

INK TECHNOLOGY FOR PRINTERS AND STUDENTS

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B.Sc., A.M.I.O.P.

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PREFACE

I HAVE been stimulated to write this book partly because of the large number of requests that have been made to me by those who benefited from reading my companion book *Printing Ink Technology*, also published by Leonard Hill (Books) Ltd., and partly because previous books on printing inks suffer from five main defects.

First, the subject of printing inks has not been scientifically discussed and built up logically from consideration of the physical requirements of the printing processes; in every case the standard of the ink chapters has not attained that of the G.C.E. Advanced Level. Secondly, inks for the minor processes (e.g. copper-plate, die-stamping, roller coating, collotype) have been hardly mentioned. Thirdly, special inks (e.g. metallic, gloss, matt, magnetic, fluorescent, ceramic, moisture-set, heat-set, quick-set) have been given inadequate treatment. Fourthly, faults largely due to ink have been omitted, or else not been discussed in the detail which is essential to a proper understanding of printers' complaints. Fifthly, the fairly extensive journal literature of printing inks has not been abstracted with a view to helping the research worker.

Even inks for the major printing processes (letterpress, lithography, and gravure) as well as flexography and screen have been given a very compressed treatment, while the discussion of inks for printing non-absorbent surfaces (e.g. plastic films, foil, tin plate) has been side-tracked.

I consider that the time has come to present a book which discusses printing ink technology in the detail which is essential to a proper understanding of the subject. The basic idea has been to reserve a new chapter for each specific type of ink and avoid the attitude of other writers of giving one short paragraph to an ink which has to be specially formulated to satisfy a particular and rather complicated need (e.g. double-tone inks, ball-pen inks, textile inks).

Obviously, I have not been able to discuss the latest information about printing inks, as each manufacturing firm must safeguard its latest secrets, as the industry is very competitive.

This book should be of considerable interest to students making a career in printing ink technology and meet the requirements of those studying the subject for City and Guilds final examinations.

The references listed at the end of each chapter should prove useful to the research technologist. For instance, included at the end of the chapter on ink-in-relation-to-paper in Part 2 are most of the important research papers yet published on the subject of ink penetration, ink transfer, and printability.

This book should be a great asset to printers and machine minders. I have tried to bear their special needs in mind, and topics such as the storage of inks, manipulation of ink at the machine side, ink estimation, press cleaning, and troubles largely due to ink have been discussed in far more than usual detail.

This book should also help manufacturers of raw materials for the printing ink industry (e.g. resin, oil, and pigment suppliers), who have repeatedly complained to me that ink manufacturers will not state clearly what their requirements are and give them adequate information about printing inks.

PREFACE

I wish to thank the editors of *Paper and Print*, *Printing World*, *Print in Britain*, *Litho-Printer*, *Tin-Printer and Box Maker*, *Metal Finishing*, *British Printer*, *Research*, and *Paint Manufacture*, who have let me use material previously published in article form, and the publishers Leonard Hill (Books) Ltd. for every possible assistance. I wish to thank my wife for help with the index.

E. A. A.

LIST OF ABBREVIATIONS

(1) *Abbreviations of physical and chemical nature:*

A.V.	Acid value
Å	Ångström unit, 10^{-8} c.m.
A.P.	Aniline Point
B.Pt.	Boiling point
B.R.	Boiling range
B.V.	Bulk value
F.O.G.	Fineness-of-grind
F.Pt.	Flash point
I.P.H.	Impressions per hour
I.V.	Iodine value
K.B.	Kauri-Butanol number
°K'	Degrees Kelvin, °C. + 273
M.Pt.	Melting point
N_D^{25}	Refractive index at 25° C. based on the D sodium line
O.A.	Oil Adsorption
P.	Viscosity in poises
R.I.	Refractive index
R.P.M.	Revolutions per minute
S.E.	Saponification equivalent
S.G.	Specific gravity
S.Pt.	Setting point
S.V.	Saponification value
μ	Micron, 10^{-6} metre, $\frac{1}{10,000}$ centimetre
τ	Thou., 0.001 inch

(2) *Abbreviations used to denote particular kinds of ink:*

P/A	Pigmented Aniline
T/A	Transparent Aniline
C/P	Copper-plate Engraving
D/S	Die-stamping
H/S	Heat-set
L/P	Letterpress
M/S	Moisture-set
O/S	Offset-litho
Q/S	Quick-set
S/P	Steel-plate Engraving
S/S	Silk-screen
N/C S/S	Nitrocellulose-based Silk-screen
O/B S/S	Oil-based Silk-screen

A suitable O/S ink, would mean an ink suitable for offset lithography; a D/S ink, would be an ink formulated for use on die-stamping machines; and a P/A ink would mean a pigmented aniline or flexographic ink.

LIST OF JOURNALS

At least one reference to every journal in this list is quoted somewhere in the complete book. Journals from 1902 to 1962 inclusive have been searched by the author for useful articles on printing ink; these have been classified and fully quoted.

The task has been reduced by the fact that the number of pre-war articles on ink are few and some of these have not been listed because the information in them is obsolete or even misleading, but pre-war references are given where they still contain something of value, i.e. a research technique which could still be used.

Research chemists and technicians seriously interested in developments in printing ink technology are advised to search each issue of the following journals from 1963 onwards. By doing so they will keep abreast of the latest journal information on printing inks. The author hopes that his lists of references will be a useful basic guide to the earlier literature.

Adhäsion

Hadert-Lexikon-Verlag, Berlin W30, Martin-Luther-Strasse 88, Germany

Adhesives and Resins (see *Resin News*)

Advertiser's Weekly

Mercury House, 109-119 Waterloo Road, London S.E.1

Allgemeine Papier-Rundschau

P. Keppler Verlag KG., 6 Frankfurt am Main, Untermainkai 82, W. Germany

Allgemeiner Anzeiger für Buchbindereien

Buchbinder-Verlag Max Hettler, Stuttgart S, Christophstr. 9, W. Germany

American Boxmaker (see *Board Pack Age*)

American Chemical Society, Division of Coatings and Plastics Chemistry (papers presented at)
G. R. Somerville, Esq., Shell Chemical Co., 1120 Commerce Avenue, Union, N.J., U.S.A.

American Dyestuffs Reporter

Howes Publishing Co. Inc., 44 East 23rd Street, New York 10, N.Y., U.S.A.

American Ink Maker

MacNair-Dorland Co., 254 West 31st Street, New York 1, U.S.A.

American Newspaper Publishers Association, Research (Institute) Bulletin (formerly *Mechanical Bulletin*)

750 Third Avenue, New York 17, N.Y., U.S.A.

American Paper Merchant

Peacock Business Press Inc., 200 South Prospect Avenue, Park Ridge, Ill., U.S.A.

American Photo Engraver

International Photo Engravers Union of North America, 3605 Potomac Street, St. Louis 16, Missouri, U.S.A.

American Pressman

International Printing Pressmen and Assistants' Union of North America, Pressmen's Home, Tenn., U.S.A.

American Printer and Lithographer (see *Printer and Lithographer*)

American Society for Testing Materials Bulletin (now *Materials Research and Standards*)

Analytical Chemistry

American Chemical Society, 1155 16th Street, N.W., Washington 6, D.C., U.S.A.

L' Annunziatore Poligrafico

via Gluck 2, Milan, Italy

Asian Printer

Insatsu Gakkai Shuppanbu, No. 4, Ginza-5, Chuo-ku, Tokyo, Japan

Australasian Printer

Lawson Press Pty Ltd, 49 Clarence Street, Sydney, N.S.W., Australia

BBD News and Tips

General Printing Ink Co., division of Sun Chemical Corp., 750 Third Avenue, New York 17, N.Y., U.S.A.

LIST OF JOURNALS

Board Pack Age

200 South Prospect Street, Park Ridge, Ill., U.S.A.

Book Production

Freund Publishing Co., Inc., 404 Park Avenue So., New York 16, N.Y., U.S.A.

Boxboard Containers

Hayward Publishing Co., 6 North Michigan Avenue, Chicago 2, Ill., U.S.A.

British and Colonial Printer (now Paper and Print)

British Federation of Master Printers Members Circular

11 Bedford Row, London, W.C.1

British Gelatine & Glue Research Association Abstracts

2a Dalmeny Avenue, Holloway, London, N.7

British Gelatine & Glue Research Association Bulletin

2a Dalmeny Avenue, Holloway, London, N.7

British Ink Maker, The

Batiste Publications Ltd, Drummond House, 203-9 Gower Street, London, N.W.1

British Journal of Applied Physics

The Institute of Physics and the Physical Society, 47 Belgrave Square, London, S.W.1

British Journal of Photography

Henry Greenwood & Co. Ltd, 24 Wellington Street, London, W.C.2

British Printer

Maclean-Hunter Ltd, 30 Old Burlington Street, London, W.1

B.S.I. News

British Standards Institution, 2 Park Street, London, W.1

Bulletin de l'Association Technique de l'Industrie Papetière

154 Boulevard Haussmann, Paris 8e, France

Bulletin d'Informations de la Fédération française des Syndicats Patronaux de l'Imprimerie et des Industries Graphiques

115 Boulevard Saint-Germain, Paris 6e, France

Bulletin of the Technical Association of Graphic Arts of Japan (Nippon Insatsu Gakkai)

No. 4, Ginza-5, Chuo-ku, Tokyo, Japan

Canadaink

Canada Printing Ink Co. Ltd, Brockhouse Road, Etobicoke, Toronto 14, Canada

Canadian Packaging

Maclean-Hunter Publishing Co. Ltd, 481 University Avenue, Toronto 2, Canada

Canadian Printer and Publisher

Maclean-Hunter Publishing Co. Ltd, 481 University Avenue, Toronto 2, Canada

Caractère

Cie Française d'Editions, S.A., 40 rue du Colisée, Paris 8e, France

Carta Stompa e Cartotecnica

Via A. M. Ampère 9, Milan, Italy

Caxton Magazine (see Lithographer and Offset Printer)

Chemikerzeitung

Dr. Alfred Huethig Verlag, Wilckenstrasse 3, Heidelberg, Germany

(London: Albert Milhado & Co. Ltd, 140 Cromwell Road, London, S.W.7)

Chemisch Weekblad

D. B. Centens Uitgevers-Maatschappij, P.O. Box 507, Hilversum, Holland

Ciba Rundschau, Ciba Review

Ciba Ltd, Basle, Switzerland

Den Danske Presses Faellsind Købs-forening,

Copenhagen, Denmark

Deutsche Drucker

Verlag Ernst Boehme, Reichensteiner Weg 8-10, 1, Berlin-Lichterfelde-West, Germany

Deutsche Farbenzeitschrift

Birkenwaldstrasse 44, Stuttgart, Germany

Display Producers' & Screen Printers' Association Year Book

Batiste Publications Ltd, Drummond House, 203-209 Gower Street, London, W.1

Double Laison

Les Presses Continentales, 40 Rue de Cherche-Midi, Paris 6, France

LIST OF JOURNALS

Druckspiegel, Der

'Der Druckspiegel' Velarg, Stuttgart 1, Postfach 2650, W. Germany

Dyer, Textile Printer, Bleacher and Finisher

Heywood and Co. Ltd, Drury House, Russell Street, London, W.C.2

Dyestuffs

National Aniline Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N.Y., U.S.A.

Electronic Engineering

Morgan Bros. (Publishers) Ltd, 28 Essex Street, Strand, London, W.C.2

Electrotypers & Stereotypers Magazine

International Association of Electrotypers & Stereotypers Inc., 758 Leader Building, Cleveland 14, Ohio, U.S.A.

Emballages

Cie Française d'Editions, 40 rue du Colisée, Paris 8e, France

Emballage Digest

Société Européenne de Presses et d'Edition, 6 rue Catulle Mendès, Paris 17e, France

Engineering (London)

33 Bedford Street, London, W.C.2

Engraver & Die-Stamper

National Association of Engravers and Die-Stampers, 29-30 Balfour House, 119 Finsbury Pavement, London, E.C.2

Ernährungswirtschaft

B. Behr's Verlag GmbH., Hamburg 22, Averhoffstrasse 10, Germany

Export Polygraph International

Polygraph Verlag GmbH., 6 Frankfurt am Main, Schaumainkai 85, W. Germany

F & L Litho Letter

Fuchs and Lang Mfg. Co., 10th St. and 44th Avenue, Long Island City 1, N.Y., U.S.A.

Fachberater, Der

Hanns Eggen K.G., Gerberstrasse 26, Hannover, W. Germany

Fachhefte für die Chemigraphie, Lithographie und den Tiefdruck

Conzett & Huber, Zürich 4, Postfach Zürich 1, Switzerland

Fadenzähler, Der

Gebr. Schmidt GmbH., Frankfurt am Main, W. Germany

Farbe, Die

Musterschmidt-Verlag, Göttingen, Turmstrasse 7, Postfach 421, W. Germany

Farbe und Lack

Curt R. Vincentz Verlag, Hannover, Am Schiffgraben 41, Germany

Farbenzeitung (since 1920 the name has changed to Textil Berichte)

Finnish Paper & Timber Journal

Unioninkatu 19, Helsinki, Finland

Flexogram

Interchemical Corporation, Printing Ink Divsn, 67 West 44th Street, New York 36, N.Y., U.S.A.

Flexography

Graphic Magazines, Inc., 61 Hilton Avenue, Garden City, N.Y., U.S.A.

Fogra Literaturdienst

Deutsche Gesellschaft für Forschung im graphischen Gewerbe e.V., München 13, Bamberger Haus im Luitpoldpark, W. Germany

Fogra Mitteilungen

Deutsche Gesellschaft für Forschung im graphischen Gewerbe e.V. München 13, Bamberger Haus im Luitpoldpark, W. Germany

Forme

Printing Inks and Machinery, Ltd, 105 Federal Street, Auckland, New Zealand

France Graphique, La

8 rue de la Michodière, Paris 2e, France

Grafische Mededelingen

N.V. Lettergieterij 'Amsterdam' Voorheen N. Tetterode, Bilderdijkstraat 163, Amsterdam, Holland

Grafiska Forskningslaboratoriets Meddelande

Drottning Kristinas väg 61, Stockholm 0, Sweden

Graphic Arts Buyer

Publishing Divsn, Duralith Corp., 1025 Race Street, Philadelphia 7, Pa., U.S.A.

LIST OF JOURNALS

- Graphic Arts Monthly*
Graphic Arts Publishing Co., 608 South Dearborn Street, Chicago 5, Ill., U.S.A.
- Graphic Technology*
Shand Moran Ltd, 58 Frith Street, London, W.1
- Graphische Neuheiten- und Fachkartei*
P. Ambühl, Indermühlweg 14a, Berne 18, Switzerland
- Graphische Revue Österreichs*
Bildungsverband der Gewerkschaft der Arbeiter der graphischen und papierverarbeitenden Gewerbe, Wien 7, Seidengasse 15, Austria
- Graphische Woche*
Schlütersche Buchdruckerei Verlagsanstalt 3 Hannover, Postfach 314, Georgswall 4, W. Germany
- Gravure*
Graphic Magazines Inc., 61 Hilton Avenue, Garden City, N.Y., U.S.A.
- Gravure Technical Association Bulletin*
Warren R. Daum, 30 Rockefeller Plaza, Room 5060, New York 20, N.Y., U.S.A.
- Heidelberg News*
Heidelberg Printing Machinery Co. Ltd, Eyot Works, Eyot Gardens, London, W.6
- Hexagon Digest*
Imperial Chemical Industries Ltd, Imperial Chemical House, Millbank, London, S.W.1
- I.G.T. News*
Stichting Instituut voor Grafische Techniek T.N.O., Postbus 4150, Amsterdam, Holland
- Imprimerie Nouvelle, L'*
112 rue Régnault, Paris 13e, France
- Indian Print & Paper*
Shimwell & Bro. (Cal.) Private Ltd, 1 India Exchange Place, Calcutta 1, India
- Indian Pulp and Paper*
14 Radha Bazar Lane, Calcutta
- Industrial & Engineering Chemistry*
American Chemical Society, 1155 16th Street, N.W., Washington 6, D.C., U.S.A.
- Industrie de la Parfumerie (see Parfumerie, Cosmétique, Savons)*
- Industrie Lackier Betrieb*
Am. Schiffgraben 41, Hanover, Germany
- Inland Printer/American Lithographer*
Maclean Publishing Corp., 79 W. Monroe Street, Chicago 3, Ill., U.S.A.
- Institute of Packaging Journal*
Malcolm House, Empire Way, Wembley Park, Middlesex
- Institute of Paper Chemistry, Bibliographic Series*
Appleton, Wisconsin, U.S.A.
- Interchemical Review*
Research Laboratories of Interchemical Corp., 432 W. 45th Street, New York 36, N.Y., U.S.A.
- Intergrafia*
Warmoesstraat 151, Amsterdam-(1) C, Holland
- International Bulletin for the Printing and Allied Trades*
57 Wharfedale Road, London, N.1
- International Paper Board Industry*
The Bottler & Packer Ltd, 33 South Audley Street, London, W.1
- Jobbing Printer*
29 Oakhill Road, Ashstead, Surrey
- Journal of the American Chemical Society*
American Chemical Society, 1155 16th Street, N.W., Washington 6, D.C., U.S.A.
- Journal of the American Oil Chemists' Society*
The American Oil Chemists' Society, 35 E. Wacker Drive, Chicago 1, Ill., U.S.A.
- Journal of the Chemical Society*
Chemical Society, Burlington House, Piccadilly, London, W.1
- Journal of Colloid Science*
Academic Press Inc., 111 Fifth Avenue, New York 3, N.Y., U.S.A.
- Journal Japan Society of Colour Materials*
Tohan-Bldg, 1-5 Kanda-Sudatyo, Tiyoda-ku, Tokyo, Japan
- Journal of the Oil & Colour Chemists' Association*
Wax Chandlers' Hall, Gresham Street, London, E.C.2

LIST OF JOURNALS

- Journal of the Optical Society of America*
American Institute of Physics, 335 East 45th Street, New York 17, N.Y., U.S.A.
- Journal of Photographic Science*
Royal Photographic Society of Great Britain, 16 Princes Gate, London, S.W.7
- Journal of Scientific Instruments*
Institute of Physics and the Physical Society, 47 Belgrave Square, London, S.W.1
- Journal of the Society of Chemical Industry*
14 Belgrave Square, London, S.W.1
- Journal of the Society of Dyers and Colourists*
Dean House, 19 Piccadilly, Bradford 1, Yorks
- Journal of the Textile Institute*
10 Blackfriars Street, Manchester 3
- L & M News, The*
Linotype & Machinery Ltd, Linotype House, 21 John Street, London, W.C.1
- LTF Lithographic Abstracts*
1800 South Prairie Avenue, Chicago 16, Ill., U.S.A.
- LTF Research Progress*
Research Department, 1800 South Prairie Avenue, Chicago 16, Ill., U.S.A.
- Litho-Printer, The*
Litho-Printer Magazine Ltd, National House, 60-66 Wardour Street, London, W.1
- Lithographer, The*
The Amalgamated Society of Lithographic Printers of Great Britain and Ireland, Senefelder House, 137 Dickenson Road, Rusholme, Manchester 14
- Lithographer and Offset Printer* (incorporating *Caxton Magazine*)
F. W. Bridges Ltd, 9 Fryston Avenue, Croydon, Surrey
- Lithographers' Journal*
Amalgamated Lithographers of America, 233 West 49th Street, New York 19, N.Y., U.S.A.
- M.A.N. Printing Machinery News*
Maschinenfabrik Augsburg-Nürnberg AG., Augsburg, W. Germany
- Managing Printer*
R. F. Hillier, 50 Temple Chambers, Temple Avenue, London, E.C.4
- Materials Research and Standards*
1916 Race Street, Philadelphia, Pa., U.S.A.
- Mechanical Bulletin* (see *American Newspaper Publishers Association, Research (Institute) Bulletin*)
- Media/Scope*
5201 Old Orchard Road, Skokie, Ill., U.S.A.
- Metal Finishing Journal*
Fuel and Metallurgical Journals Ltd, John Adam House, John Adam Street, Adelphi, London, W.C.2
- Modern Irish Printer*
Graphic, 66 Annamore Road, North Circular Road, Dublin, Eire
- Modern Lithographer and Offset Printer*
F. W. Bridges Ltd, 9 Fryston Avenue, Croydon, Surrey
- Modern Lithography*
Industry Publications Inc., Box 31, Caldwell, N.J., U.S.A.
- Modern Packaging*
770 Lexington Avenue, New York 21, N.Y., U.S.A.
- National Lithographer*
1 Sherman Avenue, Jersey City, N.J., U.S.A.
- National Printing Ink Research Institute Monthly Literature Review*
Lehigh University, Bethlehem, Pa., U.S.A.
- Nature*
Macmillan & Co. Ltd, St. Martin's Street, London, W.C.2
- Nauch. Trud. Noskovsk., Poligraf. Inst. Sbornik*
Moscow, U.S.S.R.
- Neue Verpackung*
Verlag für Fachliteratur GmbH., Berlin-Grünwald, Bismarckplatz, Germany
- New England Printer and Lithographer*
Editor and Printer Publishing Co., 470 Atlantic Avenue, Boston 10, Mass., U.S.A.
- New Scientist*
Cromwell House, Fulwood Place, High Holborn, London, W.C.1

LIST OF JOURNALS

- Newspaper Society Production Journal*
The Newspaper Society, Whitefriars House, 6 Carmelite Street, London, E.C.4
- Newspaper Techniques*
Lugdunum, Leidsch Dagblad N.V., 1 Witte Singel, Leyden, Holland
- Norsk. Skogindustri.*
Rådhusgt, 7B, Oslo, Norway
- ODR Reproductions Review* (see *Reproductions Review*)
- Office Magazine*
Current Affairs Ltd, 319 High Holborn, London, W.C.1
- Official Digest (of the Federation of Paint and Varnish Production Clubs)*
121 South Broad Street, Philadelphia 7, Pa., U.S.A.
- Offset*
Weteringschans 86, Amsterdam C, Holland
- Offset Duplicator Review* (see *Reproductions Review*)
- Olearia*
132, Via Tornacelli, Rome, Italy
- Österreichische Chemikerzeitung und Zeitschrift für Nahrungsmitteluntersuchung, Hygiene und Warenkunde*
Springer-Verlag, Moelkerbastei 5, Vienna 1, Austria
- Österreichische Papierzeitung*
Rennweg, 64; Vienna, Austria
- Packaging*
Tudor Press Ltd, Tudor House, 75 Carter Lane, London, E.C.4
- Packaging Review*
Harlequin Press (1955) Ltd, Commonwealth House, New Oxford Street, London, W.C.2
- Paintindia*
208 Himalaya House, Bombay, India
- Paint Industry Magazine*
144 North 12th Street, Philadelphia 7, Pa., U.S.A.
- Paint Journal*
The Ruddington Press, Nottingham
- Paint Manufacture*
Stratford Press Ltd, The Tower, 229-243 Shepherds Bush Road, Hammersmith, London, W.6
- Paint, Oil and Chemical Review*
332 Harrison Street, Oak Park, Illinois
- Paint, Oil & Colour Journal*
Scott, Greenwood & Son Ltd, 83-86 Farringdon Street, London, E.C.4
- Paint Technology*
Sawell Publications Ltd, 4 Ludgate Circus, London, E.C.4
- Paper, Film and Foil Converter*
Peacock Business Press Inc., 200 South Prospect Avenue, Park Ridge, Ill., U.S.A.
- Paper Maker*
S. C. Phillips & Co. Ltd, Alliance House, 50-51 Fetter Lane, London, E.C.4
- Paper Market*
S. C. Phillips & Co. Ltd, Alliance House, 50-51 Fetter Lane, London, E.C.4
- Paper Packs*
S. C. Phillips & Co. Ltd, Alliance House, 50-51 Fetter Lane, London, E.C.4
- Paper & Print*
Stonhill & Gillis Ltd, Lincoln House, 296-302 High Holborn, London, W.C.1
- Paper Salesman*
Advani Chambers, Sir Pherozechah Mehta Road, Bombay 1, India
- Paper Technology*
The Technical Section, British Paper & Board Makers Association, Fetter Lane, London, E.C.4
- Paperi ja Puu: Papper och Trä (Paper & Timber)*
Unioninkatu 19, Helsinki, Finland
- Paperboard Packaging*
Board Products Publishing Co., 228 North La Salle Street, Chicago 1, Ill., U.S.A.
- Paper Trade Journal*
49 West 45th Street, New York 36, N.Y., U.S.A.
- Papier, Das*
Eduard Roether Verlag, Darmstadt, Berliner Allee 56, W. Germany

LIST OF JOURNALS

- Papier Fabrikant-Wochenblatt für Papierfabrikation*
Guntter-Staib Verlag, Biberach an der Riss, Württemberg, Germany
- Papier und Druck*
VEB Verlag für Buch- und Bibliothekswesen, Leipzig C1, Gerichtsweg 26, E. Germany
- Papierwereld, De*
Lorentzkade 186, Haarlem, Holland
- Parfumerie, Cosmétique, Savons*
Société de Productions Documentaires, 28 rue St.-Dominique, Paris 7e, France
- Patra Journal*
Printing, Packaging, and Allied Trades Research Association, Randalls Road, Leatherhead, Surrey
- Peintures-Pigments-Vernis*
28 Rue St. Dominique, Paris 7, France
- Penrose Annual*
Percy Lund, Humphries & Co. Ltd, 12 Bedford Square, London, W.C.1
- Photographic Journal*
Royal Photographic Society of Great Britain, 16 Princes Gate, London, S.W.7
- Plaste und Kautschuk*
VEB Deutscher Verlag für Grundstoff-industrie, 27 Karl-Heine-Strasse, Leipzig W31, E. Germany
- Plastics*
Temple Press Ltd, Bowling Green Lane, London, E.C.1
- Poligraficheskoe Proizvodstvo*
State Publishing House of the Council of Ministers of the U.S.S.R., Moscow, U.S.S.R.
- Poligrafico Italiano, il*
Milan, Via Devoto 5, Italy
- Poligrafika*
Warsaw, Poland
- Polygraph, Der*
Polygraph Verlag GmbH., Frankfurt am Main, Schaumainkai 85, W. Germany
- Print in Britain*
National House, 60-66 Wardour Street, London, W.1
- Print and Direct Mail Marketing*
City Magazines Ltd, 30 Bouverie Street, London, E.C.4
- Print & Paper Review*
Gray's Publicity Services, 8 Glenluce Road, Glenesk, Johannesburg, South Africa
- Print Review* (see *Print & Paper Review*)
- Printer and Lithographer*
Moore Publishing Co. Inc., 48 West 38th Street, New York 18, N.Y., U.S.A.
- Printers' News*
Federation of Master Printers of New Zealand (Inc.), Box 1422, G.P.O., Wellington, New Zealand
- Printers Sales & Wants Advertiser* (formerly *Sales and Wants Advertiser*)
Benn Bros Ltd, Bouverie House, Fleet Street, London, E.C.4
- Printing and Binding Trade Review*
85 Elmhurst Drive, Hornchurch, Essex
- Printing Equipment Engineer*
Willsea Publishing Co., 1276 West 3rd Street, Cleveland 13, Ohio, U.S.A.
- Printing and Graphic Arts*
Hyphen Publishing Co., 246 Lennox Street, Richmond, Melbourne, E1, Australia
- Printing Magazine*
Walden, Sons & Mott Inc., 466 Kinderkamack Road, Oradell, N.J., U.S.A.
- Printing Production*
1276 West 3rd Street, Cleveland 13, Ohio, U.S.A.
- Printing Review*
Printing Review Co. Ltd, Room 214, 1117 St. Catherine Street West, Montreal 2, Que., Canada
- Printing Technology (Proceedings of the Institute of Printing Ltd)*
44 Bedford Row, London, W.C.1
- Printing World*
Stonhill & Gillis Ltd, Lincoln House, 296-302 High Holborn, London, W.C.1
- Proceedings of the Institution of the Rubber Industry*
4 Kensington Palace Gardens, London, W.8

LIST OF JOURNALS

Proceedings of the Royal Society
Burlington House, Piccadilly, W.1

Proceedings of the Technical Section of the British Paper and Board Makers' Association (now *Paper Technology*)

Process: the Photomechanics of Printed Illustration (see *Graphic Technology*)

Pulp & Paper Magazine of Canada
National Business Publications Ltd, Gardenvale, Que., Canada

Recherche Graphique, La
Institut Professionnel de Recherches et d'Etudes des Industries Graphiques, 17 rue des Reculettes,
Paris 13e, France

Reproduction Methods
Gellert-Wolfman Publishing Corporation, 33 West 60th Street, New York 23, N.Y., U.S.A.

Reproductions Review (incorporating *Offset Duplicator Review*)
393 7th Avenue, New York 1, N.Y., U.S.A.

Research
Butterworths, 88 Kingsway, London, W.C.2

Research Bulletin of the Government Printing Bureau of Japan
Tokyo, Japan

Resin News
A. S. O'Connor & Co. Ltd., 331 Gray's Inn Road, London, W.C.1

Resin Review
Röhm & Haas Co., Philadelphia 5, Pa., U.S.A.

Review of Current Literature relating to the Paint, Colour, Varnish and Allied Industries
Paint Research Station, Waldegrave Road, Teddington, Middlesex

Rheology Abstracts
Pergamon Press Ltd, 4-5 Fitzroy Square, London, W.1

Röhm & Haas Reporter
Röhm & Haas Co., Philadelphia 5, Pa., U.S.A.

Roland Nachrichten
Faber und Schleicher AG., Offenbach a.M., W. Germany

Roland News
Faber und Schleicher AG., Offenbach a.M., W. Germany

Sales and Wants Advertiser (see *Printers Sales & Wants Advertiser*)

Schweizer Archiv
Buchdruck Vogt-Schild SA., Solothurn, Switzerland

Schweizerische Buchdruckerzeitung
Postfach 121, Zürich 30, Switzerland

Schweizerische Fachschrift für Buchbindereien
Verband Schweizerischer Buchbindermeister, Postfach Zürich 23, Switzerland

Screen Process Magazine
Signs of the Times Publishing Co., 407 Gilbert Avenue (P.O. Box 1171), Cincinnati 1, Ohio, U.S.A.

Share Your Knowledge Review
International Association of Printing House Craftsmen Inc., 7599 Kenwood Road, Cincinnati 36,
Ohio, U.S.A.

Siebdruck, Der
Ter Rivierenlaan 131, Deurne-Antwerpen, Belgium

Skinner's Silk and Rayon Record
Thos. Skinner and Co. (Publishers) Ltd., 44 Brazenose Street, Manchester 2

Small Offset User
Corbett, Cope (London) Ltd, Evelyn House, 62 Oxford Street, London, W.1

Soap and Chemical Specialities
MacNair-Dorland Co., 254 West 31st Street, New York 1, N.Y., U.S.A.

Svensk Papperstidning
Villagatan 1, Stockholm Ö, Sweden

TAGA Proceedings
Technical Association of the Graphic Arts, P.O. Box 3064, Federal Station, Rochester 14, N.Y.,
U.S.A.

TAPPI
Technical Association of the Pulp & Paper Industry, 360 Lexington Avenue, New York 17, N.Y.,
U.S.A.

LIST OF JOURNALS

Téte

Technisch Tijdschrift voor de Grafische Industrie, Koninginneweg, 20, Amsterdam-2, Holland

Textil Berichte

Mellian Vextillerichte KG, Rohrbachenstrasse 76, Heidelberg 69, Germany

Textil Praxis

Danneckerstrasse, 52, Stuttgart, Germany

Tin-Printer and Box Maker

Canning Publications, Peninsular House, 28-34 Monument Street, London, E.C.3

Toronto Craftsman

Toronto Club of Printing House Craftsmen, (Secretary: Mr. S. Hewines), 179 Bartley Drive, Toronto 16, Ontario, Canada

Verfkroniek

Groot Haesebroeksweg 1, Wassenaar, Holland; Keizersgracht, 255, Amsterdam, Holland

Wochenblatt für Papierfabrikation (see *Paper Fabrikant-Wochenblatt für Papierfabrikation*)

World's Paper Trade Review

Stonhill & Gillis Ltd, Lincoln House, 296-302 High Holborn, London, W.C.1

Zeitungs Verlag

Bad Godesburg, Wurzerstrasse, 46, Germany

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