founding fathers of heliobiology

Shubinkov, Lev (1901–1937) - experimental physicist, specialist in low temperature physics

Losev, Oleg (1903-1942) - physicist.

Kurchatov, Igor (1903–1960) - physicist, "father" of Soviet atomic bomb

Kolmogorov, Andrei (1903-1987) - mathematician, founder of research schools

Alexandrov, Anatoly (1903-1994) - physicist.

Gamov, Georgy (1904-1962) - theoretical physicist, astrophysicist

Cherenkov, Pavel (1904-1990) - physicist, Nobel laureate 1958

Khariton, Yury (1904–1996) - physicist and physical chemist

Korolev, Sergei (1906–1966) - designer and organizer of the production of rocket and space machinery and rocket weapon of the USSR, founding father of practical space technology

Frank, Ilya (1908-1990) - physicist, Nobel laureate 1958

Glushko, Valentin (1908–1989) – engineer, leading Soviet scientist in rocket and space equipment area

Landau, Lev (1908-1968) - theoretical physicist, Nobel laureate 1962

Kozyrev, Nikolay (1908-1983) - astrophysicist

Vlasov, Anatoly (1908-1975) - physicist, plasma theory

Ambartsumyan, Victori (1908-1996) - astrophysicist

Keldysh, Mstislav (1911-1978) - scientist in the field of mathematics and mechanical science

Feinberg, Evgeny (1912-2005) - theoretical physicist

Chertok, Boris (1912-2011) - rocket builder

Kantorovich, Leonid (1912-1968) - mathematician, economist

Pontekorvo, Bruno (1913-1993) - nuclear phyisicit

Ginzburg Vitaly (1916-2009) - theoretical physicist, astrophysicist, Nobel laureate 2003

Prokhorov Alexander (1916-2002) - physicist, Nobel laureate 1964

Sakharov, Andrei (1921-1989) - physicist, academician of the USSR Academy of Sciences, one of the creators of the first Soviet hydrogen bomb. Philanthropist, dissident and human rights activist; Nobel peace laureate for 1975.

Chudakov, Alexander (1921-1989) - physicist, academician of the USSR Academy of Sciences

Basov, Nikolay (1922-2001) - physicist, Nobel laureate 1964

Abrikosov Alexei (1928) - physicist, Nobel laureate 2003

Alferov Jores (1930) - physicist, Nobel laureate 2000

Snol, Simon (1930) - biophysicist, research historian

Lobashev, Vladimir (1931-2008) - nuclear physicist

Osipyan, Yury (1934-2011) - physicist.

Arnold, Vladimir (1937–2010) - mathematician

Perelman, Grigory (1966) - mathematician

and many others...

«The Russian Academy of Science the symbol of Russia. It did not appear neither today, nor yesterday, nor during the Soviet time period: Our Academy is more than two hundred years old, it was created during the rule of Peter I. For More than two centuries it has served our country with honor, concurrently absorbing traditions and customs, sometimes good, and sometime not good. In any case, the Academy became part of our country and part of our history.

Many distinguished, world-famous scientists have worked there. They are great talents,;Nobel laureates. Today in an instant it has been suggested that we too forget all this and close down the Academy of Sciences. The first draft of the document dealt with the closing down of RAS and creation of some public organization to take its place, as if were an exclusive

club of common interests. It actually implies that within the Academy´s organization nobody was capable of closing it down» [Iosseliani, 2013. In fact, on March 24, 2013, Dmitry Livanov, the Minister of Education, talked about the inefficiency of RAS, and suggested the creation of an alternative organization comprised of «scientists of a legally competent age».

The idea to of reforming the Russian Academy of Sciences did not occur yesterday as far as the current Russian authorities are concerned.

As the Roman warlord and senator Katon Senior (Mark Portsy Katon, 234-149 BC), bitter enemy of Karfagen, ended each of his appearances at the Roman Senate with the words «Karfagen shall be destroyed» (Latin Carthago delenda est, Carthaginem delendam esse), so did Livanov, Minister of Education and Science, who spoke in recent years of the necessity to urgently reform (close) the Academy in the name of better and more worthy applications

Saint-Petersburg Mint. Monogram of Pavel I on the front side.
On the back side book, globe, owl, lyre, key
Inscription around the circle: Imperial Russian Academy
(private collection)

2. **International ratings in the reform of RAS.** The formal basis of the need for the reforming of the Russian Academy of Sciences, according to the speeches of Dmitry Livanov, Russian Minister for Education and Science, and Olga Golodets, Deputy Premier, at the Russian State Duma were based on the international ratings by the Nature Publishing Index, according to which RAS occupies 193rd place in the world [http://www.natureasia.com/en/publishing-index/global/]:

International rating of research organizations and universities by NPI

Position	***Research organizations and universities***	***Rating***	***Number of publications***
1	Harvard University, USA	150.25	369
2	Stanford University, USA	76.34	161
3	Max Planck Society, Germany	64.31	186
4	Massachusetts Institute of Technology (MIT), USA	60.39	199
5	French National Centre for Scientific Research (CNRS), France	45.91	246
6	National Institutes of Health (NIH), USA	43.82	143
7	University of Washington, USA	40.97	102
8	University of Cambridge, UK	39.8	137
9	The University of	39.72	116

	Tokyo, Japan		
10	Swiss Federal Institute of Technology Zurich, Switzerland	39.28	72
193	***Russian Academy of Sciences (RAS), Russia***	***4.1***	***21***

Nikolai Laverov, Vice President of the Russian Academy of Sciences, considers the publishing activity rating of scientific organizations (Nature Publishing Index – ***NPI***), prepared by Nature Publishing Group (NPG), as not entirely objective, in particular, with regard to Russian science.

Indeed, the rating of the Nature Publishing Index takes into account only the works in English published mainly in approximately two thousand US science journals, published by the international publishing company Nature Publishing Group.

It should be said that the publications in NPG journals are prestigious for the scientists, but at the same time, the decision to publish depends not as much on the quality of articles, as on the opinion of the editors of NPG journals about the importance of one or other directions which research may take.

In connection with these methods in the selection

of works, the leading position of the ***NPI*** rating is traditionally occupied by American universities.

In particular, Harvard University published 368 scientific papers **NPG** in 2012, and RAS – accounted for 21 NPI papers. The remaining Russian research organizations and universities together published less than 20 works in 2012 in NPG journals.

In contrast to ***NPI*** rating, there exists **SCImago** rating, which uses information from 18,500 magazines, being part of one of the two most popular scientific databases – SCOPUS [http://elsevierscience.ru/products/scopus/].

Scopus (www.scopus.com) represents the world's largest unified abstract database, which indexes more than 18,000 items of scientific, engineering and medical journals of approximately 5,000 international publishers. The daily updated Scopus database includes records of the first volume and the first issue of journals of the leading science publishers, including those that are Russian.

The advantage of the **SCImago** rating against others consists in the databases used during their calculations which exceed in the completeness and retrospective depth of the majority of databases existing in the world; contains full information on Russian organizations, Russian journals and Russian authors, in particular citation indices; contains means of control of research efficiency, which helps to assess authors, organizations, fields in research and journals; contains

the possibility of viewing the breakdown of results for all the potential sources of search (quantity in scientific journals, patents, research sites on the internet) and allows to get a detailed picture by names of journals, authors and co-authors, organizations, years, types of publications etc.

The Russian Academy of Sciences was third in **SCImago** rating for 2011 and 2012 after the French (CNRS) and Chinese Academy of Sciences, overtaking Harvard University (4th place).

Thirty five organizations in all are present in this rating for 2012, besides RAS overtakes them all in points, almost by one and half times.

Taking into consideration the intent of the Russian authorities to reform RAS, the third place of RAS in **SCImago** rating was an unpleasant surprise for the Russian government, and its unwillingness to use it is obvious.

SCImago rating of research organizations 2011
[http://www.scimagoir.com/pdf/SIR%202011.pdf]

International	***Research organization***	***Indicator for calculation of index***

			Output	*IC, %*	*Q1, %*	*NI*	*Spec*	*Exc*
1	–	Centre National de la Recherche Scientifique	193560	49.97	59.05	1.31	0.54	15.85
2	–	Chinese Academy of Sciences	135869	21.53	39.69	0.93	0.65	11.31
3	**1**	**Russian Academy of Medical Sciences**	**87907**	**35.00**	**24.2**	**0.5**	**0.7**	**5.9**
4	–	Harvard University	71944	34.49	78.3	2.38	0.53	29.42
88	2	Lomonosov Moscow State University	18954	35.5	24.5	0.6	0.8	6.6
540	3	Saint Petersburg State University	5538	44.8	28.0	0.5	0.8	5.9
610	4	Russian Academy of Medical Sciences	4984	24.6	21.6	0.6	0.9	8.0
620	5	Joint Institute of Nuclear Research	4893	77.0	34.1	1.0	1.0	11.3

1058	6	Russian Research Centre Kurchatov Institute	2541	50.9	31.8	0.8	0.9	7.25
1134	7	Alikhanov Institute for Theoretical and Experimental Physics	2266	73.5	41.8	1.2	1.0	16.0
1388	8	Novosibirsk State University	1670	26.1	27.0	0.5	0.8	4.6
1408	9	Saint Petersburg State Politechnical University	1627	40.8	22.9	0.5	0.9	4.6
1525	10	Kazan State University	1458	34.8	23.3	0.4	0.8	4.1

Note. Six indices were used for assessing research organizations, such as the:

1. **Output**: Number of research articles of the organization, published in any of 18,000 research journals, included in the database.

2. **International Collaboration (Int. Coll. or IC)**: number of research articles, written in joint

authorship with foreign researchers and published in 18,000 learned periodicals.

3. **High Quality Publications (Q1)**: Normalized ratio SJR The assessment of the influence of journals, where the articles of the organization are published, is made according to special index SCImago Journal Rank. The publications in journals, included in the first quarter of the rating of SJR journals in each of the subject field, are considered.

4. **Normalized Impact (NI)**: Normalized assessment of citing in a certain research area. Relation between average scientific impact of the organization and complete average impact of publications in the specific time interval and specific scientific area. If the result is equal to, for example, 0.8, then it implies that the publications of the organization are cited on an average 20% below the average citation level for a specific research area and specific time period. If the result is equal to, for example, 1.2, then it implies that the publications of the organization are cited on an average 20% above the average citation level for a specific research area and specific time period.

5. **Specialization Index (Spe):** Defines the degree of subject concentration/dispersion of research articles, published by the organization. Measured in values from 0 to 1 and reflects the broad or specialized orientation of the research organization's activity.

6. **Excellence Rate (Exc):** reflects the percentage of the organization's publications, included in 10% of

the most cited publications in its subject field.

Ranking of universities and research institutes in the version of SCImago rating for 2011 was carried out using the Output parameter.

Based on **SCImago 2012** rating [http://www.scimagoir.com/pdf/SIR%202012.pdf] the first seven organizations are as follows [http://www.scimagoir.com]:

1	Centre National de la Recherche Scientifique	FRA	204784
2	Chinese Academy of Sciences	CHN	146249
3	**Russian Academy of Medical Sciences**	**RUS**	**92894**
4	Harvard University	USA	75146
5	Helmholtz Gemeinschaft	DEU	56128
6	Max Planck Gesellschaft	DEU	51893
7	University of Tokyo	JPN	50742

Subsequently, the Russian research institutes and universities occupied the positions among the best 2,392 research organizations of the world (first ten in the list, after RAS):

106	Lomonosov Moscow State University	19320
600	Saint Petersburg State University	5481
632	Russian Academy of Medical Sciences	5141
636	Joint Institute for Nuclear Research	5054
1119	Russian Research Centre Kurchatov	2522

	Institute	
1186	Alikhanov Inst. for Theor. and Experim. Physics	2330
1279	Novosibirsk State University	2081
1451	Ural Federal University	1681
1473	Southern Federal University	1640
1579	St. Petersburg State Polytechnic University	1445

It should be noted that a significant problem of both the ratings is that they compare the organization's activity disparate by sizes and forms. It is for this reason that they are difficult to use for direct comparisons of organizations [http://trv-science.ru/2013/07/16/rejjtingi-nezavisimye-mezhdunarodnye-i-takie-raznye/].

Nevertheless, both ratings show one and the same viz. in the scale, Russia RAS produces more than half of the entire research product: 56% of Russian papers were published by the employees of the RAS institutes. Therefore, it is quite strange to talk about its inefficiency: The assertions that the Russian Universities had overtaken RAS by publication activity are incorrect.

The important parameter of global recognition of Russian science is the fact that Russian academic scientists are included in the list of Nobel laureates. From 1904 on, the Nobel Prize was awarded to the following Russian scientists, artists and public figures

(including non-citizens of Russia).

Russian and Soviet scientists, Nobel laureates

Year	*Area of interest*	*of Person*	*Affiliation*	*Formulation of award*
1904	Physiology and medicine	Pavlov Ivan	Imperial Saint Petersburg University	For the work on digestion physiology
1908	Physiology and medicine	Mechnikov Ilya	Kharkov University	For works on immunity
1956	Chemistry	Semenov Nikolay	Institute of Chemical Physics USSR Academy of Sciences	For research in chemical reaction mechanism
1958	Physics	Cherenkov Pavel	Physics Institute named after P.N. Lebedev USSR Academy of	For discovery and interpretation of Cherenkov effect

			Sciences	
1958	Physics	Tamm Igor	Physics Institute named after P.N. Lebedev USSR Academy of Sciences	For discovery and interpretation of Cherenkov effect
1958	Physics	Frank Ilya	Physics Institute named after P.N. Lebedev USSR Academy of Sciences	For discovery and interpretation of Cherenkov effect
1962	Physics	Landau Lev	Institute of Physics Problems USSR Academy of Sciences	For pioneering condensed media theories and particularly liquid helium

1964	Physics	Basov Nikolay	Physics Institute named after P.N. Lebedev USSR Academy of Sciences	For fundamental works in quantum electronics, which lead to creation of transmitters and amplifiers on laser-maser principle.
1964	Physics	Prokhorov Alexander	Physics Institute named after P.N. Lebedev USSR Academy of Sciences	For fundamental works in quantum electronics, which lead to creation of transmitters and amplifiers on laser-maser principle.
1975	*Peace Prize*	*Sakharov Andrey*	*Physics Institute named after P.N. Lebedev USSR Academy of Sciences*	*For fearless support of fundamental principles of peace between people and courageous struggle with abuse of power and any form of suppression of human*

				dignity
1977	Chemistry	Prigozhin Ilya	Foreign member of the USSR Academy of Sciences	For the theory of dissipative structures
1978	Physics	Kapitsa Piotr	Institute of Physics Problems USSR Academy of Sciences	For his basic research and discovery of low temperatures in physics
2000	Physics	Alferov Jores	Physics and technical institute RAS	For works in semiconductor technology
2003	Physics	Ginzburg Vitaly	Physics Institute named after P.N. Lebedev RAS	For the theory on super conductivity of second kind and superfluidity of liquid helium-3

2003	Physics	Abrikosov Aleksey	Institute for Physical Problems named after P.L. Kapitsa RAS	For the theory on super conductivity of second kind and superfluidity of liquid helium-3
2010	Physics	Novoselov Konstantin	Institute for Microelectronics technology problems RAS	For trailblazing experiments for studying the two dimensional material graphene
2010	Physics	Game Andrey	Institute for solid-state physics RAS	For trailblazing experiments for studying the two dimensional material graphene

Международная междисциплинарная кофнференция «Флуктуационные явления в физических, химических и биологических системах» (организатор РАН) Пущино, 1983 г. TRANSLATE

(вставить в любой другой блок книги)*TRANSLATE*

Nobel Prize awarded to RAS academic V.L. Ginzburg

Nobel laureates, academics N.G. Basov and A.M. Prokhorov

On the other hand large scale inflows to university science (programs of innovative higher educational institutions, federal and research universities, programs for the development of higher educational institutions, invitations to leading scientists from higher educational institutions, etc.), which started in 2006, are yet to give the expected result. What can be said about the effectiveness of state control and planning in science and management...

No less indicative are data on the contribution of Russian highly cited scientists, according to the research of the project "Experts corpus" [http://expertcorp.ru] [Figovsky, 2013]:

Highly cited Russian scientists, included in "Experts corpus"

Research and development organizations	***Number of scientists***	***Share of the total number of scientists, %***
RAS	2828	60 (with PNPI 61.4)
All universities except MSU	596	12.6
MSU	565	12.0
Kurchatov Institute	84	1.8
Together with ITEP and	233	4.9

PNPI		
JINR + IFVE	197	4.2
RAMS	65	1.4
Various departments	227	4.8

The analysis of publication activity of Russian research organizations, carried out in 2012 in the report to the Council under the President of the Russian Federation for Science and Education, shows that approximately half of the papers are published by scientists of the Russian Academy of Sciences (RAS), a little more than 10% is published by scientists from Lomonosov Moscow State University.

This data takes into consideration only those publications, where the ownership of publications of the institutes is clearly specified viz. relating the papers´ authors to RAS or MSU.

In reality, data obtained thus far for the publications of RAS and MSU are somewhat understated: In many papers from the most famous academic institutes (15-35% of the total number of publications from the selectively checked institutes), and institutes forming part of MSU belonging to the institute of RAS (or MSU) is not specified, and due to this RAS and MSU lose no less than 10% of the papers.

Thus, the contribution of RAS, of the total number of Russian publications (according to data by Web of Science) constitutes approximately 55%, MSU is slightly more than 10%, besides this contribution is

increasing over time: 15 years prior to this approximately 40% of papers from Russia were from RAS, MSU and the contributions constituted somewhat less than 10%, which *shows the fall in contributions of prospective researchers*, working outside RAS and MSU, during the past 15 years.

The analysis of publication activity reflects that the departmental applied research, lost orders in the beginning of 1990s, and institutional research suffered the most, in spite of considerable financial inflows. The latter is also confirmed by the assessments according to the Civic Chamber of the Russian Federation, in which the contribution of lecturers engaging in research and development, had decreased from 38% to 16% from the middle of the 90's to the middle of the first decade of the XXI Century.

The publication activity of some Russian research organizations in 1995-2010 (according to data by Web of Science)

Research and development organizations	***Years***			
	1995	*2000*	*2005*	*2010*
Russia at large	30,904	32,634	30,494	32,637
RAS	10,680	13,434	13,189	15,867
MSU	2,873	2,445	3,389	3,420

Joint Institute for Nuclear Research	584	748	758	847
RAMS	772	721	867	879
SFU + SibFU	–	–	–	518
R&D Center "Kurchatov Institute"	427	496	443	413

The meeting of RAS President Vladimir Fortov with Vladimir Putin eliminated several myths, popular after the announcement of the mentioned "reforms". In particular it became clear that the *issue of the academy's assets with all its importance is neither basic, nor independent in the draft discussed*.

The transfer of "ineffective use of asset" plays the same role here as the "dispute of economic entities" in the famous grave history of the beginning of the past decade...

Moreover, it became clear that in spite of some decorative concessions, the government is not intent on scaling back from the path of RAS reforms, which it chose itself

As Igor Kharichev puts it in his article: «End of Russian Science - 3. Results of second reading»: «The conclusion that can be made after studying the law adopted in the second reading "On the Russian Academy of Sciences, reorganization of state academies of sciences and introduction of amendments to certain

laws of the Russian Federation", is not consoling: The RAS institutes are to be handed over to be controlled by bureaucrats i.e. they shall decide the fate of research organizations and the fate of research in the most diverse spheres of research activity. This was confirmed on July 11 by the Minister Dmitry Livanov in his interview by "Echo Moskvy" radio station.

According to Livanov, the separation of the "Club of Eminent Scientists" from the system of research institutes is a principal stance taken by the "reformers", as "... one and the same persons make decisions on what research shall be financed, they finance them, they conduct them, and they report to themselves later and award themselves».

It is strange to hear this. First of all, it's not true that one and the same people do everything at once. One set of people make decisions for financing research, others finance it, and a third set of people conduct research and then report on their findings. The President of the Russian Federation awards the scientists state decorations.

Secondly, RAS never acted without control from the government viz. correctness of spending budget funds by individual research organizations and the Audit Chamber of the Russian Federation regularly checked it" [http://www.ej.ru/?a=note&id=13101].

«The Russian Academy of Sciences by the summer of 2013 remained the only institute of civilians, to command serious authority and independence in making

decisions. This is the main reason for "reforms" according to me» [Kurilla, 2013].

In our country such swift reforms as today's RAS reforms are made only in the event that at each level of authority all the multidirectional interests coincide with all the concerned persons. Therefore, the issue concerning the reasons for the current rapid RAS reforms are very important in understanding the essence of all that is taking place and remedies from the formed deadlocks existing in Russian science and education.

Primarily, in our opinion, it is necessary to abandon the one-sided understanding that the RAS reforms were made as the banal forcible takeover of its assets. Probably, *such motives are present with part of the reformers*, but it cannot be proved, and it is not a fact that the amount of theft of the Academy's assets will in the end turn out to be significantly high.

Formally the current draft law is directed, first of all, to handing over operational management of the economic activity of institutes and RAS asset management entirely to the Federal bureaucrats from the newly formed Agency.

The latter (according to the official version) will carry out these more professionally, than the bureaucrats, appointed by the Presidium of RAS and directors of institutes, and lend an ear to the academic advice on research issues. Thus, "more money should be earned for operating the Academy, and available funds should be used more accurately.

As envisioned by the reformers, RAS shall be thus transformed from the self-controlled «Ministry of Fundamental Research» to the «Club of Scientists», that shall give the country and new «Agency», wise advice and engage exclusively in scientific research.

The reformers regularly, like a mantra, repeat the incantations about the requirement for the creation of a unified authority, which would resolve all the issues of management, work organization and financing of institutions, and would also be part of the structure of the Academy of Sciences.

Possibly, this measure could have been called correct and timely, had there have been such managers in our country, who could have managed all of these, viz. managers, who specialize *in* research management issues. But we simply don't have such specialists in our country. There are businessmen and financial experts. It would be incorrect to give complete control of the Academy of Sciences to them. There would be no issues when and if experts in the field of managing academic research appeared.

«However, even such specialists should have worked in the position of assistants, i.e. be deputies of directors of academic institutions and have had experience in helping to resolving organizational and financial issues.

The academic institutions should be headed up by the specialists and scientists. These leading scientist-organizers in our country number quite a few like:

Kurchatov, Alexandrov, Keldysh, Korolev etc.... Such people, without a doubt, are available today also. The government should help them, by providing them with the financing that they really need, and not those pittances, which they learned to live on for many years» [Iosseliani, 2013].

XX Conference of RAS on using neutron scattering in condensed matter physics (2008, private collection)

Participants Anniversary All-Russian Cosmic Ray Conference of the RAS (at the grave of famous physicists Galina and Yury Shafer, Yakutsk) (IKFIA RAS collection)

Conference in honour of Fedor Bogomolov's 65th birthday

The winners of the Free Economic Society of Russia, 2013 (private collection)

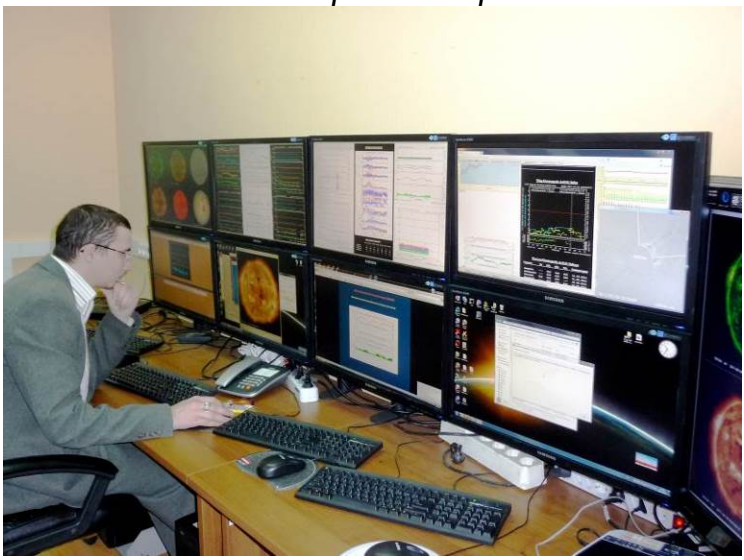
President and Past-President of the Free Russian Economic Society (professor Vadim Belov and professor Yury Roslyak, left to right) (I. Libin private collection)

Solar energy Conference (RAS developments)

Research vessel "Academic Kurchatov" tuned out to be expendable by the Russian bureaucracy (I. Libin private collection)

Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation of the RAS behalf N.V.Pushkov
(I. Libin private collection)

Cosmic Ray Station of IZMIRAN (I. Libin private collection).
Survives after the reform?



IZMIRAN Space Weather Center
(I. Libin private collection)

IZMIRAN Scintillation telescope (prof. V. Zirakashvili, Dr. K. Yudakhin, Dr. E. Klepach) (I. Libin private collection)

The result of research management by the bureaucrats was best of all clearly manifested in the situation with oceanological research, in particular, using deep-sea vehicles. Today there are six ocean going ships at the Oceanology Institute of RAS (OI RAS). The financing allotted for expeditions to the institute is enough to cover costs for one week a year. Therefore, the institute is forced to lease two passenger class research vessels to from tourist companies that gives the opportunity to conduct two to three expeditions every year. But the reformers assert that this is not effective.

Moreover, in spite of *the President's express references*, the scientists of the Executive Body of RAS

meet with regular resistance from the bureaucratic apparatus in the allotment of financing provided. This occurs in spite of the fact that such a situation considerably reduces the possibilities of Russia in submarine oceanological research, where Russia is the undoubted leader.

Deep water descent module "Mir" (RAS)
The President of Russian V.V. Putin takes part in the immersion

Apropos, the original idea of the drafted law, particularly in this (radical) part, today is above all falling apart at the seams: Apparently, the academicians had managed to "get" the President's approval for their participation in the planning of research and the distribution of funds for the directions [http://www.strf.ru/material.aspx?CatalogId=221&d_no=58681], however, for the time being, failure in reaching the planned targets of the new Agency in reform ideology does not follow this.

This leads to the downfall: «The activity of the Research Institute Agency shall be noted by the termination of certain institutes, the inconsiderate merger of the others, and the sharp curtailment of research teams.

Non-professionals, who to the present day had never exhibited the capacity or willingness to listen to the opinion of specialists, shall take decisions as to which research is to be carried out and which is not to be considered. For certain there shall be kickbacks: if they are in other spheres of activities, depending on bureaucrats, why can't they be in science? We shall get be like "Skolkovo" in the scale of the country viz. no money, no science» [http://www.ej.ru/?a=note&id=13101].

Because of this, we believe that the simplistic attempts to stigmatize RAS reforms with a simple reference to the mercenary interests of the initiators would be an indecisive argument. It could have been possible to get on with the new structure had the reforms not gone far beyond the draft of the law proposed.

The main problem lies in the series of laws and bylaws, which shall follow after adoption of the present main draft of the law and will regulate the choice of topics for research, opening and closing of institutes and laboratories, financing principles of different directions and topics by the bureaucrats.

As told by Andrei Game (who is by the way, an ardent supporter of the present radical reform of The

Academy of Sciences), ex-employee of RAS, currently residing in Holland, Nobel laureate of 2010) in his interview to "Gazeta.ru": "Science is rather a delicate matter. The bureaucrats had tried and try to organize science and teach, how to make science better" [Game, 2013].

In the new law everything «... can be summarized by saying that the administration had been placed in front of those people who make science. It can be done in other fields of human activity, but in science it should not be done, say, as in literature. The only possibility for managing art is to give the control to those, who understand something about it. If the administrator is to be put above the writers or those, who paint, then nothing good will come of it. The same is true with science».

Now, apparently the decisions about these issues shall be initiated not by the Presidium of RAS, but by the governmental structure, which shall be governed by some criteria of "more important" and "less important" science. What are these criteria?

In order to understand the idea of the reformers, it is required to attentively read the current draft of the law, as well as program articles and speeches of the reform ideologists or its avid agitators.

The following basic materials of the reformists that reflect the key moments of the doctrine for reformation of Russian science are known [Guriev, 2012; Guriev etc., 2009; Gelfand and Livanov, 2011; Krushelnitsky,

2010; Krushelnitsky, 2010a].

Moreover, the reforms have several speeches by experts of the Ministry of Education and Science, more or less, reflecting the Ministry's point of view [http://kassian.livejournal.com/312849.html, www.scientific.ru/dforum/scilife/1373460817].

The speeches made by the reform opponents were many, but the problem is that few among them were conceptual and serious. True, there were strong reactions from leading scientists [http://expert.ru/2013/07/2/uchenyie-o-reforme-ran-chast-3/], but they were too brief and only related to one or two aspects.

Upon the first approximation the following sources exist that reflect the critics' point of view more completely: [Osipov and Popov, 2010; Kuleshov, 2011; Kuleshov, 2011a; Kuleshov 2013; Osipov, 2010; Kara-Murza, 2013; Kara-Murza, 2013 a; Kara-Murza, 2013b; Gromkovsky. 2013; Glaziev, 2013].

In 1992 commemorative coins were issued

in honour of the Academy of Sciences and its founders

3. Preliminary stages of reforms (up to 2013)

Now, as such, about the apparent standoff motives and rather extremely belated public debates concerning the problem.

The country's top leadership had decided that science should give Russia some perceptible effect in the form of technological development outperforming the rest of the world, but sees such this resulting from it: innovative and even modernization activity in Russia is not sufficient.

As it always has been, in the course of the reformation of the last twenty years, the resolution has been to remediate by way of copying or “transplanting” in Russian soil the agencies that ensure innovative development in the West. As it usually is in similar cases, the transplantation was the first of the visible part of these agencies, without considering the fundamentals.

Thereafter, in the *regime's thinking*, highly advanced fundamental Physics, Biology etc. will considerably ease the appearance of state-of-art technologies in electronics, transport, medicine and agriculture. Consequently, it is required that organizations engaged in high science, and having an output to applications, be set up as in the West, i.e. it is a blessing that fundamental science does not require a lot money *and in certain fields, it is not that disastrously*

lagging behind western science, as in other fields.

On the other hand, the research institutes of the Russian Academy of Science were not like those specimens, which the reformers had in mind. They (reformers and authors) more than understood the American system of concentration of high science in the universities and systems of special R&D centers and tried out this system of concentration of high science as in several catching-up countries based on technology parks or other territorial compounds, where there were favorable conditions for attracting innovative companies (for example, in South Korea) were created.

For that reason in the second half of 2000 the country's top leadership decided to incubate a new system of high science next to RAS, based on specially picked out research and federal universities, and innovation centers, such as "Skolkovo", with plans for replication of the experience gained.

"When we talk about the cessation of the academy or the considerable restrictions of its functions, then a reasonable question arises: Is there an alternative? Can it be true that the alternative is Skolkovo? Perhaps, one day it shall become a worthy replacement for RAS, but it will not take place today nor tomorrow, it takes time. Even if Skolkovo should prosper and surprise everyone by its achievements, would it be bad if two competing research organizations were in our country?. On the contrary, it should be only to the good of the country! Nevertheless, today we do not have this.

Today RAS is a non-alternative organization, which will coordinate and develop science and continue only as the main coordinating authority [Ioselliani, 2013].

Nevertheless, the main increment of research financing for the past years had been allocated in particular for this plan (Skolkovo). (By all accounts, the orders for the other industry research institutes, connected with nuclear, space and defense topics and "ROSNANO" were increased in a parallel manner, but this sector had luckily become independent of the general problems of fundamental civil science and we shall not discuss it here.

In the recent past, huge amounts of money (by academic measures) were allotted to programs like "Science in educational establishments". Consequently, equipment costing millions is idling in many places even unpacked (or down and not running), and where they are in conditional operating mode, the students and research scientists, who operate it perform standard dull measurements.

Those who could really make use of the modern installations lacked the funds. Since they, for a greater part, were from RAS, and this contradicts the guiding idea. Recently MSU announced a 30% reduction in the strength of research employees. Is it perhaps a step towards the unforeseen blossoming of science in the higher educational establishments?

The reform ideologues had strongly hoped that in

due course these new organizations (research centers, Skolkovo and federal universities) would demonstrate their successes and effectiveness (as compared to the traditional system of academic research and development institutes), until the latter would have inevitably re-structured and diminished.

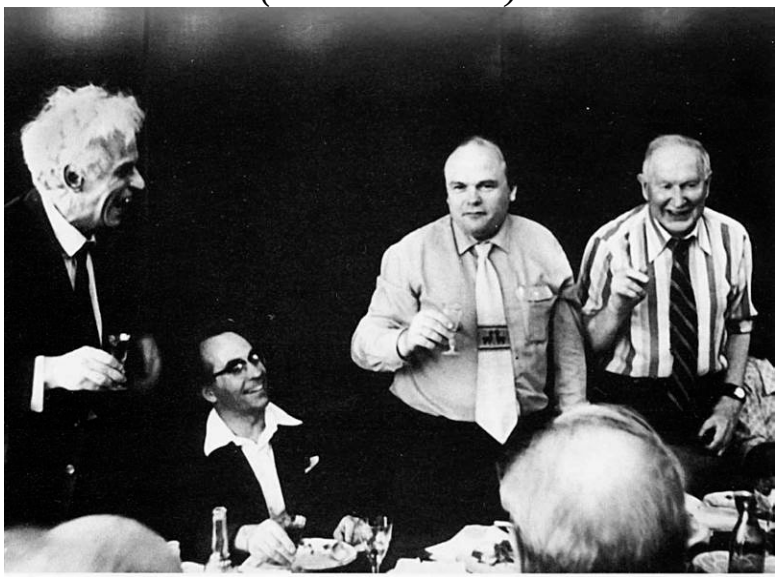
Even at this stage, a certain impairment of the authoritarian position in the matter of organizing research in Russia exuded. Even in the fiction story "Neznaika on the Moon», Fuksiya and Seledochka, the designers from Sun City, designed the rocket for the flight and not the chief scientist Znaika, and Vintik and Spuntik implemented the project.

Academician D.V. Skobeltsin and Nobel laureates A.M. Prokhorov (behind) and V.G. Basov (on the right)

Future Nobel laureates I.E. Tamm and L.D. Landau among the participants of the Conference on Theoretical Physics at Kharkov 1929

Academician D.V. Skobeltsin and academician S.N. Vernov
(I. Libin photo)

Academician S.N. Vernov and professor G.B. Khristiansen
(MSU collection)

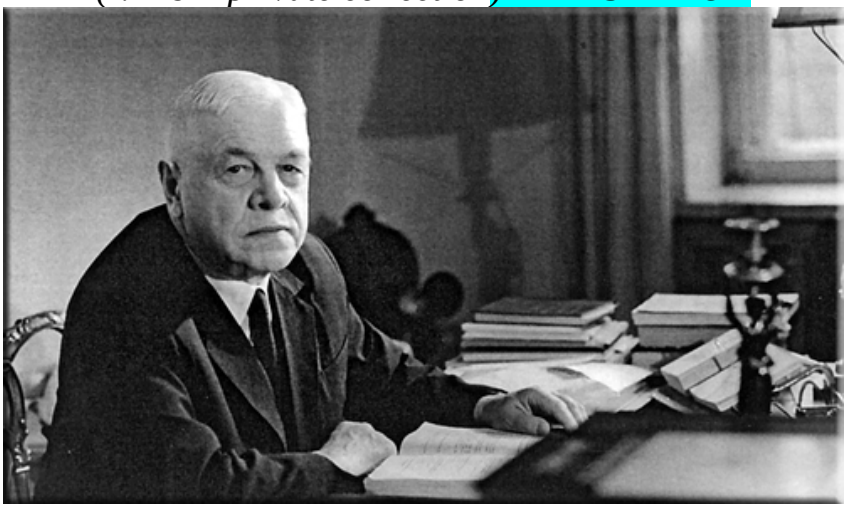


Distinguished Soviet and Russian physicists of RAS (Corresponding member of RAS A.E. Chudakov, Academician V.M. Lobashev, Academician E.P. Velikhov, Academician M.A. Markov. Pakhra, 1980. Photo Yu. Tumonov)

Geophysicists, Academician V.V. Migulin is in the last row to the extreme right, 1945

(I. Libin private collection)

Награждение ученых и артистов орденами СССР, 30-е годы
(I. Libin private collection) TRANSLATION



Academician D.V. Skobeltsin

Nobel price laureate RAS academician A.D. Sakharov

The founders of Skolkovo viz. the analog of American Silicon Valley should have understood the technology of its success. For decades, the US Government had purposefully channeled funds to the Valley. The trick was that the financing was not purely for defense research, but for civilian projects.

Then the projects that endured and withstood competition paid-off and found military applications. The funding of Silicon Valley was made jointly by the government, universities and the private sector that gradually began to stand on its own legs thanks to the

government's orders [Figovsky, 2013].

In the West, the system of the creation and implementation of innovations is not the function of science alone, but function of a huge number of institutes and favorable conditions, among which fundamental science plays an important, but not exclusive role, whereas the methods of the performing functions of science can be different.

It is true that studies of fundamental science in any given Western country increase its general educational level, supplies the country with required experts and staff for resolving breakthrough technological tasks, but along with this, there are general market conditions. They are: the cost of resources, pressure of competition, insistence on high standards and scopes of demand, availability of quality suppliers and there are cultural and organizational factors of economic activity.

If innovations in the country are not sufficiently profitable or there are no organizations, which could be engaged in them, then how well the system of fundamental research is organized, shall not be of much help to the economy.

The tragedy of today's Russian economic situation is that the demand for modernization is very low. Demand in the truest economic sense, i.e. promised monetary reward to the initiator of innovation-modernization, and not just the management's wishes that more innovations should take place.

There is no sense in saving cheap resources. The pressure of competitors is not sufficiently strong, long-standing consumers are consuming outdated products, getting deliveries of quality component parts is quite difficult, finding suitable employees for performing complicated task is harder and harder, profit obtained to a considerable extent is taxed, and in certain cases the authorities in power can force the transfer of business to their confidants.

All these make innovations scantily profitable and worth striving for. The cost of innovations in the Russian system is very high. There are no established organizations or structures that could be accustomed to engaging in innovations. The R&D departments of companies are very weak and start from a low level. Government industrial research, connecting "high" science with production and adopting western innovations, in the 90's experienced a stronger delay in progress pogrom than research of academic and higher educational institutions.

Using economic terms, in today's conditions the demand curve for innovations and their supply intersect at such a point as to demonstrate that innovations are very scarce and this is the product of not only the sorry state of fundamental and applied science, but the result of the non-functionality of the entire economic system of Russia.

Thus, additional allocations given during the 2000's for science of higher educational institutions, research

centers and the experimental "Skolkovo" platform, of course, had some meaning, but in isolation from the general innovation system that touches upon all aspects of economic life, they could not and should not have gone into effect so quickly.

In this context, it is appropriate to cite one of the articles of Krushelnitsky [Krushelnitsky, 2010], who writes "To reform fundamental science is simpler, quicker, and cheaper than applied science. The stimulation of scientific and technical innovations is directly linked to the economy, on demand from of business.

Hence, reforming applied research without simultaneous reformation of the entire economy, is doomed viz. if it is more profitable to pay bribes than to implement new technology, then a majority of budget allotments for the development of applied research will be siphoned-off.

Only political will is required for reforming fundamental science.

Based on the above, it would have been more logical and sensible to begin the reforms with fundamental science, and it could have become the new road map for development of the entire research and technology chain. Instead, we begin to build the house starting from the roof. Why? I do not see any other explanation, than the lack of knowledge and short-sightedness of government bureaucrats and the behind the scene struggle of bureaucrats".

In fact, to reform fundamental science is simpler and cheaper only when we know the expected results in advance of fundamental science. Krushelnitsky and other reformers are confident that they know what the ultimate result should be: *it should copy the West*.

However, in our opinion, the structure of fundamental science in our country should be formed historically, as the answer to specific requirements of Russian life viz. economy, cultural development, military affairs and the political system. It should be clear in the beginning, why the country requires science, then science shall adjust to these needs.

The present day structure of RAS had been formed during the past decades and is heterogeneous. Thus along with the grand institutions of world science, like the Physics Institute (FIAN) or Troitsk Institute Nuclear Research (with world famous scientists, and correspondingly with their high ratings), the RAS structure includes small regional institutes, engaged in resolving local regional research and applied tasks (with low ratings).

In order to meet the requirement to retain these small R&D Institutes we will concentrate on the last resolution of Russian authorities: in the beginning of August 2013 Vladimir Putin, President of Russia, assigned Dmitry Medvedev, the Prime Minister to consider the issue of changing the legal status of 15 RAS research institutions by the 1st of September

engaged in the field of physics. (Among them the absolute leaders of Russian Science, such as the United Institute of Nuclear Research, the Institute for Applied Physics RAS, the Troitsk Institute for Innovation and Thermonuclear Research etc.).

Highly cited Russian scientists work at these RAS institutes and placed a requisition in the document dated June29, President Putin refers to the appeal of Yuri Osipov, the ex-chief of RAS.

However, all 15 RAS research institutions in the last year had only concluded a partnership agreement with the National Research Center "Kurchatov Institute", viz. agreement, which served as the reason for the unexpected reforms. Six months later, on June 24, 2013 a letter, signed by Mikhail Kovalchuk, Director of the Kurchatov Institute and Yury Osipov, ex-president of RAS, was received by the President's administration, where it made reference to the requirement to “form a new system of management and financial infrastructure for the "mega science" class. The proposal relates to the "creation, modernization and use of unique mega-class research installations".

The Academy could possibly lose the most capable research organizations, always considered as the elite of academic science and forego some percentage of budget financing. The "Union of the 15" is a kind of model structure, called upon to show the remaining ones who have doubts that there is life outside RAS.

According to Evgeny Semenov, Director of the

Russian R&D Institute of Economics, Politics and Law in research and technology (RIEPP), the issue should be gradually resolved with other institutes of RAS. Perhaps, the Ministry of Foreign Affairs want to take cross-cultural institutes under its control and would like to create something complex; it may be that these complexities would originate on the basis of territorial principle. "Maybe, the Siberian division of RAS could remember the idea of development of production forces to the east of the Urals and will create a complex national research center".

"No changes are possible without the approval of the directors of institutes, - declared the current president of RAS academician Vladimir Fortov. - I am against such a transition. Currently, we are not considering the possibility of setting up any new structure".

Nevertheless, these shall be resolved, of course, not at the minister's level. Perhaps, the matter to attend now is considerably more serious than even preserving national science.

Today the matter to be considered is not national science but national safety.

Instead of first creating the demand for knowledge, available with fundamental science and reforming all the rest, creating the innovative system and making the entire economy interested in modernization, use of knowledge, and changing the political component in the development of the country’s economy, the country’s

top leadership in some way, decided to "strangle" reforms by creating an alternative structure. The reforms were proposed in the governmental law drafted on June 28 of this year.

The fact that several people secretly made the decision to abolish the Academy of Sciences with three hundred years of history, is the symbol of destruction of the remains of the reasoning power in Russia.

In fact, the destruction of science and education is the route: it has been decided that the country for a long time, should remain a raw material colony and a second or third rated country, or third rated country.

In regard to the stance of the ideologues and supporters of such kinds of reforms, which is inspired by the ideology of the first five year plan, viz. that in the beginning established ore mining was established, then metallurgy and power generation, then machine-building all of them of a high level of added-value.

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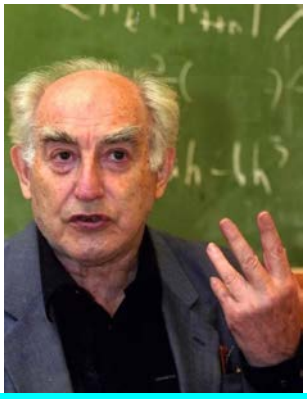
There is another shortcoming in the concept of the reform: *division into fundamental and applied science itself is false*. Fundamental and applied research can be divided depending on the goals set when resolving a specific task, but the division does not depend on particular methods, moreover it does not depend on people and organizations, with some of them supposedly engaged in fundamental science, and the rest in applied science.

The attempt to start off with separate regulations

concerning fundamental science will not be attached to the existing old random imported random objectives (In general, it is not the business of scientists, who were engaged only in fundamental research, to become the leading experts for reforming science. They do not know why all this is required. Moreover, it is not the business, of bureaucrats, for whom Russian science and its future is an empty sound, to become the leading reform experts.



Нобелевский лауреат академик В.Л. Гинзбург писал: «Будущее принадлежит не таинствам, мистике и вере, а научному мышлению и научному мировоззрению»

Ademician V. Fortov, President of RAS

Один из основных противников реформы РАН, вице-президент РАН, лауреат Нобелевской премии, академик Жорес Алферов

Американский астронавт Нейл Амстронг в Санет-Петербурге, 1970 (справа профессор Г.Е. Кочаров, I. Libin photo)

Do bureaucrats require scientific research in space?Dumitru Dorin Prunariu (Romanian cosmonaut) and Igor Libin

Handing of diplomas at the Russian Academy of Natural Sciences - Lana Surikova-Camu (L.Surikova private collection)

Handing of diplomas at the Russian Academy of Natural Sciences (President RANS academician M. Ledvanov) (I. Libin private collection)

The world-famous Space Physics L.Dorman and

National Workshop on space physics, Yakutsk, 1984 г. (next straight L. Dorman, G. Shafer, G, Kacharov)

Laboratory cosmic-ray variations IZMIRAN (80 years)

(I. Libin private collection)

Graduate students of Professor L.I. Dorman, founder of the research school "Variation of cosmic rays"

Anniversary celebrations of the Joint Institute for Nuclear Research (Dubna, 2011)

Meeting of Russian and Italian scientists, Padua, 2011 (I. Libin private collection)

Russian scientists in Mexico (Dr. Oleg Gulinsky third from the left)

(картинки с Хорхе и Кавлаковым, Обрегон)

Russian Academy of Science is the symbol of Russia.

4. Arguments and program of reform ideologists, basic shortcomings

Incidentally, let us get back to the history of reforms. The reforms of science got a new lease of life after the return of V.Putin as President.

The President and the Government did not want to wait, until the new scientific and technical system (consisting of federal universities and international standard R&D centers) to develop alongside RAS and independent of it and decided to reform the Academy itself in order to ensure the required output from it.

The idea was not theirs. It was nurtured by the radical supporters in order to reorganize the Russian research system of Russia in a western manner, who prepared arguments for such reorganization in the

required number [Guriev, 2012; Guriev etc., 2009; Gelfand and Livanov, 2011; Krushelnitsky, 2010; Krushelnitsky, 2010 a].

The first thing that strikes the eye when reading all this material is that the authors selected an ***alarmist style,*** *which starts with assertions about the forthcoming catastrophe in Russian science, and in order to overcome this it is urgent to put the reforms into effect.*

What can one say about the general style of the following arguments? The editions that were posted in the texts are general and not intra-academic. The reader, far removed from science, could do with an introductory paragraph with clarification about what key role is played by science in the country's life, which criteria would indicate the successful execution of this key role played by science to be measured and why things are not going well with science in the country.

Instead of this, from the outset, the authors had set the exclusive criteria viz ***publication activity and citations***, which ascertained the plight of science for this criterion and immediately digressed into the subject of how to improve the situation ***by this criterion***.

N.B. How catastrophically the point was made and reported to top leadership that the contribution of publications from Russia constituted 2% percent of the global number of publications (for all of sciences). Therefore, the Russian presidential decree (dated May of last year) mentioned that the contribution of our publications on the Web of Science (WoS) was to be

2.44%. However, in effect 2.44% is much less than what we have in reality: for example, in nuclear physics the contribution of our publications is already 6.5%, and in mathematics 6%. Overall, for hospitals it stretches to 2%.

We all know well what the Academy of Sciences is and that it is comprised of historians, economists, masses of different fields and specialties, where the metrics, used in natural sciences, are not applicable. The authors of the reforms had forgotten to add in reporting to the President that this is an overall figure for physics, for example, this is also the 6% of contribution of publications

Nevertheless, why Physics in particular has to endure the brunt of the «reforms».

Improvement of the position is suggested by the closing the "weak" institutes and laboratories, not coming under the competitive framework at international levels and by publications (quotations) or, at worst, by external audits.

Here are two provisions that the reform authors suggested:

Sergei Guriev: "*I understand that bibliometric measurements are imperfect, but, it's a pity that I don't know any other more thorough of a system of assessments of the quality of Russian research, based on independent expertise*".

Sergei Guriev, Dmitry Livanov, and Konstantin Severinov: "*Unconditionally, the editorial publication*

quantity and quotation index are not absolutely correct and are not the only potential measure of the result of research activity. Are other approaches for assessing the efficiency of Russian research institutes possible? In many countries, a peer review mechanism viz. external assessment by scientists-colleagues is used.

In fact, the authors had clearly jumped the gun.

In the beginning, it was required to be clear on why Russia needs fundamental science and how far the bibliometric measurements [Guriev, 2013] reflect this need.

Cautious objections to this key element in the reform concept were found in the interview of Yu. Osipov, ex-President of RAS [Osipov, 2010], they appear in more detail and with substantiation in the series of works by S. Kara-Murza and have been properly summarized in [Kara-Murza, 2013, 2013a, 2013b], in which he warns about the reckless reformation of science.

The conclusion, solicited from the works of Kara-Murza, is absolutely clear-cut: Bibliometric indicators, like external assessment are useful and effective, although they are not universal tools for comparative assessment of the productivity of scientists in the same research area.

Even in this case they fail, and the competent research authority or group has to make corrections to the conclusions when taking practical resolutions, following the comparison of bibliometric indices.

Since science is an area, not subject to clear-cut algorithmization, these competent correctives can often be of a willfulness nature and wont rest on the criteria that is based on a generalization of previous experiences.

However, if one has to shed light on the comparison of different fields of knowledge and research areas, then bibliometric indices very often fail. The external assessment may be of help, but the competent choice of experts will also be willful due to the impossibility of writing the an objective algorithm for choosing experts.

In other words, in the "objective" bibliometric indices and "objective" (based on the assessing expert algorithm written in advance) external expertise *very often do not correlate with the pertinence from one to another research or research workers around the country*. Therefore, in the case of Russia, the transition to a grant system for financing science by the selection of criteria, based on these indicators, will do more damage than good.

The arguments of S. Kara-Murza are very simple: Contrary to the notions of "reformers", the functions of academic science for Russia are not only conducting research and obtaining international standard results.

For Russia, the Academy of Sciences is the storehouse of knowledge for the entire spectrum of fundamental sciences of interest for its practices to which one can approach in case of needing expertise.

Moreover, RAS itself, "without demand or order", entwines a multitude of strands into its economic practice, providing the required support for the country's scientific life. Often it can be seen in some areas of knowledge, which are totally undeveloped or unnecessary, such as expendable nuclear icebreakers.

In critical cases, we will not be able to import the required expertise, if we do not have knowledgeable specialists in each field.

Besides the specialists in each field, in general, would not be necessarily those of a world level or those published in western journals. Sometimes the lagging research worker, who by himself gets inferior results at slow rates, is sufficient and thanks to this is at least capable if need be to understand top-notch results of western science.

A good deal of specific knowledge will not be much in demand in the West so that that it will be tabooed in western journals. We therefore suppress such knowledge and the related scientists.

Finally, if one talks about such an important function of science, as *expertise*, then often, only broad knowledge is required from the invited expert and not depth. For such an expert, we do not need a world-renowned scientist and Nobel laureate, but simply a good scientist with wisdom, a talented popularizer or author of textbooks.

In this context, it is appropriate to comment on the statements of A. Krushelnitsky from [Krushelnitsky,

2010] about such "non-global" institutes as is RAS: "... outdated science in need of renovations or secondary freshness, independent of the amount of financing, like research on the flesh of sturgeon, is simply meaningless".

It is difficult to say, what images forced Krushelnitsky to find similarity between science and the flesh of sturgeon, but from the point of view of the functions of science for the country, the thesis is highly disputable, however much we want a larger part of science to be of an international standard.

Actually, in order to reach conclusions, one can simply collate the level of Krushelnitsky's argument with the quotation of Kara-Murza: "The following principal position in the doctrine for reforming science can be summarized by saying that it was meant to support only the lustrous and prestigious research schools. It was assumed that competition would preserve and strengthen those areas, where the domestic scientists worked up to world standards. Thus, the spread of activities was sharply reduced, and by virtue of the resources freed, the reforms of science were financed. The concept for reformation of Russian science for the period between 1998 and 2000 states that, "The main task of the coming years is providing the required conditions for retaining and developing the most productive part of Russian science".

Knowledge and wisdom say that this notion about the tasks of science is false.

What does the concept of "world standard" have to do with it?

A mediocre and even nondescript laboratory, providing at least some activity at the minimum level essential for the security of the country (for example, Weather bureau), is far more important than a prestigious and even lustrous laboratory, not as directly related to the critical requirements of the country.

To sacrifice mediocre laboratories in order that their resources strengthen the lustrous laboratories, in some cases is equivalent to sabotage, especially in times of crisis. This attitude is yet to be reconsidered.

This assertion does not mean in the least way that the bibliographic indices and external evaluations are not required as auxiliary target indices.

There is no doubt that "under otherwise equal conditions", the higher the level of research in each separate area, the closer it will be to the best world level. Therefore, the gradual reorientation of Russian fundamental science to these indices is very important, especially as far as stimulating scientists is concerned.

The point is that one cannot proceed from these criteria when the future Agency under the Ministry selects which institutes and research areas are to remain, and which are to be closed down, and in which proportion the financial flow has to be divided between them and how to plan the research topics etc. These criteria can play only an auxiliary role along with the completely "willfulness " methods of selection not

algorithmized in advance.

The expert, who makes such decisions, can and should understand the crux of the matter, and not the formal indices. Only a bureaucrat can judge by concocted formal indices, the substance is not of interest to him.

Science has other functions, for example, assisting education and maintaining sufficient cultural levels in society [Seara Vasquez et al., 2012; Seara Vasquez and Libin, 2013]. It is important to emphasise that active research activity of the university professor is usually very important in order that he teach the student well. The higher the researcher's level, the better he can prepare students.

Therefore, the intention of the Ministry of Education and Science in forcing the professors of higher educational institutions to carry out research work is correct and very similar to the system used at SUNEO [Seara Vasquez and Libin, 2013].

Moreover, if one can agree that for many specialties, in particular, the international standard research carried out by the professors, is required in order to properly teach students, then the Hirsch indices should be considered adequate.

Again, the *requirement of international standard research by university professors for good teaching is not as universal as the requirement of international standard research by RAS for performing the functions of knowledge storage and expertise*.

It is dangerous to think that the grants for university professors would rest on only this indicator.

It is characteristic in this plan to find that Russian employees often prefer graduates of Russian higher educational establishments, which are not at all included in the international ratings of higher educational institutions, more to the graduates of the most famous higher educational institutions, which occupy prestigious positions in these ratings.

If higher educational institutions are forced to enter these ratings, then one of the methods for carrying out the tasks set would be a radicalization of the Ministry's line for conducting research at the highest level of higher educational institutions. Thus, the professors and students would reflect a higher Hirsch index.

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However, in reality this can take away valuable resources from some other areas in the activity of the higher educational institutions, viz. those, at any given time, that Russian employers determine to be higher. Maybe, the employers are currently making mistakes in the assessment of future cadres (if so, then it is required to substantiate this and bring around the employers!). But at the present moment they are the main (and not the western universities and companies) consumers of the product output of Russian higher educational institutions (together with corporate customers who perform applied work at the higher educational institutions). So, *the devil may care* attitude of the

country's top leadership as to the consumer's opinion does not conform to the principles of the market economy and should be reconsidered.

On January 24, 2011, the first conference of the Russian Association for Assistance to Science (RASN) was held at the Russian Civic Chamber. As the famous scientist and philanthropist Mikhail Gelfand (one of the ideologues of reforms) said: "Tragedy shall begin not when nobody is there to write an article in "Nature", but when there'll be no one to read this article in "Nature". ... Science requires integration with higher education. The system, when the laboratories are separate, and auditoriums are separate, does not function in the modern world. A a proper perspective is required as to how this would be carried out because *the existing approach viz. blunt shift of financing from the Academy (RAS) to the universities does not work. How it will take place is the subject of the discuss ion".*

Contributions of Russian publications and citations . However, out of the two percent of money, the contributions of the Russian Academy of Sciences represents only one fifth, i.e. 0.4% of the world's expenditures in science. The contribution of RAS in citations and publications of Russian origin is half, i.e. on the world scale one percent. Thus, by publications and citations, we in Russia have a low-cost organization.

If we want to move all research to the universities, then we should consider that approximately ten times

more money on research will be required to be spent The budget of a large American university is about two billion dollars. The entire Russian Academy spends two billion dollars.

Science which is significantly important is now concentrated in RAS. Of course, there are brilliant research groups at MSU, for example, in the problem laboratories and institutes, but these are equivalent to only 4-5 universities in Russia. Moreover, the scientists from RAS do a considerable part of serious research in these universities. MSU and several other leading universities highly appreciate the existing symbiosis with RAS, and the academic institutes can *not* imagine how it can be possible not to participate in the preparation of students, since later, they would to be accepted as a research fellow and/or for work.

Overall, the Russian system of higher education is far from ideal. The students of leading higher educational establishments are overloaded with paperwork, their curriculum has a multitude of short duration disciplines, which they fail to master, and subjects, which are considered mandatory by state standards" [Vadim Radaev 2010, http://polit.ru/article/2010/09/14/uni/]. Consequently, it is required that the work system be change, but indiscriminately not by doing away with that which was created for decades.

In any case, to establish a modern university the higher educational institution is to be transformed to a

research university i.e. development of a research component not only at the master's level, but in the bachelor's program also. Eliminating rigid, educational standards imposed from above and individualization of the curriculum connected with the following renouncement; massive, at least to begin with, investments in human capital of the university and mandatory inclusion of the university in international professional community network.

Therefore, the proposed thinning out of RAS by the reformers by leaving the most competitive institutes and laboratories, where competitiveness is measured by publications and their citations, is an incorrect road map, if it is derived from the understanding of the functions of science [Kara-Murza, 2013].

These indicators play an important role and are needed as an auxiliary tool, but not as the main gauge, as offered in the following work:[Guriev, 2012]. There are no words to say that if two specialists, working on one and the same topic, are to be compared then their citation index, in a majority of cases, will adequately reflect their credits (if the factor of mutual citation inside the research teams is to be excluded).

However, it is true of the current system of grant making. The general planning of the research spectrum and distribution of funds are tasks, whereby the bibliometric parameters will not give correct answer, if removed from Russian interests.

If removed from Western interests, then that is

another matter. In this case, our scientists would fit into the popular research areas of the West, in order to reach the required number of publications and references in the western press and secure favorable opinions from international expertise.

It is not so important that it would not correlate with the requirements of a more backward Russian society and Russian economy. It is not important that the Russian budget be spent for supporting Western research and a technical sphere.

Aside from all of this, Hirsch index would be high.

Similar arguments can be made regarding the idea from the article [Guriev etc., 2012] about external independent expertise of all RAS institutes as the mechanism, alternative to assessment based on publications and citations. The idea is good... but in which cases are these arguments applicable?

Where appropriate out of five of the same types of institutes, engaged in one and the same areas, two are to be closed and three strengthened, in which case independent expertise may help.

If the case is about whether the given institute, which is the only one in the country that oversees some remaining areas, is to be retained, then the issue is not questionable.

If the scientists and their laboratories occupied themselves in going in a new direction, then not every external auditor would understand its importance.

Thus, the absence of consistency in analysis and

the wavering in the assessment of the role of science for the whole country, prior to analyzing the provision inside science itself, played a low-down trick with authors of reforms: criteria, which they propose, does not measure the execution of efficiency of its functions by science

They wrongfully took the thesis as the axiom: "more publications - more use" and "higher citation in international journals - better research", and now instead of the function "benefit for Russia" study the arguments "publications" and citations, making it the targeted parameter.

However, let us understand how they solved the task of assessing research by the criteria they suggested.

Can it be true that the age of
Enlightment is ending in Russiaa?

5. Analytical methods of the partisans of reforms

Actually, the bulk of work for analysis of the results of works [Guriev, 2012; Guriev and others, 2009; Gelfand and Livanov, 2011; Krushelnitsky, 2010; Krushelnitsky, 2010a] was made in the work [Kuleshov, 2011, 2013].

It was shown that information, given by the reform ideologues, allegedly revealing the falling productivity of RAS with respect to the resources invested in it, and its inefficiency as compared to institutional science of Russia and foreign scientific organizations, is misleading or incorrect. It does not reveal the true picture; some data do not contain explanations on the procedure of origination, and the conclusions downright conflict with reality.

In spite of this, the way of working with data and their interpretation exposed two years before are reproduced in the current argument of the partisans of reforms.

Unfortunately, the reformers themselves did not give an exhaustive reply to the criticisms made.

Justifying the reform ideologues before those, who defend the thesis about effectiveness of RAS, A. Krushelnitsky writes

[Krushelnitsky, 2010] that it is incorrect to consider, that RAS gets financing only from the Russian Government.

Actually, writes Krushelnitsky, since the joint articles of the Academy's staff with foreign scientists are written based on research, carried out *«at the experimental base of western colleagues*». Subsequently the Russian scientists carry home costly reactive, devices and programs in suitcases, then «if we want to take into consideration the articles and citations, which were received thanks to cooperation with leading western countries, it is required to take into account the funds that they invested in these Russian articles and citations».

In fact, it is quite difficult even to approximately assess it. But it is obvious that the western financing of the work of Russian scientists as a minimum is comparable with that financing, which they get at home, and most probably exceeds it.

Unfortunately, the author forgets his own disclaimer of the same paragraph: *«very often the setting of the problem, key solutions in joint research originates from the Russians, but at the same time the Russians almost always act as the poor cousins»*.

Nevertheless, why then does the author not add the *Soviet costs for training the scientists* to the western costs for these researches, from whom «the statement of problems and key solutions very often originate»?

If the reformers themselves assess publication efficiency of RAS in comparison with the publication efficiency of western research organizations then the same criteria shall be presented to both the objects compared!

«The statement of problems and key solutions» are similarly irreplaceable components of research data in experimental science, like equipment, research infrastructure and consumable materials; in this specific case, there is no basis to consider one of these resources as free of cost, and the other - not.

Most often, it seems that the «reformers» simply go in for destroying something at any cost. For example, they decided to

get rid of RAS pensioners (no matter how important their knowledge was for training the youth in conditions where the middle generation is absent) and are ready to use rent incomes from RAS property for this purpose.

They decided to commend publication activity of higher educational institutions as compared to RAS Institutes and at the same time forgot to compare the quality of publications by international citation indices etc.

The most striking instance is the passage from the article [Gelfand and Livanov, 2011]. «RAS is no more the absolute leader in the sector of fundamental research in Russia, as it was in the middle of the 1990's».

Currently the Russian Universities publish approximately the same number of articles, as RAS, overcoming almost the two-fold lagging for the past fifteen years (refer graph 1 below from the work [Gelfand and Livanov, 2011]). However, it should be noted that the overwhelming majority of these articles is published only by several leading universities, above all by MSU.

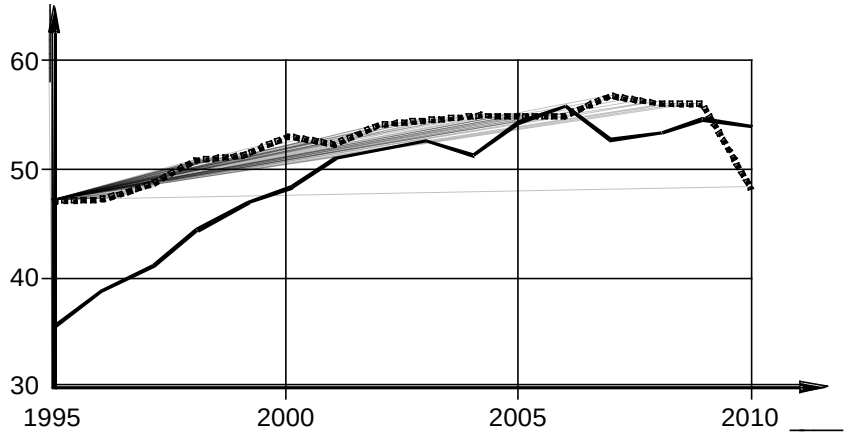
Despite the several-fold increase in financing in 2003-2008, the number of publications of RAS academicians stagnates around the parameters of the end of 1990's - beginning of 2000's. The result of ineffective management is the stable growth tendency of the «cost» parameter of one publication in the last years (refer graph 2)».

Similar ideas in the work [Guriev, 2013]: «For the last five years the number of publications is approximately constant, but financing is increasing. Correspondingly, the number of publications per Rouble financing falls».

The article [Guriev and others, 2009] says about the «increase in financial support of RAS by several times in the past five years» and it is underlined that the «sharp increase of RAS financing in the recent past has neither led to the increase in research efficiency, nor staff renewal».

Let us try to analyse these assertions based on Gelfand and

Livanov graph and diagram. Below is the graph, certifying about «overcoming of the almost twofold lag»:



Graph 1 from the work [*Gelfand and Livanov, 2011*]
Share of publications of RAS (dotted line) and universities (unbroken line) in the total number of publications from Russia (source: Web of Science).

проценты годы	Percent Years

Based on the graph it can be seen that approximately 36% of publications fall under the universities, and 47% fall under the Academy of Sciences. «It *appears* two-fold only in the graph, because the authors had drawn the x-axis through the mark 30%.

We even drop the issue that as shown in the article by Kuleshov, the calculation was incorrectly made: for example, RAS staff, who had published articles jointly with Ph.D students and employees of higher educational institutions and specifying only one place of work viz. higher educational institution, as required by grant financing etc., have not been taken into account. And this, according to [Onishenko, 2013], constitutes no less than 24% of Russian articles out of 49% of articles, published by the staff of Russian universities and research institutions of any

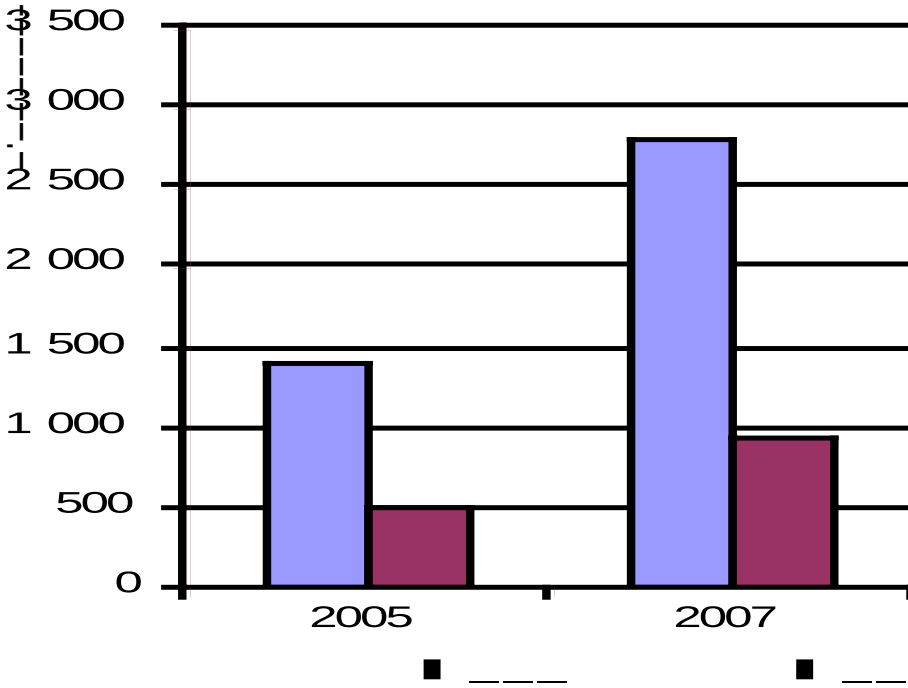
departmental affiliation.

(Primarily, MSU and St. Petersburg State University, other State Academies of Sciences, State Science Center and departmental R&D Institutes, National Research Center «Kurchatov Institute», Joint Institute for Nuclear Research, Ministry of Education and Science, Ministry of Health etc.).

How did the authors assess the spending behavior on the Academy?

As seen from the graph (refer graph 2 given below from the work [Gelfand and Livanov, 2011]), taking account of information on the stagnation of the number of RAS publications from 2005 to 2009, the financing of research had increased a little more than by two times. (It's not difficult to find that the total budget of RAS in 2009 constituted 60 billion Roubles, in 2005 - 20 billion Roubles, i.e. increase of 3.0 times). However, these data are incomplete without considering the dynamics of prices for specific costs of the establishment, and only then, we shall be able to assess, whether RAS used the same material and labor resources more or less effectively.

What is the cost structure of RAS?



Graph 2 from the work [Gelfand and Livanov, 2011]. Cost of one publication at RAS and higher educational institutions of the Russian Federation (source: «Science indicators: 2010», Ministry of Science and Education, Rosstat, State University - Higher School of Economics, Moscow, 2010).

р. за статью	RUR for article
годы	years
РАН	RAS
ВУЗы	Higher Educational Institutes

As of 2002, the current expenditure structure of academic R&D Institutes for job compensation and payroll charges in 2002 constituted 83%, and payment for utility services was 10%. [Dezhina, 2006, page 40, table 2.4.] In other words, in 2002 more than 90% of the Academy's expenditures were towards job

compensation, payroll charges and utility services. This number hardly had changed significantly in 2005.

What was this index on payroll and prices for utility services during this period? The salaries in the economy rose as follows: Average gross payroll in 2005 constituted 8,555 Rubles and in 2009 – 18,638 Rubles [On differentiation of payroll in the Russian Federation http://www.gks.ru/bgd/regl/B11_04/IssWWW.exe/Stg/d10/03-00.htm]. In other words, just for the sake that the appeal of scientific work did not fall as compared to other occupations, RAS was required to increase payroll by 2.17 times. In fact, the payroll part at the end of the 2000s constituted the same 80% budget of the Academy, i.e. Ruble growth of job compensation was approximately three times greater.

By maintaining the same staff strength, this allowed the Academy to slightly come out of the derogatory poverty of 90's, increase salary compared to other sectors by less than one and half times only. This allowed attract young scientists more than in 90s, but what is meant here, for example, is not about the possibility of increasing staff strength two-fold or bringing back the middle-aged employees, who had quit Russian science, from abroad or business.

It is how the consumer price indices appeared for housing and utility services (January to January of the previous year); Price indices hardly had differed strongly for the organizations.

Change in cost of housing and utility services for the period from 2006 to 2010

Year	2006	2007	2008	2009	2010
Change in cost of housing and utility services as compared to the previous year	126.54	115.01	114.79	119.02	115.08

Source: [http://www.gks.ru/dbscripts/cbsd/dbinet.cgi?pl=1902001]

It is not difficult to calculate thus that the prices for residential and utility services between 2005 and 2009 had increased two times. Such expenditures for transport and communications are probably less than for utility services; communications is far less than utility services. Since these articles of expenditures are of no great concern than residential and utility services, here the rougher estimate is fully admissible than for payroll.

Thus, the banal increase in prices for the main cost items of RAS «took a heavy toll» on almost the entire increase in financing.

If during one period the organization spent 83 of 100 Roubles received for salary and 10 for housing and utility services, then during another period (assuming the same expenses by volume) it spent 180 Roubles for salary and 20 Roubles for housing and utility services. Then for all the rest (repair, equipment, consumables, and work trips), in substance, more money 50 Roubles instead of 7 is available. Most of these costs have also become costlier for the period specified, although lesser than the work force and housing and utility services.

At the same time, it is required to take into account that the replacement of outdated equipment, which had not been renewed in the 90s, is an age-long and capital-intensive process, and it is not fact that the increase of financing would have at least compensated the outdated equipment.

As S. Kara-Murza writes, «Fixed assets replacement coefficient in the industry «Science and scientific services» in 1998 constituted 1.7% only as compared to 10.5% in 1991. In 2002-2004 this coefficient constituted 0.9-1%». However, the number of people occupied and consumption of housing and utility services at RAS could not increase even by 10-15%.

For the specified period, no integral multiple increase of resources consumed by RAS becomes possible except in

equipment supplies, repair and consumables!

Integral multiple is only one of the many factors of production, broadly speaking, does not give the integral increase of product. From the figures given by the authors, considering capital depreciation, it is impossible even to find out whether the objective conditions for the Academy had improved or deteriorated, information is insufficient!

There are no words, and all the articles of the reform ideologues unconditionally certify the requirement for immediate reform of national science. M. Gelfand, Deputy Director of RAS Institute for Information Transmission Problems, K. Severinov, Chief of Laboratories and receiver of mega grants, and D. Livanov (then) Rector of Moscow Institute of Steel and Alloys do not take into account the expenditure structure of R&D Institutes on assessing the dynamics of their financing. Then the management of financial flows to science is to be actually taken away from the unsophisticated scientists and transferred to the government Agency.

In this background it no more so important that (as Kuleshov rightly noted) the methods for which the authors calculated the cost of publications in institute science, raises additional questions. If it is to be taken into account that at the higher educations institutions in contrast to RAS the publications are auxiliary product along with education, it is difficult to separate the expenses for education from the expenses for scientific research in budget universities.

Unfortunately, the authors had not explained this and it remains their trade secret.

Thus, summing up: the list of claims, which are made to RAS by the reformers, are sufficiently comprehensive: Ineffective use of state financing, bloated workforce, absence of rating assessment of laboratories and institutes, wherein the reformers use the figures that does not always reflect the real state of RAS.

The devastating analysis of quantitative conclusions of the

reformers practically on all the claims to RAS was made in the work by Irina Victorovna Shulgina [Shulgina, 2010], Candidate of Economic Science, senior research fellow of the center of history of organizing science and science studies of the RAS Institute of History of Natural Science and Engineering, as far back as 2010.

Shulgina referred to the statistical factors of resource provision of RAS for 1990-2007. Three factors were selected as the resources provision factors: Numerical strength, expenses and fixed assets value.

It is very important that the researcher highlighted data for the state sector, which includes RAS establishments, from the total data file for science as a whole, and from them the development factors of the organizations of state administration bodies, characterizing the highest growth rates. (For the period 2003-2007 the number of scientific organizations in the management sphere had increased by 198 units, and RAS organizations only by 16).

Analyzing the quantitative (and qualitative, which the reformers do not do, is important) composition of the Russian science employees, and RAS Institutes in particular, I.V. Sheveleva argued against the first assertion of the reform ideologues that the fundamental science activity is in the state sectarian research formations. (R&D Establishment, RAMS, Russian Academy of Agricultural Sciences, Russian Education Academy, universities and organizations of administrative bodies).

The share of RAS employees from the total number of employees in science constituted 12%, besides these figures included *administrative staff of RAS and auxiliary and engineering services*. Besides, at RAS for 56,800 research fellows 40,200 other employees were employed, at the same time in the sphere of science organizations, subordinated to management organs, these figures constituted 57,700 (research fellows) and

71,800 (remaining employees).

Moreover, it should be noted that when it concerns R&D Institutes the non-research staff includes engineers and laboratory assistants.

(It should be noted that during the years when the number of people engaged in academic science reduced, the number of employees in the organizations, subordinated to the management organs grew steeply and without control) [Shulgin, 2010].

The analysis of the qualitative composition of RAS employees showed that at the RAS Doctors of Science there are 19% of the total number of scientists, Candidates of Science are 42% and research fellows without an academic degree are 39%. The sector academies have similar indices, and the lowest scientific level is characteristic for management research institutions: Doctors of Science are only 5% of the total number of research fellows; Candidates of Science 18%, research fellows without doctoral degree is 77%.

An important factor for provision of scientific activity in the country is the average annual cost factor for one research fellow: At RAS according to Rosstat data it constituted 780,000 Roubles (approximately 25,000 Dollars) in 2007, and in management sciences, which is supervised by the Ministry of Education and Science, this factor had attained 36,000 Dollars.

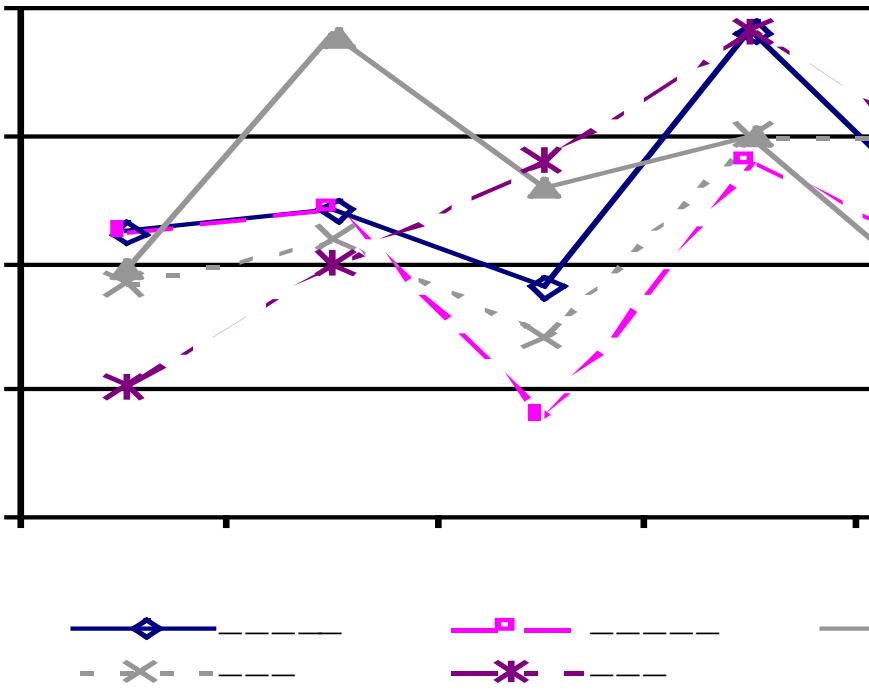
Given that more specialists with higher qualification work at the Academy of Sciences, it means that on the one part the funds for management sciences are spent ineffectively, and on the other part *fundamental research, conducted by RAS, is clearly not sufficiently financed*.

From this point of view, a univocal conclusion is made in the work of I.V. Shulgina: from the economic viewpoint, the effectiveness of RAS is quite high.

Moreover, Shulgina showed the presence of a clear trend for slender rejuvenation of the Academy, exceeding the statistic error: With every passing year, young scientist join the Academy of

Sciences, although, as before, there is a demographic hollow of middle-age research fellows in the age category 30-49 years. Although many scientists in the age 50-70 years remain in the Academy, on the other part, in the last decade many young scientists in the age group of up to 29 years have joined it.

For all the reform ideologues say, the level of science in Russia continues to remain at a sufficiently high level, comparable with the relation to science from the part of authorities: Government has nothing to offer RAS, except a small share in the budget and calls for reduction in strength as it is. *(Simultaneously the financing of bureaucrats from science and their quantity is continuing to be increased).*



Age distribution of researchers at the state academies (as

percentage of the total number of research fellows)

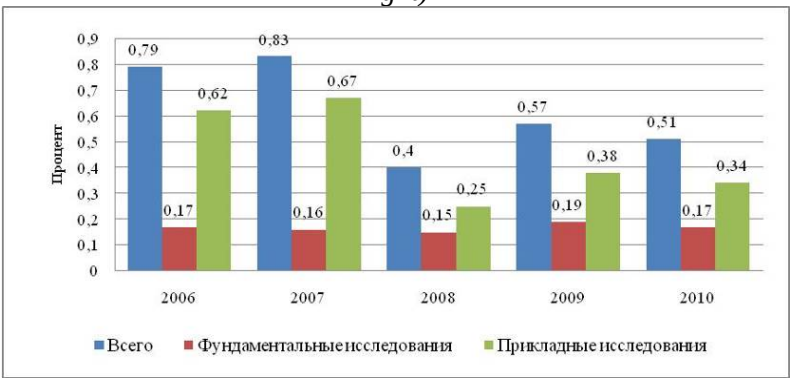
До 30 лет	Up to 30 years
Лет	Years
Более 70 лет	More than 70 years
РАСХН	RAAS (Russian Academy of Agricultural Sciences)
РААСН	RAACS (Russian Academy of Architecture and Construction Sciences)
РАМН	RAMS (Russian Academy of Medical Sciences)
РАН	RAS (Russian Academy of Sciences)
РАО	RAE (Russian Academy of Education)

Indeed, official statistical data completely confirm the conclusions of Shulgina and does not confirm the alarmist declarations of reformers. The analysis of age distribution of all the research fellows gives considerably uniform picture for all the academies. The «Double peak» distribution with «dip» in the age interval 41-50 and peaks of scientist strength 31-40 and 51-60 years, related to mass exodus and insufficient inflow of young specialists to science on the whole in the beginning of 90's, is traced practically at all academies. (The situation is a little worse at the Russian Educational Academy, Russian Agricultural Academy and Russian Academy of Architecture and Construction Sciences, it is better at Russian Academy of Medical Sciences).

Analyzing the government's expenditures overall on science and RAS in particular, I.V. Shulgina showed that financing of the Russian Academy of Sciences does not exceed 12% of the total budget resources, allotted for science in Russia. Besides the author had discovered an interesting dynamics: For ten years, the financing of RAS had increased by 3.2 times, and for research organizations in management sphere by 3.5 times.

A careful examination of statistical data dispels the myth, actively manipulated by the reformers, about the allegedly huge amounts, invested by the government in academic science. It should be noted that overall, the government saves on science, the share of domestic costs for research and development in GDP of Russia during the past years remains very low and constitutes 1%, whereas in Great Britain it is 1.8%, in USA 2.7%, in Japan 3.5%.

Gross added value of high technology sector products to costs for research and development, times (columns to the left) Per capita costs for R&D compared to costs in Russia (Russia = 1, columns on the right)



Allotments for science from the Federal budget resources of the Russian

Federation as percentage to GDP

Процент	Percent
Всего	Total
Фундаментальные исследования	Fundamental research
Прикладные исследования	Applied research

One of the examples of incorrect information, propagated by the reformers is that «the government had increased financing of science by ten times, but the number of articles, published by RAS staff in the international science journals, had not increased».

The deception of the assertion consists in that practically the increase in financing had been for Skolkovo and creation of new federal universities (one university at Russky Island costs so much).

The financing of RAS has practically not changed, as we had already written about it, if the number of articles had not increased then all claims are required to be addressed to the reformers themselves. Skolkovo and the federal universities and research and development establishments are located under their supervision.

6. Other proposals on reforms

Overall, an impression is created that the ideologues of RAS reforms in their works do not make complete and above all a true analysis of the existing situation, but look for arguments on the out of box solution made in advance.

For example, as we had already mentioned, they had decided to get rid of pensioners at RAS, allegedly preventing the development of Russian science. For this, they are ready to use rental incomes from RAS property, without analyzing the alternatives for using rental payment, nor the importance of elders for bringing up the young scientists in conditions which infer the absence of the middle generation.

Here we see the obvious manifestation of *non-economic approach*, correlating the objectives, results and costs, and Soviet practice of «resolving immediate task of the party at any cost».

What additional measures do the ideologues of academic reforms offer?

Among them, [Guriev and others, 2009; Gelfand and Livanov, 2011] for example is the:

- Accelerated removal of elderly staff members through an increase in research pensions;
- The execution of open contests for filling research positions;
- Prohibition of «academic incest» viz. hiring of their trainees by scientific units;
- Support of geographic mobility of scientists

through «travel grants» and provision of housing;

- Staff rotation at administrative positions;
- Transformation of RAS from the «Ministry of Fundamental Research» to «Scientists club».
- Transition from the primarily estimate financing to the primarily grant financing;
- Creation of the system of independent expertise, including, international;
- First stage of reforms is the audit of research and staff potential of RAS Institutes, segregating the competitive among them, who shall get the non-competitive grants;
- Second stage, simultaneously with the transition to predominantly grant financing,
- *Gradual transfer of the best laboratories under the jurisdiction of Universities;*
- Transfer of collective bodies, buildings and property of Institutes to Universities or on the contrary, transformation of R&D Institutes into master's and Ph.D. universities;
- Accompanying reduction of the teaching load on research teaching fellows.

Two general observations on the points listed:

1. Universal rationale of the specific measures has been taken out by the authors from flawed indicators, inconsistent statistics and gives incomprehension of the present purposes of science. This we have already investigated.

2. Totalitarianism is the motivating force behind the authors. In reality, in certain cases each of the measures proposed can be rational, but why make it compulsory for all? Let us say, some dedicated R&D Institute or laboratory can be subordinated to the University and thus compel its researchers to bring greater benefits to the role of lecturers, and at the same time ensure the inflow of a fresh staff derived from the student body.

However, in many cases, the academic R&D Institutes and Universities are integrated due to informal relations and job combinations, so that the *division of R&D Institutes by different universities is unreal.*

Thus, it can be seen that the hiring of their own trainees by the research divisions, is given the epithet «academic incest» by the authors who make negative associations. On the contrary, in other cases, when the organization is strongly oriented towards effectiveness by some other stimuli, this reduces the transactional costs. (this is translated as the loss of rights of academic R&D in Ph.D. Institutes for, stipulated in the draft law, which is entirely scandalous).

The reform program, whose first outlines are seen in the above mentioned articles with the participation of the future (then) minister, wrapping anything and all in science under the allegedly generally recognized and only possible criteria, related to publication activity and citation. The authors somewhat acknowledge that not everything is reflected by these criteria. However, they

immediately forget about it, and comparing the efficiency and competitiveness of different forms of organizing science, and are inclined to consider the assessment only by this criteria.

The result has been given in advance concerning such an approach, however much the publishing functions of science deviated from those functions for which science is needed for Russia. As such, it is seen from the articles written that the authors are simply substantiating the direction of given reforms given in advance.

It is obvious that the intention of the reforms is based on erroneous ideas about the functions of science, and on incorrect purposes selected and unsuccessful criteria.

On the completion of the reforms, if they take place according to the scenario planned by the ideologues, in reality, will be many competing «small and sharp» scientific organisms, *affected by those measures, which the reform initiators had given*. (Although during the reforms several research schools shall fall the inevitable prey, new international level groups shall appear).

Nevertheless, the conformity to the interests of Russia on the part of fundamental science performing its functions with such efficiency can be considered to be less significant than had the existing system been preserved. The effective research teams will preserve only that part of the spectrum of fundamental knowledge

required for Russia.

One of the unsuccessful traits of the new structure of science can be thought of as the proposed disintegration of the RAS system by the reforms.

Instead of the vertically administered structure, whose administration can in special cases mobilize different subdivisions for vital mega projects (similar to the development of atomic bomb) or even simply help the client-government to distribute application research to the Institutes existing in smaller projects. Because of the reforms on the ruins of RAS a lot of competing research teams, engaged in writing articles in their speciality and barely considered to be subject to inclusion in resolving global tasks of the country, shall remain.

It is not clear whether the new managing Agency of research institutes competently take over this function from the Academy.

The transformation of RAS to «Scientists Club» carries additional risk viz. loss of authority of scientific expertise on entirely univocal issues, related to core sciences.

If as of now many technical projects can be «axed» at RAS structures at the theoretical stage of examination or taken up as consultation by theoretical scientist, then with the loss of authority, capable of giving the final opinion in technical expertise in application science and experimental design works for verifying hypothesis experimental work shall have to be

added. R&D in the country shall become more costly.

If, for example in the economic policy there is an inherent uncertainty, related to complexity of the system and relative immaturity of economic science, then it is entirely unnecessary to artificially create the same situation in natural sciences, implanting pluralism in physics and chemistry.

Moreover, it is not very clear why the reformers have got so concerned with RAS, where only every tenth scientist works at the Institutes viz. 40,000-50,000 researchers out of 400,000-500,000 in Russia?

The tendency followed in the second half of 2000 could have been continued allowing RAS to remain (part of the academy) an island, working on other principles rather than on the remaining research structures. However, the reformers took up the rest downright not achieving the obvious success in the first initiatives.

In the article [Gelfan and Livanov, 2011] the following argument is made in favor of it: «On the other hand, as shown by the past years experience, reform of science cannot lead to simple transfer of basic financial flows from RAS to the universities and the so called national research centers (NRC). The only operating center at present is Kurchatov Institute (author). Since in this case the same tendencies inclined towards inefficiency, non-transparency and corruption is reproduced. The reform should be systemic to be successful».

As noted in the Report to the Council under the President, in 2013 the Russian Academy of Sciences shall get 62.6 billion Roubles for fundamental research, the Russian Academy of Medical Sciences shall be granted 14.8 billion Roubles in 2013, the Russian Academy of Agricultural Sciences shall get 7.7 billion Roubles, and the Ministry of Education and Science - 21.2 billion Roubles. (These funds shall be distributed under the Federal Target Program), R&D Center Kurchatov Institute - 1.2 billion Roubles for fundamental research and 6.5 billion Roubles for applied research.

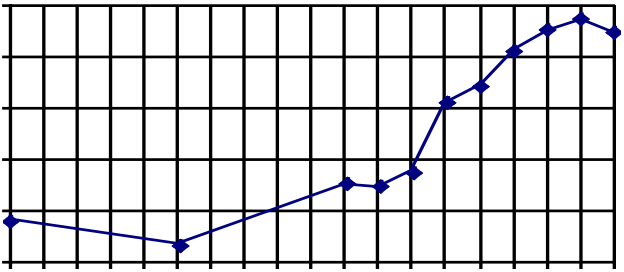
Finally, the Skolkovo Fund, which is considered as the receiver of funds for «research» and financial developments and some research projects, in reality does not get funds from the research budget items: 23.5 billion Roubles in 2013 shall be received by this fund under the item «other issues on national economy».

Thus, de facto, within the limits of the same financing item, *it suddenly turns out that financing of RAS not only grew and grew from year to year, but the shifting of major financial flows from RAS to the universities and R&D centers took place in full.*

It is not clear, how the Academy of Sciences comes into picture for inefficient spending of resources by the Universities, which are subordinated to the Ministry of Education and not to RAS?

The complaints of reformers [Guriev, Livanov and Severinov, 2011] reminds us of the statement of M.S.

Gorbachev, given in the book of Victor Afanasiev «Fourth power and four general secretaries»: «We initially placed the stakes ... on scientific and technological progress, but the mechanisms of its implementation failed to become activated. We took up the reforms of economic mechanisms, but it was interlocked. Then the idea of political reforms appeared …».



Dynamics of budget financing of science in 1995-2013, (all data given in 2013 prices)

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Did the sharp redistribution of financing to the Universities lead to their surge.

International rating of universities (2011/2012)

Position	***University***	***Country***	***Rating***

1	University of Cambridge	Великобритания	100
2	Harvard University	США	99,34
3	Massachusetts Institute of Technology (MIT)	США	99,21
4	Yale University	США	98,84
5	University of Oxford	Великобритания	98
6	Imperial College London	Великобритания	97,64
7	UCL (University College London)	Великобритания	97,33
8	University of Chicago	США	96,08
9	University of Pennsylvania	США	95,73
10	Columbia University	США	95,28
112	***Lomonosov Moscow State University***	***Россия***	***61,28***
251	***Saint-Petersburg State University***	***Россия***	***41,06***
389	***Moscow State Institute of International Relations (MGIMO-University)***	***Россия***	***30,09***

400	***Novosibirsk State University***	***Россия***	***29,25***

In Russia, it is required to change the system of higher education, and this costs money.

The President of our country declares quite well-deserved ideas on modernization of higher education and that the investments in education should become the key budget priority of the country, since this is «not only training personnel for the economy, but also the most important factor of social development of society and the formation of values uniting us».

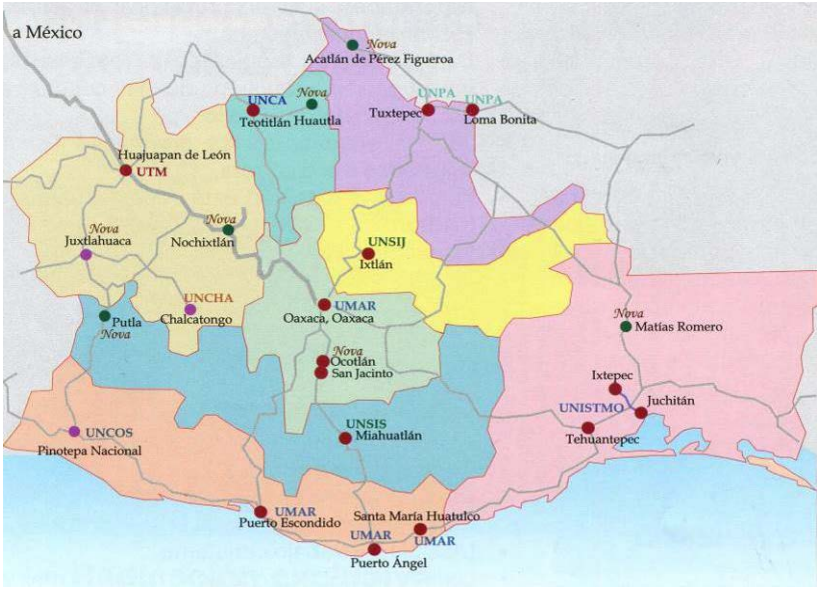
However, for now it is only a declaration.

For now, we cannot afford to convert the Russian Universities to Cambridge, Harvard, Stanford or MIT. Could it be that we need not hurry?

Maybe, there is not much point in endlessly multiplying large Federal Universities (although in some cases this idea does seem dubious) and close the remaining higher educational institutions, but think, on the other hand, about decentralization of higher education, as they successfully did in Oaxaca the most poor state of Mexico [Seara and others, 2012].

Although, of course, the experiment made in Mexico is an educational project rather than a research and development project. The synergistic effect, requiring spatial juxtaposition, for considerable engineering advancement. (Besides, economic clusters develop, only, when the distance between the elements

does not exceed 50 km. [Porter, 2005, 2011].



The system for the national universities of the state of Oaxaca was built in the form of clusters of 18 small narrowly-specialized research universities all over the state's territory (points on the map)

In addition, one would ask oneself, why the activity of further school reform should take place by destroying academic science, and not by parallel development of research universities?

As Professor Alexader Rubstov, head of the Center for Research of Ideological Processes of the Institute of Philosophy RAS, wrote in the Novaya Gazeta: «Science is in crisis, due to the «historical moment», and the

authority itself with its vulgar policy. The scientists are in crisis and apparently only partly so, and not even in the first instance. If the full strength of U.S. universities were to be carried over into our situation, after six months more ruins would occur.

In this situation it would be rational to not make abrupt movements and preserve for other times the greatest amount of that which can suddenly play a role in the near future. This is like it is with ecology when the species are preserved out of principle, and not for benefit.

Additionally, it is required that we be careful with our methods for performance assessments which by itself is a challenge, including scientific (meta-scientific) performances. Nevertheless, in our country (reformers and editors) want to accomplish a feat equal to building the collider in a year, partially catching something from nuclear physics and assembling detectors from the wreckage of the cycle completely invented.

Ekaterina Dashkova large gold medal

Ekaterina Dashkova big large gold medal

7. Behaviour of reform opponents and current debates

Regretfully, the position of the opponents is even worse than could be believed expected. This is due to the way it was addressed by the reform opponents, however right or congruent they were in private criticism of its conductors, *they are extremely non-constructive*: they clearly are incapable of proposing their alternative vision of the problem and their plan for RAS to adapt to the new conditions.

Ignoring the invitations of the authorities to have a dialogue concerning the reforms, the Academy and its members had maintained silence for a long time, limiting themselves to private comments, without offering comprehensive competitive concepts, but the waiting is over with. In spite of the intellectual potential, with which the capacities of reform ideologues are simply disparate and, this constitutes the defeat of the Academy, and it is in itself to be blamed for it.

For example, those opposing the authorities presented very strong arguments. It is therefore that many functions of science are not reflected by the publication activity and citation indices.

Hence the transition from budget financing to grant financing with competition for the grants, based on publications and citation, will lead to the loss of the functions of science which are important to the country. Moreover, the selection of lines of action according to «international recognition» in principle is dangerous. They are right on this count.

Nevertheless, they have not to this day found valid alternative proposals, where it could have been what was reflected on was how to effectively organize the island of science, which is alternatively regulated, what and also determined was which alternative indices are required in general, apart aside from publications and citation, etc.

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They did not have the courage to expressly declare that the universal indicators are not possible and it is required that a complex institute be established, selecting indicators which depend on the specific tasks set. Thus, it would have been necessary to show the top leadership, how their proposals for restructuring science are tied to the functionality of science in the interests of Russia.

The authorities do not pay attention to the critics as they had not proposed even a single alternative index of science efficiency, nor did they explain with sufficient clarity, why the alternatives which they proposed would be better.

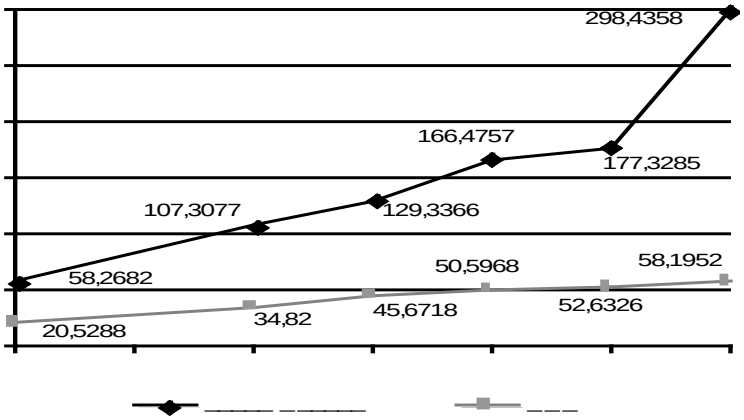
When at last on April 25, 2013 V.E. Fortov, the candidate for the President of RAS, published «Basic directions of development of the Russian Academy of Sciences», though no specific proposals were made except regular requests to assign the reforms to the Academy itself (which was a breakthrough in itself) as well as cautious complaints on the shortage of financing

RAS (that also corresponds to reality):

«The Administration of the Academy shall assist in the active participation of Institutes in implementing the national scale programs and projects, taking up the initiatives and responsibility for their development, qualified independent expertise, and analysis of the process and end results of their implementation. An illustrative example are the large-scale programs for the development of medicine, nano-technologies, power engineering, aviation, space etc. It is difficult to assess the role, which RAS is to play in implementing the national educational projects.

Unfortunately, the degree of our Academy's presence in the generation and, the implementation of such large-scale projects and initiatives of the country's top leadership is inferior to its capacities. Consequently, the redirection of marked financial flows to the educational as well as other structures alternative to us.

Whilst financing of RAS in recent times remains at almost a constant level or even decreases taking into account the inflation on the background of exponential growth of financing science in the country (see figure below) up to 2015 the Government does not stipulate an increase in financing of RAS». Nevertheless, the figure (see below) given in the report of V. Fortov is undoubtedly interesting.



Financing of Russian science (overall) and RAS (in particular)

млрд.р наука России РАН годы	bln. RUR Russian science RAS Years

Why the Russian officials adopted the reformers' program is quite plain. They «drew» a simple and clear formal diagram, allowing the bureaucrats, without going much deeper into the scientific subtlety, to separate the «deserved» science from the «undeserved», distributed funds consequently resubordinate and liquidate scientific organizations.

However, it is also understandable, why the Russian authorities did not embrace the opponents' view. They did not propose another scheme for the selection of priorities, lest even more complex. The same Kara-Murza in his report, developing a convincing theory, rejecting the reformers system of indicators, and only began to approach the idea that the resources are limited. Consequently, to have one research group for each narrow topic in modern science is not possible because the topics are infinite in numb

Thus, some mechanism for the selection of priorities and

the rejection of the unimportant is not only required, but inevitable. Not expressing his proposal directly, he began to give examples of the Soviet state of affairs that science was in: «Now, by studying the scientific edification in the USSR during 1920-1930, we can observe an import feature, which our scientific policy had lost, unnoticed in the 1970's. It consists of the fact that the funds allotted for construction were not in any way connected with the indices, which existed in developed countries. The funds were allotted based on those tasks, and resolving them was imperative for the survival of the country. By the second half of 1918, the scientific institutions were assigned funds 14 times higher than in 1917. The costs for scientific research in the second five year period had grown 8.5 times as compared to the first five year period, and the expenses for scientific equipment had increased by 24 times.

The scientific community (represented by leading scientists) and planning bodies of the government defined science by the scale and structure required in particular for our country viz. based on the threats and development tasks and in particular on the long-term horizontal planning considered. This was a rational approach, whereas the approach adopted after 1960s and surviving today is irrational…

The USSR scientific community could have allotted a group of prestigious scientists, eloquently explain to the authorities where the strategic requirement of the country lies for one or other scientific programs, in spite of the outer «inefficiency».

Apparently, the main idea of the author is in the

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reproduction of this Soviet system. Within its framework, declares Kara-Murza, will be the inevitable triumph of wilfulness viz. adoption of the required resolution by the higher-ups each

time concerning the new criteria, and considering this is correct. He writes, «Selection of scientific directions is a major operation, science acts as one organism. For any large scientific engineering program (like the space program), support of practically the entire scientific front is required. Any active policy with selective distribution of resources will inevitably contain a large share of wilfulness , but in these conditions it is a lesser evil than inaction. Moreover, this program shall be complimented by measures meant for preserving the cultural medium for the reproduction of science in the next generation, aside from supporting active scientists with grants etc.»

It is clear that neither the President V. Putin, nor Minister D. Livanov, having read the similar brief, shall never suggest that the author participate in the development of reforms, even if the latter, are basically correct.

It is a pity, hardly anyone of the reform critics noted directly that the choice now is between the «generally world accepted » simple and clear algorithm of managing science, *convenient and prestigious for the state apparatus, but less useful for Russia*, and the more complex system of institutes, binding the functioning of science to the country's requirements with flexible and ambiguous connections, which for specific management solution will spill over into actions that shall not be subject to algorithmization and indicators established in advance, and are in essence, «wilfull ».

Unfortunately, there are no clear tasks before the country today, which would have indicated to RAS management the desired direction of development, correspondingly, the reform directions are not clear. The responsibility of the sole head of RAS to the supreme authority is good, if the authority, would at least give the head approximate criteria that would have instructed him adequately to perform the required functions.

It is characteristic that other critics of reforms, to whose materials we referred to [Gromkovsky, 2013], in the end came to

the conclusion that the wilful definition of the principles of reforming RAS by the leading scientist and his team, was acting on direct instruction from the supreme authority. It is obvious that the supreme authority of today simply cannot understand such point of view.

Moreover, for the bureaucrat to follow wilful criteria, and not the given clear algorithm, especially in the context of the anti-corruption campaign is a sure-fire way behind bars. It is in vain that the current state apparatus take up RAS reforms now in particular: it would have been expedient for it to not touch the system by its own initiative and leave the management of academic institutes to the management of RAS.

It is difficult to understand, to what extent the outbreak of the scientific community, expressed after the publication of the draft law, or if this helped the case. Of course, on the one hand, it helped in applying the brakes on the most radical version of the reforms, and in all likelihood, will facilitate its correction. (http://wiz-aut.livejournal.com/17121.html).

S. Kara-Murza wrote about the reaction of the public to the reforms: «intelligent public is overfilled with emotions, which as long-term experience demonstrated, do not have the chance of outgrowing constructive deductions. This failure occurred long before i.e. during the Perestroika period it was already found to be the phenomenon of mass culture. However, three generations had already risen but with no normal restoration of connections in thought. As a result there was a degeneration of the political system. Some noise is made on the net, sometimes people go to gatherings concerning this, but they cannot formulate an orderly strategy, which would draw the authorities into dialog.

The scientists brought the «coffin of Russian science» to the Academy of Sciences, stood with it and went home. Well what is this! The speeches of academicians at meetings only raise eyebrows. All lead to the fact that Peter I incorporated the Academy and there is no need to touch it. They neither distinctly

talk about the irreplaceable role of this sick Academy, nor about those changes, which the scientists themselves propose for adaptation of the Academy to felt needs, not similar to the times of neither Peter I, nor Stalin, nor Brezhnev. Both the authority and academicians are equally inadequate; there is no mention about the population».

Thereby, it would be acknowledged that the reform opponents are in an unequal, disadvantaged position. It is not understandable how the reforms are criticized, *if now its ideologues themselves disown the draft law, which completely was confined within their concept* and were called upon to implement it, and conceptual materials, implementing them shall become utterly simple after adoption of the proposed law, as if they were not the official documents.

Broadly speaking, the situation reminds us something of the efforts of economic reforms in the later Soviet era. When the desperate communist retrograded to the end and torpedoed any attempt of not even full-fledged market reforms, but controlling the prices, which represented the real «kingdom of distorting mirrors», and as a result they dragged this into that era, when the liberalization of the economy could not but take place along the most painful of paths. The responsibility for the failure of the 90's lies not only in the Gaidar reformers but also with those who till the end held on to the «charm» of socialism.

If because of reforms of the state academies of sciences that research is degraded of the guilt for this shall lie in the current reform opponents, who do not want to enter into dialog with the authorities and propose their alternatives.

In other words, because of the reforms, the new RAS shall become an administrative and command structure, but once again, the administrative mechanism of science development in Russia misfired and that has been acknowledged by the Minister Livanov in the report to the Prime Minister of the Russian Federation. *«In principle the draft law does not start the reforms of scientific*

activity because the document is taken considered in such a short period of time».

The declared objective to multiply the potential of RAS by merging the three academies did not gain support either from the academic elite, nor from the professional scientific environment.

«The academicians, scientists, doubted such a simple resolution of the global problem of uniting scientists, working in one scientific area, and the expansion of the spectrum of interdisciplinary research, as the most prospective form of scientific knowledge» [Sergeev, 2013].

Besides, the failure of the «Skolkovo» project, built without legal foundation of innovations and technologies by the same people, who today lobby the conduct RAS reforms, forces to doubt the success of such a decision.

Therefore, the scientists prepare their amendments to the law concerning RAS reforms. They do not want the right that the Academy has to disburse funds be given to the bureaucrats and they fear that the reforms shall kill the «oasis of freedom and democracy».

As a result of the hard-line response of RAS scientists («Letter of Seventy Scientists» and others), the draft law on reforms of the Russian Academy of Sciences changed for the better, but as before it is not accepted by the academicians,

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declared Ruslan Grinberg, Director of Institute of Economics RAS, correspondent member of RAS. R. Grinberg placed emphasis on the following «in the entire civilized world it is perceived that the results of scientific research can be reached only by the scientific community», and not bureaucrats, even from the Ministry of Education and Science.

«RAS always was the oasis of free thought and democracy in the country, and it will be very sad if this oasis should disappear, and it will be sad indeed for all. Here such a political part of the case is important, after all we are building a civilian

society, we have a large deficit of democracy, but it should not be magnified», he emphasised.

In turn, Nikolai Shmelev, Director of the RAS Institute of Europe critically spoke out about the reforms of the Academy: «I am categorically against these reforms. I think they started it not from that end and not for that reason. All these rebukes on inefficiency etc. are a smoke screen».

According to R.Grinberg, the Academy of Sciences annually creates a whole series of amazing scientific results: «Our problem consists in that we have a lot of reserves for which there is no demand in our own country. Because in reality the results of scientific activity are used in practice only then, when there are companies, for which the use of these results are the means for a competitive struggle. One cannot demand from a scientist that he discover the product and put it into practice.

Incidentally, the first sample of graphene (for which Andrei Game and Constantin Novoselov won the Nobel Prize) was made at the Institute of Solid-State Physics of RAS in Chernogolovko, and not in the West. What happened that the discovery came to life in the West is not the fault of the Russian Academy of Sciences but of the government, which did not see and did not want to create conditions for research work and the implementation of the results of young scientists.

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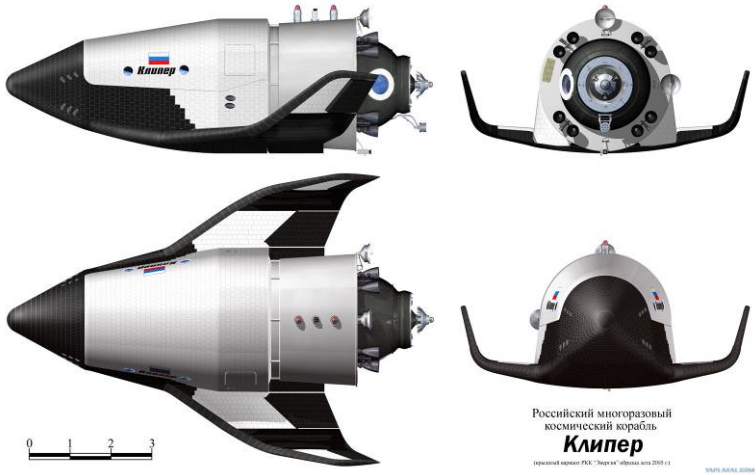
N.B. Incidentally in the West today there are enough problems in science: the prestige of scientist has fallen in developed countries. The work of a scientist, be it that of a philosopher or natural scientist to a considerable extent has become a trade.



New «successful ventures» of RAS - reusable space shuttle «Clipper»

Space suits for the project «Mars-500»

As the Nobel laureate, Andrei Game (incidently, one of the champions and defenders of RAS reforms): said in his interview : «People gradually stop to assess what the industrial revolution and science, which was behind it and which was brought to us.

Behind our modern technologies, computers, phones and new cars are the scientists, who in the beginning of the last century, conducted research on the properties of solid materials, quantum mechanics, and then all these grew into transistors and have been transformed into the fact that our modern society is based on silicon technologyYet, nobody can track this chain.

There are even many scientists who do not know that the system of satellite orientation GPS without two theories of Einstein viz. Special theory of relativity and General theory of relativity, cannot function. If the corrections of Einstein are not taken into account then GPS shall show that you car is several meters away from that place where you actually are.

Nevertheless, western scientists sharply react to that taking place: agreeing with the reformers about the necessity of reforms at RAS, they nevertheless are sure that the scientists themselves will engage in the reforms of science and its management, and not the bureaucrats who understand little about this problem.

«These are unprecedented reforms by due to hastiness and scope. It is positioned as the government's initiative, although there are strong signs indicating that its true authors are the staff of the President's administration», it is said in the article of Pilar Bonet [Bonet, 2013] from the Spanish newspaper El Pais. – According to Academician Fortov, President of RAS, there are even arithmetic errors in the draft law».

«The Academy acknowledges the need for reforms, but the planning, secretly carried out by the government, aroused deep doubts regarding the true purposes of the initiative. Especially if the precedent of the Ministry of Defence is to be taken into account, where the authority for property management viz. Rosoboron service was setup, which later was engrossed in the scandalous transactions of privatization». It is said in the article - Some academician in the open letter had named the reforms «destructive» and declared that this is an attempt to shun liability for skittling away budget funds and failing to succeed with the

projects «ROSNANO» and «Skolkovo».

S.I. Vavilov RAS gold medal awarded since 1952 for outstanding works in physics.

8. Probable consequences of reforms

How will the current standoff end? Of course, the RAS reforms are unavoidable due to the mismatch of forces «for» and «against» reforms, due to the support for reforms by the top leadership. Nevertheless, should it take place according to the most inadequate scenario, drawn by the reformers? Maybe, the time gained by the opponents by the reforms will assist in clarifying the topic by the country's top leadership in so far as finding a more radical trade-off alternative and uniting the positive ideas of the opponents. On the other hand, taking into account the non-constructive attitudes of both parties, they will pound one another until they annihilate each other, and because of this battle, will the worst ideas of both sides be implemented?

Nevertheless, it seems that the most probable scenario will occur when the main idea is gradually implemented, where by it becomes simpler to execute due to absence of resistance. The leading and successful scientific organizations shall be somewhat integrated with the universities or shall acquire the status of educational institutions, obviously the rest shoud succeed in running into the shade of the industry ministries or itwill be liquidated without visible damage.

All «intermediate» cases will be postponed until the lessons of «extreme» cases are not clear: It will not be possible to

overcome this standoff at once. Possibly, the most radical version of reforms was proposed in the beginning to make the academicians accept the compromised version with considerable gratitude. The most controversial ideas shall be removed from there: for example, the current institutes shall be financed through grants of 45% and not 55%; RAS structures shall as before de-facto, recommend distribution of the cost component of financing.

The required corrections shall be made to the reforms after several years, after the clarification of the results. One should not exclude that the reforms should be carried through in some modified form, and damage from this shall be far less than what the opponents promise.

We saw this in the case of agriculture, which in general and as a whole, for the last decade, was quite successful. Alternatively, in the example of the housing and utility services bubble, which has not burst until now in spite of the catastrophic warnings of several publicists. The years go by; we become older and see that the reformers were right in part. Many spheres were restored or became better after the transition period, while others did not.

The main hope in this case is the unavoidable adaptation of living systems (Russian high science is such an example) to the changing realities, an example being the general patriotic disposition of the scientific community, consequently the result of which shall differ from the initial structure of the reform ideologues for the best.

The movement of reform opponents towards the authority has started: The Coordination Council of the St. Petersburg Union of Scientists, on July 29 2013, published the «Concept of RAS reformation» in the newspaper «Troitsk version online». There the proposal for discussing real reforms of the Russian Academy of Sciences was stated in detail in the interests of Russia and scientists working there, and not the pseudo-scientific bureaucrats [http://trv-science.ru/2013/08/06/koncepciya-

reformirovaniya-ran/].

As written in the preamble to the document «This Concept formulates the basic provisions of these in RAS, which during its implementation could have led to significant progress in the development of fundamental science in the country. In contrast to the notorious Law No 305828-6 « Pertaining to the Russian Academy of Sciences, reorganization of state academies of sciences and making amendments to separate legislative acts of the Russian Federation» discussed in the second reading.

Its adoption as the basis by RAS scientists and management allows first to overrule numerous accusations that RAS management is against true reforms and only strives to maintain status-quo, using state property for this purpose.

Secondly, this concept allows a comparatively easily way to work out such amendments to the Law 305828-6, which shall give a real and positive effect to the development of both science and the country.

The Concept provided is the first more or less productive and serious document, proposed by the reform opponents. However, without analyzing the advantages and disadvantages of the Concept, we are forced to find it deplorable that this document most likely will probably not only be adopted but even discussed by the Government.

Can we also try to propose an alternative program for reforming fundamental science in Russia or, more narrowly, the system of RAS?

Reading the arguments of the supporters and opponents of reforms, we unwittingly conclude that our ideas can be as good as theirs.

As it seems to us, two alternative programs of reforms are possible.

The first is that, which starts from the current situation (before the reforms), and the second is that which starts from that position, which shall exist after several failures of the reforms

started.

Of course, the first program is of pure theoretical interest, since the situation, for which it is designed, shall continue for a maximum of a year or year and a half: Reforms, whose beginning shall take place according to prepared patterns, are overwhelming and shall lead to irreversible change in the situation.

Nevertheless, if RAS reforms are to be made, starting from the current situation, then it should be started not from the Academy, but from the environment surrounding science.

In the beginning, it is required to make modernization and innovations at all sections of the economy more profitable.

It is required to recreate the state industry science and induce Russian companies to create their own R&D departments.

It is required to strengthen the intellectual provision of management solutions, taken by the government authority and the management of companies and stimulate them often to take to the expertise the solutions found.

Application tasks are required to be put before the specialists of RAS for resolving tasks vital for the country in the specific specializations i.e. parallel to their basic activity for «satisfying self curiosity at the government's expense» in fundamental research.

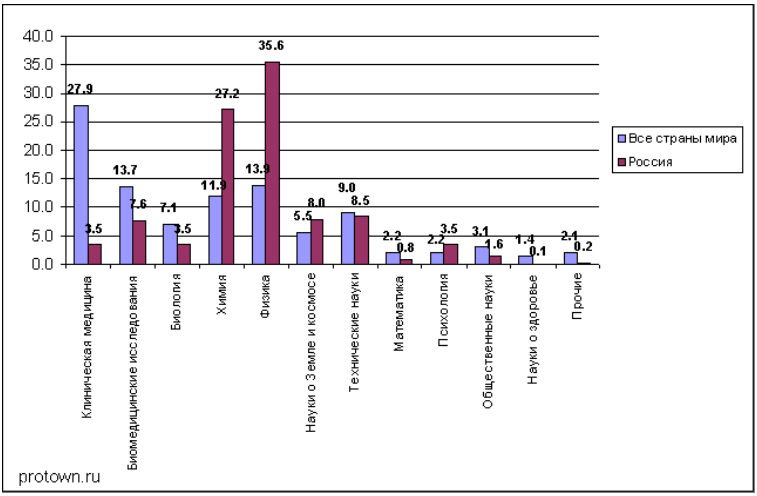
The rampancy of quackery and obscurantism in mass media shall be ended, the scientists must be attracted to educating and popularizing knowledge, and they should be compensated for this and punished in case they perform the functions inadequately.

Criminal responsibility for deliberate false expertise, falsification of data should be introduced and unfailingly implemented.

The implementation of each of these points requires adoption of serious policy decisions and conduction of complex reforms (naturally, we will not rest upon this within the given text limits), but they, in contrast to the reforms of RAS proposed now, would have been reasonable: cause and effect relationship

between these objectives and welfare for Russia is sufficiently obvious.

The new environment will create new requirements to the Academy of Sciences, also for the distribution of efforts between research directions, viz, requirements, which now, until science is not needed by anyone, even makes guessing is difficult.



Strong and weak sides of Russian science.
May be it is not required to drive all directions under one standard?

Клиническая медицина	clinical medicine
Биомедицинские исследов.	biomedical research
Биология	biology
Химия	chemistry
Физика	physics
Науки о Земле и космосе	Earth and Space Science
Технические науки	technical sciences
Математика	mathematics
Психология	psychology
Общественные науки	social science

Здравоохранение	health
Прочие науки	Other science

The new requirements shall define the new structure; simplify the task of reforming and the choice of priorities, finding required indicators of efficiency in specific situations. Unconditionally, many ideas, proposed by ideologues of current reforms, shall also be implemented.

Academic science and higher education will be integrated somewhere into unified organizations. The geographic mobility of researchers should increase, and in a majority of the directions, assessment by publications, citations, and external audit shall appear.

Perhaps the pure ideological objectives like «at any cost get rid of elders» (ignoring their pertinence) should not be assigned.

However, all ideas of the current reformers shall be implemented then and there when this is required viz. in agreement and mutual understanding of the government and the RAS elite.

Unfortunately, the sufficiently critical requirement of the government in regard to the measures specified is not seen now, although it is more obvious than the requirement to reform fundamental science in a western style.

The current system criticized by the reformers, allowing many RAS employees to perform in a minimum way and use time for something other than their work, should gradually become null, when the Academies and institutes should get far more orders for applied development and along with this, decide on the task of maintaining prestige in fundamental research. The problem of the clear idlers shall be easy to resolve thanks to the softening of the labour code and the simplification of dismissals, and in many cases with the help of tender mechanisms, proposed by the current reformers.

The citation index, advocated by the reformers, shall acquire

more meaning as far as Russian interest in this is concerned.

When RAS institutes perform applied development, and colleagues from the industrial institutes more often revert to it for help, then, the settting up of tasks for fundamental research in Russia shall increase. Not only due to internal logistics of previous research and western «fashion», but from the internal logistics concerning the problem and models, which had grown during the resolution of the application tasks.

The development of topics thus born of the subsequent works should award the authors with the required citation. Thus, even when oriented on citation, the selection of fundamental research topics shall take into consideration several more actual Russian problems than in the current situation, where «science is not needed by anybody».

One more very important conclusion: The government should become the main customer of the Academy of Sciences and finance the research works of scientists in which they are interested in. Of course, private structures can and should act as the customer and financier in a parallel fashion. In which case, the demand should be very strict and responsible. That is, the government gives the order to the scientist, it to be carried out and then with all strictness accepts the final product.

It seems that a serious committee, comprised of not only bureaucrats, but also of independent scientists, should do this. Even foreign specialists could be employed (of course if it is about developments, having strategic or military significance). Under such a scheme (the government would order, pay and together with the scientific world accept the final product) misuses should be considerably less, and this would only benefit science.

The acceleration of the evolution of social sciences in Russia should be considered a separate item, and their attainment should reflect the minimum norms of professionalism, achieved in Natural Science. One of the first steps in this path should be the

international and independent Russian audit from the point of view of the economy and science studies of materials, which was the ideology from which the current reforms are based on check the figures used, methodology for calculating parameters and adequacy of models used by the authors for the description of the cause and result relationships in the science and technical sphere of Russia etc.

However, as we all understand, the program formulated shall not be implemented. The implementation of those reforms, which have been planned now, start to be implemented. Will it move Russia far ahead? Probably right to that time when the fundamental defects of the project shall not be manifested.

But in the beginning it will probably seem that the collapse of the academic reforms not be noticed at all and comprehended due to the «mania of the appraisers» with indicators, related to costs, publication, citation and rating of higher educational institutes. Science and education in Russia shall be extremely successful within these parameters (from the point of view of the whole country). The Ministry execute or almost execute the «May» decree of President V.V. Putin 2012 «On measures for implementation of state policy in education and science» [Decree of the Russian President No 599, 2012]. In particular, the following target parameters shall be achieved with a high probability:

- *«Inclusion by 2020 of no less than five Russian Universities in the first hundred of the leading international universities according to the international rating of universities;*
- *Increase by 2018 of the total volume of financing state academic funds up to 25 billion Roubles;*
- *Increase by 2015 of the internal costs for research and development up to 1.77 percent of gross domestic product with an increase in share of educational institutions of higher professional education in such costs up to 11.4%;*
- *Increase by 2015 of the contribution of publications of*

Russian researchers in the total number of publications in international scientific journals, indexed in «WEB of Science» database, up to 2.44%.

However, simultaneously with the successes, the country's leadership will be surprised to find that the work force coming out from the first five Russian higher educational establishments leaves much to be desired. They shall also find that there are breakthroughs that are no more fundamental, applied R&D works in the country are very costly and less effective. Organizing the scattered research groups for implementing application mega-project in a new field vital for the country is not successful, outstanding scientists with high citation index are incompetent when they are employed for expertise in a down to earth field or for popularization of contemporary knowledge.

For example, the tasks of economic development, similar to the one set in another May decree «On long-term state economic policy» [Decree of Russian President No 596, 2012] shall be scuttled. *«Increase in the share of product of high technology and knowledge intensive industries of the economy in the gross domestic product by 2018 by 1.3 times to the relative level of 2011. Increase in labour productivity by 2018 by 1.5 times in relation to the level of 2011».*

It will be difficult to say how soon it will be clear that the important reason for failures lies in particular in the system of organization of science and education, in the objectives incorrectly set before the Ministry in the first place: according to generally accepted measures education and science will advance considerably

Here considerable reflection and complex analysis will be required. Could the experts, who had grown on the grants of the Ministry of Education and Science, execute it? It is not known, but already now, one can understand that overcoming the difficulties occurring will be too costly..

Then,the other project, one or other version of correcting

the reforms will be in demand. What is required to be done in the new circumstances?

It is more likely that the first actions will be the elimination of that unexpected disaster for which the requirement for correction of reforms shall become obvious.

If deficiency is found out in some area of fundamental knowledge, caused by the speed-up of secondary institutes, then it can be compensated by organizing the R&D Institute which we accustomed to us with budget financing.

If mass loss of the population's mind be found out based on obscurantism, then RAS can be allocated the duty to help in eliminating it and allot the required resources.

However, simultaneously with the resolution of urgent tasks the issue of long-term reorganization of fundamental and applied sciences shall again come up in Russia.

Its more likely that in this case it will be necessary to not start with RAS, but with the creation of the atmosphere surrounding science that shall require from science the execution of its functions. These being a series of reforms in the economy, sectorial science, political sphere, education and interaction with population through mass media etc.

In the new conditions one can better observe what conditions will be required to separate R&D Institutes from the university and transfer them to RAS and what conditions will be required to return to budget financing instead of grant financing, and in what conditions on the contrary will continue the movement in the direction given by the current reforms.

The main principle of new science in Russia shall be multiple in form.

RAS shall be preserved or revived not as the «Club of scientists», but as the «Ministry of Fundamental Research», partially self-regulating in reconciliation with the government, and partially implementing the tasks set by the government, having own R&D Institutes, integrated with the universities on a

formal and informal basis.

However, together with RAS fundamental research shall be made at the universities, in other academies and in some private structures, in sectorial institutes.

In all likelihood, the reduction in the strength of the research fellows at the Academy based on the results of perturbations is inevitable, maybe it will constitute the current 40,000-50,000, but together with the branches of agricultural and medical sciences, maybe it will constitute 30,000. Too many shall go to the universities and sectorial institutes. RAS will become a small island in the total organism of Russian science, in whose womb research shall be planned and financed under other principles than at the universities, private structures and sectoral R&D institutes.

RAS will often be oriented toward filling in the «gaps» of: non-popular for publication and citation or for immediate applied interests, conducting research on a wide spectrum of topics, complex expertise of the common problems of the country, global program research, the overwhelming amount of separate teams dispersed across higher educational institutes and sectorial R&D Institutes. (It should not hinder the Academy by attracting these teams to the common projects).

The island of RAS should remain free from totalitarian uniformity of current reforms («Academic freedom») that brings anything and everything from the effectiveness of fundamental science to simple indicators convenient for the bureaucrats. Because none of the indicators given in advance can serve as permanently active criteria of the effectiveness of science i.e. spheres, which permanently create new situations.

Indeed, fundamental science can develop only in that case, if the principle of «academic freedom» is implemented in it and if

the scientists themselves manage it. This principle was formulated in Western Europe as far back in the Middle Ages and carried out in the form of independent universities, independent initially of the secular authorities and then from churchdom.

In particular, «Academic freedom» made the development of science possible in its modern understanding and together with it the development of technological progress. The freedom of scientific research and traditional respect to scientists is one of the basic principles of western civilization.

N.B. In fact, the principle of «academic freedom» was implemented in full measure at the Paris Academy: Academicians received money from the government, but they were free in the choice of the directions of their research. They were not appointed, but elected for life by other academicians, and hence they were called «immortals». During the Great French Revolution, the Academy was closed, and six «immortals», including the great Lavoisier, were killed: the authorities in power always suspected scientists as the carriers of free and potential counter-revolutionary ideas.

The control of spending fairness of government funds under such «wilfulness» shall be made indirectly viz. Through the limitation of the strength and budget of RAS and by setting up tasks before the Academy, by executing them, the organization will necessarily have the highest Russian levels in science.

As written by V.S. Kapustin in his article «Economics of knowledge» [Kapustin, 2006]: «Two resources compete on the scale of modern Russia: raw materials and intellectuals and leading to «exporting them» from Russia in the future intellectuals directed to the «entry» of Russia into the future. Therefore, the European thesis: «the intellectual resource is the main factor of economic development» acquires decisive significance for the country».

An extremely interesting analysis of the Draft Law No 305828-6 «On the Russian Academy of Sciences, reorganization

of state academies of sciences and making amendments to separate laws of the Russian Federation» was made by Igor Kharichev [www.ej.ru/?a=note&id=13073], General Director of the journal «Knowledge is power»:

1. Item 3 clause 2 – «the Russian Academy of Sciences is created for providing continuity and coordination of fundamental ...» Thereafter loosely in the text «the Russian Academy of Sciences, founded by this Federal Law...» *Thus, the reformers do not even hide that the consequence of the adoption of the law shall be the appearance of a new RAS, not connected with the current one. By this law the entire history of RAS is cancelled out, although the RAS Charter has the words «Russian Academy of Sciences, founded by the order of the Emperor Peter I Decree of the Directing Senate of 28 January (February, 8) 1724. It was restored by the Decree of the President of RSFSR November 21, 1991 No 228 «On the organization of the Russian Academy of Sciences» as the highest scientific institution of Russia. On the Russian Federation territory the Russian Academy of Sciences is the successor of the USSR Academy of Sciences».*

2. Sub-item 3, item 1, clause 7 - basic tasks of the Russian Academy «participation in the organization, coordination and conduct of ...». *This «innocent» wording hands over to the bureaucrats not only management of the Academy's property, but also management of scientific organizations and their research.*

3. Clause 5 – « The Russian Academy of Sciences can be reorganized on the basis of Federal Law». *Practically with such wording, the independence of the*

Academy has been destroyed, as it completely transfers everything to the bureaucrats.

4. Igor Kharichev writes about the organization of a special Agency of scientific institutes that the scientific organizations are handed over to the bureaucrats, and not only their property, i.e. institutes together with the employees. In this case, the agency governs their scientific activity, including staff issues. That is nothing had changed in the law after the second reading in the State Duma.

5. Item 10 is one more trap for the Academy, legally allowing the takeover of land plots, belonging to the Academy («for purposes, established by the Federal Law of 24 March 2008 No 161-FZ «On promoting the development of residential construction»).

6. Item 11 «The directors of such scientific organizations are appointed and dismissed by agreement with the Presidium of the Russian Academy of Sciences and after approval of their candidatures by the Committee for staff issues of the Council under the President of the Russian Federation for science and education.

After the adoption of the law, the staff of the institutes are removed from the process of appointing the director and the candidature shall be approved at the Presidium and get the approval of the Committee.

It is likely that the appointment would be made by the Agency for Scientific Institutes that is confirmed by the ill-concealed desire of the reformers to pluck out the institutes from RAS.

Based on the above given analysis of the law, performed by Igor Kharichev, it is safe to assume «that the main impulsive cause of the reforms conducted is to force the people working at

Academy, who are independent and critical of the authorities, to remain silent.

It is obvious that the desire of the authorities is to liquidate the organization, which « in current Russian political reality is relatively free and independent».

Starting from 2011 the authorities consider the Academy as a serious source of Fronde, having in addition its own autonomous budget, and considerable property, therefore the reforms of RAS according to the initiators, allows the economic base to be cut off from this Fronde and convert the scientists to be , completely dependent on the bureaucrats and employees of the budget sphere.

In the beginning of July 2013, an appeal to the Russian President was published by the leading scientists of RAN (academicians and correspondent members). It was said there that in the event of adoption of the law concerning RAS the scientists, signing the appeal, refused to enter the new academy, as they think it to be «illegal and not a worthy legal successor of the Academy of Sciences, founded by Peter I.

It is symptomatic that the scientists being part of the elite of Russian science and having outstanding citation indices (about which the reform ideologues speak with envy) signed the letter.

We Cannot but quote the text of the appeal, but the important one is the surnames of scientists who signed it.

далее документ более мелким шрифтом ???????

To the President of the Russian Federation V.V. Putin
Chairman of the Federation Council of the Russian Federation V.I. Matvienko
Chairman of the State Duma of the Russian Federation
S.E. Naryshkin
Prime Minister of the Russian Federation D.A. Medvedev

Expressing categorical rejection of the draft of Federal Law «On the Russian Academy of Sciences, reorganization of state academies of sciences and introducing amendments to separate legislative acts of the Russian Federation» 305828-6, sent to the State Duma, we declare the refusal to enter the new «RAS», if the law is to be adopted, since we do not think it a legal and worthy successor and replacement of the

existing Russian Academy of Sciences, founded by Peter I.

1. Academician V.E. Zaharov, theoretical physicist, mathematician, Landau Institute of Theoretical Physics and Lebedev Physics Institute
2. Academician A.V. Kryazhimsky, mathematician, V.A. Steklov Mathematical Institute, RAS
3. Academician V.A. Rubakov, theoretical physicist, Institute for Nuclear Research, RAS
4. Academician D.V. Shirokov, theoretical physicist, United Institute for Nuclear Research, RAS
5. Academician Yu.L. Ershov, mathematician, Mathematical Institute, SB RAS
6. Academician V.M. Kotlyakov, geographer, Geographical Institute RAS, honorary president of Russian Geographical Society
7. Academician N.S. Dikansky, physicist, Institute for Nuclear Physics, SB RAS
8. Academician V.A. Vasiliev, mathematician, V.A. Steklov Mathematical Institute, RAS, president of Moscow Mathematical Society
9. Academician L.V. Keldysh, theoretical physicist, Lebedev Physics Institute, RAS
10. Academecian S.M. Stishov, experimental physicist, Institute for high pressure physics named after L.F. Vereshchagin RAS,
11. Academecian A.A. Starobinsky, theoretical physicist, Landau Institute for Theoretical Physics, RAS
12. Academician V.L. Yanin, historian, History Faculty, MSU,
13. Academician A.A. Abrikosov, theoretical physicist, Nobel laureate, Landau Institute for Theoretical Physics, RAS
14. Academician V.B. Betelin, mathematician, R&D Institute for System Research RAS, Russian Research Center «Kurchatov Institute»
15. Academician R.I. Nigmatullin, mechanical engineer, P.P. Shirshov Oceanology Institute, RAS
16. Academician V.V. Dmitriev, experimental physicist, Kapitsa Institute for Physics Problems
17. Academician M.V. Sadovsky, physicist, Electophysics Institute RAS, Yekaterinburg
18. Academician M.A. Grachev, biologist, Limnological Institute Siberian Branch of RAS
19. Academician A.P. Kuleshov, mathematician, A.A. Kharkevich Institute for Information Transmission Problems, RAS
20. Academician V.B. Timofeev, Institute for Solid State Physics, RAS
21. Academician V.A. Dybo, linguist, Center for comparative studies of the Institute for Oriental and Classical Studies of the Russian State University for the Humanities
22. Academecian G.M. Eliashberg, theoretical physicist, Landau Institute for Theoretical Physics, RAS
23. Academician A.V. Chaplik, physicist, A.V. Rzhanov Institute for Semiconductor Physics, SB RAS
24. Academician S.S. Gershtein, physicist, Institute for High Energy Physics

25. Academician R.Z. Sagdeev, physicist, University of Maryland
26. Academician A.V. Gaponov-Grekhov, physicist, Institute for Applied Physics, RAS
27. Academician N.S. Kardashev, astronomer, Astro-Space Center of the Physics Institute of the Academy of Sciences
28. Academician Yu.P. Paryisky, astronomer, Special Astrophysics Observatory, RAS
29. Academician R.A. Suris, physicist, Ioffe Physics and Technology Institute, RAS
30. Correspondent member Yu. I. Manin, mathematician, North-Western University (USA)
31. Correspondent member I.V. Volovich, theoretical physicist, mathematician, Mathematical Institute, RAS
32. Correspondent member A.Yu. Morozov, theoretical physicist, Institute for Theoretical and Experimental Physics
33. Correspondent member P.I. Arseev, theoretical physicist, Physics Institute RAS
34. Correspondent member M.I. Vysotsky, theoretical physicist, Moscow Physics and Technology Institute
35. Correspondent member K.P. Zybin, theoretical physicist, Tamm Theoretical Physics Branch *Branch*
36. Correspondent member V.N. Gavrin, experimental physicist, Nuclear Research Institute RAS
37. Correspondent member I.B. Khriplovich, theoretical physicist, Institute for Nuclear Physics RAS, Novosibirsk
38. Correspondent member V.I Danilov-Danilyan, economist, environmentalist, Institute for Water Problems RAS
39. Correspondent member V.E. Balakin, physicist, Institute for Budker Nuclear Physics
40. Correspondent member O.N. Solomina, geographer, Geography Institute RAS
41. Correspondent member N.G. Smirnov, biologist, Institute for Ecology of Plants and Animals, Ural Branch of RAS
42. Correspondent member A.A. Soloviev, mathematician, geophysicist, International Institute for forecast of earthquakes and mathematical geophysics RAS
43. Correspondent member S.Yu Nemirovsky, mathematician, V.A. Steklov Mathematical Institute, RAS
44. Correspondent member A.A. Belavin, theoretical physicist, Landau Institute for Theoretical Physics, RAS
45. Correspondent member I.I. Tkachev, theoretical physicist, Nuclear Research Institute RAS
46. Correspondent member M.I Yalandin, experimental physicist, Electrophysics Institute Ural Branch of RAS
47. Correspondent member E.L. Ivchenko, theoretical physicist, Ioffe Physics and Technical Institute St. Petersburg
48. Correspondent member S.V. Ivanov, mathematician, St. Petersburg branch of V.A. Steklov Mathematical Institute RAS
49. Correspondent member B.L. Ioffe, theoretical physicist, Institute for Theoretical

and Experimental Physics

50. Correspondent member N.N. Sibelkin, physicist, Lebedev Physical Institute of RAS
51. Correspondent member A.V. Sobolev, geologist, V.I. Vernadsky Institute for Geochemistry and Analytical Chemistry
52. Correspondent member E.V. Shchepin, mathematician, V.A. Steklov Mathematical Institute RAS
53. Correspondent member S.K. Gulev, physicist, P.P. Shirshov Oceanology Insitute RAS
54. Correspondent member Yu. G. Makhlin, theoretical physicist, Moscow Physics and Technology Institute
55. Correspondent member E.A. Khazanov, experimental physicist, Nizhegorod State University
56. Correspondent member A.A. Tolstonogov, mathematician, Institute for System Dynamics and Control Theory, SB RAS
57. Correspondent member I. A. Panin, mathematician, St. Petersburg branch of V.A. Steklov Mathematical Institute RAS
58. Correspondent member A.I Ivanchik, historian, Institute of General History RAS
59. Correspondent member D.I. Trubetskoye, theoretical physicist, Saratov Science Center RAS
60. Correspondent member D.V. Treshchev, mathematician, V.A. Steklov Mathematical Institute named after RAS
61. Correspondent member R.L. Smelyansky, mathematician, faculty of Computational Mathematics and Cybernetics MSU
62. Correspondent member A.V. Dybo, linguist, Institute of Linguistics RAS
63. Correspondent member A.A. Razborov, mathematician, V.A. Steklov Mathematical Institute RAS
64. Correspondent member L.D. Beklemishev, mathematician, V.A. Steklov Mathematical Institute RAS
65. Correspondent member V.V. Brazhin, physicist, Moscow Physics and Technology Institute
66. Correspondent member K.E. Degtyarev, geologist, Geological Institute RAS
67. Correspondent member A.M. Sergeev, physicist, Institute for Applied Physics RAS
68. Correspondent member A.B. Borisov. theoretical physicist, Institute for Physics of Metals UB RAS, Yekaterinburg
69. Correspondent member N.N. Rozanov, physicist, State Optical Institute named after S.I. Vavilov
70. Correspondent member M.I. Rabinovich, physicist, University of California in San Diego (USA)
71. Correspondent member A.K. Murtazaev, physicist, Dagestan Science Center RAS

Reformers talk about the ageing of RAS. But had any one

analyzed the age of hundreds of thousands, mainly young scientists, who left Russia for normal conditions of scientific work, appropriate salaries, social status and even (it is not a secret) for various prestigious international awards, including the Nobel prize?

Probably the reformers who regularly cited the ineffectiveness of RAS do not know that not only Russian academicians and doctors of sciences are in demand abroad, but practically all scientist who had left Russia. Thus is the case in mathematics, physics, and in other natural sciences. However, the diplomas and degrees of our lawyers and economists, as a rule, are not in demand, maybe not counting the reform ideologue S. Guriev himself, who left Russia for France.

However, it is a funny thing, now in particular that these people are engaged in reforming all of science, including physics and mathematics.

Besides, the stipend of a research fellow at RAS is only about 60 Euro, where as abroad the salary of a postgraduate constitutes of 1600 Euro. «Only someone without talent or a very patriotic person would not agree to take part in such conditions in the continuing brain drain, which no academic reform, except salary, can prevent» [Figovsky, 2013].

It may be that this is why the average age of RAS increases, at the cost of the remaining patriots, such as the great nuclear physicist and great patriots of Russia, RAS Academician Vladimir Lobashov, who said that he would work only at home, at the Troitsk Nuclear Research Institute and who worked there till his last days.

As he exlained in his interview to Echo Moskvy radio station, Valery Rubakov the RAS academician, chief staff scientist of the theoretical physics department of RAS nuclear research institute and professor at MSU: «In the form in which this draft law appeared and in the way in which it now exists after the second reading, this draft law is about the destruction of the

academy of sciences. The creation of a new structure in its place, with entirely other functions.

In the current draft law, the words that the Academy of Sciences, constituted by this Federal Law, are found. That is a new structure and a new organization is constituted and the old correspondingly is liquidated. It is not clearly spelled out that it is liquidated, but de facto, if you create something new under the same name, it means, you should cancel the old.

In our opinion, there is no reason to discard the Academy of Sciences and create something new in its place. Rumors that science in Russia at the Academy of Science is dead are greatly exaggerated.

We can give an example only in our field of science for the previous week two important events took place. Alexei Starobinsky, academician, got the prestigious American Grubber prize for cosmology,. The most prestigious prize on cosmology.

Literally, today we had the seminar, where the announcement was made about the discovery of elementary particles, which was carried out by the international group, where the scientists of our institute took active participation. Today they reported simultaneously in many places. that science exists. that life continues. We do not see any basis for destroying the Academy of Sciences, yet we do believe in reforming it.

In our work, we had not touched upon another very important issue. How much do these reforms of RAS cost? How much will it cost the Russian taxpayer and is the society ready to pay the price for the reform with unclear prospects?

Besides, the issue here of impending mass retrenchments that shall take place at RAS, RAMS and RAAS under the reforms is not discussed here and consequently nor is the growth of social conflicts in the country. *What tools can be used to assess the social unrest in the Russian society that will occur because of the reforms?*

In the report of the Institute of Economics about RAS and

the authenticity of the costs for reforming RAS in the draft law of the Russian Government (draft law No 305828-6 «On Russian Academy of Sciences») expert assessment of the real (and not that declared by the reformers equal to 514,240,000 Roubles) costs of the reforms is given.

The audit alone of 436 research and development organizations of RAS shall requirea minimum of 1.5-2 billion Roubles. The audit of 498 research institutions of RAAS would cost more and additionally to consider is a complex system of measures of registration and evaluation which would be required (cadastre evaluation of land plots, movable and immovable property) and whose cost is difficult to evaluate at present. RAMS 33 science and education facilities work here.

Thus, the minimum figure of additional costs of the RF budget for the RAS reforms under this clause, according to IE RAS will constitute *approximately* ***5 billion Roubles.***

As specified in the report, the draft of organizing the Federal Agency for Asset Management of the Academy is nothing more than widening the field of state control without a sufficient objective basis that as a rule would lead to the rise in the number of bureaucrats and an increase in the corruption level.

«Comparable losses and costs for the government from this aspect of the activity of «effective managers and financiers», according to the famous example of Sochi-2014, Glonass project, reforms of the Russian Ministry of Defence, projects of «APES-2012 summit», «Skolkovo», «Rosnano» can vary from ***hundreds of millions to tens of billions of Roubles».***

The transition from the classic «academic Russian model» to the academic model of a western type of model will require the creation of the «corresponding infrastructure of national laboratories and science centers practically from the foundation» in Russia, new instrumental and technology provision of science and «a reduction of three of the ten time breaks in the salary levels that shall lead to huge ***billion rouble expenses of the***

budget.

In this connection, the demolition of the Russian Academy of Sciences have long-term consequences, whose scale could exceed all thinkable and unthinkable assumptions, including in the assessments of compensating costs. In any case, the country would have to pay a huge amount in order to prevent sliding into technological solitude.

Besides here, the issue of impending mass retrenchments that shall take place at RAS, RAMS and RAAS under the reforms is not discussed here and consequently nor is the growth of social conflicts in the country. *What tools can be used to assess the social unrest in the Russian society that will occur because of the reforms?*

It will be also difficult to assess the financial political, organizational, and image losses aspect awaiting RAS because of its reformation as per the available draft law.

The reforms will nullify the many years efforts of professional training of the staff of scientists and the rejuvenation of research teams» and the alumni of higher educational institutes will turn their attention to other spheres of activities and of course to the foreign research and development centers.

An idea about the scales of such potential drain can be obtained by extrapolating from today's situation the circumstances that took place from 1990 to the middle of 2000: During this period, more than *800,000 research fellows* and engineers had emigrated depleting science and industry in Russia. Even today, as shown in the report, approximately 15% of the graduates of higher educational institutions leave the country annually.

The brain drain, probably, shall increase noticeably, and correspondingly, *the costs of the restoration of losses from the departure of highly qualified specialists abroad will surely increase, as according to the calculations of UN experts, the departure abroad of a person with higher education causes damage equal to 300,000 - 800,000 dollars.*

Summing up the above, one could assert with greater probability that the actual costs the «reforms» *will be no less than 50-60 billion Roubles*, i.e. amount *equal to the annual budget of RAS*, without taking into account the image and human losses of our country.

In memory of the 50th anniversary of the Imperial Academy of Sciences.On the front side – a portrait of Peter I and the inscription «Peter the Great. Founder of the Academy - 1725 «On the back - a portrait of Catherine II and the inscription «Ekaterina II. Russian empress. Patroness of the Academy – 1776»

Conclusion

The reform ideologues of the regime are destroying, and not reforming the Academy and do not understand that they are destroying Russia with their own hands.

«Fundamental science must be saved in the first instance, otherwise it will not be possible to make it in the forthcoming years, this foundation will undergo heavy damage implying that in order to restore the ranks of the scientists they have to be invited from the developing countries, and Russia shall become a secondary technological and scientific empire. If today the path of science coming out of stagnation is still discussed, then soon it may seem that there will be nothing to discuss» [Figovsky, 2013].

We attempted in this our work to analyze the potential causes and potential consequences of this transient ill-considered reform of Russian science, conducted by the government of President V. Putin.

XX Century history of the Russian Academy is a separate and great history.

This was the time of destruction of blooming biological

science (as a consequence of the roughest, most rigid and uncovered intervention of the regime in the freedom of the scientific search), and a time of massive successes (establishment of nuclear parity with America and sending of man into space). Beginning with the stagnation of the Soviet economic system to the weakening of the range of positions in both natural and engineering sciences.

During almost three hundred years of its existence, the Academy of Sciences of Russia had tirelessly toiled in the country's favour, by employing its most talented representatives in the business of science developing awareness and maintaining the principle of academic freedom.

During the process, conflicts with the bureaucrats took place several times and the Academy incurred in losses. However, the bureaucrats came and went, but the Academy remained.

«The ruling ideologies changed, social formations changed, but the Academy remained. Because its task viz. To vigilanly hold the light of awareness and reason above one seventh of the earth's landmass remaining unchanged».

The contemporary Russian Academy has excellent intellectual potential and sufficiently young recruits to resolve their problems by themselves.

From the open letter of Nobel laureate academician Zhores Alferov to the Russian President [Alferov, 2013]:

«The Law on the reorganization of RAS and other state academies of sciences proposed by D. Medvedev (*Prime Minister of Russia, author*) and D. Livanov (*Minister of Education and Science, author*) in a scramble, as it is now obvious, supported by you (President V.V. Putin, author), by no means resolves the task of increasing effectiveness of scientific research.

I submit that any reorganization, even more rational than that proposed in the Law mentioned, does not resolve this problem.

The basic problem of Russian science is the absence of

demand for our scientific results by the economy and society.

The most important task before us is to make science to be in demand. Without this, it is not possible to remove it from the sorry state.

When science is in demand then there are always resources for implementing scientific development. Today our country needs the creation of such conditions.

The real tool for resolving this task shall be the Russian Academy of Sciences.

We can do this, and the regime is obliged to help us».

Again, the regime did not want to listen to the voices of Russian scientists. The scientists were unable to convince the regime of the possibility the RAS self-reform.

On 18 September the President of Russia (to whom Vladimir Fortov, President of RAS, had earlier appealed to protect the academy from unqualified bureaucrats) and had made amendments to the legislation of the Russian Academy of Sciences to the Duma. The Duma in haste adopted the law on reformation of the system of state academies of sciences, immediately in the second and third reading. With the requirement of 226 votes, 331 deputies voted for the law, 107 against and one person abstained.

These amendments and the law itself are of a catastrophic nature not only for RAS, but also for the many directions of fundamental science in Russia.

This in fact is a roll back in comparison with that which was agreed upon between Fortov and Putin a week before, and that, which was articulated at the General Meeting of the Russian Academy of Sciences several days earlier.

Valery Rubakov, physicist, RAS Academician, one of the most cited Russian scientists, made a comment on the situation with the legislation on reforms of the Academy of Sciences: «Fortov went to Putin on 11 August and carried with him the list of amendments made by RAS Presidium... The letter contained: «The effective delimiter of

authorities for management of RAS research organizations would have been the preservation of the control of their research, organizational and staff components with the Academy and with the transfer of the functions for management of immovable property to the agency being created».

The Academy´s Vice President Academician Lev Zeleny had criticised the new law, by noting that it is not acceptable for the academy, as it gives control of the research institutes to the bureaucrats. «We agreed that the Academy's property should be managed by a different agency, this is not the most clever solution, we are not holding the property. But to hand over scientific research, research policy to the bureaucracy...», - said Zeleny (Research institutes, forming part of the three united Academies of Sciences, the deputies transferred the control of the specially formed federal agency for managing RAS property, which shall be controlled by the bureaucrats, not having any relationship to science).

According to information from the RF Government, the bureaucrats of the Ministry of Education and Science are quickly planning for a considerable reduction in the academic institutes and in their merger. It is obscure what shall remain eventually of the mindless reductions and mergers. However, corruption, in all likelihood, shall blossom after this in full measure, as it is the bureaucrats who shall later determine the priority directions of scientific research to be financed. They will not care about the lack of real results, which are not needed by anyone, except the scientists themselves.

All this forces us to come back to the apprehensions of reform opponents about the Government's wish to seize and sell RAS property which is a « band aid approach» in the state budget of Russia. Is the apprehension of reform opponents, who perceive the «reformers» to be heroes of the book «A dog's heart» by Mikhail Bulgakov, so unfounded?

N.B. *For foreign readers:* (The event in the book «A dog's

heart» takes places after the revolution of 1917) the heroes of the book, Bolsheviks, under the guidance of the commissary Shvonder, came home to the famous Doctor Professor Preobrazhensky in order to «help him academic experiments». However, in reality they came to take away a greater part of his home from him.

Popular Russian caricature on RAS reforms – a scene from the Russian film «A dog's heart». Commissar Shvonder: «We are from the Agency of scientific institutes. Be calm, comrades, we are interested only in your property»

Some research shall of course be conducted at the institutes, which will have been created by this reform. If, of course, there is financing available. Overall, for the next several years, the prospects for the Russian academic science is quite pessimistic.

In practice, there shall be no serious fundamental science in the universities. The employees of the Ministry of Education and Science did all that is required for this: Lecturer's are loaded with lectures approximately 1200 hours per year. They do not have time to engage in science. Money, as a rule, is allotted only for applied scientific research.

Nevertheless, fundamental research in all the prospering countries is developed exclusively with the Government's support. If the Government does not know how to spend money on

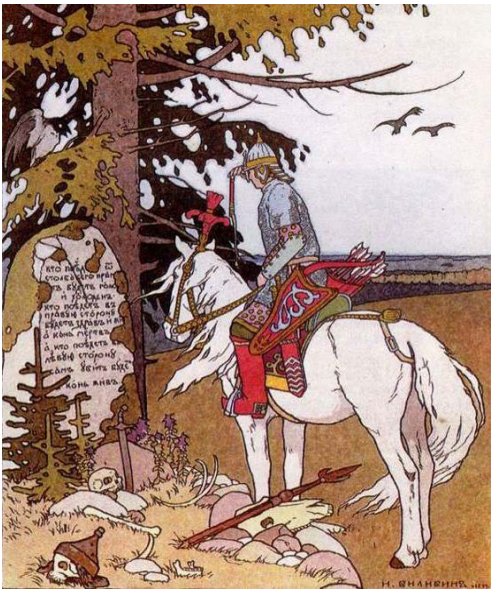
science, then the enlarging of the academies and the creation new agencies shall not help science.

However much it is not desired, the danger of repeating this situation is great and this is what took place in Russia in the beginning of 90's of the last century. The scientists remaining in Russia today shall depart, research schools shall close down, and only the memory of past greatness of domestic science shall remain.

As Igor Kharichev wrote on September 20, 2013 in the article «Eternal memory... End of Russian science is nearing» [http://www.ej.ru/?a=note&id=13309]: «... there is no point in hoping that at some point in time funds shall appear and everything will be revived. History has not invented a better example than Germany: The most advanced science in the world was destroyed in two stages, first in 1933, when Hitler came into power, and finally in 1945, when the Third Reich fell. Even now a rich Germany has not been able to catch up with the USA, Great Britain or France in science, although it is already close to them, displaced by China. However, 68 years have passed since 1945.

So, is this really the end of Russian science? We would most like to believe that this is not so.

Russia today is again at crossroads, but the potential of science in Russia is great and shall be in demand. The bureaucrats (whatever post they occupied in the country) come and go (even if they occupy their post for several periods). The Academy shall remain.



Russia is again at a crossroad. Where to go? (Russian artist Ivan Bilibin)

Nevertheless, we hope that the Russian scientists have learnt one lesson from the entire history with this reform: Do not trust, do not be afraid and do not ask anything from authories. (Rather than as done by the management of RAS). Every scientist, who thinks about the country and science, shall achieve his target by himself, and not wait, for his colleagues to do it for him.

We cannot wait for everything to be resolved by itself. We do not have time. It is our science, it is our country and it is our life. The life of every man, every scientist, feeling his part in the great building that is called the Russian Academy of Sciences.

«No man is an island, entire of itself; every man is a piece of the continent, a part of the main. If a clod be washed away by the sea, Europe is the less, as well as if a promontory were, as well as if a manor of thy friend's or of thine own were. Any man's death diminishes me

because I am involved in mankind; and therefore never send to know for whom the bell tolls; it tolls for thee» [Hemingway, 1940].

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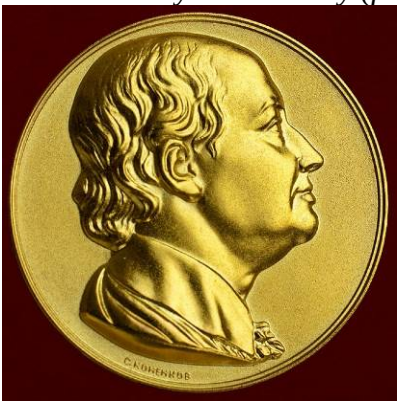
Commemorative Medal «Peter the Great Emperor. The founder of the Academy, 1725» (private collection)

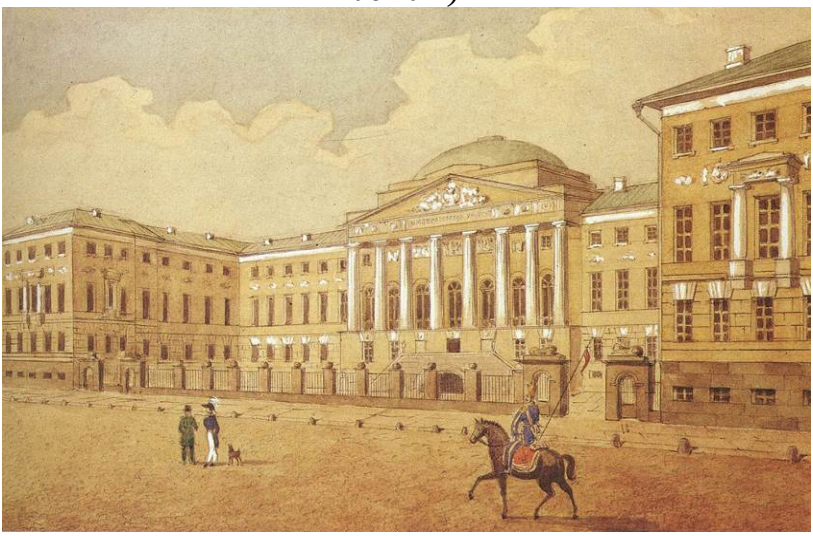
Great Gold Medal of Catherine II (Free Economic Society of Russia collection)

Gold medal of Russian Emperor Nikolai I
On the reverse «Imperial Saint-Petersburg Academy of Sciences. 29 December 1926» Author Fyodor Tolstoy (private collection)



Great Gold medal of RAS named after M.V. Lomonosov, awarded for outstanding achievements in the field the sciences and humanities. The reformers did not deserve it.
Author Sergey Konenkov

Kunstkamera (Russian Academy of Science, St.Peterburg (public domain)

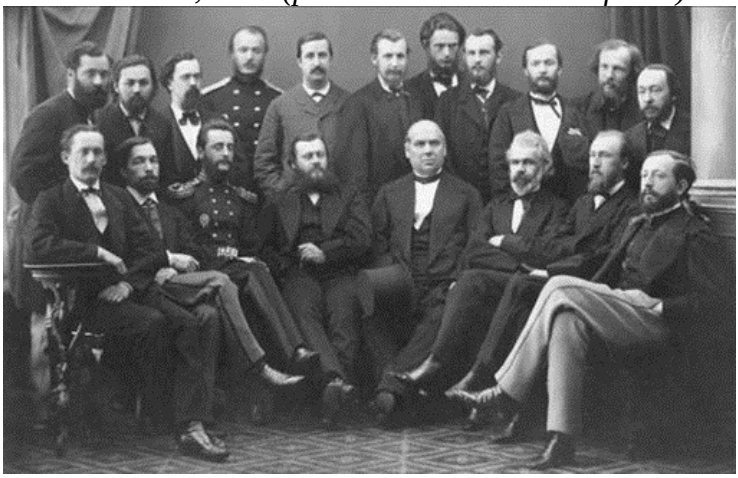


The building of the Imperial Russian Academy of Sciences (public domain)

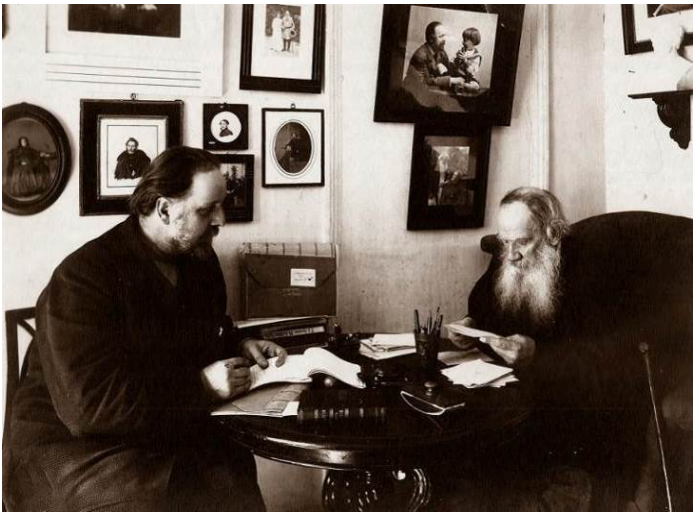
Today, the building of the Imperial Russian Academy of Sciences – the Russian Academy of Arts

Russian Academy of Science, Moscow

The Russian scientists, members of the Russian Society of Naturalists, 1868 (private collection G. Gofman)



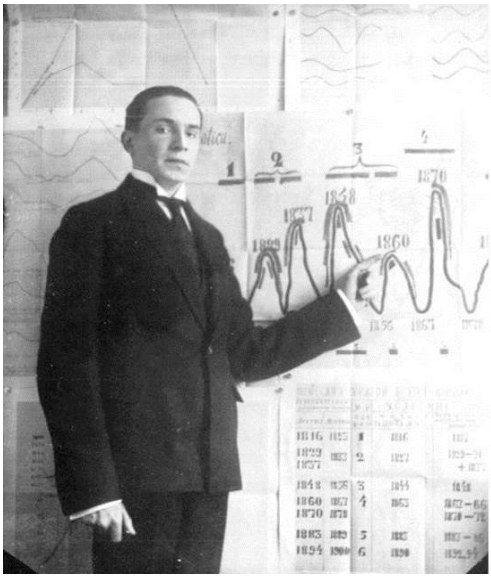
XIX century elite of Russian science (public domain)



L.Tolstoy and I. Chertkov (private collection)

Alumni of the Academy of communist education, 1918 (private collection)

Educational courses in the Red Army (Libin private collection)

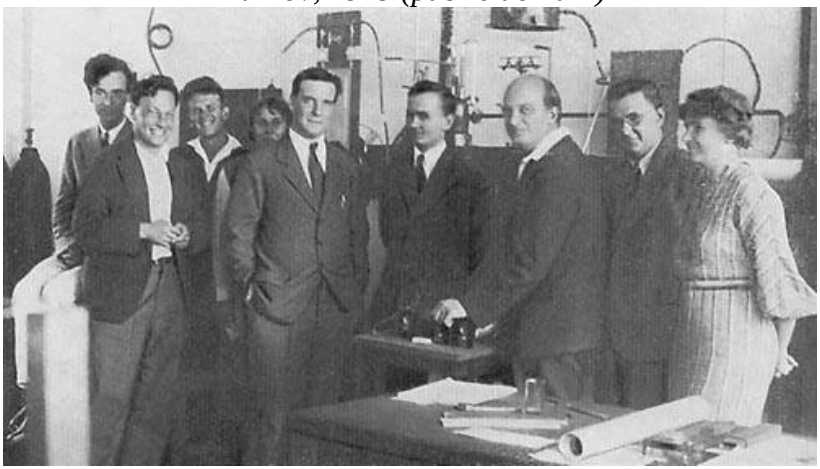


Famous Russian scientist A.L. Chijzhevsky reports to work «Echo of space storms» (public domain)

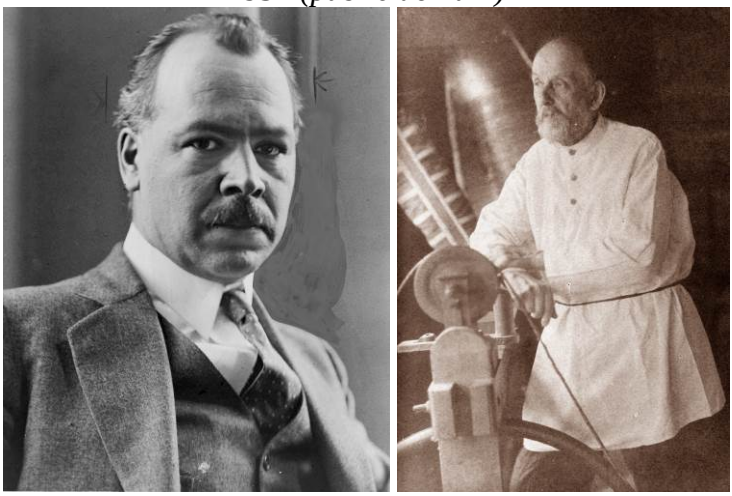
Academician V.I. Vernadsky with his assistants (public domain)

(left to right: V. Karandeyev, G. Kaspiarovich, V. Vernadsky, A. Fersman, P. Aleksat Photo Archive Fersman Minneral museum)

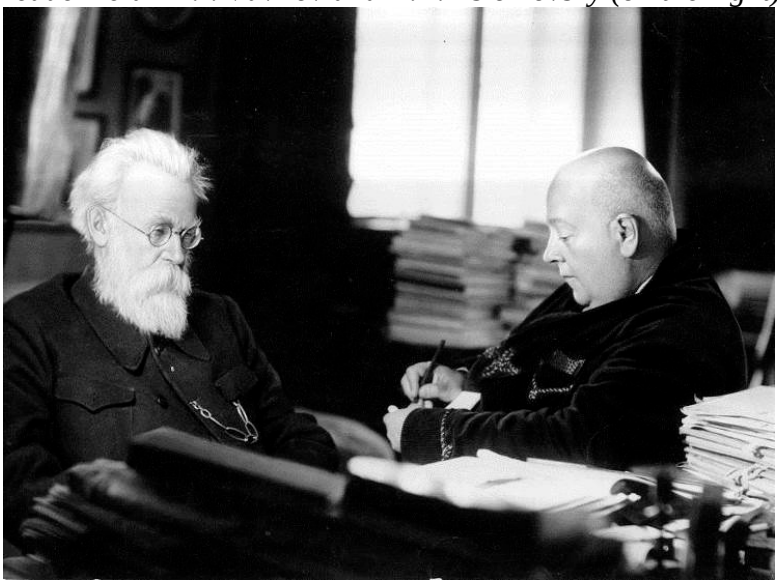
Future Nobel laureates I.E. Tamm and L.D. Landau among the participants of the Conference on Theoretical Physics at Kharkov, 1929 (public domain)



P.L. Kapitsa (fifth from the right) at the laboratory of L.V. Shubnikova (third from the right). L.D. Landau (extreme left), 1937 (public domain)

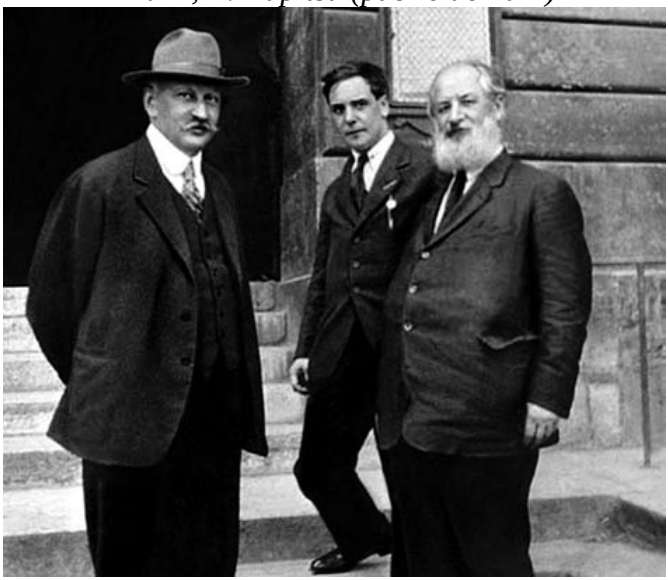


Academician N.I. Vavilov and K.E. Tsiolkovsky (on the right)



Academicians V. Vernadsky and A. Fersman. Moscow, 1941 (public domain)

Ya. Frenkel, S.I. Vavilov, Maks Born, V. Kondratiev, D. Frank, P. Kapitsa (public domain)



A.F. Joffe, P.L. Kapitza and A.N. Krylov (left to right)

(public domain)

Expedition on the liner «Griboedov». Group of participants of the Soviet expedition on the liner «Griboedov». First to the right in row 1 – S.E. Khaikin, 4th – G.A. Ushakov, 4th to the left in row two V.L. Ginzburg, 9th – B.M. Chikhachev, 2nd to the right in row 3 – I.S Shklovsky. (Libin private collection)

Moscow physicists at Ivanovo on full solar eclipse July 9, 1945. In the center P. Kapitsa and L. Landau (public domain)

Can and would the Academy of Sciences reformed by the bureaucrats want to propagandise general observation of solar eclipse, as it was in 1936? Written on the packet: film for observation of solar eclipse June19, 1936 (freely distributed to all) (Libin private collection)

Academician A.F. Losev (in the center) with relatives and students (public domain)

Invitation for the jubilee of FIAN, 1945. Speakers: Academician N.I. Vavilov, Academician D.V. Skobeltsin, Correspondent Member RAS I.M. Wood. Will FIAN celebrate its next jubilee as part of RAS? (Libin private collection)

эти картинки надо взять из русской книжки

CHANGE TO ENGLISH this phrase

L.D. Landau was one of the few, who was not afraid of visiting P.L. Kapitsa during his years of disgrace, 1948 (public domain)

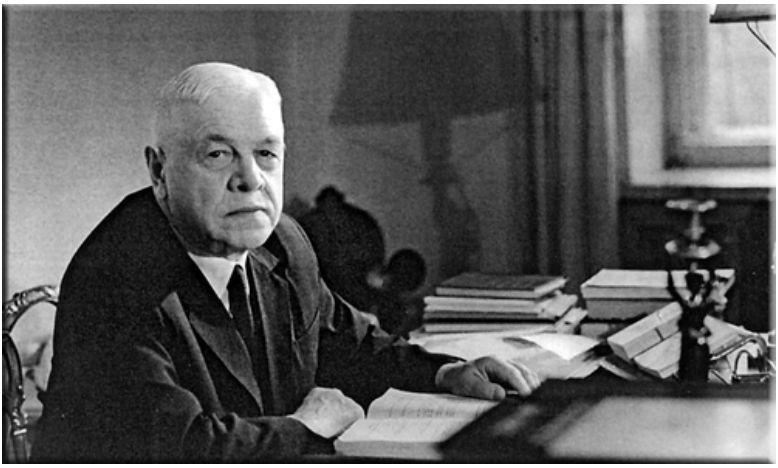
F. Jolio-Curie, I.V. Kurchatov, D.V. Skobeltsin (public domain)

Geophysicists of MSU, academician V.V. Migulin is in the last row to the extreme right, 1945 (public domain)

Awarding the Order of scientists and artists of the USSR, 30 years *(Libin private collection)*

Academician A.N. Nesmeyanov (the President of the USSR Academy) presents the Award to academician V. Obruchev, 1953 (public domain)

Awarding the Order of scientists and artists of the USSR, 30 years (Libin private collection)



Academician D.V. Skobeltsin (public domain)

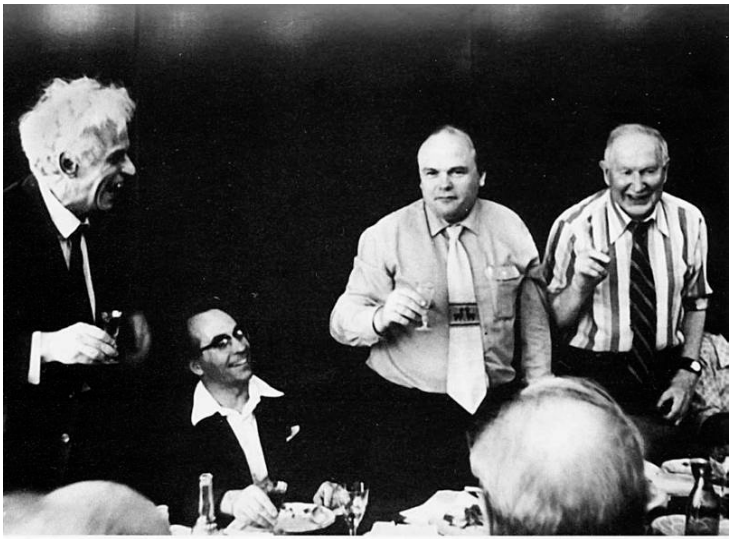
U.S. astronaut Neil Armstrong in St. Petersburg, 1970
Right - Professor G.E. Kacharov (Libin photo)

Academician D.V. Skobeltsin and academician S.N. Vernov
(Libin photo)

Academician S.N. Vernov and professor G.B. Khristiansen
(MSU collection)

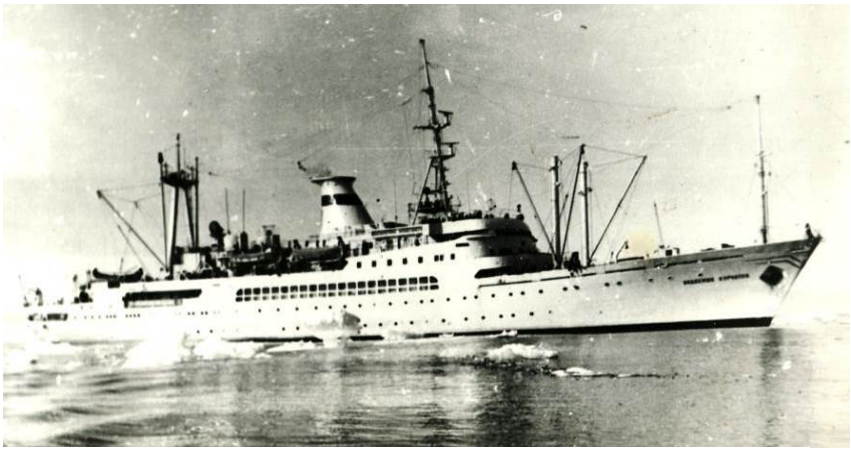
Academician A. Sakharov and academician I. Kurchatov (public domain)

M. Keldish, A. Leypunsky, V. Ievlev, I. Kurchatov (public domain)



Distinguished Soviet and Russian physicists of RAS (Corresponding member of RAS A.E. Chudakov, Academician V.M. Lobashev, Academician E.P. Velikhov, Academician M.A. Markov. Pakhra, 1980. (Photo Yu. Tumonov)

President of the Academy of Sciences of the USSR, famous mathematician and academician M. Keldysh with the second astronaut of the world G. Titov and General Designer academician S. Korolyov, right to left. (public domain)



Research vessel «Academic Kurchatov» tuned out to be expendable by the Russian bureaucracy (Libin private collection)

Participants of RAS expedition on research vessel «Academic Kurchatov», 40 trip (Libin private collection)

Soviet and American geophysicists in Honolulu - Research vessel «Academic Kurchatov» (Libin private collection)

Meeting participants at Pulkovo, 1998 (private collection)

XX Conference of RAS on using neutron scattering in condensed matter physics, 2008 (private collection)

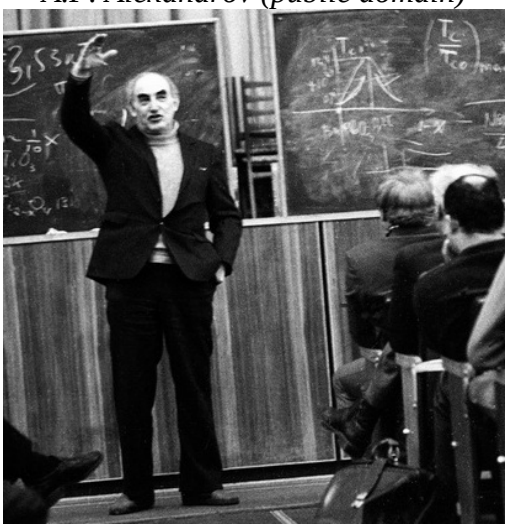
Participants Anniversary All-Russian Cosmic Ray Conference of the RAS - at the grave of famous physicists Galina and Yury Shafer, Yakutsk (IKFIA RAS collection)

Conference in honour of Fedor Bogomolov's 65th birthday (private collection)

The winners of the Free Economic Society of Russia, 2013 (private collection)

President and Past-President Free Russian Economic Society (Professor Vadim Belov and Professor Yury Roslyak, left to right) (Libin private collection)

Prominent Soviet nuclear physicist, President of the USSR Academy – academician A.P. Alexandrov (public domain)



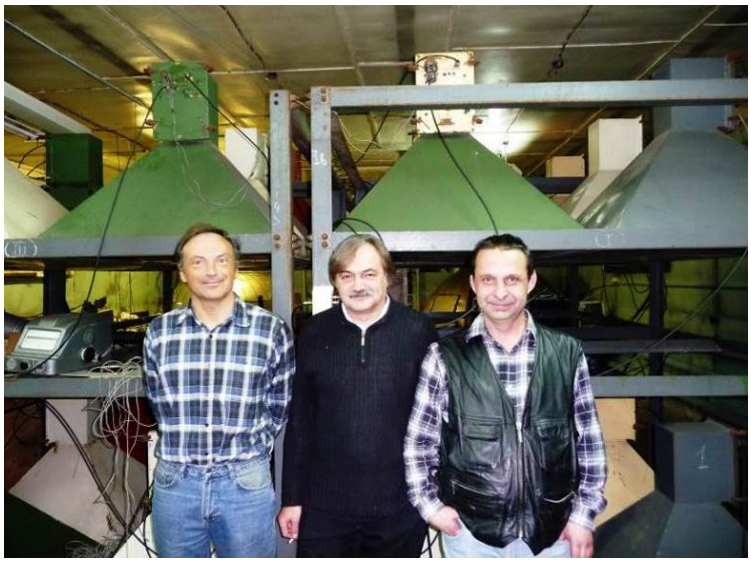
Academician V.L. Ginzburg at the seminar in FIAN (public domain)

Nobel laureates, academics N.G. Basov and A.M. Prokhorov {public domain)

Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation of the RAS behalf N.V.Pushkov (Libin private collection)

Cosmic Ray Station of IZMIRAN Survives after the reform? (Libin private collection).

IZMIRAN Space Weather Center (Libin private collection)



IZMIRAN Scintillation telescope - prof. V. Zirakashvili, Dr. K. Yudakhin, Dr. E. Klepach (Libin private collection)

Installation for getting artificial diamonds (Libin private collection)

Russian scientists in Mexico, dr. Oleg Gulinsky third from the left (Libin private collection)

Soviet scientists in México, left to right Leonty Miroshnichenko, Oleg Lyssovoy, Octavio Obregon Dias, Igor Libin, 1982
(Libin private collection)

Prof. Octavio Obregon Dias and Alla Rodionova (Libin private collection)

Russiant scientists in Mexico, left to right Igor Libin, Jorge Pérez-Peraza, Sergey Pulinets, Anando Leyva Contreras, 2002
(Libin private collection)

Laboratory cosmic-ray variations IZMIRAN (80 years) (Libin private collection)

Graduate students of Professor L.I. Dorman, founder of the research school «Variation of cosmic rays» (Libin private collection)

National Workshop on space physics, next straight L. Dorman, G. Shafer, G, Kacharov, Yakutsk, 1984 Yakutsk, 1984 .
(Libin private collection)

The world-famous Space Physics L.Dorman and I.V. Ginzburg-Dorman (Libin private collection)

Russian scientists, working at the University of the Mixteca, as guests of Modesto Seara Vazquez, Rector of SUNEO University, Oaxaca, Mexico, 2012
(Libin private collection)

Anniversary celebrations of the Joint Institute for Nuclear Research, Dubna, 2011 (public domain)

Meeting of Russian and Italian scientists, Padua, 2011
(Libin private collection)

Do bureaucrats require scientific research in space?
Dumitru Dorin Prunariu (Romanian cosmonaut) and Igor Libin (Libin private collection)

Handing of diplomas at the Russian Academy of Natural Sciences - Lana Surikova-Camus (Surikova private collection)

President RANS academician M. Ledvanov hand of diplomas at the Russian Academy of Natural Sciences (Libin private collection)

International Conference «Prospects for the development of university science», Russia, Cochi, 2013 (Libin private collection)

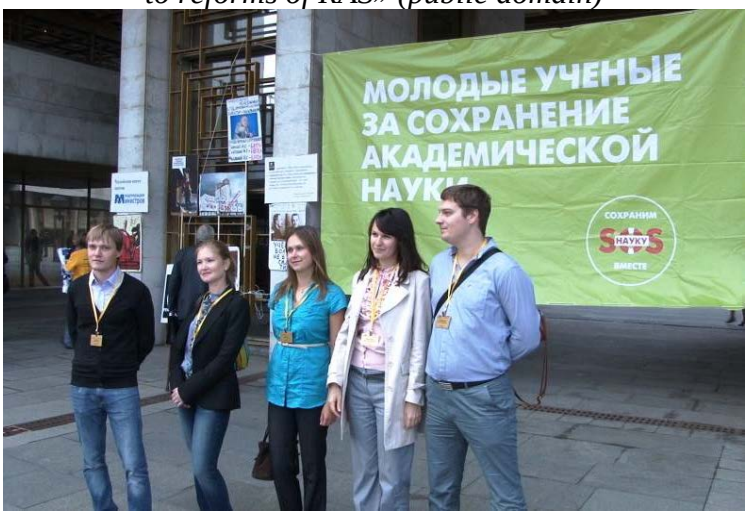
« 

Ademician V. Fortov, President of RAS (public domain)

Scientists are against the government reform of Russian science. The General Meeting of the RAS (public domain).

Opponents of RAS reforms: Correspondent member of RAS Sergei Gulev, Academician Alexander Kuleshov, Academician Robert Nigmatullin (public domain)

Protest demonstrations of scientists against RAS reforms. Inscriptions on the banners «No to reforms of RAS» (public domain)



Demonstration of scientists against the reform. Young scientists of Russia for the preservation of national science (public domain)

The main slogan of the opponents of reform RAS: No Pasa (in Spanish; RAN - PAH - by English is RAS (public domain)

Acknowledgements

The creation of St. Petersburg Academy of Sciences in 1724 was directly related to the reform activity of Peter I. It is one of the greatest services of Peter the Great to the future generations.

Could it be true that 290 years later the destruction of the Russian Academy of Sciences would be connected with to the names of the current Russian leadership? Could it be true that they will remain in history only as Herostrat, who, in order to remain in the memory of the future generations, burnt the temple of Artemida at Efes.

We hoped that our book, published first in Russian, shall help in making our small contribution to the struggle for saving the Russian Academy of Sciences. However, it did not happen.

Now (after the adoption of the law «On the Russian Academy of Sciences, reorganization of state academies of sciences and making amendments to separate laws of the Russian Federation») the Russian Academy of Sciences had become part of history. We wish it were the Academy alone, and not the entire fundamental academic science.

Nevertheless, we decided to publish the second revised edition of our book (in English) so that it was clear to the international scientific community how and why the Russian bureaucracy destroyed the Russian Academy.

This book never would have been published, if the examples of great Russian scientists were not before us (and teachers of many famous scientists) viz. Nikolai Vasilievich Pushkov, Evgeny Lvovich Fainberg, Vladimir Vasiievich Migulin, Vitaly Lazarevich Ginzburg (and many others), who had dedicated themselves to science and to the Russian Academy of Sciences.

May their memory and our deep respect to them live forever!

This book would not have been published without the help from the International Academy of Assessment and Consulting, and we are extremely grateful to it for support and courage to publish this book.

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RAS reform.

In conclusion, we would like to express our love and gratitude to our friends and colleagues from RAS, in particular, to friends and colleagues from the Institute of Terrestrial Magnetism, Ionosphere and Radio wave propagation RAS named after N.V. Pushkov with hope for their successful future in Russian science.

Igor Libin, Mikhail Kudryavtsev, Tatyana Oleinik,
Jorge Pérez-Peraza, Lana Surikova-Camus **Briefly about the authors:**

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Lana Surikova-Camus, specialist and expert in language teaching methodology, history of science, history and training technology. Development of the method «Lana Learning System», research scholar of the University of Russian Educational Academy on the speciality theory and methodology of teaching foreign languages. Author of more than 50 textbooks and workbooks on English. She speaks in English and German