tion is made of the fact that his scientific colleagues have been quite unable to repeat his key observations and experimental findings on the key instinctual role of animal aggression and that he himself draws relatively optimistic conclusions in applying his studies to human society.

For the rest, we have only pretentious dogmatizing:

> The war system, for all its subjective repugnance to important sections of "public opinion," has demonstrated its effectiveness since the beginning of recorded history. . . .
>
> . . . *any* condition of genuine total peace, however achieved, would be destabilizing until proved otherwise.
>
> War . . . has uniquely served societies . . . as an indispensable controller of dangerous social dissidence and destructive antisocial tendencies.
>
> It has enabled societies to maintain necessary class distinctions. . . . No modern political ruling group has successfully controlled its constituency after failing to sustain the continuing credibility of an external threat of war.
>
> It is entirely possible that the development of a sophisticated form of slavery may be an absolute prerequisite for social control in a world at peace.

The reader will find the text studded with similar profundities: a sort of hand-me-down Oswald Spengler.

I have read longer and duller books than this, but never, I believe, a worse one.

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Vapors

Theory of Fog Condensation. A. G. AMELIN. Translated from the second Russian edition (Moscow, 1966, B. V. Deryagin, Ed.) by Z. Lerman. Israel Program for Scientific Translations. Jerusalem; Davey, New York, 1967. xii + 236 pp., illus. $14.

This book is not primarily concerned with fogs in the atmosphere. Rather, it treats the general problem of condensation within a gaseous volume. It discusses industrial applications extensively, but mentions meteorological examples only briefly and cursorily.

The author restricts himself to the formation of fogs by condensation. The formation of mists by spraying or other mechanical means is not discussed. However, condensation is such a complicated process that there is no shortage of material to be covered. The deficiency in this book is rather the slighting of some of the topics which could well have been explored in greater depth.

The idea of treating condensation of drops in complete generality and then applying the results to various specific systems which occur in nature and in industry is an excellent one. I know of no other attempt to carry out this procedure. The same principles, both for homogeneous and for heterogeneous nucleation, are invoked by various investigators, be they physical chemists, process engineers, or meteorologists working on problems in cloud physics. In bringing together the theories into a unified presentation this book performs an important service. However, it is only partially successful, because of some lack of rigor and an unevenness in the coverage of the material.

The book begins with a fairly thorough treatment of the theory of homogeneous nucleation. Its treatment of condensation on nuclei is much less complete. It then covers, in varying degrees of depth, the formation of supersaturated vapor and fog by adiabatic expansion, radiative cooling, turbulent mixing, molecular diffusion, thermal conduction, and chemical reactions. In the discussion of these several processes a number of practical problems are discussed, including preparation of metal powders and carbon black and the prevention of fog during condensation in spray towers and bubblers.

The author is obviously less well acquainted with the meteorological aspects of the subject than with the physical chemistry. His treatment of radiative cooling, for instance, is primitive, and his statement that "The radiative cooling of a cloudy atmosphere is lower than that of a clear atmosphere, since clouds reflect radiant energy" is actually wrong. Because water in liquid drops has a much larger overall emissivity than water vapor, radiative cooling of clouds is greater than that of clear air containing the same amount of water substance. Similarly, he attributes the formation of clouds and fog at fronts to mixing of the air masses on the two sides. Actually they are formed for the most part by adiabatic cooling of air being lifted by the convergence of the air masses.

This translation is one of a number, mostly of books originally published in Russian, which the Israel Program for Scientific Translations has made available to English-reading scientists. The program is to be congratulated both on the quality of the translations and on the fact that the prices of the books are much more reasonable than those of most translations. On the other hand one might take the liberty of pointing out that the format leaves something to be desired. For instance, running heads at the top of each page to identify the chapters would be helpful, and the diagrams and symbols in equations frequently could be larger and clearer.

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Earth and Space Sciences

The Encyclopedia of Atmospheric Sciences and Astrogeology. RHODES W. FAIRBRIDGE, Ed. Reinhold, New York, 1967. xvi + 1200 pp., illus. $35. Encyclopedia of Earth Sciences, vol. 2.

This one-volume encyclopedia covers rather well the broad range of topics suggested by the title. Atmospheric Sciences includes both the chemical and the physical phenomena of the atmospheres of the earth and other planets. Astrogeology ranges between geology and astronomy. Thus one finds articles such as Cosmology, Universe, Galaxy, and Cosmic Rays alongside articles such as Climate and Geomorphology, Atmospheric Circulation—Global, Aeronomy, Geomagnetic Disturbances, Van Allen Radiation Belts, and Lunar Geology.

I tried to judge the quality of this encyclopedia by looking up articles on subjects that I felt I knew something about (to see if I agreed with the presentation) and articles on subjects about which I knew little (to see if the articles left me edified). In my opinion the book passed both these tests rather well. For example, the article on aeronomy is exceedingly well done in its accuracy, conciseness, and completeness, and I found the article on hydroclimate both interesting and informative.

Following the book-reviewer's syndrome, I searched for errors and omissions. They seemed remarkably few, and they were not especially significant ones: for example, a log scale on the figure on page 258 reads, from right to left, 10^5, 10^3, 10, 0; Aeronomy is not cross-referenced under Upper Atmosphere; and there is no index heading under Scale Height.

This encyclopedia is a handy refer-

ence that one might use to check on an occasional item without having to trek over to the library. Although the individual articles vary somewhat with the skill and competence of the more than 150 contributors, the articles show a regularity of editorial style that makes the encyclopedia pleasingly uniform. Anyone who wishes to have a convenient, readable, and brief reference work at hand should find this book quite satisfactory.

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Thermobiology

Molecular Mechanisms of Temperature Adaptation. A symposium, Berkeley, Calif., Dec. 1965. C. LADD PROSSER, Ed. AAAS, Washington, D.C., 1967. viii + 390 pp., illus. $12.50; to members, $10.50. AAAS Publication No. 84.

In a symposium designed to explore molecular mechanisms of temperature adaptation in the broad range of organismic responses to heat and cold, one must, as the walrus said, "speak of many things." The phyletic materials introduced by the contributors to these proceedings range from thermophilic and cold-sensitive bacteria to spermatophytes and the poikilothermic animal phyla. Lest the homoiothermists turn aside, the primary mechanisms are developed both generally and specifically in several excellent papers relating to the informational macromolecules, concerning which many of us tend to remain ignorant.

The emphasis of the symposium is mainly on the molecular and subcellular levels, but some attention is given to the intact organism. Awaiting the reader, whether generalist or specialist, are various scientific vignettes relating to new concepts of adaptive mechanisms, such as modes of induction, development, feedback control, and the roles of these in speciation. To many it may be exciting to find that, in response to seasonal cold, living things, from trees to earthworms, tend to synthesize both proteins and RNA which are variously accumulated in nuclear, mitochondrial, and microsomal components. Similarly, lipids are selectively accumulated either prehibernally or, in animals, during cold acclimation. A common property of these changes is the increased potential for respiratory exchange and the attending capacity for evolution of heat, as in cambium tissue of tree bark. Conversely, in warm environments most of these responses are reduced or even reversed.

As the order of activation and control of the adaptive responses to thermal change must be referrable to the cell and its enyzmes, the complexities of regulation increase as the structure. Whatever the overlay, however, the ultimate kinetics of stimulus to the sensorium must be at least a function of the temperature, and hence subject to representation by the Arrhenius plot. That some biological systems deviate significantly from the predictions of the Arrhenius law is emphasized in an especially interesting paper, by J. L. Ingraham and Ole Maaløe, on cold-sensitive mutants and minimum temperature of bacterial growth. The implications of their work clearly suggest the value of an exact model and the theoretical power which it may give to the interpretation of temperature adaptation and to the biological meaning of the "temperature characteristic."

Perhaps the keystone of the conference is to be found in Roger Milkman's closing statement: "To conclude, observations of a process of adaptation and observations of the behavior of a protein combine to suggest that conformational change in protein may be a molecular mechanism of temperature adaptation." The volume is well rounded off by Prosser's extended summarization, in which he draws attention to the significance of adaptive molecular events in relation to speciation.

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Mollusks

The Invertebrates. Vol. 6, Mollusca I, Aplacophora, Polyplacophora, Monoplacophora, Gastropoda: The Coelomate Bilateria. LIBBIE HENRIETTA HYMAN. McGraw-Hill, New York, 1967. viii + 792 pp., illus. $17.50.

Malacologists have long looked forward to the publication of Libbie Hyman's volume on the Mollusca, and they should not be disappointed in the fulfillment. In an exhaustive review of the phylum, Hyman has assembled information which will serve as an important reference on Mollusca for a vast audience ranging from scientist to informed layman.

Mollusca I treats four classes: Aplacophora, Polyplacophora, Monoplacophora, and Gastropoda. It will be noted that Hyman has taken the obvious but long avoided step of treating the Aplacophora (solenogasters) as a class distinct from the Polyplacophora (chitons). Although the two groups evidence characteristics in common, the former is considered to have evolved much more slowly and the latter to have diverged from it early in geological time. This change is well balanced by the conservative handling of the subclasses of Gastropoda, in which Hyman retains Prosobranchia, Opisthobranchia, and Pulmonata in spite of a recent trend to combine the last two as Euthyneura.

One wonders how the author was able to deal with the large amount of information she synthesizes in this work, but she gained much practice in the first five volumes, and the fact emerges that once again she has done a fine job. The reference-laden paragraphs flow with a remarkable readability. The characteristics of each group are discussed under as many as two dozen subject headings. The author readily admits at the outset that the book is a compilation from the literature. Nevertheless, she occasionally includes interpretations of her own. Topics such as tissue morphology, regeneration, habits and behavior, and biological relationships are seldom mentioned in textbook treatments of the phylum. One can glean such cryptic information as a report on a rotifer's attacking the egg masses of pulmonate snails and such important information as a review of literature on chemoreception in the prosobranchs. In areas of one's specialization it is to be expected that one will encounter omissions of recent research; the author notes in the preface that this is a hazard of the long-term nature of her work.

A bibliography of 120 pages forms an extremely valuable part of the book, although the user may soon question the wisdom of its arrangement. The alphabet is repeated with the references for each of the several sections, and severe difficulties were experienced in locating a number of citations. A vast amount of page turning sometimes located the reference in another section, seemingly there by error, but in a few cases the search was fruitless and the reviewer had to resort to the *Zoological*