

task. I think that this one could form the basis for an excellent and valuable course for senior chemistry majors.

The weaknesses of the book include some that are inherent to the attempt to present essentially mathematical concepts, such as band theory and Brillouin zones, in a purely qualitative way. I found the discussion of the Born-Haber cycle very turgid, and the implied definition (p. 97) of London forces is erroneous. There are also some verbal and typographical errors that could be confusing to the uninitiated. I cannot resist noting the misquotation of Tom Lehrer: the word is evade (which rhymes), not escape (which doesn't).

The strengths of the book, aside from its excellent overall design, are many. The discussion of ionic radii and their role in predicting structures is admirably critical. The presentations of the work of Mooser and Pearson, Phillips and van Vechten, and Kitaigorodski are excellent. I am not aware of any other book that tries to cover this ground. In my opinion, it succeeds well and fills a real need.

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Caste in Social Insects

Sozialpolymorphismus bei Insekten. Probleme der Kastenbildung im Tierreich. GERHARD H. SCHMIDT, Ed. Wissenschaftliche Verlagsgesellschaft, Stuttgart, 1974. xxiv, 974 pp., illus. DM 290. Bücher der Zeitschrift *Naturwissenschaftliche Rundschau*.

Caste is one of the defining qualities of insect societies. The higher social insects—the ants, termites, and eusocial bees and wasps—are all characterized by the division of colony members into reproductive queens and nonreproducing workers. In species with larger colonies, workers are further differentiated into subcastes, which consist either of stages in the life cycle through which individuals pass or fixed physical forms such as minor workers, medias, and soldiers. Insect castes constitute the most advanced such systems based on mobile individuals known in the animal kingdom; their degree of specialization approaches but does not equal that displayed by the sessile heterozoids of corals, ectoprocts, and other colonial invertebrates. Because the members of each colony are genetically diverse, the properties of the caste systems form a potentially important testing ground of kin selection theory.

Sozialpolymorphismus bei Insekten, a

large and handsome volume edited by Gerhard H. Schmidt, documents the rich diversity of insect castes. It covers the literature with reasonable thoroughness up to the year 1972 and should serve as the definitive reference work for scholars interested in this subject. All groups of higher social insects are covered; there are also good reviews of aphids and locusts, which possess remarkable phases that are concerned less with social organization than with individual adaptations to changes in the environment. The emphasis of the book as a whole accurately reflects the state of the art. There are detailed, often highly technical accounts of the anatomical differences among castes and the genetic and physiological bases of caste determination, with much less attention being paid to behavior, especially communication among castes, and to demography and other aspects of population biology. Almost no mention is made of the ecological significance and optimization of caste ratios. These subjects seem clearly to offer the best opportunities for future research. *Sozialpolymorphismus bei Insekten* must be classified as an advanced treatise. It is not written or organized in such a way as to constitute a self-contained introduction, and its entirely German text will make it less than convenient for most English-speaking readers.

A strong feature of the book is its truly cosmopolitan authorship: the 26 contributors represent ten countries and many specialties, including biochemistry, cell biology, genetics, taxonomy, and morphology. No single theme or grand new conception emerges, but some chapters are particularly valuable. These include an explanation of kin selection and its special applications by W. D. Hamilton; an exhaustive review by G. H. Schmidt of *Formica polyctena*, the caste system of which is now the best studied of any insect species; and meticulous, richly illustrated accounts of the leptothoracine and social parasitic ants by Alfred Buschinger. Shōichi Sakagami traces the beginnings of caste differentiation among the species of *Formica polyctena*, the caste system of which is now the best studied of any insect species; and meticulous, richly illustrated accounts of the leptothoracine and social parasitic ants by Alfred Buschinger. Shōichi Sakagami traces the beginnings of caste differentiation among the species of the primitively eusocial halictine bees. Peter-Frank Röseler shows that caste interaction and worker control in bumblebees is more sophisticated than the otherwise relatively primitive behavior of these insects led us to suspect, while Heinz Rembold summarizes the lengthy biochemical studies which are at last beginning to isolate the queen-determining substances in royal jelly.

The weakest feature of the book is its astonishingly high price, which will probably limit its purchase to a small number of libraries and specialists. There have been too many such cases of overpricing in the

last several years. Publishers left to their own devices tend to be very conservative in producing technical treatises. They print the smallest number they are confident of selling, then set the price high to guarantee against a fiscal loss. The projection becomes self-fulfilling, since the high price results in the expected small number of sales. Authors and editors would be well advised to bargain with publishers for a reasonable price, a large enough printing, and an adequate sales program to make a balanced account more probable. To obtain really good books publishers will be willing to gamble.

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Books Received

Advances in Comparative Physiology and Biochemistry. Vol. 6. O. Lowenstein, Ed. Academic Press, New York, 1975. x, 262 pp., illus. \$22.50.

Advances in Pharmacology and Chemotherapy. Vol. 12. Silvio Garattini, A. Goldin, F. Hawking, and I. J. Kopin, Eds. Academic Press, New York, 1975. xii, 408 pp., illus. \$39.50.

Albert Einstein in Bern. Das Ringen um ein neues Weltbild. Eine dokumentarische Darstellung über den Aufstieg eines Genies. Max Flückiger. Haupt, Bern, 1974. 220 pp., illus. DM 38.

Antibiotics. Vol. 3, Mechanism of Action of Antimicrobial and Antitumor Agents. John W. Corcoran, Fred E. Hahn, J. F. Snell, and K. L. Arora, Eds. Springer-Verlag, New York, 1975. xii, 744 pp., illus. \$77.10.

Behavioral Pharmacology. Susan D. Iversen and Leslie L. Iversen. Oxford University Press, New York, 1975. xiv, 310 pp., illus. Cloth, \$10.95; paper, \$5.95.

The Biogenesis of Mitochondria. Transcriptional, Translational and Genetic Aspects. Proceedings of a conference, Bari, Italy, June 1973. A. M. Kroon and C. Saccone, Eds. Academic Press, New York, 1974. xxii, 552 pp., illus. \$19.

Biological Interfaces. An introduction to the Surface and Colloid Science of Biochemical and Biological Systems. Malcolm N. Jones. Elsevier, New York, 1975. x, 240 pp., illus. \$24.50.

Black Holes, Gravitational Waves and Cosmology. An Introduction to Current Research. Martin Rees, Remo Ruffini, and John Archibald Wheeler. Gordon and Breach, New York, 1974. xvi, 332 pp., illus. + appendix. \$29.50. Topics in Astrophysics and Space Physics, vol. 10.

Cancer Epidemiology and Prevention. Current Concepts. David Schottenfeld, Ed. Thomas, Springfield, Ill., 1975. xii, 574 pp., illus. \$45.50. American Lecture Series Publication No. 953.

Clinical Applications of Zinc Metabolism. Proceedings of a symposium, Cleveland, Oct. 1971. Walter J. Pories, William H. Strain, Jeng M. Hsu, and Raymond L. Woosley, Eds. Thomas, Springfield, Ill., 1975. xvi, 302 pp., illus. \$28.50.

Concepts, Problems and Solutions in General Physics. A Study Guide for Students of Engineering and Science. Vol. 1. Raymond A. Ser-

(Continued on page 1324)