

# BOOK REVIEWS

## MICHURIN AND HUXLEY

SELECTED WORKS of I. V. Michurin. (*Foreign Languages Publishing House, Moscow, 1949. 15s.*)

A PEOPLE'S ACADEMY. By Gennadi Fish. (*Foreign Languages Publishing House, Moscow, 1949. 2s. 6d.*)

SOVIET GENETICS. By J. Huxley. (*Chatto & Windus, London, 1949. 8s. 6d.*)

THE name of Michurin is now used by Soviet scientists to designate those new theoretical and practical trends in Soviet biology which have been developed by Academician Lysenko and his co-workers. The appearance in English of *Michurin's Selected Works* is therefore particularly welcome as it will enable people in this country to learn something of the man and his work, and of his ideas, and to see how these ideas are related to the most recent developments.

Michurin was indeed a very remarkable man. The quality of his writings is always lucid and attractive and conveys the impression of an outstanding personality. The history of his life, which is the history of his work, confirms this impression. He came of a family of bankrupt petty landowners, and was forced for financial reasons to abandon his plans for further education at the age of seventeen. With characteristic determination he took a job as a goods clerk on the local railway and supported himself in this way for twelve years. At a very early age he had become interested in horticulture, and was inspired with the idea of improving the cultivated fruit plants in Central Russia. To this self-imposed and selfless task he devoted the remainder of his life, working with almost unbelievable industry in the face of poverty and of all the difficulties and frustrations imposed by Tsarist society.

While still working on the railway, he began to build up a small nursery, which eventually became sufficiently self-supporting to enable him to give his whole time to it. He continued to work in these difficult conditions for over 40 years without the slightest help or encouragement from the Tsarist government. His methods were so successful that he acquired a considerable reputation in Russia, and even the U.S. Department of Agriculture were, in 1911, sufficiently interested to try to get him to go to America or at least to sell his best

varieties. Michurin rejected these offers because of his patriotic desire that his work should be of use to his own people. This wish was realised with the establishment of the Soviet Government, which Michurin, who had always been a man of progressive ideas, unhesitatingly welcomed. The Soviet Government recognised the importance of Michurin's work and provided him with funds and assistance for its development. His nursery became the *Michurin Central Genetics Laboratory*, with Michurin as the director of its large staff.

Michurin's concern, throughout his long and busy life, with the practical problems of improving fruit culture in Central Russia made it inevitable that his writings should be cast mainly in instructional form. Nevertheless he was guided throughout by certain theoretical principles which emerge quite clearly, if sometimes almost incidentally, in his works. For the same reason the many experiments he carried out were directed to the solving of practical problems and were not designed for the critical establishment of theoretical principles. But Michurin was always insistent on the need for correct biological theory as a guide in practice.

Michurin's fundamental ideas emerge most clearly in his attitude to adaptation, to the relation between the organism and its environment. He approaches this question in an instinctively dialectical way, recognising as a result of his own experiments and observations in the practical work of fruit breeding that the adaptation cannot be separated from the process of development. He considered that organisms are more plastic and have greater adaptive possibilities in the earliest stages of their development. The way to change heredity, in his opinion, was by means of environmental changes acting on the young developing organism. This is the basis for his belief that growing plants from seed is the best way to get varieties adapted to specific conditions of life. He attached special importance to using hybrid seeds for training, as being more adaptable owing to their "shaken" heredity. These ideas were the foundation of his successes in practice. The theoretical ideas of Lysenko and his followers are clearly a development and extension of Michurin's concepts. In the same way, Michurin's detailed and acute observations on the specific environmental requirements have been developed and given precision in Lysenko's "phasal" theory of plant growth.

Many readers will be interested in Michurin's references to Mendelism. He did not deny the application of the Mendelian laws to many plants, but he did not consider that they had much relevance in his own work with fruit plants. Moreover, Michurin did not believe that the formal genotypic analysis of Mendelism was capable of correctly selecting pairs of plants for crossing. He considered that the biological history of the parents, the environmental conditions to which they had been exposed, were the important factors to be taken into account. This is because in the hybrid the greater influence will be exerted by the parent which is developmentally older or which has had a longer history in particular environmental conditions. By correct selection of pairs for hybridisation in this way, the adaptability of the hybrid plant can be increased and guided into a desired direction. In this connection it is worth pointing out that Michurin did not in general employ mass selection (although of course he did not exclude this method in appropriate cases). In his own work, however, he employed only small numbers of plants, derived from carefully chosen crosses followed by minute attention to the conditions of rearing, to the "training" of the developing seedlings.

It is impossible here to comment on the many features of interest in this book. Michurin employed many bold and interesting methods in his work, such as the use of mixed pollen, vegetative approximation, the use of an intermediary, the use of grafts as mentors. These methods have not only become a part of Soviet practice, but have led to various lines of experimental investigation reflected in recent developments in biological theory in the Soviet Union. The book contains a large number of very interesting observations and much practical detail on methods of fruit culture. Particularly fascinating are Michurin's notes on methods of selection of various seedling fruit trees. It is clear that the current ideas in Soviet biology are closely related to and a development of the fundamental conceptions of Michurin. For this reason the book will be found very valuable to all who wish to understand these developments. It is beautifully produced and well translated, and the material is conveniently arranged to show the development of Michurin's work and thought.

The little book by Gennadi Fish, *A People's Academy*, gives an account of the campaign of the Lenin Academy of Agricultural Science in 1938 and succeeding years to increase the cultivation and yield of millet in the Soviet Union. This campaign was initiated by the Communist Party and the Soviet Government and was carried out under the leadership of Lysenko. The spectacular increase in millet production which resulted was a not inconsiderable factor in the feeding of the Red Army during the war.

This book is warmly to be recommended. It is not concerned with scientific detail but is a popular and human account of the way in which a particular agronomic problem was tackled and solved. In a graphic and exciting manner the author brings out the way in which science and practical agriculture are linked together in socialist society, and it is fascinating to read how the collective farmers were drawn into a concerted effort with the scientists to gain a victory in the control of nature. To many scientists in Britain this account will provide a vivid and revealing glimpse of the tremendous part science plays in the Soviet Union today, and the way it has become a possession and a tool of the people. After reading this little book one gets a fresh understanding of the importance of the Academy of Agricultural Science in the development of collective farming and of the characteristic methods of work and thought of Academician Lysenko, which have earned him such affection and respect among the Soviet people.

Professor Huxley's book on *Soviet Genetics* is an expanded version of a long article on this subject which he wrote for *Nature*. His aim is to give an account of the genetics controversy in the Soviet Union and to explain its significance to English readers. Unfortunately Professor Huxley's statement of the issues involved is itself based on very serious misapprehensions. For this reason it must be said that his book will prove far from helpful to anyone wishing to understand the questions at issue and is in fact likely to cause considerable confusion in the minds of those unacquainted with the whole background.

A very large part of Huxley's book is devoted to an attack on Lysenko and the Michurinists for their alleged repudiation of the concept of scientific method and scientific activity held by the great majority of men of science elsewhere. The Michurinists are accused of rejecting ascertained scientific facts on the basis of some preconceived doctrine. The basis for these statements by Professor Huxley is Lysenko's rejection of the Mendelian theory of heredity, which Huxley chooses to equate with the facts of modern biology. But it is repeatedly made clear by Lysenko and his followers that they reject none of the facts which have been accumulated by the Mendelians or the Neo-Darwinists: what they reject is the Mendelian *explanation* of these facts. Nor do they reject experiment and scientific method; instead they claim that they have scientific evidence which in their opinion must lead to a rejection of Mendelian theory. Scientists elsewhere are quite entitled to view this evidence critically, but they should be clear that the issue is for Soviet biology a scientific one. It cannot apparently be too clearly emphasised that Lysenko rejects none of the facts of orthodox genetics but only their explanation in

terms of the gene-chromosome theory. The extraordinary confusion which Huxley makes between facts, and the theory intended to explain them, has led him into what is in fact a prolonged tilting at windmills, an attack on something that does not exist.

In his treatment of the modern Mendelian gene-chromosome theory of heredity Huxley is not quite fair to his non-scientific readers. Because he himself is convinced of its validity he presents it as if it were established and universally accepted. Yet he cannot be unaware of the exceedingly damaging criticisms of the particulate theory of inheritance that can be, and have been, made by many biologists and philosophers since the theory was first propounded. Whatever advantages may be claimed for a particulate theory of inheritance as a hypothesis to cover experimental facts, the philosophical and scientific difficulties of such a theory are surely too great for it to be considered even by its supporters as more than a convenient approach to a really fundamental treatment of heredity. It is for these reasons that Mendelian theory has always been viewed rather coolly by considerable numbers of Western biologists. Furthermore, Huxley conveys the impression of a much more uniform body of opinion among orthodox geneticists than actually exists. There are in fact more discordant voices within the orthodox chorus than are consistent with the harmony Huxley wishes to present for our admiration. There can be no doubt, however, that Huxley's blindness to the weaknesses of Mendelian theory have led him to do less than justice to the weight of Lysenko's attack.

The confusion which Huxley makes between Mendelian theory and scientific fact leads him into further difficulties when he tries to account for the decision of the Soviet Academy of Sciences to reject Mendelism and to base teaching and research on Michurinist theory. Since to him Mendelism is equivalent to science, he regards this decision as non-scientific and therefore seeks for some non-scientific reason for its adoption. Thus he says: "The next question was, why had Lysenko won his battle and how was it possible for the Academy of Sciences to have lent their scientific authority to the suppression of an entire branch of science? The conclusion is inescapable that this has been done on ideological grounds, under political pressure, although the precise reasons why political and ideological pressure has been so forcibly exerted are not altogether clear." It is naturally very difficult to explain why Soviet scientists or the Soviet Government should adopt for non-scientific reasons an unscientific theory which would be likely to lead to disaster when applied to agriculture, and Huxley's endeavours to provide such an explanation are unconvincing in the extreme.

But all these involved speculations are unnecessary once it is realised that the Academy's decision was a scientific one. In their opinion, which, of course, many Western scientists do not share, Michurinist genetics is likely to be more helpful in solving the problems of collective agriculture than is Mendelism. After all, the most urgent problem facing Soviet society at the present time is the most rapid possible increase in agricultural production. Nor are there in the Soviet Union any of the social conflicts, characteristic of capitalist society, that can make a good harvest into a disaster. It is surely therefore ridiculous to suppose that the Soviet Government or the Communist Party of the Soviet Union would for obscure and unspecified political reasons support a scientific policy which they knew to be without foundation. The facts are clear and straightforward. Michurinism was adopted as the leading biological theory replacing Mendelism because it was believed to be better as a scientific theory on the scientific evidence accumulated in the course of some twenty years of collective agriculture. That is the attitude of the majority of Soviet scientists and of the Soviet Government, and that is the simple explanation of recent events in the Soviet Union.

Naturally many Western scientists will disagree with the new genetic theories, but they will have to understand them, and they will not be able to do this unless they are clear about the real issues involved. It is unfortunate that this book is only likely to make those issues more confused. As far as the Soviet people are concerned the issue is fundamentally a scientific one, although it is recognised to be fraught with social consequences of the utmost importance. They believe that the new approach to genetics will prove more fruitful in theory and in practice and will materially assist in the strengthening and advance of socialist society.

A brief review is not the place to attempt to give, as Huxley has failed to do, a considered account of Lysenko's ideas. It appears, however, that these ideas are both penetrating and fundamental and will have to be approached with more seriousness and objectivity than some Western scientists have been able to assume. There appears, for example, to be much more experimental evidence inconsistent with Mendelism, from both Soviet and Western sources, than is referred to in this book, and it is disappointing that Professor Huxley did not give more space to a critical consideration of these facts and less to the repetition of baseless allegations concerning the fate of certain Soviet geneticists. Such allegations are, rightly, deeply resented by Soviet scientists and can do great harm to the cause of friendship and understanding between the Soviet people and ourselves.

ALAN MORTON.