others of their kind have not been throwing paradigm shifts in our faces for years, if only as types to avoid, then Dunn has not made clear what he means by the term.

Having completed his main theme, in his final chapter Dunn reviews numerous lines of thought that seem to converge into the central proposition of his book. The essential sensibleness of this chapter clarifies why, whatever the reservations, the book has a place in contemporary developmental social science.

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Renal Agents

Kidney Hormones. J. W. FISHER, Ed. Academic Press, New York, 1971. xviii, 666 pp., illus. $25.

The kidney was for a long time considered to be only an excretory organ; its function as a source of humoral agents acting inside and outside the kidney was only partially known or hypothetical. There are only a few renally produced chemical substances with well-defined biological activities, but the clinical implications of a better understanding of them are important in such common conditions as hypertension, renal insufficiency, and polycythemia.

This book is an evidence of how far the isolation, physicochemical characterization, assay, standardization, physiology, pharmacology, and pathology of renal hormones have progressed in recent years. It gives an up-to-date general review on renin, erythropoietin, prostaglandins, and other, still hypothetical, renal hormones. Although the review is not complete in every respect it covers the main topics. Composed of 25 chapters by 45 contributors, the book deals with the subject in a markedly well coordinated way, although some overlappings inevitably occur. The first two chapters, on renal blood flow and oxygen utilization, are less organically integrated into the main part of the book. The chapter on oxygen utilization is too general and the subject is presented in such a way that so important an aspect as the effect of hypoxia on renin release is not taken into account; the chapters on renin-angiotensin describe the main well-established and also some still controversial data (concerning renin inhibitors, for example) in an informative way. The most comprehensive and best coordinated are the chapters dealing with erythropoietin. The chapters on the prostaglandins reflect well all the controversies concerning these substances but also reveal their potential important practical implications. It is always difficult to coordinate a collection of articles written by different authors and to maintain a general line. This book has done it remarkably well. A more general style in writing the individual chapters should have been maintained, however, and the reader would have appreciated a short summary accompanying each chapter. In some places, established facts and hypothesis should have been better differentiated.

It is not the purpose of this book to describe new discoveries but to give a good general review of our present knowledge. The writing of the book was a worthwhile undertaking; it offers a comprehensive view of all important new data on this subject for workers in physiology, pharmacology, biology, biochemistry, and pathology and for those interested clinically in cardiovascular and some endocrine, metabolic diseases and in polycythemia.

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Goal-Directed Endocrinology

Cortisone. EDWARD C. KENDALL. Scribner, New York, 1971. xiv, 176 pp. + plates. $7.95. Scribner's Scientific Memoirs.

This is an autobiography of a scientist beginning with insights into the determinants in early life which produced a career in scientific research and ending with an account of his being awarded a Nobel Prize in 1950. Though his parents and his home life were deeply religious and puritanical, Kendall early tested the concept of divine retribution by shouting a profanity and awaiting the response. From Kendall's own pen it is clear that his scientific career was characterized by intensity of purpose and dogged persistence. Early in his career, Kendall decided to limit his activities to studying those biological phenomena that he considered important. He tells of his disillusion with the scientific activities in a research department of a prominent pharmaceutical company. Later, because of this, he took a position as a research biochemist in a large urban hospital, where he continued studies on the isolation of the active hormone of the thyroid gland, which he had begun at Parke Davis and Company. He was able to concentrate thyroid hormone and demonstrate its activity in clinical patients, but, as often is the case, the hegemony of the physician in clinical research became obvious. Kendall did not permit himself to be diverted in his quest for the isolation of thyroid hormone and steadfastly refused to participate in biochemical research which he considered to be irrelevant to his stated goals. In 1913, at the Mayo Clinic and in a new laboratory, Kendall began the successful isolation of thyroxine, which was completed in 1914. This important accomplishment reinforced his belief that research should be goal-directed and not fragmented by following every lead. The Mayo Clinic provided the environment for Kendall's successful activities. In this environment, Kendall continued to be productive, elucidating the chemical structure of glutathione, with Mason and McKenzie, in 1929.

The major portion of this volume is dedicated to a description of the discovery of cortisone, its therapeutic application, and the reception of the Nobel Prize for his discovery. At about the time adrenocortical extract had been isolated by Swingle and Pfiffner and Leonard Rowntree was treating patients suffering from Addison's disease with this extract at the Mayo Clinic, Kendall and his group became interested in the adrenal cortex. By agreeing to separate epinephrine from adrenal glands obtained from slaughterhouses for one of the pharmaceutical companies, Kendall was able to extract nearly 900 pounds of adrenals per week. This activity went on for several years. Late in 1933, crystals were obtained which were thought to be the active substance from the adrenal cortex. With the help of chemists in his section, particularly Harold Mason, the biological activity and eventually the structure were established. Kendall acknowledges the important observations

of Reichstein which indicated that the adrenal compounds had a sterol ring structure. The contribution of Dwight J. Ingle is emphasized in this book, because Ingle developed a test for the biological activity of the corticosteroids which did not involve changes in electrolyte metabolism, but rather variations in muscle work response. It is of great interest that in the beginning most adrenal physiologists felt that a single hormone possessed all of the observed activities such as sodium conservation and potassium loss and life maintenance. It became slowly and painfully clear to Kendall and others that a single hormone could not account for all of these activities. Had not some assessment other than of the electrolyte activities of the compound been made, it is possible that cortisone and the glucocorticoids would have been overlooked as important biological substances. The story makes good reading.

Edward C. Kendall possessed an intense desire to create something useful, that had application. He is a strong advocate of goal-directed research. His story is one of great motivation as he labored successfully to his goals.

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Nitrogen

The Analytical Chemistry of Nitrogen and Its Compounds. C A. STREULI and P. R. AVERELL, Eds. Wiley-Interscience, New York, 1971. In two parts. xvi, 764 pp., illus. $35. Chemical Analysis, vol. 28.

The fact that this book is volume 28 of a series of monographs on analytical chemistry and its applications may give the impression that it is somewhat encyclopedic in character. This is a correct impression. An excellent coverage of the analytical chemistry of nitrogen and its compounds is to be found here. The volume is a valuable source of information on almost any aspect of nitrogen analysis, and should be useful to chemists and scientists in related areas. With the exception of alkaloids, which have been deliberately omitted because they "are covered thoroughly in other publications," only a few of the more exotic types of nitrogen compounds (for example, nitrile oxides and *N*-sulfinylamines) are missing. Each chapter contains sections on the general chemistry, the qualitative detection, and the quantitative determination of the class of compounds under discussion. The general chemistry discussion is valuable in that it permits the analyst to approach his own particular problem in an intelligent manner. The methods described range from classical wet methods to modern instrumental techniques (for example, there is a chapter on the nuclear magnetic resonance of nitrogen). The inclusion of older noninstrumental methods is of value to people who do only an occasional analysis or who do not have access to expensive instruments. The specific directions given for some of the analytical methods are often too brief to be useful to anyone but an expert, but they do serve the purpose of giving the reader a better idea of the method. It would be well for the reader to consult the original literature after using the volume as a guide to the available methods.

Many chapters, such as the one on amino acids, polypeptides, and proteins, contain valuable critical discussion concerning the relative merits and weaknesses of the methods described. The chapter on inorganic nitrogen compounds of sulfur and phosphorus has a valuable tabulation of those compounds. This chapter is also to be commended for its discussion of the safety precautions to be taken in handling them. The chapter on synthetic polymers constitutes a brief course in practical polymer chemistry.

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Chromatographies

Modern Practice of Liquid Chromatography. J. J. KIRKLAND, Ed. Wiley Interscience, New York, 1971. xxii, 454 pp., illus. $14.95.

This book unifies, both in theory and methodology, the historically separated ion exchange, adsorption, liquid partition, and gel permeation chromatographies. The initial chapter, by Karger, sets the theme in terms of the modern concepts of plate heights, resolution, the van Deemter equation, and optimized performance. The remainder of the book follows as a logical application of these principles. Henry's chapter deals with the equipment needed to accomplish the theoretical goals and takes the reader step by step from the mobile phase source to the detector in such a manner that he should be able to evaluate commercial equipment or assemble his own. Byrne treats the detector problem with equal nicety. The prayer for a general detector has never been wholly answered in liquid chromatography, and determining the detector appropriate to the problem requires much attention. In liquid chromatography the number of stationary phases is small, and solute separation is largely a problem of choosing the appropriate mobile phase. This problem is attacked by Snyder, who attempts a logical approach which will, we may hope, avoid the capricious selection of mobile phases and circumvent the empiricism that clogged the early literature with a multitude of developers and complex combinations of them. Snyder points out that the suitable separation of multicomponent mixtures of solutes of widely different selectivities must be accomplished by changing the mobile-phase composition (gradient elution) during the chromatography. This point feeds back to the chapters on equipment and detectors.

Part 2 takes the reader into modifications required by more specific techniques. Kirkland deals with liquid-liquid methods. This chapter is most welcome because the information it summarizes is scattered throughout the literature; the reviewer is unaware of any other collective review on this subject. Snyder deals with liquid-solid separations, Bombaugh with gel permeation, and C. D. Scott with ion exchange. Halász follows with a short overview.

Part 3, which deals with specific applications and results, is not as well organized and "tight" as the preceding sections. Bombaugh compares separation mechanisms, Schmit treats controlled surface porosity supports, and Gere deals with nucleic acid constituents. We'd all like to see more varied data to support the contentions of the first two parts.

The book is photocopied from typed pages with an unjustified right margin. There are few errors. Kirkland has supplied us with an urgently needed modern treatment of this subject. The book must be on the shelf of anyone doing or teaching separations. We thank Kirkland for the appropriate dedication to Steve dal Nogare.

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