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Mutations in Soviet public health science: Post-Lysenko medical genetics, 1969–1991

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ABSTRACT

This paper traces the integration of human genetics with Soviet public health science after the Lysenko era. For nearly three decades, USSR biology pursued its own version of anti-bourgeois, Soviet 'creative Darwinism', departing from western, post-WWII scientific developments. After Lysenko was suspended, research niches of immunology, biophysics and mutation research formed the basis of new departments at the Institute of Medical Genetics, which was founded in 1969 as part of the Soviet Academy of Medical Sciences. Focussing on early research activities and collaborations at the institute, I show how the concept of mutagenesis, a pivotal issue during the Cold War, became mobilized from Drosophila genetics to human heredity and to society as a whole. This mode of scaling up and down through population studies shaped not only Soviet human biology and genetics; it also brought about changes in clinical practice and public health as well as in the monitoring and regulation of mutagenic agents in the environment.

1. Introduction

In his popular science book "Geny i sudby" ("Genes and Fates") published in 1990, Nikolai P. Bochkov (1931–2011) elaborated on "the implications of genetics to planetary ecology, demographics and in the struggle for people's health" (Bochkov, 1990, p. 254).[1] Like most popular accounts, the book largely presents genetics as a coherent, refined system. In the final chapter, rather between the lines, the author points to some of the practices and infrastructures that shaped 1970s and 1980s Soviet genetics: "Contemporary problems of genetics are solved in laboratories and in the field, in sterile boxes and space ships, in the clinic and in expeditions, at the desk and in electronic data processing" (Bochkov, 1990, p. 254). This sketch of sites, procedures and things situates genetics in its research practices and localities, which range from the spaceships of the Cold War to more mundane objects such as boxes and desks. What was the role of these distributed sites and heterogeneous practices in the re-establishment of USSR research into human heredity in the late 1960s and 1970s?

Taking up Bochkov's remarks on genetics, this paper tracks some of those sites of research into human heredity, through anthropological expeditions, public health surveillance and cosmic journeys in post-Stalin Soviet science. That genetics took place in spaceships calls for particular attention to the Cold War scientific infrastructures of the space race. On both sides of the iron curtain, large-scale government programs pushed the nuclear sciences, information technology and the biosciences. Khrushchev's reforms in the 1950s had strengthened science in general, emphasizing its key role in the space race and nuclear race during the Cold War. However, with regard to biology and agriculture, Khrushchev's science policy still held on to the Lysenko doctrine and its ban on classical genetics. During the 1930s and early 1940s, agricultural biologist Trofim D. Lysenko's visions of increasing crop yields, along with his ideas about 'vernalization', had gained the direct support by Stalin, resulting in a ban on classic genetics and the loss of

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[1] Nikolai Pavlovich Bochkov was director of the Moscow Institute of Medical Genetics of the Soviet Academy of Medical Sciences between 1969 and 1989.

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positions and even arrest of many geneticists.[2] Despite Lysenko's influence on the Soviet life sciences, the terms genetics and cytogenetics began to reappear in medical research during the 1950s, yet they remained an "underground science" (Adams, 1977).[3] Radiation biology in particular was one of the hidden sites for genetics, especially in its guise of mutations research, a field of military relevance in the atomic age. A few scientists of the early Soviet school of genetics were able to continue their work, now formally affiliated with biophysics in military research centres or working for departments of physics, chemistry and cybernetics. Military research units, including those under the atomic program that studied radiation's effects, were outside of the Academy of Sciences' biological institutes, and thus outside the sphere of Lysenko's influence. For instance, both the Institute of Biophysics in Moscow and the Centre for Medical Radiology in Obninsk (about 110 km south-west of Moscow) worked on genetic mutations and studied cytogenetic effects of radiation.

Only when Khrushchev retired in 1964 was Lysenko suspended and the Institute of General Genetics, which had been under his leadership,[4] was completely reorganized. The laboratory for radiation genetics in Moscow's Institute of Biophysics became the basis of the new Institute of General Genetics. Five years after Lysenko's dismissal, the Academy of Medical Sciences of the USSR appointed radiation geneticist N. P. Bochkov, who at the time was working at the Centre for Medical Radiology in Obninsk, to establish an Institute of Medical Genetics in Moscow under the auspices of the Academy of Medical Sciences.

This paper zooms in on some of the settings of Soviet human genetics as it became reintegrated into Soviet public health sciences after the Lysenko era. While there are a number of accounts of Soviet genetics and anthropology (Adams, 1977, 1990; Hirsch, 2005; Krementsov, 2006; Mogilner, 2008; Solomon, 2006), few scholars have addressed the Soviet biomedical sciences in the post-Stalin period.[5] By examining research activities subsumed under the heading "medical genetics", I explore the ways in which the field was implemented and renegotiated from the late 1960s. I argue that it was by means of linking human genetics and population genetics to Soviet public health through population studies that medical genetics was re-established in post-Lysenko human biology in the USSR.

Histories of population studies are often approached through specific academic disciplines, either dealing with anthropology and ethnography, or medicine and epidemiology, or genetics as such. In this paper, I go beyond these divisions and examine how, in Soviet population studies, the lab–field relations brought together a range of disciplines and scales of investigation. To provide a survey of the re-emerging field of Soviet medical genetics, I draw on scientific reports of the Institute of Medical Genetics from 1969 onwards: research reports and plans had to be annually submitted to the state committees, such as the State Committee for Science and Technology and the State Planning Committee (Gosplan), as well as annual reports on achievements in the past year.[6] The copious reporting generated by research bureaucracy provides historians of science with rich archival sources. The reports can serve as a window into the emerging research landscapes of Soviet public health genetics.

The structure of these plans and reports remained largely the same over the decades: listing and describing departments and 'laboratories' (subunits of departments); outlining the methodology and research organizing the unit; summarizing key research themes; and listing technical equipment. The detailed reports give summaries of the work done in each laboratory, services provided to other institutions, publications and lectures given, as well as international collaborations and scientific expeditions. Each report included accounts of the work of academic commissions (e.g. candidate and doctoral dissertations), a section on "ideological, methodological and pedagogical work",[7] a list of scientific conferences, workshops, symposia, activities and scientific publishing, as well as domestic and international cooperation, popularization and outreach[8] with regard to medical genetics and public health.

This paper aims to track broadly how the renewal of Soviet medical genetics was distributed between the workbench of the cytogenetics lab, population studies in biological anthropology, and the establishment of a public health infrastructure. One core goal of population genetics in the Soviet public health framework was to bring the prevention and treatment of the different features of 'regional pathology' in the USSR into a scientific basis. Here, medical population studies also drew on long traditions of Russian and USSR population research in biological anthropology, which conducted scientific studies of populations in the Far North, Siberia, Central Asia and the Pamir Mountains. In what follows, I survey some of the sites and practices through which genetics was re-implemented in the USSR during the 1970s, when researchers took up earlier Soviet traditions of "genogeography" and population studies, and also reconnected to international developments.

Medical genetics as a discipline worked at multiple scales, including the laboratory where irradiated *Drosophila* were studied for mutations, biological anthropology of human populations in the field, cytogenetic techniques in clinical diagnostics, and public health as a policy framework. I argue that population studies here served as a "boundary infrastructure" that connected different "communities of practice" (Bowker & Star, 1999, p. 314). Population studies functioned as devices to scale up cytogenetic methods and results as well as to scale down overarching public health concerns within socialist society. The attention to scales and scaling is inspired by Bruno Latour's account of how laboratories can "raise the world" (Latour, 1983). When describing how Pasteur's lab changed nineteenth-century France, Latour suggests expanding the historical and ethnographic studies of laboratories to their "societal milieu" (Latour, 1983, p. 143).[9] Exploring shifts in scale in human genetics in the USSR, I describe how medical genetics iteratively shifted scale between the lab bench, populations in the field and public health conceptualizations of mutagenic environments in industrial society. Here, the transfer of concepts and practices in the laboratory works by undoing scale, collapsing and synchronizing ideas and modes of intervention between lab, field, clinic and health policy (Latour, 1983, p. 143). By following multiple locations

[2] Among them was the renowned Soviet plant geneticist, Nikolai I. Vavilov, who died in prison in 1943. On the Lysenko affair and its implications, see for example Medvedev (1969), Adams (1977), Soifer (1993), and Roll-Hansen (2005).

[3] An early attempt to re-establish genetics took place at the Institute of Cytology and Genetics, founded as part of the Siberian branch of the Academy of Medical Sciences in Novosibirsk in 1955. The appointed director, Nikolai P. Dubinin (who intermittently had worked as ornithologist), began to train medical scientists in classical genetics (Anonymous, 1987). Two years into his position, however, he was suspended for "Morganism–Weismannism". See Adams (1977) for an account of the struggles over genetics in the immediate post-Stalin period.

[4] This institute had previously been led by Nikolai Vavilov and was renamed the Vavilov Institute in 1983 (Sorokina, 2009).

[5] Mark Adams' work is an exception in this context; see in particular Adams (1977).

[6] On average those documents comprise 80–100 pages for reports and 20–40 pages for research plans.

[7] Archive AMN SSSR–RAMN, fond P-9120, op. 2, d. 5985, 5996, Annual Reports of the Institute of Medical Genetics, 1969, 1970.

[8] The term used in Russian is "propaganda", a word also used for science popularization.

[9] Here, Latour takes the term "societal milieu" from his colleague Michel Callon (Latour, 1983, p. 143).