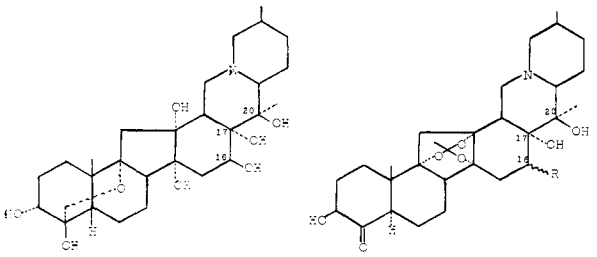
case) bearing a *cis*-1,3-diaxial relationship to the ester group and thus juxtaposed for participation. This hypothesis was tested by treatment of strophanthidin 3-acetate with dilute methanol and cevine for 20 hours[4]; strophanthidin was isolated in 66% yield.[7]

The C_{16} acetate in the germine series also exhibits this abnormal reactivity.[8] Now this group is evidently β(axially)-oriented[5] which requires, on the basis of a 1,3-diaxial facilitation, a β(axial)-orientation of the C_{20} hydroxyl. It was therefore attractive to postulate similar disposition of the C_{16} and C_{20} hydroxyl groups in cevine. The following experiments establish this point.



II (R = α-OH)
III (R = β-OH)

Hydrogenation of 16-ketocevine 3,4-diacetate[2] over platinum oxide proceeded stereoselectively to give cevine 3,4-diacetate. The molecular model of the ketone shows that the α- is much less hindered than the β-face for approach to the catalyst, suggesting that reaction would proceed to give a β-oriented hydroxyl.

Sodium borohydride reduction of 16-ketocevadine-D-orthoacetate 4-acetate[3] afforded a mixture of cevadine-D-orthoacetate 4-acetate[4] and *16-epicevadine-D-orthoacetate-4-acetate*, m.p. 314–316° dec., $[\alpha]^{21}D$ + 65° (*c*, 1.17 chf). (Found: C, 66.21; H, 7.96). The structure of the 16-epi compound was confirmed by oxidation with chromic acid to regenerate the original ketone. In order to liberate the C_{17} hydroxyl group, both epimeric D-orthoacetates were submitted to alkaline hydrolysis followed by treatment with mineral acid to effect rearrangement to the C-orthoacetates.[9] 16 - Epicevagenine - C - orthoacetate (II) crystallized with one molecule of benzene and melted at 276–279° dec., $[\alpha]^{21}D$ −10° (*c* 1.22, chf). (Found: C, 9.09; H, 7.81. The two epimeric C-orthoacetates were compared in their behavior toward lead tetraacetate, and cevagenine-C-orthoacetate[8] was found to react at a strikingly slower rate than the 16-epi compound, suggesting that the hydroxyl groups at C_{16} and C_{17} are *trans*-disposed in the former and *cis*- in the latter. Since the C_{17} hydroxyl group is undoubtedly α-oriented,[2,9] the configurations are established as III and II, respectively.

The established β-configuration of the C_{16} hydroxyl group in cevine now points strongly to a β-configuration for the C_{20} hydroxyl group—a point concerning which there has been considerable doubt.[2,10] We have noted that the C_{16} hydroxyl group of 16-epicevadine-D-orthoacetate 4-acetate is relatively difficult to acetylate. This fact is consistent with the α(equatorial)-configuration for the methyl group at C_{20} which is held rigidly eclipsed with the C_{16} α-hydroxyl group and exerts serious crowding. One is forced to conclude that the simple rules of conformational analysis must be regarded with caution in treating complex structures.[11]

(7) H. B. Henbest and B. J. Lowell, *Chemistry and Industry*, 278 (1956), have independently presented an elegant demonstration of this effect in the sterol series.

(8) *E.g.*, the facile methanolysis of germine-14,15-acetonide 3,16-diacetate, S. M. Kupchan and C. R. Narayanan, *Chemistry and Industry*, 251 (1955).

(9) S. M. Kupchan, THIS JOURNAL, **77**, 686 (1955).

(10) F. Gautschi, O. Jeger, V. Prelog and R. B. Woodward, *Helv. Chim. Acta*, **38**, 296 (1955); K. Macek and Z. J. Vejdelek, *Nature*, **176**, 1173 (1955).

(11) This work was supported in part by a grant (H-2275) from the National Heart Institute of the National Institutes of Health.

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BOOK REVIEWS

Conference on Effects of Radiation on Dielectric Materials. NAVAL RESEARCH LABORATORY. OFFICE OF TECHNICAL SERVICES, DEPARTMENT OF COMMERCE, Washington, D. C. (Publication No. PB111863). 1956. v + 169 pp. 20 × 26.5 cm. Price, $4.25.

This is a compilation of reports presented at a conference on the effects of radiation on dielectrics held at the Naval Research Laboratory in December, 1954. It serves primarily as a survey of the scope of development and of interest in the subject at that time in various university, governmental and industrial laboratories. Among the laboratories represented are the University of Notre Dame, Naval Research Laboratory, Carnegie Institute of Technology, Brookhaven National Laboratory, Argonne National Laboratory, North American Aviation Corp., Bausch and Lomb Optical Co., Oak Ridge National Laboratory, Naval Radiological Defense Laboratory, Westinghouse Electric Corp., General Electric Co., National Bureau of Standards, and Knolls Atomic Power Laboratory. The papers include surveys of the radiation chemistry of organic systems and of the radiation synthesis of polymers, three surveys of radiation effects in polymeric systems, four papers on various deleterious aspects of radiation on organic materials, and eleven papers on the radiation physics of the solid state. The solid state papers are concerned with changes in conduction, optical transmission, magnetic susceptibility and lattice parameters in inorganic crystals due both to the effects of γ-rays and to displacements resulting from fast neutron bombardment.

The twenty-one reports vary widely in detail; a one-half page abstract in one case and thirty pages, including eleven of references, in another. A number of the papers appear

to have been hastily written in order to satisfy the obligation for having spoken at the Conference. In general the reports are brief and heterogeneous in style. They do not serve to give the reader any unified over-all comprehension of the subject matter of the Conference.

The content of this volume is extremely specialized. Workers in the field will find it useful as a catalog of work in progress although the delay in publishing of over a year is somewhat unfortunate. It is not recommended to the general reader who merely wants a cursory review of the physical and chemical effects of radiation.

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Progress in Organic Chemistry. Volume 3. By J. W. COOK, D. Sc., F.R.S., Editor, Principal, University College of The South West of England, Exeter, Fellow of University College, London. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1955. viii + 273 pp. 16 × 25 cm. Price, $7.80.

Volume 3 maintains the same high standards set in the preceding two volumes. This particular work in the progress series is devoted to five topics. These topics are, (1) Total Synthesis of Steroids (43 pages) by J. W. Cornforth, (2) Non-benzenoid Aromatic Compounds (37 pages) by W. Baker and J. F. W. McOmie, (3) The Fulvenes (97 pages) by Ernst D. Bergmann, (4) Organic Compounds of Lithium (46 pages) by E. A. Braude and (5) Indole Alkaloids (49 pages) by V. Boekelheide and V. Prelog. In accordance with the announced editorial policy of this series, Dr. Cook has been eminently successful in obtaining contributors who are actively engaged in the development of the topics discussed in this volume.

This is a well written book, and the reviewer has enjoyed reading these chapters. Synthetic schemes, interrelationships amongst complex compounds, discussions and arguments, etc., have been clearly and concisely presented.

Organic chemists will find this a valuable review of the five topics covered in this volume.

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BOOKS RECEIVED

June 10, 1956–July 10, 1956

HANS A. BETHE AND PHILIP MORRISON. "Elementary Nuclear Theory." Second Edition. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1956. 274 pp. $6.25.

DAVID E. GREEN, Editor. "Currents in Biochemical Research 1956." Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1956. 697 pp. $10.00.

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"Proceedings of the International Conference on the Peaceful Uses of Atomic Energy." Held in Geneva, 8 August–20 August 1955. Volume 6. "Geology of Uranium and Thorium." Columbia University Press, 2960 Broadway, New York 27, N. Y. 1956. 825 pp. $10.00.

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HIROOMI UMEZAWA. "Quantum Field Theory." Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1956. 364 pp. $9.75.