duction, "remove the burrs of misunderstanding and ignorance." Once these burrs are removed, some medical scientists can be depended upon to raise pertinent questions about the validity of specific procedures.

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A Further Study of Visual Perception. M. D. Vernon. New York: Cambridge Univ. Press, 1952. 289 pp. Illus. $7.00.

In 1937 the author of this volume published its predecessor, *Visual Perception.* The earlier work was a rather brief, but nevertheless comprehensive, review of investigations throughout the entire area of its title. Critical comment was minimal, and no systematic position was adopted.

A Further Study of Visual Perception is a revision of *Visual Perception.* Only those earlier studies considered particularly important are now included in its coverage; for others, the reader is referred to such historical treatments as Boring's. A great many recent investigations find place in the volume, however, and thus its bibliography embraces over 500 references. There are 30 figures now, as against 19 in the original edition.

Once more the author ranges widely. After a brief discussion of "the nature of perception," she studies the phenomenology of the perceptual process, form perception, spatial perception, the constancies, frame-of-reference and anchoring effects, the time error, real and apparent movement, flicker, and fusion. Finally, there is emphasis on the recent work by Michotte (concerning the perception of causality, intentionality, and reality), and a rather long chapter on "internal and individual factors" in perception.

Theoretical integration is not stressed, although the author intersperses critical comments among experimental results. There is a general sympathy for the introspective, phenomenological approach. The stated thesis of the book is that the perceptual field is structured for stability by the perceiver, and that it displays an "extraordinary unlikeness . . . to the stimulus field;" a second point of emphasis is that there are large individual differences in perception.

It is a difficult task to summarize a great many investigations in a relatively brief volume—this the author has managed to do, and so provides a valuable reference book. Like most such books, however, it needs to be used with some caution. Where dubious methodology lies behind stated conclusions—as, for instance, in many of the motivational studies—that fact is not always indicated. There is perhaps a slight nativistic bias. Just occasionally, there are errors of fact: the figural aftereffect is inaccurately described, as is the Schafer-Murphy experiment; and Margaret Elizabeth Tresselt and Anna Gertrude Douglas are referred to by masculine pronouns.

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The Medical Sciences

Poliomyelitis. Papers and discussions presented at the Second International Poliomyelitis Conference. Philadelphia–London: Lippincott, 1952. 555 pp. Illus. $7.50.

I have heard it said that international congresses on poliomyelitis (as on other scientific or medical problems) are a waste of time, because little or nothing is presented that has not already been published, or soon would have been published, or could not be read at leisure with greater profit. Since I have attended and greatly enjoyed both the 1948 and 1951 congresses on poliomyelitis, for reasons not solely related to the acquisition of new knowledge, I am perhaps not qualified to give a dispassionate opinion about their ultimate usefulness. It seems to me that these conferences serve their most useful purpose in providing a synthesis of accumulated, scattered information and, through the minds of certain gifted people, a critical evaluation as well. The individual publications on poliomyelitis are scattered in time and space in countless journals the world over, but within the covers of this book, containing the papers and discussions presented in Copenhagen in 1951, are many thoughtful communications dealing with almost every aspect of the numerous scientific and medical problems in poliomyelitis. The subjects covered range from the interaction of viruses and their host cells, the newer knowledge of the effects of poliomyelitis virus on various tissues *in vitro* and *in vivo,* the pathology, pathophysiology, immunity and resistance in invaded hosts, and the ecology of the infection, to the practical problems of laboratory and clinical diagnosis and the management of patients, with special emphasis on respiratory insufficiency, reconstructive surgery, physical medicine, and the social and psychologic aspects of the disease.

Those who are not impressed with the importance of holding these congresses and oppose them on the grounds of their great cost may suggest that the same synthesis could be achieved by publishing in book form, at three-year intervals, critical "present-status" reviews of the whole field. It must be pointed out, however, that the discussions presented at these conferences are as vital a part of the total synthesis as the formal presentations. Although the editors of the proceedings have not (at least in all instances) submitted the transcribed remarks to the speakers for correction, the informal discussions read quite well and, with a few exceptions, "sound" alive and spontaneous. The speakers should not, however, be held responsible for all details appearing under their names, for I have noted certain errors in the transcription of my own remarks.

Even those who attended the conference, but found it difficult to follow the on-the-spot translations of discussions in languages they did not understand, may find the English translations in this book informative

and intriguing. Thus, at the time of the conference, I was not actually aware of what the Russian delegates were reporting and was interested to read the remark attributed to Professor Levkovitch that, using monkey antipoliomyelitis sera, they had been successful in demonstrating specific complement-fixing antigens in the feces of "100 per cent of examined acute cases of poliomyelitis." If this can be confirmed, it would represent an advance in the rapid diagnosis of poliomyelitis that has not yet been achieved anywhere else in the world.

The value of this book is greatly enhanced by a complete reproduction (including photographs) of the many excellent scientific exhibits. It should be added that those who will consult this book in search of information on poliomyelitis will also be delighted to find a stimulating essay by Niels Bohr, entitled "Medical Research and Natural Philosophy," and penetrating remarks by Basil O'Connor on "Man's Responsibility in the Fight Against Disease."

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Pathologie Chimique, Vols. I and II. M. Polonovski, P. Boulanger, and G. Schapira, Eds. Paris: Masson, 1952. Vol. I: 832 pp., Vol. II: 770 pp. Illus.

The editors of this two-volume treatise, with the collaboration of numerous coauthors, drawn chiefly from the medical faculties of French universities, have provided a systematic and carefully organized presentation of chemistry in medicine. Polonovski indicates in the introduction, *"De prétention plus humble, mais d'ambition plus vaste, il voudrait initier le clinicien à une façon de penser biochemique et à une interprétation des symptômes morbides plus en relation avec le jeu des réactions cellulaires. . . . Il n'y a plus de médecine hors la chimie!"* He expresses the hope that future editions will see the immense gaps of knowledge disappear. A 12-page table of contents evidences the care with which the material presented has been classified and organized.

Book One in Volume I, introduced by a concise résumé of present understanding of intermediary metabolism, includes a long section on water and the mineral elements and very brief comments on vitamins, hormones, and enzymes as related to deviations of metabolism.

Part One of Book Two considers pregnancy, normal and pathological, the fetus, the newborn, the nursing infant, puberty, and senescence. A brief commentary on the relation of food and eating practices to health opens Part Two. This more extensive section includes long chapters on the avitaminoses and cancer, and others on the biochemical effects of work and fatigue, climate, radiation, ultrasonic vibrations, burns, and viruses, and on the biochemistry of stress reactions, intoxications and detoxifications, shock, infections, immunity, allergy, and parasitoses.

Part One of Book Three, on the diseases of metabolism, contains chapters dealing with acid-base balance, cystinuria, alkaptonuria, and other anomalies in the metabolism of the amino acids, porphyrinuria and related conditions, gout, undernutrition and emaciation, obesity, steatoses, amyloid disease, polycorias (glycogen disease), hyperglycemias, and meliturias.

Volume II continues Book Three on the biochemistry of diseases. Part Two discusses at length diseases of the endocrine glands and includes a brief chapter on the thymus body. Part Three deals with the autonomic nervous system; Part Four, with the blood and reticuloendothelial system, including chapters on the lipoidoses and multiple myeloma.

Digestion, normal and pathological, opens Part Five on the diseases of the organs. Other chapters consider hypertension and abnormalities of the liver, heart, circulation, lungs, and kidney from the biochemical viewpoint. The final section deals with the pathological biochemistry of the nervous system, the muscles, joints, bones, teeth, skin, and the sense organs.

The text is clear and authoritative. The editors have competently avoided the space-consuming overlapping found at times in works of collaboration. Duplication observed is essentially only that resulting from the impossibility of separating an extensive field of knowledge into rigidly mutually exclusive categories. There is adequate use of structural formulas. Each chapter is accompanied by a list of references. In most instances these are brief, with heavy emphasis on secondary sources, books, and reviews. There is no attempt to provide exhaustive bibliographies. A lengthy index, with boldface type indicating the more important references is commendable.

The objective of providing the clinician with an up-to-date extensive and intensive survey of the implications of biochemistry for medicine has been well realized. It may be hoped that, as frequently as practicable, subsequent editions will be forthcoming.

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Chemical Induction of Cancer. George Wolf. Cambridge, Mass.: Harvard Univ. Press, 1952. 250 pp. Illus. $3.50.

Most scientists work in compartments created by the nomenclature of their specialties. The modern babel of science is one of the barriers to progress in cancer research—a field that cuts across so many disciplines. The chemist often leaves his neighbor scientist bewildered when he presents organic formulas for concepts where no concise expression of words suffices. It is particularly noteworthy, therefore, when one writes so well—as Dr. Wolf has done—for the understanding of those outside his field of specialization. Although the book is addressed primarily to the medical reader, anyone who is interested in cancer research will profit by reading this review of the present state of knowledge of the chemistry and metabolism of the

chemical entities that produce experimental cancer.

In the first chapter the author discusses the relationship between organic chemical structure and carcinogenic activity of hydrocarbons. Beginning with elementary organic chemistry, he progresses through a brief development of the subject to an exposition of the complex polycyclic structures which are carcinogenic. Although the reader probably will not recover his knowledge of organic chemistry so casually, he should be able to regain an over-all impression that will be sustained through succeeding pages that are extensively illustrated with formulas of the compounds under discussion. This is not, however, simply a book of organic chemical considerations. In the next two chapters, the author turns about and discusses the "Biological Aspects of Tumor Induction" and "Test Methods" in words that are meaningful to the organic chemist. In reviewing carcinogenic hydrocarbons, azo dyes, and aromatic amines, Wolf has made many interesting evaluations of the data. His interpretation of the problem is set forth in the introduction, to the effect that "cancer research is concerned with the discovery of a cure for cancer," but the development of his philosophy of cancer research reveals a broad approach to the subject. Many readers will agree with the author that the highlights of the book are found in chapters on "Theories of the Mode of Action of Carcinogens" and "Biogenetic Relationships." The treatment of these subjects is speculative in character, but the circumstantial nature of the evidence and the tentative nature of the conclusions are never lost to sight. Readers are certain to be stimulated to new experimentation by these concepts. After each chapter there are bibliographical references to more technical reviews, but these are superfluous to an understanding of the book.

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The Literature on Streptomycin, 1944–1952. 2nd ed. Selman A. Waksman. New Brunswick, N. J.: Rutgers Univ. Press, 1952. 553 pp. $5.00.

The present volume is not a critical survey or digest of streptomycin literature but is a revised edition of a smaller book issued in 1948. There is a selected list of references on actinomycetis (12 general and 12 on antagonistic properties) and on streptothricin (19 references). The greater portion of the book consists of the more or less chronological listing of 5550 references to the literature concerned largely with the medical uses of streptomycin, alone and in combination with other drugs. This listing covers papers published up to April 1, 1952. The remaining 50 references are to a few of the more important papers received after the closing date and are given only in the subject index. An author index (67 pp.) and a subject index (44 pp.) complete the book.

Since the original references are not grouped according to subject matter, the reader will rely primarily upon the subject index in order to locate the references pertaining to a particular subject. A general survey indicates that the index could have been enlarged so as to increase the usefulness of the volume. The author is aware of the problem, for he states that "a special effort has been made . . . to provide a more detailed subject index." No doubt the difficulties are partly inherent in the fact that "in the great majority of cases, the original papers could not be consulted, and only the titles or brief abstracts were available." This situation is understandable when one considers the flood of papers published on streptomycin since the announcement of its isolation in 1944.

Some typographical errors were noted, but these do not detract from the general usefulness of the work. This volume will be of value to those primarily interested in the therapeutic uses of streptomycin, although references to the chemistry, production, and methods of assay and analysis are also included. Much labor has gone into this revised edition, and the compiler and his associates deserve praise for their efforts.

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A Survey of the Literature of Dental Caries. Pub. No. 225. Prepared for the Food and Nutrition Board, National Research Council, under the supervision of the Committee on Dental Health, P. C. Jeans, Chairman; Guttorm Toverud *et al.* Washington, D. C.: National Research Council, 1952. 567 pp. Illus. $3.00.

Five coauthors have made an extensive survey of the literature on dental caries published before 1950 as evidenced by an excellent 58-page bibliography containing over 2000 references. The work is divided into 7 sections. The first is an introductory review, by Guttorm Toverud, of the literature concerning the relation of food and microorganisms to dental caries and the frequency of caries in various ancient, primitive, and modern civilized populations.

The second section, by Gerald Cox, reviews many studies that have been made on the experimental production of caries in animals. The types of tooth cavities that develop, the diets used, the bacteria involved, and salivary influences are included. The prevalence of dental caries is surveyed in the third section, by Sidney B. Finn. The data considered include race, age, sex, and geographic distribution. The need for statistical methods and more uniformity in examination procedures is stressed.

Section four, by Charles F. Bodecker, considers the pathology of dental caries and the histology and physiology of the teeth. Those publications that give the impression that metabolism in enamel is an essential factor in cavity production are stressed.

The complex problem of the oral environment is reviewed by Gerald Cox. The role of specific microorganisms, the physical, chemical, and antibacterial

influences of saliva on dental caries, as well as carbohydrate degradation and tests for caries activity, are appraised. The sixth section, also by Gerald Cox, contains a thorough review of the discovery of fluorine in biological tissues and fluids, the relation of this element to dental caries, and its use to reduce caries prevalence.

In the final section James H. Shaw reviews the extensive studies on nutrition. He includes surveys of the relation of diet to caries in various population groups, the possible influence of pregnancy, and the etiologic and preventive role of various nutritional factors.

The literature reviewed in each of these sections is classified into well-defined subsections, and the material is arranged in historical sequence. Brief, helpful summaries and conclusions expressing the author's opinion of the evidence reviewed usually follow each subsection. They express biased points of view and indicate an effort to reanimate the vital theory of dental caries, which holds that caries is dependent upon metabolic changes within the tooth.

Some scientists seem to believe that dental caries cannot be explained on a biological basis unless metabolic changes occur within the tooth substance. Too often, the contributors to this book discount or overlook simple explanations, in the false belief that science must be complex. It is obvious that there must be a biological basis for caries because the process stops after death, and teeth, even the carious ones, become the longest preserved anatomic structures. On the other hand, caries has not been found in completely unerupted teeth. The oral environment of the tooth can be influenced as much or more by metabolic activity than the tooth substance itself. It is entirely sound for scientists to reason on the basis of available evidence that dental caries is primarily a local or environmental process. After all, the disease does begin on the exterior surface of the tooth. The *Survey* provides an exceptionally comprehensive source of information for students and investigators concerned with dental caries. It is unfortunate, however, that the treatment is biased in favor of one school of thought.

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