

Solutions of palladium chloride and silver nitrate gave immediate yellow precipitates when mixed with dilute hydrochloric acid and nitric acid solutions of the diazaphenanthroline, respectively. *Anal. Calcd.* for $\text{Ag}_3(\text{C}_{12}\text{H}_{10}\text{N}_4)_4(\text{NO}_3)_3$: C, 42.64; H, 2.96; N, 19.70; Ag, 24.02. Found: C, 42.93; H, 3.14; N, 19.22; Ag, 24.06. Calcd. for $\text{Pd}(\text{C}_{12}\text{H}_{10}\text{N}_4)\text{Cl}_2$: C, 37.16; H, 2.58; N, 14.46; Cl, 18.33; Pd, 27.46. Found: C, 37.61; H, 2.77; N, 14.76; Cl, 15.75^{4b}; Pd, 26.70 (from residue).

The ligand to metal ratio for the silver complex (which was the same in three separate preparations) is in contrast to that found with benzocinnoline presented in this paper but is in agreement with the results obtained by other workers with azobenzene.² In one preparation the sample was stirred 24 hr. before filtration. In this case there was no significant change in the elemental analysis.⁹ These complexes were all infusible (>300°) materials. The silver complex was

(9) This was also true for the palladium complex.

soluble in hot dimethylformamide, but the palladium complex was insoluble in this solvent or nitrobenzene at the boiling point. The infrared spectra of these two compounds were very similar to that of the ligand itself. The low solubility of the palladium complex and 1:1 ligand:metal ratio suggest a polymeric-type compound which could occur if both the azo group and the "methine chromophore" are interacting with the metals. Benzocinnoline gave a 2:1 ligand ratio for the palladium complex where polymer formation is not likely.

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John J. Porter, Joel L. Murray

Department of Textiles, Clemson University
Clemson, South Carolina

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Book Reviews

Kunstliche Organische Farbstoffe und Ihre Zwischenprodukte.

By HANS RUDOLF SCHWEIZER, Dr. sc. techn. ETH. Springer-Verlag, Heidelberger Platz 3, Berlin-Wilmersdorf (West), Germany, 1964. xii + 542 pp. 16 × 24 cm. Price, DM 49,60.

In revising his earlier, two-volume work ("Künstliche Organische Farbstoffe," Verlag der Vereinigung der Chemiestudierenden der Eidgenössische Technische Hochschule, Zurich, 1959), the author has aimed at providing German-speaking students with a modern, comprehensive textbook on the chemistry of dyes and their intermediates. Comparison with other recent attempts in this direction, by Seidenfaden in 1957 and Schaeffer in 1963, shows decisive improvement. But the result is short of the goal even when the relative paucity of basic research in this field is taken into account. This failure may well be rooted in the catalog-like nature of the book, which includes topics of importance in Victorian times, but not now.

The book is organized in three sections: the application of dyes to textiles, or dyeing; intermediates; and colored compounds, including both dyes and pigments. The first section outlines dyeing technology, the various substrates and auxiliary products, as well as apparatus, but is so much a compendium of isolated and often irrelevant information that one gets the impression that the author has little more than second-hand knowledge in this field. This is disappointing since contemporary research calls much more for an understanding of the chemical and physical properties of dyes in solution and on substrates than mere search for new chromophoric systems.

The section on intermediates is adequately done. Sufficient mechanistic emphasis is given to awake some imagination on its utility in process rationalization, although this is not stressed.

The third and longest section presents dyes and pigments according to the classical approach. Such recent developments as reactive, 2:1 metal complex, phthalocyanine precursor, and polymerizable dyes are treated for the first time in a general textbook. Disappointingly, some space is given to pharmaceutical and insecticidal examples, when it more properly could have been devoted to the important areas of water-soluble sulfur, and azo and anthraquinone cationic dyes, which received little or no attention. Neither is there a serious attempt to correlate structure and properties, nor a sufficient explanation in modern terms of old termi-

nology, e.g., basic or acid dyes. Attention to these matters would have materially aided in arousing real interest for the subject in Hochschule chemistry students.

While the book is an improvement in the Germanic literature, it is less successful when compared to English-language competition. If an English translation were ever undertaken, a thorough revision would be indicated.

Robert F. Johnson

Research Department, The Dow Chemical Company
Williamsburg, Virginia

Nuclear and Radiochemistry. Second Edition. By GERHART

FRIEDLANDER, Senior Chemist, Brookhaven National Laboratory, JOSEPH W. KENNEDY, Late Professor of Chemistry, Washington University, and JULIAN MALCOLM MILLER, Professor of Chemistry, Columbia University. John Wiley and Sons, Inc., 605 Third Ave., New York, N. Y. 1964. xi + 585 pp. 17.5 × 24.5 cm. Price, \$10.75.

Among other expectations of the postwar world—everyone owning his own helicopter, and so on—was the importance nuclear and radiochemistry was to have in the college and graduate chemistry curriculum. Unfortunately, the dilapidations of time have been such that despite the *de rigueur* inclusion of the usual chapter at the end of the usual textbook of freshman chemistry, the teaching of radiochemistry has become a chore that chemists expect the departments of physics to perform. So it comes about that a new edition of perhaps the best of the advanced texts of nuclear chemistry waits nearly a decade for publication, and its review is only reluctantly accepted by the Editor of the *Journal of the American Chemical Society*.

I shall confine myself to changes from the first edition (itself a revision of "Introduction to Radiochemistry," published in 1949): first, an increase in size by roughly a third (is the second edition ever smaller?) due in part to a thorough job of redesigning to give the book a much more attractive format. Professor J. M. Miller has replaced the late Joseph W. Kennedy of Washington University as author. Two new chapters have been added: "Nuclear