

COMPREHENSIVE **Graphic Arts**

Third Edition

Ervin A. Dennis, Ed.D.
Professor
Department of Industrial Technology
University of Northern Iowa
Cedar Falls, Iowa

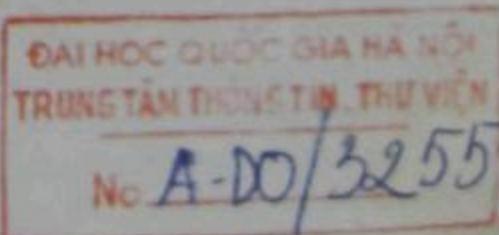
John D. Jenkins, Ed.D.
Professor
Department of Industrial Education and
Technology
Eastern Kentucky University
Richmond, Kentucky

GIFT OF
THE ASIA FOUNDATION
NOT FOR RE-SALE

GLENCOE

McGraw-Hill

New York, New York
Columbus, Ohio
Mission Hills, California
Peoria, Illinois



CONTENTS

Preface	iii
Acknowledgements	v
SECTION 1. Graphic Arts Industry	
1. Introduction to Graphic Arts	1
2. The Scope of Graphic Arts	3
3. Cultural Contributions of Graphic Arts	6
4. Size of the Industry	9
5. Graphic Arts Printing Processes	10
6. Learning Experiences: Graphic Arts Industry	14
SECTION 2. Type Styles	
7. Introduction to Typefaces	17
8. Evolution of the Alphabet	18
9. Development of a Typeface	21
10. Characteristics of Typefaces	23
11. Text Type Style	27
12. Roman Type Style	28
13. Sans-Serif Type Style	30
14. Square-Serif Type Style	31
15. Script Type Style	32
16. Novelty Type Style	33
17. Learning Experiences: Type Styles	34
SECTION 3. Planning, Design, and Layout	
18. The Value of Planning, Design, and Layout	37
19. Point and Metric Measurement	40
20. Graphic Design Principles	47
21. Graphic Color Principles	52
22. Thumbnail Sketches	55
23. The Rough Layout	58
24. The Comprehensive Layout	59
25. Page and Signature Layout	63
26. Learning Experiences: Planning, Designing, and Layout	69
SECTION 4. Type Composition Methods	
27. Introduction to Type and Image Composition	73
28. Foundry Type Composition	76
29. Hot-Metal Type Composition	81
30. Impact, Thermal, and Laser Imaging Systems	83
31. Dry-Transfer and Hand-Mechanical Type Composition	88
32. Photographic Type Composition	91
33. Electronic Imagesetting	97
34. Learning Experiences: Proofing Type and Image Composition	101
SECTION 5. Proofing Type Composition	
35. Introduction to Proofing	105
36. Proofing Relief Type	106
37. Proofing Photographic and Digital Type Composition	109
38. Proofreading Procedures	111
39. Correcting Type Composition	113
40. Learning Experiences: Proofing Type and Image Composition	114

SECTION 6. Copy Preparation for Process Photography

41. Introduction to Copy Preparation.....	117
42. Equipment and Materials for Copy Preparation.....	118
43. Kinds of Copy	121
44. Copy Considerations	128
45. Cropping, Scaling, and Register Marks	130
46. Making the Paste-Up	133
47. Copy Division for Multi-Color Reproduction.....	135
48. Notes and Instructions to the Printer	138
49. Learning Experiences: Copy Preparation for Process Photography.....	140

SECTION 7. Process Cameras and Darkroom Procedure

50. Introduction to Process Cameras and Darkroom Procedures.....	143
51. Classifications of Process Cameras	146
52. Films and Chemicals for Process Photography.....	148
53. Darkrooms	151
54. Safety in the Darkroom	156
55. Exposing and Processing a Line Negative.....	157
56. Exposure Calculations for a Halftone Negative.....	162
57. Exposing and Processing a Halftone Negative	169
58. Contact Printing.....	176
59. Diffusion Transfer Process	181
60. Process-Color Reproduction	186
61. Difficulties and Answers in Working with Negatives	195
62. Standardizing Darkroom Procedures	197
63. Learning Experiences: Process Cameras and Darkroom Procedures ...	199

SECTION 8. Letterpress Image Carriers

64. Introduction to Letterpress Image Carriers	203
65. Safety with Letterpress Carriers.....	206
66. Photoengravings.....	207
67. Rigid Photopolymer Relief Plates	209
68. Flexible Photopolymer Relief Plates	213
69. Stereotypes and Electrotypes	216
70. Flexographic Printing Plates.....	218
71. Rubber Stamp Making.....	223
72. Creating Linoleum Blocks	227
73. Learning Experiences: Letterpress Image Carriers	230

SECTION 9. Letterpress Imposition

74. Introduction to Letterpress Lockup and Imposition	233
75. Tools and Equipment	234
76. Kinds of Lockups.....	238
77. Lockup Procedure	240
78. Multiple-Page Lockup and Imposition	244
79. Learning Experiences: Letterpress Imposition	249

SECTION 10. Letterpress Image Transfer

80. Introduction to Letterpress Image Transfer	251
81. Flexographic Printing	255
82. Book Production System	259
83. Safety with Letterpress Presses	263
84. Platen Press Preparation.....	264
85. Platen Press Operation.....	267

86. Cylinder Press Operation.....	270
87. Platen and Cylinder Press Cleanup.....	274
88. Learning Experiences: Letterpress Image Transfer.....	275
SECTION 11. Lithographic Imposition	
89. Introduction to Lithographic Imposition.....	279
90. Tools and Materials for Stripping.....	280
91. Preparation and Layout for Stripping.....	283
92. Attaching Negatives to the Masking Sheet.....	287
93. Combining Negatives and Proofing.....	292
94. Stripping for Multiple Exposures.....	295
95. Learning Experiences: Lithographic Imposition.....	299
SECTION 12. Lithographic Image Carriers	
96. Introduction to Lithographic Image Carriers.....	301
97. Kinds of Plates.....	302
98. Exposing Pre-Sensitized Plates.....	304
99. Processing Pre-Sensitized Plates.....	308
100. Preparing Diffusion-Transfer, Direct Image, and One-Step Photographic Plates.....	311
101. Correcting, Preserving, and Storing Pre-Sensitized Plates.....	315
102. Learning Experiences: Lithographic Image Carriers.....	316
SECTION 13. Lithographic Image Transfer	
103. Introduction to Offset Lithography Presswork.....	319
104. Offset Lithography Duplicators and Presses.....	322
105. Safety with the Offset Lithography Duplicator/Press.....	326
106. The Offset Lithography Duplicator/Press.....	327
107. Preparing the Lithography Duplicator/Press.....	330
108. Operating the Offset Lithography Duplicator/Press.....	334
109. Lithography Duplicator/Press Adjustments.....	336
110. Lithographic Printing Problems.....	341
111. Cleaning the Lithography Duplicator/Press.....	343
112. Learning Experiences: Lithographic Image Transfer.....	345
SECTION 14. Gravure Printing Process	
113. Introduction to the Gravure Printing Process.....	349
114. Gravure Image Carriers.....	351
115. Gravure Printing Presses.....	355
116. Safety when Etching and Engraving.....	359
117. Flat-Plate Gravure Etching.....	360
118. Hand Engraving and Printing.....	362
119. Thermography.....	365
120. Learning Experiences: Gravure Printing Process.....	367
SECTION 15. Screen Printing	
121. Introduction to Screen Printing.....	371
122. Industrial Equipment and Production Methods.....	373
123. Screen Printing Equipment for Hand Production.....	378
124. Safety with Screen Printing Equipment and Materials.....	382
125. Building a Screen Printing Press.....	383
126. Artwork for Screen Printing.....	385
127. Lacquer-Soluble Hand-Prepared Film.....	387
128. Water-Soluble Hand-Prepared Film.....	391
129. Direct Photographic Screens.....	392

130.	Indirect and Direct Photographic Stencil Film	398
131.	Masking the Non-Printing Areas	402
132.	The Screen Printing Operation	404
133.	Screen Cleanup Procedures	407
134.	Paper Stencil and Washout Screens	409
135.	Multi-Color Screen Production	411
136.	Learning Experiences: Screen Printing	412
SECTION 16. Photography		
137.	Introduction to Photography	415
138.	The Camera	416
139.	Photographic Films	420
140.	Making the Exposure	423
141.	Film Processing	428
142.	Photographic Papers	433
143.	Photographic Printing	435
144.	Finishing and Mounting Prints	443
145.	Learning Experiences: Photography	446
SECTION 17. Duplicating and Special Printing Processes		
146.	Introduction to Duplicating and Special Printing Processes	449
147.	Spirit and Mimeograph Duplication	450
148.	Office Copying Methods	455
149.	Inkjet Printing and Heat Transfer	458
150.	Learning Experiences: Duplicating and Special Printing Processes	460
SECTION 18. Finishing and Binding		
151.	Introduction to Finishing and Binding	463
152.	Safety in Finishing and Binding	464
153.	Finishing Methods	465
154.	Paper-Cutting Procedures	471
155.	Basic Binding Methods	475
156.	Soft-Cover Binding	478
157.	Case Binding	485
158.	Hand Case Binding	490
159.	Microstorage and Retrieval Systems	495
160.	Learning Experiences: Finishing and Binding	498
SECTION 19. Pulp and Paper Manufacturing		
161.	Introduction to Pulp and Paper Manufacturing	501
162.	Pulp Manufacturing	504
163.	Paper Manufacturing	510
164.	Kinds, Weights, and Sizes of Paper	517
165.	Buying and Finding Cost of Paper	523
166.	Making Paper by Hand	526
167.	Learning Experiences: Pulp and Paper Manufacturing	528
SECTION 20. Printing Ink Manufacturing		
168.	Introduction to Printing Inks	531
169.	Formulation of Printing Inks	532
170.	Manufacture of Printing Inks	533
171.	Kinds of Printing Inks	535
172.	Difficulties with Printing Ink	537
173.	Mixing Printing Inks	539
174.	Learning Experiences: Printing Ink Manufacturing	542

SECTION 21. Legal Considerations for the Printer

175. Legal Restrictions of Printed Materials Production	545
176. How to Obtain a Copyright	546
177. Copyright Infringement	547
178. Pornography	549
179. Counterfeiting	549
180. Moral and Ethical Considerations	551
181. Learning Experiences: Legal Considerations for the Printer	552

SECTION 22. Desktop Composition

182. What is Desktop Composition?	555
183. Input in Desktop Composition	559
184. Page Layout and Output in Desktop Composition	561
185. Learning Experiences: Desktop Composition	566

SECTION 23. Graphic Arts Career Opportunities

186. Introduction to Careers in Graphic Arts	569
187. Opportunities in Pre-Press Preparation	571
188. Opportunities in Printing and Finishing	573
189. Opportunities in Management and Sales	575
190. Opportunities in Teaching Graphic Arts	576
191. Pulp and Paper Manufacturing Opportunities	578
192. Being a Successful Employee	580
193. Owning a Graphic Arts Business	586
194. Learning Experiences: Graphic Arts Career Opportunities	594
Glossary	597
Index	621