

research and literature with presentation of new findings. The subject of one is an applied study of the effect of pesticides in deterring ant predation of aerially sown agricultural seed. This seems out of place in a volume on coevolutionary relationships. New ideas on ant-plant associations emerge from a few chapters, including the hypothesis that myrmecochory is an adaptation of plants living in poor soils. The final chapter is a worldwide review of ant-plant interactions that in quality supersedes other reviews of which I am aware. It is followed by an excellent comprehensive bibliography of literature up to and including 1981.

The value of this collection is in its synthesis of past literature and present research on ant-plant associations in Australia, North America, and South Africa. In addition, it develops in the reader an awareness of research in progress and provides easy access to the literature for those entering or interested in the field. It is a valuable companion to recent review papers on granivory in desert ecosystems and community structure in ants and a worthwhile supplement to current treatments of animal-plant coevolution.

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Salt Appetite

The Hunger for Salt. An Anthropological, Physiological and Medical Analysis. DEREK DENTON. Springer-Verlag, New York, 1982. xx, 650 pp., illus. \$149.80.

This book is by far the most comprehensive examination yet undertaken of the abundant and diverse literature on the appetite, or hunger, for salt. Denton's goal is to set the subject in a broad context by discussing it from both a behavioral and a biological vantage. Using this discussion as a basis, Denton then addresses the wide-ranging and at times controversial literature on the medical implications of salt intake and the etiology of hypertension. Much of the work of Denton and his colleagues is discussed in the book.

Sodium is essential for such processes as neuronal function, cellular metabolism, and blood pressure regulation. A central theme of the book is that for many mammals, particularly humans, selective pressures favored the evolution of mechanisms insuring adequate levels

of sodium. Denton cites anthropological evidence suggesting that environmental salt was scarce throughout much of primate and human evolution. He goes on to suggest that by virtue of a largely vegetarian diet (meat was rarely available) sodium intake was low relative to potassium intake and that this dietetic pattern favored the development of salt appetite and a complex endocrine system for sodium conservation. In a chapter on salt in history, Denton discusses the symbolic and social, as well as the physiological, aspects of salt.

Denton gives numerous examples of salt hunger exhibited by animals in their natural habitats and by humans in clinical studies. The salt appetite drive is aided by a recognition system in the salt taste receptors. Denton reviews the evidence that sodium deficiency, and presumably also experience, can enhance a hunger for salt. He discusses the contribution of taste to the more general problem of learning to consume foods that are nutritious and to reject those that are toxic. The rich literature on learned appetites and learned aversions illustrates the capacity of organisms to associate the taste of a substance with its gastrointestinal effects.

In addition to salt appetite, animals have efficient mechanisms for retaining salt by way of increased activity of the renin-angiotensin system and aldosterone biosynthesis in response to physiochemical changes associated with sodium regulation. A significant part of the book is devoted to research investigating these changes and the degree to which they may be causally linked with both endocrine response and salt appetite. For much of the discussion Denton draws upon his own research, in which sheep are used as a model preparation for the study of endocrine factors and sodium and water homeostasis. One of the more controversial chapters concerns the putative brain renin-angiotensin system and its possible role in sodium deficiency.

In the final chapter, on salt intake and hypertension, Denton argues that excessive salt intake throughout life is a plausible factor in the genesis of hypertension, particularly given selection pressures that favor both salt hunger and salt retention. Confronted with a high-salt environment, humans are naturally inclined to overindulge in salt but have insufficient mechanisms for excreting it. Along these lines Denton suggests that the greater incidence of hypertension among North American blacks may be the legacy of greater and more persistent stress on sodium homeostasis.

Initially, the book's length is startling given the subject matter, but the length is easily understood given the book's scope. The book contains controversial but interesting material on cannibalism, pica, and electrical brain stimulation and stream of consciousness passages that may seem peripheral to the topic but are nevertheless woven nicely into the fabric of the book. Most of the published work on salt hunger appears in review articles, book chapters, or symposium proceedings; Denton's book is the only place where all the literature is integrated in a single text. He should be applauded for his authoritative and scholarly effort.

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Solar Astronomy

The Sun, Our Star. ROBERT W. NOYES. Harvard University Press, Cambridge, Mass., 1982. viii, 264 pp., illus. \$20. Harvard Books on Astronomy.

The study of the sun is, after the study of planetary motions, the oldest branch of scientific astronomy. In spite of its obvious importance as the source and sustainer of life on the earth and as a Rosetta stone for the study of other stars, the sun tends to get little or no attention in many beginning university astronomy courses and textbooks in this country. This is one reason that *The Sun, Our Star* is so welcome. It is an accurate, up-to-date review of solar research, written for the intelligent person who has a little knowledge of physics and astronomy.

The Sun, Our Star replaces the book *Our Sun* by the late Donald H. Menzel in the series Harvard Books on Astronomy. The Menzel book, first published in 1949, was a spirited description of the solar research of that era. It was a thorough review, accurate yet entertainingly written—in short, a tough act to follow. But Robert Noyes has risen to the occasion, creating a comprehensive description of the sun and of current research on its structure, its active phenomena, and its ultimate fate. The book is attractively illustrated with photographic views of the sun in its many aspects and numerous diagrams to help as Noyes leads the assiduous reader through the complexities of solar research.

The book is sprinkled with interesting asides, such as a story about a flock of homing pigeons disoriented and ulti-