tance of and respect for professors and professional workers will depend directly upon the spirit of service exhibited by each.

I feel that science is an intellectual activity, and that its nature is the very essence of the practical.

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EDUCATION IN ARGENTINA

I WAS quite surprised to find two misstatements in Dr. Shellenberger's note under this title.[1] One is an insignificant slip—the revolution occurred June 4, 1943, not June 3—but the other is somewhat more important. His sentence, "Each change in the position brings about the resignation of each of the interventors assigned to Argentina's six universities," is too sweeping. The Universidad Nacional de La Plata has not had an interventor for many years, and since the revolution there has been but one change in the presidency. In October of 1943, a set-to between the then minister and the then president of the university, over the execution of decrees resulting from the Manifesto[2] made the tenure of the presidency unbearable to any conscientiously liberal-minded man, and the president, vice-president and several other members of the Superior Council resigned; while other members, with totalitarian sympathies or tendencies, remained, and one of these latter assumed the presidency. Several months later there was held an election at which he was, on the first balloting, confirmed in office for a full term. The proportion of blank ballots cast was large enough to be highly significant of discontent, but not sufficient to invalidate his election.

This correction does not alter the spirit of Dr. Shellenberger's note, nor in the least affect his conclusions; but in ticklish matters such as these one should be meticulously careful in stating facts, else a well-intentioned declaration may do more harm than good.

Local circumstances oblige me to use a pseudonym.

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BUENOS AIRES

SCIENTIFIC BOOKS

THE CHEMISTRY OF CELLULOSE

The Chemistry of Cellulose. By EMIL F. F. HEUSER. v + 660 pp. 15 chapters, with 87 tables and 112 figures. New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd. 1944. $7.50.

THE rapidly expanding research in the field of cellulose combined with the diverse and extensive uses of this product as a raw material of industry have created an urgent need for a concise summary of the present state of knowledge of this subject. A brief compendium was called for, which would not only serve as a digest of the literature on the chemistry, physics and uses of cellulose, but which would also offer a systematic, coherent and integrated presentation of the subject for the interested technologist and for the student. The author undertakes to meet most of these requirements and does so quite successfully.

Dr. Heuser's work in the field of cellulose has been extensive and distinguished. His first book, following many contributions to the literature on the subject, was published in 1921. The author is systematic in his presentation and meticulous in supporting his statements and conclusions with references to literature, characteristics for which the reader will be grateful.

After an introductory chapter, Dr. Heuser deals with morphology of the fiber and composition of the cell wall. In this reviewer's mind, Dr. Heuser has done well in this treatment in exercising discrimination as to the reliability of references which have been confusing in the literature. It might have been well if the author had exercised this prerogative even more extensively.

In Chapters III, IV and V, the reactions of cellulose with water, with aqueous alkalies and finally with organic bases, ammonia and concentrated salt solutions are taken up.

Great space and weight are naturally given to the reactions of cellulose with alkalies (Chapter IV), which form the basis of industrially important processes. This topic is confusing, as every worker in this field knows, but the author, by making his discussion replete with figures and tables, does much to bring clarity to the reader.

In the chapter on the action of cuprammonium hydroxide on cellulose, an important process in the textile industry, each of the factors and conditions affecting the reaction is separately treated from a purely scientific point of view but without much reference to the industrial process. Although this treatment accords with the author's intent, as stated in the preface, a brief discussion of the industrial process would have been helpful.

The bulk of the book (Chapters VII, VIII and IX) is devoted to the important chemistry of the cellulose esters, cellulose xanthates and cellulose ethers, respectively. In dealing with the cellulose esters the author

[1] SCIENCE, 100: 11, 1944.

[2] SCIENCE, 98: 467, 1943.

has gone thoroughly through the literature and coordinated almost 600 references to cover the topic and to assist the reader more easily to understand the excellent presentation of the effect of the many reaction variables.

Although only 68 pages (Chapter X) are devoted to the oxidation of cellulose, oxycellulose, the fractionation of oxycellulose, the method of preparation, the mechanisms involved and various other aspects of these topics, this coverage presents an adequate summary of the present status of these subjects.

In the following three chapters (XI, XII, XIII), the decomposition of cellulose by acids, heat and by biological processes, respectively, are studied. The author follows similar patterns in each case. First he handles hydrocellulose, its fractionation, its formation, rate of formation and properties, and then takes up the formation of special products produced under unique conditions—such as cellobiose, glucose, etc., giving due and adequate consideration to the factors and conditions involved.

The chapter on the thermal decomposition and destructive distillation of cellulose is perhaps the least adequate of the book in view of the industrial significance of this topic. However, a more adequate treatment would have materially lengthened the book, and this topic forms the subject of several existing and adequate treatises. Noteworthy is the addition of a special treatment on the "Hydrogenation of Cellulose"—appearing for the first time in a textbook, so far as this reviewer is aware. Here is a field in its infancy. As yet the literature is mostly in the form of patents of very conflicting specifications and claims.

Chapters on the chain structure and the molecular weight of cellulose, respectively, conclude the book with an exposition of some of the laboratory techniques employed in these fields.

The book fulfills the promise of the author's preface, "emphasis has been laid on the scientific aspect rather than on the practical application of cellulose chemistry, . . . the book may be regarded as a textbook . . . (for) a student who is looking for guidance in his studies and who expects to find an unbroken and coherent treatise, rather than a number of individual and loosely connected chapters."

Some lack of clarity is occasionally encountered. An example or two will suffice. On page 552 the author postulates the formation of levoglucosan from cellulose on distilling in vacuo, as arising from the dehydration of glucose, which presumably is formed as a primary product. Some source of water must be available to produce the glucose, and this may, of course, come from the pyrolysis of another part of the cellulose molecule. However, the author fails to provide a source of moisture and leaves the reader somewhat puzzled to formulate the entire process which the author has in mind. Again, on page 146, data are presented which might be misleading. The percentage of cotton linters dissolved is based upon a total of 2 grams of cellulose exposed to the action of the hydroxide solution. The data are correct, but the uninformed reader might assume from the table that weak copper solutions were capable of dissolving high concentrations of cotton. Fortunately, such instances are relatively rare.

Certainly, "Cellulose Chemistry" is a helpful addition to the library of the scholar, to those who practice the chemistry of cellulose in industry and in research activities, and above all, to the advanced student who, by Dr. Heuser's coherent and systematic presentation of the topics, can be guided in his studies to an understanding of a difficult field of chemistry.

The printing and general format are good. Sized paper is used and space is well conserved in accord with W.P.B. restrictions.

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SOLID ADSORBENTS

Bibliography of Solid Adsorbents. An Annotated Bibliographic Survey of the Scientific Literature on Bone Char, Activated Carbons, and Other Technical Solid Adsorbents for the Years 1900 to 1942 Inclusive. By VICTOR R. DEITZ. A contribution from the United States Cane Sugar Refiners and Bone Char Manufacturers, and the National Bureau of Standards. $7 \times 10\frac{1}{4}$ in. lxxxi + 877 pp. Bound in black cloth, with gold lettering and red back title bands. Washington. 1944.

DON'T gather from the subsidiary title of this very important publication that it is of interest only to the sugar refiner. Far from it. For you are more intimately and more immediately concerned than perhaps you suspect. In fact, your life may depend upon the efficiency of the activated carbon in the cannister attached to your gas mask, as supplied by the Chemical Warfare Service of the United States Army. Further, solvent-recovery adsorbents play a leading role in many organic chemical industries. Large amounts of expensive solvents are recovered through the use of activated charcoal, and the resultant economy makes possible otherwise unprofitable processes. In the packaging of goods for storage or shipment, moisture adsorbents provide protection against mold, mildew and corrosion. The purification of water, refining of petroleum products, agricultural uses, biochemical, medical and pharmaceutical applications, as well as applications to foods, wines, liquors,