

## New horizons of chemistry of the XXI century

**E. Z. Golosman**

*Ltd. «NIAP-Katalizator».*

*10, Svjazi St., Novomoskovsk, 301660, Russia*

*E-mail: evgolosman@yandex.ru; golosman.niap@mail.ru*

## Engineering and scientific elite at the Mendeleev congress in Ekaterinburg and reflections about science and education

The article by professor Eugene Golosman was dedicated to Mendeleev congresses, science, education, officials, conferences, Hirsch index, Academies of Russian Academy of Sciences, RIA, MANEB, competitions «Engineer of the Year», the Mendeleev Museum, the catalysts, the Union of scientific and engineering organizations, chemical society named D. I. Mendeleev. Eugene Zinov'evich is acting in the press, on television, radio and as a great scientist, and as a famous public figure. The raised issues are of a sharp polemic character, but always they seen the sincere interest of the author in addressing of key issues.

The evidence of the importance of the problems under consideration are the numerous responses from readers, responses from the heads of Committees on science, education, the State Duma, the number of Departments of the Ministries of the Russian Federation, the Russian Academy of Sciences and its departments.

**Key words:** Mendeleev Congress; higher education; production workers; D. I. Mendeleev; the Academy of Sciences.

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## Новые горизонты химии XXI века

**Е. З. Голосман**

*ООО «НИАП-Катализатор»*

*Россия, 301660, Новомосковский, ул. Связи, 10*

*E-mail: evgolosman@yandex.ru; golosman.niap@mail.ru*

## Инженерная и научная элита на Менделеевском съезде в Екатеринбурге и размышления о науке и образовании

Статья профессора Евгения Голосмана посвящена Менделеевским съездам, науке, образованию, чиновникам, конференциям, индексу Хирша, Академиям РАН, РИА, МАНЭБ, конкурсам «Инженер Года» музею Менделеева, катализа-

торам, Союзу научных и инженерных организаций, химическому обществу им. Д. И. Менделеева.

Евгений Зиновьевич выступает в прессе, по телевидению, радио и, как крупный ученый, и как известный общественный деятель. Поднимаемые вопросы носят острый полемический характер, но всегда в них видна искренняя заинтересованность автора в решении важнейших вопросов.

Свидетельством важности рассматриваемых проблем являются многочисленные отклики читателей, ответы руководства Комитетов по науке, образованию, ГосДумы, ряда департаментов Министерства РФ, Российской Академии Наук и ее отделений.

**Ключевые слова:** Менделеевский съезд; вузовское образование; производственники; Д. И. Менделеев; Академия наук.

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Recently in the capital of the Urals Ekaterinburg the XX Mendeleev Congress on General and applied chemistry was hosted. The Report-back election Congress of the Mendeleev chemical society was held in one of these work days of the Congress.

Plenipotentiary representative of the President in the Urals Federal district Igor Kholmanskikh voiced a greeting of Russian President Vladimir Putin to the Congress. Sverdlovsk Governor Yevgeny Kuyvashev addressed the Congress. The head of the Federal Agency of scientific organizations Mikhail Kotyukov congratulated the Congress on behalf of the Chairman of the RF Government D. A. Medvedev.

Vice-President of RAS academician Sergei Aldoshin expressed confidence that the Congress will allow to identify the main ways of industry development in the next five years.

The Chairman of the Ural branch of the RAS academician Valery Charushin at the Congress and at the opening of the exhibition recalled the motto of the breeders Demidov – «deeds, not words».



The President of the International Union of pure and applied chemistry (IUPAC), corresponding member of RAS Natalia Tarasova welcomed the Congress.

The permanent President of many programs of the Mendeleev congresses academician Oleg Nefedov and Chairman of the Russian Foundation for Basic Research, academician Vladimir Panchenko welcomed the Congress on video.

The President of the Russian chemical society, academician Aslan Tsivadze recalled

that recently the Russian cities other than Moscow and St. Petersburg were not ready to receive thousands of Congress.

The capital of the Urals managed to organize such Grand public gathering.

The organizers of the Congress were the Russian Academy of Sciences, Ural branch of Russian Academy of Sciences, Federal Agency of scientific organizations, the Government of Sverdlovsk region, the

Russian Chemical Society named D. I. Mendeleev, Ministry of Education and Science of the Russian Federation, Ural Federal University named the First President of Russia B. N. Yeltsin, the national Committee of Russian chemists, Russian chemists Union. The Congress was held under the auspices of the International Union of pure and applied chemistry (IUPAC).

### The First Mendeleev Congress

The first Mendeleev Congress to the memory of D. I. Mendeleev «Questions of General chemistry, chemical industries, technologies and applications of chemistry in different branches of science and technology» was held in St. Petersburg in 1907. The Congress was attended by representatives of 80 cities. Later the congresses were held in Moscow, Leningrad (Saint-Petersburg), Kazan, Kharkov, Kiev, Alma-ATA, Baku, Tashkent, Minsk, Volgograd.

The theme of the Congresses covers the key directions of development of chemical science, technology and industry, chemical education and interaction of business with science and industry, which distinguishes

them from common scientific conferences. The Mendeleev congresses are organized every four to five years in the largest scientific centers of the country and determined the path of development of chemical science and industry of Russia.

About 2000 delegates, including 300 foreign scientists and representatives of companies involved in the production of chemical products and materials participated in the largest Russian scientific forum in Ekaterinburg.

There are Nobel laureates, more than 100 academicians and corresponding members of Russian Academy of Sciences, hundreds of professors and doctors of Sciences,



700 young scientists among 2000 participants of the XX Congress. The President of the Russian Engineering Academy, corresponding member of Russian Academy of Sciences, laureate of the Government prize of the Russian Federation B. V. Gusev and other active members of this Academy; academician, laureate of the State prize and the prize «Energy» V. N. Parmon, academician of RAS, Honored Petrochemist of the USSR, laureate of Government Prize of the Russian Federation S. N. Hadzhiev; the Government prize laureate the academician V. V. Lunin, academician, laureate of the State prize M. P. Egorov and others also took part in the Congress. More than 1,100 scientists made oral and poster presentations. About 2,500 abstracts on behalf of the 7800 authors in Russian and English were published in 5 volumes of materials of the Congress.

The discussion of many chemical problems, including chemical education and teaching in Russia, the interaction between chemical science and business, actual problems of the nitrogen industry, in addition to plenary, oral and poster presentations

### The Congress in the Tauride

Of course, to read, to listen to stories, watch on television is very interesting but, of course, nothing can replace personal participation in congresses.

I was lucky enough in life to participate in several of the Mendeleev congresses in Leningrad, Minsk, Moscow, Volgograd... The participation in the X Mendeleev Congress in Leningrad in 1969 was most memorable, which was dedicated to the 100th anniversary of the opening of Dmitri Ivanovich Mendeleev periodic table. As they say, with open mouth I watched the famous organizers and participants of the Congress, held in the Tauride Palace in Len-

were held in the framework of the 9 sections, 3 International symposia, 10 round tables, which represented a great platform for discussions of the experts of science and industry, defining the direction and development of the metallurgical, petrochemical and other industries.

Of course, the implementation of such large public gathering would be difficult without the financial contribution of sponsors and dozens of organizations.

The leadership and members of the organizing Committee, Moscow and the Ural experts, scientists of the Ekaterinburg and, of course, hundreds of young volunteers (students and postgraduates) in beautiful t-shirts with the inscription «I love chemicals» were of great assistance in the conduct of the Congress. With gratitude I must mention a tremendous job of scientific secretaries of the Congress, Dr. of chemical Sciences, Professor Yu. G. Gorbunova, candidate of chemical Sciences O. A. Kuznetsova.

Ekaterinburg is the largest centre of chemical and metallurgical industry of Russia, the capital of the Urals was chosen to host the XX Congress

ingrad. 2,000 people including many foreign guests took part in the X Congress. I call a few names: Nobel laureate N. N. Semenov,





academicians S. I. Volkovich, N. M. Lark, Gol'danskii, V. I. Tananaev, Y. K. Syrkin, Deputy Chairman of the Council of Ministers, V. A. Kirillin, Minister of education V. P. Elyutin and dozens of the most famous scientists in the world. What presentations were made by the discoverers of new elements – the legend of science, academician G. N. Flerov (opened 104 element – rutherfordium, and in honor of the Flerov element 114 is named flerovium), Chairman

of the atomic energy Commission USA G. Seaborg (synthesized plutonium, and together with other scientists discovered americium, curium, berkelium, californium, einsteinium, fermium, mendelevium, in 1997 in honor of Seaborg the 106th element is named seaborgium). And the reports of the Minister of chemical industry L. A. Kostandov, Director of the Institute of catalysis academician G. K. Borekov were impressive.

## King Henry IV

Unwinding of tape memory, I thought and the possibility of the participants of the Congress to visit theatre of Arkady Raikin and first heard and seen by me scenes of then still not very well known in the country, the brilliant Mikhail Zhvanetsky performed by Raikin. Unfortunately, ordinary members of the Congress did not have the opportunity to purchase tickets to the Bolshoi Drama theatre under the direction of famous producer George Tovstonogov. I having been to the beginning of the theatrical play to the theater and talking with the manager, who explained to me that the tickets here are the local currency, I realized the hopelessness of getting into the theatrical hall. It was light rain, I walked along the Fontanka river, where the theatre was and I thought, how I can get to theatrical play. And finally the desperate idea came to my head, which is characteristic only of reckless youth. I'm waiting for the intermission, take off my nylon coat, put it in the gutter and together with the audience, released during the intermission outside to smoke, I go to

one of the lodges and watch standing two acts of the play «King Henry IV» by William Shakespeare with great actors Sergey Yursky, Oleg Borisov, Evgenie Lebedev, Yefim Kopelyan, Vladislav Strizhelchik, Oleg Basilashvili, Nikolai Trofimov, etc.

And after dozen years I think that I was then a young specialist, the employee of branch of the State Institute of nitrogen industry and was lucky to take part in the Congress, and how much it gave me in further work and I hope, in the transfer of the commitment to science to my young colleagues in the created sector, laboratory which bore the name of SCAR (study of catalysts, adsorbents, reactions). I think that I did something for science, industry. There are hundreds of articles, books, reports, patents, developed catalysts are introduced at nearly 200 enterprises of the USSR, Russia, CIS and far abroad. But, apparently, SCAR and many industry and academic research institutes flew very closely to the sun and now it's not, unfortunately.

## Periodic legality

But back to Ekaterinburg. On behalf of my colleagues – experts «NIAP-Katalizator», NAK «Azot», «Nizhnekamskneftekhim» I submitted two reports to Congress (on cat-

alysts of methanation and purification of propane) and at the round table «Actual problems of nitrogen industry» (under the leadership of corresponding member the

RAS V. G. Sister) a report about the industrial catalysts, developed and produced in the «NIAP-Katalizator».

Dozens of sections and round tables scattered in the giant center Ekaterinburg-EXPO, thousands of reports to listen, of course, was impossible, despite a very tough program (the beginning of the Congress at 9 am and ending at 20 pm). I mention some from the most prestigious reports.

Many years ago D. I. Mendeleev said: «Periodic legitimacy for the first time gave the chance to see else undiscovered elements so far, which chemical vision unaided by this legality until then not achieved and thus new elements informed of their discovery draw a lot of properties». These predictions soon came true brilliantly. In our days the discovery of new elements continues. This is evidenced from the report of Yu. Ts. Oganessian and S. N. Dmitriev about the discovery of new superheavy elements with atomic numbers 113–118 of periodic table of D. I. Mendeleev. The opening of a new region of stability of superheavy elements has created a whole range of new questions and, in particular, where the boundaries of the periodic table of D. I. Mendeleev. Academician Yuri Oganessian together with two American scientists have been nominated for the Nobel prize in chemistry in 2016, but the prize was received by other scientists. Recently the question was resolved finally and one of the newly discovered elements will now bear the name of Oganessian. Also the question was resolved on naming one of the new elements – Moscovium (in honor of the Moscow region Dubna), where is the joint Institute for nuclear research, jointly with Lawrence Livermore national laboratory (USA) conducted experiments for the discovery of new elements). However, as noted by academician Oganessian «In our



country one opens and the other has the right to name».

At the closest to me for many years the subject (catalysts) reports of academician V. I. Bukhtiyarov, professor V. M. Kapustin, academician A. G. Dedov, corresponding member of RAS Z. R. Ismagilov made the greatest impression. I mention only a few of the reports (of the many) who failed to listen to personally.

For the Russian and world science, the importance of the Congress was underlined by the participation of the President of the RAS academician V. E. Fortov with report «Chemical elements in extreme conditions». A speech in the message V. E. Fortov was about the behavior of chemical elements in conditions of ultrahigh pressures. At the same time their properties change dramatically. In the coming years, there is perhaps the discovery of the chemical elements that do not fit into the periodic table, which undoubtedly will force to expand the boundaries of knowledge.

Of course, there is the brilliant report by Nobel laureate Daniel Shehtman, professor at the «TECHNION» (Haifa, Israel) and the

University of Iowa (USA). No revolution in the science of crystalline materials was not expected, to the works of D. Shehtman. For more than 10 years his works would not even print, criticized. But he persistently argued the importance of his scientific

ideas. In the end, the Nobel Committee noted that its discoveries have forced the scientific world to reconsider their views about the nature of the materials. There is a great example of devotion to science and perseverance in achieving goals.

### **Where there are production workers...**

I would like to point out the problems with the audience of our speakers. The time requirement is the implementation of developments, and number of production workers (engineering managers, heads of departments, leading and chief engineers) is extremely small. The reason is the miscommunication of owners and management companies, insufficient awareness of plants and the exorbitant cost of almost all scientific conferences, conducted at least for the last 15–20 years. Unlikely due to the current production employment, as well as high cost the employees, even from the surrounding regions from the location of the conference could not participate in scientific forums for 4–5 days. But it really would be to organize the delivery of engineering and technical personnel alternately for a day at least. It is necessary also send invitations to our conferences not only to directors and chief engineers, but it is necessary to inform personally and their deputies, chiefs of industries, shops, etc. I remember that in Nizhnekamsk the chief engineer of OJSC «Nizhnekamskneftekhim» has led to the conference «Innovative petrochemical technologies» about ten directors of the plants. And each of them

is briefly told what problems they have in production. The workers outlined the objectives and asked the scientists to solve these problems. Otherwise, as happens now, researchers talk to other researchers about their achievements that it is imperative to implement. New achievements of the Russian developers do not reach producers, and most importantly are not discussed with the practices. Hence, perhaps, there are the illusions of developers from universities and academic research institutes which do not represent fully (in contrast to specialists of branch institutes) the most difficult problems with scaling their achievements.

I remember how at a conference «Scientific bases of preparation and technology of catalysts» academician I.I. Moiseev after his plenary report noted that he listened to a huge number of messages with beautiful modern methods, excellent appliances, and new industrial catalysts are enough!

Our Congress is also no exception, and it is devoted to fundamental and applied chemistry. Here are also largely unclaimed potential of Russian science, though of course there are many other reasons. They are slightly lower.

### **And again about education**

Of course, a lot of questions were related to university and high-school education. Science, education, medicine can not, should not be services. I will focus on the problem of the closure

of a number of universities. This is especially painful for the regions. Yes, it is possible to strengthen a few dozen universities in Moscow, St.-Petersburg, Novosibirsk and other scientific centers. Of course,

who would argue – good institutions with modern equipment devices and qualified teachers are need. Yes, it would be good, if they were all at the level of the Massachusetts, California,... the Indian institutes of technology, or our Physical technical Institute. But it's unreal. But only 15–20% of adolescents will be able to arrive for study in these universities, the parents of other adolescents will not be able to provide financially. Besides, most universities have a lack of places in hostels. Did the authors of the idea of reducing of the number of universities to minimum think about that how much graduates from these universities go back to work in the province after the temptations of life in the capital and other cities?

According to the information of the President of the Russian Academy of Sciences and the Chairman of the Committee on science of State Duma, nearly 80% of the graduates of metropolitan universities who came to study from different cities, are staying in megalopolises. Who will work in factories, design departments, research institutes, the Russian open spaces?

To strengthening of provincial universities it's need to send there mostly young candidates and doctors of Sciences from leading universities and research institutes of the country (of course, with their consent and with the provision in the first phase of service apartments with the right of privatization in 7–10 years), as it was done once many years ago.

Of course, it's need to «refresh the blood», to establish links of various scientific schools, and not to carry out mechanical reduction of students and teachers, and not to deprive the regions capabilities of education and culture centers. It would not had to recall the old joke: to the question, which institute is easiest to get,

followed by the answer – in the institute of Sklifosovsky.

In Novomoskovsk in 1958 the branch of the Moscow Institute of Chemical Technology (now the SR RUCT) was organized. More recently, the number of full-time, part-time Russian and foreign students was approximately 5000. There are the huge buildings, the stadium, dormitories. Our giants – NAK «Nitrogen», «Procter & gamble», «Plaster of Knauf», TPP, «NIAP-Katalizator», etc. enterprises of Novomoskovsk, Tula, Efremov, Schekino were provided by the graduates (technologists, mechanics, power engineers, economists) for many years. The graduates of SR RUCT named D. I. Mendeleev work in dozens of Russian cities.

Whose wisest decisions led to a sharp reduction in students, teachers? The city of chemists, engineers and the region will be left without University... I thought about who was nominated, endorsed, appointed Ministers A. Serdyukov, D. V. Livanov, the acts which in the field of science, education, the army will long disentangle country?

Who is the concrete author of the law about the so-called reform of the Russian Academy of Sciences? The diligent, zealous conductors of this reform are enough, but still would love to know the main authors.

It is time to solve questions of graduation of the bachelors (unfinished engineers).

Who will be working on high-tech enterprises? It should be noted that the demand for bachelors in the industry is virtually nonexistent. It seems that the country back in the thirties of the last century, when it was necessary to prepare the technical specialists in a hurry on the workers' school. It is known that even engineers have to complete their education in enterprises for the purpose of production of the industry. The good full-fledged en-



gineers are need. And instead of bachelors it is necessary to increase the training of qualified technicians and lab technicians in technical schools and colleges. It's necessary, at least at universities, if a shortage of students is experiencing, students can, in my opinion, to prepare as technicians and laboratory assistants. Thus, the download of the lecturers of these universities and use, as a rule, richer than in technical schools and colleges training base will be provided.

If the state needs more highly skilled workers, there are still technical schools, colleges, professional schools. If they are insufficient and need in the 21st century, more skilled workers, let's release them further in technical universities. The society will get highly skilled workers. Will remain The good base on the basis of universities will remain, and the teaching staff will be protected. I remind that in developed countries the share of highly skilled workers is up to 50%, and in Russia - 5-10%.

It is necessary to save the technical universities, especially those located in industrial regions, but to strengthen their material base and teaching staff with involving, as noted above, experts from leading research institutes and factories. The students of these universities will undertake training in the surrounding businesses and, of course, they will first be able to replenish the corps of engineers in their regions. Is it not clear that graduates of MSU, LSU, NSU... designed primarily to work in the Russian Academy of Sciences, analytical centers and can't resolve problems with engineering personnel.

The issue of attracting of professors and associate professors employed in research institutes and industrial enterprises to universities has long been discussed. It is the symbiosis of university teachers with

assistants initiated once the legendary Moscow Engineering Physical-Technical Institute, demonstrated a high efficiency in the preparation of undergraduate and graduate students.

The Department of catalysis of Novosibirsk University, headed by academician of RAS, Director IR, SB RAS Vladimir Bukhtiyarov shows excellent results in the training of undergraduate and graduate students. A significant proportion of teachers are the employees of the IR of the SB RAS, where, in addition, the students and graduate students can work at real problems and listen to lectures of leading specialists and later to work at the famous Institute of catalysis.

Unfortunately, in some universities the picture is quite different. By following out decree of the President of Russia about increasing of salaries of university employees, there is washing away part-time workers reported to be 0.1-0.5 wage rate, thus, raising his average salary to high school teachers. Who is it for camouflage? Who are we kidding? We deprive students and graduate students of contacts with leading practical specialists. And, above all, who will prepare engineers from students without specialists of research institutes and factories?

At the presidential Council on science and education it discussed about the loss of popularity of engineering education, the shortage of qualified engineers, which become the constraining factor of the development of the economy, and about the need to bring education to the production, about that educators have to teach students who know modern production that real university is university where there is science and that not only university educators but also practitioners should be taught students, for which the Ministry of Education will eliminate excessive barriers like restrictions

on moonlighting, for those who are doing science or working on a real production.

Changes not yet visible. What are else need directions?

### **And we're dreaming Hirsch**

And once again about rating of scientists, engineers, about citation and Hirsch index. How can you compare scientists, teachers, engineers and to do assessment of their work on different publications. One author wrote a review article that is cited many times. Another author wrote an article on the new results, which may be quoted in a few years. How to compare time for preparation of one large article and 2-3 small articles. What if some materials at certain stages, can be quite long, are closed and the authors have no possibility of publication. In addition, the citation depends on the number of researchers in this field.

Hirsch index is an important but not the only defining assessment of the level of researcher. I repeat multiple statements made in the scientific community. Hirsch index cannot serve as an absolute, objective criterion for the evaluation of the activities of the scientist. It reflects the overall result of the work, but not efficiency

We jump aside all the time: a Single state exam, Hirsch, consolidation and liquidation of universities, the Bologna system. I'm not talking about «cross-pollination» – mutual agreement of citing of articles between the parties. And finally, the highest rating is achieved when printing in foreign magazines for publication some of which require payment requires.

### **Ab ovo (lat. from egg)**

At the Congress, round tables, on the sidelines, of course, the questions of reorganization of RAS were discussed. Three years have passed. Have any results achieved? In my opinion, except expenses (insoluble contradictions between RAS and FANO), this reform did not improve anything.

ously supported by unprepared law on the reorganization of the RAS, also cleaned their ranks, especially after the speech of leader of the Liberal Democratic Party, who said that in the Academy there are all the old, and that after 40 years the brain for creativity runs out. Or does the brain need only to scientists?

Of course, there are a lot of questions to the work of RAS, but who doesn't? Who does not remember about the problems not only in RAS but also branch research institutes, let's see the numbers of drop in GDP, as well as monthly, annual reports of the investigative Committee and other power structures about the different agencies, including well-known public persons. Yes, it is necessary to clean the ranks of the scientific community, first and foremost, from bare administrators. But it would be nice that the deputatskiy corps, so zeal-

For 300 years Russia has developed academic science. Why is need to break it through a knee? If the train station works badly, it is not demolished and the chief exchanges.

At one meeting the President of Agricultural Academy of Sciences Gennady Romanenko said that «at all times our leaders think about science when in the country there are problems, and when with the help of science they are eliminated, they begin to reform the science».

What kind of understanding of destructive process of elimination and even – the new wording is supposedly a reorganization can be discussed when during the debates about the law on RAS in the State Duma, candidate of economic sciences, Deputy Prime Minister Olga Golodets said that after the reforms the sectoral science is alive and well, and Academy after the reforms will live well. And this is declaration to the deputies, all over the country and including all of us, the staff of defeated branch research institutes.

Many years ago, when they began to destroy the institutes, I interviewed a number of academicians and leading scientists of the RAS, proved that if you do not stop the rout of branch research institutes, Academy of Sciences, with its huge property in the center of usually the largest cities will be next. Academics did not joined to the ranks of the defenders. Although they resented, but quietly. Remember at Saltykov-Shchedrin: «the Governors are on their knees, but it is clear that rebelling»? What is it, in particular, brought? To implement the development has become problematic. The Academy is increasingly criticized by the fact that its researches are divorced from industry although the funding is modest. The intention of mainly selective funding of individual groups is totally unacceptable, which of course will lead to petty themes. Even the best scientists and laboratories invariably need to replenishment of the scientific masses. To determine administratively what research groups must cease financing is the very dangerous and will lead to a mass resignation of researchers. The effects of this impact catastrophically in a short time. This is evidenced by the Russian and international experience. In Russia there is no longer excess of scientists,

and we are on the number of researchers per 10,000 people somewhere in the third ten.

The reform of such complex Corporation of scientists like RAS slow down the development of Russian science for many years. Academician, Nobelevskiy winner I. Pavlov about the first reforms of the young Soviet power in the 20-ies of the last century, ironically commented: «I would try first on the dogs».

The Confirmation of rashness of reforms is the continuing departure abroad of talented engineers and other specialists. I repeat the classic example. Germany, who lost after the war, plants, equipment, leading scientists and designers after the war have been unable to reclaim, for example, superiority in aircraft even decades later.

The losses of Russia only from the departure of our talents abroad from the inventor of television V. Zworykin and chemist V. Ipatiev to the Nobel laureates K. Novoselov, A. Geim is ten times higher than the annual budget of the Russian economy.

Along with the leak of young, energetic minds abroad, and possible patents leaked. The cost of obtaining patents is very high. If patents don't give, there is high probability of intercept of the developments by foreign companies. What, don't need the fixing of inventions of Russia to the state? The number of accepted patents of the Russian Federation in the year is inferior to the USA more than 15 times, and China more than 40 times.

We know from human history that basic research will sooner or later ends up applied results (laser and thousands of other examples). Yes, science is a risky industry. It takes about three thousand ideas to get one large real commercial product. But even in this case firms and the government get huge profit. It is necessary to know everything, including the poorly prepared critics of science.

## The drivers and officials...

The acceptance of officials to RAS raises many questions and complaints in society. What attracts them there? Of course, I suppose that is the prestige, the creation of alternate aerodromes and the opportunity to practice good positions, well, lifelong scholarship of academicians and corresponding member of RAS will not be superfluous.

And yet, I think that there prestige, ambition in the first place. It was in tsarist times, the Soviet Union and continues today. It concerns and the desire of thousands of officials of all ranks, especially in the field of law, political science, sociology, history to become candidates and doctors of Sciences

Very interesting story is about the desire of one of the king's war Ministers to become

an academician. Academicians were gathered, they don't know what to do. How does he relate to science, what are scientific papers? One of the leaders of Imperial Academy says that he's still close to the king. What free-thinking academician noticed that the driver of the Royal carriage is closer to the king and even sitting with my back to him... the Minister has not elected, and the academician was sent.

The separate theme is nepotism, the «roofs» at the Academy. For a long time on my Skype hangs «Has the science the "bullying"?» There are still some! But this theme requires a separate page and a separate discussion. «The moral of the story is: Another label is stronger than a lion».

## The effectiveness of scientific research

Yet, despite all problems, we can cite many examples of the effectiveness of scientific researches for «citizen» and «defense». I focus on few close to me examples of topics related to the development of effective catalysts underlying in basis of the 85–90% of all chemical technologies, used in various industries. The total volume of world production produced in a year by using catalytic technologies, is estimated at \$3 trillion dollars. The cost of the annual production used for this catalyst does not exceed

13–15 billion dollars. In other words, the fraction of the cost of catalysts in the output producible with their help usually does not exceed fractions of a percent. This is the effective research developments! It is pleasant to note that among the 500 industrial catalysts used in chemicals, petrochemicals, metallurgy and other industries of the Russian economy more than four decades is the development of my hometown of Novomoskovsk Institute of nitrogen industry («NIAP-Katalizator»).

## Catalyst is the strategic concept

Despite the fact that the production of catalysts in Russia for a long time attributed to the so-called critical technologies, the share of imported catalysts supplied in our country is steadily growing and accounts for a variety of industries from 60% (nitrogen industry) to 90% (getting gasoline). I remind you that a large part of chemical and petrochemical products is manufactured using catalysts. The catalysts are used in all

industries for purification of technological and exhaust gases. The exporting countries, if it's necessary, can exert the enormous pressure by restricting the supply of necessary catalysts. The consequence of such rigid policy is very alarming, because now the number of countries which have full complex of technologies of production of catalysts of oil refining (industries are strategic to the economy of many states), was



less than the number of states possessing the technology of production of the atomic bomb.

I discussed the problems of sanctions with a number of managerial staff of chemical plant and reproached them that they don't help us – industry institutions, in the end, the chemical plants can remain without catalysts. The response of some professionals was discouraging. Nothing, we buy in China. As they say, thanks to the Chinese proletariat for the fact that it freed the Russian proletariat from working.

Science is increasingly offered to do all yourself: and costly research and self-financing and carry out industrial applications. As it was said in KVN: «What is a manicure? When it is not himself biting his nails». And yet, the words of Nobel laureate Peter Kapitsa are «the main impetus of each work is discontent».

The production of catalysts is reduced. Europe's largest catalyst plant in the city of Dorogobuzh, which was built on developments and projects GIAP and his Novomoskovsk branch completely was closed. Thousands of tons of catalysts of world-class, including created by me with the staff were produced in the factory.

The deprivation of industry, academic, university science by necessary support with such short-sighted behavior of public figures recalls: «Girl escapes from a vampire, scratches, screams. And he speaks philosophically: "Well, why do you just piss off and nervous? I just drink a pill"».

Are there still examples of creation of new effective industrial catalysts? This is, of course, the development of the Institute of catalysis SB RAS and the latest developments of the technological Institute for superhard and novel carbon materials in Troitsk.

There are a lot of high class researchers in our country, but the list of creators of industrial catalysts, which are able to bring your product to the introduction, unfortunately is few in number. Once again I have to say – bridge of the RAS, universities, industrial science is destroyed. And yet we eat «old baggage».

I will give a few developments of our «NIAP-Katalizator» (former branch of GIAP) in the city of Novomoskovsk.

It is a catalyst for methanation processes (one of the stages of aggregates of ammonia synthesis). Its service life was able to extend from 5 years to 15–16 years or more. The confirmed economic effect from the introduction of these catalysts was several billion rubles. Despite the expansion of foreign companies, almost all methanators in Russia and the CIS were uploaded by it.

In the last few years a new, more effective catalyst for methanation with a number of significant advantages has developed with colleagues. But there is no interest in the management of the plants when introducing a new, even a highly effective catalyst. Apparently, they think, will these heads even work? Why did they experiment...

And a very good example is the catalyst of decomposition of ozone. Ozone, when the content of it in the air already is above of thousandths of a percent, it effects on a person stronger hydrocyanic acid. We have developed jointly with the chemical Department of Moscow state University named M. V. Lomonosov and the company «TIMIS» highly efficient catalysts that operate in thousands of installations in many civil and defense industries and even in the hadron Collider in Switzerland.

In Moscow on the Western waterworks 240,000 m<sup>3</sup> of water are ozonized (instead of chlorination) in the day and the residual ozone is decomposed in our catalysts.

The works on the creation of catalytic decomposition of ozone are awarded by the prestigious prize of RAS named out-

standing technologist of the academician V.N. Ipatiev.

### **A new drug of plant protection**

New fungicide – copper-ammonia-carbonate solution (MAKR), having higher characteristics of protection of plants (Bordeaux mixture, copper sulphate, etc.) was created. The product does not contain harmful impurities and allows to carry out root additional fertilizing of plants, stores for a long time, in any containers and may be used for the treatment of hooves of animals and for preservation of wood products. The drug is many times cheaper than the existing ones.

### **Public Academy**

And public Academies contribute to the solution of many problems of the industry, including the largest Academy – RIA, MANEB engaged in scientific and engineering activities on key issues of science and technology in almost all industries. Nobel laureate, academician Zhores Alferov, academician Aleksandr Ishlinskiy and many other academicians and corresponding member of Russian Academy of Sciences, distinguished statesmen and organizers of production, winners of foreign and the state prizes of the Russian Federation and etc. include in these academies.

The most complete and significant results of the activities were summed up at various conferences, plenums and congresses of engineers of Russia in 2003 (in the Kremlin), in 2010 and at the recently held (may 2016) in Moscow in October hall the International forum «Sustainable development and solving of scientific and technical problems in various fields of creative activity».

There are excellent results of experimental tests in large farms and in suburban areas. But the exorbitant multi-million funding is required for the paperwork in the Ministry of agriculture and other centers. In this regard, I remember a gloomy joke: "To pull a nail out of your head you will have to pay 100 thousand rubles. But I have the same policy?! We can bend on the policy, that it not interfered".



Golden Sign of RIA

The preparation of RIA starts to III Congress of engineers of Russia, which will probably take place in Ekaterinburg. The speeches of scientists, engineers, business leaders are shiny, the solutions are fundamental. I had euphoria especially after the first Congress in the Kremlin, and probably not only I had. There were the grand collections of the engineering elite, the smartest decisions.

What will be next in real life with science, education, critical ageing of production assets, GDP... It's not so good. All of this in our reality reminds me how our famous supervisor at all concerts before

beginning got into the pocket of his coat, pulled out a note, read it and then started to conduct. The audiophiles could not understand, and finally, with difficulty found out contents of the note with the wife of the conductor: the violins are left, the cellos

are on the right. Apparently, many of our government leaders would be nice to know where there are specialists of our country—metallurgists, chemists, shipbuilders, electronics, power engineers, builders, geologists, engineers, economists.

## White nights

I was able to visit not in many conferences and congresses held by the Academy of MANEB. I remember the 4th international conference in 1999 on ecology under the auspices of MANEB, the Ministry of Science and Technology of the Russian Federation, RAS, etc., which took place on the board of the ship «Saint-Petersburg». The route was «Saint Petersburg – Valaam – Petrozavodsk». The ship had well equipped conference hall which was almost always 100 % filled by the participants.



The breaks were at the time of the visit of Balaam, etc. Islands, Ladoga lake and Onega lake and Petrozavodsk. There were the beauty of the Northwest, the white nights, the historic White Sea-Baltic canal. I also

had a report on the catalytic purification of process and exhaust gases.

The organizing Committee by headed President MANEB, professor Victor Rogalev recommended to speakers for preview of participants to hang their reports on the stands. My big report was well decorated and was supplied with pictures and witty sub-headings of its individual parts. The report hung in the conference room for 1.5–2 days and disappeared. The appeal of the organizing Committee with a request to return the paper was constantly on the board radio. During lunch of the participants of the conference the head of one of departments of Petersburg, who was sitting at our table heard the recurrent announcement about the missing report, invited me with a serious face not to get upset – «Your report was of use. Have you seen, Eugene Zinov'evich, that during the final approach to the island the gorgeous herring was selling, which was wrapped in your report»? The joke was a success. I did the report, but never saw the artistic text.

## The competition «Engineer of the year»

The competition «Engineer of the year», which RosSNIO conducts under the guidance of academician Yuri Gulyaev and Vice-President of RosSNIO Vladimir Sitztev, become a good way to attract engineers to research and innovation activities, revealing of the elite of the engineering corps, formation of interest to engineering work of youth.

This competition in about ten years also carried out the Tula Union of scientific and engineering organizations in two versions: «Engineering art of the young» (for participants up to 30 years) and «Professional engineers». The competition had 10 categories: 1) mining and underground construction, 2) informatics, information networks, computer engineering, 3) mechanical en-



gineering, 4) instrument making, 5) radio engineering, electronics, communication, 6) construction, 7) technique of military and special purpose, 8) chemistry 9) metallurgy, 10) energy.

The winners are given the diploma of the winner of the competition and the beautiful badge «Engineer of the year» made at the Mint. The awards are given annually in the Tula regional House of science and technology in the Day of Russian science, February 8. The award ceremony is held by the administration, Council, USEA. The special issue of the newspaper is produced. The regional competition is held under the leadership of President of SNIO, professor Alexander Chukov and director of DNIIT Vladimir Mikhailovsky.

The engineers of Shchekinskii p/o «Nitrogen», the enterprises «Tulatochmash», «Tulamashzavod», Tula arms plant, plants of town Efremov, researchers, professors, associate professors, engineers of the Tula State University, SI RCTU named D.I. Mendeleev, «NIAP-Katalizator», etc. actively participate in competitions of various categories. The engineers of the defense plant «Splav» most actively participate in com-

petitions. The general director (now scientific leader), the Hero of Russia, professor Nikolay Makarovets gives great support on the organization of the regional competition and the participation of the engineers of this plant in the competition for many years.

Repeatedly and engineers of the city of Novomoskovsk became the winners of the contest, and in the first place in the nomination «Chemistry» (technological, industrial, scientific and research work) and were the winners of the Russian contest «Engineer of the year» (E. Golosman, V. Efremov, A. Dul'nev, etc.). The names of the winners of the national competitions are in the hall of Fame SNIO. You can regret that a number of our chemical giants, including «NAC "Nitrogen"», «Procter & gamble», the plaster pant for completely unexplained reasons in such prestigious competitions will not take part. Non-participation in the competition is due to a lack of understanding enterprise managers and, of course, with the lack of activity of the engineers of these companies.

And in February, 2017 the regional Union of scientific and engineering organizations celebrated the Day of Russian science. There was full auditorium (area managers,



The winners of the contest "Engineer of the year"



engineers of various enterprises, students and University professors). In the nomination «Chemistry» six engineers from four organisations of Novomoskovsk («NIAP-

Katalizator», NO RKhTU named D.I. Mendeleev, «Plazmotekh» and «Piper») were the winners. All of them were awarded medals and diplomas.

## Handsome city

For the participants of the XX Mendeleev Congress the cultural program was prepared. This is the sightseeing tours of Ekaterinburg, the visit to Ganina Yama (the former mine in the area which were thrown the remains of the Royal family and entourage, now there is founded the monastery)) and excursion on the border of Europe and Asia. Numerous museums, exhibitions, theatres were proposed.



Due to the tight schedule I only managed to take the opportunity to participate in a short sightseeing tour of the city. Officially in the capital of the Urals 1.5 million people is inhabited. The high cost of land makes to build a lot of high-rise buildings (second place in Russia after Moscow). And

## Ipatiev house

Many years ago I was in a long trip through the cities of the Urals (Magnitogorsk, Beloretsk, Pervouralsk, etc.) where implemented our catalysts for producing protective atmospheres in the metallurgical and pipe plants and I've been in Sverdlovsk (now Ekaterinburg). My older brother worked here. One day he went to

two biggest towers «Iset» and «Vysotsky» were built. The height of the 54-storey tower «Iset» is 209 meters. The height of one of the most energy efficient buildings in the country – the 50-storey tower «Vysotsky» – is 188 meters. There is an observation deck and even a helipad. The building is a Museum of Vladimir Semenovich. This skyscraper was the first building in Russia, which was carried out vertical run. The participants overcome 1137 steps by foot.

One of the most beautiful places is the Plotinka (city pond) on the site of the former main state plant on the small river Iset. The most beautiful monument to the founders of city Vasily Tatischev and de Vilim de Gennine is next to it. The city has many of the original monuments and preserved ancient buildings.

In fact, most part of tour on the city took place through the glass of the bus. We went on «Plotinka» and near the former house of engineer Ipatiev – brother of the famous chemist-technologist of the XX century, Vladimir Nikolayevich Ipatiev (about the genius of science, the academician V.N. Ipatyev I have previously published several articles).

Pervouralsk and dropped me off at the pipe plant, where our catalyst was exploited. On the way we drove to the 2-story Ipatiev house, in the basement of which the Royal family was shoot.

The Museum of the revolution, party archive, an antireligious Museum, the exhibitions were housed in the house in



different years... In September 1977, the building was demolished. In 2003 «Church on the Blood» was built there. The height of the temple is 60 m, its area is 3000 m<sup>2</sup>. The monument to the Tsar family is included in the ensemble of the temple. On the walls of the temple there is a huge amount of documents and photos. It is not only the current



Cathedral, but a Museum complex. 20 to 25 minutes was allotted on examination of the Cathedral, since it was necessary after the tour to go to the evening session of the Congress.

It's a pity that the tour was short, because to see in town you can pretty much. But inexorable time is inexorable..

## Congress decided

At the final session it was noted that the reports and proceedings of the Congress reflected the recent direction of development of chemical science and technology, many current developments, and outlined the prospects for their development and use. The Congress confirmed once again that chemistry occupies a special position in the process of transition of our country towards sustainable development, allowing to solve a wide range of tasks from the study of the molecular basis of life and sustainability of the natural environment up to the creating of new materials and energy sources. Congress demonstrated the achievements of Russian and world chemical science in the areas of innovation developments to create new materials and technologies, including nanomaterials and nanotechnologies, the development of new drugs, electrochemical energetics, alternative energy resources and motor fuels from plant material, environmentally safe (i. e. green) chemistry and sustainable development problems. The

special attention was paid to the issues of chemical education and the fight against chemophobia.

The Congress draws the attention of the Government and of the Commission on modernization under the President of the Russian Federation on the inadmissibility of the mechanical merger of universities, academic institutions.

Congress believes that one of the most important social factors for successful implementation of the proclaimed by of leadership of the Russian Federation the strategy of modernization of the Russian economy through innovation is the availability of highly skilled scientific and engineering personnel. The development of such skills requires increased attention of society to secondary and higher technical education, as well as to schooling, which will tend to cause interest of pupils to study natural science subjects – mathematics, chemistry, physics, biology. In this regard, the participants of Mendeleev Congress consider the



necessity to ask the Ministry of education and science of the Russian Federation to ensure the development and implementation of system of measures on improvement of training programs (including increasing the number of hours to study chemistry and physics in school) and teaching chemistry and physics in secondary school.

At the same time despite some successes the Congress believes that further development of chemical science and industries, chemical education and related sectors, with a glance of their significance and potential capacities, requires the adoption of urgent measures to accelerate the commercialization of results of fundamental researches and the improvement of legislation in matters of intellectual property. The providing investment, update technology and engineering, expanding of the attracting of talented young people in the chemical science and industry, strengthening of its social support also are required.

I offer my opinion briefly, which was outlined in several publications on the work of industry and academic institutions and universities. The ill-conceived reorganization of the Academy of Sciences, the strange association of universities, reduction of staff, low funding, the transformation of education in schools and institutions in services didn't contribute to the success of science. I want to remind you the statement, attributed to German Chancellor Otto von Bismarck: «the War is won by school teacher». On the ratio of expendi-

ture on science and GDP, Russia ranks last among major developed countries. The relationship between the authorities and the scientific community is becoming more like – «I checked, you are not sick of me».

The very low prestige of scientists in recent years is disastrous for Russian science. In Canada the survey was conducted: «What an achievement more raises the patriotic spirit – the Nobel prize or the number of medals at the Olympic games»? Almost 75 % of Canadians chose the Nobel prize. As the newspaper «Izvestia» wrote, the Sochi Olympics are more important than Stockholm for us.

The disappearance from the map of Russia more than 5,000 branch scientific research institutes and KB from 6000 in many ways reduced and opportunities to implement of developments of academic research institutes and universities to industry. I asked more than once – how many are the engineers in Russia? It seems that there is no accurate data. At the I Congress of engineers of Russia in the Kremlin in 2003, two speakers called the various numbers 15 and 11 million. On the Internet the exact figure is absent. More specific information about the number produced by our institutions of engineers is more than 400,000. There is the huge army of graduates, but not all they work in the specialty. Of course, it's repeated like a mantra «the engineers and scientists change the world». Why ENGINEERS go into other areas? It's not prestigious as science. The salary of engineers



in Russia to 2016 in the regions in various sectors ranges from 11000–15000 to 100000 rubles and more. Of course our oilmen, working in difficult conditions receive high wages, it's no doubt. But why do engineers performing roughly the same work in the big cities and especially in Moscow, receive 3–5 times higher salary than in the regions, for example, in Novomoskovsk? You can certainly order to push Moscow not only to Kaluga region. What is next?

The taxes of thousands of Russian enterprises remain in Moscow, because these companies are registered in the capital (although working in the regions). Therefore the miners of oil, gas, chemists, metallur-

gists, etc., although operating in very difficult conditions and toxic emissions, receive much lower wages than the Muscovites. Even the cities, where there are these enterprises, can hardly survive. I recall the commercial where the girl is drinking glass after glass of juice and to the comment of his dad: «My child, you will burst!» – answers: «And you, daddy, come in».

Does anyone still not clear that we need other laws by which the portion of taxes that is not going to the Federal centre, should stay there, where are the enterprises?

Again not to recall the wise men – «If you do not know where to drift, the tail wind does not help».

### **Russian chemical society**

In the framework of the Congress a few hours on one of the evening meetings was allotted to the VIII report-electoral Congress of the Russian chemical society. D. I. Mendeleev (RKhO). I Congress of RKhO was held in 1991 in Rostov after the collapse of the Soviet Union. I was one of the delegates. The Statute was adopted and the President of the Russian chemical society was academician Yu. A. Zolotov.

In subsequent years, President of the society were elected academicians A. I. Rusanov, P. D. Sarkisov, A. Yu. Tsvivadze. 90 Delegates from 125 selected in the regional organizations took part in the VIII Congress, including the author of these lines from Tula organization chemical society. Among the participants there are 22 academicians and corresponding member Q. Russian Academy of Sciences, 30 professors, 28 researchers and engineers.

The report on the work of the society was made by the President RKhO named D. I. Mendeleev, academician A. Yu. Tsvivadze. He noted the difficult situation in

almost all public organizations, the lack of assistance of regional authorities, ministries, lack of facilities, poor funding. Aslan Yusupovich spoke sharply about the same at the opening of the XX Congress in the presence of two thousand participants of the Congress, the representative of the Russian President in the Urals Federal district (district is larger than the area of Germany, France, UK, Spain together), heads of the Russian Academy of Sciences, FANO, Governor of the Sverdlovsk region and others.

After the collapse of the USSR RKhO named D. I. Mendeleev exists on a very modest budget of a minimum membership fee. The reason is the status of public organizations, lack of funding from companies, universities, research institutes

In foreign chemical societies, the situation is different. For example, in the UK chemical society is a professional organization, which consists of about 55,000 members. Society has a big budget that allows it to allocate funds for awards, scholarships, publishing of journals.



It is urgent to improve the activity of the Russian chemical society.

The proposals for the amendment of the Charter concerning differential membership with the appropriate variety of entrance and annual membership fees was introduced by A. Yu. Tsivadze and then approved by the delegates. The amendment of the Charter to the extent that the members of the society can be along with public organizations as legal entities is important. To formulate proposals for the Board of Trustees was entrusted with the presidency of the society. Moreover, an extremely useful experience of boards of guardians is known on example geographical and military history societies. It is decided to establish a gold medal RKhO named D. I. Mendeleev, which will be awarded for outstanding achievements in the field of chemical Sciences and technology. The medals will be awarded annually to Russian and foreign scientists, the representative of the domestic industry.

Of course, it's not all kindly in the activities of the society. There are very few young members of society and, in my opinion, a great loss in the work of the society is the long pause (mainly due to financial issues) of the publication of the popular Newsletter «Chemistry in Russia».

Yes, without a good funding the conducting of conferences, competitions, etc. is almost impossible. Once again, I note that these issues really can be solved only with the involvement of collective members, who will be able to sponsor NTO. But still I believe that many of the problems of the chemical society, NTO miners, metallurgists, mechanical engineers, etc. are associated with a very poor awareness among engineers, scientists, especially the young about the challenges societies on the prestige of participation in the work of these organizations. There are virtually no ap-

pearances on television, radio, publications in Central and regional of press managers NTO, members of the Presidium with many high academic regalia.

For a long time I thought about the difficulties of public works. Many organizations became private and not everywhere there, and in the state organizations, the leadership understands the necessity of participation in the work of the Russian engineering Academy (RIA), the International Academy of ecology (MANEB), the Union of scientific and engineering associations (USEA), the Mendeleev chemical society and others.

And if there are such and the other enough problems, primarily young employees, the engineers are not eager to participate in public life. We all know that part of the activities carried out during working hours and they are forced to take their vacation days. And with a glance of modest wages, especially at the young employees, but their excessive pragmatism – the result is known. The very likely result is to remain all us without young reserve.

Director of the Institute of physical chemistry and electrochemistry of RAS, academician-Secretary of the Department of chemistry and materials science of RAS A. Yu. Tsivadze was reelected President of the society, and candidate of biological sciences N. R. Kosinova was reelected scientific Secretary. Vice-presidents, the Bureau RKhO and Board members were elected. From the Tula region the Chairman of the regional Board of the Tula chemical society, Professor of the Tula University, V. M. Panarin was elected, and the main scientific employee of «NIAP-Katalizator», professor E. Z. Golosman was re-elected Deputy Chairman of the regional Board (since 1967) which was member of the Central Board since 1994.

The pleasant and promising conclusion of the Congress was the message that the next Mendeleev Congress will be dedicated to the 150th anniversary of the discovery of the periodic law and the 150th anniversary of the formation of the Russian chemical

society (formerly the Russian physico-chemical society). Naturally, the Congress will be held in St. Petersburg, in which all significant of the above events were happened. This event will occur in 2019.

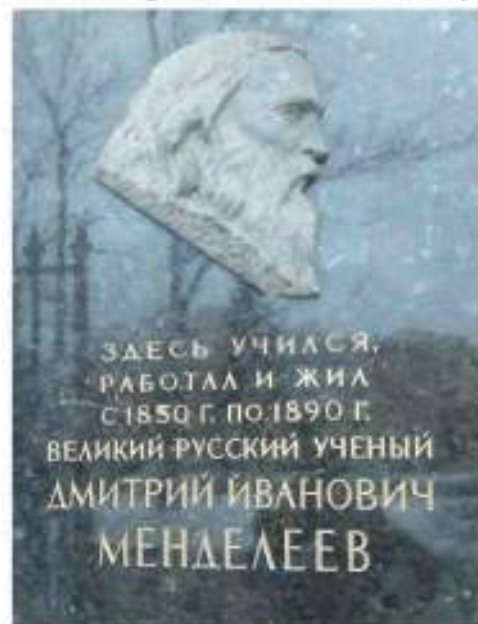
### Visit to Dmitry Ivanovich

About 200 museums are located in Saint-Petersburg and I will allow to give advice to future participants of the Congress and, of course, to all who visit St. Petersburg to the landmark forum – to visit the Museum of Dmitry Ivanovich Mendeleev. The Museum is located in a historic building of the Twelve colleges of the Saint Petersburg state University on Vasilevsky island. The Museum was founded in 1911 on the initiative of participants of II Mendeleev Congress and is located in the former government apartment of Dmitry Ivanovich, where he lived for almost a quarter century as a Professor and head of Department of the University.

At the invitation of D. I. Mendeleev students could come for advice, without leaving the University building, through the door leading to the apartment of the Professor. The Professor's study, a huge library collected by him, many books which were presented to him by colleagues and friends survived. The major role plays the archive of scientist.

In this apartment were arranged the scientific and artistic «environment», which were: the sculptor Peter Klodt, artists Ivan Kramskoy, Arkhip Kuindzhi, Ilya Repin, Ivan Shishkin, music critic, art historian Vladimir Stasov, the composer Alexander Borodin, the physiologist Ivan Sechenov, Admiral Stepan Makarov, poet (brother-in-law periodic) Alexander Blok. The Museum has a fine collection of paintings, collected by D. I. Mendeleev. The Desk preserved:

where Mendeleev invented his periodic law, which worked for 25 years; old camera; chess; a huge library; a large collection documenting the life and scientific activity;



Office of D. I. Mendeleev  
in St. Petersburg University

the layout of the icebreaker, invented by Mendeleev the instruments on which he conducted researches, map with marked cities which Mendeleev visited, and a tablecloth with autographs of famous people of the time preserved too. Thousands of people, among whom was Nobel laureate I. Prigozhine, G. Seaborg, L. Pauling, P. Kapitza, the President of France Jacques Chirac, a famous Russian and foreign scientists visit the Museum annually. I believe that no chemist, physicist, Metallurgist, physician, metrologist, oilman, Explorer, Collier, an economist, a meteorologist, school teacher, University lecturer, researcher, artist, com-

poser, sculptor and balloonist, the student, the student can not go to a Museum scientist, a genius of science.

The Congress appealed to the President of the Russian Academy of Sciences and the Ministry of foreign Affairs, International organizations with a request to declare 2019 «International year of the Periodic table of chemical elements».

And yet, after Irakli Andronicov want to say: «Let's raise the level of our discussions to the level of backroom conversations». Meantime, good luck to the future participants of the world events,

## Epilogue

Favorite example from history. Napoleon was losing the company in Egypt. A military camp was surrounded and fired by the enemy. Napoleon ordered to gather in

the safest place of the camp Donkeys and Scientists, considering that in the first place to save the Transport and Science.

## *In Russian*

В последние годы написал много статей, посвященных российской науке, образованию, реформированию РАН, конкурсам «Инженер года», научно-

техническим обществам, чиновникам, гибели отраслевых институтов. Статьи были опубликованы в центральных, областных, городских газетах и журналах. Откликов от специалистов из НИИ, вузов, заводов, РАН и даже из Госдумы, правительства, от губернаторов было много. Получил как-то письмо от коллеги из новосибирского Академгородка с вопросом: «А есть ли хоть какие-либо сдвиги после Ваших многолетних набатов?» Мой ответ дословно был такой: «Если бы только мой набат. Выступают сотни тысяч известных ученых и инженеров с искренним стремлением не дать разрушить достижения страны непродуманными реформами. Можно только позавидовать КПД паровоза отца и сына Черепановых». И все же, если ты

