The first four chapters consider what has been learned about the etiology and epidemiology of cancer of the urinary system under various conditions of exposure to chemicals, chiefly in industry. This section of the book highlights aromatic amines and nitro compounds. The fourth chapter contains a plan for the industrial physician who is responsible for the surveillance of workers in an environment where there may be an increased risk of urinary cancer; diagnosis, prophylactic measures, treatment, and the pathology of industrial urinary tumors are considered. Other chapters deal with the experimental production of cancer by aromatic amines and nitro compounds and with the possible carcinogenicity of endogenous aromatic amines such as tryptophan metabolites. Hueper has summarized the data that have been published regarding the effects of smoking and schistosomiasis on the excretion of urinary tryptophan metabolites. He classifies the suggestion that tryptophan metabolites are sometimes a factor in the etiology of bladder cancer as "unproven but interesting speculations." It is difficult to argue with this point of view. There are also chapters about the role of combustion products, ionizing radiations, parasites, and miscellaneous organic and inorganic chemicals which have been related by some investigators to the etiology of urinary cancer. The final chapter reviews the preventive and legal controls of urinary cancer hazards.

The author has not omitted mention of any significant factors that are known or suspected to be of significance in the etiology of urinary cancer. He has included consideration of viruses, bladder stones, estrogens, alkaloids and plant products, food additives, medicinal agents, and water pollution as possible sources of substances that may cause urinary tract cancer. The use of intravesical implants of vehicles containing test chemicals is given brief mention. The latter technique, he believes, "reflects the combined additive action of carcinogenic vehicle and a carcinogenic test chemical." Because of the "uncertain primary or contributory role played by the vehicle containing the chemical in inducing bladder tumors" he has not included a consideration of the data collected with this technique. On a related subject he concludes that "bladder stones do not induce cancers in this viscus by a prolonged, nonspecific, mechanical irritation upon the mucosa."

The major value of this book is that it offers a detailed and organized summary of a large body of literature such as is not available in any other single source. In a typical section Hueper presents a brief summary of a problem in environmental cancer followed by references to the information present in key publications about the subject, and gives his own interpretation of the data along with the interpretations of the authors of the original articles or other reviewers. He frequently points out opportunities for further work to clarify questions that have not been answered beyond doubt. There is usually a final paragraph in which he presents his own conclusions about the available information. For example, he concludes a discussion of arsenic with the statement that "the evidence at present does not support the view that arsenic is an established urinary carcinogen," a conclusion that few oncologists would dispute. The doubts that he expresses about the relationship between bladder cancer and cigarette smoking, although well presented, would not be as widely accepted.

Some readers may be critical of some of the author's interpretations of original data. However, the serious reader will value this book as an initial source or reference and may read the original articles to develop his own conclusions. A deficiency of the book is that there is no author index and the subject index is very limited.

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Beginnings of the Germ Theory

Analecta Medico-Historica, No. 4, Un Médecin et Biologiste, Casimir-Joseph Davaine (1812–1882). JEAN THÉODORIDÈS. Pergamon, New York, 1968. 238 pp., illus. Paper, $13.

In 1850, Pierre Rayer and Casimir-Joseph Davaine in a communication to the Société de Biologie of Paris reported the transmission of anthrax by the inoculation of healthy sheep with the blood of animals dying of the disease, and the finding of microscopic rod-shaped bodies in the blood of the dead sheep. Neither Rayer nor Davaine fully grasped the significance of their observations. Indeed, the latter was then interested chiefly in the study of the blood. Though this was the first report of the anthrax bacillus, the matter was not pursued further at that time. After reading of Pasteur's work, however, Davaine in 1863 returned to the investigation of anthrax and the rodlike bodies. He showed that healthy sheep became infected with the disease when these bodies, which he called bacteridia, were present in the blood, but not when they were absent. Furthermore, he did not succeed in isolating the bacilli in pure culture. Davaine's experimental studies rendered it highly probable that anthrax was due to the rod-shaped organisms in the blood. Although this view was shared by other investigators, there were still gaps in the natural history of the disease. Davaine thus prepared the way for Robert Koch to elucidate the obscurities of anthrax and to begin to clear up the mysteries of infectious diseases.

Despite Davaine's important contribution to the establishment of the germ theory of disease and of medical bacteriology, there has hitherto been no complete biography of him. This omission has now been admirably corrected by Jean Théodoridès. Based on a thorough knowledge of the sources and the context, this biography offers a rounded picture of Davaine as a physician, scientist, and man of his time. In his presentation of Davaine in his time and place, Théodoridès also makes a significant contribution to the history of French medicine and biomedical research during the 19th century.

Although Davaine was interested in medical research, he could pursue such activities only as a sideline. After graduating in 1837, he had to establish a medical practice in order to earn a livelihood. Eventually he became a very successful practitioner with a clientele at the highest social and political levels. He was appointed physician to the household of Napoleon III, and among his patients were members of the Rothschild and d'Eichthal families. Indeed, as Davaine had no laboratory of his own, most of his animal experiments were carried out in the house of his friend and patient the banker Adolphe d'Eichthal.

In spite of the demands of his medical practice, Davaine was active scientifically and in addition to his work on anthrax carried on studies in hematology, particularly on leucocytes, in parasitology, in teratology, and in pathological anatomy, both human and comparative. The bibliography of his writings indicates that from 1849 to 1881 there was hardly a year in which

he did not publish a scientific contribution. In essence, this is the biography of a medical scientist. We do learn that in 1845 he had a son out of wedlock by Maria Georgina Forbes, and that when the parents were married in 1869 their child was legitimated. But there is no further account of these events.

This book is recommended to anyone who is interested in the history of medicine, science, and French culture. One must point out, however, that the price is quite steep for a paperback, even one printed on coated stock. This is a pity, because the author has produced a book which should reach a wide readership.

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Uses of Labeled Compounds

International Conference on Radioactive Isotopes in Pharmacology. Geneva, Sept. 1967. P. G. WASER, B. GLASSON, A. BENAKIS, Y. COHEN, R. A. COLLET, H. KEBERLE, and R. STRAUB, Eds. Wiley-Interscience, New York, 1969. xiv + 492 pp., illus. $29.

Of the 60 papers in this volume, 42 are in English and the remainder are in French. About half of the papers are very brief summaries, about a page in length, which give only a few details. Many of the remainder, however, contain thorough and detailed discussions.

The conference was planned to survey the practical uses for radioactive isotopes in all branches of pharmacology. This goal was achieved; the book serves as a useful review of the current uses for isotopes in pharmacology. At least one of the papers reports a new technique in pharmacology accomplished without isotopes; it is suggested that the use of isotopes could make it more informative. The book is divided into four sections concerned, respectively, with problems of synthesis and methodology, electron-microscope autoradiography, specific receptors, and biochemical and pharmacological mechanisms.

Novel methods for labeling compounds and problems encountered in synthesizing and identifying labeled compounds are presented in the first section. A few papers concerning electron-microscope autoradiography emphasize that much still needs to be done in the development of a technique that will allow localization of soluble substances at the electron-microscope range of magnification. A satisfactory technique does not yet exist for the localization of labeled compounds which are not incorporated into large molecules and consequently are translocated by fixing solutions and processing for electron microscopy.

Pharmacologists concerned with the localization of specific receptors for drugs have conducted extensive studies on the localization of radioactive compounds in tissues and cells of experimental animals. The problems are the recognition of nonspecific effects such as metabolism, water compartmentalization, *p*H gradients, and active secretion which also may produce increased concentrations at various sites. These effects, of course, must be ruled out before specific affinities attributable to receptors can be identified.

The final section of the book includes reports on specific inhibitors of steroid synthesis, intermediary metabolism of phospholipids, and recent studies on the mechanism of induction of drug metabolizing enzymes. Several papers deal with kinetic studies. One concerns the effect of the presence of an isotope in the molecule on the rate of metabolic transformation of compounds.

Although much of the information in the book has been published elsewhere, pharmacologists, particularly those using isotopes, may find the book a handy source for the state of the art as it existed when the conference was given. The authors include those who are most active in the field.

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Scattering

Topics in Atomic Collision Theory. SYDNEY GELTMAN. Academic Press, New York, 1969. viii + 248 pp., illus. $13. Pure and Applied Physics, vol. 30.

This book develops certain portions of the theory of scattering which have significant applications in atomic physics. These topics include potential scattering, the many-channel theory of electron-atom collisions, and elastic and inelastic scattering of atoms.

The treatment of the scattering of a single particle by a static potential emphasizes bound-state and resonance effects and contains a thorough discussion of the properties of the Jost function in the complex k plane. Complex angular momenta, however, are not considered. Variational methods for scattering amplitudes and phase shifts are discussed.

Electron-atom scattering is described from the viewpoint of both the common simple approximations (Born, Born-Oppenheimer, and their modifications) used for inelastic processes and the close-coupling method for elastic collisions. The presentation of the theory of resonances and compound atom states employs the Feshbach projection operator method. The author has contributed significantly to this subject, and this section is a particularly valuable feature of the book. The applications described are concerned mainly with the electron-hydrogen system.

The difficult subject of atom-atom collisions is discussed in a manner that distinguishes between approaches valid in different energy ranges, including expansion in molecular states, the impact parameter method, the unitary approximation, and the Landau-Zener-Stuckelberg theory of the crossing of potential energy curves. There is a description of the problem of charge transfer in fast collisions which indicates the confused and incomplete state of present knowledge of this topic.

Although the book does not attempt a complete treatment of scattering theory, it will be valuable to readers who are interested in low-energy atomic processes, which are not developed with thoroughness in works directed toward nuclear and elementary particle physics. The strongest feature of the book, in this reviewer's opinion, is the presentation of the popular and reasonably successful close-coupling method. Other approaches to the electron-atom scattering problem which have been widely used in circumstances where a close-coupling treatment would be too difficult (the polarized orbital method) or which are of major conceptual interest (the diagrammatic method based on many-body perturbation theory) are not considered. Reference is made only to the most significant theoretical papers in the areas considered. Some, rather sketchy, experimental results are presented for purposes of comparison with theory, or to illustrate types of behavior that theory must attempt to explain.

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