The second half of the book is devoted specifically to the responses of plants to salinity. The story of salt glands in halophytes is well told by Thomson, who makes it interesting even to the nonspecialist. Morphological, anatomical, and ultrastructural effects of salinity are described by Poljakoff-Mayber, who notes that generalizations are difficult because effects vary greatly with species of plant and with species of salt ion.

The critically important metabolic and biochemical aspects of salt tolerance are discussed by Kylin and Quatrano. After noting that enzymes isolated from halophytes seem no more salt-resistant than those isolated from glycophytes, they turn their attention to possible mechanisms for restricting salinity in the cytoplasm and thus protecting enzymes from inhibitory salt concentrations. Cell membrane properties that restrict ion transport and ion pumps (salt-activated adenosine triphosphatases) are considered in detail. Salinity-induced changes in metabolic pathways include a shift to the pentose phosphate pathway, induction of crassulacean acid metabolism carbon dioxide fixation, and a shift from organic acid to amino acid production. Possible relations of these changes to salt tolerance are considered.

Gale, discussing water balance and gas exchange reactions, concludes that incomplete osmotic adjustment or reduced stomatal aperture, caused perhaps by salinity-induced changes in hormone levels, together with increased respiration generally reduces net photosynthesis under saline conditions. Water balance problems are also involved in increases in damage done by salt to sensitive crops under conditions of low relative humidity or high temperature.

The authors acknowledge exceptions to the adjustments and mechanisms that may improve salt tolerance, but some additional items should perhaps be mentioned. Rootstocks that are presumed to restrict chloride uptake because of their membrane properties actually show no reduction in rate of chloride uptake (Bernstein, unpublished). Chloride transport to the shoots, rather than uptake by the roots, must therefore be restricted. Salinity markedly increases the accumulation of sugars in some sensitive crops such as carrots and cantaloupes, indicating that net photosynthesis in these species is not growth-limiting under saline conditions. The exceptions that can be found to generalizations about mechanisms of salt tolerance tend to leave us with only the near tautology that salt tolerance is the ability to adjust to salinity with minimal effect on growth.

On the whole this volume provides a good discussion of the status of research on its subject.

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Catabolic Processes

The Lytic Compartment of Plant Cells. PH. MATILE. Springer-Verlag, New York, 1975. xiv, 184 pp., illus. $38.30. Cell Biology Monographs, vol. 1.

Work on the regulation of metabolism and development in plants is still predominantly concerned with anabolic processes. In this monograph (which is the first of a new series continuing the older Protoplasmologia) Matile makes the valid point that most metabolic charts lack one entire dimension, namely the integration of the usually unspecific hydrolases that are involved in the control of macromolecular turnover. His book is the first comprehensive effort to fill this gap by summarizing knowledge concerning lytic processes in higher plants and fungi and, perhaps more important, by trying to establish some unifying principles of catabolic regulation.

Matile treats the lytic compartment as two functional components: the vacuole and the space external to the plasma membrane, where digestive processes occur, and the Golgi apparatus and endoplasmic reticulum, where digestive enzymes are synthesized and processed. Considerable space is devoted to the vacuole, its ultrastructure, enzymatic contents, and ontogeny. Knowledge gained from work with higher plants is complemented with results of research on yeast and other fungi. Technical progress made recently in the isolation and analysis of yeast vacuoles may point the way to similar approaches with cells of higher plants. Autophagy and autolysis are extensively discussed, the former as a controlled degradative process during which lytic compartmentation remains intact, the latter as an indiscriminate digestive process during which cellular compartmentation breaks down and which is followed by the death of the cell. The most intriguing question concerns the selection process by which certain cytoplasmic components are preferentially autophagized and how this may lead to the observed differences in the rates of macromolecular degradation and turnover. Attention is also given to special cases of the lytic compartment and of lysis. The development of storage vacuoles and the mobilization of reserve substances are documented extensively on the biochemical and ultrastructural levels. Lytic processes during plant development, such as modification of the cell wall, are described in relation to growth, morphogenesis, and leaf abscission. Mention is also made of lysosomal activities in parasitic and pathological processes.

In addition to assembling and interpreting a wealth of data and providing the reader with an extensive list of references, Matile's book makes a significant contribution in directing future work on control mechanisms in plants toward degradative processes, both at the subcellular level of lytic compartmentation and at the biochemical level of hydrolytic enzyme activities.

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Ecology of Small Mammals

Rodents in Desert Environment. I. PRAKASH and P. K. GHOSH, Eds. Junk, The Hague, 1975. xvi, 624 pp., illus. Dfl. 180. Monographiae Biologicae, vol. 28.

As a collation of information on the biology of desert rodents this book can be judged a modest success; inevitably, coverage is incomplete and uneven. The subjects treated include activity patterns, behavior, coloration, population ecology, and reproduction; the coverage of physiology is limited because adequate coverage is available elsewhere.

For most deserts there is only a natural history level of understanding of the rodents: knowledge of habitat and biotic associations and relative abundances, and sketchy information on reproduction and trophic relationships. The lacunae can be stimulating, however. M. A. Mare's account for Argentina excites one to try to explain why South America should "lack . . . true desert rodents . . . as conspicuous faunal elements." One may also wonder why the principal rodent in Old World deserts is often a diurnal gerbil, whereas in North America the dominant species is nocturnal. The most valuable regional account is that for the Soviet Union by N. P. Naumov and V. S. Lobachev, 133 pages dealing with 24 species, based on about 200 Russian articles. Here are impressive quantitative data for spans of 10 to 15 years and sometimes tens of thousands of animals. But, there are also many conclusions presented without supporting facts.

One expects comparison and integration of information in a collation, but these are generally lacking. Where synthesis is present, some will think this volume worthwhile for that alone. A. E. Newsome and L. K. Corbett critically analyze the erratic outbreaks of three native rodents and *Mus musculus* in Australia. They conclude that the native species react differently from *Mus* (by not always responding to very favorable conditions, and by responding with a year's lag) because of interactions with predators, because they occupy refugia, and because of the supercompetitive position of *Mus*. This study allows one to draw important contrasts with other irruptive species. J. F. Eisenberg compares the behavior of bipedal rodents in New and Old World deserts, and of bipedal and quadrupedal species within families. There are remarkable convergences, but also surprising differences, as in the degree of food caching and sociability. M. L. Rosenzweig, B. Smigel, and A. Kraft examine the causes of the diversity of rodents in the San Pedro Valley of southeastern Arizona, "the richest local association of rodents in the world." Data from experimental modifications of habitats and other observations suggest that vegetational complexity is the main clue to diversity. Although the authors' laboratory work suggested that the rodents could be coexisting by virtue of seed preferences based on body size, they did not find this to be true in nature.

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(Continued on page 344)