

The Journal of Heredity

Vol. XL

JULY, 1949

No. 7

LYSENKO'S MARXIST GENETICS

Science or Religion?

ROBERT C. COOK

THE Sixth International Congress of Genetics, held at Ithaca, New York, on August 24-31, 1932, was the last Genetics Congress to be attended by an official delegate from the Soviet Union. It also marked the last appearance at a scientific Congress of Nicolai Vavilov, who, under a direct mandate from Lenin, had directed the organizing of genetic research in Soviet Russia. In his address to the Congress Vavilov included the following "flash":

The remarkable discovery recently made by T. D. Lysenko of Odessa opens enormous new possibilities to plant breeders and plant geneticists of mastering individual variation. . . . The essence of these methods, which are specific for different plants and different variety groups, consists in the action upon the seeds of definite combinations of darkness (photo-periodism), temperature and humidity. This discovery enables us to utilize in our climate for breeding and genetic work tropical and sub-tropical varieties. . . . This creates the possibility of widening the scope of breeding . . . to an unprecedented extent, allowing the crossing of varieties requiring entirely different periods of vegetation.

Vavilov considered Lysenko "an angry species — all the progress in the world has been made by angry men."^{41*} In the light of developments since, he seems to have underestimated the scope and range of Lysenko's "anger," and to have over-estimated it as a constructive force. Within the past year we have seen Lysenko's "Marxist-Michurinist genetics" become the latest thing in science, or the oldest, depending on how we look at it. Whatever status may be

assigned Lysenkoism in the mature hindsight of history, it is unique in one respect: it is the only scientific discipline in existence today whose validity depends, not on experiment, but on certification as to purity and truth, in content and concept, by government fiat.⁴⁰

Historical Background

At Ithaca, delegate Vavilov had extended to the geneticists of the world a cordial invitation to hold the next International Genetics Congress at Moscow in 1937, and preliminary plans for the conference in Moscow were well under way by 1935. About a year later it became clear that something was amiss. The *New York Times* on December 14, 1936, carried the news that the Genetics Congress had been postponed and that research geneticist Agol and Academician Vavilov had been arrested. Vavilov's arrest was later denied, but that the Congress had been postponed "at the request of a number of scientists who had expressed a wish to extend their preparations," was confirmed.

Other dispatches to the Associated Press and the *New York Times* amplified the news of the upheaval. The name of Lysenko for the first time appeared as a critic of genetics. "Genetics is merely an amusement, like chess or football—a science of no practical value." (*N. Y. Times*, Dec. 14, 1936.) Then a few days later, Vavilov sent a message to the *Times* denying the story of his arrest,

*The references are to the Bibliography, which follows this article (Page 203).

and pointing to the rapid growth of plant breeding and research under his direction as proof that all was well.^{50A}

This reassuring picture of harmony was jarred a few days later by another dispatch to the *Times* on December 26, 1936, which told of the expulsion from the Communist Party of Dr. S. G. Levit, head of the famous Medical-Genetic Institute at Moscow. Dr. Levit was also General Secretary of the Organization Committee of the Congress. From that day to this, Levit has never been heard of.⁴⁴ And it became generally known that Agol was executed for alleged "Trotskyist" activities although when in this country he vigorously defended Stalin against Trotsky even in the most private and confidential conversation.⁴⁴ The Genetics purge of 1938-1948, which culminated with final victory last August, created several other scientific martyrs, but Levit and Agol were among the first.

On January 13, 1937, the Editor of the JOURNAL OF HEREDITY addressed a letter to the Soviet Ambassador in Washington calling attention to these reports, and requesting clarification. On January 17, Counselor Oumansky replied in part as follows: "For the moment I can only confirm that the Genetics Congress has been postponed at the request of several scientists desiring greater time for preparation. I am expecting more exact information from Moscow and will not fail to communicate it to you as soon as I receive it." In spite of repeated friendly requests for further information and clarification, the Soviet Embassy never replied to later inquiries regarding Vavilov or the Congress.

The International Organizing Committee was convinced by May 1937 that the "postponement" constituted in effect a cancellation. It was stipulated by the Soviet government that if the Congress were to be held, no papers on human genetics could be presented.^{50A} Under such circumstances a free scientific meeting was hardly possible, and arrangements were made to hold the Congress at Edinburgh, Scotland, in 1939. Vavilov was elected its President,

which position he did not fill, as no Russian delegates were present. Then in September 1939, while the Congress was in session, the nonaggression pact between Germany and Russia was signed and World War II began.

In the light of what has happened since, it may be significant that the "genetics furore" in the U.S.S.R. toward the end of 1936 marked the beginning of the blood purge of generals and officials that continued through the following year. Although Vavilov was not arrested at that time, from then on he was made the target of attacks by Lysenko and his associates with the support of high officials of the Communist Party. Vavilov's prestige as a protégé of Lenin and as a pioneer in analyzing the origin of cultivated plants could not save him. Throughout 1938 and 1939 he fought a losing battle against the emerging power of Lysenko.⁴ Two years later he was relieved of his post as head of genetics research in the U.S.S.R.²⁰

It is very difficult to get quotable and official news of events in the Soviet Union. The information on which Dr. Dobzhansky based his statement¹⁴ that Vavilov died in the village of Magadan on the sea of Okhotsk late in 1942 or early in 1943 is from reliable confidential sources. No official statement regarding the fate or whereabouts of Vavilov has ever been made by the Soviet government. One official source does furnish definite information that prior to June 1945 something had happened to Vavilov. At the time of the 220-year jubilee of the U.S.S.R. Academy of Sciences, a list of the living and recently deceased members of the Academy was forwarded with the invitations to foreign scientists and to foreign scientific institutes to participate. This list contained the name of Sergei Vavilov, but it did not include the name of Nicolai Vavilov. This is not positive proof of Vavilov's death, but it does constitute official evidence that one who for many years had been a distinguished member of the U.S.S.R. Academy of Sciences was no longer a member. The statement of Left-



THE "ANGRY MAN"*

Sovfoto

Figure 1

"Trofim Lysenko, Member of the Academy of Sciences of the USSR, reporting on his achievements to the participants of a session of the USSR Academy of Science, June 1948."—official legend.

["The Michurinist Savonarola" presented to the Lenin Academy of Sciences of July 31, 1948 the official version of his strange cult which "had been examined and approved" in advance by the Central Committee of the Communist Party. Lacking an official photograph of this historic occasion when science by fiat first emerged in the twentieth century, this gives the atmosphere at a similar occasion less than two months earlier.]

ist protagonists that "nothing was done to Vavilov" is specious in view of this fact. Dr. Dobzhansky and this writer would be among the first to withdraw these statements if an interview with Vavilov were arranged, whereby the statements concerning his condition and status could be clarified.

Vavilov's successor as President of the All Union Lenin Academy of Agricultural Sciences was Trofim Lysenko,²⁹ one of the youngest members of that august Academy, and surely one of the least well educated.

The war years are a blank as far as our information goes. Then in 1945

*The official Soviet photographs used herewith are sold "on condition caption is not distorted or factually changed." These official captions are reproduced under the photographs. The titles and the commentaries in brackets which follow the captions are not part of the official captions.—EDITOR.

Eric Ashby, Australian botanist, was sent to Moscow as Counselor of the Australian Legation. The account of his experiences in Russia⁵ is an invaluable document.

Ashby devotes considerable space to Lysenko, and his account is essential to an understanding of some of the paradoxes and incongruities in Russian science. Ashby reported that competent Soviet biologists took little stock in Lysenko's queer notions. He believed Lysenkoism was on the way out:

In a country as great as Russia, with such an impressive body of first-class scientists, who are familiar with science in the rest of the world and are contributing substantially to it, the 'new genetics' is a strange anomaly. It is well past its zenith but it still flourishes in uneasy truce beside the 'old genetics.' Lysenko and his school are clearly a deep embarrassment to *bona-fide* biologists; yet the school goes on, and Lysenko was made a Hero of Socialist Labour, the Soviet equivalent of an Order of Merit, in June 1945. How can the Academy tolerate such a departure from its catholic standards? And how can Lysenko pose as leader of genetics when he is patently unfamiliar with most of the advances in the subject over the last twenty-five years? . . . He was aptly described to me by one who knew him well as 'like Savonarola.' The 'new genetics' is an interesting example of the grave danger of departing from the familiar methodology of science, and approaching natural phenomena with the mind already made up. Just as Krenke's work is a legitimate and profitable use of dialectics in science, so Lysenko's work is an exploitation of dialectics in science for political ends. The ends may be justified; Lysenko may be doing a great job for Russia. But the bulk of his opinions on genetics may be dismissed as the products of a medieval mind using what is almost a medieval technique.

A practical plant breeder, but with a minimal knowledge of experimental genetics, Lysenko still faced serious opposition.²⁰ "Morganist genetics" still reared its "reactionary head." Though many laboratories had been closed, excellent genetic research was still being done at some places in the Soviet Union. Hudson and Richens, summarizing the situation in 1946 were able to say: "It is not certain that Lysenko is as highly regarded by his fellow geneticists as he is by the farm workers, and it is possible that opposition to his theories may flare up. . . . The present situation is re-

markably unstable."²⁰

Science in the Soviet Union was at that time under control of the Academy of Sciences, which was then at the peak of its prestige. The mean age of the academicians, Eric Ashby tells us, averaged about sixty-five years. These "conservative aristocrats of Soviet science" have always looked askance at Lysenko's theories. Ashby underestimated the extent to which Lysenko's ideas appealed to the top Communists, as well as to the farmers. His power was growing, and, sponsored by Number 3 (or Number 2) Communist Malenkov, great things were in store for him.

The next step in the drive for "Marxist-Michurinism" was the publication in 1943 of Lysenko's *Heredity and Its Variability*. Following closely on definite information that Vavilov was dead, this book inspired several critical articles in British and American scientific journals.³⁰

It was clear by the summer of 1947 that several new approaches to Soviet science were under way. The attack was fanning out and there were rumors of a new "Marxist science" far more general than the graft-hybrid of Lysenkoism with biology.⁴³ During the latter part of 1947 and the early months of 1948 there were rumblings in *Pravda* which proved to be the warnings of a new genetic storm a-brewing. One of these blasts, published on September 2, 1947 attacked certain "reactionary biologists" by name.³⁴ As a result of *Pravda's* critique Zhebrak was dismissed as President of the White Russian Academy of Science.

Genetics Congresses seem to be nodal points in the history of Michurinist genetics. To the Eighth International Congress of Genetics in session in Stockholm, July 7-14, 1948, came word from the Soviet Academy of Sciences that "the Russian geneticists are too busy to leave their work"; hence they would not be present at Stockholm.

The nature of this "work" was revealed three weeks later when the Lenin Academy of Agricultural Sciences met



LYSENKO'S CHICKENS

Sovfoto

Figure 2

"Trofim Lysenko, Member of the Academy of Sciences of the U.S.S.R. Laboratory assistant Genrietta Korepanova at the poultry farm of the Genetics' Institute, June 1948."

[The unmaterialized (idealistic?) spirit of Lysenko must hover over these premises, for he is visible only in the official legend. How Korepanova's stance and methods of feeding affect the heredity of the chicks is not explained. The pigmented chick in the lower left-hand corner might represent a capitalist Mendel-Morgan influence through action of the genes which Lysenko has outlawed. It is to be hoped that Michurinist influences on this chick will make possible a melanolytic recantation before the emergence of adult plumage.]

in Moscow on July 31-August 7. Like that historic meeting in 1939 when Vav-

ilov suffered his first defeat, the opening addresses⁶⁷ gave the illusion that this was to be a valid scientific discussion. Actually the meeting was called to inveigle reluctant converts to Michurinism into restating their views and to hear a fateful announcement concerning such views.

Professor Zavadovsky, *doyen* of Russian Zoologists, definitely let the cat out of the bag when he outspokenly criticized the organization of the meeting. A sick, ailing old man, going from one sanatorium to another, Zavadovsky had heard of the meeting by accident and demanded an opportunity to answer those who questioned his Communist loyalty.⁶⁷ But before we go on to an account of that strange meeting, let us consider in detail the claims of the Lysenko school. What is this new "Marxist genetics"? How is it put together? What makes it tick?

Conceptual Basis of Soviet Genetics

To understand the genetic situation in Russia today, and to be able to appraise future developments in genetics and other fields of science, it is essential to have some insight into the ideological situation within that country. Is there a pattern, or is it best dismissed as the whimsicality of a waking nightmare? It solves no riddles to brand the successful leaders of the "Marxist genetics" movement as charlatans, even though it be true. This would hardly account for their amazing success in building up a few rather mediocre observations in plant physiology into an "official" science, whose founders now have a huge following in the Soviet Union and who wield great power.

For an understanding of the situation of science in the U.S.S.R. two sources are indispensable. The most complete review of the background and history of the genetics controversy in the U.S.S.R. was presented in 1946 by P. S. Hudson and H. R. Richens of the School of Agriculture at Cambridge, England.²⁹ Most of the survey presented in this section is based on this very scholarly report. The other source is Ashby's

Scientist in Russia to which we have already alluded. For the rest we have to rely mainly on official Soviet sources.

It is a mistake to believe that Lysenkoism and the currently booming Michurin cult are due solely to the genius of Lysenko. It is quite clear that Lysenko filled an ideological need which, before he emerged as a prophet, was being met in other ways by the Communist propaganda machine. Richard Goldschmidt²³ tells us that in 1929 he was amazed to encounter in Leningrad feature billing of a motion picture called "Salamandra," which proved to be an ingeniously concocted "documentary" of the Kammerer incident, complete with sinister capitalist-clericalist plots against a great scientist. In this movie version Kammerer's attempt to take his own life is foiled by a Communist student, and the fade-out shows him entrained for Moscow with his Russian savior, enfolded by a large streamer which read: "to the land of liberty"!

So the need for a new genetics—ultimately a "new biology"—which Lysenko has been filling, considerably antedates the appearance of that great man on the stage of Soviet science.

The hodge-podge which is called "Darwinist-Michurinist-Marxist-Genetics" (in contrast to "Mendelian-Morganist-Weismannian Genetics") is not the work of one master-mind, but of a team. Biologist philosopher I. I. Prezent is the philosophical Svengali to Lysenko's agronomic Trilby. Who does which is not always clear, but in the light of results the team is most efficient. They have "sold" both the peasants and the Politburo on their methods.

The philosophical basis for Lysenko's Marxist genetics is alleged to be "dialectic materialism." What, exactly, "dialectic materialism" is is not easy to discover. It has been defined as "the summation of terminological inexactitude." With this definition one is inclined to be sympathetic. There are several "dialectical materialisms" current at the moment in the Soviet Union. The particular brand which Lysenko and Prezent advocate seems only casually related to what oth-

er Marxist scientists and philosophers claim as the true and Simon-pure form of that powerful epistemological nostrum.

Five tenets are usually assumed to underlie Marxian dialectical materialism:²⁰ (1) Everything that Exists has a Material Basis; (2) Matter is Eternal; (3) and Always Changing. Most important for Lysenko's purpose is the concept, (4) That Matter Always Comprises Opposing Forces or Tendencies Whose Struggle is the Cause of Change. Not too important is the elastic concept, (5) that Material Change is Historical, which can mean about what one wants it to mean—as can also items 1, 2, 3, and 4.

Phasic Development

Lysenko's concept of genetics pays lip-service to Michurin, but it is based mainly on the work of a Communist plant physiologist, Krenke.^{5, 20} According to this concept, living matter is assumed to act out its inevitably conflicting dualism in a continuing spiral of thesis (birth) antithesis (death) and synthesis (the organism?). Lysenko calls these opposed forces "senescence and rejuvenation." This struggle results in a "phasic development of a plant as one or the other tendency happens to prevail." The trick of juggling a plant's heredity consists in "shaking" its heredity by rough or unusual treatment at a critical phase. The idea is logical enough. The crucial question, "Does it work?" is answered: "It *must*, for Socialist farmers need better varieties, and the Soviet scientist's job is to wrest secrets from nature!"

Nowhere does Lysenko attempt to account for the experimentally established observations on which genetics rests. He simply denies the existence of that which conflicts with his views. This is equivalent in physics to denying that stones fall if dropped from a window. With the facts out of the way by verbal fiat, Lysenko proceeds to build his own superstructure of dogma on a foundation of very moot assumptions.

The evidence on which Lysenko's

claims are based comprises twelve categories of alleged departure from Mendelian behavior in experimental material. This evidence has been examined by Hudson and Richens. Their discussion of this evidence covers eighteen pages, and is in considerable detail. Difficulty of interpretation and lack of data in critical experiments (Lysenko denies the need for controls in experimental procedure) are cited as serious bars to accepting these experiments as evidence. These two authors have been more than fair in their adjudication of the validity of Lysenko's claims. Some competent geneticists feel that they have even leaned backwards (or leftwards) somewhat farther than is required by the evidence.

The conclusions of Hudson and Richens are summarized in their own words:²⁰

1. *The genetics of earliness.* Lysenko's theory that a hybrid F_1 plant is never later than the early parent is untrue, also his theory that transgressive segregation for earliness in the F_2 and later generations is impossible. When qualified, however, to apply only under appropriate conditions of existence, it cannot be disproved since these conditions are in most cases unknown. The theory is thus elastic and can be applied to all instances irrespective of whether it is true or false. Such elastic hypotheses are practically useless for scientific purposes.

2. *The prediction of dominance.* The theory that those characters are dominant which are best adapted to the environment of the hybrid has many exceptions. If, however, the environment is restricted to some unknown and early stage in the development of the seedling, the generalization becomes elastic and practically incapable of disproof. Thus formulated it is again practically useless.

3. *Degeneration of pure lines.* An inevitable deterioration in the vigour of pure lines has not been proved.

4. *Rejuvenation.* The evidence for the claim that intravarietal crossing is frequently beneficial is satisfactory [and not incongruous with "classical genetics"—R. C.1.

5. *Induced mutation.* Although not yet adequately established, there is some evidence that environmental factors may induce hereditary changes more or less directly. Much of the evidence is of little value.

6. *Segregation.* Certain instances of non-random segregation are known. Lysenko's data on the subject are not convincing.

7. *Millardetism.* Non-segregating hybrids are known in some cases. The Russian ex-

amples are not compelling.

8. *F_1 heterogeneity.* Heterogeneity in the F_1 generation of a cross between homozygotes may occur after mutation. Lysenko's data are susceptible to normal genetic explanation.

9. *Reciprocal hybridization.* Many instances of difference between reciprocal crosses are known.

10. *Internal genetic variation.* Chimeras and plants bearing bud mutants are genetically diverse individuals. The theory that normal plants become genetically heterogeneous through the operation of environmental factors lacks cogent demonstration.

11. *Mixed inheritance.* Variegation may be due either to chimera formation, differentiation of pigmentation during ontogeny, cytoplasmic factors or virus infection. There is no advantage in maintaining Timirjazev's category of mixed inheritance.

12. *Graft hybridization.* The evidence for genetic interaction between stock and scion is not compelling but suggestive. Further experiments are needed before a conclusion can be reached.

These moot principles are obviously not a very solid foundation on which to build a revolutionary theory of biology, and nothing less than that is what is being undertaken. Summing it all up, Hudson and Richens's conclusion is a masterpiece of the British method of understatement:

Mendelian genetics is criticized by Lysenko for its failure to conform to his chosen authorities, for its claimed inconsistency with dialectical materialism, and for the supposed discrepancies between its tenets and Lysenko's experimental results.

These theories, although exhibiting a certain degree of internal coherence, contain various inconsistencies and receive only slight support from the facts. Lysenko's rejection of the data accumulated by Mendelian genetics during the past thirty years is obscurantist and reduces the value of his speculations.

The Panel of Authorities

The experimental "evidence" is rather less than half of Lysenko's bill of particulars against genetics. Increasing in importance and growing in violence have been the ideological and "philosophical" attacks on the validity of the concepts of "Mendelian-Morganian genetics." The methods and the rationale of dialectic materialism, as practiced by the Soviet spokesmen, are excellently adapted to such use. The methods and principles which are adopted in this attack are so foreign to our thinking that



Sovfoto

CONFERENCE ON WHEAT IMPROVEMENT

Figure 3

"A conference of the chairmen of collective farm boards and agronomists of two districts of the Moscow region has been called by the experimental station of the Academy of Agricultural Sciences named after V. I. Lenin to instruct them in the methods of cultivation of wheat developing several ears on one stalk, evolved by the station. Academician T. D. Lysenko talking with participants of the conference. This is a new variety of branched wheat, the heads being extremely heavy."

[The branched or Poulard wheats are a distinct species (*Triticum turgidum*) related to the durums. The grain makes poor flour and is used almost exclusively for stock and poultry feed. It is grown to a very limited extent in the United States, though more extensively in England. The heads shown in this photograph are identified by a wheat technologist as being typical Poulard wheat. In spite of repeated claims by Soviet agronomists that the branched wheats are a new invention they have long been known. (See Figure 4.) A study of the faces of the "Chairmen of Collective Farm Boards" gives a good idea of the sincere but ignorant peasant types among whom Lysenko has his most enthusiastic support. Here, safe from questions as to the validity of his methods, Savonarola smiles.]

it is hard to believe they are seriously intended; but such appears to be the case. The authority cited by the Michurinists is not primarily the authority of the data. According to the Marxists, truth emerges not by an appeal to ex-

perimental elucidation of the facts so much as by an appeal to the opinions and preconceptions of the accepted authorities. Over against the authorities are arranged the heretics and heresies. To label a viewpoint "heretical" is more



TWO VARIETIES OF POULARD WHEAT

Figure 4

The branched wheats are not new. They have long challenged and disappointed plant breeders, because their performance belies their promise. They were not "invented" by the Lysenkoists. This illustration was published in the U. S. Dept. Agri. Bull. 1074. Nov. 8, 1922.

damaging than the experimental proof that a moot hypothesis cannot account for the facts.

All of this leads to a form of discussion so different from what we are accustomed to as to leave many Western disputants breathless and furious. Superficially it appears to give, as Howard Fast recently alleged, an impression of objective calmness and scholarliness. In fact Lysenko naively describes his own writings as "always impartial, although passionate." His opponents, Lysenko says, are "passionless, cold-blooded and measured, yet extremely partial."²⁹ References to the extensive quotations from Lysenko in this article will enable the reader to evaluate his "impartiality." To the person cognizant of the serious distortions concealed in the for-granted which are accepted as articles of faith, any "calmness" in such discussion of the nature of life processes is the calmness of rigor mortis. This "calmness" of alogic, of authority, of heresy, is not the method of science. "The methods of attack," say Hudson and Richens, "are various, and include an even greater proportion of alogical

conclusions than their constructive theories."

The "basic authority" which underlies the concept of Michurin genetics is, of course, "dialectical materialism" (which includes by definition Marx, Lenin, Engels, Stalin, et al). In the more specific field of biology, we encounter a heterodox company of bedfellows indeed in the strange pentatheon of genetic authority: Darwin, Timirjazev, Michurin, Burbank, and Lysenko.

An "authority" in science in the Soviet Union—as in theology elsewhere—is not by any means pure, and rarely simple. We start with the "basic datum" (what the authority actually said or is alleged to have said) and we add to that the gloss of interpretation by later "authorities" which may drastically modify the original statements. Legalists and students of mediaeval history will understand this better than laboratory scientists. As a consequence of this Procrustean process, "Darwinism" in Russia means something very different from what we might expect it would mean if we merely read Darwin. Darwin's views in terms of genetic theory were expounded in the Soviet Union mainly by Timirjazev. He gave an excellent presentation of the elements of genetic knowledge as they were understood about 1905, but he missed the implications of the latest developments.

Timirjazev's Heredity

His classification of heredity, essential for an understanding of the position of Soviet genetics today, is a queer hodge-podge. He divided inheritance into "simple" or "complex." By "simple" he meant asexual "inheritance" involving only one parent, that is grafting, budding, and layering; "complex" inheritance involves bi-parental or sexual inheritance. "Complex inheritance" he divided into three categories; "mixed" (mosaic); "blending" (intermediate); and "mutually exclusive" (dominant-recessive). Two categories of mutually exclusive inheritance were recognized: "Millardetism" and "Mendelism." "Millardetism" was based on the findings of

a French biologist of the nineteenth century who reported that in some interspecific and intervarietal crosses the resulting hybrids sometimes resembled one or the other parent, and with no segregation in the succeeding generations. (This rather rare situation may in part be accounted for under classical genetics by special cases, such as apogamy in *Hieracium* and balanced lethals in some *Oenotheras*.)

Lysenko follows and adds to Timirjazev, in resolving Darwin's perplexity as to how evolution was activated, by selecting out of Darwin's views only those having a Lamarckian tinge. Thus "Darwinism" has a restricted and unrealistic meaning in the Soviet controversy, and the term "neo-Darwinist" which is hurled at "Mendel-Morganist theorists" is the height of opprobrium. Lysenko's abstract is unrealistic in that it takes out of Darwin's concept merely a few highly speculative points about which Darwin had grave doubts, and which he did not originate. It scoffs at the very fruitful extensions of Darwinian concepts by Western geneticists, systematists, and paleontologists since the turn of the century.

Where Darwin's views do not fit the dialectical bill they are revised to suit. Thus may a great "authority" commit "heresy" and yet retain his amateur status. Says Lysenko:

Many are still apt to slur over Darwin's error in transferring into his teachings Malthus' preposterous reactionary ideas on population. The true scientist cannot and must not overlook the erroneous aspects of Darwin's teaching. . . . It must be clear to any progressively thinking Darwinist that even though Darwin accepted Malthus' reactionary theory, it basically contradicts the materialist principle of his own teaching. Darwin himself, as may be easily noted, being as he was a great naturalist, the founder of scientific biology, whose activity marks an epoch in science, could not be satisfied with the Malthusian theory, since it is, in fact and fundamentally, in contradiction to the phenomena of living nature.⁵⁷

Here we see the basic concept on which Darwin erected his theory of evolution by selection among recurring diverse variations denied and *disallowed* by a higher and more potent authority—

that of the great Lysenko himself! Repeatedly and vehemently Lysenkoists deny that "competition between individual members of a given species is possible."⁵⁷ Hence overpopulation is impossible, and Malthusianism absurd!

Timirajazev was a liberal biologist, who, one might expect from his writings, would be horrified by the recent developments with which his name has been associated.⁶² He had a broad and intelligent grasp, for a man of his generation, of the whole problem of genetics and evolution. His criticisms of genetic tenets early in the century were eminently sound. We would hardly expect him to espouse the strange views of those who now claim him as one of the five basic authorities upon which the preposterous theories of "Michurinist genetics" are based.

Burbank and Michurin

Aside from Lysenko himself, the two other accepted authorities are Michurin and Burbank.²⁹ About Burbank little need be said. In this country his name has become a symbol in the popular mind of the great plant wizard, an estimate which is not shared by competent specialists. His contributions to knowledge of plant breeding and genetics were practically nil, and many of his sweeping claims were manifestly absurd. What seems to have been his most valuable technique, the selection of aberrant seedlings from mass plantings, may, in the light of more knowledge, turn out to have a sound genetic basis. Burbank's actual contributions to the agriculture of this country are modest indeed when compared with the fantastic claims which he made in his catalogues. The feeling of some workers that Burbank was a conscious fake is probably extreme, but he definitely has no standing as a leader of biological advance in this country.

Possibly Michurin was a man of greater stature than Burbank. Of humble peasant origin and largely self-educated, Michurin's interest in plant breeding developed early, and during his younger years he was able to devote only

part of his time to improving the fruit trees of his native land. In 1878, when Michurin was 28, he decided to devote all of his life to this work, and during the next years he achieved considerable success. Like Burbank, he was critical of genetic theories, and had his own ideas about the way heredity worked, and the effect of environment. He maintained that the transmission of hereditary characters depended on the comparative vigor of the two parents. This depended, he alleged, solely on environmental conditions, and consequently he maintained that environment has a profound effect on heredity. He also maintained that it is possible to modify the heredity of a plant by grafting it onto a scion of different heredity. Later he claimed that the reverse was also true, that the stock may affect the scion. None of the claims that heredity is influenced by grafting have been supported by the work of others, with the exception of some special cases of virus or "plasma-gene" transmission. Moreover, it is recognized that the stock on which the scion is grafted may have profound effect on the growth of the latter. Such effects, and the fact that stock and scion tissues sometime become intermingled, giving "chimeras," are irrelevant to Lysenko's claims. But such effects do not alter heredity so far as available evidence goes. The "mentor effect," which Lysenko so strongly supports, appears to be pure illusion.

Michurin died in 1935, and shortly thereafter the Soviet government published his *Works* in one of the finest pieces of printing which has come from that country. This book parallels the publication of Burbank's work, by a private publisher in the United States also in several volumes. This latter extravaganza is merely a collector's item. It is not required reading in any research institution or university in the Western World, and is viewed with horror by some serious-minded botanists lacking an appreciation of the ludicrous.

The Heresies

So much for the "authorities." Op-

posing them is a strange assemblage of persons and concepts, heretics and heresies. In Western culture this word "heresy" has not been much bandied by scientists since the Middle Ages, and even then, philosophical principles were considered outside the realm of heresy. One could even differ from ecclesiastical authorities on the number of angels capable of resting on the point of a pin without risking excommunication. In the Soviet Union to brand a scientist's views "heretical" is far more damaging than to produce experimental evidence that he is talking nonsense. The label is all that one needs. There are ten main heresies: metaphysics, vulgar materialism, capitalism, idealism (including deism), fascism, abiologism, Weismannism, and "Mendel-Morganism", formalism, and the transferring of conclusions from one level to another, as from biological to social science or vice versa.

Any or all of these terms of heresy appear as epithets of contemptuous opprobrium in almost all of the discussions of genetic principles which Lysenko has so "impartially" undertaken. As an example of the technique, let us consider a most serious "heretical" deviation: the use of mathematics in biological research. This is violently and frequently interdicted in the writings of the Michurinist philosophers. Lysenko puts it thus at one point:

We biologists, however, do not want to submit to blind chance, even though this chance is mathematically admissible. We maintain that biological regularities do not resemble mathematical laws. . . . *By ridding our science of Mendelism-Morganism-Weismannism we will expel fortuities from biological science. . . . the strength of the Michurin teachings lies in its close association with the collective farms and State farms, in the fact that it elucidates profoundly theoretical problems by solving important practical problems of Socialist agriculture.*

Even more damning is the fact that the principles of Mendel-Morgan genetics are "idealistic."⁶⁷ This idealism is displayed in all its horrible perversion in Weismann's concept of the germ plasm: "An immortal hereditary substance, independent of the qualitative

features attending the development of the living body, directing the mortal body, but not produced by the latter—that is Weissmann's frankly idealistic, essentially mystical conception which he disguised as 'neo-Darwinism.' It is also vulgarly materialistic and it is metaphysical because it is not concerned with the needs of the Soviet people. That Weissmann's more extreme attitudes have been greatly modified by current genetic thinking one would never discover by reading Lysenko.

Lysenkoism in Practice

It is not possible in a brief review to delve into all the ramifications of what Lysenko has wrought from such bizarre elements. It is hard to believe that many of the inner circle of "Michurin geneticists" who are foisting this nonsense on the Russian people take their own pronouncements very seriously. Lysenko appears to be sincere but badly misguided and in no mood to risk a disturbing encounter with experts. He has time and again avoided personal discussions with visiting foreign scientists, as if he were unsure of his ground with them. Dr. S. C. Harland is one of the few Western geneticists who have had an opportunity for face-to-face discussion of genetics with the prophet himself. He summed up a three hour interview in these words: "I found him completely ignorant of the elementary principles of genetics and plant physiology. To talk to Lysenko was like trying to explain the differential calculus to a man who did not know his 12-times table."⁴¹

What actually has been the result to date of turning over genetical research in the Soviet Union to a mediaeval obscurantist who does not know his biological multiplication table, is impossible to say. The 600 page report of the meeting in Moscow last August con-

tains many bold statements regarding the enormous progress made by the use of Lysenko's principles. They are always lauded extravagantly in popular articles on the subject. The Communist front magazine *Soviet Russia Today* has a long article on "Citrus Moves North."⁴⁵ This is the same story that was being told back in 1935: that Lysenko's discoveries would surround Moscow overnight with citrus orchards. Thus the revolving cage seems still to be spinning merrily. This fascinating, or fantastic, piece (depending on how you look at it), tells about the current experiments wherein the Hero of Labor, S. M. Grinko is proudly and hopefully planting slips and seedlings of citrus in *open ground* in Siberia. [The italics are the author's.] The closing part of the sentence is something of an anti-climax. "... then in winter transplanted to a new well-equipped orangery." Somehow the fact that seedlings were planted in "open ground" during the hot arctic summer is expected to make arctic plants out of citrus in practically no time at all!*

The official handouts still lionize Lysenko's "great discovery" which Vavilov announced in 1932. Yet in 1945 Ashby tells us that vernalization was finished:

When the much-advertised pre-treatment of grain by low temperatures, called vernalization, proved a great failure, Lysenko cleverly substituted another pre-treatment, which is virtually a germination test, but which appeared under his name in the decrees for the Spring sowing in 1945 and 1946. He is the peasant's demagogue. What he says to them, goes. And he epitomises dialectical materialism in action; he provides the practical philosophy for the collective farm. If the Bolsheviks had not believed that man can remake his crops, his beasts, and even himself, they would not be where they are today. The missionaries of this faith have to be less sophisticated than the average polished and well-educated Academician. That, in my opinion, is one reason why Lysenko and his school are quietly tolerated.

*Ashby reports heroic efforts to conquer the Soviet Arctic. "It is incorrect to imagine that these efforts have transformed" that grim region. "There are patches of oats along the roadside but these seem to be more a gesture of optimism than anything else." When he asked one Soviet official whether it would not be far cheaper to import potatoes than to import forty tons of fertilizer to grow fourteen tons of potatoes, he was told "That is not our policy." To carry out that policy great trouble is taken. "Potatoes, for instance, are exposed to light under glass for forty-five days before planting. . . . Arctic agriculture is an ideal; uneconomic, difficult, and of doubtful political value." Where grain usually fails, citrus is marching in!



"A TWO-STORY TREE"

Sovfoto

Figure 5

"One of the two-story trees of the All Union Selection Station. March, 1941. Upper level, lemons; lower level, tangerines."

[The trunk is not visible, which leaves the question of the relationship of these two branches to the readers' imagination. If the branches are attached to the same trunk, it proves only that the art of grafting and budding is practiced in the Soviet Union. Burbank achieved wide publicity by grafting over a score of different varieties on one tree. This photograph is typical of a large stock of such propaganda "evidence" to support Michurinism and the "mentor theory."]

Inasmuch as the official Soviet view still attempts to foist on the world the picture of vernalization as a great success, we appear to be justified in extreme skepticism in regarding all of the rather lyrical claims of the tremendous practical value of the "Michurin teaching."

As we will see below, it is very likely that what results have been achieved are to be attributed to the use of sound biologic and genetic principles howbeit parading under new Michurinist labels.

Walpurgis Week

The reason that Marxist-Michurinist geneticists were "too busy" to attend the Eighth International Genetics Congress at Stockholm is made clear when we study the record of a meeting that was then imminent in Moscow, and which very likely was intended as an answer to the pronouncements of "Mendel-Morgan-Capitalist" geneticists from the Swedish capital. In this fantastic seven days the world was to see a long gestation ended. The bizarre story of "Salamandra," the strange obsession of the "angry man" whose anger ended the work and the life of his benefactor, the saga of the arctic citrus groves—all of this was to come to fruition in a new official "Marxist science."

Fortunately, a complete stenographic transcript of this meeting has been published in Russian, and more recently in English.⁵⁷ The English translation was prepared in Moscow, and it is quite possible that, as in the report of the genetics controversy in 1938, this "verbatim" transcript also may be considerably expurgated. Of that we cannot say. Whether expurgated or not it is fascinating reading.

In a later paragraph we will discuss some odd features of the publication of this book. For the purposes of our story now, the 636 pages here made available to the English-speaking world contain (along with everything else) the Lysenko addresses separately published.⁴⁰ Sandwiched in between Lysenko's opening address and his concluding remarks are the "full reports" of sixty other "scientists." Forty-seven of these participants were members of the Academy. The other thirteen were scientific workers from experiment stations and agricultural colleges. To assure the proper Party flavor, an assistant editor of *Pravda Ukraini* also participated.

This transcript records interruptions during the reading of the papers and the discussions at the close. Among those present were many important leaders of the Soviet school of Michurinism, and most of the remaining "Men-

del-Morgan" geneticists who still survive in the Soviet Union. However, it is to be noted that the only ones left to defend genetics were a few of the younger people hardly established as yet; some second or third raters who had already compromised to an extent; and such courageous veterans from other branches of biology as Schmalhausen and Zavadovsky who realized that all biology was threatened and who said so, knowing the consequences. The genetic leaders of a decade ago were all missing. The whole record is here in its full verbosity: an incredible hodgepodge. Most of the speakers were enthusiastic in their praise of the new biology. There was a corporal's guard of "Mendel-Morganists" to pepper and salt the proceedings and to furnish fresh meat to run through the recantation-grinder in the final session.

This meeting of the Lenin Academy of Agricultural Sciences was Lysenko's big moment. His opening address and closing remarks constituted the alpha and omega of the proceedings. He also served as a combination public prosecutor and chairman of a scientific Thomas Committee on heretical utterances. When the Michurinists had the floor his role was rather that of the high school senior who has won the national debating contest. He was showered with congratulations, adulations, and flattery. To say that the "angry man" loved every moment of these proceedings would appear to be an understatement.

The "Situation" in "Biology"

At the risk of doing some violence to the chronological order, we will distill the essence of Lysenko's words of wisdom, and then touch on some of the high points in the interim proceedings. Following that we will review the recantations and record briefly some of the results of the meeting, which in a few weeks seem to have changed completely the organization and direction of biology in the Soviet Union.

Lysenko's opening address occupied some thirty-four printed pages. It was

divided into nine sections. A very brief synopsis of each of these sections will be given, and comments will be enclosed in brackets. "The Situation in the Science of Biology" opens with:

1. *Biology, the Basis of Agronomy.*

Three paragraphs of scientific platitudes. "The science known for half a century now as genetics is of essential importance for our agricultural science."

2. *The History of Biology: A History of Ideological Controversy.*

Four pages of praising Darwin and attacking Darwinism. Darwin "marked the beginning of scientific biology," but his endorsement of Malthusian principles was "preposterous," basically contradicts his own theory. [A rambling, illogical discussion containing many non-sequiturs and ex cathedra dicta.]

3. *Two Worlds—Two Ideologies in Biology.*

Nearly six pages of an attack on "Weismannism," and the "Mendelism-Morganism" genetics which Lysenko claims is slavishly derived from it, and of a defense of certain naive Lamarckian ideas. Johannson and Morgan are castigated in the role of supporting heretics. Michurin and Williams, founders of "Soviet agro-biological science," are pictured as ushering in a new day: "The well-known Lamarckian propositions . . . are quite true and scientific!" [Comment is hardly necessary.]

4. *The Scholasticism of Mendelism-Morganism.*

Six pages to dispose of the "erroneous idea" of the isolation of germ cells from the soma. "The chromosome theory . . . based on Weismann's absurd proposition regarding the continuity of the germ plasm" is castigated. Morgan, Castle, Schroedinger are paraded as a prize collection of foreign heretics of baleful influence. Sinnott and Dunn, whose textbook of idealistic genetics usually accepted by "Mendel-Morganists" was until quite recently "the standard textbook on genetics in many of our colleges," also are thrown to the dogs. "The Mendelism-Morganists have thus thrown overboard one of the greatest acquisitions in the history of biological science—the principle of the inheritance of acquired characters." [!]

5. *The Idea of Unknowability in the Teaching on "Hereditary Substance."*

Four pages debunking the mutation fallacy. "The Morganist-Mendelists who proclaim that hereditary alterations, or 'mutations' as they are called are 'indefinite,' presume that such alterations cannot as a matter of principle be predicted. We have here a peculiar conception of unknowability." The local boys who have been seduced by this "peculiar conception of

... idealism in biology" include Schmalhausen, Dubinin, Malinowski, the Zavadovskys, Koltzov, et al. "Michurin himself and his followers have obtained and are obtaining directed hereditary changes in vegetable organisms literally in immense quantities." [The unpredictability of mutations is not a "matter of principle," it is a matter of fact. Reasonable as these statements may sound to the lay reader, they are non-scientific and thoroughly logical. The evidence against them is overwhelming].

6. *The Sterility of Morganism-Mendelism.*

Over four pages. The "exposure of Morganist metaphysics, which is in its entirety an importation from foreign reactionary biology hostile to us" is at last completed. Formerly a minority in the Lenin All-Union Academy of Agricultural Sciences, the Michurinists now come into their own, "thanks to the . . . Party . . . and Comrade Stalin personally. A considerable number of Michurinists have been elected . . . and more will be added shortly." The work of Dubinin on chromosome evolution in populations of *Drosophila* is ridiculed. [The sinister implications of the Academy-packing now going on is a good example of Lysenko's dispassionateness. The angry man can be nasty too!]

7. *Michurin's Teaching, Foundation of Scientific Biology.*

Ten pages of getting rough and tough with nature. "I. V. Michurin's motto was 'we must not wait for favors from nature; our task is to wrest them from her'." He considered 'it is possible, with man's intervention, to force any form of animal or plant to change more quickly and in a direction desirable to man.' [This is true, but irrelevant to the main argument]. "Once we know how the heredity of an organism is built up, we can change it in a definite direction, by creating definite conditions at a definite moment in the development of the organism". [This is Lysenko's phasic theory. It has not been proven, and has little to do with forcing organisms to change]. "Any character may be transmitted from one strain to another by means of grafting as well as by the sexual method. . . . Vegetative hybrids do not differ in principle from sexual hybrids". [These assertions of authority remain to be proven. The evidence that grafting is as potent as heredity does not exist. The evidence is quite to the contrary].

8. *Young Soviet Biologists Should Study the Michurin Teaching.*

Two pages. Attack on Zhukovsky for advocating the teaching of reactionary Mendel-Morganism. [More "impartiality" in an atmosphere of particularly odious smugness. Just you chaps wait!]

9. *For a Creative Scientific Biology.*

This is the summing up. The only factual data presented cover the conversion of a 28-

chromosome wheat into a 42-chromosome wheat.

This is Lysenko's best experimental evidence and deserves a detailed quotation:

"Species are not an abstraction, but actually existing links in the general biological chain. . . . I am confirmed in this opinion by the data of experiments for the conversion of hard wheat (*durum*) into soft (*vulgare*). . . . When experiments were started to convert hard wheat into winter wheat it was found that after two, three or four years of autumn planting (required to turn a spring into a winter crop) *durum* becomes *vulgare*, that is to say, one species is converted into another. *Durum*, i.e., a hard 28-chromosome wheat, is converted into several varieties of soft 42-chromosome wheat; nor do we, in this case, find any transitional forms between the *durum* and *vulgare* species. The conversion of one species into another takes place by a leap."

[In comment, Karl Sax²¹ has this to say: "Lysenko claims to have changed a spring wheat to winter wheat by three years of autumn planting. This change is accompanied by a change in chromosome number from 14 to 21, according to Lysenko. Anyone with even an elementary knowledge of cytogenetics knows that this is utterly impossible. The 14-chromosome wheats carry only genomes A and B, while the 21-chromosome wheats carry genomes A, B, and C. There is no possibility, whatever, of deriving C genomes from the 14-chromosome durum wheat and thus developing a 21-chromosome bread wheat. The only logical conclusion is that Lysenko planted a mixed lot of seed which contained seed of the 21-chromosome spring variety, and that these were selected over the period of the experiment."]

Origin of species under conditions of experiment and "by a leap" is not unknown. *Primula kewensis*, wherein an essentially "new species" arose by chromosome doubling in a sterile hybrid, is a classical case in point. It is interesting that Lysenko should select for emphasis an experiment involving polyploidy, for he (page 44) says: "The numerous and lengthy efforts made in the Soviet Union to produce polyploid plants with the aid of colchicine and similar potent factors have in no way led to the results so widely advertised by the Morganists."]

After the sessions were over, Lysenko summed up and rebutted in twelve pages of "Concluding Remarks." His first two paragraphs, models of lucid exposition by one often not easy to understand, created a sensation. They deserve a place in the history of science; hence we print them in bold face type:

"Before I pass on to my concluding remarks I consider it my duty to make the following statement.

"The question is asked in one of the notes handed to me, What is the attitude of the Central Committee of the Party to my report? I answer: The Central Committee of the Party examined my report and approved it."

This is the first time in the twentieth century that the content and concept of any science has been decided, not by experiment and rigorous analysis, but by the arbitrary decision of a non-technical governmental agency.

Those who had spoken against Lysenko in the conference found themselves suddenly caught in a trap. The result was astonishing, and not without elements of the pathetic. While the line of recanters was forming at the "left," Lysenko went on to take up in five pages "some of the points brought out in our session." The chromosome theory of genetics is traced to Weismann, therefore all connections of chromosomes with heredity are "Weismannian" and are appropriately disposed of. The Michurinian trend "is a materialist trend, because it does not separate heredity from the living body and conditions of its life." Therefore, by some strange allogical saltation, Michurinism is enthroned as the doctrine of authority and Morganism-Mendelism is the doctrine of heresy. Vegetative hybridization is again detailed, and the labile nature of organisms reaffirmed. "For 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." [This bold statement has been proved egregiously false in a multitude of carefully controlled experiments.]

Academician P. M. Zhukovsky came in for a violent tongue-lashing:

"As becomes a Mendelist-Morganist [he] cannot conceive transmission of hereditary properties without transmission of chromosomes. He cannot conceive that the ordinary living body possesses heredity. . . . He there-

fore does not think it possible to obtain plant hybrids by means of grafting, he does not think it possible for plants and animals to inherit acquired characters."

Lysenko then displayed some tomato-potato graft hybrids.* These are not, as far as the description goes, different from earlier chimeras of this kind reported in the literature of "reactionary" biology.

Commenting on studies in polyploidy, Lysenko had this to say:

"When a good strain has been produced, we can also determine the number of its chromosomes. But no one, certainly, will think of discarding a good strain only because it has turned out to be a polyploid or not a polyploid. No Michurinist, no serious-minded person generally, can approach the question from such an angle."

The "angry man" can also be very childish. Polyploidy is a tool, not a fetish, and a very sharp and valuable tool. Those who use it intelligently keep track of the ploidy of their strains as they go along.

Outlawed Chance

In the closing pages of his statement Lysenko propounds a principle of which we are going to hear much more. It is of great importance not only to Soviet genetics but to Soviet science generally:

"For instance, the Weismannist conception that the hereditary characteristics of an organism are independent of environmental conditions has led scientists to affirm that the property of heredity (i.e., the specific nature of an organism) is subject only to chance. All the so-called laws of Mendelism-Morganism are based entirely on the idea of chance.

"On the whole, living nature appears to the Morganists as a medley of fortuitous, isolated phenomena, without any necessary connections, and subject to no laws, chance reigns supreme.

"A science which fails to give practical workers a clear perspective, the power of finding their bearings, and confidence that they can achieve practical aims does not deserve to be called science.

"Physics and chemistry have been rid of fortuities. That is why they have become exact sciences.

"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."

*Dr. Julian Huxley confirms a press report that some of Lysenko's demonstrations were of "wax tomatoes." Huxley says, however, this involved no falsification as implied in the news stories, because the exhibits were prepared as a permanent demonstration.



Sovfoto

CITRICULTURAL KU KLUX

"The Ilyich State Farm (Abkhazia Autonomous Republic). The citrus plantations of the State farm in winter. Trees are covered with cheesecloth to protect them from frost."

[Since 1935 there has been much enthusiastic talk about the imminent appearance of citrus groves in the region of Moscow through application of Lysenko's methods. The plan to inure tropical species to a Siberian climate through gradually pushing them into the deep freeze seems still stuck at the post. The "trek" of a plant into a strange environment is supposed to be speeded by "shaking" its heredity through rough treatment. This assumedly adapts the heredity to the kind of environment which does the "shaking."]

[Michurinism, on the other hand] has *eliminated chance*, and therefore is science. [Furthermore, it is] "practical." "The great future of our entire natural science is in the collective farms and state farms." . . . It *elucidates profoundly theoretical problems by solving important practical problems of socialist agriculture.*"

The naive idea that "chance has been eliminated" from science is one of those imposing dicta which is completely false, but which sound very impressive to the unwary layman. To analyze the elements of a situation so that predictions are possible does not "eliminate chance." It merely takes into account the manner in which randomly interacting elements in a situation operate. If the chemist puts together pure hydrogen

and pure oxygen in the proper proportions he gets pure water. But he has altered not one whit the combining-tendencies of the atoms with which he works. He has simply controlled the opportunities for combination. In a mixture of ions, the combinations are constantly shifting, and the situation is described by the same kind of chance-formula the geneticist uses. When the geneticist crosses two highly inbred strains of maize he gets a predictable combination. He has "eliminated chance" too—but by understanding how chance operates: not by rhetoric.

That about winds up the "Condition of Biology Today." The concluding paragraphs echo strangely in a scientific

gathering, and deserve to be quoted fully enough to get their full redolence, italics and all:

"Progressive biological science owes it to the geniuses of mankind, Lenin and Stalin, that *the teaching of I. V. Michurin has been added to the treasure-house of our knowledge, has become part of the gold fund of our science.* (Applause)

Long live the Michurin teaching, which shows how to transform living nature for the benefit of the Soviet people! (Applause)

Long live the party of Lenin and Stalin, which discovered Michurin for the world and created all the conditions for the progress of advanced materialist biology in our country.

Glory to the great friend and protagonist of science, our leader and teacher, Comrade Stalin! (All rise. Prolonged applause)."

Program Notes

The nine sessions sandwiched in between Academician Lysenko's opening statement and his concluding remarks cannot receive the space they deserve in view of the lengthy distillations we have allowed ourselves from the words of wisdom of the great man himself. Academician M. A. Olshansky keyed the proceedings in the first sentence of the first paper: "When judging the correctness of one or another theory, it is important to ascertain to what extent that theory assists practical work." As we might have guessed, Mendel-Morganism proves to be "often a direct hindrance to practice," while Michurinism "arms plant breeders with effective methods for improving the breed qualities of seeds." Present, Lysenko's teammate, wound up the proceedings at the end of the ninth session with these stirring phrases: "We look boldly forward to the future because we have a real leader, while you, the Morganists, have Schnalhausen (*loud and prolonged applause*) . . . The future belongs to Michurin and only to Michurin and with this, permit me to conclude." (*Applause*).

Between these gems of rhetoric we wander through a veritable wonderland of dialectics, *tour de force* and logical *non-sequiturs*. There is much that deserves fuller consideration not because it is science but because it is so admir-

ably adapted to be twisted into effective religious and political propaganda. To require that a theory be "practical" from a purely utilitarian viewpoint is obviously nonsense, and it is the worst kind of heretical "idealism" so violently fulminated against. But how many people outside of laboratories will recognize the irrelevance and fatuity of these arguments? This extravaganza would be downright funny did it not have its serious and sinister angles. I. E. Glushenko, of the staff of the Institute of Biological Sciences, took his audience on a terrifying tour of the wonderland of Mendel-Morgan, which should be read in full to be appreciated. Such sinister figures as "Dunn, Dobzhansky, Goldschmidt, Stern, Sax, and their followers in the U.S.S.R. — Dubinin, Zhebrak, Romashov, Khvostova, etc." are up to no good with their chromosomes and their idealistic nonsense. Cook, Fawcett, and Rife are attacked for having dared to suggest that population pressure is a serious danger in high birth rate countries! All this builds up to an amazing conclusion:

In July, this year (1948), the Eighth International Genetics Congress was held. Its proceedings have not yet been published. But the *Journal of Heredity* printed news items about the preparations for the Congress and its character.

Here is the scope of the papers that were to be read at the Congress, as reported in the magazine: "The Organizing Committee has decided that papers which only deal with the pure application of genetics to practical animal or plant breeding must be excluded. The animal breeders have international congresses of their own and these congresses must be looked upon as the proper fora for such papers. . . . In the case of human genetics no limitations will be made with regard to the scope of papers.

"The Program of the Congress is not yet decided. The Organizing Committee has decided to announce only one special section at this time, viz., the Section of Human Genetics."

All this goes to show whom and what Mendel-Morgan genetics serves. The organizers of the Congress and their masters are not interested in problems of animal and plant breeding, in ways and means of increasing the productivity of agricultural crops and animals. Eugenics is the main objective of their efforts and the field to which they apply their conclusions.

That is the character of the logical development and present state of "world-wide genetics" so revered by our native Morganists. (pp. 224-226).

This statement is doubly interesting in the light of the attitude of the Soviet government toward the "postponed" Congress of 1937. It is quite clear that the picture of "Morganist Genetics" as fulminating dilettantism plus racist sadism is the official line.

It is astonishing how ingenious in evil intention and how stupid in practice these Mendel-Morganists are. But fortunately the Michurinists are more than a match for the foreign devils. "A classical example of the unsoundness of the methods the Mendel-Morganists employ in stockbreeding is 'testing the males by their offspring'." This horrid practice is exposed and condemned vehemently and at great length by Academician V. M. Yudin. So what does Comrade Yudin do? We quote:

Realizing the importance of an animal's phenotypical characters and their connection with hereditary characters, this new method first of all provides a careful selection of the rams that are to be tested by progeny; the rams are chosen with an eye to the specific features of the flock and the immediate task connected with it. Account is taken of their environmental and feeding conditions. To emphasize the importance of the careful selection of rams, the term "testing the ram" introduced by the Mendel-Morganists was discarded and another term, "selection of rams and testing them by their progeny" was adopted instead. (P. 408-9)

Merely by re-labelling the "offspring" of the rams the "progeny," the foreign toxin has been eliminated, and the despised foreign-capitalist method is now safe for good communists to use! The thing that is really impressive about this proceeding is the nerve of it.

Karakul Sheep have not been the only victims of Mendel-Morganian "idealism". Deputy Minister of Soviet Farms Chekmanev tells us (p. 305) that the Mendel-Morganists have actually ruined many fine breeds of livestock. Comrade V. S. Dmitriyev, Chief of the Agricultural Planning Administration of the State Planning Commission of the U.S.S.R., told his shocked

hearers that given aid and comfort by Academician Schmalhausen the reactionary scientists have successfully sabotaged reforestation of the steppes:

But what resistance [Michurinism] came up against! Excuse me if I put it strongly but it was like that of wild animals. The enemies of progressive tendencies in science, in defending their obsolete views, resort to wrong, impermissible methods, a point that should be placed on record and condemned. Is it worthy of a scientist to behave as Professor Rappaport did yesterday?

(Voice from the hall): "It was ruffianism!" (P. 317).

When it is stated on the dust jacket of the book that "a careful study of these papers will amply reward every serious student of biology" we can only utter a startled assent. Whether or not this odd hodge-podge of misstatement, unprovable dicta, bland fact-lifting, and scurrilous invective, will "make clear to the general reader the nature of the political controversy by presenting the scientific facts", is very definitely another matter.

So much for the comic relief. There was work to do: some of it grim work. A science had to be put under wraps, and a dogma had to be set up in its place.

In the sixth session, Professor Zavadovsky was the final speaker. He opened his address by protesting vehemently that he had not been informed of the meeting.

"Insufficient opportunity was given to those who are rightly, and especially for those who are wrongly considered among the Weismann-Morganists to prepare and have the possibility to express themselves freely and fully." Hearing about the meeting quite by accident he prepared to defend himself. Zavadovsky definitely states that since 1936 he has been opposed to formal genetics. "That is why I need alter nothing in my negative attitude towards Weismann-Mendelism formal genetics." But he is even more opposed to T. D. Lysenko. "I consider that I am entitled to show my profound disagreement with T. D. Lysenko." "I think, Comrades, that we are making a big mistake and misleading our leading organs, when we are now so stubbornly trying to prove that there exist only two lines, two trends in Soviet-biology—the teaching of Lysenko, called the Michurin trend, and the formal genetics, the Weismann trend, whereby all those who think differently and dare not to agree with Lysenko are

in a wholesale manner put by Lysenko's supporters in the odious category of "formal Geneticists."

Zavadovsky said further:

I in no wise deny the work of the Mendelian law. On the contrary, I only insist on the necessity of introducing corrections and additions in view of the unadaptability of its calculations to the cultivated types of fruit plants which on the crossing of different kinds among themselves produce the structure of hybrids that comes not from hereditary transmission of the characteristics of the nearest direct producers, but mainly from the kin. . . . But comrades, all grows and develops, and to a considerable extent the mistakes of the representatives of the Mendelian teaching in our country have been corrected. They introduce valuable achievements into the treasurehold of our Soviet Science and practice. . . . It is our duty to utilize the polyploid method and the method of crossing of maize between different kinds which has given great riches to the U. S. A. We must not throw these achievements overboard, must not throw the child out with the bath water. . . . Vegetative hybrids have not yet been suggested for animals, except in the creation of Chimeras such as butterflies with different wings. Let us have concrete directions and suggestions of how to apply the methods of vegetative hybridization (T. D. Lysenko's first symbol of fact) to the animal world . . . consider that this narrow, limited, one-sided line of slandering not only the methods but also the people who are not working within the approved plan is an unadmissible thing. . . . I was deeply grieved to hear the contribution of Comrade Muromtsev, who, I consider, made it only because he thought circumstances demanded it. . . . Who gives the right to include under the name of Darwinism that context which contradicts his teachings. Call things by their right names, Comrade Lysenko.

Zavadovsky was heckled repeatedly from the floor, and interrupted many times by Lysenko and Present. So long did the argument go on that Zavadovsky was allowed seven extra minutes. He said in his closing remarks:

To whom and by whom was it necessary to include me among the Weismannists and formal geneticists? Only because I have constantly come forward and will continue to come forward to point out the mistakes of Comrade Lysenko's works, only because I have constantly pointed out that Comrade Lysenko while being an innovator in one sphere has in other spheres become a heavy brake on many necessary and useful trends. I have frequently said this both at sessions of the Academy and in front of Comrade Lysenko. I do not conceal it. But is that a reason to defame me and stick labels on me?

Zavadovsky, pulled no punches, re-

canted not a whit and had the last word. He did a masterful and most courageous job of defending the principles of freedom of scientific thought, even though his own specialty is not genetics.

The eighth session included three speakers for the defense who would be heard from again later. They were Docent S. T. Alikhanian, Professor I. M. Poliakov, Academician P. M. Zhukovsky. Alikhanian was critical of Lysenko's views regarding chromosomes. "One thing is clear. Facts cannot be discarded. The vast amount of experimental data accumulated over the past fifty years cannot be ignored."

Poliakov took a middle of the road position. "Not denying that 'neo-Darwin-Weissmannism' was reactionary and opposed to Communist teaching", Poliakov extended a friendly hand to heretic Schmalhausen. "I want to say we must calmly examine the works of Schmalhausen. This is no brief article which can be thrown away and which is of no value. We must take all that is positive from these works". Poliakov's enthusiasm did not extend beyond the border of the Soviet Union however: "Hence it follows that many contemporary foreign geneticists who call themselves Darwinists are not actually Darwinists but neo-Darwinists and Weismannists, i.e. metaphysicians and anti-Darwinists". He was violently heckled by both Lysenko and Present because of his advocacy of Schmalhausen. It was clear that the prosecutors did not approve of his position. Zhukovsky spoke for unity, from the point of view of a cytologist. He too believed in chromosomes and was mercilessly heckled.

They were followed by Academician Zhebrak. Under heavy fire since 1937⁶⁶ he spoke in defense of his program of constructing new strains of grain by the use of polyploidy. He was violently attacked because the yield of his hybrids did not justify the effort, but he pointed out that the possibility of extreme variability in some of the forms he had produced gave great promise for increased yields in the future. In closing,

Zhebrak had this to say:

Work on polyploids confirms the dialectic interdependence of the inner nature of plants and their environment, and shows that the hereditary nature of plants, linked up with the rules governing the embryonic complex, is in the hands of man. In this work more than any other work in genetics, it seems the truth of Marx's aphorism, which says that so far philosophers have only explained the world and our task is to reconstruct it. Modern experimental genetics has mastered ways of reconstructing the hereditary foundation, and rebuilding the plant world.

On the ninth day, Comrade Schmalhausen, who had been frequently and vehemently attacked by Lysenko, defended himself against his traducers, claiming to be a sound Marxist dialectical materialist in spite of his support of Weismannian-Mendelian-Morganism.

The tenth session was a strange conclusion to a scientific gathering. It opened with the presentation of Lysenko's "Concluding Remarks", which we have already considered. Those who had mistaken the meeting for a *bona fide* scientific symposium were caught in a trap. Three of the participants scurried to safer ground with on-the-spot recantations. Their full recantations hang like scalps from the final pages of the transcript, between Lysenko's concluding remarks, and the Letter and Resolution adopted as the closing act of the session, amid wild applause, to be transmitted to Comrade Stalin.

The Recantations

A fascinating and disturbing feature of life behind the Iron Curtain is the parade of confession and recantation monotonously enlivening juridical and scientific proceedings. We present here extensive verbatim quotations from the three recantations that marked the climax and grand finale of the meeting on August 7.

P. M. Zhukovsky spoke in part as follows:

I want to make it clear that this statement is not influenced by the statement in *Pravda* today. Day before yesterday I spoke out against Michurin. My speech was not what it should have been. It was my last appearance against Michurin. . . . And it was also my last speech with an incorrect biological and ideological position. (applause) My article "Dar-

winism" was written in a dialectical manner, to which our president answered. This took me from the region of ideological battle into the region of personal offense.

It is true I am still standing (have the position) against others, but I want to say that just at this time my relations toward the President [Lysenko] have become much more bitter. When the Central Committee of the Party indicated a division separating the currents in biological thought, my speech was not worthy of a member of the Communist Party, and a Soviet scientist. I admit that I was taking an incorrect position. Yesterday's wonderful speech by Lobanov was addressed directly to me, "we are not on the same road as you are."—and I consider Lobanov a great government man. These words upset me very much. His speech threw me into confusion, and a sleepless night helped me to think over my actions. The speech of Vasilenko also had a similar effect on me because he showed me how Michurinism is tied up with the people, and how important it is at this time, to uphold the authority of the president [Lysenko]. So convinced of the rightness of the session and its demonstration of strength, and of its relation with the people, and of the demonstration of weakness of the opponents, is for me so obvious that I will fight—and sometimes I am capable of fighting—for Michurin's teachings. I am working for the committee for Stalin prizes, in the Council of Ministers, and therefore I think that I have a great moral duty. That is, to be an honest Michurinist, to be an honest Soviet biologist. If I say that I am going over into the ranks of Michurinists, and that I will defend them, I do this honestly. I declare that I will honestly perform what I declare today. Those who know me know that I do not do this out of cowardice. An important facet of my character was always a great sensitiveness. Everybody knows that my nerves are impressed by everything. Therefore you will believe me that this session really had an enormous effect on me.

Said Docent Alikhanian:

I decided last night *before* I saw the article in *Pravda*, to make this declaration. Mr. Lobanov can testify to this—inasmuch as I had a talk with him yesterday. We gave ourselves up to polemical passions, and because of these polemics we could not see the new growing direction in genetics. This is the new teaching of Michurin. It is important to understand that we want to be on this side of the academic barricade, with our party, with our Soviet science. It would be naive to think that we are required to renounce all that was positive, constructive, and useful, which has accumulated in the course of the development of science. We are required to renounce all that is reactionary, untrue, useless, and we want to do that honestly and frankly, as a true scientist should. I, as a Communist cannot and must not pit

my personal views and understanding against the course of development of biological science. . . .

From tomorrow on I will free my scientific actions from the old reactionary Weismannist-Morganist views — and thus I will make over all my students and comrades.

Academician Poliakov said in part:

I had a conversation with some of my friends last night and said then that this meeting was a great event in my life. It upset me very much and caused me to re-evaluate a lot. . . .

I recognize that I am rightly censured by the meeting, and that my views were incorrect. I recognize that the only thing for party and nonparty bolsheviks to do is to say right out that Michurinist direction is the general road of development of biological science. We want to go on this road. If we do not go on this road, willy-nilly we will draw to ourselves people inclined to unprincipled action—people who in scientific discussions do not see the essential greatness that is being done in our country. . . . You might understand that this rottenness has influenced some Soviet scientists, and it is necessary to eradicate it to the end. I will work for Lysenko.

The letter in *Pravda* referred to by the recanters was written by the young geneticist, Yuri Zhdanov. It was a public recantation of genetics addressed to Stalin, and its publication on the last day of Walpurgis Week represents either a remarkable coincidence or excellent timing. A more elaborate “double play” which did not come off, might have been a possibility, for Zhdanov’s father, who had often been considered the most likely successor to Stalin, died some weeks later.

Within the week after the meeting ended several similar reversals of position appeared in *Pravda*,^{57A} with Zhebrak leading the line of mail-order recanters. Schmalhausen soon chimed in, as who would not under the circumstances? Then Academician A. I. Oparin, the acting Director of the Bach Biochemical Institute, and author of the unexceptionable book, *Origin of Life*, published a full page letter in *Pravda* calling on the Presidium of the Academy of Sciences of the U.S.S.R. to renounce genetics.

It is worthy of note that not a single one of the reversals in attitude announced at the meeting, or in the pages

of Pravda was predicated on the question of the validity of the evidence. The credibility of the experiments and the nature of the basic data never came up for discussion. Faith, as defined by a perplexed schoolboy as “belief in something you know is impossible”, became the basis by dictatorial fiat for biological science in the U.S.S.R. “Personal views” congruent with the relative data, must now bow before the official line of the party, however absurd that line might be. “It still moves”, tradition tells us the recanting Galileo whispered. “The chromosomes still segregate at random in spite of Lysenko and Malenkov”, we can hear these frightened people whisper.

On August 26 the academy of Sciences of the U.S.S.R. met.^{57A} It took Oparin’s hint, and followed the lead of the All-Union Agricultural Academy. In an open letter to Stalin the Presidium of the Academy promised “resolutely to correct the mistakes we have made, to reorganize the work of the Section of Biological Sciences and its institutes, and to develop biological science in a genuine Michurin direction.”

These were no idle words. The same meeting dismissed the head of the Biological Sciences Section, Academician R. A. Orbeli, an outstanding pupil of Pavlov and recognized as one of the leading physiologists of the Soviet Union, and a Stalin prize laureate. He was accused of having been remiss in putting the theoretical work of the biologists of the Academy at the service of Soviet plant and livestock breeders. Orbeli is said to have recanted since that time. With him into limbo went Academician I. I. Schmalhausen, probably the leading Soviet scientist in the field of morphogenesis and regeneration. N. P. Dubinin, perhaps the leading *Drosophila* geneticist left in the Soviet Union, was also separated from his job and his whole Institute of Cyto-genetics, which harbored a considerable proportion of the remaining geneticists of high international reputation in Russia, was abolished amid sarcastic vituperations



RESEARCHER AT WORK

Sovfoto

Figure 6

"T. A. [sic] Lysenko, the President of the Lenin Academy of Agricultural Science, measuring the growth of wheat on one of the Kolkhoz fields near Odessa."

[It is noteworthy that Lysenko, who has interdicted experimental controls and the use of mathematics in biological research needs only eye-power and general impressions to "measure the growth of wheat." Self-appointed champion of "Darwinism" in the Soviet Union, Lysenko takes no stock in Darwin's basic premise that survival is struggle, nor of Darwin's praise of ruler and notebook: "I put no faith in anything but actual measurement and the rule of three." The presence of that capitalist symbol, Santa Claus, in the center of the picture is purely coincidental.]

by *Pravda* against "fenced-in pontiffs toying with fruit-flies."

Letter-writer A. I. Oparin did not wait long for his reward. He got Orbeli's job. Oparin promised that all experimenters in natural science would reconstruct their work in a fundamental fashion and cease "fawning and ser-

vility before foreign pseudo-science." His speech in New York in March 1949 is discussed below.

This resounding defeat to the "aristocracy of science in the Soviet Union" was administered to an Academy headed by Sergei Vavilov, the brother of the geneticist Vavilov, liquidated in 1942.

Said physicist Vavilov: "Our mistake has been primarily to fail to see that one of the conflicting trends, the Michurinist teaching, is genuinely materialistic and progressive. The organistic type of Mendelian trend is idealistic and reactionary."

On August 27, 1948, a *Pravda* editorial, quoted in the official *Soviet News*, put the capstone on this strange interlude in explicit and all-inclusive terms:

"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 U.S.S.R. 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."

Walpurgis Week was over. The "pseudo-scientific", "reactionary", "idealistic" biology of the capitalist world was dead. *Pravda* and *Izvestia* screamed approval. The provincial boy from the Ukraine who came to Moscow less than ten years before had indeed made very good!

The New "Soviet Science"

The virus of medieval obscurantism is extending far beyond genetics—even beyond biology—and in several directions. As long ago as August 1946, the Central Committee of the Communist Party accused social scientists, in particular, and the majority of scientific workers, in general, of being "backward." "The scientific worker is a public worker: he cannot be apolitical. He must guide himself toward the policy of the Party, which reveals itself to be the living basis of Soviet Society." It is also reported that the Party Central Committee has set up a new Academy of Sciences, independent of the existing Academy whose "backwardness" has been censured by Stalin personally.⁴⁸ This is the more strange because in the summer

of 1945 the Soviet government celebrated, with great international fanfare, the 220th anniversary of that same Academy, founded by Peter the Great.

In recent months, these criticisms of scientific workers have run the entire gamut from atomic physics to sociology. Since the August reorganization, four atomic scientists have been harshly criticized by Soviet newspapers for the statement that science cannot predict the behavior of atomic particles. On January 26, 1949, A. A. Maximov, of the Institute of Philosophy, attacked, over the Moscow radio, foreign physicists who were "responsible for idealistic interpretations in relativity and the quantum theory." Einstein, Bohr, and Heisenberg were guilty of "Kantian acrobatics," Joliet-Curie, Blackett, and Haldane were praised for their sound doctrine.^{8A}

The Varga incident of several months ago is typical of these widespread attacks. Varga, a leading economist, was so undialectic as to have made the disturbing suggestion in 1948 that the impending "collapse" of the United States might not come off according to the Marxian schedule. This position branded him as a capitalist-reactionary; he was violently attacked and removed from his job as Director of the Institute of World Economics of the All-Union Academy of Sciences. He continued the argument, however, and was allowed to state his views with considerable freedom. Now an Associated Press dispatch of March 15, 1949, tells us that Varga has recanted. The U. S. is going to "fold" Varga now agrees. In fact, it pretty much already has! Varga's recantation came one day after the announcement that N. A. Vognesensky, had been relieved of his duties as head of the Soviet Social Planning Commission.

In medicine three leading scientists have recently been fired from key posts, among them, C. F. Gause, Russia's best-known authority on malaria.⁶⁵ At the Academy meeting of August 26, the Minister of Health criticized the reactionary attitude of Davidenkov,

Gurvitch, and Rubenstein. The geographers also had a going-over in August "Pseudo scientific conceptions bourgeois in origin" were noted, and their elimination promised. Several dispatches have told of plans to rewrite the encyclopedia along Marxist-dialectical lines! On February 20, 1949 a United Press dispatch said that:

The government has ordered publication of a new edition of the Soviet Encyclopedia to correct 'crude theoretical and political errors in the first edition,' it was announced today.

The new edition will be edited by Sergei Vavilov, president of Academy of Sciences.

It was held that the first edition 'does not reflect the great changes which have occurred in life in the Soviet Union and foreign countries.'

Hence the cabinet said in its decree: 'The second edition must broadly illuminate universal and historic social triumphs in the fields of economics, science, culture and art. It must exhaustively show the superiority of socialist culture over the culture of the capitalist world.'

The Lysenko Fifth Column

In many countries we may be thankful that the attack on biology cannot be made by such direct and brutal methods. But with what gentler means are at hand, the vineyards of the capitalist world are being industriously tilled. As an instance of the nature of this infiltration, the history of the publication in this country of the report of Walpurgis Week is illuminating. When Lysenko's "Heredity and Its Variability" was published in 1943, Dr. Th. Dobzhansky felt it necessary to translate it into English, so that biologists generally would have available the truth about this weird obscurantism.³⁹ That precaution was not necessary in 1948. Within a matter of weeks, a translation of the full text of Lysenko's speeches of July 31 and August 7 was published in England. Shortly thereafter an American edition was offered by International Publishers in New York City with an advertisement in the *New York Times Book Review* which read in part: "Now you can read the *facts* in the Lysenko controversy. Are acquired characters inherited? Here is the full text of Lysenko's address. . ."

By October, 1948, a single copy of

the Russian edition of the stenographic transcript of the entire July 31-August 7 meeting reached Washington. Within a few weeks an English translation, published in Moscow, was offered in London by the Society for Cultural Relations with the U. S. R. R. On June 1, 1949, a facsimile photo-offset edition of this same Moscow edition was offered by International Publishers.

The manner of publication of these two books deserves comment. The British translation of Lysenko's speech appears to have been translated in England. It is not copyrighted. The American edition is a reset verbatim version of the English edition. It is "copyright 1948 by International Publishers," which would certainly convey the impression to most readers that this book was produced in the United States on its merits as a profit-making capitalist publishing venture. Such is definitely not the case.

The Moscow translation of the complete stenographic transcript bears the title page: "Lenin Academy of Agricultural Sciences of the U.S.S.R. Foreign Language Publishing House, Moscow, 1949." The American edition, *which is a facsimile photo-offset of the Moscow edition*, bears the imprint, "Copyright: International Publishers, New York, 1949." Its origin as a facsimile of the Russian translation is not stated. The Moscow edition states: "This translation of the verbatim report of the session of the Lenin Academy of Agricultural Sciences has been made from the Russian edition published by the State Publisher of Agricultural Literature, Moscow, 1948." The American edition appears to have sprung, like Minerva from the brow of Zeus, fullblown in midtown Manhattan.

These details may be trivial or they may be very significant. It all depends on whether they are merely routine Communist evasiveness or whether they are part of a larger plan. That the sponsors of Michurinism consider it worth while to distribute Lysenko's absurd *Heredity and Its Variability* in large quantities from at least one Latin-

American Embassy, that in Venezuela, suggests unusual zeal in propagating this strange faith throughout the world.⁴⁴ If it were clear to all readers that the American editions of both these books are Kremlin inspired and Kremlin-financed, it would detract from their propaganda value.* But it is of inestimable value to us that these official documents are freely available in this country.

During the late spring and early summer of 1949 a full-length Russian technicolor film, "Love in Bloom," was shown in New York City, at the Stanley Theatre on 42d street, and later at neighborhood cinemas featuring foreign films. This incredible "documentary" gives the "life-history of Michurin," and is required seeing by all biologists.

A synopsis of the film by a reliable reporter indicates that it is an excellent source of propaganda for Lysenko's brand of Michurinism rather than a factual exposition of Michurin's achievements. It starts off with a stirring scene in Michurin's garden around 1890. Two pot-bellied capitalist American professors appear to tempt him with bags of gold and promises of great glory in the capitalist paradise across the seas. Michurin is almost seduced by this bait, but suddenly recovers his aplomb, waves a violet-scented lily before the startled Americans' noses, and spurns their nefarious temptings. He tells them his horticultural miracle is the product of a hybrid between a violet and a lily, and he follows this blast with a withering blow to their intellectual solar-plexes: "That's the trouble with the Mendelians, they can't explain hybrids!" The capital-

ists withdraw with snarls and imprecations.

Since no "Mendelians" existed anywhere until at least ten years later, this strange timing sets the tone for two hours of conceptual pie-sliding which may be as excellent as propaganda as it is deplorable as a factual presentation of the issues in the current controversy.

The leftist writer, Howard Fast, in commenting in Muller's review of the crisis in genetics in the *Saturday Review of Literature* had this to say:

Prof. Muller's charge that the "sinister" denizens of the Kremlin rape science by a "combination of flagrant misrepresentation and calculated brutality," really makes one wonder what those Russians are up to and who profits through their cutting their own throats; but such a frenzy of unrestrained name-calling hardly refutes the calm and reasoned arguments put forth by Trofim Lysenko in his book *The Science of Biology Today*.

Having only a layman's knowledge of biology, I do not propose to enter into the Lysenko discussion. I can only say that I read his book and that I was impressed by his calmness of tone, his scholarly approach, and his patient marshalling of facts—a characteristic of Soviet argumentation in almost every field.

Certainly, if Lysenko were as wrong as Prof. Muller considers him to be, he could best be demolished through a careful and intelligent refutation of his arguments. However, the very hysteria of Prof. Muller can only make a judicious reader doubt the ground he stands on.

Several of the "Letters to the Editor" of the *Saturday Review of Literature* took issue with Muller's article on the destruction of Soviet Science. Some of these had a leftish tinge. Others criticized Muller for stressing the dangers of careless use of X-rays in medicine.

*These two books are only part of the rich dialectic fare offered by International Publishers. *The Theoretical Principles of Lenin* at \$2.75; *Dialectical and Historical Materialism*, by Joseph Stalin, at \$1.00; a *Textbook of Dialectical Materialism* by David Guest, at \$1.25; and Marcel Prenant's *Biology and Marxism* at \$2.50 are among the other items offered on the dust jacket of the "Situation in Biological Science."

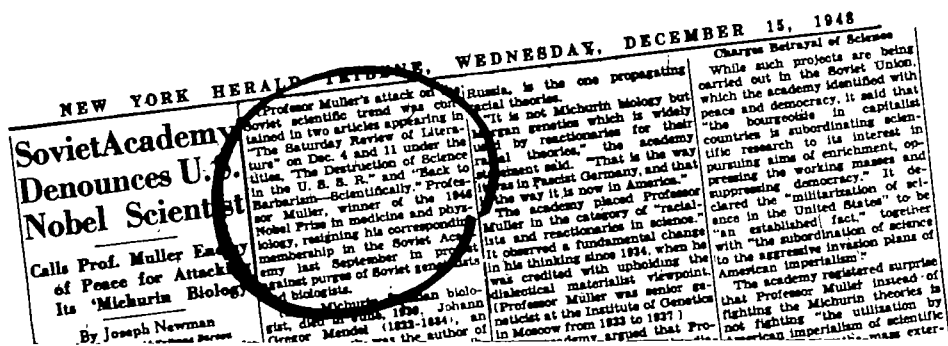
Here we also find an invitation to readers many of whom will not have an adequate basis for evaluating this strange document:

"The 640 pages of the present volume contain addresses, papers, and discussions by sixty scientists, representing varying points of view on the inheritance of acquired characteristics. Among them are academicians, professors, and heads of departments at research institutes and stations—biologists, agronomists, and technicians.

"The presentation of the divergent views is accompanied by experimental evidence and a discussion of scientific results, summing up many years of scientific debate. A careful study of these pages will amply reward every serious student of biology, and for the general reader they make clear the nature of the political controversy by presenting the scientific facts."

Influence!

Examples of how the Saturday Review
influences thought and action in America
and in Russia...



PROPAGANDA POT-SHOT

Figure 7

Leaflet mailed by *Soviet Russia Today* as part of the blitz to gain acceptance of Michurinist ideas. The implication follows the Fast-Friedman line that the refusal of American biologists to accept the Lysenko gospel is motivated by hatred of the truth, and that the *Saturday Review of Literature*, by contributing to this "reactionary falsification" is widening the breach between the worlds of Communism and Democracy. The "One World" of the Communists can only be the world of "naked irresponsible force" and of dogma approved by the Central Committee.

The combination was calculated to give the nonbiologist reader the false impression that "classical" genetics is somehow on the spot.

The frankly Communist and Communist-front publications have welcomed Lysenkoism enthusiastically. The leading authority in this field among our "home-grown Michurin geneticists" appears to be a Mr. Bernard Friedman who writes for the leftist monthlies *Masses and Mainstream* and *Soviet Russia Today*. Mr. Friedman is billed in the author's columns of these as a cytologist who has been "teaching biology for fifteen years and has published

research in cytology on a Carnegie Research Foundation grant".*

In the January 1949 *Soviet Russia Today*, Mr. Friedman writes glowingly of Lysenko's work and attacks Muller, Morgan, and the classical geneticists with the same casuistic smokescreening which marked the proceedings in Moscow in August 1948. His discussion of how the views of the two schools differ is thus summed up:

It is this idea of a separate, isolated material of heredity unaffected by the activity of the living body that Lysenko questions. This is the real subject-matter of the controversy.

The only legitimate question at issue is whether the traditional view reflects reality or

*No organization titled "The Carnegie Research Foundation" has been located. The Carnegie Institution of Washington, the Carnegie Foundation for the Advancement of Teaching and the Carnegie Corporation of New York have been unable to identify a Bernard Friedman as being among their grantees. Is it possible that, as is a custom with Party members, he did this work under an alias?

distorts it. Many of the printed comments on the controversy have served to obscure the basic fact. . . . Lysenko is called a "charlatan" and some go to the extreme of accusing him of having arranged for the dismissal and even deaths of his opponents.

This is an excellent example of the sophistry which marks so much of the Communist attack on "classical genetics." The issue is not whether "the tradition of Mendel-Morganism" or the "Michurin teaching" is doctrinally true. The issue is of the facts, which Lysenkoists deny. The principles of "Mendel-Morgan genetics" are not a "tradition". They have been established by experiment and many thousands of students have personally observed the nature of the evidence on which genetics rests. As we have so abundantly seen, Lysenko's scorn of experimental method in science, his contempt for "chance", and his utter ignorance of the subject matter he is discussing make his teaching merely a dogma. *That is the issue.* That Lysenko boasted of his power to dismiss his opponents; that he attacked his sponsor and benefactor ruthlessly is a matter of record. That those who lacked enthusiasm for the new doctrine lost their jobs is a matter of official record in *Pravda*.

In *Masses and Mainstream*, Friedman returns to the attack in the March 1949 issue. Here he comes up with the amazing idea that agronomists and plant breeders in this country were pledged to restrict production, because scarcities are necessary for the smooth working of a capitalist economy. To square this dictum with the facts of five record-breaking wheat crops and the contribution of hybrid corn to the war effort must strain even the Party member's will to credulity. Friedman considers Lysenko's book the most important publication in biology since Darwin's *Origin of Species*! This is surely allogical dictum-propaganda at its worst!

The barrier of Marxist genetics is also being gallantly carried forward by such pinko sheets as *Science and Society*. In the winter issue, the French School of Lysenkoism, identified with

Marcel Prenant came up with an apologia of Michurinism. The question of Professor Prenant's integrity has recently been discussed by Dobzhansky in these pages. In the spring issue our "home grown" Lysenkoists had their innings. Bernard Stein used the legalistic road-block method so popular with Prezent, of alleging technical exceptions which, since they do not prove Lysenko wrong have the magic effect of proving him right!

In England the British *New Statesman and Nation* published a long letter in defense of Lysenkoism which, on the basis of alleged discussion of facts, also achieved a high level of biological illiteracy. The irrepressible and biologically irresponsible Bernard Shaw has also contributed to the fog. That editors of journals of repute are not able to evaluate such discussions intelligently, and are willing to accept any statement, however nonsensical, regarding the facts of genetics is a distressing evidence that there is a wide and fallow field for sowing the tares of Lysenkoism.

These queer ideas are presented to many intelligent people who are unacquainted with the subject-matter discussed and whose ability to appraise what they read is very slight. Such people can get nothing but utter confusion and misinformation from reading Lysenko's words of wisdom, from the transcript of the August, 1948 meeting, or from listening to the profound nonsense of our Friedmans, our Spitzers, and our Fastes.

The Cultural Relations Deadlock

The State Department has recently revealed the sad story of the past six years' efforts to establish cultural and scientific exchanges between the Soviet Union and the United States.⁹ During the early years of the war, some progress seemed to be made, but since 1945 only an increasing resistance and hostility has been encountered. This reached a point of complete impasse by the summer of 1947 when the American Council of Learned Societies sent a special emissary, Professor Ernest J.

Simmons of Columbia University to Moscow. He was very coolly received and labelled in *Izvestia* of October 19, "the learned servant of the 'yellow devils', which is Gorky's name for the all-powerful dollar." This the State Department interpreted in effect as an official answer to Professor Simmons's mission. Later in the year the Institute of International Education was denounced as "a monopoly American Institution . . . training legal, "pedagogic spies and informers for establishing an 'American column' in every country."

The State Secrets Act of June 1947 put a security lid on practically all mental activity. On July 24, 1947, a writer, P. Vyshensky stated that "every Soviet patriot must realize the importance of keeping secret our discoveries and inventions." In Russia there has been increasing criticism of publication abroad of any Russian works. Some of this vituperation has been directed against geneticists Zhebrak and Dubinin. A Soviet professor who published an account of Soviet research in perfume chemistry in a French periodical was violently attacked. In February 1948 Professor W. I. Frenkel was attacked for publishing some of his works abroad though he was not denounced by the government.

Almost complete blockages exist in the exchange of publications. "As in international politics, too, the basis of the relationship is a deep undercurrent of official Soviet distrust and antipathy towards the Western world." Here again, it is quite clear that the "official line" envisions a bigoted and suspicious chauvinism that extends far beyond the borders of genetics. This is Oparin's "democracy" and "open discussion."

The Academic Front

The Lysenkist offensive is a two-pronged attack. The pinko and the crackpot press represents one prong; the academic front the other. This second scientific front was opened early in 1949 when Dr. Ralph Spitzer, associate professor of Chemistry at Oregon State University objected to an editorial

on "state science" in the December 6, 1948 issue of *Chemical and Engineering News*. Professor Spitzer took violent exception in a letter in the January 31, issue.⁶⁰ He followed Howard Fast in taking Lysenko's extravaganzas at face value, and in closely following the Party Line. He said in part:

Perusal of Lysenko's report shows that the issue is largely over matters of biological and technological fact and theory. Are vegetative hybrids possible? Mr. Lysenko has samples. Can the heredity of growing organisms be changed by changing the environment at an appropriate time and in an appropriate way? The Michurinists have changed 28-chromosome spring wheat into 42-chromosome winter wheat by suitable temperature treatments during several generations. . . . The heated, not to say hysterical, charges which are now being made are reminiscent of previous assertions that the Soviet Union was destroying art, music, and economics. . . . Judged in the light of the Soviet social structure, this method of allotting funds and responsibilities does not seem less democratic than our method of allowing boards of directors, Congress, or the military to decide . . . which branches of science and which projects to encourage.

This defense of Lysenko by Spitzer was described by President A. L. Strand of O. S. U. as the culmination and the most open of a series of activities in the furtherance of the Communist Party line. It is perhaps unfortunate that on the basis of this letter, Professor Spitzer was dismissed by the president of the University. In his letter of dismissal, President Strand said in part, "Spitzer showed such poor power of discrimination as to choose Lysenko's genetics against all the weight of evidence against it, that he is not much of a scientist or has lost that freedom of opinion that an investigator should preserve."

Inasmuch as Spitzer emphasized the availability in Russian of the full proceedings of the August meetings in Moscow, his enthusiastic endorsement of Lysenkoism appears to represent more than a casual ignorance of the situation. That a competent scientist could be favorably impressed on the basis of the proceedings in Moscow last August and the total record as it has unrolled over the past sixteen years is hard to believe. Whether Spitzer's biological notions incapacitate him for teaching chemistry is

a moot point. That he follows the Party line with great fidelity even into a field of science where he is not competent is quite clear.

Spitzer has appealed his discharge to the American Association of University Professors. The case presents perplexing angles with regard to the question of freedom of research and academic tenure. Spitzer was appointed on a temporary basis, so the question of tenure really does not enter into this particular case. But the principles involved will almost certainly come up in other cases. Every scientist should of course be free to express his conclusions regarding scientific or other subjects. But there is the question of how much freedom does a Communist actually have?

The question of where the Party line leads the scientific worker has recently been highlighted by the furor over F. Joliot-Curie's appointment as Director of the project to construct and operate the first atomic pile in France.* Joliot-Curie is an avowed Communist. In answering British critics who questioned his loyalty, Joliot-Curie responded very eloquently, in part as follows:

A French Communist, like any other French citizen holding a post entrusted to him by his government, could not possibly think of communicating to any foreign power whatsoever, results which do not belong to him, but to the community which has permitted him to work. . . . What supposition underlies this absurd argument which leads to the conclusion that to be a Communist is to be relieved from the moral obligations of a French citizen, and to be astonishingly transformed into a spy, well meaning or otherwise?

These sentiments are very fine in a political vacuum. Those who know him have no doubt that Professor Joliot-Curie believes what he says. But in the light of the record in *Pravda* and of the meeting of July 31-August 7 last, his position can mean only one or two things: either he is utterly cynical or childishly naive. The leaders of the Communist Party do not allow any freedom of decision on the part of Communist party members as to where their loyalties lie. Time and again the geneticists' recantations have stressed the principle that no

**Bull. Atom. Sci.* Apr. 1949, page 109.

Basis of Communism

"THE scientific concept of Dictatorship means neither more nor less than unrestricted power, absolutely unimpeded by laws or regulations and resting directly on force."—Nicolai Lenin.

"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 U.S.S.R. 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."—*Pravda*, August 27, 1948.

party member can have opinions of his own that run counter to the official Party line. Party principle, and the ruthless irresponsible power of the Party leadership, are the absolute mediators of Communist ethics and behavior. It is quite clear that in a Communist-dominated country this is accepted.

If Joliot-Curie is in fact a member of the Communist Party he can only escape discipline for pledging a limited loyalty to the Party because he is out of the range of its effective power, and in a position where retaliation would be inexpedient. For a Party member to claim to have any liberty of decision or action where Party policy is involved, is, in the light of the record, hardly a tenable position.

Comrad Oparin in New York

The Cultural and Scientific Conference for World Peace held in New York in March 1949 featured the new Mich-

Liberty vs. Force

AND what is this liberty which must lie in the hearts of men and women? It is not the ruthless, the unbridled will. It is not freedom to do as one likes. That is the denial of liberty, and leads straight to its overthrow. A society in which men recognize no check upon their freedom, soon becomes a society where freedom is the possession of only a savage few; as we have learned to our sorrow. The spirit of liberty is the spirit which seeks to understand the minds of other men and women. The spirit of liberty is the spirit which weighs their interests alongside its own without bias. The spirit of liberty remembers that not even a sparrow falls to earth unheeded.—Judge Learned Hand.

urine genetics.⁴⁷ In further recognition of his yeoman service in attacking the "rotteness of capitalist biology," Oparin was the one scientist among seven delegates sent by the Soviet Union to that Conference. His address appears in the May issue of *Soviet Russia Today*. Oparin echoes the Communist line regarding atomic energy, war-mongering by everybody but the Kremlin gang, and an enthusiastic encomium of Lysenko, who, believe it or not, is, in spite of his contempt for theory, a great theoretician! In the light of the parade of recanters last summer in Moscow this paragraph is illuminating:

This democratic character of Soviet science is not accidental or transient. The roots of this democracy are deep in our history. It was bequeathed to us by our great democrats of the nineteenth century, by Gertsen, Belinsky, Dobroliubov, Chernyshevsky and by our teachers—prominent naturalists of the end of the last century and the beginning of this century. Timirjazev once said, "Those chosen to deal with science must look upon knowledge as upon a treasure entrusted to them which is the property of all people."

To one who has read the reiterated searing attacks on "foreign rotteness,"

or. "ruffianism," on "Mendelian-Morganian obstructionism" which Oparin and his pals indulged in last August, this address is incredible in its double-dealing cant. The same Oparin who last August demanded Kremlin intervention in Soviet science and who promised no more "fawning and servility before foreign pseudo-science," is a very mellow fellow, at the capitalist Waldorf-Astoria:

It is possible to agree or disagree with us. It is possible to argue with us, and we readily respond to this because truth is found through such discussion. But no honest man can find in the principles proclaimed by us any trace of ideas that could be used as the theoretical basis for misanthropy or military expansion. We love our native country very warmly and we are ready to defend it against any attack, but we feel great respect for all other peoples of the world. Absence of national narrow-mindedness, of narrow nationalism, has always been a characteristic feature of Soviet men of science. Our philosophy in its very conception is alien to any military aggression.

The End of Lysenkoism?

As a contribution to science, Lysenkoism was stillborn and this ritual of last August represents a recrudescence of mediaevalism at its worst. Over the past several years the panel of "Mendel-Morganian" geneticists who have preached its funeral in non-Communist countries is impressive.* If the only issue in Lysenkoism were the question of the genetic realities, we have long since devoted more space to the subject than it deserves. If, as is suggested below, it turns out that we have seen as yet only the beginning of an all-out battle of ideologies, world-wide in scope, then we have probably underemphasized the importance of this con-

*It is interesting that the *Bulletin of the Atomic Scientists* considers the Michurinist controversy so important that an entire issue is devoted to the subject.⁴⁸ A summary of the meeting of last August is presented in some detail, and extended comments by "classical" geneticists, either original or reprinted, are presented. We are quoting briefly here from some of these comments, and from others.

Sewall Wright: The basic facts of genetics are at least as easily verified by individual students as the basic facts of physics and chemistry. Judging from the amount of excellent research in genetics that has come

troversy. That this battle will be in the fields of politics and religion rather than of science, only makes it of wider import.

The complete record has here been reviewed only in part. It should suffice to establish the contrast between the Soviet viewpoint and that of the Western world with respect to science and freedom of opinion. "Science" in the U.S.S.R. is a one-party ticket and the science worker who refuses to vote the

ticket straight is exposed to varied, capricious, and sometimes fatal manifestations of naked, ruthless, irresponsible force. He may not be liquidated, but he can be, and he will be if it suits the whim of a hierarchy pledged to a policy of ruthlessness. The record of what may happen is clear: Vavilov, Levitsky, Agol, Levit, Karpechenko, Kerkis and others were of a different opinion. Perhaps Mr. Friedman can tell us where they are now?

from Russia, there must be hundreds of persons there who know these facts at first hand and who thus know the falsity of Lysenko's statements. The pitiful crawling of many of the leading scientists after the decision of the Central Committee of the Communist party was announced, reveals more clearly than anything else the present climate of thought in Russia.⁵¹

L. C. Dunn: In the second place, the biology which is attacked in the Report is the biology of 1900-1910. The "immortal hereditary substance," sacrosanct and inviolable, against which the Report inveighs so violently, has long since been given up by biologists.⁵¹

Karl Sax: The key-point in Lysenko's theory is vegetative hybridization. We have many centuries of horticultural experience to prove that such things do not happen. . . . Here at the Arnold Arboretum we have pears growing on hawthorns, hawthorns on mountain ash, peaches on cherries, and innumerable other combinations in our nursery. In every case the stock shows absolutely no effect on the scion except for dwarfing.⁵¹

Theodosius Dobzhansky: In reality the decision [of the Central Committee] was a monstrous error, most of all from the standpoint of those who made it. They have made themselves a laughingstock to millions of people all over the world, and being laughed at may be fatal to them. Having placed a maniac in charge of their agriculture, they are bound to suffer grave losses in harvests, and this for a long time—losses which are assuredly not welcome to them. Verily: *Quos vult Jupiter perdere, dementat prius*.⁵¹

M. B. Crane: Lysenko brings in Michurinism in connection with the inheritance of acquired characters and he states, 'the well-known Lamarckian propositions, which recognize the active role of external conditions in the formation of the living body and the heredity of acquired characters, unlike the metaphysics of Neo-Darwinism (or Weismannism) are by no means faulty. On the contrary, they are quite true and scientific'. I cannot find anything in the book which proves that the inheritance of acquired characters is true.^{5A}

R. B. Goldschmidt: Lysenko does not think much of genetics and refuses to accept such

simple facts as the uniformity of F_1 , the numerical rules of segregation, or the chance assortment of chromosomes in meiosis, not to speak of the more advanced facts of genetics. Such elementary facts as the chance assortment of chromosomes he considers mystical nonsense.

It is not an overstatement that almost everything Lysenko says about genetics and cytogenetics in his three major translated books and speeches exhibits a complete ignorance of the subject. How is it possible that he has never taken the trouble to see with his own eyes what thousands of students all over the world are unfailingly shown in laboratory courses in genetics and cytology, year after year? Is this bad will or obscurantism? Someone should take the trouble to extract all his statements on modern genetics, so as to have them side by side. The collection would make a stone weep.

H. J. Muller: In the light of modern knowledge, Lysenkoism can only be termed a superstition, just as a belief in the flatness of the earth today would be. It is however a more dangerous superstition than that would be. Not only does it lead to an entirely false conception of the nature of living things and to erroneous methods in the attempt to control other organisms, but it results in a complete misunderstanding of the genetic processes occurring in man himself, and hence to social and medical policies which would be destined to lead, in the end, to the degradation rather than the progression of the biological basis which underlies humanity.⁴⁴⁻⁴⁵

C. Leonard Huskins: We have, however, no reason to believe that Lysenko has contributed one jot of evidence worthy of consideration. His book and most of his papers have been carefully translated and studied. It is evident that he is a fanatic with many qualifications as a demagogue and politician, and doubtless some as a plant breeder along the lines of his idol Michurin who was a sort of Luther Burbank. Obviously he is not a scientist in either our eyes or those of the older generation of Russians and he certainly does not understand the complexities of the problems on which he forcibly and so effectively, in a political sense, voices his opinions.⁵⁰

The Power Mania

"THE struggle today is not between Democracy which is simply a form of government and Communism but between the creative civilized tradition and the revolution of destruction. For it is of the very essence of Communism that it has no moral code or legal framework. The tyrants of the Politburo enjoy an absolute power more terrifying in its mad extent than any rulers in the history of mankind. Many people, and I admit I was one, used to believe that the terror of the early Bolshevik days was only a passing phase, that the days of violent excess would pass and Russia would settle down into a more or less civilized community. But to believe this now is to be totally blind. The slave camps and torture chambers of the totalitarian states are not by-products of the struggle for power, they are the means of the state's existence. Abolish the slave camps and the secret police and Stalinism tumbles down."—*John Durness, The Scot's Review, Sept. 1948.*

It is abundantly plain from the record in *Pravda* and elsewhere that in spite of Academician Oparin's bland phrases in New York, Lysenkoism and the broader attack on "foreign rottenness" in science will be pushed ruthlessly and without quarter. Not to believe this, as John Durness says, "is to be totally blind." Our ground-rules of tolerant give and take are not understood by those who explicitly deny any tolerance, who cynically accept naked and irresponsible force as the ultimate arbiter. To extend the usual human-canine amenities to a dog suffering from hydrophobia is obviously to invite disaster. To pretend that this fulminating madness can be placated is stupid. If the new doctrine according to Marx prospers, we will find it very

difficult to arrange a divided peace with it.

As far as perhaps 95 percent of the population of the world is concerned, what geneticists think about Lysenko is not crucially important. If enough people can be "sold" on the Gospel of St. Marx as revealed by Apostle Trofim, Friar Bacon's hard discipline of rigidly experimental science may be swallowed up in the dialectics of Marx-Engels-Lenin-Lysenkoism. And in that case there is a real danger that a major issue of our time will not be settled in the laboratories by experiment but in packed meetings like that in Moscow, and by acclamation. Whether this uncanny business could balloon to such fantastic proportions concerns not only geneticists, but all believers in freedom of the human spirit, and in the sanctity of the individual.

Geneticists may as well face another unpleasant fact: That is that this new evangel being foisted by the Kremlin on what it hopes is a gullible world, has one big item in favor of its success. What professional geneticists, or biologists generally, think about genetics and Lysenkoism does not make too much difference. There are in the aggregate a very large number of people in the world, even in the United States, who still harbor the illusion that genetics is tainted with racism and somehow represents most of the worst features of Presbyterian predestination. It matters not at all that geneticists have a clean record of opposition to the dangerous and unscientific dogmas of such pundits as Madison Grant, Lathrop Stoddard, and Adolph Hitler. The embarrassing fact remains that to a great many people the pronouncements of such opinionated worthies are valid samples of genetic thinking. Such illusions feed the Lysenko myth, and are the main reason why it is a source of danger.

The possibility that such arguments may be used as the ideological "front" for a new and utterly cynical "religion" puts biologists in almost as delicate a spot as the atomic physicists.

"Every man a Communist King," a sort of global Huey-Longism, might be more effective in stress areas than "you have nothing to lose but your chains." Professor Muller is right in pointing out the fallacy in the Lysenko position that if we accept the inheritance of acquired characters, then it inevitably follows that a people who have suffered from an adverse environment are "inferior." But this controversy will not be fought with logic: these people are masters of alogia. That an argument is logically untenable may not make it any less effective at the level of biological illiteracy at which this propaganda will operate. This may indeed be a "second front" in an ideological war wherein Lysenkoism is a devilishly effective secret weapon.

The Dilemma of "Scientism"

All too often in our own country, and in the Western world generally, we are still tempted to ascribe to science and the scientist the role of the priest or the magician. It is easy to be sympathetic with the Russian obsession with "what must be" when we see it so often nearer home. Scientism very easily becomes the dead hand of preconceived authority. Whether it be in this country or in the Soviet Union, the scientist who pretends to speak with the voice of authority concerning subjects on which he lacks competent information becomes an ally of this, our greatest enemy. For the scientist, our constitutionally guaranteed freedom of speech has a special and critical meaning. It is—and it must always be—a freedom to speak the truth in so far as we see it. It is also the freedom to speak against antitruth (better, "anti-reality") wherever we find it. For any

scientist to speak nonsense, and to use the prestige of his scientific position to expound nonscientific views, is to be guilty of the ultimate treason in the long battle to free the human mind.

The fight against revealed authority, against enthroned opinion, and against the use of power to force acceptance of *ad hoc* assumption as "revealed truth" is by no means ended. It goes on here, as it must go on "underground" in the Soviet Union if the minds of that fine courageous people are ever to be free. It goes on when we try to resolve the paradox of preserving academic freedom even for those pledged to destroy it. In an uncertain world, we are hardly likely to find perfection anywhere, and it is stupid and chauvinistic to claim perfection here. In the vivid phrase of DeWitt Wing, things are "less worse" in some places than they are in others, and we are very fortunate in many respects. But all who are the intellectual descendants of Galileo, of Servetus, of Vavilov, must never forget that the fight is not yet over. This fight has always been to a finish. The enemy is here as well as in Moscow. Our Spitzers, Fasts, Haldanes, and Blacketts, and the scientists who pontificate without adequate knowledge, our trustees and executives who engage in mass witch hunts, all these give aid and comfort to that ultimate enemy of science and intellectual freedom.

But for the grace of all who have fought for the freedom of the human mind, each of us stood in Moscow on August 7 last, and heard the words of doom: "The Central Committee of the Party examined my report and approved it."