tus is devised to solve more readily both old and new problems.

The new department should be an effective tool in the direction and supervision of the combined agencies of the state for conserving her natural resources and for the arousing and educating of the public to the necessity of enlightened and cooperative action. Results from this reorganization should put Maryland in an advanced group of states looking to full preservation and wise use of the heritage that makes nations and peoples great, a heritage of the type we are now fighting to defend and to keep intact for future generations.

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SCIENTIFIC BOOKS

PHOTOGRAPHY

Photography—Its Principles and Practice. By C. B. NEBLETTE, F.R.P.S. 4th edition. New York: D. Van Nostrand Company. $7.50.

THE number of printings and editions of this work since it was first published in 1927 is ample testimony of its wide acceptance. It is a book which appeals to advanced amateurs, some professionals and particularly to those who use photography in connection with scientific work. The book is primarily practical with emphasis on processes, but also discusses underlying theoretical considerations so that the reader is given both a broad understanding and practical working directions in the many phases of photography.

The new fourth edition is 50 per cent. larger than the previous edition, the expansion being devoted largely to recent developments. Several new chapters are devoted to color photography; a large section on the theory of the photographic process is made up mostly of new material, and a chapter on tone reproduction embodies the latest published work on the subject. Almost the entire book has been rearranged and much of it rewritten. A distinctly better grade of paper has been used than in former editions; consequently, the illustrations are much improved, as is the entire appearance of the book. One very valuable feature is the thoroughness with which significant literature and patent references are given.

The author of a book on photography who attempts to cover both the scientific and the practical aspects of the subject faces a most difficult task. In the first place, his basic material is widely scattered and usually not well organized. This is particularly true in the present state of color photography. A great deal has been written within the past five years on the subject, very little of which can be used in a book of this sort. While the section on color photography was actually written by the author's associate, Howard C. Colton, the same clarity that is evident in the rest of the book has been maintained. Particularly in the new sections of the book, the only source material in many cases has been the patent literature, and a great deal of credit must be given the authors for their clear condensation.

The varied training of potential readers of a book such as this present a second formidable problem to the author. Many advanced amateurs have quite a substantial background in science; for example, some are organic chemists, some are physicists, and others are engineers. Still other amateurs have no scientific background and are interested only in pictorial results, and it is hard to write a book which will satisfy the requirements of such varied readers. Yet, in so far as this is possible, this book will do so. The pictorially minded amateur will find many sections of the book entirely understandable, dealing as they do with specific directions for carrying out one process or another. At the same time, the scientifically trained photographer will find the theoretical aspects of photography quite thoroughly covered; in fact, the organic chemist should revel in the chapter on color sensitizing dyes. Actually, this chapter goes into the subject almost too deeply, considering the broad nature of the book as a whole. The same may be said of other but shorter sections of the book. The chapter on photochemistry, while it has its place in a book of this sort, is presented in a much too condensed form to do justice to the subject. It would be much better to present the material from a more elementary view-point rather than to go into the equations of the Bohr atom. The last chapter, that on the accuracy of color reproduction, will undoubtedly be rather difficult for most readers, but this is perhaps justified, since many color workers may not even be aware of the existence of chromaticity diagrams, and merely by pointing out that a great deal of work has recently been published on color vision and its relation to color photography, the authors have achieved a worthwhile result.

There has been a criticism of previous editions, which unfortunately carries over into the present edition—that a number of typographical and other minor mistakes have been allowed to appear. For example, on page 675 the word "brief" is used where the word "relief" is meant. Mistakes of this sort, while readily recognizable, are apt to detract from one's estimate of the caliber of the work. Formulas of organic compounds are not too carefully checked,

since there are occasional trivalent carbon atoms and quadrivalent nitrogens.

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DRUGS AND CELL CATALYSTS

The Interaction of Drugs and Cell Catalysts. By FREDERICK BERNHEIM. 85 pp. Minneapolis: Burgess Publishing Company. 1942. $2.25.

THE author of this limited review has summarized the principal literature concerning the *in vitro* interaction of certain selected drugs and cell catalysts in order to attempt a correlation of pharmacological action, and the fate of drugs in the body, with enzyme action. No claim is made for a complete survey of the field. Certain chemical compounds ordinarily termed "drugs," such as the indifferent narcotics, the vitamins and the hormones, are purposely excluded from consideration.

This review, although somewhat less complete than the title might indicate, is perhaps timely and should be studied carefully by all writers and teachers who are concerned with drug actions. It can be recommended heartily to those in this class who have yielded to the temptation to bridge the enormous gaps in our present knowledge concerning the reactions of cells to changes in their chemical environment by dogmatically invoking "enzyme actions."

The critical reader can not finish many sections of this review without being conditioned, by repetition, to the fact that correlations between pharmacological and enzyme action apply, for the most part, in isolated instances only, and under strict and limiting conditions of dosage, physiological state, animal species, etc. A few notable exceptions such as cyanide and physostigmine prove the rule. The evidence, for example, which relates the pharmacological actions of cyanide to its inhibiting effect on cytochrome oxidase, and physostigmine to its inhibitory action on cholinesterase, is definitive and convincing. On the contrary, as the author infers, a generalization such as the one which invokes the cholinesterase mechanism to explain all the diverse pharmacological actions of morphine, strychnine, curare and methylene blue is premature and unjustified on the basis of the facts now available.

Some reasonably good correlations are possible regarding the *in vivo* degradation of certain drugs as a result of enzymic catalysis. The hydrolytic deacetylation of heroin by a specific esterase and the oxidation of alcohol by a liver oxidase are good examples.

The author, a pioneer in the field of which he writes, takes the only position which appears to be tenable at the present time, *i.e.*, he reviews the facts, indicates the possible mechanisms which may be involved, suggests trends and methods of study and carefully refrains from personal opinions and from broad generalizations. He is frank to admit that one of the principal purposes of this review is to invite greater investigative effort in this field. The review will be welcomed by those engaged in this line of endeavor and should provide great satisfaction to the casual reader whose search is for questions, rather than answers.

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SPECIAL ARTICLES

THE LETHAL EFFECT OF TRIETHYLENE GLYCOL VAPOR ON AIR-BORNE BACTERIA AND INFLUENZA VIRUS[1]

IN an attempt to gain further insight into the mechanism of the bactericidal and viricidal action exhibited by propylene glycol vapor for air-borne disease agents[2, 3] a number of glycols and related compounds were tested with the same techniques employed in the studies on propylene glycol. Among the compounds investigated were other members of the aliphatic glycol series such as ethylene glycol, diethylene glycol, triethylene glycol, trimethylene glycol, dipropylene glycol, various butylene glycols, a number of aliphatic and aromatic ethers, alcohols, ketones and amines and compounds containing various combinations of these active chemical radicals.[4] Some of these substances were found to be fully as effective as propylene glycol and several of them considerably more lethal for air-suspended bacteria. However, with two notable exceptions most of these latter compounds were unsuitable for practical use because in the concentrations required they were toxic or possessed a disagreeable odor. The two substances which exhibited a high degree of germicidal potency and were odorless were triethylene glycol and dipropylene glycol. There is not much data available on the

[1] This investigation was aided in part through the Commission on Cross Infections in Hospitals, Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the Army, Preventive Medicine Division, Office of the Surgeon General, U. S. Army.

[2] O. H. Robertson, E. Bigg, T. T. Puck and B. F. Miller, *Jour. Exp. Med.*, 75: 593, 1942.

[3] O. H. Robertson, C. G. Loosli, T. T. Puck, E. Bigg and B. F. Miller, SCIENCE, 94: 612, 1941.

[4] A detailed record of these experiments together with a theoretical analysis of the mechanism of action of glycol vapors will be presented elsewhere.