rather than in terms of the syntactic properties of codes and messages, may be convenient now but are likely to be provisional.

Chapter 4 deals with species identification in aggregational systems (cellular, sessile, mobile, social, and interspecific) and dispersal systems (ritualized fighting, aggressive displays, and territorial behavior). Chapter 5 is devoted to social cooperation, involving such items of information as alarm signals (subclassified here as indicators of departure, distress, warning, and the like) and food signals; it also contains a summary of what is known about the chemical guidance system of ants and the dances of the honeybee, but there is no mention of information transmission in the honeybee by means of sound, certain uses of which have been amply demonstrated by H. Esch and by A. M. Wenner.

In chapter 6, the authors take up, channel-by-channel, signals involved in sexual attraction and recognition, remarking somewhat enigmatically that, "In these processes, communication reaches its highest development." In the next two chapters, they briefly consider signals to further courtship and mating in such taxa as annelids, molluscs, crabs, scorpions, insects, and several vertebrates, and in a lengthier excursus, displays used by spiders; then they take up some of the ways in which parent-young relationships entail communication.

Under the heading "Sources of error in animal communication," the authors discuss the development of dialects and of cross-reactivity, by which they mean the development of reactions by a receiver to signals other than those appropriate to the species for the temporal and spatial context in which they are observed. These are fascinating topics that yield different results depending on whether the problem of efficiency is approached from the point of view of the encoder's or the decoder's ensemble. In the human situation, for example, an individual is often capable of decoding more than one dialect of a language, but his capacity to encode is more likely to be limited to just one.

A sketchy outline of evolutionary theory leads to pertinent observations about the evolution of communication and reassertion of the ethological hypothesis that "communication signals usually originate as modified intention movements." The authors' intimations concerning the differences between human and animal communication underline the urgent need for a fresh approach, cutting across established academic disciplines, to the meaningful problems of zoosemiotics.

The value of this splendid little book is enhanced by nine pages of selected references, an index table of animal groups and systems of communication classified by function, and an index of subjects and names. There are also 24 illustrations, mostly line drawings.

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Plasma Physics

Plasma Kinetic Theory. D. C. Montgomery and D. A. Tidman. McGraw-Hill, New York, 1964. xii + 293 pp. Illus. $11.50.

This monograph is intended for the serious student or researcher in plasma physics and will serve as an excellent introduction to the subject for the student who is well grounded in the classical kinetic theory of neutral particles and the basic mathematics of theoretical physics. The authors do not pretend to discuss every topic that could conceivably be included under the title, but instead expend their energies and pages trying to give the reader a deeper understanding of some of the most widely discussed (and often, therefore, the most widely misunderstood) problems in the field. They make a great effort to point out which parts of the treatments must be taken as assumptions; then they try to give the reader a feeling for which assumptions are reasonable and which are made out of mathematical necessity rather than on the basis of well-founded physical facts. The authors apologize for their lack of emphasis on experiments, but continually demonstrate their awareness of the "unfortunate separation" between the theories of highly idealized models and experiments on extremely complicated natural or laboratory systems. Whenever they can, they point out paths that may eventually provide links between the two.

The book is arranged in three parts. In the first the authors discuss the aims and limitations of classical kinetic theory, beginning with an heuristic derivation of the Boltzmann equation, description of attempts to apply it to plasmas, and discussion of the Fokker-Planck equation. The BBGKY approach to kinetic theory and discussion of the Vlasov equation, the adiabatic assumption, the Balescu-Lenard equation, and statistical fluctuations in plasmas are presented in part 2. In part 3 the authors apply the formalisms to some wave and nonlinear phenomena, discuss attempts at fluid dynamic descriptions of plasmas, and treat certain radiation and electromagnetic wave scattering problems. The final chapter is reserved for comments on three experiments that the authors feel offer promise of bridging the "unfortunate separation"—the positive ion electrostatic oscillation experiments, the observations of incoherent backscatter from the ionosphere, and the computer "experiments" with simplified models of plasmas.

In my opinion, the book will prove quite useful to the student and to the researcher, both of whom should be much concerned with understanding the present state of plasma kinetic theory, particularly its limitations and weaknesses, and its relation to experiments.

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Chemical Engineering

Advances in Heat Transfer. vol. 1. Thomas F. Irvine, Jr., and James P. Harnett, Eds. Academic Press, New York, 1964. xi + 459 pp. Illus. $16.

The editors of this compilation of reviews of the current literature in six areas of heat transfer research have, for the most part, selected interesting and timely topics that should be of interest to those working in related areas as well as to the heat transfer specialist.

The sections on thermal radiation and electric and magnetic effects on heat transfer to electrically conducting fluids are novel and well done, while Luikov's review of heat and mass transfer in capillary porous bodies brings a large amount of Russian work to the attention of the English-speaking