Soviet genetics: new controversy

Zhores Medvedev reviews the development of human genetics in the Soviet Union since Lysenko

T. D. LYSENKO dominated Soviet genetics and biology for more than 25 years. In 1965, when his domination was over, genuine science was quickly restored to research and education. It was generally assumed that his political and ideological interference in the nature of genetic problems had been completely wrong and harmful. The notions of a 'Soviet' and a 'bourgeois' natural science had been almost forgotten. In spite of Lysenko's long 'dictatorship', there were still quite a few prominent, enthusiastic geneticists of the older generation who could build up research again, write new textbooks for schools and universities, and support and teach the younger generation.

For human genetics, however, the position was much more bleak. The subject was declared racist and was completely destroyed in 1936–38. Most of its prominent representatives were arrested, and not one of them was found alive when Khrushchev dismantled the GULAG camp-prison system in 1956. The liquidation of Soviet human geneticists during the pre-war period explains why medical and particularly human genetics lagged behind in the rapid development of genetics after 1965.

The problems of human genetics were discussed only very briefly. In the first Soviet textbook on general genetics, written by Professor M. E. Lobashov and published in 1967, attention focused on the pattern of human chromosomes and immunogenetics. In only one chapter did Lobashov really repeat the old 'clichés' on the bourgeoisie's misuse of human genetics. Through human genetics, he claimed, this had tried to "justify the exploitation of one class by another, antagonism between different nations and creation of the racist theories". Lobashov also made some very positive statements about eugenics and considered that previous errors in this branch of human genetics did not necessarily indicate that it could not be developed into a useful field of research. Lobashov's view was that individuals in a human population, although equal in the social sense, have different genotypes and far from identical intellectual possibilities. These inherited differences had to be taken into consideration by educational training programmes so that the individual's

potential could be released and developed.

At the same time, I. T. Frolov, philosopher and senior official of the Department of Science of the Central Committee of the Communist Party of the USSR, published a small booklet entitled *Methodological Problems of Genetics*. His main points were designed to prove that the collapse of Lysenko's pseudoscience would not in any way diminish the importance and validity of Marxist dialectic-materialist philosophy for biology and natural sciences in general. Lysenko simply did not use this philosophy correctly; he falsified and distorted both biology and dialectical materialism.

With his philosophical criticism of Lysenko's ideas, Frolov attempted to present the Marxist background to modern classical genetics, biochemical genetics and evolution. Human genetics were not mentioned in his essay at all, as if they were not part of the problem; the rehabilitation of genetics stopped short, neither ideologists nor scientists being able to analyse human genetics. Nobody wanted just to acquire knowledge from abroad, but all the roots of Soviet human genetics had been completely destroyed, and as yet nothing could appear from the rubble.

Development inevitable

The logic of science and the practical needs of medicine, however, made the development of human and medical genetics in the USSR inevitable. The Academy of Medical Sciences started to consider establishing a research institute in the field, and the leading figures of genetics and biology, none of whom had real practical knowledge of human or medical genetics, started discussing their possible task.

Initially, the discussions were very peaceful and pragmatic with nobody, quite understandably, wanting to take the lead. Among those taking part, Academician Nikolai Dubinin, Director of the newly-established Institute of General Genetics, was considered to be the main authority. His expertise lay in the field of *Drosophila* genetics. The next most prominent but most popular of the geneticists was Academician Boris Astraurov. He was elected the first President of the Society of Geneticists of the Soviet Union, which was established in 1966, and an expert on silk worm genetics. He established the Institute of Developmental Biology which excluded research on human genetics.

Of the others actively involved in the discussions, Professor Dmitry Beliaev, Director of Novosibirsk Institute of Cytology and Genetics, had experimented in the genetics of rabbits and some rodents. The man most excited about human genetics, Dr Vladimir Effroimson, was a silk worm geneticist whose very wide knowledge of medical genetics (he published the first Soviet book on medical genetics in 1963) was purely theoretical. The other members of the discussions came from similar backgrounds: Professor S. J. Alikhanian was Director of the Institute of Bacterial Genetics and Selection; A. A. Prokofieva-Belgovskaja and N. P. Bochkov were cytologists; N. P. Timofeev-Resovsky and R. L. Berg, drosophilists.

Although the project to establish the research institute on human genetics was generally supported, its organisation and priorities were not established in the meetings and discussions sponsored either by the Medical Academy or by the newly-created All-Union Society of Geneticists. The peaceful but not yet very productive discussions, however, were suddenly sharpened by Dubinin, who, like Frolov one year earlier, published a small popular book under the almost identical title, *Some Methodological Problems of Genetics*. The essay strongly politicised the discussion and opened up a new division among geneticists who only recently had represented a strong and friendly joint front against Lysenko.

Dubinin, introduced by the publisher as "a famous geneticist who had great influence on the development of Soviet and world genetics", started his essay in the usual demagogic style of his former Lysenkoist opponents. The methodological principles of the modern natural sciences, he claimed, had been founded by Lenin in his work *Materialism and Empirio-criticism* (1909). This had eternal importance for the further development of philosophy and all natural sciences, genetics in particular. After a short description of the history of modern genetics, with more than generous attention to Dubinin's own contributions and frequent quotations from Marx, Engels and Lenin, Dubinin unexpectedly made a statement on human genetics, differing little from Lysenko's approach to the field.

"In research on human genetics the main task is to realise that the human race during its development excluded itself from the evolution of other animals . . . Now social factors only—class struggle, industrial, cultural and scientific progress—determine human evolution. Anthropogenesis is completed and ended by the appearance of consciousness. Now social factors are primary and biological factors secondary". (p. 60).

At first this statement did not look

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out of place. Nobody considered Dubinin an expert on human genetics and his colleagues and friends tried to explain to him that genetic laws and principles apply equally to all animals and that man is no exception. Very quickly, however, it became clear that the statement quoted above was not accidental; it was part of a developed system of views which recognised the human race as a qualitatively different, new and final stage of animal evolution.

Two years later, in 1970, Dubinin published another book for the general reader called *Genetics and Human Future*. By this time his ideas about the qualitative biological gap between man and other animals had developed. He tried to show that genetic make-up in humans bears no relation to the formation of personality. According to Dubinin's theory, human development from birth is determined by "social inheritance", everybody having potentially equal intellectual capabilities. Social inheritance is determined by the character of society itself and so far only the Communist societies can create the favourable conditions for the full development of human potential.

This book provoked more open discussion. Both sides tried to keep it outside serious academic journals, mostly because the discussion was based on opinions, not on facts or research. But both Astaurov and Effroimson wrote critical essays which were published in the popular literary magazine *Novy Mir* in 1971. Frolov, then Editor-in-Chief of the journal *Voprosy Filosofii* (Problems of Philosophy), organised a round-table discussion on human genetics, also sponsored by the Advisory Research Council, on the Problems of Philosophy of Nature at the Presidium of the Academy of Sciences of the USSR. It was clear from the discussion which was published in *Voprosy Filosofii* in 1972, that Dubinin's view received very little support.

Narrow objectives

The new Institute of Medical Genetics, which was finally established in 1971 within the Academy of Medical Sciences of the USSR, did not have the organisation to make the study of all aspects of human genetics possible. It was given narrow objectives and a comparatively young director, Nikolai Bochkov, a medical cytologist. Bochkov's appointment was supported by Dubinin who expected him to be an ally in the personal confrontations which now made up the discussion.

In 1973 Dubinin published *Vechnoe Dyizhenie* (Perpetual Motion), a rather self-promoting autobiography. Reviewed very widely and favourably in the official press, it distorted the factual history of Soviet genetics

and gave a very mild version of the Lysenko controversy. In it, though, Dubinin tried to reply to his critics and to formulate the main principles of his vision of human genetics.

"... The attempts to whitewash eugenics and to use for this purpose new genetic discoveries had been made by B. L. Astaurov, A. A. Neifakh and M. D. Golubovsky. V. P. Effroimson developed wrong views about genetic determination of intellectual and personal characteristics of man. This trend started to be an ideological danger. Again alien ideology tried to poison the clear sources of our science. I tried to make an uncompromised denunciation of this ideologically harmful attitude. Alas, I met a small, but well united group of opponents; B. L. Astaurov, S. M. Gershenson, S. I. Alikanian, D. K. Beliaev who defended their wrong position. This worried me and proved that some old geneticists do not understand Marxist ideas about human race and principles of society which is the only factor determining the intellectual specificity of man..." (p. 434).

'According to Dubinin, human development is determined by "social inheritance", which is determined by the character of society itself. Only the Communist societies can create the favourable conditions for the full development of human potential'

Dubinin also tried to develop the distinction between the genetic control of physiological and psychological characteristics of human individuals. Genes, according to his view, determine the programme of development, lifespan, some pathologies, expectancy of heart troubles, cancer and resistance to infections. The shape of nose and mouth, or height, are also inherited traits. However, personality and intellect, he claimed, depend not on genes but only on social environment and self-training; their possibilities are unlimited. As soon as man is able to think consciously, he isolates himself from the laws of biology. All "normal" persons are psychologically and mentally equal at birth and so there is no reason for taking the racist approach when talking about the quality of human genotypes with regard to intellect.

"... Let us remember the story of emigration from Russia of many representatives of bourgeois art, scientific and technological elite after the October Revolution. Some eugenicists considered this exodus as an irretrievable loss of valuable genes. But this was nonsense. New talents from grass roots through Revolution found their way to lead the country, the Party, to create new science, new art, to create the great Soviet Union! ... This fact illustrates that the creation of personality does not depend

on genes, but is induced by the information of social environment." (p. 426).

In 1974 Academician Boris Astaurov died from a heart attack—a great loss for Soviet biology. His death was probably hastened by strong political pressures induced by the defection of one of the senior research scientists from his institute. As director, Astaurov had recommended that this good research worker present a paper at an international conference in Italy. The man asked for political asylum and did not return to the USSR. In such cases, the official bureaucracy makes directors personally responsible. Special Academy commissions started to 'investigate' (with active participation by Dubinin) all aspects of the ideological and moral atmosphere of Astaurov's institute. Some senior members of his staff were demoted or dismissed, and Astaurov's health suffered.

Not long before his death, Astaurov, as a member of the Editorial Board of a popular scientific journal *Priroda* (Nature), recommended that it publish a translation of the article "Man as a Biological Species" by Professor Ernest Mayr, a prominent American zoologist and population geneticist. The article did not ignore the social aspects of formation of human personality, but it considered all characteristics and qualities of individuals to be a result of the interaction of genotype and environmental and social influences.

Mayr's article provoked interesting discussion in *Priroda*; several anthropologists and philosophers supported his views. Dubinin did not join in the *Priroda* discussion, but instead attacked Mayr's article in a paper published in a philosophy journal where he insisted that all the spiritual aspects of human life are outside biology or genetics. He labelled Mayr's synthetic, social and biological approach as "reactionary" and "racist".

Reply published

The average publication time in Soviet journals, including popular scientific ones, is very long. Consequently a reply to Dubinin's article, written by D. K. Beliaev, was not published in *Priroda* until a year later. Beliaev, who in 1976 had already been appointed President of the 1978 International Genetic Congress in Moscow, was reluctant to acknowledge the seriousness of the controversy among the Soviet geneticists. He clearly explained, however, that he disagreed with Dubinin's simplistic explanations. Behaviour, he wrote, as well as many of man's intellectual abilities, certainly depend on social factors, teaching and training, but these factors act on a highly differentiated population and the main organ of mental activity—

the human brain—is not excluded from genetic laws and genetic diversity.

Dubinín published a new detailed article on the subject which appeared earlier this year in *Voprosy Filosofii*. It mostly repeated his earlier arguments, though it was more politicised. The ideas about the intellectual or spiritual aspects of human life became rather mystical, in spite of regular quotations from Marx, Engels and Lenin.

Through a complex of pseudo-scientific argumentation, Dubinín tried to state that the intellectual and ethical progress of *Homo sapiens humanis* is properly directed in one social system only. In any other social system there is no progressive evolution. Social systems create the real man after birth; the priority of genes before birth is not questioned. Good systems create good

persons, bad create bad. From Dubinín's autobiography it is clear that he considers himself a good man whose psychology and intellect has been developed under the influence of the best social systems. "I am thankful for my fate . . . I do not want to live another life . . ." He is happy. During his 70 years of life, he never discovered that 30 years of Stalinist terror were not good for the creation of *Homo sapiens humanis*.

There is, however, at least one important factor for securing the happiness of *Homo sapiens logic*—freedom to do research, whether genetic, social or political. Using his position as the director of the main Institute of General Genetics, his influence as Consultant on Biology for the Central Party Committee and his membership

of different commissions and groups, Dubinín is working hard to suppress by all possible means the development of genuine research in the field of human genetics in the USSR. Even now the Soviet Union is not involved in many important fields of research in human genetics. As part of medical science, human genetics now has modest conditions for research into several specially selected problems, mainly associated with health programmes. But as a part of general biology, evolution research or population genetics, human genetics does not really exist in the USSR.

In a great country with more than a hundred national minorities, several different races and many different cultural roots, human genetics is probably too hot a science to handle. □

ILL at ease

Judy Redfearn finds out about neutron research at the Institut Laue-Langevin and talks to its director

NEUTRONS have long been recognised as valuable tools for research. Their importance is still growing as new techniques are enabling them to find new applications in different branches of science. One of the world centres for neutron research is the Institut Max von Laue-Paul Langevin (ILL) in Grenoble, France. It is jointly run by Britain, France and Germany, and this year, when it celebrates its tenth anniversary, has seen the appointment of a British scientist as its director.

He is Dr John White, a physical chemist from St John's College, Oxford, who took over from Professor R. Mössbauer, a German, last March. He faced a pressing problem after he took up his new post: what to do with spent fuel rods from the high flux reactor, the cornerstone of ILL's neutron facility. ILL has been assured of a fuel supply since President Carter lifted his ban on the export of enriched uranium, but the freeze on reprocessing caused some worries. Just last week, however, it was granted a licence to import 12 fuel elements into the USA for reprocessing at ERDA's Savannah River plant in Georgia.

But President Carter's policy is not the only factor which may influence ILL's future. The lifetime of the high flux reactor and the value of all ILL's facilities to its member states are now being assessed to determine the institute's long term prospects after 1982, the earliest date at which the three member countries could, under the

original agreement, revoke their commitment. An extensive study of the reactor has shown that it may yet have 20–25 years more life in it—"a tribute", says Dr White, "to the French and German engineers who built it". If further studies support this, a report on the institute's future, due in the autumn, should give a firm assurance that the reactor will continue operating into the 1980s.

How it will continue, however, is not yet certain. The report is expected to recommend whether or not it should go into a 'deuxième souffle'—a second stage involving the member states in another major investment to extend the facility's scope. Dr White believes that ILL will only survive into the 1980s if instruments and techniques are constantly up-dated. "At the moment we have got world leadership in this area—and we have got to keep it up."

A matter of satisfaction

ILL's future success will depend, as it always has, on how well it satisfies its visiting researchers. Unlike many other laboratories and research organisations, it is essentially a users' laboratory. Some 70% of the neutron-beam time is available for outside experiments, mainly from universities and institutes in the three member countries but also from many other parts of the world. Only 400 staff, of which 70 are PhD scientists, are employed under five-year contracts to keep instruments running. ILL's Scientific Council considers approximately 700 experimental pro-

posals each year; at its last meeting in March, it reported requests for twice as much experimental time as is available.

Experiments originating in the member countries are funded by the organisations, or Associates, which run the institute: the Science Research Council in Britain, the Gesellschaft für Kernforschung in West Germany, and the Commissariat à l'Energie Atomique and the Centre National de la Recherche Scientifique in France. France and Germany signed the first inter-governmental treaty giving the go-ahead for the building of ILL in 1967. It was not until 1973 that Britain, having abandoned an idea to build its own intense neutron source, joined in, paying a share of the original capital investment. Routine operation of the high flux reactor, which cost FF240 million of the FF335 million spent on building the whole institute, began in 1972. It has almost completed five years of successful operation and most of the instruments designed around it

ILL's director, John White