progress in our knowledge about the macromolecules present in sympathetic neurons is our almost total ignorance about the nature of the receptors for catecholamines in postsynaptic cells. The development of antagonists that are relatively specific for the different types of adrenergic receptor has provided the biochemist with valuable tools in his search for the elusive receptor molecule—tools which, alas, seem to be little used and poorly understood in a chapter dealing with a substance from heart tissue that binds catechol derivatives.

Possibly the most challenging and exciting area of research covered in this book is that having to do with the functions of catecholamines in the central nervous system. The gateway into this area was opened 20 years ago by Vogt's discoveries that the distribution of norepinephrine between the regions of the brain was not uniform and that centrally acting drugs, such as morphine and reserpine, markedly reduced the concentration of norepinephrine in the brain. Some of the problems raised then still remain. As Vogt aptly puts it, "We know a great deal about correlations between the effects of drugs on behaviour and on brain biochemistry, but the transformation of mere correlations into causal relationships is in its mere infancy." One of the difficulties in deducing causal relationships from studies of the actions of drugs on the central nervous system arises because no drug is entirely specific in action. The widespread use of intracranial injections of 6-hydroxydopamine, for example, as a method of causing damage to central catecholamine-containing neurons may lead to erroneous conclusions because this is a highly reactive substance that could damage other neurons when applied locally in high concentration.

Such pitfalls can be more easily avoided if a truly interdisciplinary approach is used. For example, because it is known that the rate of synthesis of catecholamines from tyrosine increases in stimulated nerves, there has been a tendency to assume that an increased rate of synthesis always reflects an increased impulse flow in the nerves. However, Aghajanian and his colleagues, by a combination of biochemical, histochemical, and electrophysiological methods, have convincingly demonstrated that such an assumption is not valid for the dopaminergic fibers in the nigrostriatal pathway of the rat brain. It was found that upon administration of two drugs that lead to an increased rate of dopamine synthesis there is actually a decrease in the impulse flow in this pathway.

Another problem in studies of the role of catecholamines in the brain is that of the measurement of behavior. Not only is it regrettable that different procedures are used in different laboratories, there is also a need for more precise methods of measurement. A procedure introduced by Ungerstedt is a good example of what is required. By measuring the rotational movement of rats that have a lesion in the nigrostriatal dopaminergic tract on one side of the brain, it has been possible to construct dose-response curves for the interaction of drugs with striatal dopamine receptors and so to study one component of the animal's behavior. The striking behavior changes following overactivation of dopamine receptors in rats resemble some aspects of human psychoses, and it is suggested by Davis that amphetamine psychosis, which clinically is difficult to distinguish from schizophrenia, may involve an interaction between amphetamine and dopaminergic neurons. We can hope that a combination of the scientific study of behavior together with the pursuit of interdisciplinary studies on catecholamine-containing neurons in the brain will yield dividends for the understanding and treatment of mental illness. Society will then obtain another benefit, to add to those it has already received for the treatment of circulatory diseases and of Parkinsonism, from the resources it devotes to research on the catecholamines.

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## Forestry and General Ecology

**Genetics of Forest Ecosystems.** KLAUS STERN and LAURENCE ROCHE. Springer-Verlag, New York, 1974. x, 330 pp., illus. $29.60. Ecological Studies, No. 6.

This book is remarkable for setting a large block of forestry literature into the context of the ecological and evolutionary theory of the 1970's. The first chapter opens with a detailed exposition of niche theory and fitness sets. The literature of forestry has been better known for introspection and chauvinism than for contributing to advances in general biology. Therefore it is almost beyond belief that a book on forests should be quoting extensively from the work of Hutchinson, Lewontin, Pimentel, Warburton, Pianka, Levins, MacArthur, Waddington, Bradshaw, Haldane, Crow, Kimura, and van den Planck. None of these authors has been concerned specifically with forests, or even with trees (except MacArthur, as a home for warblers), but all have contributed strongly to general biological theory.

Some of the wealth of forestry knowledge is now brought forth both to test the robustness of general theory and to be illuminated by it. This book arranges a marriage and richly endows the partners. The exercise will prove itself if there are intellectual descendants—extended or modified theory, new approaches to forest experimentation and practice.

The book carries a very large bibliography, a source list to guide population biologists and evolutionists to the forestry literature and foresters to general theory. The title of the book is most misleading—there is no useful sense in which an ecosystem has a genetics. There is a useful analogy by which ecosystems may be said to evolve, but genetics is about individuals and populations. It is a description of the relationship between ancestors and descendants. The ecosystem itself has no genetics. Large parts of the book have been translated from the German. For the most part the text reads smoothly and easily, but the misleading title may reflect translation. There are six chapters, the first five concerned with genetics and evolutionary theory and the sixth with the role of man in forest ecosystems. The book ends with a startingly effective last page, a description of the "present status of a tree species in danger of extinction," *Vateria seychellarum.* The description contains these comments: "Status: critically endangered. Present distribution: three trees survived on Mahé on the Seychelles . . . formerly a common timber tree. . . . Nothing is recorded of its biology. Protective measures already taken: none." It is in such a context that theories of genetic drift, biogeography of islands, niches, and the genetics of adaptation take life.

Klaus Stern died tragically in a bicycle accident before the book was published.

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