even the β-O–Si interaction proposed by Brook and coworkers.[2] The latter effect, however, is probably small compared to the C–Si π-bonding considered above. For reasonable values of bond distances and angles in silyl carbonyl compounds, overlap of 3d silicon orbitals is expected to be larger with the carbon π-orbital than with the oxygen lone pairs.[6]

Extension of the approach given above to other chromophoric groups can easily be carried out. For example, class 2 substituents on C=C chromophores should produce a spectral shift of the same type as found for class 1 substituents, decreasing the energy of the π–π^* transitions. A further prediction from our theory is that compounds with a boron atom attached directly to a carbonyl group (such as $R_2BCOC_6H_5$), when they are synthesized, will show transitions above 400 mμ and so will appear visibly colored.[8,9]

Acknowledgments.—The authors thank the Air Force Office of Scientific Research for financial support and the Stauffer Chemical Company for a fellowship (to D. F. H.)

---

[6] Such β-interactions may, of course, be important in lowering the energies of transition states, *i.e.*, for rearrangement reactions.[2,7]

[7] A. G. Brook, *J. Org. Chem.*, **25**, 1072 (1960); *J. Am. Chem. Soc.*, **80**, 1886 (1958); A. G. Brook, C. M. Warner, and M. McGriskin, *ibid.*, **81**, 981 (1959); A. G. Brook and W. W. Limburg, *ibid.*, **85**, 832 (1963).

[8] Observations on α-boryl ketones should provide a good test of theory, for β π-bonding of the type suggested by Brook[2] should be negligible to the p-orbital on boron.

[9] NOTE ADDED IN PROOF.—A similar, though less detailed, explanation for the spectral properties of α-silyl ketones has recently been advanced independently by L. E. Orgel, quoted in "Volatile Silicon Compounds," E. B. Ebsworth, Pergamon Press, Ltd., Oxford, 1963, p. 81.

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF WISCONSIN
MADISON, WISCONSIN, 53706

DANIEL F. HARNISH
ROBERT WEST

RECEIVED MAY 31, 1963

Book Reviews

Absorption Spectra and Chemical Bonding. By C. K. JØRGENSEN. Addison-Wesley Publishing Co., Inc., Reading, Mass., 1962. 347 pp. 14 × 22 cm. Price, $10.00.

Probably the largest amount and certainly the dullest[1] prose being written today is the scientific, so-called "literature." As a notable exception, one might cite the works of Christian Klixbüll Jørgensen. Former astronomer and sometime symbolic logician, he writes in a style unmistakably his own and often refreshing in its dissimilarity to the usual run of insipid syntax. Of course, roses (excepting Zephirine Drouhin and a few others) come equipped with thorns; that is, one seldom finds unadulterated virtue, with no catches, in this world. Some of Jørgensen's prose seems inspired by the stream of consciousness school. Both in his style of writing and in his scientific thinking he is *durchaus eigentümlich,* with all the good *and* bad consequences this may have. In the volume under review, his *Eigentümlichkeit* is much in evidence.

I cannot but applaud Jørgensen's stated purpose of trying "to win over some of the mental inertia which has caused most chemists to think of chemical bonds in terms of a valency-bond and hybridization description." I am afraid, though, that the preaching which follows will be mainly to the already converted, because of the pell-mell attack on the subject matter. The presentation has indeed some logic of its own, but not, I fear, the sort which is appropriate for instructing the uninitiated.

Having offered these animadversions, I hasten to say also that this book has its attractions for the serious (but not entirely naïve) student of coordination chemistry. It contains a great deal of interesting factual information and many stimulating and unusual observations. It is also noteworthy for its eclectic approach; probably no element in the periodic table goes unmentioned, and all aspects of the subject, as summarized in the title, are discussed to some extent.

---

[1] Not, however, the most abominable, for which due acknowledgment may be given to the social "sciences" and "communications sciences."

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE 39, MASSACHUSETTS

F. A. COTTON

Progress in Inorganic Chemistry. Volume 4. Edited by F. A. COTTON. Interscience Publishers, Division of John Wiley and Sons, Inc., New York, N. Y., 1962. 540 pp. 15 × 23 cm. Price, $15.00.

The fourth volume of the series "Progress in Inorganic Chemistry" contains these seven articles: (1) The Polymorphic Modifications of Arsenic Trioxide, by K. A. Becker, K. Plieth, and I. N. Stanski; (2) The Nephelauxetic Series, by C. K. Jørgensen; (3) Peroxides, Superoxides, and Ozonides of the Metals of Groups Ia, IIa, and IIb, by N. Vannerberg; (4) Isopolytungstates, by D. L. Kepert; (5) Phosphonitrile Polymers, by C. D. Schmulbach; (6) The *trans* Effect in Metal Complexes, by F. Basolo and R. G. Pearson; and (7) The Coupling of Vibrational and Electronic Motions in Degenerate Electronic States of Inorganic Complexes. Part II. States of Triple Degeneracy and Systems of Lower Symmetry, by A. D. Liehr.

This reviewer cannot imagine the inorganic chemist capable of digesting the entire seven-course meal. Articles 1, 3, 4, and 5 are mainly descriptive. They are well written and usefully referenced.

Articles 2, 6, and 7 are more theoretical in the order Basolo and Pearson (mildly theoretical), Jørgensen (highly theoretical), and Liehr (whew!). The account of the *trans* effect is very readable and complete in every detail. The article on the nephelauxetic series is well worth reading, although it will be rough going for most inorganic chemists. It is by far the most complete treatment of the subject yet presented. I think it is fair to say that the article overemphasizes many of the author's own prejudices concerning the electronic structures of transition metal complexes. This is not unexpected since he and C. Schäffer gave us the nephelauxetic fever in the first place.

The Liehr article is wasted in this series, being too theoretical for inorganic chemists. It should have been published in one of the volumes read mainly by chemical physicists.

Finally, I should mention that a very useful cumulative index (covering volumes 1–4) appears on p. 577.

In summary, "Progress in Inorganic Chemistry" continues to provide excellent critical reviews of interest to inorganic