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978-1-316-60693-3 - The Chemistry of Dyestuffs: A Manual for Students of  
Chemistry and Dyeing

M. Fort and L. L. Lloyd

Frontmatter

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# THE CHEMISTRY OF DYESTUFFS

A MANUAL FOR STUDENTS OF  
CHEMISTRY AND DYEING

BY

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## PREFACE

**T**HE recent opportunity offered to the dyestuff industry in this country may be expected to lead to a greater interest in the chemistry of dyestuffs and a greater demand for chemists possessing special knowledge of colouring matters. To the dyer, a scientific knowledge of dyestuffs is always very useful, and to the dyer's chemist it is indispensable.

It is necessary, however, that a thorough and systematic study of pure chemistry should precede any attempt to master a branch of applied chemistry, and we have presumed some such preparation by the student for whom this book is written. Although not specially intended to cover the syllabus for the City and Guilds of London Institute's examinations it provides the requisite knowledge in compact form.

The scheme of treatment adopted being on elementary text-book lines, we have made no attempt to give references to original papers and patents. This would have involved considerable extra cost, and moreover such references are usually neglected by students in a first study of the subject, in our opinion wisely so. In a second reading, however, works of reference should

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not be neglected, and the type of additional reading recommended in the first place is intermediate between text-book and descriptions of original research, namely, a résumé on some special section of subject matter. In addition, current literature must be consulted for new work and abstracts of new patents. It is only in this way that one can maintain contact with an industry developing with such extreme rapidity as the synthetic dyestuff industry has done hitherto. In any case, certain kinds of knowledge are most difficult to acquire, especially information as to the plant actually in use for large scale manufacture. So far as the limits of the book have allowed, we have endeavoured to assist the student in grasping the methods of large scale manufacture.

M. F.

L. L. L.

*July 1916.*

The second edition of this book follows so closely after the first that practically nothing has been altered. The activity of dyestuff manufacturers outside Germany has been directed mainly towards increasing the output of those dyestuffs most necessary to dependent industries. New names are being given to dyes previously manufactured in Germany, but no special introduction of new dyes has taken place since the first edition was printed.

M. F.

L. L. L.

*June 1918.*

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- Handbuch der Organischen Chemie*, F. Beilstein. Voss, Leipzig.
- Die Fortschritte der Teerfarbenfabrikation und verwandter  
Industriezweige*, P. Friedlaender, 8 vols. (1877—1911).  
Springer, Berlin.
- Coal Tar and Ammonia*, G. Lunge, 2 vols. (1909). Gurney and  
Jackson, London.
- Technical Methods of Chemical Analysis*, G. Lunge, trans. C. A.  
Keane, Volume II (1911). Gurney and Jackson, London.
- Die Chemie des Steinkohlenteers*, G. Schultz, 2 vols. (1900). Vieweg,  
Braunschweig.
- Farbstoff-Tabellen*, G. Schultz, 12 parts (1911—1914). Springer,  
Berlin.
- Dictionary of Applied Chemistry*, T. E. Thorpe, 5 vols. (1912—1913).  
Longmans, London.

### JOURNALS.

- Berichte der Deutschen Chemischen Gesellschaft* (Berlin).
- Journal of the Chemical Society* (London).
- Journal of the Society of Chemical Industry* (London).
- Journal of the Society of Dyers and Colourists* (Bradford).
- Journal of Industrial and Engineering Chemistry* (American  
Chem. Soc., Easton, Pa.).

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## INDEX OF ABBREVIATIONS OF NAMES OF DYESTUFF MANUFACTURERS WHOSE PRO- DUCTS ARE DEALT WITH IN THIS VOLUME

*British* :—(R.H.) Read Holliday & Sons, Ltd., Huddersfield  
branch of British Dyes Ltd.

(Lev.) Levenstein Ltd., Manchester.

(B.A.) British Alizarin Co., London.

(Cl.) Clayton Aniline Co., Manchester. (This firm is  
now the property of the Society of Chemical  
Industry in Basle.)

*French* :—(P.) Société Anonyme des Matières Colorantes de  
St Denis, Paris (Poirrier & Dalsace).

(Mon.) Société Chimique des Usines du Rhône, Lyons  
(Gilliard, Monnet & Cartier).

*American* :—(Sch.) The Schoellkopf Aniline and Chemical Co.,  
Buffalo, U.S.A.

*Swiss* :—(Gy.) J. R. Geigy, Basle.

(S.) Sandoz & Co., Basle.

(S.C.I.) Society of Chemical Industry, Basle.

*German and Austrian* :—(B.) Badische Anilin und Sodafabrik,  
Ludwigshafen (The Badische Co. Ltd.).

(By.) Farbenfabriken vorm. F. Bayer & Co., Elberfeld  
(The Bayer Co.).

(M.) Farbwerke vorm. Meister, Lucius & Brüning,  
Höchst (Meister, Lucius & Brüning Ltd.)

(C.) Leopold Cassella & Co., Frankfort.

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*German and Austrian, continued:—*

(Ber.) Aktiengesellschaft für Anilinfabrikation, Berlin  
(The Berlin Aniline Co.).

(K.) Kalle & Co., Biebrich.

(G.E.) Chemische Fabriken Griesheim Elektron,  
Griesheim.

(W.-t.-M.) Chem. Fab. vorm. Weiler-ter-Meer,  
Uerdingen.

(J.) Carl Jäger, Barmen.

(Ki.) Kinzlberger & Co., Prague.

(L.) Farbwerk' Mühlheim (A. Leonhardt & Co.).

(W.) R. Wedekind & Co., Uerdingen.

The leading German firms were associated in two groups, the first including the Badische Anilin u. Sodafabrik, F. Bayer & Co., and the Aktiengesellschaft, Berlin. The second combination included the firms of Cassella, Meister &c. and Kalle. For the purpose of further strengthening the German industry, these two trusts and the firm of Weiler-t.-Meer formed a new syndicate in 1916, with a capital of over £11,000,000.