

industrial enterprises, professional societies, universities and specialized colleges. The information provided for each of the 490 institutions is listed under the following headings: name, location, personnel, structure, affiliations, research and other activities and biographical information. In addition three appendices follow the main section; a Pin Yin/Wade-Giles conversion table, the names of an additional 1,127 identified research and development institutes about which little or no information is available, and a set of maps to show the spatial distribution of the 490 institutions. A comprehensive set of indexes makes the directory easy to use for quick reference.

The compilers make no claim that the 490 institutions are representative of the whole of the Research and Development sector. As is to be expected, no information is available on the large national defence research sector. But it is reasonable to suppose that most of the other significant research institutions have been included in the main section of the directory. The termination date for the study was spring 1967, so none of the many institutional changes that followed the "cultural revolution" have been included. This book is nonetheless still valuable in that it gives the first comprehensive detailed information on research institutions up to 1967 and will be indispensable for seeing what changes have taken place when more new information becomes available.

R. J. CONROY

## Resources of the USSR

*Natural Resources of the Soviet Union: Their Use and Renewal.* Edited by I. P. Gerasimov, D. L. Armand, and K. M. Yefron. Translated from the Russian by Jacek I. Roamnowski. English edition edited by W. A. Douglas Jackson. Pp. xiii + 349. (W. H. Freeman and Co.: San Francisco and Reading, October 1971.) £6.

THIS important collection of essays, produced under the direction of the Institute of Geography of the Academy of Sciences of the USSR, reflects the concern of Soviet geographers with problems of conservation. Unlike many of their Western colleagues, geographers in the USSR seem to have no doubts about the peculiar value of their discipline in the consideration of such problems. "... The conservation of nature," they write in the preface, "is complex geographically, requires an assessment of the natural conditions of every region, and can be successful only if geographical methods are employed. This latter requirement has not always been stressed sufficiently".

In a day of increasing concern with the preservation of the natural environment, no excuse is needed for the publication of a volume of this type. My major criticism is that this well-written and well-produced work, replete with most valuable statistics and diagrams, was not republished in the West much earlier. The book appeared in Moscow as long ago as 1963, and hence sections are now somewhat dated. Nevertheless, a set of useful and informative notes by the editor in part closes this gap, and in particular rectifies economic predictions made in the text in the light of subsequent performance.

Much interest naturally attaches to the fact that these essays, often highly critical of previous planning failures, indicate that the centralized economy of the USSR faces the same conservation difficulties as the more diversified economies of the West. Central planning is not always sensible planning. It is, however, entirely characteristic that the writers should believe that only their economic system can solve such problems. "The USSR has the necessary political and economic prerequisites for planning the use and renewal of natural resources: national ownership of land, a planned economy, a unified economic policy. . . ." But in practice the consequences have often been the opposite to those intended. "Nature is often regarded as an inexhaustible reserve, and the only concern is how fast the resource can be exploited."

Most aspects of the natural environment are treated here, the principal gap being minerals, in the USSR the prerogative of the geologist. Because the essays were intended for the specialist, they are frequently technical, but closely allied to specifically Soviet situations. The grandiose scheme—the planting of shelter belts on a huge scale, the diversion of rivers—still plays largely upon the Soviet imagination. But there is evidence here that they have learnt from previous errors—the falling level of the Caspian and Aral Seas, caused respectively by hydroelectric schemes on the Volga and by the expansion of the irrigation network, the reduction in fauna resulting from indiscriminate forestry and the Virgin Lands Scheme, are all graphically described. More importantly the volume indicates a continuing preoccupation with the backward state of agriculture. Special emphasis is laid on land improvement schemes, schemes which outlived Khrushchev and continue in the 1970s.

The translation is good, the footnotes, references and index are all most full. The occasional printing error does little to detract from what is in effect a most useful addition to the available literature in English on aspects of Soviet geography.

DENIS J. B. SHAW

## Genetic Variation

*Genetic Diversity and Natural Selection.* By K. James Murray. Pp. viii + 128. (Oliver and Boyd: Edinburgh, February 1972.) £2.50.

PROFESSOR MURRAY teaches at the University of Virginia and is best known for his work with B. C. Clarke on the ecological genetics of *Partula* species. His purpose in writing the book under review was "to attempt an assessment of the present state of knowledge of variation in populations and to inquire whether the concept of natural selection may not be of crucial importance in our understanding of the situation"; his hope is that it "will provide an introduction to the literature of ecological genetics and evolution for advanced undergraduate and beginning graduate students". He is probably successful in this, although students will need a fair grounding in genetics if they are to make full use of what Professor Murray has to tell them. Moreover, they must not be allowed to gain all their understanding of the maintenance of genetical variation from this work: one of its main aims is to argue the importance of frequency-dependent selection in a wide range of ecological situations rather than to present a review of modern doctrine. This is legitimate, but it has to be interpreted in the context of the weight of dogma that population genetics has inherited from its theoretically-minded proponents. This often makes the separation of fact from interpretation as elusive as in some religious traditions.

The book has five main chapters: polymorphism, frequency-dependent selection, the evolution of dominance, the Wallace effect (hybrid infertility, not zoogeography), and parapatric speciation. Each provides an adequate survey of its subject within the terms of reference that Murray gives himself. Indeed I was pleased to learn of several pieces of work in a field in which he considers himself reasonably at home. In brief, a lucid synthesis of a variety of genetical and ecological concepts; worthwhile reading for any concerned with the study of populations; useful background for mathematicians, biochemists, and others unfamiliar with the complexities of real populations. Moreover, since one of the most relevant tasks facing biologists is, in Murray's words, "the specification of the components of fitness affected by heterotic selection . . . (which) can only be met by a joint attack combining the resources of protein chemists and ecological geneticists working together on the functional properties of enzymes and on the distribution of alleles in space and time", it is to be hoped that the readership will not be confined to converted ecologists.

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