is seeking to interpret it in relation to other findings.

The subject-matter is presented in three parts. Part I (641 pp.) is entitled "The Clinical Interpretation of Laboratory Examinations" and includes a comprehensive discussion of the many laboratory examinations from the fields of hematology, biochemistry, physiology, toxicology, parasitology, bacteriology, immunology and mycology, which are a part of the armamentarium of modern medicine. Each subject is accompanied by a discussion of normal functions and values, to aid in the understanding of pathological variations. Naturally, much of this material is standard, but the author has drawn considerably on his own extensive experience for aid in interpretation, and there is much recent material on such subjects as hormones and vitamins, for example, which in general is of excellent quality and not readily available elsewhere.

In Part II (328 pp.), the many diseases for which laboratory data are of value are discussed briefly but individually, from the point of view of clinical characterization and relevant laboratory information. There is considerable repetition of material from Part I in this section, which is perhaps unavoidable.

Part III (142 pp.) presents the technique of certain of the more common laboratory examinations and is intended for use in the teaching of clinical pathology and in the smaller laboratories. This section was not meant to be extensive, nor is it; its scope can be illustrated by the chapter on quantitative blood analysis, which contains, in addition to the recent copper sulfate method of Phillips, Van Slyke, *et al.*, for determining specific gravity of whole blood and plasma, methods for the following: sugar, CO_2-combining power, urea nitrogen, non-protein nitrogen, the plasma proteins, bilirubin and the sulfonamides. Visual colorimetry is described; modern photometric procedures, which are now routine in many hospital laboratories, have been ignored.

A noteworthy feature of the book is the author's emphasis upon what may be called the "pre-laboratory" phase of a laboratory examination, *i.e.*, the proper preparation of the patient and collection of material. The author feels, and rightly, that too much laboratory information may be rendered valueless because of ignorance or neglect in this respect. Another feature is the many tables found throughout the book which summarize textual material; while these may be open to the criticism that they tend to make controversial material appear established, there is no question but that they are a great convenience when used intelligently. There is also an excellent and up-to-date bibliography for each chapter.

Those portions of the book which deal with fundamental biochemical material are in general quite unsatisfactory. The sections on acid-base balance (pp. 99–102, 850–853) will scarcely be of value to any one who does not already understand the subject; a portion of the treatment of alkalosis on page 100 appears to be missing entirely. In the discussion of nitrogen metabolism such statements as these are found: that creatinine is a product of endogenous protein metabolism (pp. 73, 107); that urea is one of the chief products of protein digestion as well as of protein metabolism in the tissues (p. 102); that it is a major source of urinary ammonia (p. 72), and that it is formed from ammonium carbamate (p. 107); and in the table on page 62 we are told that the creatinine content of the urine is independent of the diet, whereas on page 73 the true state of affairs is given. On page 103 we read that the fatty acid equivalent of ingested protein is 42 per cent. by weight, a value presumably obtained by subtracting 58 from 100.

These are small points, perhaps, in only one of the many fields covered by the author, but they represent the level of biochemical knowledge found throughout the book, and this level must be regarded as inadequate. It does not appear unreasonable to expect as high a degree of technical precision in any particular field embraced by the author's treatment as one should find in a specialized treatment of that field, even though the scope be necessarily limited.

The book is printed in type which is clear and easy to read, and the general typographical arrangement is excellent; typographical errors are not too numerous. Those who purchased the first edition of this book, which appeared in September, 1943, priced at $8.00, will be interested in knowing that no differences whatsoever have been noted between the two editions except in (a) price, (b) the inclusion in the revised edition of the specific gravity method mentioned above.

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CHEMISTRY

Systematic Inorganic Chemistry. By DON M. YOST and HORACE RUSSELL, JR. New York: Prentice-Hall, Inc., publishers. 423 pp. $4.60.

PROFESSOR YOST and Dr. Russell have set out to write a book which is complete on the elements discussed—nitrogen, phosphorus and the oxygen group—and have succeeded notably. "Systematic Inorganic Chemistry" will undoubtedly remain the standard reference text in its field for many years. By critical

selection of experimental data, together with the careful inclusion of experimental data in support of each conclusion presented, the authors have achieved the happy result of a book that is authoritative without being encyclopedic.

Among the best features of the treatment are the following:

(1) For each molecule whose structure is definitely known from electron-diffraction or x-ray data, the interatomic distances and bond angles have been given and a helpful scale drawing of the molecule included. For molecules whose structure must be deduced from other evidence (*e.g.*, spectra, freezing-point depression, chemical reactivity) the actual data are cited.

(2) By judicious use of tables, the authors have been able to include a wealth of physicochemical data for each compound, without interfering with the continuity of the text.

(3) About half the book is devoted to the methods of preparation and the principal reactions of the compounds discussed. In these sections the authors' physicochemical approach shows to great advantage. Each equilibrium is discussed from a quantitative, thermodynamic point of view. Numerical reaction-rate laws, or occasionally tabulated rate data, are given for almost every reaction discussed. For complex reactions (those of nitrous acid, hypophosphorus acid, or peroxydisulfate, to mention a few) the probable reaction mechanisms have been outlined.

"Systematic Inorganic Chemistry" should prove to be not only a valuable text for the graduate students for whom it was designed, and not only a reference book for any research worker who uses these inorganic compounds, but also a challenge to other inorganic chemists to write equally good books covering other parts of the periodic table.

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SPECIAL ARTICLES

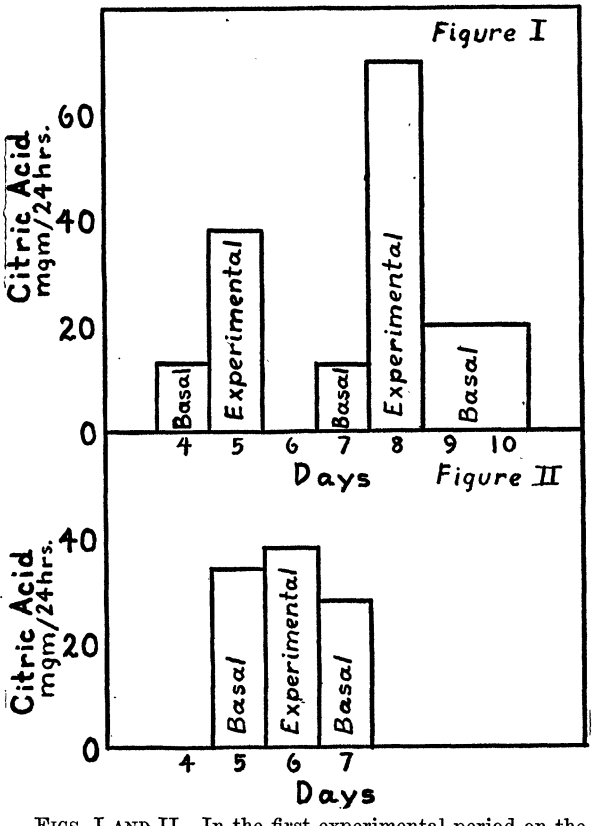
THE EFFECT OF COCARBOXYLASE ON THE CONVERSION OF FAT TO CARBOHYDRATE

IN a recent study on the conversion of fat to carbohydrate, two lines of attack suggested definite possibilities. The first arose from a realization of the fact that odd-numbered fatty acids are readily converted to glucose[1]; the second, from the apparent necessity of a catalytic reaction to increase the sugar production over that already present in an animal. Since the experimental diabetic animal produces sugar in large quantities, it was conceivable that the second approach might increase sugar output in this animal.

If one could cause an even-numbered carbon fatty acid chain to be converted to an odd-numbered carbon chain, the conversion should proceed from that point to glucose. The reverse reaction, in which an odd-numbered carbon acid (pyruvic) is converted to an even carbon chain, is known. The catalyst involved is cocarboxylase. Its action is believed to involve reversibly the liberation or combination of CO_2 from pyruvic and back to pyruvic.

The molecule that most closely resembles pyruvic acid and that is intermediate in the breakdown of fat is acetoacetic acid. It differs from pyruvic acid only in having one more carbon and in having the keto group in the beta position instead of the alpha. Since the alpha keto acid can form sugar, it was reasoned that the beta keto acid should, after decarboxylation, perform in a similar manner, though probably to a much less extent. It therefore seemed worth while to

[1] J. S. Butts, H. Blunden, W. Goodwin and H. J. Deuel, Jr., *Jour. Biol. Chem.*, 117–131, 1937.



FIGS. I AND II. In the first experimental period on the fifth day off insulin, 6.54 grams of the acetoacetate radical were given by stomach tube along with 32.9 milligrams of cocarboxylase. On the eighth day off insulin, 6.54 grams of the acetoacetate radical plus 33.5 milligrams of cocarboxylase again were administered by stomach tube. In the last experimental period the animal utilized 3.77 grams of the acetoacetate radical, excreting as citric acid