Whatever may be the exact chemistry of this action, it is at least evident that to obtain a C. P. sodium chloride on a manufacturing scale, that shall be free from all insoluble matter, is practically an impossibility, though the amount of this insoluble matter may be reduced, under the best circumstances, to a negligible quantity.

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NEW BOOKS.

The Chemical Basis of Pharmacology. An Introduction to Pharmacodynamics Based on the Study of the Carbon Compounds. By FRANCIS FRANCIS AND J. M. FORTESCUE-BRICKDALE. London: Edward Arnold. 1908. Price, $4.00.

It is stated to be the purpose of the writers of this book to give their readers an outline of the relationship that exists between the chemical structure and the physiological action of drugs. The arrangement of the subject matter, according to the preface, "is on lines resembling those found in works on organic chemistry, and so much of general chemical theory has been introduced as will suffice to render this portion of the subject clear to those who have not recently studied it."

An idea of the scope of the book is best obtained by a glance at the table of contents. Following a chemical introduction and a general physiological introduction we have a chapter on the aliphatic and aromatic hydrocarbons in which is also treated the physiological reactivity of these bodies as influenced by the introduction of methyl and ethyl groups and also the influence of the unsaturated condition of the molecules and isomeric and stereoisomeric relationships. Then follow chapters treating of changes in organic substances produced by metabolic processes, also of anaesthetics, hypnotics, antiseptics of various kinds, antipyretics, urethanes, ureides, purine compounds, alkaloids, glucosides and synthetic products whose physiological action is similar to that of certain alkaloids. The last chapter discusses taste and odor as dependent on chemical constitution and closes with a brief account of organic dyes. An appendix containing notes on recent investigations and a fairly good index close the volume.

It seems to the reviewer that it is of questionable value to write in our day a hybrid treatise of this sort. It is true that the aspect of pharmacology which is here discussed involves a thorough knowledge of organic chemistry on the part of the author who undertakes to treat it, as witness the exhaustive treatise of Sigmund Fraenkel or the smaller work of H. Hildebrandt. But a few pages devoted to the synthesis of aliphatic derivatives, or to "the methods employed in the synthesis of derivatives of aromatic hydrocarbons," or to the chemical characteristics of various groups of drugs, can be of little value to a reader in the way of preparing

n for an understanding of the chemical basis of pharmacology. Foot-notes referring to standard treatises on synthetic methods and to important original papers in chemistry are quite sufficient and leave the writer free to devote his pages to the real question at issue.

But on the other hand, it is essential that treatises of this sort should give to chemists and others not trained in the physiological sciences an adequate conception of pharmacodynamical action, and it is just here that our hybrid treatise falls short of what sound scholarship demands. There is a lack of detail and of precision in the description of pharmacological processes and a glossing over of difficulties which are apt to mislead the uninitiated reader and to cause him to believe that we are really in possession of far-reaching theories of pharmacological action. A more careful treatment of the subject on its biological side would show the reader that the results thus far obtained hold only for small families of organic substances and lead as yet to no theories of wide application. It is quite true, however, that in certain homologous series chemical alterations of a definite character will be followed by physiological changes which agree fairly well with the predicted result—but as a rule when side reactions are taken fully into account the agreement with theory is anything but perfect.

To give an instance of lack of detail in pharmacological treatment and of the acceptance of a theory on insufficient evidence the following case may be cited. In discussing the differences in pharmacological behavior that are shown by quaternary ammonium compounds as compared with those shown by the tertiary type (pp. 54, 179) it is stated that "this new characteristic (the appearance of "curara-action") is dependent on the change in stereochemical configuration—on a change from a plane to a tridimensional arrangement of atoms."

Even Fraenkel who proposed this hypothesis admits to his pages some evidence which is opposed to this view. Our authors might well have given a few details from the writings of Richet, Tillie and Santesson as showing that in some instances, at least, this alteration in the valency of nitrogen does not give rise to an entirely "new characteristic" (the curara-action) but only induces a change in the sequence and in the intensity of certain inherent and fundamental pharmacological properties of the molecule. To take the well-known case of methyl strychnine versus strychnine: the former compound exhibits a curara-action under ordinary circumstances, but strychnine itself too can be made to exhibit an intense curara-action under artificial respiration to speak here only of warm-blooded animals; that is to say, when strychnine is changed to the alkyl alkaloid, a curara-action does not arise *de novo*, but is merely pushed into the foreground of the pharmacological picture. Fühner, indeed, speaks of "curara-action in the broadest sense" as a widely distributed, if not a general characteristic, of all nerve poisons with basic properties.

Then, too, on this connection it might have been well to speak of Meyer's hypothesis that the development of a curara-action in the substances under discussion is to be referred to the "increased basicity" (basenstärke) of the quinquivalent as distinguished from the trivalent compounds from which they were derived. Führer's recent studies in the field of curara-action tend to support this hypothesis.

Another instance of insufficient treatment from the pharmacological point of view is seen on p. 92, where primary alcohols are dismissed with a few brief and colorless statements. Methyl alcohol is referred to as acting "to some extent in an exceptional manner" while in the case of the other members of its series pharmacological action increases in intensity as the series is ascended. Not a word is said about the highly interesting pharmacological properties of this alcohol, which fits only poorly into its homologous series as soon as we consider its pharmacological behavior from *all* points of view.

The formation of sulphocyanides in the body is a subject that is likewise treated in too fragmentary a manner, considering its theoretical importance.

Numerous other examples of a lack of thoroughness in the treatment of pharmacological questions might be cited. The book gives one the impression of having been compiled rather hastily and therefore fails to represent a high standard of scholarship in pharmacological research.

Treatises covering this field are needed for the English reader and it is to be hoped that our authors will present this subject in future editions in a more adequate manner. JOHN J. ABEL.

Determination of Radicles in Chemical Compounds. By DR. H. MEYER, Imperial and Royal University, Prague. Authorized translation by J. Bishop Tingle, Ph.D., F.C.S. Third American edition, revised and enlarged. 12mo., iv + 218 pp. Cloth, $1.25 *net*. New York: John Wiley & Sons. 1908.

The third edition of this excellent book is welcome. It can be heartily commended to all organic chemists.

The text of the previous edition has been thoroughly revised and cross-references inserted to the new material. The latter is added in an appendix, which increases the total text of the book by about 35 per cent. and brings it as nearly up to date as is possible. In general style and make-up, the book resembles the earlier editions. MARSTON TAYLOR BOGERT.