Information

The time to learn. To Oleg Matveevich Nefedov: scientist, organizer, and teacher

A. B. Yaroslavtsev,[a]★ I. V. Svitanko,[b] and M. P. Egorov[b]

[a]N. S. Kurnakov Institute of General and Inorganic Chemistry, Russian Academy of Sciences, 31 Leninsky prosp., 119991 Moscow, Russian Federation
E-mail: yaroslav@igic.ras.ru
[b]N. D. Zelinsky Institute of Organic Chemistry, Russian Academy of Sciences, 47 Leninsky prosp., 119991 Moscow, Russian Federation

Probably, humans are called *Homo sapiens* because they learn something throughout the whole life. As soon as we are born, we begin to be aware of the surrounding world bit by bit, then we go to school, to the institute, and to post-graduate courses. However, it is important that, having reached a certain level, a person begins to help others and, hence, actively teaches them. The main thing is that we have something to share. There is certainly a lot to learn from such remarkable scientists as *Oleg Matveevich Nefedov* (Fig. 1). He has a plethora of disciples whom he trained for science and brought up for life.

In this paper, we would like to talk not about all pedagogical achievements of *Oleg Matveevich*, but only about the achievements related to higher education. For this goal, we have to look back at the 1980s. "Perestroika", which is often mentioned as a fresh breeze for the USSR, had a very hard impact on science and education. Suddenly, science was no longer a priority and turned out to be a non-prestigious profession. This was due to low salaries and declining social status of scientists, the lack of up-to-date equipment, which actually precluded conducting scientific research at a reasonable level, and the absence of demand for science from the state. The scientific com-

Fig. 1. Academician Oleg Matveevich Nefedov.

Published in Russian in *Izvestiya Akademii Nauk. Seriya Khimicheskaya,* No. 1, pp. 176—180, January, 2022.
1066-5285/22/7101-0176

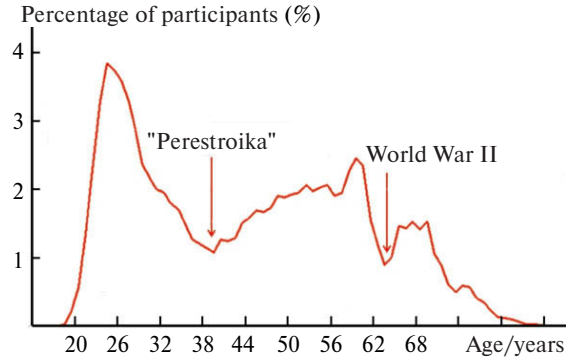

Fig. 2. Age distribution of Russian scientists by the example of competition of the Russian Foundation for Basic Research of 2006.

of Sciences. The graduates themselves started to leave science, move abroad, or, at best, started to work at educational institutions. Moreover, many researchers of active age, who had earlier graduated from universities, also left science for the same reasons.

In Russia, as in all developed countries, a clear-cut maximum of scientific manpower, fell on the most productive age, that is, 30 to 50 years. However, as a result of "perestroika", Russian science has dramatically changed. The change in the age distribution of the most active part of the scientific community participating in the projects of the Russian Foundation for Basic Research can be analyzed in relation to participants of the competitions of 2006 (Fig. 2).

The small minimum observed for participants aged 62—65 is a consequence of the great tragedy of Russia. These are children born during the World War II. The second, much larger minimum, falls on the mentioned productive age. It was caused by the large-scale loss of personnel of this age group from scientific institutions. In this situation, recruitment of young people has become the most urgent need for the Academy of Sciences. Actually, this was the key issue of survival of Russian science within the walls of the Academy. That is why, in March 1990, when an initiative group stated the necessity of initiating a new educational institution for talented chemists to deliberately train the future staff of the Russian Academy of Sciences, *Oleg Matveevich*, who was Vice-President of the Russian Academy of Sciences at that time, caught fire with this idea.

Actually, this story demonstrates a remarkable feature of *Oleg Matveevich*: the ability to quickly make the right decision and implement it in practice. This is exactly what happened. The first, quite obvious approach was to create such division at the Moscow State University. However, *Yuri Yakovlevich Kuzyakov*, who was the dean of the Chemistry Department at that time, refused this idea. The next step was to apply to *Gennadii Alekseevich Yagodin*, Chairman of the USSR State Committee for Public Education, who was also a chemist (Fig. 3). He warmly supported the idea of organizing a college and proposed to make it a part of the D. I. Mendeleev Moscow Institute of Chemical Technology (MICT, currently, D. I. Mendeleev University of Chemical Technology of Russia). *Pavel Dzhibraelovich Sarkisov*, rector of MICT (see Fig. 3), immediately appreciated the benefits of MICT participation in this project. The documents were ready as soon as in two weeks, and on June 28, 1990, the Order No. 452

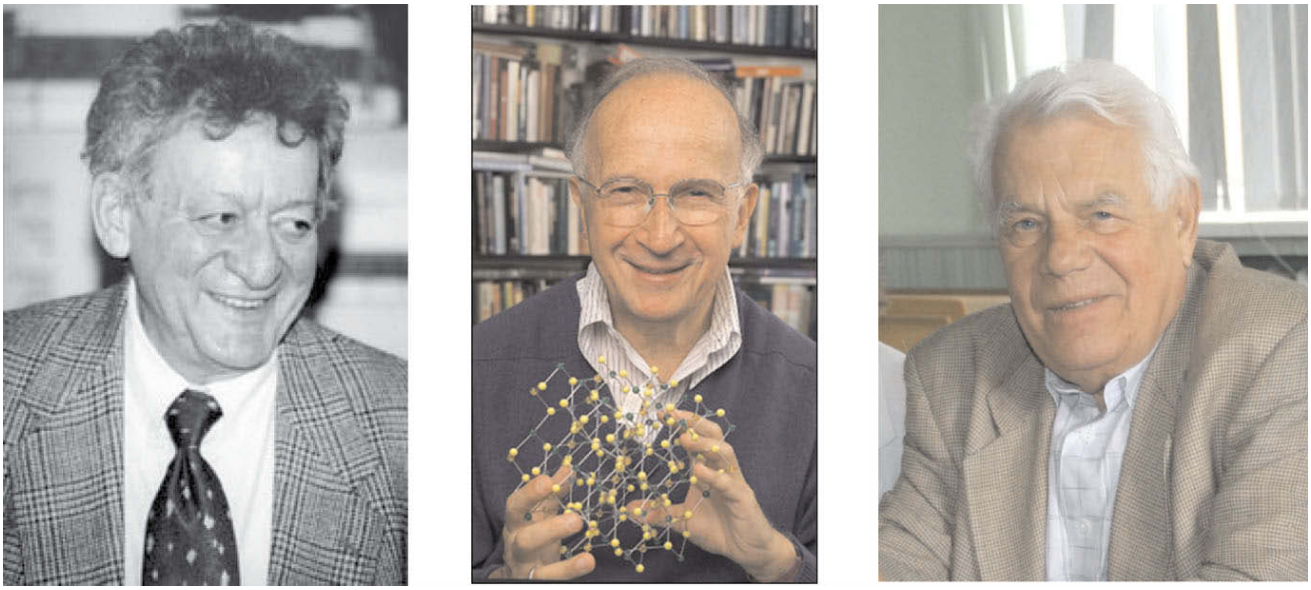

Fig. 3. Some members of the Trustee Council of the Higher Chemical College of the RAS who participated in the foundation of HCC (from left to right): Academician P. D. Sarkisov, Nobel Prize Winner R. Hoffmann, and Corresponding Member of the RAS G. A. Yagodin.

of the USSR State Committee for Public Education entitled "Organization of the Higher Chemical College at MICT" was issued. Thus, the Higher Chemical College of the Russian Academy of Sciences (HCC RAS) started to function on July 1, 1990, as a Faculty of MICT. It is noteworthy that second clause of this document declared an extra scholarship for college students amounting 20 rubles per month. In July of the same year, the first students were enrolled, each of them being a bright personality.

This revealed one more remarkable feature of Academician *O. M. Nefedov:* the ability to recruit an enthusiastic team. The Trustee Council of the Higher Chemical College included members such as Academicians *O. M. Nefedov, M. E. Vol'pin, K. I. Zamaraev, Yu. A. Zolotov, N. A. Plate, A. L. Buchachenko, A. I. Konovalov, V. A. Tartakovskii, G. A. Yagodin*, and other prominent scientists. Roald Hoffmann, a Nobel Prize Winner (see Fig. 3), who was also a member of this Council, regularly visited the College and gave fascinating lectures on chemistry. Brilliant professors such as *N. A. Plate, Yu. A. Ustynyuk, D. A. Lemenovskii*, and many others took an active part in the work of the college.

The organizers of the College looked, first of all, at well-known successful examples of targeted integration of education and science, deliberate personal training of researchers for fundamental science, and early specialization of students. Such examples were provided by the Moscow Institute of Physics and Technology, Novosibirsk State University, and Schools of Physics and Mathematics of the Siberian Branch of the Academy of Sciences and the Moscow University. The Higher Chemical College, which adopted the efficient practices of the listed institutions, established, in addition, a lot of new approaches to organization of the educational process; students participated in scientific research from the first year. The idea was that students could become devoted to chemistry and fundamental science only if they are deeply immersed into this wonderful world of synthesis and investigation of new substances and materials. The educational courses were also aimed at providing even first-year students with the understanding of what and why they are doing. If students are unable, from the very beginning, to set a problem, they should gain understanding how to solve it in the optimal way.

A primary problem of talented young people who decide to devote their lives to science is that, having received the higher education diploma, they usually prefer to stay within the walls of their native university, where everything is familiar to them and some research has been already started. The alternative is to move to institutes of the Russian Academy of Sciences, a completely new place where everything should be started from scratch. Meanwhile, just at this time, many of the graduates start to live on their own and get married. However, those who start their research as undergraduate students arrive to this milestone as almost established scientists with their own scientific background and a solid groundwork for a PhD thesis.

Perhaps the most acute problem was that our students used to move abroad. In the early 1990s, all of us lived with the feeling that our science needed to integrate as quickly as possible into the international scientific community. Not only young scientists appreciated the opportunity to work abroad, but educational institutions themselves were proud of organizing foreign research internships for their students. Naturally, HCC RAS immediately provided for the possibility of such internships in leading foreign universities. As a result, most of the graduates of the first two enrollments settled in the United States, and some did not even return from the internship. Foreign colleagues responded to our calls for the return of young scientists by mentioning human rights. A lot was done to ensure that in the future, most of the graduates stayed to work at the Russian Academy of Sciences.

In 1991, Academician *Yu. D. Tretyakov* founded the Higher College of Materials Sciences at the Moscow State University. This College resembled HCC, but also had some differences. Later, it was transformed into the Faculty of Materials Sciences. In 1995, Academician *A. M. Kutepov* founded the Ivanovo Branch of the HCC RAS, which is successfully functioning today. The activity of these educational institutions is largely responsible for the attraction of gifted young people to science, which was already visible in the beginning of the 21st century. This feature is also clearly seen in Fig. 2. In 2008, a fundamental research group and also a Division of Fundamentals of Chemistry, with Academician *O. M. Nefedov* at the head, was organized at the Chemistry Department of the Moscow State University according to the principles of HCC. Finally, quite recently (in 2018), a Division and then the Faculty of Chemistry appeared at the Higher School of Economics. We also hope that graduates of this Faculty will not only become good chemists, but would be superior to us in the readiness to practically implement their results. It seems that the necessity of bringing the results of scientific research to practical use is now becoming one of the most pressing issues of fundamental science in Russia. It is worthy of note that the important problem of optimizing the timetable and transfers has been solved at the HSE Faculty of Chemistry: locations within walking distances facilitate the active involvement of students in scientific research.

The results of training can be evaluated by considering the achievements of some graduates. By graduation, the best students have about 10—20 publications. A lot of HCC graduates defended PhD theses; there are also many PhDs among the graduates of the fundamental research group at the Moscow State University. There are quite a few Doctors of Science among HCC graduates. The first of

Fig. 4. At the ceremony of presentation of the RF Government Prize in the field of education for the work "Innovative Development of Higher Education based on Integration between Education and Fundamental Science".

them were *Konstantin Lysenko* (Institute of Organoelement Compounds, RAS), *Yurii Torubaev* (Institute of General and Inorganic Chemistry, RAS), *Aleksandr Dilman* (Zelinsky Institute of Organic Chemistry, RAS), *Yan Zubavichus* (Institute of Catalysis, Siberian Branch, RAS), and *Irina Stenina* (Institute of General and Inorganic Chemistry,

Fig. 5. Students of HCC RAS congratulate Academician O. M. Nefedov on his 75th birthday.

RAS). Graduates of HCC RAS actively give classes to students of HCC and the HSE Faculty of Chemistry. Junior students become winners of the Mendeleev competition of research works for chemistry students. Students and graduates of HCC RAS were awarded medals of the Russian Academy of Sciences and Academia Europaea and prizes of the Moscow Government; they are winners of the L`OREAL-UNESCO competition for women in science and many other prestigious competitions.

In 2006, Academician *O. M. Nefedov* and some of his colleagues who contributed to functioning of HCC, the Ivanovo Branch of HCC, and the Chemical Lyceum were awarded a Prize of the Government of the Russian Federation in the field of education for the work "Innovative Development of Higher Education based on Integration between Education and Fundamental Science". (*O. M. Nefedov, N. P. Laverov, P. D. Sarkisov, V. I. Svettsov, I. V. Svitanko, S. E. Semenov, N. P. Tarasova, Yu. V. Chistyakov, V. A. Sharin, and A. B. Yaroslavtsev*, Fig. 4). This vividly confirms that the work started by *Oleg Matveevich* more than thirty years ago is in demand and is highly appreciated, in particular, throughout the country.

It is worth noting that *Oleg Matveevich Nefedov* has been always actively engaged in teaching students and in campaigning for applicants. Each academic year began with his meeting with newly admitted students, which was followed by Welcome Days at institutes of the Russian Academy of Sciences. He also always attended the Graduation Ceremony. Although our student days were over long ago, we also consider ourselves to be students and companions of *Oleg Matveevich* in many ways. The students′ attitude to their most important scientific mentor can be clearly seen if one looks at the photograph taken at the 75th birthday of *Oleg Matveevich* (Fig. 5).

Received June 11,2021
accepted June 23, 2021