

State Chemistry of Binary Metal Hydrides (1963)] and the bare mention of surface adsorption, hysteresis and other important topics are serious flaws. Perhaps they are treated in the second volume, *Kinetics and Mechanisms*. In these times when chemistry, metallurgy, and solid state physics are converging on the problem of the nature of metals, it would be helpful to orient students towards this convergence by means of a few dozen pages written in the same clear style as the rest of this book.

The format, printing, and illustrations (which include several colored photomicrographs) are excellent, as is the translation (by M. E. Mulder-Woolcock). The book will probably enjoy wide use by metallurgists and metallurgy students because it contains a great deal of factual material, including many phase diagrams, and because it is lucid and concise.

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Biochemical Research

Biologically occurring quinones, particularly those related to ubiquinone, vitamin K, plastoquinone, and tocopherol, have recently assumed increasing interest in a variety of biochemical research areas—for example, in oxidative phosphorylation and electron transport, photosynthesis, and nutrition. This interest stems from the fact that these quinones are easily oxidized and reduced; they provide chemical models for oxidative phosphorylation, and they are present in practically all cells. However, in few cases have these properties been unequivocally related to a distinct biochemical process. As Crane writes, "we have quinones in larger amounts and in more places than we can explain on the basis of recognized electron transport function" (p. 183).

The publisher states that this book, **Biochemistry of Quinones** (Academic Press, New York, 1965. 603 pp., \$18), edited by R. A. Morton, was "planned as a guide to the firmly established knowledge concerning methods of studying quinones and to recent advances in this increasingly important field of research." The first claim is well realized in an invaluable series of articles (by Morton, Pennock, Isler, and Langemann, and J. Green and McHale) on the chemistry and spec-

troscopic properties of the quinones. These articles represent the best current compendium of such data. The power of nuclear magnetic resonance spectroscopy (NMR) in deciding fine points of structure is especially evident. Some cross-references in these articles would have been helpful—for example, there is no mention in Pennock's discussion of NMR spectra that actual figures of such spectra appear in the review by Isler and Langemann, which Pennock's review precedes.

The publisher's claim with regard to recent advances in this area is much more difficult to realize, as it must be in all cases where research is moving rapidly and the publication lag is approximately 12 to 18 months. Recent developments have necessitated a complete reevaluation of some points raised by D. E. Green and Brierley. New advances in knowledge of biosynthetic pathways have also occurred.

In the section that deals with function, a novice might be unaware of some sins of omission concerning the work of groups other than the author's own. To the editor's credit, this seeming disadvantage is turned to an advantage by making it possible for various opinions to be expressed where areas of controversy exist. Although this approach has led to some overlap, it is of minor consequence compared to the benefit of having different points of view presented—for example, the following articles should be compared: the article by D. Green and Brierley with the one by Chance on the role of ubiquinone in electron transport; that by Hemming and Pennock with the one by J. Green and McHale on tocopherol relationships; that by Redfearn with the one by Crane and Arnon on plastoquinone function.

Glover's review on the biosynthesis of quinones is marred by some unfortunate printing and bibliographic errors—for example, on page 215 the formula of sodium bicarbonate is presented rather than sodium formate; on page 240 the reference to Olson and others, 1960, does not refer to formate incorporation as claimed. I noted other errors throughout the book.

The two articles, the one by Redfearn and that by Crane and Arnon, provide a modern picture of the role of plastoquinone in photosynthesis. Redfearn's concluding discussion is excellent. Brodie, in a scholarly article, marshalls impressive evidence showing that naphthoquinones play a role in oxidative processes in *Mycobacterium phlei*.

Clinical and nutritional studies on vitamin K are covered by Doisy and Matschiner and by Mitchell and Marrian. B. Chance provides an excellent review of the difficulties inherent in measuring and relating the rate of oxido-reduction of ubiquinone to the overall rate of electron transport in the respiratory chain. The discussion of the principles involved in building adequate instrumentation to attack this problem is exceedingly well done. Chance suggests that ubiquinone may play a significant role in reverse electron transport.

Reading this book leaves one with the impression that the whole research area is poised for a deeper biological understanding of the role of these universally occurring, highly reactive substances. Despite the shortcomings that I have noted, this book has in great measure fulfilled its aims, and all of those who are interested in quinones will undoubtedly refer to it frequently.

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Cybernetics and Medicine

Complex regulatory mechanisms that operate at the cellular level, the organ level, and the organ systems level are subjects of a considerable amount of current biomedical research. The various regulatory mechanisms also must be interrelated in order to maintain the homeostasis of the entire organism. The study of these biological control systems and of the problems of synthesis and coordination of knowledge about these systems in health and disease is included in the subject of cybernetic medicine as it is presented by Aldo Masturzo, the author of this monograph, **Cybernetic Medicine** (Thomas, Springfield, Ill., 1965. 158 pp., \$6.50). In addition Masturzo presents a short commentary on regulatory mechanisms that may be applied to the area of social medicine.

In the United States there is no general agreement among scientists about what the subject of cybernetics should include, and it is not likely that a student could obtain an advanced degree in "cybernetics." For similar reasons the subject of cybernetic medicine is illdefined, and perhaps it will remain so because current usage of the word cybernetics seems

to imply analyses or procedures which have unusual characteristics. Terms such as cybernetic logic, cybernetic models, and cybernetic methodology do not help to clarify what cybernetics as a discipline can contribute to biomedical research, to the maintenance of health, and to the treatment of disease. I wish the author had not used these phrases but had described in more detail the physiological control systems and probabilistic mechanisms with which the experiments were concerned.

The book presents in four chapters a selection of examples which the author uses to illustrate cybernetic principles applied to biology and to ten medical specialties. The reference material is rather limited and is taken mainly from papers presented at the Congresses of Cybernetic Medicine and at the 2nd International Conference on Medical Electronics. This is the first book that I have seen with the title *Cybernetic Medicine*. I had hoped to find in it a more complete introduction to the subject material of the field.

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Attitudes: Yesterday and Today

One of the most distressing of paradoxes has been the concern shown by men of education and good will, during and since the days of the great revolutions of freedom and equality, with the bases—indeed, the “causes”—of human inequality. Because, almost by dogma, they could not find it within the society they had created, nor within themselves, they were forced to look elsewhere for it. In the days before Darwin, one of the favorite “causes” of human differences was assigned to climate; geography was the queen science, and also the determinant of human variation. Nobody had to do anything. With respect to many of these problems, we are still looking for explanations that will keep us from having to do anything.

This book, *An Essay on the Causes of the Variety of Complexion and Figure in the Human Species* (Harvard University Press, Cambridge, Mass., 1965. 345 pp., \$5.95) edited by Winthrop D. Jordan, with its 18th-century title, is actually a reprint of the second and enlarged edition (1810) of a work originally published in 1787.

Its author, Samuel Stanhope Smith, was the Presbyterian minister who succeeded John Witherspoon as president of Princeton University, and who retired from that job under something of a cloud. In fact, Samuel Stanhope Smith suffered a predicament familiar to us today: he was a college president whose students were up in arms because they could not get an education that would prepare them for modern life, whose Board of Trustees distrusted him because he had already deviated too much from the purposes for which his school had ostensibly been established, and whose book was attacked by conservatives who did not like his particular elucidation of one of the knottiest issues of his day—race.

Smith was faced with a theological monstrosity: he had, as his editor notes, either to espouse a theory of the unity of mankind or else face the fact that Holy Scripture applied only to Caucasians. He was not completely comfortable with the unity theory, because he did not like African or Negro culture. His position was that the differences in human physiognomy are created by climate in the first place, and stages of culture (which he calls “the state of society”) in the second; therefore he could have the unity of the species and still dislike “savagery.” The approach seems quaint today—and it would be so, were it not for the fact that most of the stereotypes that bug the “Negro Revolution” today are here set forth, but are proved or disproved (in this field it is six to half a dozen) by a completely outmoded “science”: “As the intensity of the sun’s rays falling on the superior parts of the head has a tendency to contract the forehead and eyes, will not this effect, in consequence of the natural relations between different parts of the system . . . contribute to the dilation of the parts below, whence may be occasioned, in a degree, the unsightly protrusion of the mouth?”

It tells us a great deal about our own time that so sumptuous a reprint of so tenuous a piece of American scholarship could appear, with a fine introduction by Winthrop D. Jordan. Obviously the introduction is a working paper of Jordan’s forthcoming book on the development of attitudes toward the Negro from 1550 to 1812, a book that I await with real interest.

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Chronic Diseases and Disability

One must carefully assess the intent of the editor, Julian S. Myers, and the intended readership before commenting on *An Orientation to Chronic Disease and Disability* (Macmillan, New York, 1965. 496 pp., \$8.95), because much of the material presented in the volume can be found in a variety of medical textbooks designed for non-physicians. The editor has successfully achieved his stated goal in that he has drawn together and arranged a meaningful body of medical information (an especially difficult task in this age of burgeoning knowledge) that will enlighten nonmedical specialists who deal with the chronically ill in their daily work. Designed most specifically for vocational counselors, the volume can be of value to other professionals—nurses, therapists, and social workers, for example. The book would also serve as a good review for general practitioners who have been away from the groves of Academe, and the excellent chapter on respiratory disorders could well be studied by physician trainees in physical medicine and rehabilitation.

All major categories of disease and organ systems are covered. However, the attempt is so inclusive that one wonders if the designation “chronic” disease and disability in the title is entirely accurate.

In general, the choice of material in each chapter reflects careful attention to essentials and a well-balanced presentation of the various elements involved in understanding, diagnosing, and treating human disease. The writing is generally lucid and interesting, and although some of the material may require additional study and further research on the part of the non-physician, much of it is suitable for use by professionals.

A few criticisms seem to be indicated. No reference is made to the audiologist and his technology in the chapter on disorders of hearing. In this age of ever-increasing sophistication with respect to diagnostic instrumentation, this aspect should have been mentioned. Similarly, the problems of language impairment receives very scant treatment (in the chapter on disorders of the brain). In fairness to the editor, I should say that my frequent preoccupation with these problems may give them a greater importance, in my view, than that which the editor of such a text