in their appearance and interpretation. Lastly, it is not true (p. 157) that $p = \frac{1}{2}$ in the Gaussian distribution. As N grows large, all binomial distributions approach the normal if p is held fixed. This is a common error.

I have reflected a long while on what general implication can be drawn from the fact that a first-class scientist finds it necessary to relegate Mendel to a footnote and to describe A. H. Sturtevant's beautiful paper on the linear arrangement of genes in *Drosophila* as "a great little paper." I think the key to the problem is in the fact that Stahl puts "nineteenth century" in the lower case but uses capitals for the "Nuclear Age." There is implied a rejection of the past and the preaching of a new gospel in genetics, the gospel of a molecular Messiah. In the very first paragraph of the preface Stahl tells us that "old texts, then, must go to the shelf (not the wastebaskets, please) and new ones to the students desk tops." And he is right. Genetics *is* a dynamic and changing science, but what Stahl fails to see is that there is no break with the past, but a building on it—or perhaps he does see it and that is what disturbs him. I almost get the impression that Stahl wishes there were no continuity with the past because that continuity in some way detracts from the accomplishments of the present. I find support for this uncharitable point of view in little turns of phrase, the most revealing of which are repeated references to experiments done and papers published "in the late 1950's" or "in the 1960's" when, what is meant is simply "in 1958" and "in 1963."

Stahl is looking at genetics not from the perspective of 1964 but from that of 2064 when men will refer to the golden age of the "1960's" as we now speak of the *Cinquecento*. This pseudohistorical style shows pretty clearly that, although other texts may go on the shelf, Stahl's has been written for the ages. Moreover, it is the history of a new movement, of a revolution, that is being written. It is a new testament in which the miracle of the fish and the loaves is a case of semiconservative replication. Yet, for all that, the very great contribution that microbial genetics has made to our understanding of the molecular tactics of evolution, does not entitle Stahl to be condescending to Mendel or contemptuous of the intellectual level of his readers.

Nuclear Chemistry

Nuclear Chemistry and Its Applications. M. Haïssinsky. Translated from the French edition (Paris, 1957) by D. G. Tuck. Addison-Wesley, Reading, Mass., 1964. xiv + 834 pp. Illus. $22.50.

Since the discovery of radioactivity, chemists have contributed greatly to the investigation and explanation of radioactivity, nuclear structure and reactions, and the interaction of radiations with matter. They have also shown how nuclear and isotopic effects can provide unique research tools in all branches of science and technology.

In this volume, which is a translation of his 1957 treatise, Moïse Haïssinsky has set out to provide an integrated description of this history, of the fundamentals of nuclear science, and of its manifold applications. His is not a popular or superficial account, but a thoroughly professional description within the space limitations set by the extremely broad range of subject matter. Haïssinsky is eminently well qualified to do this. In his early years he worked with Marie Curie and with Irène and Frédéric Joliot-Curie. For several decades he has been associated with the famous Institut du Radium, in Paris, as a leader of the French school of nuclear and radiochemistry. It is welcome news that his 1957 reference work, *La Chimie Nucléaire et ses Applications*, an impressively clear and concise summary of an enormous scientific literature, is now available in this excellent translation by Dennis G. Tuck of Nottingham University.

The first six chapters provide a concise description of the history of this science, of the fundamental particles, of nuclei, and of the spontaneous and artificial transmutation of nuclei including nuclear fission. Two chapters review the natural radioelements and the synthetic transuranium elements. There is a chapter on isotope effects, and one on geochemical, geological, and astrophysical applications of radioactivity. One chapter reviews the dissipation of energy of radiations in matter. Several chapters constitute a compact review of various aspects of radiation chemistry, radiation effects, "hot atom" effects, and related topics. Another group covers radioactive tracers and their application to a variety of chemical studies. The final chapters deal with biological, medical, technological, and industrial applications of isotopic tracers. It is impossible in this bare-bones summary to convey a real idea of the detailed contents of this volume.

It is inevitable in a work of such wide scope that the specialist will find limited coverage of his own field. Nonetheless, he should find this volume valuable for a discussion of the origins of his specialty and of its position in the context of the whole science. It should also serve him as a useful encyclopedia of possibly pertinent information in related fields. It is also inevitable that in a translation of a 1957 work dealing with fields under vigorous investigation some important recent developments are not considered. These defects do not detract greatly from the usefulness of Haïssinsky's book as a comprehensive, well-organized, reference work.

As a final note, this volume can be recommended to those university departments of chemistry that are debating the importance of inaugurating a program in nuclear chemistry.

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Medical Care in England

Trends in the National Health Service. James Farndale, Ed. Pergamon, London; Macmillan, New York, 1964. xiv + 423 pp. Illus. $15.

The practice of producing a book by inducing a number of authors to write short essays on single aspects of a complex problem seems to be growing. In this book, described by its editor as a "form of stocktaking and also a self-examination," some 36 authors have contributed chapters on subjects as diverse as planning, financing, medical-legal problems, nursing education, and ambulance service operations in England's National Health Service.

It is quite clear that no one is going to push himself very hard to write an essay for someone else's book. It is almost a foregone conclusion that results will be routine. Since a routine performance by some contributors is bound to be better than that of others, the book is a mixed bag. An introductory essay by Arthur Blankensop, a parliamentary secretary to the Ministry of Health during the early days of the

National Health Service, contributes an interesting and too brief reminiscence of early problems. Godber, the Chief Medical Officer of England and Wales, has supplied a speech that provides a very interesting and well-informed view on the current problems of the National Health Service. There are a few other good essays by capable people who have long been concerned with the service. One can also find statistics on the number of ambulances, the number of patients carried, and the miles driven for certain years. Some of the authors have padded their rather short essays by inserting Ministry of Health memoranda or extensive quotes from other well-known documents. The following is an example of some of the banalities encountered in the discussions of special services: "Methods of teaching should follow modern educational methods with much more emphasis on class participation and student projects."

It is difficult to recommend this book. The good papers have mostly been published elsewhere, and the remainder are routine descriptions of component divisions of the National Health Service. A "stock-taking" should take stock. Only a minority of these contributions fill the bill.

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Study of Animal Societies

Social Behavior and Organization Among Vertebrates. William Etkin, Ed. University of Chicago Press, Chicago, 1964. xii + 307 pp. Illus. $7.50.

There is every sign of a revival of interest in the comparative study of animal societies and in the genetic, structural, and behavioral correlates of the various types of social systems that occur. New ideas are being put forward on the genetics and ecology of cooperative and competitive behavior, polygyny and monogamy, the energetics of sexual dimorphism, and the evolution of parental care. Since Huxley and Mayr and others in the late 1930's and the early 1940's summarized the conclusions of a generation of post-Darwinian investigations on such things as mating systems, sexual selection and the evolution of sexual dimorphism, there has been something of an eclipse. The intervening years have seen dramatic advances in the fine analysis of behavioral mechanisms and their physiological substrates and, with some notable exceptions, a relative neglect of the nature and significance of different types of social systems.

Social Behavior and Organization Among Vertebrates is a kind of hybrid between the two types of emphasis. Four of its ten chapters deal with physiological themes. Etkin reviews vertebrate neuroendocrine systems, with little emphasis on behavioral correlates. David Davis writes on the physiological analysis of aggressive behavior, developing the discovery that pituitary gonadotrophins have direct effects upon the aggressive behavior of birds and summarizing recent work on effects of aggressive interaction on reproduction and mortality. Frank Beach considers the neural and hormonal mechanisms that underly mammalian sexual behavior. In interpreting the so-called hypersexuality of animals with lesions in the pyriform cortex, Beach brings out the need for sophisticated behavioral description, both before and after operation. Daniel Lehrman explores the mechanisms of hormonal action in the reproduction of birds and mammals and the role of environmental stimuli, both present and past, in the control of the patterns of hormonal secretion that underly cycles of breeding activity. Among the less physiologically oriented chapters, those by Niko Tinbergen, on the evolution of signalling devices, and J. P. Scott, on the effects of early experience, are both up to date, providing students with clear reviews of such subjects as the origin and ritualization of signal systems and the role of early social experience in mammalian development.

The remaining four chapters (by Etkin), which come closest to the theme in the title of the book, are more in the nature of historical reviews. In the section on cooperation and competition in social behavior, Allee's works loom large, but the discussion of territory fails to come to grips with the problems of function and definition which are a current source of concern for behaviorists and ecologists. The review of reproductive behaviors brings in recent work, within a framework that will be familiar, for example, to readers of E. A. Armstrong's 1947 book on bird display and behavior. The concluding "important general principle that the type of sexual dimorphism shown by a species correlates with the role of the sexes in courtship and parental activities" was anticipated by Darwin and Wallace, among others.

A chapter on the theories of animal socialization and communication reviews the highly influential ideas of European ethology, more or less as those ideas were summarized in Tinbergen's 1951 book, with some more recent illustrations included. In the last section, on types of social organization in birds and mammals, the social systems of several species and their correlates are outlined; the section concludes with a discussion of their relevance to the evolution of early human societies.

It is regrettable that the parts of this book dealing with the comparative study of social systems mostly take a historical viewpoint rather than emphasizing the new developments that I at least believe are emerging. Nevertheless, the subject has not been brought together in this way before, and the juxtaposition of highly critical, experimentally oriented discussions with the broader, inductive treatment of evolutionary problems will serve to remind students how much still remains to be done before we can understand the adaptive significance of different types of social systems.

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Paleopathology

Bones, Bodies, and Disease. Evidence of disease and abnormality in early man. Calvin Wells. Praeger, New York, 1964. 288 pp. Illus. $6.95.

Because so much of the writing about disease in skeletons is unreliable, I fully expected the present book, a popular presentation, to be more of the same. It is a pleasure therefore to say at the outset of this review that Wells has produced a generally reliable, wide-ranging, and quite readable account. Undoubtedly this result is due to his combined training in medicine and anthropology, as well as to his experience as a lecturer. Training in either medicine or anthropology by itself does not qualify a person to deal