quent evaporation. Palmitic anhydride (4 mmoles) was added, and the sealed reaction mixture was kept at 70–80° for 24 hr. Chloroform (20 ml) was added and the solution was shaken with Dowex 50 (pyridinium) ion-exchange resin (15 g. of dry resin) for 5 hr. The resin was removed by filtration, and the solution was passed through a column of the same resin (10 g.) to ensure removal of the tetraethylammonium ions. The chloroform was removed by evaporation and a mixture of chloroform–methanol (2:1, 15 ml.), pyridine (13 ml.), and water (3 ml.) was added to hydrolyze the anhydrides. After 15 hr. at room temperature all the solvents were removed by evaporation *in vacuo*, and the residue was dried *in vacuo* over phosphorus pentoxide. The dry product was dissolved in chloroform (20 ml.) and passed through a column (36 × 2 cm.) of silicic acid (Unisil). The column was eluted with chloroform (500 ml.) to remove the palmitic acid, and then with 10% methanol in chloroform (300 ml.). The second fraction containing the product was analyzed for ester linkages by the hydroxamic acid test[14] and for phosphorus according to King,[15] giving a ratio of ester:phosphorous of 2:1 (yield 80%). The product gave one spot on thin-layer chromatography in two solvent systems (chloroform–methanol–acetic acid (85:5:2) and ether–ethanol–HCl–acetic acid (150:3:2:2)). The thin-layer plates were coated with silica gel without $CaSO_4$, and visualization of the spots was obtained by direct charring with 50% H_2SO_4. Treatment of the acylation product with 7 *M* ammonium hydroxide yielded α-glycerophosphate as the sole product, whereas material obtained by acylation in the absence of tetraethylammonium salt yielded a mixture of glycerophosphate and the cyclic phosphate. The glycerophosphate (R_f 0.15) and the cyclic phosphate (R_f 0.50) were detected by paper chromatography using 2-propanol–ammonia–water (7:1:2) as the solvent. Elemental analysis of the dipalmitoyl DL-α-glycerophosphate gave the expected results. *Anal.* Calcd. for $C_{35}H_{68}O_8P$ (648.6): C, 64.75; H, 10.73; P, 4.78. Found: C, 64.89; H, 10.98; P, 4.85.

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Book Reviews

Molecular Orbital Theory. An Introductory Lecture Note and Reprint Volume. By C. J. BALLHAUSEN, Kobenhavns Universitet, and HARRY B. GRAY, Columbia University. W. A. Benjamin, Inc., 1 Park Ave., New York, N. Y. 1964. ix + 273 pp. 16 × 23.5 cm. $4.95.

When reviewing a book written by two friends of high professional stature and undoubted ability, it is most agreeable to be able to express sustained enthusiasm for their work. I am very sorry to have to say that while much of this book does arouse my admiration, I find myself somewhat dissatisfied with the part which, though small, represents in my judgment the heart of the book.

There is, of course, the general question of what critical standards are supposed to be applied to a book which implicitly begs off being a *book* and calls itself instead "An Introductory Lecture Note and Reprint Volume." This is, of course, a clever *finesse* by the publisher, since it enables him to corral busy authors who could not be persuaded to write a *book*. Instead their "lecture notes" are published as a...what? Unbook? In fairness, there are merits to the scheme, beyond the aggrandizement of the publisher. It can and often does make available to a wide audience the personal approach which some specially gifted or expert people bring to their subjects. Moreover, it may—already or in the future—have the advantage that less effort and expense will be devoted to some material of limited or transient interest.

If, for such reasons, one accepts the "half a loaf is better than none" philosophy, one is bound to say that these unbooks should not be criticized for a certain choppiness, a certain roughhewn quality in their style. That, within reasonable limits, is what one expects in "lecture notes."

I do think, however, that no matter what a book (or unbook) is called, there can be no exemption from the normal standards of scholarship in regard to rigor within the declared or implied level of discussion, fairness, and a critical attitude which draws attention to the limitations and failings as well as to the advantages and successes of whatever procedures and approximations are described. In reviewing this book, the foregoing considerations were in my mind.

There are three relatively distinct parts of the book, about which rather different things must be said. The most voluminous part is the collection of reprints. Considered in relation to the material covered in the text, the selection is good. Probably each of us might think of one or another article we would like to have seen included, but it would be hard to fault the selection as far as it goes. My own suggestion would have been to include a few more papers containing tables of overlap integrals (such as Jaffé's several papers on d orbitals) to supplement the tables of Mulliken, Rieke, Orloff, and Orloff (covering s and p orbitals only) which are included.

Inspection of some of the reproduced pages which have been reduced approximately to half their original size does raise questions about the reprint idea in general, or at least about its practical implementation. One might, of course, question the justification for such reprint collections in this age of the Xerox machine, at least in the United States. Even in less developed parts of the world, it has become relatively easy to obtain photocopies of

journal material. But to return to the problem of miniaturization, after carefully reading several columns of such material (pp. 238 and 239, for instance, or Figure 3 on p. 229, parts of which are literally illegible without a magnifying glass), I was feeling the onset of a headache. I asked five friends to make the same experiment, and four of them reacted about as I did. Perhaps each volume containing miniaturized reprints should be sold with a bottle of aspirin. Alternatively, perhaps the format of these volumes should be changed so that the required reduction factor (which would have to be even less than 0.5 were an article from one of the new jumbo size ACS journals to be reproduced in a volume the size of this one) is not too far below unity.

The second most voluminous part of this book (Chapters 1–7) is dedicated to a general exposition of the molecular orbital method. It is introductory in the sense of beginning at the beginning, but it moves pretty fast for a while, being more a brief review than a true introduction for the uninitiated. It is also introductory in the sense of not reaching to the level of quantitative treatment. It does, however, prepare the student to read more advanced and quantitative material, and it nicely introduces, emphasizes, and illustrates the use of symmetry arguments. Certain sections are indeed well enough written to be in a "book," and I think that the authors are to be commended for doing a generally excellent job within the limits they set themselves.

The third part of the book, Chapter 8 and its two appendices, purports to present a detailed account, at a quantitative level, of the molecular orbital method as it may be applied to transition metal complexes. In my opinion, an evaluation of the whole volume should be based mainly on the caliber of this part, since the other parts do not and could not present any very novel or original contribution to the textbook literature, however well they might be handled. Unfortunately, I feel bound in duty to say that this part of the book leaves much to be desired.

In a certain sense, it is perhaps inherently impossible to write a good coverage of this material at the present time, for the same reason as it would have been impossible to write a good geography of North America in 1500. The inexcusable lapse in scholarship in this part of the book is that the authors did not even try. The subject is described recipe-style with scarcely any indication that profound uncertainties exist concerning the validity of certain recommended procedures. The mere outline of the "rules of the game" as it is played by these particular authors adds something, though nothing of great importance, to the descriptions already in the literature. Except for a few sentences on page 131, I could not find any indication to the reader that the recipes provided might be in any way debatable, that other workers have described procedures differing in various ways from the ones described here, or that the results obtained by the recommended methods have been subjected to criticism by others.

In direct contrast to the impression conveyed in this book, the problem of how best to apply MO theory in a quantitative manner to transition metal complexes is at present a very *un*settled problem, to which many people besides the authors are applying themselves, and some of these other workers have expressed and continue to express disagreement with various aspects of the scheme described in this book. It is just plain bad scholarship to make absolutely no mention of this and instead to write Fanny Farmer's Cookbook for the devotees of the lickety-split school of quantum mechanics.

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Alan Wiseman. "Organization for Protein Biosynthesis." American Elsevier Publishing Co., Inc., 52 Vanderbilt Ave., New York, N. Y. 1965. 217 pp. $8.00.