

Forward to the First Edition

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Our central science progresses, but often by uncoordinated steps. Experiments are done here, perceived as important there, fruitfully extended elsewhere. There are satisfactions, to be sure, in the interactive, perforce international nature of modern chemistry. Yet most advances at the frontiers of our lively discipline seem small in scope, chaotic.

Occasionally does one encounter a large chunk of chemistry that is the coherent outcome of the work of one group. Initial observations evolve into an idea. This idea leads to the synthesis of novel molecules or new measurements and to the recognition of an entirely new structural type or a different mechanism. The new field expands, seemingly without limit. All this takes time, for the minds and hands of men and women must be engaged in the effort. The careful observer of the chemical scene seeks out such rare achievements. For when the tangled web of our experience is so transformed, by one person, into symmetries of pristine order and the chemical equivalent of the rich diversity of pattern of an oriental carpet—it is then that one encounters a moment of intellectual pleasure that really makes one feel good about being a chemist.

Such a story is that of metal–metal multiple bonding. A recognition of the structural and theoretical significance of the Re–Re quadruple bond by F. A. Cotton in 1964 was followed by a systemic and rational exploration of metal–metal bonding across the transition series. Cotton and his able co-workers have made most such complexes. The consistent and proficient use of X-ray crystallography results in their studies, not only for structure determination but as an inspiration to further synthetic chemistry, has served as a model for modern inorganic research. Much of the chemistry of metal–metal multiple-bonded species—and interesting chemistry it is indeed—is due to F. A. Cotton and his students. Throughout this intellectual journey into fresh chemistry they have been guided by a lucid theoretical framework. Their bounteous achievement is detailed in this book. I want to record here my personal thanks to them for providing us with the psychological satisfaction of viewing a scientific masterpiece.

Multiple Bonds between Metal Atoms

Cotton, F.A.; Murillo, C.A.; Walton, R.A. (Eds.)

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