in which "aza" is used to denote the replacement of a –CH member of a benzene ring by a nitrogen atom. The "Chemical Abstracts" and "Ring Index" systems of nomenclature are also given.

A helpful, though somewhat superficial, introductory chapter serves to acquaint the reader with some of the more important cyclization procedures and mechanisms which form the basis of many of the subsequently described syntheses. Inevitably, a few minor errors have crept into the work which undoubtedly will be corrected in subsequent editions. For example, on p. 136 hydrogen cyanide (rather than cyanogen) is said to react with *o*-phenylenediamine to give 2,3-diaminoquinoxaline. A chapter describing some of the general ultraviolet absorption properties of heterocyclic systems is especially welcome, in view of the scarcity of such collected information. The chapter would perhaps have been more illuminating if the discussion had been illustrated with tables giving data for some specific compounds. On page 560 it is stated that the additional absorption ($\eta \rightarrow \pi$) band in polyaza compounds is shifted progressively to longer wave lengths with every increase in the number of annular nitrogen atoms. This is not strictly true, since pyridazine, with its two adjacent ring nitrogens, exhibits a larger red shift than *sym*-triazine with its alternating nitrogens.

In summary, this is a well-presented, readable volume which, like its predecessors, will be a fine asset to workers in this field.

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EXPERIMENTAL STATION R. A. CARBONI
E. I. DU PONT DE NEMOURS AND CO.
WILMINGTON, DELAWARE

The Chemistry of Drugs. Third Edition, Entirely Revised and Enlarged. By NORMAN EVERS, Ph.D., F.R.I.C., formerly Director of Research to Allen and Hanburys Ltd., and DENNIS CALDWELL, B.Sc., F.R.I.C., Development Chemist to Allen and Hanburys Ltd. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. 415 pp. 16 × 23.5 cm. Price, $12.25.

This is the third edition of Evers' "The Chemistry of Drugs" and according to the authors this new version has been completely revised and rewritten. The book is divided into two major sections: The first deals with synthetic compounds which are grouped according to their biological action and the second covers naturally occurring drugs. Most of the latter section is devoted to alkaloids, although such topics as purgatives and antibiotics are also discussed. Chapters on hormones and vitamins are included although, strictly speaking, these substances are not drugs.

The authors' rigid adherence to the arrangement of material often led to difficulties. In the chapter on synthetic antimalarials the usual compounds such as pamaquine, pentaquine, chloroquine and mepacrine are covered. However, quinine and its congeners are described in the section on cinchona alkaloids. Similarly, atropine and scopolamine, prototypical compounds, which form the basis for most of the antispasmodic work, are not discussed in the chapter devoted to this subject because they happen to be solanceous alkaloids. There are several other instances of this schismatic treatment and the opportunity to point out structural similarity between natural and synthetic drugs is missed. It is unfortunate that the authors did not use a unified approach by classifying all drugs according to their therapeutic similarities.

The method of presentation usually consists of giving the name and formula of a drug, a method or methods of synthesis and concluding with a description of some physical properties such as the melting point and solubility. In the first section each chapter begins with a brief definition of the activity in the heading. Thus tranquilizers are defined as drugs that induce a mental state free from agitation and anxiety. Even if one accepts this definition it is still difficult to see how methylpentynol, a sedative, mephenesin, a spinal cord depressant, and methyl phenidate, a mild stimulant, fall into the same class as the true ataractic drugs chloropromazine and reserpine. The latter, of course, is not discussed here because it is a product of natural origin.

It would have been better if the authors devoted more space to the mode of action of drugs and to a critical discussion of the merits and demerits of those that are in current use. In the chapter on synthetic tuberculostats more attention is devoted to the therapeutically obsolete thiosemicarbazones than to isoniazid which is the present drug of choice.

British names are used in perference to American ones, but this causes no more than a minor inconvenience. The appendices which list official (B.P. and U.S.P.), proprietary and chemical names of the drugs are extremely helpful. The errors in the book are few and easily recognizable.

The authors have compiled a volume wherein the synthesis of fairly common drugs can be found readily. If this was their goal then they have succeeded. I believe that most individuals will find that it is too modest an achievement to warrant purchasing the book.

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The Physico-chemical Constants of Binary Systems in Concentrated Solutions. Volume 1. Two Organic Compounds (without Hydroxyl Derivatives). By JEAN TIMMERMANS, Hon. Professor, Université Libre, Brussels, Belgium. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N.Y. 1959. xiii + 1259 pp. 18.5 × 24.5 cm. Price, $29.00.

This compilation of numerical data on "binary systems in concentrated solutions" is planned to appear in four volumes, arranged as follows: I, two organic, non-hydroxyl compounds; II, two organic compounds, at least one a hydroxyl derivative; III, one or both components a "metallic compound" (including salts); and IV "all other systems." The only class not to be included is the alloys. The present volume, I, is divided into seven parts, according to whether or not one or both components contain halogens, oxygen, nitrogen, oxygen and nitrogen, etc., in general "according to the degree of physico-chemical similitude of the components." The arrangement followed in each part is clearly explained and is easy to use.

The material for each system is presented in clearly constructed tables, covering first heterogeneous equilibria (vapor pressure, compositions of coexisting phases, freezing points), then properties of phases (density, viscosity, optical, electrical), and finally thermal constants (heats of mixing, etc.). The format is good, two columns to a page, with plenty of space and dividing lines. The legibility is excellent; there is no crowding, the numbers are not too small, and there is no microscopic print.

The book will thus make easily available an immense mass of data of a certain type. For what particular "field" or for what particular group of workers such a collection will be particularly valuable it is difficult to say, for "binary systems at high concentrations" is hardly a "field." This is perhaps not a serious question, for at twenty-nine dollars a volume we may expect that in general only libraries and large laboratories will be purchasing the work. When thus available, however, the book, in its spread and variety, will undoubtedly prove useful even if any one person will probably use only a small part of it.

Volume I, the only one presently available, is not complete in itself. The literature references are cited by author's name and year, and the required information is to appear in Volume IV for the whole series. Volume I, moreover, has no index. While the binary systems involving aniline, for example, can be found easily as long as aniline is the "first component," all those in which it is the "second component" cannot easily be searched out without the final index. Moreover, in the majority of cases each system is identified only according to the "common names" of its components, and it is promised that a Table, to appear in Volume IV, will follow the classification of *Chemical Abstracts*, together with synonyms.

These are only temporary drawbacks in the use of the present volume. In the meantime, however, some difficulty arises from the use of equivocal names such as nitronaphthalene, diethylbenzene, amyl naphthyl ketone, tetracyanoheptane, dichlorobenzophenone, etc. It is not clear how the final index will help this situation, which is an uncertainty in the tables themselves.

The preface implies that the literature has been covered through 1957. The discovery of omissions, if there are any, will have to wait upon the use of the book, as in all compilations. In the present case, however, uncertainties about

complete coverage will arise because of the question of the meaning of the term "concentrated solutions." The author states that "As concentrated solutions I choose to consider arbitrarily systems between 10 and 90 per cent by weight; I left also out of consideration data relating to dilute solutions, if there is only one measure between 10 and 20%." This is not altogether clear. While it suggests that the tables would give no data outside the range 10–90%, there are actually very many tables covering very low concentrations at one or both ends of a system. When such information is not given, the reader will not know whether it was omitted according to plan or whether the literature contains no such data.

Many of the systems are covered in great detail, while some are given with just three points, the pure components and one binary point, as for the over two thousand azeotropes cited from Lecat's book (1949). (The rest of Lecat's 6287 azeotropic systems will presumbly be included in the subsequent volumes, but Lecat's information on "zeotropes," altogether 7003, seems to have been ignored.

As a mechanical compilation this is quite unlike any other collection of numerical data, in that there is no averaging, no critical selection, of values. It simply presents the numbers as they were originally published. The densities of benzene–toluene solutions, for example, appear in nineteen consecutive tables, some long, some short, from the year 1896 to 1956. The author adds no comments on relative dependability, and the number of "significant figures" is left as in the original papers. The density of benzene itself, for just 25°, appears about 100 times in the Volume, many of the entries being from the same source. They cover a range from 0.8696 to 0.87661 (in one case 0.871651, from 1919). There are also the values 0.86035 and 0.8617; these are not "sports," however, but the result of the reversal, either of order or of meaning, in the composition column. The range almost overlaps that for the density at 20°(about 70 entries): 0.8760 to 0.8809, not counting one value, inexplicable, of 0.8710, and including 0.878434, from 1910.

Personally I think that this is not as valuable as would be a compilation of selected data, a thing which Dr. Timmermans undoubtedly could have done with ability and authority. But it would not have been possible without much more help than he used. And there will certainly be those who will appreciate what he did do. It is somewhat like scanning the original articles themselves, at least for the results reported in them. Some of the older items are hardly more than of historical interest. In some cases the mass of figures tabulated would require quite a labor of plotting to deduce the "physico-chemical constants" which they determine. This is the case with the pressure–volume–temperature–concentration data for the liquid–vapor relations of the system benzene–ether, given in two tables, one from 1881 and an extremely extensive one from 1908.

A more or less careful perusal of the tables has revealed certain occasional faults. In a few cases, some symbols or functions are not adequately defined, and it is consequently not clear what relation is represented by the numerical values; this happens a few times for the symbols C, C_1, C_2, meaning a solid, undefined, in certain complex phase relations involving liquid immiscibility and liquid–vapor critical phenomena. Symbols are occasionally confused, such as p (=mm.) and P (=atm.). A condition such as the temperature is sometimes omitted. Some numerical values are wrong, as seen simply from the break in trends.

By ironic accident, the very first page of the book has some strange things. The opening table gives diffusion coefficients in the system "methane (CH_4) + tritiummethane (CH_3T)"; but these were simply measurements made with tritium-tagged methane, and one could hardly be farther from "concentrated solutions" even with reagent grade materials. The third table, still on page 1, gives liquid–vapor compositions for methane–ethane; the figures looked strange, and it turns out that "%" (to be understood throughout the book as referring to the second component, here ethane) should be "% methane," and that all the temperatures listed (Centigrade) should be negative. The fourth table on p. 1 (extending to page 2), for the same system, also has strange looking figures; nine of the numerical values were either miscopied from the original or spoiled in printing. There are a few more errors on pages 2 and 3, including confusion between weight and mol % in both Table 5 and Table 6. This checking takes time, because, to repeat, the bibliography is missing. There was at least one small error on each of four more pages chosen at random for checking.

Such occurrences are not surprising in a compilation of this magnitude. In the expectation that there are not too many of them, I would say that they should not seriously impair the general usefulness of the book, particularly for the searcher, already somewhat familiar with the specific substances he is investigating.

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Some Problems in Chemical Kinetics and Reactivity. Volume 2. By N. N. SEMENOV. Translated by MICHEL BOUDART. Princeton University Press, Princeton, N. J. 1959. 330 pp. 15 × 23 cm. Price, $4.50.

This is volume II of a two-volume work. Volume I was reviewed earlier (THIS JOURNAL, **81**, 2916 (1959)). The present volume includes in an appendix a number of minor additions to Volume I, including a brief section on heterogeneous catalysis in biology.

The major sections comprise Parts III and IV of the work. Part III is a discussion of Kinetics of Chain Reaction, with particular emphasis on competition between chain reactions and direct or molecular reactions. Examples of decomposition and pyrolysis, oxidation and halogenation, polymerization, etc., are discussed. Part IV deals with branched-chain reactions and thermal explosions. Chain ignition, with detailed consideration of hydrogen–oxygen system, chain interaction, and reactions with degenerate branching are the major topics. This section includes a number of interesting comparisons with Semenov's earlier book on chain reactions, published in 1935.

There are also two appendices on the activated complex and on quantum-mechanical calculations of activation energies.

With this additional volume there are now available a two-volume version of this work from the Princeton University Press, and a one-volume version from Pergamon Press (THIS JOURNAL, **81**, 2917 (1959)). The present edition is a paperback one; but this reviewer finds the translation by Boudart somewhat smoother to read than that of Bradley. Furthermore, the two volumes of the American edition now make available the section on branched-chain reactions and explosions (Part IV), which was not included in the British edition.

Those interested in kinetics of chain reactions, combustion and explosions will find this volume a very effective extension of the discussion of the present status of the field.

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Einführung in die Theoretische Organische Chemie. By HEINZ A. STAAB. Verlag Chemie, G. m. b. H., Weinheim/Bergstr., Germany. 1959. xii + 760 pp. 18 × 24 cm. Price, DM 46.—.

"Introduction to Theoretical Organic Chemistry" is based on lectures given to advanced students at the University of Heidelberg. It deals exclusively with the structure of molecules, and therefore leaves out a good part of what is generally considered theoretical organic chemistry, namely, that part which deals with kinetics, reaction rates and mechanisms. For many, these may be the more important aspects; they are certainly the more complex ones, for, whereas there are many methods available by which to study static molecules, our techniques for studying transition states are much more limited. Nevertheless, this omission is not necessarily a drawback, if the scope of the book is recognized. In fact, this is a good and intelligently written book, and although it draws mainly on work done in the last few decades in this country and in England, no comparable volume, written by a single author, is available in English.

The range of the book is indicated by listing some of the contents. Of the five chapters which comprise the book, the first deals with the chemical bond. The valence-bond and molecular-orbital treatments are discussed in the now familiar semi-mathematical, descriptive terms, and applied