Simplified transcript of Irena Efremenko's interview by Philippe Stamenkovic*on 04/04/2022 at the Weizmann Institute

This interview is part of a series of interviews of former Soviet/Russian scientists emigrated in Israel, about their experience and conception of the relationship between science and (non-scientific) values, in the scope of Philippe Stamenkovic's postdoctoral project at the Jacques Loeb Center for the History and Philosophy of the Life Sciences, Ben-Gurion University of the Negev (Israel). Irena Efremenko is a theoretical chemist at the Weizmann Institute. Section 1 presents the interview guide (i.e. questions) used for the interview. Section 2 summarises the interview itself. Parts of the interview which refer specifically to the relationship between science and (non-scientific) values have been underlined by the interviewer.

1 Interview guide

1.1 Introductory questions

In this preliminary section, I would like to ask you some questions about your identity and tasks as a scientist.

1.1.1 Motivation

- How did you end up as a theoretical chemist? What was your motivation for choosing this field?

- Was your choice influenced by some specific circumstances, either personal or related to the political situation in the Soviet Union? Was it more or less fortuitous?

1.1.2 Description of work

- Could you describe me your current work, daily tasks and activities?

- Has your line of research evolved during your career? Why?

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1.2 (Descriptive) questions specific to the Soviet Union (SU) / Russia

In this section, I would like to ask you some questions specific to your experience as a scientist who has worked in the Soviet Union / Russia. My questions concern either your personal situation and work, or those of other people which you have witnessed.

I am interested in the relationship between science and the extra-scientific context (be it social, political, ideological or economic). I am especially interested in the political and ideological values specific to the Soviet regime.

According to (Kojevnikov, 2004, 277), "Soviet communists understood science as rooted in human beings' material and social life. They correspondingly declined to view scientific knowledge as independent of either industry and technology or politics and values." Today, many philosophers, historians and sociologists of science claim that science is not, and should not be, independent from the larger, extra-scientific context[1]. According to Kojevnikov (300, 303), Soviets were precursors of these views of science as entangled with society, values and non-scientific interests![2]

1.2.1 Description of the influence of non-scientific values on the various phases of scientific inquiry

- Did you notice, in your (or in others') activity as a scientist in the Soviet Union / Russia, an influence of the extra-scientific context / non-scientific values concerning:

  1. what to investigate / the choice of research avenues and questions (pre-epistemic phase)?

     (a) Regarding pure and applied science : much science in the SU was devoted to applications (Kojevnikov, 2004, 300). Pure science was threatened by non-scientific interests, because it had no applications. But in the end the regime decided to let it go[3]. Was there pure science nevertheless? Or was there only "big science" related to engineering/the atomic bomb/etc.? Were theoreticians supposed to bring about practical results, or were they allowed to develop their own thoughts?

     (b) Did you have to follow the already existing research avenues of the West (instead of investigating new ones), in order to "catch up and surpass" (*Dognat' i peregnat*) American science (original quote from Stalin referring to the atomic bomb in 1946 (Kojevnikov, 2004, 144), which became a popular Soviet slogan during the Cold War)?

  2. how to investigate it (gathering of evidence and choice of methods, including from the moral point of view) (pre-epistemic phase):

[1] According to Kojevnikov (2004, 300), the naive "ideology of pure and apolitical science" has almost disappeared from the West and it is a good thing! Science is "grounded in social, economic, and cultural realities of human life" Kojevnikov (2004, 302).

[2] According to Kojevnikov (2004, 223-224), the Soviets managed to reconcile the social constructivist view of science (as it is called today) typical of Soviet Marxists (science and its concepts are, like any other human activity, related to economic, political and class interests) with scientific realism (science provides true knowledge of nature) by simply stating that: interests can be right or wrong, and that having the right extra-scientific interests helps achieve scientific truth (and conversely)! The correctness of science guarantees its *partiinost'* (its party-mindedness), and vice versa!

[3] According to Kojevnikov (2004, 305), whereas the West followed the Soviets in abolishing the distinction between pure and applied science, the Soviets in fact reverted to this distinction.

(a) for example the building of hypotheses/models (for example, Kojevnikov talks of the heuristic influence of Soviet ideology on collectivist models and terminology in condensed matter physics)?[4]

3. what to conclude from our investigation: the acceptance or rejection of hypothesis/theories[5] (epistemic phase)?
   (a) for example, to possibly take more risks (make/accept more risky hypotheses, see the story of the collectivist models in physics)?

   (b) influence of the communist ritual of "critique and self-critique" (*kritika i samokritika*, see below)?

4. how to use and communicate the results of our investigations (post-epistemic phase):
   (a) For example, to disseminate (in the Soviet logic of "critique and self-critique", or to rally politicians' support) or not (internationally, in the logic of competition against the West; but also, in the SU, against rival Soviet scientists/schools) the findings/results?

5. Organisational/institutional aspects[6] (para-epistemic phase):
   (a) For example, what were the criteria for hiring/promoting people in the SU (membership of the Party? Etc.)?

   (b) for funding?

6. Teaching:
   (a) regarding the content of your (or others') courses?

[4]According to Kojevnikov (2004, xv), "some of the most fundamental concepts in contemporary [physical] science—quasiparticles and other collectivist models in condensed matter—had their roots in the socialist worldview and in the collectivist philosophy of freedom." "Collectivist ideology provided useful heuristic metaphors for Frenkel and other theorists in their search for better mathematical models for the interactions between atoms and electrons in dense bodies. Revolutionary allusions helped stir an enthusiastic reception for the radical new theories of relativity and the quanta in the Soviet society of the 1920s. Boris Hessen, Sergei Vavilov, and others used philosophical arguments from Marxist dialectics to build justification and support for novel developments in 20th-century science." (Kojevnikov, 2004, 187). I am personally not convinced by Kojevnikov's claims regarding the link between extra-scientific and scientific considerations in condensed matter physics. I find them unsubstantiated and/or exaggerated.

[5]For example, failure to develop a dialectical materialistic interpretation of a theory could lead to its rejection (Kojevnikov, 2004, 224).

[6]Kojevnikov (2004, ch 11) claims there was a link between science and political power: ideally a link of "preexisting harmony" (281), in fact continuous arrangements/compromises/reciprocal services (eg exchanging members between the Central Committee of the Party and the Academy of Science). It concerned the "relative shares of authority", "scientists' professional expertise" vs "competence of politicians" (277), not the *content* of scientific theories/hypotheses.

But even for these institutional/organisational aspects, there were in fact boundaries between the scientific and the political realms, as Kojevnikov himself acknowledges (e.g. 284).

(b) the way they are taught (for example, the textbooks or references used)?

(c) the design of the curricula?

1.2.2 Positive or negative influence of ideology

- Would you say (as Kojevnikov (2004) claims) that politics and ideology could have a beneficial influence on science (and not only a detrimental one, as Lysenkoism typically has come to exemplify in the West), in whatever stage of research work?

- And if yes, how exactly (which stage, which process)[7]?

- To what extent was this effect specific to the SU/Russia (and not to be found in another political/institutional regime)[8]?

1.2.3 Evolution between Soviet Union, Russia and Israel

- [How the situation has changed for science after 1991 in Russia] Regarding now the evolution between the SU and Russia:
  - How did the collapse of the SU and the advent of "democratic" Russia affect research?
  - Did physics flourish in the SU, and then decline after the Soviet regime collapsed in 1989 (Kolchinsky et al., 2017, R1042)[9]?
  - In which case was it a matter of funding, of good scientists leaving the country, or something else?

- Regarding now your situation in Israel:
  - When and why did you come to Israel?
  - What is the difference with respect to Israel (once you got there)?

[7]For example, according to Kojevnikov (2004, 196, 201, 204, 206) the communist ritual of "critique and self-critique" (*kritika i samokritika*) could enable constructive self-criticism and progress (I do not agree: from what I have read it seems very artificial and dogmatic). This concerns the epistemic stage of theory/hypothesis acceptance/rejection.

There was also, regarding the pre- and post-epistemic stages, competition of scholars to translate academic issues in comprehensible language, in order to rally politicians. (This seems more convincing.)

[8]For example some of the institutional quarrels described by Kojevnikov (2004, 226) could be found in the West, and are not necessarily characteristic of/only to be found in a Soviet regime.

[9]According to Kojevnikov (2004, 300, 304), the Soviet regime praised very much science, and scientists enjoyed a high status (privileges, high social status, financial support), and the fall of the communist regime destroyed this.

  - Regarding the scientific environment (selection criteria of promotion, hiring)?

  - Regarding non-scientific values, including your own?

    * For example the "will to work hard": was it lost after you came to Israel? Did the Soviet / Russian regime provide you with a specific motivation which was lost once you arrived in a 'Western' country?

1.3 (Normative) questions about their own views

[Normative questions about how they conceive non-epistemic values in their discipline, if they adhere to the VFI and why.]

- In science and in philosophy of science, there is a common view according to which science should be free from social, political and religious values and interests, either at all stages of research (from the choice of research avenues to the communication and use of results), or at least in the core phase of acceptance/rejection of hypotheses/theories.

  - Do you subscribe to this conception of science which *should* be value-free (even if it is not realised in practice)?

  - To which extent: in the large sense (during all phases) or only in the restricted sense (during the core phase)?

  - Why (can you give reasons for holding this view)?

  - If values should influence science, how should they?

1.4 Potential activity as an expert

[Potential activity as an expert (i.e. as a scientist providing advice for public authorities), in the SU/Russia, in Israel or elsewhere.]

- Do you have any activity as a scientific expert (providing advice for public authority)? Could you describe it [descriptive]?

- How do you understand your role as an expert [normative]?

1.5 Concluding questions

- Is there something else you would like to add or talk about?

- Do you know other natural/social scientists from SU or Russia whom I could interview?

2 Interview of Irena Efremenko

2.1 Introductory questions: motivation and nature of work

- Short biography:
  - Studied in high school in 1970-1972
  - Kazakh State University, Department of Chemistry 1972-1977
  - Worked in Institute of Catalysis and Electrochemistry, Kazakh Academy of Science 1977-1995
  - Technion (Israel Institute of Technology) 1996-2005
  - Weizmann Institute of Science 2005-now
- Lived in Kazakhstan. Part of the Soviet Union (SU). From the very beginning she took theoretical chemistry. Didn't like experimental work at all. Wanted to understand deeper what happens, something which theoretical chemistry allows.
- In the Soviet Union it was very difficult to work in theoretical chemistry, because this field was "bourgeois science" in Stalinist times. It was not allowed to be studied in universities. In addition, one part of the work involved computers, which were not consistent with communist philosophy, so they had no computers. Theoretical chemistry was always under the control of the Communist Party. Since the time of the anti-resonant campaign, it was considered as not important. It was so all the time IE learned and worked.
- She didn't begin in this field, because in her university they did not have quantum chemistry, just general subjects on atomic level. PhD about homogeneous catalysis (experimental work accompanied by simple calculations). Calculations done by other people. After PhD she worked in theoretical chemistry applied to catalysis. Simple programs because low level of computers. Another problem: the field did not allow applications. But in the Soviet Union it was very important to show the practical applications of one's work in the PhD. Nevertheless, she could work in theoretical chemistry because it was the after-Stalin period, when the SU partially accepted the need in theoretical science and computers.
- Chemistry was thought to be more practical. Chemistry in Kazakhstan was mainly aimed at the development of methods for oil refinement, rectification and applications. Much less attention was paid to fundamental studies. The main aim of the Institute was to develop chemical processes related to oil refinement. Less budget for exact chemical synthesis, and more for petrol.
- Computers considered as artificial intelligence, and not as having practical applications. Considered as unable to give anything to the proletariat. Indeed at the beginning computers could not provide practical applications.
  - "large electrical computing machine"

  - only when the SU was broken was it possible to exchange technology. First IBM 286: the simplest computers, a few hundred of computers which people in the West did not want.

- Moved to Israel in 1995.

- In Israel it was very difficult for her because everything was new. Worked on the theory of diamond nucleation. It is quite a practical field, but in the SU it was not a practical field because there were no synthetic diamonds. No practical applications in the SU, only for jewelry.

2.2 Questions related to work in the SU

- They had freedom to chose their research avenues as long as it was oriented towards applications.

- Science in the SU was isolated from the rest of the world. Were able to read scientific papers. But it was very difficult to express their opinion, i.e. just to publish papers. They needed political approval (from KGB, called in each institution "the first department") just to publish scientific papers. There was for example a scientific secretary who was the KGB representative. These people had both a scientific competence and were working for KGB.

  - She wanted to talk to a guest professor of Weizmann but she couldn't because the secretary was watching and she was afraid that she couldn't leave the country afterwards. After collapse of the SU, in Kazakhstan, she was afraid of talking to this professor.
  - Papers that may have military applications, or large practical applications that may be sold, were not allowed. Such research was allowed and published in internal reports, but not in external international publications.
  - In many cases they did not understand why they were not allowed to publish, in cases where they did not see any practical application. The paper was submitted to an internal committee of the Institute, who did not grant authorization. (This happened very late in the process: a kind of post hoc censorship).
  - Very small amount of international journals were available. Also under the control of the political what journals they were allowed to read. The SU government was afraid that scientists in the SU would read political things in scientific journals, or even understand that chemistry is in a better situation outside. They were allowed to read just what they needed. –> They had freedom within their specific area. It was possible to try out new ideas, and it was quite accepted to come with your idea to another scientist and ask his/her help at the expense of his/her time.
  - The management of the Institute (active scientists but with a political role) controlled other scientists' work i.e. set the limits of their freedom, in an indirect way ("you don't have to investigate that other field, thus far...").
  - The typing machines had to be returned each day to people from the "first department" (KGB) inside the institute. Not allowed to work too late.
  - The SU was very big, there were communications between scientists of the SU. The country was independent from the rest of the world. Even now Russian science is not involved with the West. Many Russian scientists do not speak English even now.

- If you allowed some time to pure theory, no advancement in career: no promotion if no practical application.
- Pre-epistemic/epistemic phase for building hypotheses/theories: some of Western theories could not be used. For example Kekule theory considered against the ideology, not allowed from 1949-1951 onwards. Because there was resonance (IE doesn't know in which way it contradicted communist ideology). The problem is that people not qualified were too much involved in making decisions. In addition, the interest of particular people may also be involved, for example someone who had another theory and didn't want this theory to be used.
- On the other hand they could take more risk in building hypotheses/theories, because the only risk was not to be advanced. So here it is a positive influence of the Soviet system: the security of the position.
- No funding at all for research projects. Fixed salary positions. Positive influence of communism: not related to money. They all had tenure position.
- Patents allowed you to submit your PhD dissertation without publications (which is usually required). In some cases PhD defenses were closed to general public.
- Teaching: she had a very good, open teacher. In the SU teaching was very important. Very wide, good quality education, and then focused professional training. Big contrast with the restricted character and limits of the professional scientific life afterwards. Apparently Efremenko's teacher had access to all international literature. Maybe because Kazakhstan was more liberal.
- The scientific level collapsed when the SU collapsed. Most scientists left forever the country or left science for business: one part of scientists left the SU and worked abroad; another part remained in the SU but left science. The collapse of science was also about money: there was no financial support at all for several scientific institutions. Efremenko's salary was 10% of her husband's who worked in industry. Professors giving lectures without salary at all. Not only money mattered: some scientists left partly because they knew that the scientific level abroad was much higher. So the general situation for science deteriorated with the collapse of the SU. The democratic advent did not compensate.

2.3 In Israel

- Arrived in 1995. Left the SU because she was Jew, because of the economic situation, because she couldn't have computers. Didn't like the society in Kazakhstan. People are ok when not critical situation, but show their unpleasant side when things get critical. People don't like educated people. Corruption.
- Very emotional decision to leave. Didn't know if she would find a job. Had an invitation at Hebrew University of Jerusalem. Found a job in Technion. One year of employment. Nine years in chemical engineering in Technion. Still wanted to do theoretical chemistry and catalysis. Here at Weizmann since 2005.
- She began to work with everything new: computers, English, Hebrew. She benefited from Shapira programme, for 3 years. Then Gillady, and Kamea programmes. Staff scientist.

- She chose her field, but she can't chose her project, she does what her PI says. Here in Israel they have to follow the research avenues which are financed.
- She doesn't feel any influence of extra-scientific considerations on epistemic phase. No practical application of her work.
- Post-epistemic phase: number of publications is what matters.
- Work hard: she had to learn everything here. So she worked harder here in Israel than in Russia. And they can work 24/7 here! Contrary to Russia.

2.4 Own normative views

- She thinks, with her experience, that science should be independent from society. From the moral point of view, maybe it is not so good. Any influence from the outside is to be banned, not good for science.
- Not all scientific results should be directly presented to the general public, some results may stay in the scientific community but not in the general press. Because in many cases it is not what scientists say, or interpreted in different ways. Because scientific dissent can be badly interpreted by the general public who does not understand it.

2.5 Conclusion

- Other potential interviewees:
  - Prof Yefim Dinitz in computer science in BGU.
  - Alexander Khenki

References

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