

FINAL REPORT TO
NATIONAL COUNCIL FOR SOVIET AND EAST EUROPEAN RESEARCH

TITLE: On the History of Genetics in the Soviet Union: Science and Politics; The Insight of a Witness

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the first time in the history of the world, the
whole of the human race has been gathered
together in one place.

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INTRODUCTORY NOTE

The Council has, since its beginnings, attempted to solicit and to support research proposals that gave promise of leading to improved American understanding of the structure and operation of Soviet scientific research organizations, and in particular of the effects of systematic political control in that area. The Trustees were happy, for this reason, to provide \$5,000 to Raissa Berg, a prominent emigree geneticist and the daughter of an exceedingly eminent Soviet scientist, to assist her in the preparation of a major memoir about Soviet genetics, and in particular about Lysenkoism, of which she had important first-hand knowledge.

The attached summary paper, requested by the Trustees as the Final Report under the terms of the contract, has been a disappointment to the Trustees who, after considerable discussion, have concluded that to request revisions from the author would be to initiate a costly, painful, and ultimately fruitless procedure. They have chosen, therefore, to submit Ms. Berg's report with only minor revisions and to provide potential readers with the following characterization:

The paper contributes relatively little that is new to the known facts concerning the rise and fall of Lysenko, his theories, or the costs to Soviet agriculture as the Government acted on them. Its value lies rather in conclusions the reader can extrapolate from this intensely personal account about the human aspects of this long period of destructive aberration. Principal among these are:

- (1) Fear, anger, hostility, frustration and an array of negative emotions are engendered among the scientists and others involved, which dissipate their energies, divide and break communication and cooperation, and cause lasting antagonisms among them.
- (2) Political value increasingly supplants scientific value as the determinant of individual choice of topic and goals, as well as in the motivation of those who have, or acquire, the authority to administer and direct the scientific effort.
- (3) A widespread alienation of loyalty to the political regime occurs in the affected individuals, ranging from cynical opportunism to deepseated and intense disaffection.
- (4) In some cases among the "victims," and perhaps in many, there occurs a compensatory heightened commitment to genuine science and a more intense effort to make a true contribution to knowledge, perhaps as the sole remaining source of legitimate satisfaction and reward.

INTRODUCTION

The story of genetics in the Soviet Union serves as a classical instance of the struggle for intellectual freedom in the face of abuses of power. It is a tragic story full of wild purges, imprisonments and deaths.

I am a Russian geneticist, so I witnessed the great battle between truth and falsehood going on in the socialist state, genetics being a battle-field, with a great, blind terror as a background. Political events that caused, influenced and accompanied this battle are described by several authors, native and emigre, inhabitants of the free world. I learned a lot from their books. I shall refer to them in my narration. Thanks to them the history of genetics in the Soviet Union is well known in the West.

For example, in 1951 a special symposium on Soviet science was held at the Philadelphia meeting of the American Association for the Advancement of Science. This symposium is published as a book, "Soviet Science". It contains an article by Th. Dobzhansky, "Russian genetics" (Dobzhansky, 1952)*.

To document the story on behalf of those who defended genetics in the Soviet Union using Soviet sources is much more difficult. Genetics in the USSR was reanimated "from above", but not its history. Biographers of the martyrs of science, their survived pupils, friends, and admirers, are forced to be silent about the crimes of the regime. The scientific and organization activities of the regime's victims are, however, fully used to glorify this same regime.

* The book is a treasury for a historian of Russian science. Of special value is an article by J.S. Joffe "Russian Contribution to Soil Science", (Joffe, 1959). Some books devoted to the biographies of most outstanding specialist in soil science who were purged and exiled have been published in the USSR. An example is the book of Orlovsky, "Alexsey Grigoryevich Doyarenko" (1980).

There is no difficulty in exposing the theory and practice of Lysenkoism. Shamelessness and cynicism speak from the pages of the books published by Lysenko and his satraps during their sixteen-year reign. Their lies are usually easily seen through. So much has been written about Lysenkoism that it seems nothing can be added. There is however, an underground current in the ocean of happenings which is not known to the Western connoisseurs of Soviet history but is well known, only never touched by Soviet authors. For these it is dangerous. For Western historians who need the archives of the Soviet Union, and who have therefore to look for an entry visa to the USSR, this aspect of Soviet scientific life is, or, let us hope, was until now, taboo. This aspect can be elucidated by a witness, who has left Soviet Union with no intention of return, and who was close to these developments. I am just that person.

What I call arbitrarily an underground current in the history of Soviet genetics is the clash between two types of intellectuals, one of which is represented by Dubinin (1907-) and the other one by Lysenko (1898-1976). I shall mention their rivalry in several places of my narration being as laconic as possible. To the extended analysis of the roles of these two malignant intellectuals, whose struggle for power contributed its share to the genetics tragedy, I shall devote a special chapter. It seems to me that the social meaning of their contest exceeds the bounds of the fate of genetics and is of general historical importance.

State and Science

In Russia, genetics came into being after the Revolution, but it was not a child of the Revolution. Many, not to say most, of the postrevolutionary achievements are the result of the simultaneous flowering of all branches of Russian culture. The Revolution itself was brought into being by the upwelling of these creative forces. Its momentum was so great that the development of Russian culture continued for years after the regime's efforts of destruction began. Genetics was preserved by these forces of inertia until 1948, survived its collapse at that time, and persists to this day.

The history of genetics in the USSR is conveniently subdivided into six periods:

- 1) 1917 - 1928
- 2) 1929 - 1935
- 3) 1936 - 1947
- 4) 1948 - 1952
- 5) 1953 - 1963
- 6) 1964 -

The sixth period began with the dismissal of Khrushchev in 1964. It still continues.

1. 1917 - 1928

The first period actually began not in 1917 but shortly before the Revolution. It started with the activity of several exceptionally energetic people. Before 1917, a constellation of brilliant men held the stage, each of them scientist, pedagogue, and organizer:

N. I. Vavilov (1887 - 1943),
N. K. Koltsov (1872 - 1940),
Yu. A. Filipchenko (1880 - 1930), and

S. G. Navashin (1857 - 1930).

Shortly after the revolution, S. S. Chetverikov (1880 - 1959) and A. S. Serebrovsky (1892 - 1948) began to contribute to genetics. By the end of the first period genetics had become a flourishing branch of knowledge, with hundreds of scientists contributing to its glory.

N. I. Vavilov founded and headed two institutions: The All-Union Academy of Agricultural Sciences and The All-Union Institute of Plant Breeding. This Institute had more than 100 experimental stations scattered throughout the Soviet Union, where geographical experiments were carried out in order to produce varieties of cultivated plants for different climate and soil conditions. Two hundred thousand samples of cultivated plants collected by Vavilov and his collaborators from all the agricultural countries of the world were available for these geographical experiments (Baranov, 1962, Grumm-Grzhimaylo, 1962, Gaissinovich, 1968, 1982, Reznik, 1968, Alexeyev, 1977, Adams, 1978, 1980b, Bakhteyev, 1980, 1981, Dobzhansky, 1980, Kohen, 1981).

N. K. Koltsov is one of the most distinguished figures in the history of Russian science. Evaluating the stability of the heredity material Koltsov postulated a monomolecular linear nature of chromosome structure and was not afraid to draw the inevitable conclusion: there is a longitudinal indivisibility of the chromosome, and its reproduction is not by growth and subsequent division, but by producing a copy for which the original chromosome serves as a template. According to Engels, the distinctive feature of the living substance is metabolism. Koltsov attacked this sacrosanct dogma of Soviet science. Long before Meselson and Stahl, and Taylor did their experiments, Koltsov took for granted the static nature of the chromosome. He predicted chemical mutagenesis. If one were to arrange scientists according

to their type of thinking, in a line leading to the contemporary understanding of the organization of hereditary material, this line might read: Mendel, Wilson, Sturtevant, Muller, Koltsov, Timofeev-Resovsky, Schrodinger, and Delbrück.

Koltsov founded the Institute of Experimental Biology and headed it for 22 years. It came into being in 1917, but, before the February and the October Revolutions was based on private support. Plant, animal and human genetics, molecular genetics, cytology, and behavioral genetics were represented in that Institute by highly qualified people, primarily students of Koltsov himself. Koltsov invited S. S. Chetverikov to head the laboratory of genetics. At this laboratory a new branch of genetics, experimental population genetics, came into being.

Koltsov taught and organized laboratories at all the universities and high schools of Moscow. After the October Revolution he organized the Department of Experimental Biology at Moscow University and served as its head until 1930. S. S. Chetverikov and A. S. Serebrovsky taught there too. Astaurov, Rokitsky, Shapiro, Efroimson, Gershenson, Vinberg, Gaissinovich, and Dubinin were among their students. He also created eight journals, Nature (Priroda) and the Biological Journal (Biologicheskiy Zhurnal) among them (Lerner, 1961, 1968, pp. 181, 182, Astaurov, 1965, 1978, Adams, 1970, 1980a,b, Astaurov and Rokitsky, 1975, Rokitsky, 1975, 1980a, Dobzhansky, 1980, Timofeev-Resovsky and Glotov, 1980, Gaissinovich, 1982).

Another center of genetic research and teaching arose in St. Petersburg, thanks to the energy of Yu. A. Filipchenko. He began to teach genetics at the University of St. Petersburg in 1913. In 1919, he founded a Department of Genetics and Experimental Zoology there. At the Academy of Sciences,

Filipchenko headed the Commission for the Productive Resources of Nature. In 1921, a Bureau of Eugenics and Genetics was organized as a part of that Commission. In 1930, after Filipchenko's death, the Bureau became the Institute of Genetics of the Academy of Sciences of the USSR, with Vavilov its director.

Excellent textbooks and monographs on general genetics were written by Filipchenko. He wrote extensively, covering the genetics of plants and of animals, biometrics, the history of ideas about organic evolution, and experimental embryology. He published translations of Morgan's books. He contributed to anthropogenetics and the genetics of the quantitative characters of plants and animals. He produced a wheat variety for the Leningrad District. Ya. Ya. Lusis, R. A. Mazing, T. K. Lepin, N. N. Medvedev, A. A. Prokofyeva-Belgovskaya, Yu. Ya. Kerkis, M. L. Belgovsky, and I. I. Kanayev were all pupils of Filipchenko. Th. G. Dobzhansky started his Drosophila work under him. With Vavilov, Serebrovsky, and Lusis, Filipchenko founded geographical genetics (N. N. Medvedev, 1978, 1980, Lobashev, 1967, Adams, 1980b, Dobzhansky, 1980).

Another important figure was the cytologist and botanist S. G. Navashin, the discoverer of double fertilization in flowering plants. His pupils included G. A. Levitsky, L. N. Delaunay, M. S. Navashin, A. G. Nikolayeva, and I. N. Sveshnikova. In 1925, he organized and headed the Timiryazev Biological Institute at the Communist Academy (Rubtsova, 1975, Gaissinovich, 1982).

At the Timiryazev Institute, A. S. Serebrovsky organized a Laboratory of Genetics and started his work on the fine structure of the gene. His theory of "step-allelomorphism" was based on the first evidence that the gene could be resolved into finer units (Shapiro, 1966, 1980, Carlson, 1966, pp. 144, 146, 150, 213, 244, 260).

Russian human genetics, like other fields of genetics in Russia, had a good chance to become worthy of a state which claimed to be founded on a scientific basis. In 1921, two eugenics institutions were founded, one by Koltsov in Moscow, the other by Filipchenko in Leningrad. Each published its own periodical. International, humane, egalitarian principles, as opposed to the principles of the German race hygienists, were built into the foundation of the new branch of eugenics (Graham, 1972, 1977, 1981, Efroimson, 1967, Adams, 1979).

Considerable contributions to genetics came from institutes in other branches of biology. For example, in 1925 at the Roentgenological Institute in Leningrad, G. A. Nadson and G. S. Filippov produced hereditary changes in yeast by using X-rays (Krivissky, 1980).

2. 1929 - 1935

In 1929, this glorious development of genetics was suddenly and catastrophically interrupted. The year 1929 was a turning point in the politics of the Soviet Government. The totalitarian architect of Soviet life at that time, Stalin, called it the Year of the Great Break. The most peculiar and the most bloody revolution ever known, the Revolution from above, as Stalin called it, began.

The course was set to create in "shock tempo" a new "Socialist worker's intelligentsia," "intellectuals of the new type", according to the stereotypes at the time.

Newspapers reported trials where innocent intellectuals, confessed plans to assassinate Stalin and his retinue, along with confessions of "wrecking," "sabotage," "resistance to collectivization," and "conspiracy with emigre groups and foreign powers." At every factory, office, institution meetings took place where people had to express their solidarity with death sentences

for the victims of these trials.

Since 1917, education was denied to the offspring of all those who were deprived of the right to vote, i.e., the offspring of clergy, private traders, nobility and gentry, rich peasants (kulaks), etc. Beginning in 1930, a ban was imposed on children of all kinds of intelligentsia, office employees, shop-assistants, etc. The descendants of all of those who did not belong to the classes of the workers and the poorest peasants (agricultural proletariat) had no right to enter universities, technical institutes, or medical, pedagogical, agricultural and art schools. Entrance examinations for universities and high schools were abolished. The teaching personnel were terrorized. Some of the most outstanding professors were arrested; many of them were dismissed; some unable to endure the baiting, left the universities. Among the last group were Yu. A. Filipchenko and my father, L. S. Berg, the founder of the Geographical Faculty of the Leningrad University and head of the Department of Physical Geography. Their persecutor was I. I. Prezent. He was a man of taste in choosing his prey, this "suave, satanic, and unscrupulous juggler of words, the dialectical materialist 'philosopher',," as Muller (1948) defined him. Besides Filipchenko and Berg, Prezent's targets were N. K. Koltsov and V. I. Vernadsky.

The fate of genetics was largely similar to that of other domains of culture. But in some respect it was unique. Genetics became the most persecuted, the most ruined branch of natural science. Only the devastations in the humanities are comparable. Psychology, sociology, pedagogy perished, to be resurrected many years later in curtailed versions. Genetics survived. Geneticists were the only men who resisted socialist quackery as a substitute for science. There were many who resisted. Vavilov had every reason to use the plural when, driven to extremity, he publicly exclaimed: "We shall go to

the pyre, we shall burn, but we shall not retreat from our convictions. To our utmost strength we shall follow what is happening in progressive world science" (Medvedev, 1969, p. 59, Joravsky, 1970, p. 108).

There were several reasons why genetics more than any science, was singled out for attacks under Stalin and Khrushchev. Being of great practical value in agriculture, medicine, education, and law, genetics also contributes to the general world outlook, to Weltanschauung. The practical importance of genetics made geneticists scapegoats for the failures in Socialist economics. Its theoretical significance turned it into an ideological battle-field. During the "Great Breaks" in Hitler's Germany, Mao's China, and Stalin's Russia, the governments embraced a kind of distorted Lamarckism, which taught that political systems could shape human nature. Obviously, true genetics, with its strict understanding of the balance between stability and flexibility, could not be tolerated.

During the period between 1929 and 1935, N. P. Dubinin (1907 -) and T. D. Lysenko (1898 - 1976) appear in the role of intellectuals of the new type fighting against the 'bourgeois intelligentsia' and its rotten ideology.

The first blow struck at the Institute of Experimental Biology. In 1929, Chetverikov was denounced to the authorities, arrested, and exiled to Sverdlovsk. No accusations were formally brought against him. The group of young scientists working with him was dispersed. Among them was B. L. Astaurov (Rokitsky, 1972, 1980b, Gaissinovich, 1975, Astaurov, et al., 1975, Astaurov, 1978, Astaurov and Rokitsky, 1975, R. Berg, 1979, Adams, 1980a, b, Dobzhansky, 1980). Koltsov and Filipchenko were disgraced, periodicals edited by them were exterminated, the Eugenics society was proscribed. In 1929, Filipchenko left the Department of Genetics. In 1930 he died. He was 49. In 1930, Kiltsov departed from the Chair of Experimental Biology. In 1931 or

1932, V. P. Efroimson (1908 -), one of the most eminent geneticists in the USSR, was arrested. Serebrovsky came under increasing assault by Dubinin, and Serebrovsky's laboratory closed in 1932.

In 1929, Vavilov became the first President of the Lenin All-Union Academy of Agricultural Sciences. Shortly afterward, he was attacked for his "failure to help agriculture." In 1929, the semi-literate agronomist Lysenko moved to Odessa, and soon became a scientific director of the influential Ukrainian research institution in agriculture, the All-Union Institute of Plant Breeding. His first claim of help for agriculture was vernalization: chilling and soaking of seeds of winter varieties of wheat before sowing them in the spring. At first vernalization was considered a protection against losses from winter killing. Soon Lysenko announced that it provided a better harvest. Beginning in 1930, every promise of Lysenko was supported by decrees of the All-Union and Ukrainian Commissariats of Agriculture. Just before it was shown that one widely adopted remedy of Lysenko's was sheer quackery leading to enormous losses, he had a new one, even more monstrous than its predecessor, but adopted even more zealously because of the mounting social rank of its author. The speed of Lysenko's move to the top was unprecedented (Glushchenko, 1953).

1933 - Full member of the Academy of Sciences of the
Ukrainian SSR

1934 - Member of the Soviet Government

1936 - Director of the Institute in Odessa

1937 - Vice-chairman of the Supreme Soviet of the USSR

1938 - President of the Academy of Agricultural Sciences
(Vavilov was replaced and his two successors,
Muralov and Meister, were arrested one shortly
after the other)

1939 - Member of the Academy of Sciences, Member of the
Presidium of the Academy

His exaltation had nothing to do with science. He was needed to represent the official Soviet point of view in agriculture, in biology, and in science in general. This official point of view is based on belief in the omnipotent action of environmental conditions upon living organisms, including man himself. Lysenkoism is a kind of Lamarckism, though it is not Lamarckism itself. From Lamarck, Lysenko took the theory of the inheritance of characteristics acquired during the lifespan of the organism.

Let us hear Lysenko's own voice. At the famous August Session of the Academy of Agricultural Sciences in 1948 he repeated word for word what he had published many times since the thirties: "Changed germs of newly generated organisms always occur as the result of changes in the body of the parent organism," (Lysenko, 1949, p. 34) or "Heredity is determined by the specific type of metabolism. You need but change the type of metabolism in a living body to bring about a change in heredity" (p. 35). To change the type of metabolism you need to "shatter the heredity." The means of shattering are new conditions of environment, hybridization, grafting (designated "vegetative hybridization"), and suffering. What is called "heredity" has the power to assimilate external conditions, light among them, and a capacity of choice. Artificial pollination with a mixture of pollen results in a love-marriage. If there are too few pollen grains, suffering results. Suffering shatters the heredity. To provide love-marriages for wheat, a self-pollinating plant, thousands of peasants had to open its spikelets.

An attack on statistical methods is an essential part of the teaching. In 1948, Lysenko said: "Unable to reveal the laws of living nature, the Morganists have to resort to the theory of probabilities of biological processes. It is not for nothing that statisticians like Galton, Pearson, and

later Fisher and Wright, are also regarded as founders of Mendelism-Morganism By ridding our science of Mendelism-Morganism-Weismannism we will expel fortuities from biological science. We must firmly remember that science is the enemy of chance" (pp. 614-615). It is significant that the name of J. B. S. Haldane was omitted. Lysenko expected to have Haldane's support, and he got some of it (Haldane, 1964).

It was in the early thirties that the ranks of Lysenkoists got a mighty reinforcement. A philosopher, I. I. Prezent, joined Lysenko. With his help, Lysenko created a new theory of evolution. In his theory, the origin of species is based on the existence of "particles" of living matter. These particles - krupinki - have to be changed by unusual feeding to give birth to a new species. Wheat produces rye, oats gives birth to wild oats, which is its weed, the fir-tree produces a pine-tree, the hornbeam gives birth to a hazelnut. The change occurs in a parent organism without affecting the parent organism itself. For example, the cuckoo is produced from different birds by a change in the particles of their living matter, every cuckoo being the result of abnormal diet of its parents. They gourmandize on shaggy caterpillars. Students of the Latvian University sent Lysenko a female cuckoo dissected and preserved in alcohol along with its ovary. On the label they put a question: "What kind of Morganist-Mendelist-Weismannist was it who put these eggs into the cuckoo?"

The idea that every crop produces its weed became the theoretical foundation of weed control on an All-Union scale. According to the theory, the origin of species has nothing to do with natural selection and intraspecific competition, because no such things as natural selection and intraspecific competition exist. Intraspecific relations are based solely on mutual love and readiness for self-sacrifice. The planting of oak trees to

produce field-protecting strips of forest was based on these theoretical considerations. Acorns had to be planted in dense clusters. It was supposed that some sprouts of the cluster, driven by their sense of their nonutility, would joint their roots to the root of a chosen oak sprout to give this happy elect their life's sap.

Under the increasing stress, literally on the verge of ruin, genetics moved forward. At the Institute of Physiology of the Academy of Sciences, headed by I. P. Pavlov, genetical aspects of neuropathology in man were studied by S. N. Davidenkov, N. A. Kryshova and I. I. Kanayev (Bochkov, 1980). The Department of Genetics and Experimental Zoology at the Leningrad University did not perish after Filipchenko's removal and death. The new head, A. P. Vladimirskey, preserved a high level of teaching and research. I was a member of the first group of students in genetics after the death of the founder. We had good teachers, excellent textbooks, first-class institutions and scientific schools, created by the founders of genetics and we were not as severely destroyed as they and their pupils were.

In 1932, a new plant genetics section was founded at the Leningrad University with G. D. Karpechenko (1899 - 1942) its head. Karpechenko, who studied in the USA, is one of the few Russian scientists known to American geneticists. He constructed a fertile intergeneric hybrid, an offspring of cabbage and radish (Lebedev, 1980). G. A. Levitsky (1878 - 1942) and M. A. Rosanova were among the professors of the newly organized department (Prokofyeva-Belgovskaya 1978, 1980). Several other establishments came into being during the period between 1929 and 1935, when destruction mingled with creation. In 1929, in Moscow, arose the Gorky Medico-Genetical Institute with S. G. Levit as its organizer and its first and its last director. In 1948, Muller wrote that this Institute, with its numerous staff of biologists,

psychologists, and more than 200 physicians, constituted a "shining example, unmatched anywhere in the world, of possibilites of research in human genetics" (Muller, 1948). Two thousand pairs of twins were under observation. In 1930, in Leningrad, the Institute of Genetics of the Academy of Sciences came into being, and Vavilov became its first Director. In 1933, Vavilov invited Muller to head the Department of General Genetics at that Institute. Filipchenko's pupils, A. A. Prokofyeva-Belgovskaya, Yu. Ya. Kerkis, M. L. Belgovsky, and N. N. Medvedev worked with him. Also in the group was S. M. Gershenson, a former member of Chetverikov's group. Muller's students were I. A. Rapoport, I. B. Panshin, and myself.

When Muller arrived in 1933 in Leningrad to head the Department of Genetics, he was not only a world known scientist, but also a crusader for human freedom (Sunneborn, 1968, Muller, 1973, Carlson, 1981). Muller came to the USSR with confidence that the Communist State would welcome his communistic attitudes and his humanistic projects to improve mankind. Shortly before his arrival to the USSR, Muller had been elected a Corresponding Member of the Academy of Sciences of the USSR. The election honored not only his scientific achievements but also his opposition to the class-stratified structure of bourgeois society. During his stay in the Soviet Union, Muller completed a book, Out of the Night, which was published in the USA, in 1935. He wrote it to bring on the radiant future as soon as possible. His appeal to mankind rang out from the night of the sinister present. As a measure to improve mankind, Muller advocated artificial insemination using the sperm of the most gifted men. He warned, however, that "eugenics in the wrong direction would present a far more abhorrent picture than no eugenics at all." The ideal characters to be selected by the wise use of eugenics measures were, according to Muller, "comradeliness and intelligence" (p. 118).

Acquaintance with the Soviet reality became Muller's tragedy. His eugenic ideal so similar to that of Koltsov, Filipchenko, and Serebrovsky, was defeated along with the demise of these great scientists and humanitarians. Muller's internationalism was in stark contrast to the ever rising chauvinism of the official ideology. Longing for the godlike beings of his imagined future, Muller considered the men of his generation as their pathetic foreshadowings, an assembly of ailing creatures. According to the official Soviet ideology, however, the people of the USSR were godlike before Muller started to improve them. The typical pattern of propaganda prevailed: the more oppressed people are under a totalitarian regime and the fewer human rights they have, the more they are glorified by the powers-that-be. Any treatment of human beings from a biological point of view was reductionism, a demeaning of the nature of man. J. Huxley (1949) learned from Muller himself that it was "arranged for the manuscript to be transmitted to the highest quarters, but it was very ill received."

During 1929-1935, in Kiev, Odessa, Saratov, Tashkent, and Kharkov, as well as in Moscow and Leningrad, such reputable men as I. I. Schmalhausen, A. A. Sapegin, L. A. Sapegin, G. K. Meister, L. N. Delaunay, B. L. Astaurov, N. K. Belayev worked at Republic academies, experimental stations, practical institutes and the laboratories of the universities. At the very end of this period, V. P. Efroimson was released from concentration camps. S. S. Chetverikov was permitted to move from his place of exile to Gorky. A Department of Genetics was organized at the University of Gorky, and offered to Chetverikov. Koltsov invited Dubinin to replace Chetverikov as head of the Department of General Genetics at his Institute of Experimental Biology, and population studies resumed there (Adams 1980a,b,c, Dobzhansky 1980).

Koltsov was famous not only as a scientist, organizer, and pedagogue, but

also for his outstanding diplomatic gifts. Until 1929, the Institute flourished under his leadership. The arrest of Chetverikov and the banishment of the members of his team was a political disgrace of the highest order. Koltsov tried to maneuver, but his diplomatic gifts failed to protect him. It seemed to him that his pupil, Dubinin, a young promotee (vidvizhenets), a militant member of Komsomol, and an intellectual of a new type, would be a shield against accusations of disloyalty. Dubinin was well-known, not only as colleague of Serebrovsky in their work on the fine structure of the gene, but also as a vigilant combatant against "ideological perversions." He had called for the purifying of science of the "scum of ideas of Lotsy, DeVries, Morgan, Serebrovsky, Filipchenko, and others."

In 1932 Koltsov founded the Biological Journal and he allowed Dubinin to combat "ideological perversions" in this journal. Dubinin's pieces of "proletarian science" were not the only means of camouflage used by Koltsov to defend his journal against the attacks of philosophers of Prezent's type. Koltsov's article, published in the Biological Journal (1938, v.7, pp3-45), a brilliant insight into the future of science by a genius, is devoted to a thesis which contradicts the definition of life given by Engels. According to Engles sacred dogma, metabolism, the exchange of substance is the principle feature distinguishing life from non-living matter. Koltsov perfectly realized the molecular basis of heredity. He extrapolated the monomolecular nature of chromosomes from their stability expressed in Mendel's laws. He writes: "For the genonema its own chemical exchange of substance with its environment is unimaginable. ... New gene molecules are crystallized ... near the old hereditary molecules which serve to the new ones as a priming in the process of crystallization" (p. 34). Again in the English summary, he states: "The genonema and its genes remain chemically stable ... and to not undergo

any metabolic changes ... the genonema represents the resistant genotype of the chromosome and can be changed only through mutation... A new genonema is precipitated alongside of the existing inherited genonema by apposition. Genonema and its single parts - the genes - are "touch-standards"; in the neighborhood of them the process of assimilation is commenced which from a physico-chemical point of view is a crystallization process" (p. 45).

So while he disagreed with Engels, the Russian title was written in such a way to hide this difference. The title is: "The Structure of the Chromosomes and the Exchange of Substance Inside of Them," while the title of the English abstract is: "The Structure of the Chromosomes and their Participation in Cell Metabolism."

This, together with Dubinin's "Bolshevik Science," is only a smoke-screen. The first two pages of this same January, 1938, issue of the Biological Journal had to serve as an iron shield against the destruction of science by the Party. The two pages featured an editorial. In March of that year, the trial of "the anti-Soviet Right-Trotskyite bloc" took place in which 20 of the 21 "members" were sentenced to death. The editorial expressed full agreement with the accusations against Bukharin, Rykov, Yagoda and the others for espionage, wrecking, promoting intervention into and the defeat of the Soviet Union by bourgeois states, organizing assassinations of Soviet leaders including Lenin, poisoning Gorky and murdering his son. The editorial gives a picturesque description of what would happen if "the Nazi plot of Bukharin, Rykov and Yagoda would be fulfilled ... For a scientist it is absolutely clear that the enormously large cadres of research workers would be disbanded, the scientific institutes would be closed, and the scientific journals would cease to appear" (p. 3). Ironically, two years after Moltsov featured on the front page of his journal this sinister phantasm, his journal ceased to appear, and

he himself became unemployed. This whole phantasm was exactly what happened to biologists in 1948, after Lysenko was crowned.

An attentive reader of this editorial would, however, find a note of discordance with other publications on the same subject. All the newspapers were full of demands to execute the "foul band of murderers and spies" (Conquest, 1970, p. 419). The speech of the prosecutor Vyshinsky, published in Pravda, concluded with the appeal to shoot the "accursed reptiles" "like dirty dogs." But the editorial of the Biological Journal did not insist on the death penalty. Again the title of the editorial is a camouflage: "The Sentence of the Court is the Sentence of the People." Now we know the sentence was death.

Thus actions which seemed to Koltsov to provide long-range self-protection turned out to be suicidal. While Dubinin never defamed Koltsov, Dubinin set a trap for Koltsov in which he was caught.

In the meantime, Dubinin became the Head of the Department of Genetics at the Institute of Experimental Biology.

3. 1936 - 1947

In 1936, several events occurred which were to culminate in a catastrophe for genetics in the Soviet Union. The process of subordination of science to political authority entered into its bloody phase. Group liquidations were always in vogue in the USSR. Beginning in 1936, geneticists became one of the target groups. At the Institute of Plant Breeding, at the Commissariat of Agriculture, and at the Agricultural Academy, arrests became commonplace. People were accused of being saboteurs and wreckers. At the Leningrad University, I. I. Prezent finally succeeded in his denunciations. Those who had represented Russian science on the international scene were the most endangered. In the twenties and early thirties, some young scientists had

been granted fellowships abroad. Most of them returned only to be arrested and executed. Timofeev-Resovsky, Dobzhansky, Karpechenko, Levit, Agol, Slepkov, M. S. Navashin, and Zhebrak had all been sent abroad. Of these the first two did not return, the last two survived, and the rest perished. Vavilov, Levitsky, Tulaykov, A. A. Sapegin, G. K. Meister, N. K. Belayev, M. L. Levin, B. A. Panshin, G. Friesen were arrested and never freed. There were thousands of less well-known innocent victims.

In 1936, a special conference was staged at the Institute of Philosophy of the Academy of Sciences. Lysenko and Prezent attacked genetics. Vavilov, Muller, and Serebrovsky were among the speakers, but Muller was the only one who attacked Lysenko from the political point of view. It was only twelve years later that Muller described the controversy of 1936. Let me explain why he was silent for such a long time. In 1937, Vavilov warned Muller that it was dangerous for him to remain in the USSR. In September, 1937, Muller left. The West was hostile to him because of his sympathy with the Soviet regime, a sympathy he no longer felt. However, he was defenseless against this animosity, because he believed that he had to conceal his political about-face. Every critical word pronounced by him publicly would have reached some vigilant ear in the Soviet Union, resulting in the persecution of his Russian co-workers, most of whom were his friends. Muller broke silence only after the final victory of Lysenko, in 1948, when there was nothing more to lose. Vavilov, the man Muller most admired among his former colleagues, was dead. In 1948, in an article, The Destruction of Soviet Genetics, Muller writes that at the 1936 meeting he pointed out the similarity between the position of Lysenko and the Communist authorities and the position of the Nazis, both being rooted in the doctrine of the inheritance of acquired characters. Because of this statement, Muller insisted, all mention of

application genetics to man was expunged from the book of proceedings of the meeting.

In 1936 or early in 1937, Vavilov was arrested. I had come to Moscow to show Muller the results of an experiment. Muller lived on the Chkalov prospect, in a small flat on the fourth floor. I arrived at the appointed time and met Muller and Vavilov outside the flat on the landing. They stood there rather than in the street in order to avoid spies. Our meeting could have been dangerous for me. This I understood only later. Muller said that he was going with Vavilov to the radio station. There had been a broadcast that day on American radio to the effect that Vavilov had been arrested, and Vavilov and Muller had been invited to the radio station to set the record straight for the Americans. Neither of them told me that Vavilov had actually been arrested, but had been released after a few hours. I learned this only in 1975, in Madison, Wisconsin. An American journalist had sent a cable to the U.S. telling of the arrest of Vavilov. Vavilov's subsequent release was the result of an American inquiry. The journalist who sent this cable is now living in Madison.

In 1936, the Medico-Genetical Institute was dissolved. Its director, S. G. Levit, was arrested with no return.

In 1932, N. I. Vavilov was a Vice-President of the Sixth International Congress of Genetics. At that Congress it was decided to hold the Seventh Congress, scheduled for 1937, in Moscow. In 1936, the Central Committee of the Party called off the meeting; it finally took place in 1939, in Edinburgh. Forty Soviet geneticists submitted papers, myself among them. Vavilov was elected President. Yet no Russian got permission to go. The President of the Congress was prevented from assuming the presidential position. It is interesting to list the members of the dissolved Organizing Committee of

that Congress. A. I. Muralov was its Head. The Vice-Chairmen were Vavilov and Komarov, a botanist. Levit was the Secretary. Gorbunov, Karpechenko, Keller, Koltsov, Lysenko, Meister, Muller, M. S. Navashin, and Serebrovsky were all members. Six out of the thirteen members were arrested and never returned. Muller left the USSR. Serebrovsky and Koltsov were those who were most persecuted.

In December, 1939, the second "genetic controversy" was staged. It became known that the Soviet rulers had decided to destroy genetics, and to declare Lysenko's teaching part of the official ideology. The editorial board of the philosophical magazine Under the Banner of Marxism was ordered to initiate the final destruction of genetics. People in the Soviet Union, including the vanguard, the proletariat, the bulwark of dictatorship, are not informed in advance about the measures taken by the ruling forces to liquidate some branch of science, some institution, or an organization.

This particular order became known in 1977, at the Biennale, in Venice, thanks to an emigre, a former member of the editorial board of the magazine, Arnosht Kolman. He appeared at the meeting devoted to cultural dissidence in the Soviet Union, giving a mea culpa* (Rich, 1977). At the second "controversy," as they had in 1936, Vavilov and Serebrovsky again defended genetics. Lysenko insisted on its total destruction. We can only guess why this was not done immediately. It seems likely that the world-wide reputation

*In his book entitled "We had not to live in that way", Kolman (1982) does not mention this shameful episode of his biography. He ascribes to geneticists the persecution of the young successful agronomist Lysenko (p. 213). This statement is absolutely wrong. Vavilov's support contributed to Lysenko's advancement (Popovsky, 1979).

of Vavilov was so high that the Central Committee of the Party preferred not to call the attention of international public opinion, but instead to keep geneticists under ever-increasing pressure. A look at the international scene clarifies the situation. Here are some important dates. August, 1939: a trade nonaggression pact was signed between the USSR and Germany. September, 1939: Germany and Russia invade Poland. October, 1939: agreement with Hitler about the displacement of Germans to Germany from Latvia, Estonia, and Lithuania, a prelude to the annexation of the three countries. November 30, 1939: the USSR attacks Finland. At the very moment the controversy occurred (December 7-14, 1939), the USSR was expelled from the League of Nations. Perhaps it was decided that it would be better not to pour oil on the flames. The equating of genetics with racism, a strong weapon against genetics in 1948, did not work at the time of the alliance between Stalin and Hitler. To celebrate the arrival of Ribbentrop in Moscow, the airport was decorated with a swastika (Koestler, 1959, p. 65).

In 1938 Lysenko became the President of the Agricultural Academy. In 1939, he was nominated for election as a full Member of the Academy of Sciences of the USSR. He had two rivals, two Corresponding Members of the Academy, N. K. Koltsov and my father, L.S. Berg. Shortly before the elections Pravda published an article signed by six Party members: Academicians Bakh and Keller along with Koshtoyants, Nuzhdin, Kossikov, and Dozortseva. The last three were former co-workers of Muller. The article was entitled There Is No Place for Pseudo-Scientists at the Academy of Sciences. In it Berg and Koltsov were accused of sympathy with Nazi doctrine. The way for the election of the "great scientist" Lysenko had been paved.

It is a custom at the Academy of Sciences, that a newly elected academician delivers an inaugural address to the assembly of academicians of

all departments. Lysenko spoke. In every speech, to make his point, he personally derided someone. At the famous August Session of the Academy of Agricultural Sciences, he made fun of Dubinin. In his debut as a full member of the Academy of Sciences, the chosen victim was Roza Andreyevna Mazing.

One of the most talented pupils of Yu. A. Filipchenko, Mazing remained after Filipchenko's death at the Department of Experimental Zoology and Genetics of the Leningrad University and worked with fruit flies. She discovered super-dominance, the phenomenon where flies which contain a hidden lethal mutation show increased viability. It is a very important discovery, since it allows one to understand the genetic reasons of hybrid vigor. This is the work that was the object of Lysenko's profanation.

At a general meeting of the Academy of Sciences, he permitted himself such rude behavior that those who knew could in the presence of ladies only make hints of what had happened, while they couldn't even do that to poor Roza Andreyevna. When it reached her that the quintessence of Lysenko's dirty joke was coarse swearing, she was very upset to learn that such language exists. She was from an refined family. One of her ancestors had been the pediatrician for Pushkin's family. All her brothers were professors. She took up the question of the origin of the mother oath and found out from folklorist that it dated from the time of the Tatar Yoke when it was, perhaps, a political euphemism. Rosa Andreyevna used as a marker the ebony body color. In her paper, published in Doklady of the Academy of Sciences in 1938, she wrote that virgin females used for crosses were ebony. Lysenko said: "Why how could they be virgins if they're....", and then he pronounced the English name with the Russian accent. The meaning of the word pronounced in that way is "f...ed". This was his "witticism". I told my father about Lysenko's prank. He said that he refused to believe it. But the infinite sadness with which

he said that showed that he did believe it.

The fate of Koltsov is described by Dubinin in his autobiography (1973, 1975). Dubinin decided that it was time to save the Institute of Experimental Biology from its Director. Koltsov had to be sacrificed to prevent the liquidation of the Institute. The staff of the Institute had to show vigilance. At a meeting at the Institute of Experimental Biology, a purge of Koltsov was staged with Dubinin the main prosecutor. Koltsov was dismissed from the post of Director.

The next day Dubinin was nominated by the Party organization of the Institute as a candidate for the post, but the Department of Biology of the Academy refused to elect him. Dubinin attributed this rebuff to the resistance of his enemies - the Lysenkoists. That was indeed correct, for both Lysenko and Dubinin were fighting for the leadership of Soviet biology. The main enemy of Lysenko was actually neither Koltsov nor Vavilov, but Dubinin himself. In some respects, the two enemies needed each other. By eliminating the most brilliant scientists, they paved the way for each other. Koltsov became the victim of both rivals.

Several months after the purge, Koltsov died of a heart attack. His wife committed suicide. Both events happened in Leningrad, in a hotel. Three persons came from Moscow to accompany the remains of the former head of the Institute and his wife back to the Institute: B. L. Astaurov, V. V. Sakharov, and I. A. Rapoport.

On August 6, 1940, Vavilov was arrested for a second time. Until the late sixties, nobody knew what had happened to him. Now, thanks to his biographer, Fatikh Khafisovich Bakhteyev, we know that he died on January 26, 1943, in a prison at Saratov. Bakhteyev had accompanied Vavilov on his last expedition to the Transcarpathians. Agents of the NKVD - this was the name of

the KGB at that time - came in plain clothes to the village where the expedition had its quarters. They grabbed Vavilov early in the morning when he was alone in the field, and isolated him from his companions. Then they came to his apartment to take his luggage. The two agents told the other two members of the expedition, Bakhteyev and his comrade, a lie about an invitation to Moscow, and invited them to join Vavilov. At the last moment, just as they were about to enter the car, the agents kicked them very skillfully in the stomach, left them lying, and whirled away with Vavilov's luggage. Only then did Bakhteyev and his comrade realize what had happened.

That village in the Transcarpathians was just the right place to arrest the world-renowned scientist. There were no journalists to appeal to world public opinion, on one who would even notice the disappearance before the end of the expedition. The secret police needed time to force their victim to plead guilty. Solzhenitsyn came to know that the calculations of the Communists had failed, for Vavilov did not plead guilty.

Zhores Medvedev (1969) describes in his book The Rise and Fall of Lysenko the circumstances surrounding Vavilov's death.

Vavilov's arrest was a display of an extraordinary brutality, by world standards. The police state could have used Vavilov, a man of the highest international standing, as camouflage for countless arrests by not arresting him. As a rule the most outstanding person in a field was not liquidated, despite dissent: Examples are Vernadsky in geology, L. S. Berg in geography, Prianishnikov in agricultural chemistry, M. M. Zavadovsky in embryology, Serebrovsky among geneticists, Pasternak and Akhmatova among poets. The arrest of Vavilov shows how influential Lysenko and Prezent were.

N. I. Vavilov was the fourth President of the All-Union Geographical Society. The fifth President was my father, Lev Semenovich Berg, a friend and

admirer of Vavilov who replaced Vavilov after he disappeared. As president, my father had to write at its centennial in 1945, the history of the Society. He devoted a chapter to the geographical achievements of his predecessor and planned to include his portrait. The censor ordered the Society to exclude mention of the disgraced President from its annals and warned that otherwise the book would not be published. Rather than submit to censorship, L. S. Berg was prepared not to publish the book. The worst times had not yet begun. The centennial history of the All-Union Geographical Society was published with the chapter devoted to Vavilov, but his portrait was excluded (Berg, 1946, pp. 209-219). No date or place of death was given, since my father did not even know whether the man that had preceded him in the office was alive or dead.

After Vavilov's imprisonment, the post of the Director of the Institute of Genetics of the Academy of Sciences of the USSR was filled by Lysenko.

In 1940 two professors of the Leningrad University, Levitsky and Karpechenko, were arrested. A unique event happened in connection with their imprisonment. A student at the University protested against the arrest and left the University. This student was an 18-year-old girl, an American — the only foreign citizen at the University at that time. Vavilov had brought her and her mother to Leningrad from the United States in 1936. After his imprisonment, they were doomed. Both died from cold and hunger in 1942 in the siege of Leningrad during World War II. The girl was Edna Borisovna Brissenden. She was my pupil and a joint author of my first article on population genetics, published in 1941 (Berg et al., 1941). Her personal and scientific talents were enormous, and are lost to the world.

Many of the young scientists who had time to complete their education before genetics was banned perished during the war. Neugaus, Borisov,

Graciansky, Muretov, Pavlovets, and Rosenstein were killed in battles. Rapoport, Efroimson, Lobashev, Polyansky, Olenov, Nasonov, Belgovsky, Kershner, Kirpichnikov, Shifrin, and Kamshilov also fought but managed to survive.

The final catastrophe for genetics was postponed by the war. The necessity of alliance with the Western democracies was one of the causes of that delay.

In 1945, the Academy of Sciences celebrated its 220th jubilee. Julian Huxley was among the numerous foreign guests. He was accompanied by Eric Ashby, an English botanist and a representative of the Agriculture Ministry in England. The Biological Department of the Academy of Sciences arranged a lecture by Lysenko to show to the foreigners the brilliant status of Soviet genetics. Huxley invited me to listen. Lysenko spoke before a large audience. He showed sheaves of wheat and spoke in a hoarse, barking voice: "This character is dominant, this one recessive. There are unfortunately still some who understand what these words mean . . ." Huxley asked Lysenko after the talk was over: "If there are no genes, what is the cause of segregation?" Lysenko answered: "It is not easy to explain but I shall try. You must know my theory of fertilization. Fertilization is mutual digestion. The egg digests the sperm, and at the same time the sperm digests the egg. They assimilate each other. This assimilation is not complete. We know in our persons what happens when it is so. We belch. Segregation is Nature's belching. Unassimilated material is belched out." E. D. Manevich, an excellent interpreter, translated word for word. After Huxley and Ashby left the grandiose lecture-hall, where they had at last learned the true laws of genetics, they first looked at each other rather confusedly. Then these two tall restrained men simultaneously put their hands on each others shoulders

and burst out laughing.

After Lysenko left, Glushchenko invited the foreigners to visit experimental fields at the Institute. It was clear that there was nothing to show. The fields looked miserable. We were invited to the banquet. I, being Huxley's attendant, was not barred. There were about twenty people at that festival placed at the festive table according to their rank. A hundred people would have been stuffed by the amount of food served.

In 1937, I had witnessed another reception for an eminent foreigner by the Director of the same Institute. It took place at the Experimental Division of the All-Union Institute of Plant Breeding, in Detskoe Selo (Pushkin) near Leningrad. The host was Vavilov, the foreigner Muller. That same day Muller was to go on board a ship to leave Russia. Vavilov himself showed the experimental plots sown with the samples of cultivated plants collected by him and his collaborators from all the agricultural countries of the world. At the cytological laboratory, Levitsky presented the slides. There was a laboratory to test the biochemical composition of grains and the baking qualities of cereals. In one of the laboratories, a breakfast was served: tea, white bread, smoked fish, and chocolate bars. The driver of the car that brought Vavilov, Muller, and me to Detskoe Selo had breakfast with us. Different times, different ways.

4. 1948-1953

In 1948 teaching and research in genetics ceased. The purge occurred at the historical Session of the Lenin All-Union Academy of Agricultural Sciences (LAAAS). The stenographic record of the August Session, as it went down into history, has been translated into nearly all European languages. The English edition, published in 1949 by the Foreign Languages Publishing House in Moscow, reads in bold letters: The Situation in Biological Science.

Proceedings of the Lenin Academy of Agricultural Sciences of the USSR Session
Session July 31 - August 7, 1948. Verbatim Report. The translation really is verbatim, but the original does not contain the whole truth. Schmalhausen told me that the stenogram of his report is falsified. The book does not have Rapoport's remark. He interrupted Prezent, shouting: "You're lying, you stinking jackel."

I cannot resist a slight digression. Rapoport was expelled from the Party. In the fifties, when Dubinin was organizing a laboratory of radiation genetics under the aegis of the physicists, he agreed to take on Rapoport on the condition that Rapoport undertake to have himself reinstated in the Party. Rapoport refused.

In 1723, Jonathan Swift described Gulliver's visit to Laputa and to the Academy of Lagado. He has earned the reputation of the wicked satirist. If Swift had described the USSR Academy of Sciences Institute of Genetics and the Department of Genetics and Selection at Leningrad University for the period beginning with the time of the August Session of the LAAAS in 1948 and the Session itself, and if he rejected fantastic allegory as a device, he would have earned the same reproach.

With the Verbatim Report in hand it is very easy to compare the two academies - the one described by Swift and the one whose meeting is reported. The parallels between the projects that Swift depicts and the practical recommendations of the Lysenkoists are amazing. The methodologies coincide completely. Let us begin with them.

There is an Academy of project designers in Lagado. The professors contrive new rules and methods for agriculture. As a result, "...all the fruits of the earth shall come to maturity at whatever season they think to choose, and increase an hundredfold more than they do at present..." (Jonathan

Swift, Gulliver's Travel and Other Writings. A Betam Book, N.Y., London, Toronto, 1971, pp. 175-176).

There are "innumerable other happy proposals. The only inconvenience is, that none of these projects has yet been brought to perfection; and, in the meantime the whole country lies miserably waste ..." The academicians, however, "instead of being discouraged are fifty times more violently bent upon prosecuting their schemes; driven equally on by hope and despair". Those who do not wish to follow the pernicious recommendations of the designers "are looked on with an eye of contempt and ill-will; as enemies to art; ignorant, and ill commonwealthsmen, preferring their own ease and sloth before the general improvement of their country."

It wasn't real help for agriculture or the well-being of the nation that were important to the rulers of Laputa, but rather the struggle against the bearers of a hostile ideology.

We turn to the Verbatim Report. The strength and significance of the Michurinist biology lies in its smashing hostile ideology. I quote from the speech of the great ideologist of Lysenkoism, the great Laputian of the Twentieth Century, Turbin: "Michurin genetics attaches special importance to obtaining by vegetative hybridization of hybrid organisms that combine the characters of the initial varieties used for grafting, not because Academician Lysenko regards vegetative hybridization as the chief method of plant breeding, as some claim, but because vegetative hybridization is the chief and most striking proof of the unsoundness of the theory of the gene. These facts alone should be sufficient to induce one utterly to reject the theory of the gene as a fallacy" (p. 480).

Those who were most farsighted, changed their strategy long ago, Kh. F. Kushner among them. Under Vavilov, at the Institute of Genetics of the

Academy of Sciences, Kushner studied the use of hybrid vigour for poultry-breeding. After the post of the Director of the Institute of Genetics was filled by Lysenko, Kushner abandoned this area for vegetative hybridization. Hybrids were produced by replacing the white of the egg of one breed by the white of another breed. Jonathan Swift, describing the research program of the Lagado Academy, missed that pearl.

Let us move on to practical measures for increasing harvest. We begin with methods of working the soil. Gulliver says: "In another apartment I was highly pleased with a projector who had found a device of plowing the ground with hogs, to save the charges of plows, cattle, and labor" (p. 178). Let us turn to the Verbatim Report. G.P. Visokos, the Director of the Siberian Research Institute of Grain Husbandry, located in Omsk, states: "In 1942 Academician Lysenko made a momentous scientific discovery, namely, that winter wheat can overwinter in the steppe part of Siberia sown in the entirely unploughed stubble of spring crops. This year the Ministry of Agriculture, taking into consideration the favorable results of the experiments, included in the collective farmers' plan in the Omsk Region the sowing of winter wheat in stubble on an area of several thousand hectares" (p. 205-206). "Thanks to Academician Lysenko's discovery, we have scored against the severe Siberian climate" (p. 207).

I return to Lagado. A scientist assures Gulliver that spiders are much more useful than silkworms, because they not only spin but weave. Gulliver says: "Whereof I was fully convinced when he showed me a vast number of flies most beautifully colored, wherewith he fed his spiders, assuring us that the webs would take a tincture from them; and as he had them of all hues, he hoped to fit everybody's fancy, as soon as he could find proper food for the flies, of certain gums, oils, and other glutinous matter, to give a strength and

consistence to the threads" (p. 179). How can one help being reminded of the cuckoo, the Ace of trumps for Michurinist biology. A chiff-chaff, or any bird, that stuffs itself by mistake on fuzzy caterpillars gives birth to a baby cuckoo. The birth of one species from another occurs as the result of a change in the diet.

And now the August Session of the LAAAS. The speech by V.A. Shaumyan from the fifth meeting. He is a Director of the Kostroma State Cattle-Breeding Station. Before getting down to praising the Kostroma breed of cattle, he called for the destruction of the enemy.

Unmasking the hostile ideology lurking behind the chromosomal theory of heredity was far more important than raising crop capacity or the productivity of farm animals. A Soviet person had to realize that the enemy wasn't dozing. Vigilance was more important than a full stomach. It had to be impressed upon the Soviet citizen that the people responsible for his hungry, empty life were intellectuals: Mendelists-Morganists-Weismannists. They were purposely lowering the harvests and, by working for the enemy, they were forcing the wise leadership to raise the Soviet Union's military potential. The August Session was carried out precisely under the slogan: "Vigilance Reinforced by State Ideology."

"It is high time to realize that today our Morganists-Mendelists are in effect making common cause with, and objectively - and in the case of some even subjectively - are forming a bloc with the international reactionary force of the bourgeois apologists not only of the immutability of genes but also of the immutability of the capitalist system" (p. 252).

After that comes the praise of the cattle breed: "What is our great success due to? The first and basic condition of success in the formation of breeds is abundant and skillful feeding" (pp. 253-254). "During our many years

of work we have steadily been guided by the teaching of that great transformer of nature, I.V. Michurin, and his foremost continuator, T.D. Lysenko. We were guided by the directives of the great scientists M.F. Ivanov and P. N. Kuleshov, innovators in the field of animal husbandry..." "Fodder and feeding," M.F. Ivanov used to say, "exert much greater influence on the organism of an animal than breed and origin!" (p. 260).

Shaumyan concludes his speech in a manner so typical for Laputa that I cannot resist reproducing that passage in its entirety: "The formal geneticists have done us tremendous harm; they are trying to disarm millions of the foremost agriculturists who with utmost devotion work indefatigably and creatively day and night to increase the wealth of our country. We must now finally and irrevocably take this unscientific and reactionary theory down from its pedestal. Unless we intensify our 'external action' upon the minds of our opponents and create for them the 'proper environmental conditions,' we shall of course be unable to remake them. I am fully convinced that if we guide ourselves by the only correct theory, the theory of Marx, Engels, Lenin, and Stalin, and take advantage of the tremendous care and attention which the genius of Stalin bestows upon men of Science, we shall undoubtedly be able to cope with this task" (p. 262).

If you take into consideration that "the proper environmental conditions" which in Shaumyan's opinion ought to be created for the representatives of "formalist geneticists" are the Gulag Archipelago, the Swiftian satire will grow dull right before your eyes.

The stenographic report of the August Session takes up 631 pages. Of the 50 speakers who called for a massacre, I've only cited the words of three of them. The speeches of Prezent, Glushchenko, Nuzhdin, Dvoryankin, and Stoletov are no less ominous than Shaumyan's. The opening speech and closing remarks

by Lysenko are a drum roll, a ritual music of public executions. Only in the closing remarks, pretending to be answering an anonymous question that had been handed to him, did he inform the Session's participants that his report had been approved by the Central Committee of the Party. The audience's reaction was: "Stormy applause. Ovation. All rise." And the concluding words of Lysenko had the same effect: "Glory to the great friend and protagonist of Science, our leader and teacher, Comrade Stalin!" The performance didn't end with that. Three of the eight defenders of genetics delivered penitential speeches. A resolution was accepted and a letter written to Stalin. No more voting was needed. The letter ends with the words: "Glory to the great Stalin, the leader of the people and coryphaeus of progressive science!" The audience reaction: "Stormy, prolonged, and mounting applause and cheers. All rise."

Academician Lobanov, the chairman of the Session, proposed doing without such a non-herd form of conduct as voting: "Permit me to interpret your applause as an unanimous endorsement of the message of greeting to Comrade I. V. Stalin." Stormy applause expressed the audience agreement.

Swift's satire is satire. The Verbatim Report is a model to be imitated.

Two events that followed the Session have to be emphasized. First: The resolution of the Praesidium of the Academy of Sciences of the USSR passed after the debates at the Academy of Agricultural Sciences. The Academy of Sciences decided to remove from scientific and administrative positions all scientists who disagreed with Lysenko. The Academician-Secretary of the Division of Biological Sciences, the great physiologist Leon Abgarovich Orbeli, was dismissed and replaced by A. I. Oparin. Academician Schmalhausen lost his directorship at the Institute and his position at the University. It was declared that the

Laboratories of Genetics and Cytology of all institutions working on the basis of the chromosome theory of heredity were to be closed. Philosophers and historians would be given the job of "popularization of the achievements of Michurinism and of critical exposure of the pseudo-scientific Morgano-Weismannite tendency." In a letter to Comrade Stalin, the Praesidium of the Academy gave a pledge "to root out the unpatriotic, idealistic Weismannite-Morganist ideology."

Second: The letter of Yuri Zhdanov to Comrade Stalin. Yu. Zhdanov had been appointed a member of the Central Committee of the Communist Party in its Science Department. This letter appeared in Pravda on August 7, 1948. As I read it, I was sure that genetics would never recover. This letter was a full-blooded example of Lagadoism. Yuri Zhdanov repented his past efforts toward compromise between conflicting trends in biology. There could be no compromise with the antiscientific views, with the denial of man's capacity to remake nature. He wrote: "From the very first day of my work in the Science Department, representatives of formal genetics began to come to me with complaints that the new varieties of useful plants obtained by them (buckwheat, koksaghyz, geranium, hemp, and citruses), possessing improved qualities, were not introduced into production . . . My mistake was that, having decided to take under protection these practical results, which were Danaan gifts (i.e., Trojan horse gifts - translator), I did not mercilessly criticize the radical methodological defects of Mendel-Morgan genetics. I recognize that this was the 'business' approach to practical work, a hunt for ha-pence." I have taken the translation of Zhdanov's letter from Julian Huxley's book (1949), where the text is reproduced.

Yuri Zhdanov was not the spokesman of a rich country with a surplus of buckwheat and citruses. During World War II a rationing system had been commissioned. It was not abolished until 1948. Buckwheat and citruses could be obtained only after hours spent standing in a line. And this was only in the

capitals of some Republics, in Leningrad and in Moscow. For several years after rationing ceased, flour was "given", according to the expression used by Soviet people instead of "sold", only before celebrations of revolutionary events and then not more than five pounds into the hands of any one person. For four, five, six hours, whole families stood in line, children with them, including the newborns, to receive these 5 pounds per person.

Danaan gifts! Yuri Zhdanov was the son of Andrey Zhdanov -- the main hangman for intellectuals, for criminals on the front of ideology. Mikhail Zoshchenko, Anna Akhmatova, Dmitry Shostakovich and Sergey Prokofyev were among A. Zhdanov's victims. Nature and nurture both contributed to the son's skill in expressing repentence.

Genetics was eliminated from all textbooks. Teaching at schools and universitites had to be entirely Lysenkoist. The glorious science of a great talented people received the name of Michurinist biology. Leading Professors in Departments of Genetics and of Darwinism - Schmalhausen, Lobashev and Alikhanyan - were replaced by Lysenkoists. Dvoryankin, Turbin and Isayev took their places. Turbin became Dean of the Department of Biology of the Leningrad University. At Gorky, S. S. Chetverikov and Z. S. Nikoro lost their positions; at Kharkov, L. N. Delounay. This political tempest swept away hundreds of scientists. The higher the scientific repute of the person, the more cruel was the persecution. People who had been devoted to their Socialist fatherland, and posed no opposition to the ruling forces, some of them members of the Party, people who took part in the Revolution, people who defended their country against Hitler were now accused as enemies of the people, as wreckers, and saboteurs, as slaves of Wall Street. Men of honour, ideolized by their pupils, were now put in the pillory. It was a tragedy not only for those who were hounded, but also for all of their friends who were forced to witness and to keep silence.

With the greatest revulsion, I read now the ignorant and irresponsible words of R. C. Lewontin and R. Levins (1976, p. 50):

"It is entirely reasonable that charges of 'wrecking' levelled by Lysenkoists against their opponents, as an explanation of the failure of proposed methods, should be believed by agricultural officials ... The very real sabotage of agricultural production [by peasants during the forced collectivization - R. B.] led to suspicion that instances of failure of Michurinst methods, which, after all, could show striking success in some years and some localities [underlined by the authors - R. B.], must be the result of abnormal conditions created by the willful resistance of saboteurs among farmers and agricultural scientists."

Lewontin and Levins are plus royalist que le roi même. The honesty of the victims is beyond doubt. All those who where imprisoned were rehabilitated after Stalin's death, most of them posthumously.

The fourth period of the history of genetics in my country had begun as the most sinister of all. It seemed in 1948 that it couldn't be worse and that the disaster would last forever. Both statements proved to be wrong. First, it turned out that it could be worse! The geneticists were doomed to extinction. They were deprived of all human rights. All publication in genetics were cut off. Geneticists were forced to be silent. It was forbidden to mention their names. Their books and articles had to be destroyed. Great efforts were made to prevent the regeneration of this abolished branch of knowledge. In 1951, India ink was used to cover the names of the most famous geneticists in all books where they were mentioned.

I witnessed these procedures in the library of the Geographical Society. My

father had died in 1950. Deprived of any hope of continuing with population studies, I had begun to study the scientific life of my father, and I was using the archives and the library of the Geographical Society. At first, I could not even understand what was happening. The head of the library, A. G. Grumm-Grzhimaylo, a historian and the son of a famous traveler, explained to me that Vavilov's name had to be covered with India ink. The staff of the library, including its Director, were in despair. Resistance was impossible. All of them looked ill. Grumm-Grzhimaylo was covered with bloody swellings.*

A ferocious campaign against geneticists began. Lysenko took revenge against L. A. Orbeli who, until 1948, had defended geneticists and genetics in his position as Academician-Secretary of the Department of Biology of the Academy of Sciences of the USSR. In 1950, he was deprived of all his positions. The collaborator working under him on the genetic basis of behavior, Rosa Andreyevna

*In 1962, i.e. in Khrushchev's time. Grumm-Grzhimaylo published a book: In Search of World's Plant Resources (Some Scientific Results of Travels of the Academician N. I. Vavilov) (Grumm-Grzhimaylo, 1962). The book glorifying the past "enemy of the people" was published, but the crimes of the regime were not shown up. This is an index of Khruschev's curtailed de-Stalinization. In a booklet of O.A. Konstantinov Hundred Twenty Five Years of the Geographical Society of the USSR, published in 1970, i.e. in Brezhnev's time the name of the fourth president of the Society, a traveler, ethnographer, and a greatest phyto- and agrogeographer who ever lived in Russia, Nikolay Ivanovich Vavilov, is not mentioned (Konstantinov, 1970). Konstantinov resorts to an usual trick of Soviet authors. The Geographical Society is described as if there were no presidents. There is no references to the books commemorating the fiftieth and the centennial anniversary of the Society written by its presidents, P. P. Semenov-Tyan-Shansky and L. S. Berg.

Mazing, died of a heart attack immediately after she learned what had happened. A. I. Promptov, another collaborator of Orbeli in the behavioral genetics of birds, and a pupil of S. S. Chetverikov, died in a similar way in 1948. V. P. Efroimson and D. D. Romashov were arrested. A. A. Malinovsky and V. V. Sakharov were on the verge of starvation. B. L. Astaurov was forced to terminate his brilliant experiments on the silkworm, I. A. Rapoport was prevented from working on chemical mutagenesis, and A. A. Prokofyeva-Belgovskaya had to stop her prophetic cytological studies of the heterocyclicity of chromosomes. N. V. Timofeev-Resovsky was imprisoned, and S. S. Chetverikov and Z. S. Nikoro were unemployed.

We were witnessing Communism in its most typical forms, and then it turned out that even the worst things change. The most sinister period in the history of genetics in the USSR was the shortest.

Signs of the erosion of Lysenko's omnipotence became evident in the last years of Stalin's reign. Some of them originated from the clandestine struggle of biologists whose activity could not be entirely banned through administrative measures taken in 1948 by all institutions connected with agriculture and biology. The Timiriazev Agricultural Academy and the Forest Institute of the Academy of Sciences of the USSR were the strong-holds of this clandestine activity. In the post-war period Stalin was as ignorant of the real situation in agriculture as he was at every period of his years in power. He had a tested method to increase the deliveries to the State of agricultural production. This was the raise of the percentage of production taken away from peasants. Both the production of collective farms and of the private plots were subject to ever higher taxation. The inability to fulfill the output program by a member of a collective farm was considered a criminal offence provisioned by the criminal code. Besides, Stalin was convinced that the rural population was really quite

well off.

"All those who interested themselves even a little in the national situation saw the difficult situation in agriculture, but Stalin never even noted it... He knew the country and agriculture only from films. And these films had dressed up and beautified the existing situation in agriculture. Many films so pictured kolkhoz life that the tables were bending from the weight of turkeys and geese. Evidently, Stalin thought that it was actually so." These are the words of Khrushchev, an excerpt from his de-Stalinization speech, delivered on February 24-25, 1956, at the Twentieth Congress of the Communist Party of the USSR. (Khrushchev, 1956, p. 522; see also R. Medvedev, 1979, p. 149).

But somehow the voice of genuine science reached the ears of the zealous film-admirer. Most probably the man who dropped a grain of doubt into Stalin's soul was the Director of the Forest Institute of the Academy of Sciences, Academician V. N. Sukachev. Under his aegis the former geneticist, the Corresponding Member of the Academy of Sciences, N. P. Dubinin, was working as an ornithologist.

It seems, that The Situation in Biological Sciences -this is, as we know, the title of the Verbatim Report of the August Session of the LAAAS, -irritated the Leader. The victory of Lysenko had not improved the desperate situation in agriculture, even though the scapegoats were liquidated. Thus Lysenko himself became a scapegoat.

Here is a passage from Joravsky's book devoted to these monarchical feelings. Joravsky writes: "In October [1952], Georgii Malenkov, reading the Central Committee's [i.e., Stalin's] report to the Nineteenth Party Congress, sounded strangely discordant notes. In the agricultural part of the lengthy report he repeated the complaint that had proved disastrous to genuine science back in the 1930's, but now Lysenko's school was responsible. Though 'all

anti-scientific, reactionary ideas have been exposed and destroyed in agricultural science, and it is developing now on the only correct, materialist, Michurinist basis,... nevertheless it is still lagging behind the requirements of production on the collective and State farms.' In the ideological part of his report Malenkov seemed to reaffirm faith in Lysenkoism; he endorsed the obscurantist positions that had been taken in the scientific 'discussions' of the late 1940s, explicitly including biology. But then he cast doubt on the endorsement by repeating Stalin's objection to 'the monopoly of various groups of scientists, who bar the way to fresh and growing forces, fence themselves off from criticism, and try to settle scientific questions by administrative fiat! ... Malenkov refrained from specifying which groups he had in mind" (p. 155).

For us, who were silenced, it was clear "which groups Stalin had in mind". The organizational manifestations of this dissatisfaction are scarce. In 1951 the director of the All-Union Institute for Plant Breeding (VIR), a devoted Lysenkoist, was replaced by P. M. Zhukovsky, an eminent botanist and a follower of Vavilov. He was one of the most productive members of Vavilov's famous expeditions. Being a Party-member he paid but ostentious genuflections to Lysenkoism.

At the same time the "Great Stalin Plan for Transformation of Nature" was abandoned. The Ministry of Agriculture demanded exact statistical data about the number of trees which survived after they were planted according to Lysenko in clusters and the number of surviving trees being planted in accordance with standard recommendations. The disastrous results of the inventory were not published but Lysenko's method of afforestation lost official support (see Joravsky, 1970, pp. 153, 154, 397).

Lysenko's ideological credo was not attacked until 1952.

The campaign against geneticists had consolidated the Lysenkoists. After

the victory of 1948, the absence of a common enemy demoralized them. Their union inevitably lost its monolithic character. The nonsense of Lysenko made him vulnerable to attack by any person in the Lysenkoist gang who had a high position but sought further advancement. The first to begin the struggle for dominance was Turbin, who had been aggressive propagandist of Lysenko's teaching, and one of the worst and most active persecutors of geneticists, absolutely uninhibited in his tactics. In Stalin's time, in 1952, in an article in the Botanical Journal, he attacked the evolutionary view of Lysenko that new species originated suddenly as the result of a change in the particles of somatic cells of the parental species and not through natural selection (Turbin, 1952). Turbin's arguments in support of natural selection as a factor of evolution were the same as those which Weismann had used in 1912. Turbin, of course, did not mention the condemned Weismann. Lysenko's genetic concepts were not criticized. Shortly after, Turbin delivered a speech on the subject of his article before a wonder-struck audience at the Zoological Institute of the Academy of Sciences of the USSR, in Leningrad. I was in the audience.

We knew that the performance was staged with some hidden design. There was more in it than meets the eye. We were well accustomed with the symbolic actions of the State. Here is one example of such a symbolic act taken from the de-Stalinization speech of Khrushchev. "I can remember how the Ukraine learned about Kossior's arrest," said Khrushchev. "The Kiev radio used to start its programs thus: 'This is Radio (in the name of) Kossior.' When one day the programs began without naming Kossior, everyone was quite certain that something had happened to Kossior, that he probably had been arrested" (l.c. p. 526).

Interpreting other signs, besides Turbin's debut, those who understood the symbolic language of administrative hierarchy could predict Lysenko's fall. In the late forties a monument to the leaders of the Soviet Union was erected in

Minsk: The great Stalin chatting with the outstanding Lysenko. A corn-cob, the obvious subject of their conversation, was held by Stalin. In 1950 a poster was published glorifying the afforestation of the steppe. There was only one human being looking meditative at Nature transformed according to his Plan -Stalin. The maiden speech of Turbin belonged, obviously, to the same category.

Turbin surely did not act on his own initiative. His orders had to come from the highest quarters, from somebody having a higher rank than Lysenko. There was only one person of that kind: Stalin. The mistrustful tyrant had good reason to be suspicious. Lysenko had taken the support of Stalin too much for granted. And those who rendered royal honours to Lysenko overdid it. All the standing ovations, ceaseless applause, orchestras playing flourishes at the entrance of the professor, millions of portraits, statues and the publication of millions of copies of his books made Stalin jealous.

I learned from Zh. A. Medvedev how Turbin became an opponent of Lysenko. The editor-in-chief of the Botanical Journal, P. M. Zhukovsky, told Zh. A. Medvedev that an article by some unknown person, Ivanov, had been received at the editorial board of the Botanical Journal, and it had become known that Ivanov was supported by the Central Committee. The article attacked the evolutionary ravings of Lysenko. Turbin, a member of the editorial board of the Botanical Journal, immediately wrote an analogous article and both appeared in one and the same issue.

It seemed probable that this was only a prelude to a much more slashing attack on Lysenko, similar to the attack on the late linguist Marr during the discussion on linguistics started by Pravda in May, 1950, when Stalin himself appeared in the role of linguist. Here are the words of Stalin concluding the "free discussion on linguistic problems":

"I feel that 'formalism' was fabricated by the authors of the 'new teaching'

for facilitating the struggle with their opponents in linguistics. The reasons for stagnation in Soviet linguistics is not the 'formalism' invented by N. Ya. Marr and his 'students', but the Arakcheyev-like regime and the theoretical gaps in linguistics. N. Ya. Marr's 'students' created the Arakcheyev-like regime. N. Ya. Marr and his closest colleagues introduced theoretical confusion into linguistics. To do away with stagnation, both of the above must be abolished. The liquidation of these ulcers will cure Soviet linguistics, will lead it onto a broad path and will enable Soviet linguistics to occupy first place in world linguistics" (Pravda, July 4, 1950). The translation is from Simmons (1951).

Alexei Andreyevich Arakcheyev - War Minister, Chief of Military Affairs, and the Chief of the Department of Councils of State in one person, was a mild analog of Stalin at the beginning of the 19th century, during the reign of Alexander the First. In the history of mankind there is not a single person more similar to Stalin than Arakcheyev. Stalin's artels - his type of collective farms - and Arakcheyev's military settlements were both the incarnation of Communism and both required bloody means for their establishment. However, the range of the revolutionary movement of Stalin exceeded greatly the military actions of his 19th century counterpart.

The words of Stalin were hypocrisy. He did not want to shatter the Arakcheyev-like regime. He himself wanted to be the sole dictator. His declarations word for word fitted the case of genetics, as well. Just as he had wanted to rule linguistics, it now appeared that he wanted to rule genetics. Lysenko was endangered.

5. 1953-1963

In 1953, Stalin died and a new era for genetics in the Soviet Union began. There was a short period when Lysenko fell into disfavor with Khrushchev. It

seemed that the return of the genuine science would be a substantial part of Khrushchev's hasty reforms.

Relations between Lysenko and the new ruler, Khrushchev, are described by Roy Medvedev and Zhores Medvedev (1978). The clash between Khrushchev and Lysenko started long before Stalin's death and thus before Khrushchev came to power. Thanks to Khrushchev the vernalization affair was abandoned, and the winter-varieties of wheat were returned to the fields. During his first years in power Khrushchev was skeptical about Lysenko's practical recommendations and most of them were not used. Khrushchev himself appears to be the architect of his agriculture policy and his grandiose projects have nothing to do with Lysenkoism. Unfortunately they also have nothing to do with science.

My father, Lev S. Berg, was an eminent geographer. Since I was deprived of any possibility to continue my genetics studies, I became after his death on December 24, 1950, his biographer. A resulting book described his paleoclimatological studies of lakes and glaciers of Siberia and Central Asia (R. Berg, 1955). Thus I knew about climate and soil of those regions which Khrushchev intended to transform into a granary as productive as the Ukrainian steppe. Reading Khrushchev's speeches, published in Pravda, devoted to his "virgin land program", I was amazed by his blatant ignorance.

His corn campaign was a disaster for peasants who were just benefiting from a series of his reforms. The order to plant corn in areas with inappropriate soil and weather conditions, for instance in the Leningrad District, forced the chairmen of collective farms to resort to forgery. I learned from a primary source about one of these tricks. Instead of planting corn, the collective farm cultivated potatoes, the harvest was sold, corn was purchased, and delivered to the State as if it was grown under the rainy sky of the Leningrad district, heated by the enthusiasm of the members of the collective farm.

In the thirties Vavilov wanted to introduce hybridization of inbred corn varieties into corn cultivation. The most absurd theoretical considerations of Lysenko about the harm of inbreeding turned out to be fatal for the application of new methods, which provided, and still provide, increased yields in the United States. With mixed feelings of shame and satisfaction we were reading in newspapers that Khrushchev during his sojourn in the USA was making arrangements with the farmer, Roswell Garst, to purchase large quantities of hybrid corn seed. Failure of Lysenko to be useful to Khrushchev in his corn campaign was, according to the Medvedevs, the main reason why Lysenko temporarily lost his position as President of the Agricultural Academy.

But step by step Lysenko wormed himself into Khrushchev's confidence. The old proposals, i.e. vernalization, vegetative hybridization, reeducation, as means of creating new varieties "in shock tempo" were abandoned in practice if not in theory.

Lysenko's new recommendations were for improving soil by using organic-mineral mixtures and in animal breeding. In 1961 Lysenko emerged again as the President of the Academy of Agricultural Sciences. Zh. Medvedev (1969) describes the effectiveness of Lysenko's soil improving methods: "Fertilizer experts may be interested to know how, despite categorical objections from agricultural chemists, Lysenko for many years proposed to mix superphosphate with lime before applying it to the soil. This procedure is absurd because it transforms superphosphate into an insoluble form, tricalcium phosphate. What happens then is that the superphosphate is converted into phosphate, the raw material from which it is originally made in chemical factories, so that, instead of being applied to the soil, it might as well have been shipped back to the factory" (p. 172). It is not useless to know that Zh. Medvedev is an alumnus of the Timiriazev Academy, the pupil of Pryanishnikov who was one of the most

outstanding agricultural chemists of Russia.

As a specialist in animal husbandry, Lysenko promised to increase butterfat content of milk "in shock tempo" by producing hybrids, which would combine the best qualities of their parents and would transmit them to their offspring. He pretended to know how to avoid segregation. The hybrids produced by crossing Jersey bulls with cows of ordinary local breeds would represent a new variety and would be used for improvement of the herds of collective and State farms. The charlatan nature of this recommendation was obvious. Hybridization was not the only method to improve herds. Abundant feeding with food, containing as much vegetable oil as possible, was considered a measure to produce a variety of dairy cattle having milk with a high butterfat content.

Khrushchev supported Lysenko's foolhardiness with the same zeal as Stalin did in his time. Scientists were forced to be silent.

The harm of Lysenko's recommendations in animal husbandry became evident when collective and State farms tried to improve their herds by purchasing bulls from Lysenko's experimental farm, and by applying the same methods to raise the butterfat content as he did.

During the reign of Khrushchev I was teaching at the Department of Darwinism of Leningrad University. One of the alumini of that Department, who graduated in Stalin's time, became a chairman of a collective farm in the Leningrad District. He came to his Alma Mater to tell about his failure to produce a new variety of highly productive livestock by changing the diet of calves. "We spared no expenses, we fed the calves on unskimmed milk. But we did not even recover the expenditures we spent to raise the cow." He exclaimed these words in despair. Being trained in biology in Stalin's time, after Lysenko's victory, he believed that his cows, grown up in luxury, would not only give him milk with a high percentage of fat, but would transmit their acquired character to their

offspring. He asked: "Why does the reeducation give such brilliant results in plant growing but not in animal husbandry?" I answered: "Raising such a big creature as a cow, you observe the effect of your measures on that particular individual, and on its progeny. When you deal with annual plants, you apply your measures to a population. You trigger selection, and its results you ascribe to the procedure you applied. This is why the idea of inheritance of acquired characters is of such great vitality. In England, where the improvement of race-horses has been practiced for centuries, training is applied as a test, but not as a means to produce a better variety. Read Wallace, his book 'Darwinism' was written in the last century."

In 1963 the newspaper Ekonomicheskaya Gazeta published an article: "The Content of Butterfat of Milk is Rising." ("Zhirkost' Moloka Povishaesta"). The title turned out to be a fool play. The article told the truth in plain words. The content of butterfat of milk is decreasing in all those farms which used the bulls purchased at Lysenko's farm. I have read the article in person.

The decree about which I am going to speak, I did not see. I know about that decree from rumors. When I heard it in 1965 in Academgorodok (Town of Science, Novosibirsk), this rumor, as many other communications which proved later to be true, seemed to me to be an anecdote. It was said that an order was issued to the shops to measure the content of fat in milk provided by a trade station and, if it was unskimmed milk, to reduce the percentage of fat to a level not more than three and a half percent. Water had to be used to improve the supply of milk to the populace. It was also said that the director of the store was cheating the State by selling unskimmed milk for a higher price, and settling accounts with the State as if he sold not milk, but milk and water. A true story or anecdote, its circulation is an example of Soviet everyday life.

The temporary fall and the subsequent rise of Lysenko under Khrushchev

created a hectic situation not only in agriculture but all over the scientific establishment. At first, the criticism of Lysenko by Khrushchev seemed to be a prelude to a de-Lysenkoization of biology and agriculture. The geneticists took heart. The Lysenkoists trembled with fear. They feared that their All-Union alliance would be liquidated. Dismissals, imprisonments, public defamation, all that had happened to every other group that fell into disgrace in Stalin's time, when nationalities as a whole were sent into exile, seemed inevitable. The discrediting of Stalin in 1956 added to their fear. The release and rehabilitation of scientists of international repute, like Timofeev-Resovsky and Efroimson, replenished the regiments of geneticists.

A breach in the iron curtain was made and then widened. Scientific data of great importance began to penetrate. The voice of international public opinion began to be heard. In 1955, three hundred signatures were put under a petition to the government with the sole request to rehabilitate genetics. No favorable action followed, but those who put their signatures on that petition were not persecuted. My signature was the fifth.

The fear of the Lysenkoists was excessive. Nothing happened to compare with the extermination of geneticists in 1948. The Lysenkoists hastened to demonstrate their readiness to accept everything demanded by the new ruler. In their haste, under the influence of fear, they permitted some of their former victims to work. Some geneticists got positions, and the right to teach genetics, at Leningrad University. I was among them. Some criticism of the statements of Lysenko was permitted in academic circles. Several foreign books on genetics were translated. Academician A. I. Oparin was replaced by V. A. Engelgart, who received the position of Academician-Secretary of the Biological Department of the Academy of Sciences of the USSR. Laboratories of genetics were opened in some Institutes of the Physical and Chemical Departments of the

Academy. Academicians Tamm, Kurchatov, Semenov, Frank and Knunyanz gave place in their institutes to the disgraced science.

In 1955, at the leading center of nuclear research, the Kurchatov Institute of Atomic Energy, a large radiobiological section was established with viral and microbial genetics as its main topics. That same year, a Laboratory of Radiation Genetics was founded by Dubinin at the Institute of Biophysics. In 1958, the secretary of the Chemistry Division, Academician N. N. Semenov, invited I. A. Rapoport to found and to head the laboratory for the study of chemical mutagenesis.

Eminent physico-chemists and biochemists, such as V. A. Engelgart and M. V. Volkenstein, studied the physical and chemical basis of heredity. Some new institutes were organized: The Institute of Cytology of the Academy of Sciences under D. N. Nasonov, the Institute of Comparative Physiology under L. A. Orbeli in Leningrad, and the Institute of Cytology and Genetics of the Siberian Branch of the Academy of Sciences of the USSR in Novosibirsk. This last measure was of special importance. In 1958, Khrushchev gave the word to build in the heart of Siberia a new town where the natural sciences would be developed -- mathematics, physics, chemistry, geology, and geography. Owing to the efforts of a mathematician, A. A. Lyapunov, biology was included and the only biological institute on the list was the Institute of Cytology and Genetics. Its director was N. P. Dubinin. Some eminent geneticists, such as Z. S. Nikoro, Yu. Ya. Kerkis, R. P. Martinova, and V. V. Khvostova, got positions as heads of the laboratories of the Institute. In 1963, I was invited to organize a laboratory of population genetics at that Institute.

A Department of Genetics at Leningrad University lost its Chairman. Turbin, for his imbecile "discoveries" supporting extreme Lysenkoist theories, was elected a Member of the Academy of Sciences of the Belorussian SSR and left Leningrad

to enjoy the fruits of the privileges of his new position. Thus, the Department of Genetics at Leningrad University was reorganized and a geneticist, M. E. Lobashev, was appointed its head. A textbook of genetics for universities, written by Lobashev, was published. The Rector of the University, the mathematician A. D. Alexandrov, was very active in supporting genetics, the application of mathematical methods in biology, and in encouraging the synthetic areas of research, such as molecular biology, sociobiology, etc. An All-University Seminar on Cybernetics was organized. I was its chairman and, together with Timofeev-Resovsky, Efroimson and Malinovsky, I also lectured on the genetic systems of control of development and their mode of transformation during evolution.

Thirty-three meetings of the Seminar were held between 1958 and 1963. A. A. Malinovsky - an outstanding thinker, an uncompromising geneticist, and the son of A. A. Bogdanov-Malinovsky, who was the first cyberneticist - spoke on the history of cybernetics. The books of A. A. Bogdanov had been published beginning in 1912 in Russian, and in 1923 in German. Bogdanov's name for the new branch of science he discussed was tectology. Tectology was to be broader than cybernetics. It was a general theory of systems. Cybernetics deals with special types of systems, namely with those which are characterized by the presence of a feedback mechanism. Lenin had sharply criticized Bogdanov's philosophical views, and after that, any reference to the books of Bogdanov on any subject was categorically forbidden. This order was given to the censors, not to the press. It was not allowed to mention his name, not even to criticize him. Tectology, one of the products of the Russian renaissance, died. The Seminar on Cybernetics at Leningrad University was the place where this rule forbidding mention of Bogdanov was broken for the first time in the history of Soviet science. The fact that the Seminar was not liquidated and that afterwards an

article describing it appeared in the newspaper, Izvestia, were signs of a "thaw."

Conferences on the application of mathematical methods in biology, headed by Professor P. V. Terentyev, were held at Leningrad University. I. I. Schmalhausen participated. The first sketch of his treatment of Darwin's theory of evolution from a cybernetic point of view was published in the Proceedings of these conferences. Encylopedias opened their pages to articles on genetics; V. Ya. Alexandrov, V. P. Efroimson, B. L. Astaurov, S. N. Davidenkov, and M.L. Belgovsky were among the authors.

This curtailed resurgence of genetics by no means injured the administrative positions of Lysenkoists. Except for the dismissal of Oparin from the post of the Academician-Secretary of the Biological Division of the Academy, not one Lysenkoist was displaced and Oparin himself retained the post of the Director of the Institute of Biochemistry at the Academy of Sciences. Lysenkoists maintained their positions in the Supreme Attestation (qualifying, degree-granting) Commission, the ministries and presidiums of various academies, universities, soviets, etc.

Every attempt to criticize any of the Lysenkoists, not to mention to replace any of them, was publicly vilified as the manifestation of a regime of Arakcheyev used by geneticists. It sounds fantastic. You cannot imagine who was accused in this way. The unemployed V. P. Efroimson, who had just been released from Dzhezkazkan, was when he criticized the Academician Turbin, a director of the Institute. This powerless critic was described using expressions coined by Stalin like "Arakcheyev regime" and "cult of personality." Ironically, both these expressions belong to Stalin himself (R. Medvedev, 1973). Stalin's name was not mentioned, even after the order "to overcome the cult of personality." The expression was "the cult of personality," not "the cult of the personality of

Stalin." A new period of dictatorship had begun, and new obligatory word combinations signaled its coming into being. Its slogans were "the cult of personality," which has to be overcome, and "collegiate leadership," to be accepted.

The best way to see how powerful Lysenko was during Khrushchev's reign is to look at the politics of the supporters of genetics at the Academy of Sciences. Lysenko remained a master of the Biological Division of the Academy. This was, even after his so called "fall", the headquarters from which he reigned over the fates of scientists. Nobody could be elected as a corresponding or a full member of the Academy without being sanctioned by Lysenko. To overcome his destructive activity was one of the significant reasons for organizing the Siberian Branch of the Academy of Sciences in 1957. It was the main reason for the establishment of another new Division of the Academy, the Division of Biochemistry, Biophysics, and the Chemistry of Physiologically Active Compounds, in 1963. Besides several Chemistry Institutes this new administrative unit included the Institutes of Cytology, Microbiology, Biophysics, Biochemistry, Radiation, Physico-Chemical Biology, and Animal Morphology. These were thus emancipated from Lysenko's dictatorship (Adams, 1972, 1977 - 1978).

Genetics remained an underground activity of its supporters. Mimetic genuflections to Michurinist biology were demanded. Those who refused, as I did, to conform to these demands, jeopardized their careers. Genetics had to speak in the language of Aesop, and the languages of molecular biology, mathematics, and cybernetics became its shield. An underground literature in genetics arose. A. A. Lyubishchev, V. P. Efroimson, and Zh. Medvedev wrote for the rulers. They had the mad idea of explaining to the rulers the value of genetics for the country and the harm of Lysenkoism. They sent their manuscripts to the Central Committee of the Communist Party asking for publication. These requests were turned down,

and their writing became part of the treasure of Samizdat. Patriotism itself spoke from these forbidden pages. Medvedev's book is published in the West (Zh. Medvedev, 1969).

New textbooks for schools were written by the same persons who wrote them in Stalin's time, and were devoted to the same tasteless propaganda of Lysenkoism as before. Lysenkoism in these textbooks was entitled Michurinist biology or, even more proudly, Creative Darwinism —because Darwin himself was, of course, a Darwinist, but not a creative one. He did not understand that his natural selection and struggle for existence were hidden supports of the capitalist regime. M. V. Keldysh, who was and continued to be a strong supporter of genetics, as soon as he was elected as a President of the Academy of Sciences in 1958, used this sacramental combination of words to designate Russian biology — Michurinist biology. Censorship was acting as in Stalin's time.

In December, 1962, in honor of H.J. Muller's 70th birthday, a book Studies in Genetics was published, containing articles by Muller which he himself had selected as the most representative of his scientific and public activity. One of these, "Science in Bondage," which is Muller's address to the panel on "Science and Totalitarianism" of the Congress of Cultural Freedom held in Berlin in 1950, was devoted to the description of the desperate status of genetics in the USSR after 1948. Muller writes: ... "modern technology, both material and social, affords a tyrant a far more inescapable, efficient and personalized grip over his unhappy subjects than in any ancient or oriental tyranny. Under such conditions science and indeed all culture becomes a trained bear with a ring through his nose. At the tweak of his master's hand he must try to dance ... An audience in Berlin knows only too well the disillusionment with regard to the progress of science and of cultural life in general which eventually followed the accession of Hitler, with its disastrous purges on grounds of race and of

politics, and its deadening regimentation of ideas. My own branch of science, genetics, was the most perverted and outraged of all, since in its place a tissue of lies was fabricated in support of the dictator's racist psychosis." (Muller, 1962, p. 552).

Muller sent this book to his pupils. In 1962, I received it with the article criticizing Lysenko cut out. Although I had received an invitation to Muller's birthday celebration, I did not even ask for permission to participate. The probability of getting it was less than zero.

The Soviet attitude toward international congresses is perhaps one of the most significant measures of the relation between science and politics in the USSR. I have discussed the Seventh International Genetic Congress already. Not one Russian geneticist participated. The Eighth and the Ninth Congresses, held in 1948 and 1953, were also boycotted by proud Soviet science.

The Tenth Congress was held in 1958 in Montreal, after the climate in the USSR had changed. Many geneticists received invitations, I was among them. I was elected chairman of a section on population genetics. The Soviet delegation to the Congress, with only one exception, was Lysenkoist. Just one geneticist, B. L. Astaurov, received permission to go to Canada, and he withdrew. In his letter to the Central Committee of the Party, he wrote: "I can't be a member of this delegation. My scientific reputation would come to harm. I don't want to use strong language in this letter, but my belief is that the views of all members of the delegation are on the verge of absurdity." His resignation accepted, the actual delegation to the Congress was entirely Lysenkoist. Astaurov was not arrested, not even dismissed. This was the enormous difference between Stalin's and Khrushchev's times.

Lysenko did not attend the Congress. He never went abroad. According to rumors he excused his xenophobia by his hatred of capitalism saying: "Let them have Communism first, then I shall visit them."

The reception of the Soviet delegation by the organizers of the Congress showed that American scientists were fully aware of the nature of Lysenkoism (Quintanilha, 1958). Adherents of the so-called Michurinist biology, Lysenko's lieutenants, all of them, with their vegetative hybridization (Gloushtshenko), their transformation of spring varieties of wheat into winter varieties by pre-winter sowing (Zarubailo), their vegetative hybridization of chicken by blood transfusion (Kushner), were gathered together, and a separate Session was organized for them. The program of the Session was drawn up by a man of taste, and not without a jeer. The chairmen were J. R. Beaudry and L. C. Dunn. There were thirteen speakers. After the floor was let to six of them, the report of A. Quintanilha "Mendelism and Michurinism" was scheduled. Quintanilha reminded the speakers and the audience of the great achievements of the genetics which the speakers were declaring not true. He had shown that "Michurin himself was not a Michurinist" (p. 225). The six following talks were again Lysenkoist.

The Soviet press described the contribution of the Soviet and Soviet block geneticists to the work of the Congress as a triumphant attack on the wide front by a true materialistic science against the impotent bourgeois science.

Taking the list of the members of this delegation — Stoletov, Turbin, Kushner, Muzhdin, Gloushtshenko, etc. — and looking at the positions they occupy or occupied until their death, one has an exact picture of the moral situation of science in the Soviet Union: a crowning evil.

Step by step, Lysenko regained power. To give but a few examples — the first Director of the Institute of Cytology and Genetics in Novosibirsk was dismissed; the Editorship of the Botanical Journal was replaced; the Conference on Experimental Genetics, to be held at Leningrad University in 1958, was called off. All this, not for anti-Lysenkoist activity, but for activity in genetics. Pravda gave a large space to the nonsense of Lysenko. To provide room for his

articles, the newspaper had to add an extraordinary third page.

The University in Leningrad was the only place where true genetics was delivered to the students. A textbook entirely free of Lysenkoism was written by M. E. Lobashev (1963). It was first published by the Publishing House of the Leningrad University only with enormous difficulties. A second edition was required during the heyday of Khrushchev's cult of personality and ran into more difficulties than the first. The textbook was attacked by an aggressive Lysenkoist, M. M. Lebedev, in Pravda (Zh. Medvedev, 1969, p. 214).

Those who write memoires tend to overestimate their role in the historical events they describe. Now I am going to describe my role in the down-fall of Khrushchev. In the spring of 1964, being in Novosibirsk, I received a letter from the chairman of the Leningrad University, A. D. Alexandrov, asking me to write a letter to the Science Department of the Central Committee of the Party in support of the publication of second edition of Lobashev's textbook. Just at that time, a Conference on population genetics was taking place in the Institute of Cytology and Genetics. Geneticists, ecologists, and specialists in medical genetics were gathered from all over the Soviet Union. I asked them to send a collective letter to the Central Committee. They refused, being afraid of any collective actions. I wrote a letter explaining that the ban of every science diminishes the defense potential of the country, since every science is capable of creating a weapon. To prohibit education is equal to destroying defense work. I consider that episode of my biography as a shame. Ten years earlier I was invited by some military institution to head a genetics laboratory to produce insects resistant to insecticides. I did not ask why the military establishment needed these insects. It went without saying. I refused to collaborate with the militant Communist imperialism.* Ten years later, I chose what seemed to be a

*Yu. M. Olenov, a pupil of Yu. A. Filipchenko, founded without any hesitations a laboratory and did excellent anti-Lysenkoist studies.

lesser evil of the two, to put forward the only argument that could convince the authoritities. Mathematics, physics, chemistry were saved from an "August Session" in their field by just this kind of argument.

I got no answer. Lobashev's book was published. I don't know, I shall never know, whether my letter contributed to the exhaustion of patience of those members of the Central Committee who were on the way to overthrow Khrushchev.

Events which I will describe now, certainly played a role in the political crisis that resulted in Khrushchev's dismissal.

The existence of the Academy of Sciences was endangered. I heard about it from sources very close to the developments. The danger emerged from a conflict between Khrushchev and Lysenko on one side, and the majority of the Members of the Academy on the other. The stumbling-block proved to be Nuzhdin. N. I. Nuzhdin had once been a geneticist, and had worked at Vavilov's Institute under Muller. He had achieved his scientific degrees by stealing the ideas of Prokofyeva-Belgovskaya, and became a follower of Lysenko and a major persecutor of genetics as soon as Lysenko rose to power. He was one of those who assisted in the death of Vavilov, in the dismissal of Koltsov, and in the arrest of Timofeev-Resovsky. His signature appeared under the article in Pravda protesting the nomination of Koltsov for election as a full member of the Academy of Sciences of the USSR. He had helped to discredit geneticists by ascribing to them political activity hostile to the Soviet State.

In 1964, Lysenko put Nuzhdin forward as a candidate for membership in the Academy. Here it became clear that Lyubishchev, Efroimson and Medvedev had not written in vain. Those who wanted to be informed were informed. A thunderclap impossible in Stalin's time was heard. A large number of academicians protested. Andrey Dmitrievich Sakharov was among those who opposed the nomination. Mathematicians, physicists, chemists, astronomers and cyberneticists united.

Nuzhdin was not only rejected in the vote, but he was publicly unmasked. Lysenko left the meeting, furious and vengeful.

I am often asked how it was possible for genetics to survive despite the terror which destroyed the lives of the most creative representatives of that branch of science and despite the decades when teaching was prohibited. What forces helped genetics to maintain itself? The rally of academicians gives the answer. The protesters were representatives of those branches of natural sciences which could not be destroyed without damaging the war potential of the State. Outstanding scientists were able to uphold the principles of their own sciences against the attacks of philosophers. They were fully aware of how the State needed them, but were silent during Stalin's era. Khrushchev's reforms gave them courage. Krushchev had freed the genie from the bottle. But it was Stalin who kept the genie bottled, instead of killing him. The answer to the question, "why did genetics survive?" is "because the country had to raise its war potential to become a superpower."

Lysenko got no opportunity to avenge the defeat.

Stalin had been an Honorary Member of the Academy of Sciences. After Khrushchev got the position of General Secretary of the Party, the Presidium of the Academy of Sciences elected him as an Honorary Member. Khrushchev refused to accept the honor of becoming an academician, with its privileges of immortality. Everybody exalted a new democratic tsar. One of his admirers was the Rector of Leningrad University, A. D. Alexandrov, who told me about the refusal. "This means that he will annihilate the Academy of Sciences," I said, and I was not wrong. For he would have, if he himself had not been removed.

Zh. Medvedev (1969) writes: "As became known later, at the Central Committee Praesidium meeting on October 12-14, and the Central Committee plenary session on October 14 in which Suslov made a report, many examples of Khrushchev's activities

deserving of extreme censure were discussed, including his unconditional support of Lysenko and, in particular, the episode involving the attempt to elect Nuzhdin and Remeslo to the Academy of Sciences, with Khrushchev's subsequent desire to involve sanctions against the Academy" (p.223).

6. Since 1964

The Small October Revolution, as we called it, resulted in the removal of Khrushchev. The time had come for a new board of rulers to relax the reins of government. They were not so generous as Khrushchev was when, looking for political prestige, he opened the prison doors for millions of those who were alive and granted rehabilitation to the dead. But the new rulers rehabilitated genetics. Lysenko was dismissed from his post of Director of the Institute of Genetics of the Academy of Sciences, and replaced by N.P. Dubinin. New textbooks of biology for schools were written, with genetics and evolution treated from the scientific point of view. Lysenkoism was removed from school and university programs. B.L. Astaurov and N.P. Dubinin were elected Full Members of the Academy. Two new journals of genetics, Genetika and Ontogenetika, came into being. In 1966, the N.I. Vavilov Society of Geneticists and Breeders was organized, with B.L. Astaurov elected as its President. In 1967, B.L. Astaurov was appointed Director of the new Institute of Developmental Biology of the Academy of Sciences of the USSR. In 1971, in the cemetery of Saratov, on the site of a common grave, where it was supposed Vavilov had been buried more than a quarter of century earlier, a marble memorial was erected.

Lysenko and his gang fell into disgrace, but still did not leave their jobs. Despite the grave damage to the national economy caused by Lysenko, Lysenkoism was far from exterminated. Its ideology, its demagogic type of manipulating the local Party and Soviet ruling centers and the press, its

readiness to submit to every desire of the highest echelon of power provided Lysenko with a shelter. One example will suffice to illustrate the existence of this protection. An anti-Lysenko complaint started with an article of I. A. Rapoport in a newspaper "Selskaya Zhizn", and continued in 1964 throughout the country. All newspapers hurried to contribute to this new trend, obviously promoted by the Central Committee. The invisible restriction line encircling the newspaper's offensive becomes visible only by evaluating the whole list of publications. Attacking and even ridiculing Lysenko's pseudoinnovations as V.P. Efroimson and R.A. Medvedev did in "Komsomolskaya Pravda" and P.M. Zhukovsky was bold enough to do in "Selskaya Zhizn", the articles still did not unmask Lysenko's crimes, ascribing his failures to delusion.

Exceptions confirm the rule. They do it by bringing to light the causation of ordinary events. There were two articles attacking Lysenko different from the articles written to defend genetics: the one by Gorodinsky "Facts Versus Fabrication" ("Komsomolskaya Pravda", November 29, 1964); the other by Agronovsky "Science Accepts Nothing on Faith" ("Literaturnaya Gazeta," January 25, 1965). Both Gorodinsky and Agronovsky focused their attention on Lysenko's experimental farm "Gorki Leninskie" where the new breed of cattle with superfat milk was raised, and wherfrom bulls and cows were sold to improve not only the kolkhoz and State farm herds but also the herds of breeding stations. Both authors charged Lysenko with obvious scientific and economic fraud.

Zh. Medvedev (1969) describes the reaction of Lysenko and Lysenkoist to the criticism: "It is remarkable that neither Lysenko nor his associates, who had previously reacted tempestuously to even indirect criticism, wrote a single reply to the great number of exposes and critical articles published. It might be thought that they were refused publication, but this was not the

case. There just were no replies. I have especially checked with a number of editorial boards, and it is clear that a staff of Lysenko's army kept silent" (p. 230).

The silence was broken by Moskalenko, senior animal husbandman at "Gorki Lenikskie". "Literaturnaya Gazeta" published the reply of Moskalenko to Pisarzhevsky whose essay "Let the Scientists Debate" was published several weeks before in "Literaturnaya Gazeta." In the same issue was published the article by Agronovsky. The coincidence is important.

Moskalenko invited Pisarzhevsky to visit the experimental farm so he could acquaint himself with the latest advances of Michurin animal husbandry in detail. Pisarzhevsky was no longer alive. He passed away several days after his article was published. But his friend, Agronovsky, accepted the invitation in his stead. His denunciation of Lysenko was the result of this visit. It had immense consequence. It might be thought that a total collapse of Lysenko's career was approaching. Lysenko was accused of criminal actions including conscious falsification. Institutions which bought bulls from his farm suffered financial losses while Lysenko made a substantial profit. Animals which were advertised as bloodstock were in reality specimens fattened on a high intensive regimen. Their improving capacity was never checked.

The apparent collapse was absolutely wrong. The whole fuss that followed was a protective measure, a camouflage, intended to save Lysenko from being brought before a court of law. It was important at that point to show that measures were taken. Their results would disappear into obscurity. A State review commission was created in January 1965 to review the work of Lysenko's experimental station. Not a single geneticist was included. The results of the evaluation were discussed after eight months at a joint meeting of the Presidium of the Academy of Sciences, the board of the Ministry of

Agriculture and the Presidium of the Agricultural Academy. The conclusions of the commission were sent to Lysenko beforehand. It was a grandiose meeting. Its protocols appeared in the Vestnik Akademii Nauk S.S.R., No. 11, 1965, and constitute the sole subject of the issue*. Its 128 pages are fascinating reading.

The President of the Academy M.V. Keldysh was presiding. Lysenko did not attend the assemblage. He had sent a letter to Keldysh, explaining his refusal to come, and a reply to the conclusions of the commission. Both documents were read out. Lysenko wrote to Keldysh that he refused to come because of the commission's inconsistent conclusions, and because of the outrage he suffered from the press. He marked out two authors. These were not

*On the Results of the Follow-up of the Work of the Experimental Station and the Subsidiary Farm "Gorki Leninskie" of the Academy of Sciences of the USSR, 1965; Vestnik Akademii Nauk (Academy of Sciences Herald), November 1965, v. 11, pp. 1-128, Nauka, Moscow.

If the reader would like to have some information about the bureaucratic scale of ranks in the USSR and how it is held sacred, he has only to look at how the twenty-one members of the Editorial Board of the Herald are listed (p. 2). The first on the list is Academician N.M. Sisakyan. He is the Editor-in-Chief. He is followed by the names of the members. These are subdivided into categories. The first taxon includes eleven academicians, Full Members of the Academy, the second taxon is represented by eight Corresponding Members of the Academy, the third sub-unit has only one member, a Doctor of Sciences. Ranks are designated not for each type, but are given for each representative separately. Inside categories the names are listed in alphabetical order. The list comes to an end with the name of the Vice-Editor-in-Chief. He is merely a Doctor of Sciences. The cobbler should stick to his last, or, to give a Russian idiom, each cricket has to know its hearth.

those who accused him of violating penal laws, but Academician Semenov and at that time the junior research worker of the Siberian Institute of Cytology and Genetics, my pupil and former coworker M.D. Golubovsky.

Lysenko's reply to the conclusions of the commission was the defense of a person spoiled by decades of support by almighty patrons. Lysenko accused the commission of distortion of his publications and insisted on word-for-word quotations. The chairman of the commission delivered the citations. It was shown that there was no distortion of Lysenko's publications. Lysenko denied that he used selection to improve his herds and demanded precise data on animals removed from his herd because of low butterfat content. He claimed that the results were obtained by the right feeding of cows crossed with Jersey bulls and that no classical breeding methods were used. The commission in its reply listed the cows that were delivered to the meat-packing plant. All of them had a low content of butterfat. Not only the percent of fat but the names of the cows were given: Veronica, Match-maker, Vase, Lash (p. 73). Lysenko's lie was obvious. Not only mistakes but criminal actions were unmasked.

A resolution followed (p. 128). At this point it becomes evident that the performance, aimed to stop Lysenko's falsifications, was by itself a camouflage. There is a Russian idiom: A mountain has born a mouse. This was precisely what happened. The resolution did not contain a request to prosecute Lysenko. It was ordered: "To bind Academician T.D. Lysenko and the Director of the farm F.G. Kallistratov to eliminate defects mentioned by the commission. To consider it useful to scrutinize the question about enhancing the leadership of the experimental farm and the auxiliary scientific production farm of "Gorvky Leinskie'" (p. 128). The resolution ordered the Ministry of Agriculture to choose several State farms which would check the bulls, grown up at Lysenko's farm, by examining the milk production and the butterfat content in the progeny of these bulls.

This episode shows the attitude of Brezhnev's Government towards Lysenko and Lysenkoism in general.

The Lysenkoists maneuvered and managed to maintain their positions at the helm of the State. To give only a few examples of that success: Lysenko retained his position not only as a Director of "Gorki Leninskie," the Institute of the Academy of Sciences, but also as a Full Member of three Academies: the Academies of Sciences of the USSR and of the Ukrainian SSR, and of the Academy of Agricultural Sciences. He remained, until his death in 1976, to be the sovereign master of the Biological Division of the Academy of Sciences of the USSR; N. I. Turbin is President of the N. I. Vavilov Society of Geneticists and Breeders, and Director of a new institute in Moscow; Stoletov is head of the Department of Genetics of Moscow University; Lobanov, the Chairman of the August 1948 session of the Academy of Agricultural Sciences, when genetics was liquidated and Lysenko crowned, was until recently President of this same Academy of Agricultural Sciences. Any geneticist who aspired to a high position had to accept the moral code of the entirely unscrupulous Lysenkoist gang. N. P. Dubinin is a striking example.

In 1972, a decree of the Supreme Soviet was published allowing officials to deprive scientists of the degrees and ranks given by the Highest Attestation Commission. Grounds for deprivation are any antisocial activities. Any social activity, any protest, and criticism addressed to the top officials of the state, of an injustice practiced by the Central Committee, the KGB, and the Courts and any published critical comment on the lack of freedom in Stalin's time was considered as antisocial activity. Since everybody knew what was meant, it was not necessary to spell all this out in the decree. No protests followed. The intellectuals against whom the new law was put into operation were silent.

Not being able to attack the principles of genetics, the ruling gang attacked the geneticists themselves. Timofeev-Resovsky, Efroimson, Malinovsky, Bakhteyev, Kirpichnikov, Medvedev and myself were victims, but their main victim was Astaurov.

Boris Lvovich Astaurov was the only one who combined in one person qualities which are ordinarily incompatible in a society demoralized by tyranny. No other geneticist united the struggle for truth with the capacity to get high administrative and public positions as Astaurov did. His biographer, A. E. Gaissinovich (1975), wrote in an obituary: "Being uncompromising to all pseudoscientific concepts and trends he energetically defended the interests of true science and struggled for the revival and development of genetics and biology in the USSR." Geneticists generally did not participate in the democratic movement beyond the realm of science. To teach genetics, to apply genetic methods in selection, to defend the truth of their science was the extent of their political activity. They did not sign petitions on behalf of persecuted writers and political functionaries; they avoided falling into disgrace and incurring disaster for their brethren, for their institutions, and for the whole branch of science. They kept in mind the group character of punishment practiced by the rulers. Astaurov was an active member of the democratic movement. He was one of the 14 academicians, including A. D. Sakharov and V. A. Engelgart, who protested against the supplements to the civil code depriving citizens of elementary civil rights. He helped me in my fruitless efforts to save the poet Yosif Brodsky from exile and forced labour. In his Institute, Astaurov refused to fire scientists on political grounds. When, on May 29, 1970, Zhores Medvedev, because of his writings critical of the Soviet government, was confined to a mental hospital, nine members of the Academy of Sciences, including President M. V. Keldysh and Professor V. Ya. Alexandrov, an eminent cytologist, protested.

The names of the eight academicians, besides the President, were: Astaurov, Engelgart, Kapitsa, Knunyants, Leontovich, Sakharov, Semenov, and Tamm. The protest led to the release of Medvedev on June 17, 1970 (Medvedev and Medvedev, 1971, Adams, 1972).

In 1974, one of the members of Astaurov's Institute got permission to go to Italy as a participant in a scientific meeting and did not return. Defamation began. On July 24, 1974, a meeting was held at the Academy of Sciences where Astaurov was informed that the unpatriotic act of his collaborator was not regarded as a chance event, and the very existence of his Institute was challenged. After Astaurov returned home from this meeting, he suddenly died. Gaissinovich (1975), in the obituary cited above, describes the cause of his death euphemistically: "High sense of responsibility for all obstacles and failures occurring on that pathway [on the pathway of defending the interests of true science — R. B.] turned out to be an enormously heavy burden for his diseased heart, which caused his untimely death." The active functionaries who performed the defamation were the young Vice-President of the Academy, the biochemist Yu. A. Ovchinnikov, and the geneticist N. P. Dubinin. The real ruling force remained in the shadows.

The subordination of the life and death of every Soviet citizen to the ruling force is nowhere seen clearer than at burials. The open coffin of an elite person is displayed in some luxurious hall of some luxurious building: At the headquarters of the Union of Writers, if the deceased was a writer, or at the Presidium of the Academy, if an academician is buried. The hall is chosen according to the number of people expected to come to pay last respects to the dead. In that hall the mourning assembly takes place. An orchestra performs ceasing only to allow the speakers to deliver the eulogies. A guard of honor, four people, stand near the coffin, mourning bands round their sleeves. There

are strict rules for positioning those who form the foursome, and rules on changing the guard. Several designated persons put the mourning bands on the arms of volunteers. An appointed person leads the members of the guard to their places. There are rules which arm - left or right - bears the band. Those who stand to the right of the dead have the band on their left arm, the other two on their right arm. The order of red and black stripes of the band is fixed. The time each foursome stands depends on the number of volunteers. The first honor guard takes position before the mourning meeting begins; it is solemnly replaced every few minutes during the speeches; and the cycle is continued even after the meeting's conclusion, during the procession of mourning past the coffin. The mourning guard is not removed until the time comes for the relatives to take their leave of the dead.

Boris Lvovich was an academician. His funeral meeting was held at the Palace of Scientists on Kropotkin Street, in Moscow. I arrived as the ceremony had just begun and the first men of the guard of honor had taken their places: Ovchinnikov, Turbin, Belayev and a man whom I did not know. I looked for the line where people were waiting their turn as guards of honor and got in at the end of the line. The line went into the Assembly Hall, a separate room, not the hall where the open coffin was placed. The line made a loop there, and came out again. The leading end and the tail-end met at the widely opened folding-door. At first, I didn't see anything and didn't notice who was standing nearby, but then I did --it was Andrey Dmitriyevich Sakharov. I was greeted by two men, Fatikh Khafisovich Bakhteyev and a young man born to be a martyr. I introduced them to Sakharov, and we formed a foursome for the honor guard. We got to the door leading into the Assembly Hall and stood face to face next to the foursome on whose arms mourning bands were being placed. Closest of all stood Iosif Abramovich Rapoport. I introduced him to Sakharov, they shook hands, and the

foursome moved on. The plump, curly-haired young man, who had led the foursome to their places, heard the names of the people whom I had introduced to each other. And suddenly the line began to melt away, there was no one left around us, and it was announced that the meeting of mourning had begun and that the honor guard had been removed. The last foursome had taken their places at the coffin: Ovchinnikov, Belayev, Turbin, and the man whom I didn't recognize - the same people who were there when I came.

It was not compatible with the plan of the concealed conductors of the ceremony that Sakharov should stand guard in honor of the Astaurov's casket. Among the numerous crimes of Sakharov which led to his public condemnation were his defense of genetics, his struggle against Nuzhdin, and his protest against the harm done to Medvedev.

The whole mechanics of a constricted criminality manifested itself in the speeches of those who were allowed not only to stand near the open coffin but to speak. Without pronouncing his name, they thundered against Dubinin. "Nothing is forgotten, nobody is forgotten," spoke Belayev in a threatening voice of an iron tribune and everybody understood that he had in mind Dubinin, and not those who unchained the dog. This was just what was needed by the conductors. Ovchinnikov spoke. On the day of Astaurov's funeral Pravda published the article of Ovchinnikov, Biology - the front border. One passage must be repeated here: "Our country always occupied leading positions in the development of new trends of biology. In these days of celebration of the 250th jubilee of the Academy of Sciences of the USSR we nominate with pride I. I. Mechnikov, I. M. Sechenov, I. P. Pavlov, A. N. Bakh, N. K. Koltsov, N. I. Vavilov and other native scientists who contributed by most valuable investments to the world of science, who by their efforts provided the creation and development in our country of large-scale biological trends and scientific

schools." Only the dead were mentioned. The ordinary scientist Bakh, who had signed the article against Koltsov saying that "there is no place at the Academy of Sciences for pseudoscientists," was put side by side with his brilliant victim. The great V. I. Vernadsky is not mentioned. At the funeral of Astaurov, it was impossible for me to make out the meaning of the words of Ovchinnikov, even to hear them — a tick-tock of a watch. Sakharov stood some time, shook hands with Rapoport and went away. Bakhteyev stood some time alone near the coffin and wept.

Novo-Devichi monastery has a churchyard where burial is allowed only by permission of the Executive Committee of the Moscow Soviet of Working People's Deputies. There, near the grave of N. S. Khrushchev, Astaurov's burial was permitted. M. V. Keldysh, at that time the President of the Academy of Sciences, and Academician V. A. Engelgart obtained this permission. Engelgart had publicly condemned A. D. Sakharov so that he could continue his struggle for genetics, and because this was the only way to preserve his relatively influential position. Now he used his influence, bought at this high price, to get an honorable grave for a geneticist. The moral code of the Academy is somewhat worse than that of the nomads of Chenghis-Khan. Although changing banners was not considered treason by the Mongols, it was considered criminal to do personal harm to the former leader.

Astaurov had refused or, perhaps, had not even been asked to sign the condemnation of Sakharov. He had to die, but a grave of high rank was permitted. The customs of Chenghis-Khan included just the same observance for titled enemies: murder without bloodshed, an honorable execution. This was the practice for relatives and sworn brothers.

Now at the churchyard of the Novo-Devichi monastery near the open grave the rules of protocol gave way, and those in disgrace were allowed to speak. Timofeev-Resovsky spoke: "For us did he hold up his unprotected breast, his

delicate, tender human heart ..."

The grave of high rank besmirches the spotless name of Astaurov. Had he been asked where he would like to lie, his answer would surely have been near Vavilov's site of burial in Saratov. But on the field of struggle for true science, the grave of high rank for Astaurov was such a strategic success that I begin to doubt — perhaps Astaurov would have agreed to accept the last honors.

In 1973, during the Thirteenth International Genetic Congress, it was decided to call the Fourteenth one in Moscow in 1978. This decision was a tribute of respect to the Russian science which had resisted the attack of obscurantism, and to the geneticists who had lost their lives defending true science. The Congress could have carried out this noble mission only if Astaurov had been President.

The disposition of Western geneticists toward the Moscow Congress was ambivalent. Most of them, I suppose, not being interested in politics, were eager to visit the country they had never seen and to make contact with people they had never met. Those who were concerned with freedom of thought faced a dilemma. To refuse to participate in the Congress, and to demonstrate in this way the protest against violation of human rights, would deprive the Russian geneticists of personal contacts they needed so urgently. Beginning in 1917, these contacts were the most sought-after privileges, permitted only for a selected minority, only for the most ardent supporters of the regime. The restriction of communication with foreigners was just one of the most common violations of human rights. To refuse to go to the Congress was to support just that violation, to be in line with the stick and carrot politics of the State. Many Western scientists refused to go, many others went to have personal contacts, and to let Russian scientists have communication. Those who

went faced a great disappointment. It was forbidden for Soviet people to enter the hotels where the members of the Congress were lodged. The Soviet members of the Congress were ordered to present reports in Russian. At section meetings there were no interpreters. The carrot was put very close to the nose of the hopeful horse only to let the animal feel the smell stronger.

A profound analysis of the relationship between science and politics in the USSR is given by Mark Adams in his article Biology after Stalin: A case study. Adams depicts the 1950's witnessing a resurgent Soviet Academy whose activities were vital to the Soviet government in innumerable ways, including computers, missiles and nuclear weapons. The Academy, contrary to experiences in Stalin's times, gained some leverage. Its power, restricted as it was, could be used to increase its autonomy and control over the conduct of science. While paying lip-service to government politics with regard to biology, the leadership of the Academy "were capable of formulating their own politics -- in some important respects at variance with the government's -- and capable of implementing them in subtle, sophisticated, and on occasion, covert ways" (Adams, 1977-1978, p. 79).

The organization of a new Department of the Academy in 1963 belongs to the practice of subtle maneuvering which started in the fifties. Adam's opinion is that recent events are in full conformity with that strategy. The net effect is a kind of symbiosis, not submission: politics would be left to politicians, science to scientists. Those who are devoted to the development of science, all those who want to avoid the more severe political interference in science, who are afraid that Lysenko's times will come back, prefer to be silent. More than this. They are active in publicly accusing those who are not silent, who sign petitions for political prisoners and exiles, for such as Sakharov and Medvedev. The common reaction to the protests against violation of human

rights is: "Don't rock the boat."

Severe selection forces the scientists to be silent. Most are brought to an understanding of the uselessness of their protests. Astaurov became a victim of this negative selection. Dubinin benefits from positive selection.

Zh. Medvedev, in his book Soviet Science (1978), describes the measures taken by the ideological guard to shove selection back. Selection is applied before the start of a scientific career, at high school.

"The Party no longer interferes with advice on how to solve a particular scientific problem, and it does not try to decide which methods of scientific research are materialistic and which are not. But the Party and State apparatus is more than ever involved in deciding who should take part in particular scientific and research missions ... Structural changes introduced political screening at every stage of scientific graduation, award and academic promotion." This is how today's relations between science and Government are put by Zh. Medvedev in his recent publication on the perspectives of Soviet science (Zh. Medvedev, 1982, p. 13). Mark Popovsky (1979) devotes several pages to this careful sifting (pp. 53-54).

In the fifties and sixties at the Institute of Cytology and Genetics in the Town of Science (Novosibirsk) and at the Leningrad and Novosibirsk Universities, I witnessed this process of screening. Some of the young people refuse to clear this hurdle and prefer a impoverished existence of a scientist with no scientific degree to the privileged life bought at the expensive cost of servility. For those who apply for a Candidate of Sciences degree a political examination is unavoidable. I tried to persuade one of my pupils and coworkers to apply for a degree. "Impossible," was his reply. "At the Marxism-Leninism exam I shall tell them such things that not an evaluation of my knowledge but an arrest will follow."

A verbal examination on ideology is not the only bar. A philosophical composition is demanded. The applicant has to treat the foundations of his area of science from the point of view of dialectical materialism. One of my coworkers, N. showed me his composition before it was presented to the philosophers. In that opus the young geneticist insisted the pedagogics, medicine, jurisprudence and jurisdiction have to reckon with hereditary inequality of human beings. I recommended to him not to present the manuscript. I advised N. to write on stabilizing selection as a factor of acceleration of evolution -a beautiful example of unity of opposites, God's truth, and the philosophers would have great difficulties to understand the subject. He promised not to present his manuscript on human genuine inequality to those who decided whether he is ideologically mature to get a Candidate degree, or as yet not ripe enough for the degree. A little later he brought me a new composition. N. attacked Marxism-Leninism. He accused the founders in ignoring the fundamental philosophical principle. This principle is the interaction of processes going on on different levels of organization of matter. He claimed that Marxism is something like alchemy. It does not take into consideration the features of human beings. He insisted that studies of human nature have to be done before a new theory on political systems would be put forward. I told him that it is time to take psychiatric advice. He did not agree. Few days later he came to report to me that his composition is accepted and he got from the philosophers an A-grade. "Did they return you the manuscript, or have they kept it?" was my first question. The manuscript was returned to N. He explained to me that it was not read. The busy man noticed the founders' names mentioned many times by the applicant and the fate of N. was decided.

Marc Adams is right when he describes the don't-rock-the-boat-outcome of

this farsighted politics.

The silence of the silent is however a very peculiar one. It is demanded by the Party leadership of every institution, inside as well as outside the Academy, that protesters be accused publicly. Political statements supporting the measures of the ruling elite are compulsory for every person having a privileged status. Every member of the Academy had to sign the accusation of Sakharov. The majority escaped, leaving for a country house and turning off the telephone. The famous geneticist Khadzhinov, the pupil and a former coworker of Vavilov and a great specialist in corn, did not succeed in escaping. He had a telephone call, the voice said: "Tomorrow your signature will be in a newspaper under a very important document." The receiver was hung up before Khadzhinov had time to pronounce a word. The next day Khadzhinov discovered his signature under the accusation of Sakharov. He had a heart attack which fortunately was not fatal.

Two Types of Intellectuals

Now, let us take up the clash between Dubinin one the one side and Lysenko on the other. Their passage of arms discloses historical shifts which embrace political, economical, cultural and ethical problems of international importance. The two malignant types of intellectuals in the Soviet Union I am going to discuss are made up of people raised to scientific leadership by post-revolutionary political forces. The forces which brought them into the forefront of historical events were in some respects opposite. One type embodied Lenin's attitude toward culture, the other the hellish policies of Stalin. The scientific leaders of the second type were not intellectuals themselves. Their leadership was destruction.

The disposition of Lenin towards the intelligentsia changed dramatically during his career. In 1901, when he was writing the book, What is To Be Done? Burning Questions of Our Movement (Lenin, 1973, p.40) he considered intelligentsia to be the only stratum which introduced political ideas into the class struggle of the proletariat. He quotes the words of Karl Kautsky, the "profoundly true words," as he called them:

..."Socialism and the class struggle arise side by side and not out of the other ... Modern socialist consciousness can arise only on the basis of profound scientific knowledge ... The vehicle of science is not the proletariat, but the bourgeois intelligentsia [K.K.'s italics]: it was in the minds of individual members of this stratum that modern socialism originated, and it was they who communicated it to the more intellectually developed proletarians..."

According to Lenin, the idea of socialist revolution has to be introduced into the proletarian class struggle from without, and this is the main task of the Social-Democracy. This statement is not just a reference to historical events but a declaration of a political platform, a stronghold from which all groups and parties opposed to the tsarist government were bombarded: all the Economists, Trade-Unionists, Legal Marxists, Lassaleans and so on.

At that time the intelligentsia was considered to be a force of great importance for an uprising.

Eighteen years later, when Lenin created the laws of Soviet Russia, and the intellectuals were no longer needed to fight on the barricades against the gendarmes, he wrote that the proletariat had to build Communism out of the bricks collected by capitalists for the fight against the revolutionaries. These bricks were said to be the bourgeois intellectuals: engineers, agronomists, lawyers and writers without exception (Lenin, 1963a,b).

The seeds of "cultural revolution" were sown by Lenin. Stalin was his follower. But being himself an intellectual, Lenin considered world science indispensable for the building of Socialism. The "bourgeois intelligentsia" was needed to provide the continuity of culture, to teach and thus to create scientists of worker and peasant origin, who would be supporters of the new regime. All the representatives of the prerevolutionary intelligentsia without exception were now judged by Lenin to be enemies. They had to be forced by terror and graft to serve the new government. War was declared on intellectuals, not on the intellect.

In 1929 Stalin went much farther. Stalin, an ignorant alumnus of a four-year parish school, was on the way to liquidating all branches of science not connected with the production of arms.

According to him the workers and peasants, the members of collective farms, entering the glorious era of proletarian dictatorship, are themselves intellectuals. It is their mission to lead the authorities, to show the experts the capacities of the technique skillfully used by them. The Short Course of the History of the Party (1938) gives the Stakhanov movement as an example of training new specialists, which fulfilled Stalin's slogan, "the personnel settle the matter." This was sheer hypocrisy. General enslavement

was the goal of the war operation whose code designations were "Cultural Revolution," the "Great Break," or more generally the "Socialist Construction." All strata were subject of enslavement, Socialist competition, production brigades, Communist labor teams, shock work and the Stakhanov movement were means of enslavement.

The anti-Marxist, anti-internationalist, chauvinist attitudes of Stalin negligently veiled by Marxist phrases are described by Chalidze (1981). For his claim to lead the world cultural development, Stalin needed a genuine Soviet science opposed to the world science. Lysenko was at his disposal to incorporate his chauvinism into science. A substantial part of the Iron Curtain was built on Lysenkoism. Outside the Soviet Union the propaganda of a new "teaching" served as a litmus-paper to discriminate between the blind followers of the Soviet policy and those who were less submissive. Inside the country it was a tool of class struggle.

According to Joravsky (1970, p. 129), "... in agriculture the political chiefs were drifting toward agreement on a clearcut definition of the reliable

specialist. He would be 'our' kind of person, anti-intellectual, authoritarian, nativist, ever ready to promise that agricultural problems would be solved cheaply within 'the next two-three years'. The administrators of terror aided this drift toward consensus by repressing specialists ... who seemed to be 'ne nashi', 'not ours'."

The brilliance, the refined intelligence, and the outstanding organizational talents of the geneticists on one side, and the brutality, the gift for using the behind-the-scenes governmental forces, and the hunger for power of the enemies of genetics on the other, contributed to the tenseness of the situation. The importance of the specific cast of characters in the struggle illustrates what Russian historians call the role of a person in history, a role that the Marxist historiography erroneously dismisses as negligible.

The two central characters in this story played major destructive roles. One is Nicolai P. Dubinin (1907-); the other is Trofim D. Lysenko (1898-1976). Dubinin, although nine years younger than Lysenko, embodied the idea of Lenin to create a new Socialist workers' intelligentsia capable of providing the continuity of science. He belongs to the Lenin type of intellectual. Lysenko is the incarnation of Stalin's idea to eliminate the intelligentsia entirely.

The history of Soviet genetics can be described as a struggle of geneticists against the quackery of Lysenko, which was supported by Stalin and Khrushchev. But it can also be represented as a collision between Dubinin and Lysenko, keeping in mind that they represent different political attitudes among the heads of the government, Lenin and Stalin, towards the role of science in the building of Socialism.

The weapons used by Dubinin and Lysenko against each other deserve

special attention. Dubinin appears in the circus ring during 1929. A young promotee (vidvizhenets), a former inmate of a children's home sponsored by OGPU, a gifted pupil of Koltsov, Chetverikov, Serebrovsky, and a militant member of Komsomol, is an intellectuals of the new type fighting against the rotten "bourgeois intelligentsia" and its insidious ideology. Those he unmasks are his teachers, the founders of genetics. With shameless frankness he describes his deeds in his autobiography, Perpetual Motion (1st ed. 1973, 2nd ed. 1975).

When Dubinin started his ideological fight, his intended victim was Serebrovsky. The laboratory organized by Serebrovsky in 1929, was closed in 1932, several months after he fired Dubinin.

There were, besides Dubinin, many persecutors, among them I.I. Prezent, a sinister ignoramus, a professor of dialectical materialism at the Leningrad University, and an adviser of Lysenko in ideological problems. Along with Present's whip of the ideological front, Dubinin's lash also whistled. His fight was an ideological one. He tried to show that those whom he attacked were representatives of the "bourgeois ideology." Lysenko went farther. Besides tagging geneticists as representatives of a bourgeois ideology, hostile to his true proletarian platform, he claimed to show that genetics and geneticists were not able to achieve a high level of agriculture production, and that thanks to his progressive teaching, he was the only one who could do it. He bombarded the Central Committee of the Party with promises to increase the crop capacity of the fields at "shock tempo." Geneticists, according to Lysenko, prevented him from fulfilling his task to create a new Soviet, proletarian science based on the principles of dialectical materialism, fit for new structure of agriculture with its collective and State farms. To him geneticists were enemies of the Soviet regime, wreckers

longing for restoration of capitalism. All of them had to be liquidated together with their bourgeois science.

The two attackers, the one who launched a flank attack -Dubinin, and the other one who beset genetics -Lysenko, had some fundamental features in common. Both longed for leadership. Both used every means in pursuit of their ends. Both had outstanding gifts of self-promotion, using public media to announce their sensational achievements. Both knew their place in the pecking order, never attacking the leader. Their goals were identical and the people they had to sweep away in order to achieve their goals, were the same. A clash between Dubinin and Lysenko was inevitable.

Origins, opportunities, and the means at the disposal of the two rivals were entirely different. Lysenko was supported by the Politbureau of the Central Committee of the Party, and thus by Stalin himself. Dubinin was upheld not by the highest officials, but by the second-rate, as compared with Politbureau executors of Stalin's will.

It is not surprising that in Stalin's time Lysenko left Dubinin behind. The semi-literate agronomist was fulfilling the aim of Stalin to destroy not only the "bourgeois intelligentsia," but science itself. Dubinin personified the goal of creating a "new worker's socialist intelligentsia," able to master the work of science and use it for the building of socialism. Posing in that role, Dubinin first got support from Koltsov, Chetverikov, and Serebrovsky, and then turned his guns against them. But by 1929 Dubinin's policy was defunct. Dubinin and Lysenko found themselves on opposite sides of the barricades. Dubinin had to be annihilated together with his teachers for Lysenko to triumph.

By the time Dubinin successfully removed Koltsov from directorship of the Koltsov's Institute, Lysenko had become a Full Member of the Academy of

Sciences of the USSR and a member of its Presidium. The nomination of directors of the institutes of the Academy is done by the Presidium of the Academy. Dubinin thus had no chance to replace Koltsov as a head of the Institute.

I have described the two discussions, concerning the agricultural problems of genetics. During the second "controversy" genetics had to be prohibited and replaced by Lysenko's teaching. This did not occur.

Dubinin, during both controversies, was a defender of genetics. According to his calculations, the victory of genetics over Lysenkoism would bring him a long awaited elevation. The task he set for himself was to show that genetics was right, and that he was the only man who knew what kind of genetics was needed for a socialist government.

In his memoirs Dubinin ascribes the survival of genetics after 1939 to his debate efforts. It was his appeal to purify genetics from all that deserves only "to be put into the container for sewage" - this means purified from the theoretical considerations of Lotsy, DeVries, Bateson, Morgan, Serebrovsky, Filipchenko, and others - and to reunite with Lysenko "in a common effort to solve in a Bolshevik way the problems of theory and practice." The other reason why genetics was not liquidated, according to Dubinin, was the position of the philosopher Mitin, who, although he evaluated the views of Lysenko as progressive and prophesized a Lysenko victory, did not deny the materialist nature of classical genetics and its practical usefulness (1975, pp. 118-119*). For sure, Mitin's position had nothing to do with what happened during the controversy. The time did not come for Stalin to crown the new paradigm, Lysenko.

* The pagination here and below is according to the 2nd edition of Dubinin's autobiography.

After the Institute of Experimental Biology was renamed the Institute of Cytology, Histology and Embryology, and a Lysenkoist became its director, Dubinin remained the head of the Genetics Department and waited fearfully for catastrophe. But the final catastrophe was postponed. Genetics had a short respite. The war against Hitler, Stalin's former friend, and the forced alliance with the Western democracies was its cause. Dubinin was given a trump-card. Many young talented scientists perished during the war. Both rivals were safe, though, since they had not fought in any battles besides the ideological ones. The postwar period revived Dubinin's longing for leadership. There was an unstable equilibrium between isolationism and cosmopolitanism. The internal affairs of the Soviet Union began to attract attention of people in the West. In 1946 Dubinin was elected as an associate member of the Academy of Sciences of the USSR. It seemed probable that an institute under the directorship of Dubinin would be organized in the Academy. The Institute of Genetics, the nursing of Filipchenko and Vavilov was, since Vavilov's arrest, headed by Lysenko. The revival of genetics, the removal of the malignant tumor of Lysenkoism from the body of Soviet science, was a vain hope. The tendencies of isolationism, chauvinism, and the struggle against the intelligentsia outweighed opposite tendencies. It seemed as if the star of genetics was to set, never to rise. The official ideology and Lysenkoism were too close to each other to tolerate genetics.

Lysenko was needed to represent the official point of view in agriculture, biology, and science in general. This official point of view was, and is, based on the belief in the omnipotent action of environmental conditions upon living organisms, including man himself. Not only do environmental conditions determine the properties of exposed organisms, but they affect the characters of their offspring. The alchemist belief in the

inheritance of characteristics acquired during the lifespan of the organism was taken for granted.

I have already told that the more people are oppressed by a totalitarian force, the more attention the government pays to the unique nature of the human being and to the inapplicability to man of the laws governing the animal kingdom. According to that doctrine, human consciousness is nonbiological, and is entirely determined by social conditions. The problem is, however, fundamentally ambivalent.

The Soviet regime claims to apply one and the same method to produce new varieties of cultured plants and domestic animals as that used to create a new type of human being, men of the Socialist type. This method is reeducation (perevospitanie). Collective work is supposed to create collective will, the sense of collective responsibility, collective conscience, and a drive for equality. All of these beautiful adaptive traits, acquired as the result of training and reeducation are, according to the official point of view, transmitted to the next generation.

But this not all. The list of services rendered by Lysenko to the State does not restrict itself to creating a new biological theory providing a firm basis for agronomy, giving a brilliant illustration to the most basic principles of dialectical materialism, and paving the way for immediate enormous rise of agricultural production. Lysenko was urgently needed for a much more grandiose task.

Collectivization brought into being a new class with its class interests obviously opposed to the interests of workers and of bureaucracy. To stratify it was urgently needed. Lysenko was a gift of fate.

Productive brigades, Socialist competition, and the Stakhanov movement

proved to be most effective means to impose inequality among workers creating a privileged strata and thus erasing all traces of proletarian solidarity.

Lysenko's destination was to be the first Stakhanovist among peasants. Application of his methods became a hallmark of front-rank collective farmers. Here is a statement of Lobanov, the Chairman of the August Session, at that Session: "By making proper use of the achievements of advanced science, collective farmers, men and women, Heros of Socialist Labor, Stalin Prize laureates, excellent bumper crop producers, and organizers of collective-farm production, have become outstanding agriculturists applying progressive science in practice. The experience of these advanced agriculturists and their achievements enrich our agricultural science, lend it new strength, open up new vistas before it ... We in the Ministry [of Agriculture] know ... how Lysenko organizes the forces of practical workers for the speedy application of the achievements of advanced science. His activity is an example for every Soviet scientist to follow; for only in close contact with practice can advanced science develop successfully." (The Situation in Biological Science. Verbatim report, pp. 551-552). Every word of this official rhetoric tells that Lysenko was needed to overcome the class struggle of peasants. The Stakhanov movement imposed a stratification into the otherwise homogenous populace of collective farmers. Among workers it created a worker aristocracy, among peasants, outstanding scientists, not only voluntarily surpassing production plans by applying new scientific methods, but developing science itself.

Ironically, the same person who had to prevent a class war of peasants was needed to stir up the class struggle this time on the ideological front. It was class struggle imposed from above on the society which only a decade ago was declared by Stalin in "his" Constitution to be classless. According

to this new idea of Stalin the class struggle becomes more and more intense just at the final period of the building of socialism.* Angels and devils among the representatives of intelligentsia following the signal of Stalin had to join battle. The role of the angels' leader was given to Lysenko. The class struggle launched by Stalin was not a class struggle at all. It was going on inside one and the same stratum and was imposed on it from above. The stratum consisted of intellectuals. Stalin's goal was to liquidate all possible dissent. Inequality had to be created "in shock tempo." Those who were going to be proclaimed as adherents of the bourgeois "camp", as slaves of the Wall Street, as myself and Rapoport were by Turbin, had to be annihilated. It is hard to believe even if you hear it with your own ears that objectivity of science got an abusive name of objectivism and that falsification was praised as partisanship (*partinosti*) of science. The goal had to justify the means.

Let us hear the voice of a Marxist author who undertook a defense of Marxism and Leninism against Stalin. Dominique Lecourt (1977) considers Lysenkoism as a phenomenon most typical to the Stalin era. In his book "Proletarian Science? A case of Lysenko" he writes: "... the 1948 Session only officially consecrated the success of Lysenko's theories .. because it was no longer a question either of Lysenko or of his theories but of something quite different which had constantly been practiced previously in partial

*This idea of Stalin does not seem to me absurd. Nationalization of industry and general collectivization call into being new classes, i.e. homogenous masses of people, with common interests opposed to the interests of other groups of people. It seems to me that Milovan Djilas, with his concept of a new class (Djilas 1957), would agree to this statement.

forms and finally achieved its general and systematic form at that date: a declared obligatory state ideology which imposed on all intellectuals the Stalinist version of dialectical materialism including the rule of the supposed antagonism of 'bourgeois science' and 'proletarian science' (p. 123). Here is how Lecourt comments on this ideology of "the two sciences": "The logic of this ideology was such that no one could disavow it without ranking themselves in the category of enemies of the authorities, hence in a place inscribed in advance in this ideology opening directly onto repression. It was an infernal circle ... allowing no other initiative to individuals than the enthusiasm of conformism or the banality of commentary -in all cases servitude ..." (p. 123).

"The formula [of class struggle expressed in the confrontation of bourgeois versus proletarian science] summed up the injunction imposed on them [on intellectuals] to join one camp or the other: either the camp of proletarian science (i.e., the authorities), or the camp of bourgeois science (i.e., of the enemies of the authorities). And at the same time this injunction was a warning ... He who has not understood that he has to choose, and to choose to submit, will be treated as what he is: an enemy of the State and the Party" (p. 125).

Lysenko, a creator of the proletarian science, opposed to the bourgeois science inside and outside the country, was a crowned leader of this socialist type of "class struggle".

Lecourt puts a question: What occurred in 1948 to result in the official consecration of Lysenkoism? His answer is: It became the urgent necessity to create "a state ideological system ... in which the 'theory' of the two sciences is the crucial component - at once privileged instrument, functional model and theoretical 'touchstone'" (p. 122). A question is unanswered.

V. Chalidze in a private conversation delivered his opinion which I share: During the World War II, some of the isolationism of the Soviet Union broke down. Truth about the miserable level of life in the USSR, compared with the comfort abroad, became known. Lysenko's affair was needed to silence those who got information undesirable for the powers that be. The rotten West had to be condemned together with its science.

It seems to me that the propaganda campaign was mounted as soon as the border was established between countries which fell under the reign of the USSR and those which did not. Pronouncements of the resolution of the August Session were a declaration of a conqueror, of the dictator, who pretended to be the dictator of the world. A new icon was needed, an icon of recent national production as opposed to the icons of such internationalists as Marx and Lenin. Unto this icon, people inside and outside the Soviet Union had to swear an oath. This touchstone was Lysenko. How it was used to test scientists abroad, and what were the consequences of that test I shall describe elsewhere. How the icon was used inside the Soviet Union I had an opportunity to witness myself and to feel the consequences of the refusal to swear an oath on my own back.

The famous session of the Academy of Agricultural Sciences held from July 31 till August 7, 1948, which went down in history as the August Session of the Lenin All-Union Academy of Agricultural Sciences, canonized Lysenko's quackery. Every piece of nonsense announced by the great scientist Trofim Denisovich Lysenko became a solemn truth. Mitin was among the main persecutors.

The associate member of the Academy of Sciences and head of the Laboratory of General Genetics at the former Koltsov Institute, Dubinin, found himself suddenly unemployed. He got a position at the Forest Institute of the

Academy of Sciences of the USSR under the protection of V. N. Sukachev, its Director.

Geneticists were doomed to extinction. Unlike Dubinin, most of them were jobless, or, like Dubinin, had to change their field of occupation entirely.

I have described the scarce omens of Stalin's dissatisfactions with Lysenko's management of agriculture. In 1952 Lysenko's method of afforestation was abandoned. I start to be lost in conjectures. Was it by chance that Lysenko's charlatan methods were unmasked just in the area of afforestation, the area occupied by a great scientist and a great protector of genetics, the Full Member of the Academy of Sciences, the Director of the Forest Institute of the Academy, V.N. Sukachev, under whose aegis was sheltered an ornitologist N.P. Dubinin?

In the twilight of Khrushchev's era, at the time that Lysenko fell temporarily into disfavor, Dubinin started his ascent. His first step was to found and to head the Laboratory of radiation genetics at the Institute of Biophysics whose Director was Academician Frank.

In 1958, just at the turning point when genetics started again its slope downward, the age-old daydream of Dubinin to become a Director of an Institute was realized. He founded the Institute of Cytology and Genetics of the Siberian Branch of the Academy of Sciences of the USSR, near Novosibirsk, in the Town of Science. His rule lasted only two and a half years. In 1963, when I was appointed a Head of the Laboratory of population genetics at that Institute, Dubinin was no longer its Director. In 1960, Khrushchev visited the Town of Science. He learned that among the fifteen institutions, consisting the core of the Siberian Branch of the Academy the only biological establishment is the Institute of Cytology and Genetics and that his Director is Dubinin. Khrushchev ordered him removed. Khrushchev's speech denouncing

Dubinin was published in Pravda.

To those who were acquainted with results of such type of publications in Stalin's time it was obvious that the future not only of Dubinin but of genetics was bleak. Khrushchev accused Dubinin of criticizing Lysenko and for having no achievements neither in theory nor in practice. The President of the Siberian Branch of the Academy, M.A. Lavrentyev, did not submit. During his next visit Khrushchev found the Institute of Cytology and Genetics still headed by Dubinin. Khrushchev angrily insisted on Dubinin's removal and he was dismissed. He retained his position as head of the Laboratory of Radiation Genetics at the Frank's Institute in Moscow. The resolutions of the Presidium of the Academy and of the Presidium of its Siberian Branch did not mention Khrushchev's accusations and his apology of Lysenko. Two different lies were fabricated.

The victory of Lysenko over Dubinin was a temporary one. With the dismissal of Khrushchev, Lysenko's career was tending downward. He lost his position of the Director of the Institute of Genetics of the Academy of Sciences of the USSR. Dubinin got it. In 1966 Dubinin was elected as a Full Member of the Academy. His longing for power was not satisfied. To climb to the highest echelon he returned to his old practice. He resumed his ideological fight.

The most outstanding geneticists were and are until now, Dubinin's targets. Filipchenko, Serebrovsky, Koltsov, and Astaurov are gone. Serebrovsky and Koltsov remain his enemies even though they are dead. His Perpetual Motion is a diatribe against the deceased.

It is worthwhile to evaluate his shamelessness from a historical point of view. Reading Dubinin's reminiscences it becomes evident that changes in his and Lysenko's fates, changes which permitted Dubinin's autobiography to be

published by Gospolitizdat, affect only a thin layer on the surface of the State ideology.

Dubinin is a conqueror over Lysenko but not over the Soviet ideology which is inconceivable without the elements of Lysenkoism: The predominant role of environment in the "reeducation" of living beings. Dubinin preaches and preaches on that subject, and his words and the words of his former enemy resemble each other like monozygotic twins. They are now together on the same side of the barricade; Dubinin, who incarnated Lenin's idea of creating the new intelligentsia, and Lysenko, the outcome of Stalin's bloody imagination.

One more detail contributes to the image of the rivals. Both of them were, throughout their battle, non-Party. Why did Dubinin, the militant member of Komsomol, brought up under the auspices of OGPU, not join the ranks of the Communist Party? Mimicry? Did he want to pose as a non-Party among those whom he denounced, and as a disinterested scientist, far from any meddling in politics, before those who had the power to elect him a member of the Academy and appoint him a director of the institute of the Academy? After he was elected a Full Member of the Academy, and became the Director of Vavilov's Institute of Genetics, he joined the Party. At that time he was 62.

In his memoirs Dubinin writes:

In January, 1969 occurred one of the most important events of my life. The Cheremushki Regional Committee of the Communist Party admitted me to the Communist Party. All my life was in the current of the indivisible breathing with the Country, and now time came for the most important achievement (p. 441).

Lysenko stayed non-Party. The analogy with Rasputin contributes to the understanding of that sinister figure. Of interest is the difference between the attitudes on Nicolas II and of Stalin toward the two quacks. The tsar made use of Rasputin to stop the bleeding of his hemophiliac son, but did not appoint him Minister of Public Health or member of the Academy.

Soon, the time came for a former militant member of the Komsomol, the former non-Party Bolshevik, Dubinin, to write his autobiography. In 1973 the first edition of his book Perpetual Motion came into being. In 1975 the second edition followed.

Memoirs, autobiographies, biographies in the Soviet Union are written to glorify the Soviet regime. The triumphant building of Socialism is the real hero of these books. Perpetual Motion is one of the most cynical specimens of that kind.

The founders of genetics, Dubinin's teachers, are "unmasked" as hidden enemies of the Marxist-Leninist humanistic ideology, striving to discredit the idea of proletarian revolution. The more Dubinin was involved in the destruction of a person, the more attention he paid to what, according to him, were the real mistakes and the real criminal deeds of that person. And it was, according to Dubinin, these mistakes and deeds which led to deserved persecution.

We learn from that book that Dubinin's life was devoted to creation of a science founded on Lenin's principles of "class consciousness and Party spirit" (p.440).

Let us hear at that point the voice of the Party itself. When I read the following sentences in the Central Committee daily paper, Pravda editorial of August 27, 1948, I had a feeling that I was hallucinating. This was just an illusion. With my own eyes I read: "The Presidium of the Academy of Sciences and the Bureau of the Biological Department forgot the most important principle in any science -the party principle. They pegged themselves to a position of political indifference and 'objectivity'. The USSR Academy of Sciences forgot the instructions given by V. I. Lenin that 'partisanship' is inherent to materialism and that materialism, whatever phenomena are being

considered must stand openly and directly on the viewpoint of a definite public group."* "Objectivity" of scientists was a justification of terror.

Dubinin's main victim, the man who promoted him to the highest ranks of scientific hierarchy, is Koltsov. Dubinin describes him as an enemy of the new order created by the Revolution. Only in 1971, according to him, did he learn from a book of D. L. Golinkov, The Bankruptcy of Enemy's Underground Organization, that Koltsov was an active member of a counter-revolutionary organization, yet long before that Dubinin had felt "the shadow that accompanied the activity of N. K. Koltsov." He writes, "... remaining ignorant of the complexity of his life, those who surrounded him were not armed to resist these shadow sides of his life" (p. 58).

There were official circles who were informed "of the complexity of Koltsov's life."

These circles prevented Kiltsov's being elected as a full member of the Academy. Dubinin writes: "Creating the new life of Russia, the creators of that life could forgive him his mistakes, but they had no right to forget them" (p. 58).

Dubinin quotes the anonymous article in The Grand Soviet Encyclopedia devoted to eugenics. Koltsov, Serebrovsky, and Levit are reckoned among the

*The translation of this cynical statement I took from Julian Huxley's book (Huxley, 1949). The great humanist concludes his book with this quotation. He exclaims: "The issue could not be stated more clearly: Do we want science to continue as the free pursuit of knowledge of and control over nature, or do we want it to become subordinate to political theory and the slave of national governments? It is a crucial question on which the general public as well as the professional scientist must make up his mind" (p. 234).

Menshevik idealists. During the early thirties, when the twenty-third volume of the Encyclopedia was issued, there was no worse accusation than that formula. Dubinin writes: "Long before the start of genetic controversies the leaders of genetics exposed their flanks to the attacks" (pp. 69-70).

In accordance with the traditions of all of those who write biographies in the USSR, Dubinin does not mention what happened to those whom he "unmasked". Not a single sound is heard about Filipchenko's dismissal, nor about the arrest and exile of Chetverikov. Not mentioned are the arrests with no return of Vavilov, Karpechenko, Levitsky, Levit, Agol, Levin, Slepkov and Friesen. According to Dubinin, Serebrovsky deserved the baiting.

To the fate of Chetverikov, who is one of the mightiest figures in the history of Russian science, Dubinin devotes three words: "S. S. Chetverikov left Moscow" (p. 129). Dubinin announces that on the line of battle for the true socialist genetics Dubinin, and no one else, was the only fearless fighter. According to his numerous digressions, in his contacts with Serebrovsky, Vavilov, and Chetverikov, they were his pupils, and every examination, every meeting with them gave Dubinin an opportunity to communicate to them those projects which they only had to elaborate.

Geneticists of his generation are now his enemies on the ideological front just as his teachers were thirty years ago. His arguments against them are indistinguishable from the arguments Lysenko used during his reign. Dubinin is a prosecutor of the late B. L. Astaurov, of the late V. V. Sakharov, of the late N. V. Timofeev-Resovsky, of V. P. Efroimson, and of M. D. Golubovsky.

Astaurov could not bear the baiting instigated by Dubinin. His death is certainly connected with Dubinin's systematic denunciations.

What is the attitude of the conqueror to his former rival, to the

overthrown Lysenko? Lysenko lost his monopoly, but retained some power.

It is no accident that Dubinin appears as a defender of Lysenko.

Dubinin praises Lysenko's "dialectical principle of the unity of the organism and environment" (p. 435), and his will to unite science and practice.

Here are the words of Dubinin: "It is an error to accept that I. V. Stalin, backing Lysenko, paved the way for Lysenko's monopoly. Stalin himself, personally supporting Lysenko, was also involved in leading the public to expect direct links between science and practice. Lysenko in his practical activity made use of the noble feelings of people's confidence in science. The nature of the Soviet system is not involved with mistakes made by some persons, but with the progressive movement toward the creation of society, which rapidly and unhesitatingly proceeds in our country" (p. 436). (I have tried to preserve the obscure and slippery language of Dubinin's narration).

Dubinin wanted Lysenko to accept his leadership and he offered him an agreement. Dubinin does not describe how Lysenko came to him with a project to unite. A common proposal was drafted, but M. V. Keldysh, at that time the President of the Academy, did not approve it.* The friendship between the two former rivals was a matter of common ideology, not of common research.

Dubinin's book is a threatening sword against all those who were resisting Lysenko during his sixteen-year absolute reign. Every attempt to develop studies in human genetics is classified by Dubinin as racism, as the revival of bourgeois eugenics.

*I have learned about Lysenko's visit from a geneticist working on radiation genetics at Dubinin's Institute.

* * * *

Lysenko is dead. Genetics is rehabilitated. Its achievements are applied in medicine and in agronomy. Textbooks, journals, and books published after 1964 are nearly free of Lysenkoism. Some curtailed biographies of the most outstanding geneticist are published by their pupils, coworkers, and admirers.

In 1964, the Academy of Sciences was saved from the joint attack of Khrushchev and Lysenko. It became known that the destruction of genetics was included in the list of charges against Khrushchev during the debate in the Politbureau leading to Khrushchev's dismissal.

The fall of Lysenko was the immediate cause of Dubinin's rise.

In these circumstances Dubinin's defense of Lysenko has a profound meaning. Dubinin's task is to be at the helm. However, Lysenkoism, and not genetics is part of the ideology of the Soviet State. Its basic idea is the necessity to create a human being fit to build Socialism and fit to live under Socialist conditions. The dependence of human consciousness on external, i.e. social, conditions, and most of all its determinism by class affiliation

are, according to doctrine, the leading principles of the creation of the "new man" (Dubinin, 1981).

In the history of mankind the revolutionary idea of changing the inner structure of the object by changing its surroundings has found many times ardent followers and practitioners. Among the innumerable adherents of the false idea there were (1) the alchemists, with their goal to turn base metals into gold, (2) Lysenko, who claimed to produce varieties of cold resistant crops by exposing seeds to low temperature, and (3) there are those who force the 262 millions of Soviet citizens to build Socialism and thus to overthrow their very human nature.

We must not forget that the credibility of the alchemist doctrine, applied to living beings, depends on selection of specimens manifesting hereditary traits, irrespective of whether they were treated or not. Hereditary variability is meddling into the experiment. Selection of individuals with desired traits imitates the inheritance of acquired characters.

"The creators on new life in Russia", to use Dubinin's expression, in their effort to create a new variety of man, also apply, besides environmental influencies, a selective process of previously unknown pressure. Millions of the most creative persons were, and are, slaughtered, imprisoned, or exiled. The creation of a new variety of man is under way.

Dubinin and Lysenko belong to one and the same type: Those who survived, being servants of one and the same ideology, the ideology of the Socialist State.

The former oponents and victims of Lysenko are not the only category of people whom Dubinin persecutes to show how devoted he is to the powers that be. The other categotry is that of the dissidents. Dubinin put his signature

under the article in Pravda accusing A. D. Sakharov. He expelled three young scientists from his institute because they were dissidents, and then personally denounced them to the K.G.B. Astaurov gave positions to two of them at his Institute. Dubinin denounced him.

Dubinin has rivals, who also struggle for leadership. D. K. Belayev is among them. In 1960, when Khrushchev ordered Lavrentyev, the President of the Siberian Branch of the Academy, to dismiss Dubinin from the position of the director of the Institute of Cytology and Genetics, the fall of Dubinin gave Belayev the chance to outmaneuver and replace him. He became the Director of the Institute of Cytology and Genetics. A dizzy career followed. The mediocre selectionist became a Full Member of the Academy of Sciences, and the two Academicians, the two Directors of Institutes, Dubinin and Belayev are now competing with each other in servility and in persecution of every display of civic courage. Belayev has to be extremely stern with the dissidents. Dubinin is on the watch. It became known that Belayev's tolerance to dissent was denounced by Dubinin to the highest echelon although there was no dissent and not a grain of tolerance.

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