progress in neurobiology. In any event, this abandonment of a field that was so largely his creation, that just as obviously was to be enormously fruitful but had not yet even begun to mature, let alone to be exhausted, was characteristic of the man and, just incidentally, the mark of a rare and great scientist.

W. D. PHILLIPS
E. I. duPont de Nemours & Company, Wilmington, Delaware

Prexy and the Computers

The Managerial Revolution in Higher Education. FRANCIS E. ROURKE and GLENN E. BROOKS. Johns Hopkins Press, Baltimore, 1966. 196 pp. $8.

This book is a research monograph in disguise, reporting a study of "managerial innovation in higher education." Of the numerous "management tools" that characterize the "revolution," special emphasis is given to the electronic computer because the authors consider its introduction into campus life to be "the most dramatic symbol of the 'new science' in university management. . . ." In making the survey the authors had two principal objectives in view: (i) "that of gauging the extent to which new techniques of management have actually permeated American higher education" and (ii) "that of measuring—in a preliminary way at least—what impact the new science of management has had upon the academic community."

The methods used included a four-part questionnaire sent to 361 state-related, 36 nonstate public, and 36 private institutions across the country. The questionnaire also was submitted to ten statewide coordinating boards. In addition, interviews were conducted with 209 individuals at 33 colleges and universities in 16 states and with a number of individuals from the staffs of agencies having state, regional, and national responsibilities relating to higher education. The response rate for the questionnaire was about 80 percent. Although the sample of institutions was focused on those representing the public sector of higher education, the authors feel that with respect to internal administrative problems and practices, the results apply equally well to private institutions.

The data are reported and discussed within a framework of four different aspects of the "managerial revolution": (i) the use of computers in various phases of college and university administration; (ii) the growth of institutional research; (iii) the allocation of academic resources, particularly financial resources and space; and (iv) the collective impact of recent administrative innovations on the general style of university administration. Bracketing these four chapters are a short introduction, touching upon the rise of administrative "bureaucracy" in higher education, and a final chapter that briefly delineates what the authors believe to be "the meaning" of current managerial innovations for the future of higher education in the United States. There are four appendices covering the "research strategy," the details of the questionnaire, a discussion of administrative changes that are occurring in institutions of higher learning abroad (particularly Europe, Australia, and Canada), and a selected bibliography of literature bearing upon the management of higher education.

As to how far the new managerial techniques have permeated the institutions studied and the consequent impact of this development upon the respective academic communities, the findings show that the "real potential" of computers is still largely unrealized. Their current use is reported as being confined largely to increasing the speed of routine administrative operations, although their presence in some instances has effected new administrative organizations, as well as a redistribution of "authority" and "influence" in arriving at policy decisions. The data reflect a sharp rise in the number of institutional research offices during the past decade, although the role and influence of these offices are less determinate. Not surprisingly, it appears that the closer a bureau of institutional research is to the president's office, the more immediate and direct is its influence on university policy. With reference to the allocation of resources (financial and space) within the institutions, there is a trend toward more "rationalized" procedures (formulas, cost analyses, and so on), although this trend is a function of both the size of the institution and its degree of enmeshment in statewide relationships with other institutions. Smaller institutions and departments within larger institutions are found to still operate in a highly subjective administrative fashion with respect to resource allocation. The trend toward rationalized allocation schemes has, in some cases, shifted control from lower levels of administration to higher levels, or laterally "from one group of individuals to another, as for example, from deans to business offices."

Certain changes in the "style" of university administration are observed to have resulted from these managerial innovations. The four most significant changes are: (i) a shift from "secrecy to publicity in the general conduct of administrative and academic affairs"; (ii) the development of a "cabinet style" of governance in the institution, replacing the traditional presidential executive approach; (iii) the introduction of new and more rational forms of decision making; and (iv) the development of the multi-campus network of administration. The inroads of the new managerial techniques tend to be more impressive in newly established institutions; at the long-established and more prestigious institutions "the advent of scientific management cannot yet be said to have worked any fundamental alteration in the relationship between the faculty and administration."

In their interpretation of the data, the authors conclude that the most noteworthy feature of the "managerial revolution" is that "it has not led to the universal triumph of any Gresham's law of administration. The soft currency of quantitative standards has not in fact driven out qualitative criteria altogether in the management of colleges and universities." They note with approval the trend toward "candor" in policy making, believing that this trend offers the prospect of rationality in administrative decision making. They warn against the major pitfall, if the newer managerial techniques are adopted, of allowing the computer and all that flows from it to completely depersonalize university life. As a sort of last word the authors declare that in the governance of university affairs the "revolution on the management side of higher education . . . calls for a revolution in the academic sphere . . . the most effective response by the faculty . . . may well be the development of its own academic civil service, which will reflect faculty rather than administrative points of view in the management of the university."

In the foreword, the authors say it might be argued that they have stretched a point in referring to the managerial innovations they have surveyed and reported as a "revolution," inasmuch as institutions of higher learning, in the main, still reflect their

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."

JOHN T. WILSON
National Science Foundation, Washington, D.C.

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.

RICHARD D. TABER
School of Forestry, University of Montana, Missoula

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,