

Book review

Radiation Chemistry of Carbohydrates: by N. K. KOCHETKOV, L. I. KUDRJASHOV, and M. A. CHLENOV, translated into English by M. A. CHLENOV and L. V. BACKINOWSKY, with G. O. PHILLIPS as translation editor, Pergamon Press, Oxford, 1979, viii + 247 pages, including an Appendix of Additional References and Reaction Mechanisms (prepared by G. O. PHILLIPS) and Subject Index, U.S. \$40.00, £18.00.

This book reviews the experimental data on the radiation chemistry of carbohydrates, concentrating on research results reported between 1961 and 1977. G. O. Phillips had discussed results obtained before 1961 in *Advances in Carbohydrate Chemistry* (Academic Press, New York), Vol. 16, and, in an appendix to the present book, briefly treats those published in 1977 and 1978.

The experimental data, obtained by the authors at the Carbohydrate Chemistry Laboratory of the N. D. Zelinsky Institute of Organic Chemistry of the Academy of Sciences of the USSR, constitute an essential part of the book. Classical methods of organic chemistry, and isolation and elucidation of the structure of the radiolysis products, were used by the authors. On the basis of these data on changes in structural organic chemistry, interpretations of the complex processes and transformations in irradiated carbohydrates were made.

The book contains five chapters and an appendix. Chapter one is introductory; chapter two discusses the radiolysis of water; chapter three outlines general approaches to, and methods for, the investigation of the radiolysis of carbohydrates; chapter four reviews the radiolysis of various classes of carbohydrates; and chapter five proposes, for carbohydrates, mechanisms and major transformations that are induced by irradiation. An appendix (pages 208–236), prepared by Professor Phillips, summarizes the current information about radical processes induced in carbohydrates by ionizing radiation. Professor C. von Sonntag made available to Professor Phillips, prior to publication [see *Adv. Carbohydr. Chem. Biochem.*, 37 (1980) 7–77], his analysis of free-radical reactions of carbohydrates as studied by radiation techniques. Information about the radical-chain process shows that the solid, carbohydrate matrix supports extremely novel reactions. The mechanisms summarized in the appendix are complementary to the interests of the authors of the book.

The book was produced from the authors' typescripts in their original forms. The clarity of the presentation in the text is of a uniformly high standard, and the Subject Index is fairly comprehensive. However, reproduction of typescripts in their original form has several editorial limitations.

Some editorial matters are summarized in the following comments. *Item 1.*

The established convention is that, when the chain of an alditol is depicted horizontally, carbon atom 1 shall be *at the right*, but this convention is not adhered to (see, for example, Fig. 3.4 on page 22, 4.5 on page 72, and 4.6 on page 73). *Item 2.* Instead of tesla units, gauss units are employed (for example, on page 23): $1\text{ G} = 10^{-4}\text{ T}$. T is in the SI list, but G is not. *Item 3.* The old-fashioned term "optical density" for optical absorbance (pages 28–31) is used. *Item 4.* Page 71, line 2. D-Galactitol is a nonexistent compound; it is just "galactitol" with no D- or L-. *Item 5.* Throughout, °K is used, when it *should* be merely K (with no degree sign in front of the symbol for kelvin). *Item 6.* Page 76, line above footnote, "Erythrulose" is not an accepted name; it should be D-glycero-2-tetralose. *Item 7.* Page 78, Compound XI is 1-deoxy-D-glycero-2-tetralose. *Item 8.* Table 4.2 (page 83). 2-Deoxy-D-ribose should be 2-deoxy-D-erythro-pentose. *Item 9.* Table 4.2 (page 83). Footnotes should read 3mm and 8mm. *Item 10.* Page 84, paragraph 3, line 5. Plural of gauss is gauss (not gauses). *Item 11.* Page 85. Formula of β-L-arabinose should have C-1 at the right. *Item 12.* Page 89, paragraph 2, lines 4 and 5. The incorrect names glucos-3-ulose, glucos-4-ulose, and glucos-5-ulose are used (there is no reference to page 89, where these appear, in the Index on page 242); the names *should* be ribo-, xylo-, and xylo-, hexos-3-, -4-, and -5-ulose. *Item 13.* Page 92, line 4. XXXIV *should* read XXIV. *Item 14.* Page 100, line 7 up "tetradialdose" *should* read L-threo-tetradialdose (for XLVII).

There are many other editorial items. Also, there appear to be innumerable errors in the list of references, such as: Page 58, *ref. 100*, *should* be Procter. Page 62, *ref. 283*, *should* be H. S. Isbell. Page 135, *ref. 17*, *should* be *Monatsh.* Page 135, *ref. 18*, *should* be *Carbohydr.* Page 135, *ref. 19*, *should* be *Zasshi.* Page 136, *ref. 39*, *should* be G. A. Jeffrey. Page 138, *ref. 126*, *should* be I. M. Sarkar. Page 139, *ref. 151*, *should* be T. M. Shen Han. Page 139, *ref. 163*, *should* be Z. I. Kertesz. Page 205, *ref. 66*, *should* be Whiffen, and page 4635 (not 465). Page 206, *ref. 117*, *should* be Hinojosa, J. C. Arthur. Page 214, *item 6*, *should* be D-gluco-Hexodialdose. Page 214, *item 19*, *should* be D-Arabinonic acid. Page 215, *item 4*, *should* be pentodialdos-4-ulose. Page 218, *bottom left*, *should* be hexonolactone. Page 226, *bottom*, *should* be D-ribose 5-phosphate.

For those concerned with the radiation chemistry of carbohydrates, the results that are surveyed of research conducted from about 1961 through 1978 *should* be most useful.

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