Book Reviews

Heredity and its variability. T. D. Lysenko. (Translated from the Russian by Th. Dobzhansky.) New York: King's Crown Press, Columbia Univ., 1946. Pp. vi + 65. $.50.

For a number of years biologists have been puzzled by the claims of the Russian agronomist, Lysenko, that Mendel's principles of heredity are all wrong and that acquired characters are inherited after all. The original technical papers and books of Lysenko and his followers have been published only in Russian and in general have not been available in the United States or in English translation. In order that Academician Lysenko's work may be judged by biologists who do not read Russian, Prof. Dobzhansky has provided an adequate, literal, and unannotated translation of the 1944 edition of Lysenko's latest book, which was first published in the USSR in 1943. It is thus possible to consult a systematic statement of the author's views in his own words, rather than the indirect accounts contained in translations and criticisms of the debates which he has carried on with Russian geneticists.

Here we find a full, if somewhat repetitive, account of Lysenko's views on reproduction, heredity, inheritance of acquired characters, effects of environment and mutation, in addition to a discussion of some of the problems of plant improvement. It is written from the point of view of a practical agronomist, confines itself almost exclusively to plant material, chiefly the cereals with which Lysenko has worked, and is addressed to a general agricultural audience rather than to a scientific and sophisticated one.

In general, detailed evidence is not given to support the broad generalizations which are made, nor are references given to published experimental data. Instead, brief summaries of results obtained by Lysenko's students and collaborators are presented. Some of these are most remarkable, and it is to be hoped that plant breeders will examine the original data when these become available. For example, a case of vegetative hybridization is reported (pp. 32–35) in which seeds from a branch of a white-fruited tomato grafted on a red-fruited host gave mostly red-fruited offspring, but seeds from these gave in later generations both white- and red-fruited forms.

In later chapters (VII, "Liquidation of the conservatism of the nature of organisms"; and VIII, "The sexual process") equally remarkable results are described in summary form, from which it is concluded that genetically spring varieties of cereals can be permanently converted into winter varieties and vice versa by subjecting the germinating seeds to altered temperatures. From these and other references to altered environment and to constant hybrids, paternal inheritance, maternal inheritance, and parthenogenesis it is concluded that "the heredity of plant organisms may be altered by altered nutrition" and that "it is possible to alter and to create varieties with a desirable heredity by controlling conditions of the external environment, the living conditions of the plant organisms. *The heredity is, as it were, the essence of the conditions of the external environment assimilated by the plant organisms in a series of preceding generations*" (p. 65).

On the whole the book reveals a man whose purpose is different from that not only of geneticists but of scientists generally, since he seeks not so much to understand as to control more directly the processes of nature, and to condemn not merely Mendelism but all theoretical considerations which do not contribute directly to this end. His purpose was to provide new and better methods and improved varieties of plants for the vast expansion of Soviet agriculture which was taking place on the collective farms, and his position and prestige were probably attributable to the promise which his methods seemed to Soviet planners to hold out in this direction, particularly the method of jarovization or vernalization of cereals which is associated with his name.

The author of this book appears as a kind of biological fundamentalist, and the scriptures according to which he interprets his observations were written by Darwin, Lamarck, Spencer, and other nineteenth-century scientists, as these were introduced and popularized in Russia by Timiriazev and Michurin, Lysenko's immediate predecessors and mentors. The primary cause of Lysenko's differences with the geneticists is his adherence to these old views of reproduction and inheritance with which the theories and facts of Mendelian heredity are incompatible. This is clearly brought out in Chapter III, "Individual development of the organism." The author supposes (p. 9) that "the sex cells or buds from which as a rule develop whole organisms are the products of the development of the entire organism which produces these beginnings of new organisms. *They arise from molecules, from granules of various organs* and parts of the organism many times but regularly altered." This is the view tentatively put forward in Spencer's theory of physiological units (1864) and in Darwin's hypothesis of pangenesis (1868) and quickly disproved and abandoned. In supposing that the germ cells derive their properties from the other cells of the organism, this view is the inverse of that generally held for the last 60 years, namely, that the germ cells transmit a stable system of determiners which guide the development of the cells which arise from them.

Needless to say, Lysenko also denies that genes or chromosomes have anything to do with heredity and rejects the most fundamental principle of heredity in the following words:

"The Mendelians foist this 'pea law,' according to Michurin's happy expression, on the whole of living nature. But in reality it is basically wrong even for pea hybrids, including the factual material obtained by

Mendel himself. The progenies of different hybrid plants varied even in Mendel's experiments much beyond the ratio 3: 1. Thus, in the offspring of one plant there were 19 yellow and 20 green seeds, and of another plant—only a single green for 30 yellow ones'' (p. 55).

Lysenko's ideas on reproduction and development derive, as did those of Darwin and Spencer and Michurin, not from experimentally ascertained facts but from the need for a mechanism by which another supposed fact, the inheritance of acquired characters, may be explained. The need for such a mechanism disappeared with the failure of proof of the inheritance of acquired characters. No new proofs are given in this book.

It has been apparent for a long time that Mendelian heredity, as the orderly transmission of relatively stable units (genes) and the inheritance of direct effects of the environment or of training and similar modifications could not both be true. Lysenko clearly believes the evidence for the latter to be more convincing than that for Mendelian heredity. While that view was possible in the Nineteenth Century and to those who ignore the modern facts of heredity, it is strange to encounter so crude a restatement of it in a country where such striking progress in genetics was made as in the USSR between 1920 and 1940. It seems an anachronism somewhat like the denial of the facts of evolution over large areas of a country as progressive as the USA. In both cases the causes of such attitudes seem to those outside the country to be obscure and puzzling. In both cases also the scientific position of the country is so strong that the heterodox views of small minority groups may safely be left to the judgment of time and progress.

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The fortress islands of the Pacific. William Herbert Hobbs. Ann Arbor: J. W. Edwards, 1945. Pp. xiii + 186. $2.50.

This interesting little book is a welcome addition to the meager list of informational volumes on the Pacific. Considering its vast area, the Pacific was surprisingly little known at the beginning of the recent Japanese war. This was particularly true of the territory mandated to Japan. The Carolines, the Marshalls, and the Mariannas were then islands of mystery. Because of extended tours in 1921 and 1923, during which careful notes and maps were made, Professor Hobbs was probably the best-informed person in America on the geologic and geographic aspects of this section of the Pacific at the time of Pearl Harbor.

The book is well illustrated with numerous original maps, diagrams, and pen drawings. The author divides all Pacific Islands into two great groups, the ''Arcuate Islands'' and the ''Strewn Islands.'' A more detailed classification, based largely on origin, results in the following types: group volcano islands, volcano islands, almost-atolls, atolls, part-raised atolls, raised atolls, newborn arcuate islands, and youthful arcuate islands. Each type forms the subject matter of a separate chapter in which well-chosen examples are used as illustrations. The chapter on the Origin of the Islands is not all which