traditional style of administration. With but a slight variation on this theme, one can argue that the authors also have stretched a point in attempting to inflate to the status of a book (priced at $8) a questionnaire-*cum*-interview survey of the status of automatic data-processing machines and program-planning and budgeting concepts in a group of state-related institutions of higher learning. While the administrative activities surveyed may be matters of some significance and even of growing concern in higher education, the "meaning" and the derivation of the issues related to them is given relatively superficial consideration. The relationships between certain aspects of "the new science of management" and the more substantive characteristics of institutions of higher learning (such as the conflict between those values espoused by business offices and those espoused by science faculties, for example) are given but nodding attention when they are mentioned at all. The key to this limitation in the treatment of their material may lie in the authors' basic concept—that from "the perspective of organizational theory . . . institutions of higher education belong in the category of professional organizations, along with hospitals, laboratories, and scientific institutes and agencies."

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Indian Wildlife

The Deer and the Tiger. A Study of Wildlife in India. GEORGE B. SCHALLER. University of Chicago Press, Chicago, 1967. 376 pp., illus. $10.

This volume deals with the large mammals of India, with particular focus on the chital (*Axis axis*), its associated herbivores, and the tiger which preys upon them. It is written by a biologist for biologists. The approach is broad, combining the results of intensive field observation with regional surveys. Both the field work and the integration of findings with the literature are exceptionally thorough.

The large wild animals of India, once a rich and numerous assemblage, have been declining in number since the days of the Moghuls. The rate of loss became steeper as the British consolidated their hold a century ago, and steeper still as a railroad system brought a relative end to local famines. Since then, public health measures and firearms (the latter especially in the 20 years since independence) have become increasingly widespread and efficient. More humans need more land. Former wildlife habitats are farmed and grazed. Wild animals damage crops and are "controlled." Even special parks and sanctuaries, established as a last small remnant, with full paper protection, are in fact grazed and poached from every side.

When Schaller was searching for a place where the native ungulates could be readily observed in natural surroundings that included their predator, the tiger, he had few choices. He selected Kanha Park, in central India, a rolling forest and meadow area covering 123 square miles. Altogether he spent 14 months in intensive study at Kanha Park and another 6 months in gathering comparative information, from detailed notes on behavior to generalizations concerning wildlife conservation on the Indian subcontinent.

The book is organized conventionally: following a description of the study area and methods there are species accounts of each of the major ungulates. Next is a comparison of their ecology and behavior, followed by a long chapter on the tiger and a short one on other predators. The final section is an analysis of the effect of predation on prey population in Kanha Park. There is a wealth of biological information in this volume. This includes detailed data on the species studied, unusually thorough analyses of predator-prey relations, and much material useful in comparing the biology of subtropical ungulates with those of temperate zones. In addition, there is throughout a realistic appreciation of the place of man with respect to this fauna.

Thirty years ago the wild ungulates of Kanha Park—chital, barasingha, sambar, blackbuck, and gaur—numbered about 52 per square mile. Schaller found the present density to be down to about 14 per square mile. Now wild ungulates comprise less than one-third of the total biomass of animals grazing within the park; the rest are domestic livestock. Preying on both groups is the tiger. During Schaller's study two adult tigers and five cubs lived in the study area, and several other tigers used it from time to time. These particular tigers, unlike most in India, lived mainly on wild prey.

It takes about 6000 pounds of meat a year to support a tiger. There are possibly 4000 tigers left in India. Populations of wild prey continue to decline, and therefore much of the tigers' food is now domestic livestock. Tigers killing stock are themselves killed, and livestock, protected, further encroach upon wildlife habitat. Poaching continues. Even in Kanha Park, one of the best protected of India's natural areas, Schaller concludes that "poaching and not tiger predation has been the general cause of the decline of wildlife."

Two years of study, however competent, can scarcely be expected to result in a treatment that is definitive in the sense of being so comprehensive that little will be added. But this book may well be definitive in quite another sense, that little will be added because the populations that were studied may not long survive.

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The Lower Atmosphere

Descriptive Micrometeorology. Advances in Geophysics, Supplement 1. R. E. MUNN. Academic Press, New York, 1966. 259 pp., illus. $9.75.

Micrometeorology is the physics of the atmosphere near the ground. The exact limits of this field are not rigid. In the preface to his book Munn suggests that those processes should be treated in which the Coriolis force does not play an important role. In practice, this means that the book concentrates on atmospheric phenomena in, roughly, the lowest 20 meters. In spite of the limited vertical extent of the region discussed, it strongly influences all kinds of human activity; and agronomists, foresters, various kinds of engineers, air pollution control officers, astronomers, and many others have become interested in the properties of the atmospheric surface layer.

The behavior of air near the ground is extremely complex; it is controlled by turbulence and radiation and is greatly modified by the characteristics of the terrain on which it rests. A complete discussion of our current knowledge in this area would involve some sophisticated mathematics and much space, and Munn has done a great service to the workers in micrometeorology by summarizing many of the results of the theoretical and observational studies in easily readable form. The book is divided, broadly,

into two parts: a little over half is devoted to basic principles, and the remainder applies the principles to particular kinds of situations. Thus, the first half is mainly concerned with properties of the ground, with atmospheric turbulence, and with radiation; the second half considers air flow, temperature, and moisture over bare ground, plants, water surfaces, and cities. Special sections are devoted to mountain-valley flow, sea breezes, and air pollution.

The book is most successful in its purely descriptive second part. In the first, largely theoretical part, it suffers from the necessity of having to cover difficult material in little space. The space problem is aggravated by the fact that terms familiar to meteorologists had to be explained to scientists in other fields. Thus most of the theoretical arguments are extremely brief and must appear rather mysterious to the uninitiated reader. Further, many of the arguments are inexact, and, on rare occasions, incorrect. The book is well written and printed, and unusually free from typographical errors.

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Irreversible Processes

Kinetic Equations of Gases and Plasmas. TA-YOU WU. Addison-Wesley, Reading, Mass., 1966. 304 pp., illus. $12.50.

A kinetic equation for a gas of classical point particles is generally understood to be an equation for advancing the one-body distribution function f_1 $(\mathbf{x},\mathbf{v},t)$ in time, according to the relation

$$\partial f_1/\partial t = F(f_1),$$

where $F(f_1)$ is some functional, generally nonlinear, of f_1. The example everyone knows is Boltzmann's equation, usually met for the first time in elementary statistical mechanics courses.

If one wants to improve, in any direction, upon the elementary intuitive picture of Boltzmann, the subject rapidly becomes more mathematical, and intuition must be used only with restraint. Even to derive kinetic equations (apart from the much harder problem of solving them) has been a problem upon which much energy has been expended since 1946. In one form or another, the starting place is usually assumed to be Liouville's equation and nonequilibrium ensemble theory. Wu's book is a collection of a large portion of the calculations which have been done along these lines.

The three physical limits which have received most attention are those of dilute gases (Boltzmann), weakly interacting gases (Fokker-Planck), and ionized gases (the "plasma" case). The plasma case has perhaps been the most tractable, partially because the linearized Vlasov equation (the low-density or high-temperature limit of plasma dynamics) is unique in being solvable by elementary means. The book being reviewed here reflects this emphasis in being devoted to a large extent to the plasma case.

Considerable space is devoted to the work done by Choh and Uhlenbeck, Guernsey, and others on the basis of the Bogolyubov "functional assumption." There is a presentation at some length of the Frieman-Sandri multiple-time-scale method (a generalization of the Krylov-Bogolyubov methods of nonlinear mechanics). There is an introduction to the Prigogine-Balescu diagrammatic perturbation theory. Some attention is given to the contributions of Cohen, Green, Dupree, and others. Finally, some connections are established between kinetic theory and macroscopic fluid dynamics.

The book is a useful one, designed for specialists. It contains a large amount of material. Particularly valuable is the rather comprehensive presentation of the important thesis of Guernsey, never published and now difficult to obtain. Some criticisms, however, must be added to these plaudits.

First, the book is more likely to be of use to someone who already has a fair grasp of the material than to a student in search of information. Insufficient attention has been paid to reordering and organizing the material to make clear which equations (among the—quite literally—thousands) the author regards as fundamental and which as peripheral: all are given approximately equal weight. Second, there is little indication that the quantities being calculated bear or should bear any relation to laboratory numbers. This is no real fault of the author's, in one sense: the increasingly refined calculations of transport coefficients which have preoccupied kinetic theorists of neutral gases for over a generation seem to have little relevance to the present rough-and-ready state of experimental plasma physics. But it seems that one ought at least to pay lip service to some happy future time when it will be possible to find more plasma quantities that are simultaneously measurable and calculable to better than order-of-magnitude accuracy. On this possibility the continued existence of plasma physics as a research area seems increasingly to depend.

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A British Physician

Dr. Thomas Sydenham (1624–1689). His Life and Original Writings. KENNETH DEWHURST, Ed. University of California Press, Berkeley, 1966. 201 pp. illus., $6.

As an outstanding figure in the evolution of British medicine, Thomas Sydenham has naturally received much attention from historians of medicine and science. Since the end of the 19th century there have appeared at least four biographies (Picard, 1889; J. F. Payne, 1900; Newman, 1924; Riesman, 1926). To these may now be added this edition of the original writings of Sydenham together with a biography prepared by Kenneth Dewhurst.

Primarily this volume is intended to present Sydenham's extant English writings. The fact is that his works were translated into Latin by various friends, and the subsequent English versions are retranslations into a smoother, less robust language than Sydenham had himself employed. To the original English versions of these items Dewhurst has added the extant letters. Payne referred to five letters; Dewhurst reprints 11 letters by Sydenham, as well as several letters and documents about him. The writings and correspondence comprise the second part of this book.

The first part is a brief biography which offers a background for the writings. Dewhurst has made use of the Lovelace collection of Locke's papers, incorporating some new material in his biography. Although he does not materially alter the picture of Sydenham's life presented by earlier writers, he does enrich our knowledge of various aspects, particularly Sydenham's medical practice and his relations with Locke. Furthermore, Dewhurst shows quite clearly that Sydenham