

GRAPHIC COMMUNICATION TECHNOLOGY

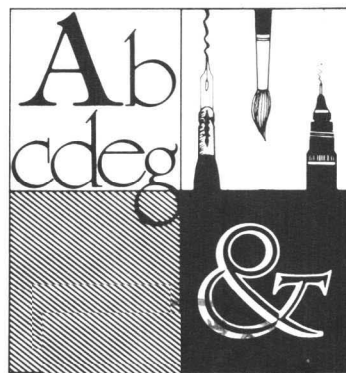
SECOND EDITION

JOHN R. KA

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GRAPHIC COMMUNICATION TECHNOLOGY

Second Edition



JOHN R. KARSNITZ

School of Technology
TRENTON STATE COLLEGE



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Preface

It is said that we are living in an information age that is leading to a post-industrial information society. The history of the United States can be identified by three distinctive ages, namely, agricultural, industrial, and informational. Actually, we became an information society by definition around 1956, when more than 50% of our work force became primarily involved in the creation, processing, and dissemination of information. Will the information society be a valuable human-scale technology or will it be a major dehumanizing force? This question is being currently debated and helps to frame the purpose for this text, which is primarily to assist students in becoming technologically literate in terms of communication. The mass print and mass electronic industries comprise the major communication technologies of our society.

The graphic communication industry, through its printing, publishing, and packaging divisions, provides the bulk of the mass print media. The print media typically provide the best sources of information for disseminating our accumulated knowledge. It is a permanent form of information. The industry offers a wide variety of career options for students who have the necessary educational background and possess the required skills. From design through production and marketing, the career opportunities are exciting and challenging. By studying

about the graphic communication industry, students gain control over this all-pervasive force and learn how to solve problems using graphic communication technology.

SCOPE OF THE TEXT

The text is divided into eight major sections. Each section tells a sequential part of the story of how a printed product is produced and is used to solve an identified graphic problem. The role of problem solving using graphic communication principles is explored extensively. Students are asked to play a variety of roles, including designer, manager, producer, and consumer. Students are also asked to consider the impact of information on the individual, the society, and the environment.

Section I, *Introduction to the Graphic Communication Industry*, describes the industry and introduces the concepts upon which all of the succeeding chapters are based. The place of graphic communication in the broader context of our technological society is described. The industry is introduced as a managed production system organized into the printing, publishing, and packaging divisions. To emphasize the importance of providing information by producing a product, a brief history of newspapers and gaining freedom of the press is described. The

story of the newest "high-tech" newspaper, the *USA Today*, is presented.

In Section II, *Beginning the Product*, the chapters describe the activities that occur once a client indicates that a specific printed product is needed. The first step is to discuss the project with the client to gather the required information. Problem solving through graphic means is the major focus of Chapters 4 and 5, which deal with design principles and practices. After all details are known, costs for the project are estimated. Before production begins, a final cost will be determined. The section concludes with information on production scheduling and how time is allotted during scheduling for preparing to produce, reproduction, and production of the final product.

Section III, *Preparing to Produce Through Image Generating and Assembling*, describes the beginning of the actual production sequence. Image generation consists of creating the visual elements necessary to produce the product. Image assembling takes the generated images and positions them properly for the next production sequence. The concepts of image generating and assembling deal with very different practices, but are thoroughly defined, illustrated, and related in this section. Electronic prepress, including desktop publishing concepts are presented. In addition, photographic and laser composition and continuous tone photography are stressed.

Section IV, *Preparing to Produce a Product-Image Converting*, deals with those practices used to change a graphic product from one form to another. This section concentrates on the photographic conversion practices, including line photography, halftone photography, and color process photography.

The last step prior to reproducing the image on paper is covered in Section V, *Preparing to Produce Through Image Carrier Preparing*. Image carriers are made from the products of the image conversion process (Section IV). The form the images take in image carrier preparation is determined by the image transferring process used. In all of these processes, there are image

areas and nonimage areas. This section presents image carrier preparation for the methods commonly used to separate image from nonimage areas: lithographic, relief, intaglio, and stencil.

Section VI, *Reproduction Through Image Transferring*, is concerned with the process of actually putting ink on paper, and includes the control of paper and other materials as the image is transferred to that material from the image carrier. The chapters in this section deal with the concepts of feed, registration, transfer, and delivery using various press designs. Typical problems that can be encountered are also discussed for each press design. Also introduced are the topics of electrostatic printing and inkjet printing.

After the image is transferred, other operations are usually required to finish the printed product. Section VII, *Production Through Finishing*, covers the operations of sizing, forming, assembling, binding, and packaging. Typically, more than one operation is performed on a given product. A knowledge of finishing practices is required before designers can create and before managers can send the product into production.

In Section VIII, *Allied Industries*, attention is paid to those areas which provide support to the production practices necessary to produce the product. Two very important industries which supply materials essential to the graphic communication industry are described; these industries supply ink and paper. The increasingly important concern for environmental issues, including governmental regulations and recycling, are presented in Chapter 33.

It is suggested that the chapters in this text be used in order of sequence. However, because of varying time limitations for courses being taught, it may be possible to teach only some of the chapters in a given section. In Section IV, for example, the teacher may choose to teach Chapter 14, *Introduction to Photographic Processes*, and Chapter 15, *Image Conversion Through Line Process Photography*, and reserve the remaining chapters for more advanced courses. Whatever chapter selection is made, it is important to

PREFACE

keep in mind that each section describes work that is necessary for a product to be produced.

PROBLEM SOLVING

Graphic Communication Technology is the human process that identifies problems that are best solved through graphic practices. The problem solving process, sometimes referred to as *design/problem solving*, employs a logical or rational process similar to the scientific method. But it is different in purpose. In technological problem solving, the purpose is to meet a human want or need. There is never one answer and all solutions involve trade-offs and risk. The process of design/problem solving is introduced in Chapter 1. In Chapters 1, 5, and 33, unique problems are presented for students to solve. Information about teaching using the problem-solving process is presented in the Instructor's Manual. In addition, throughout many of the identified chapter activities, *design briefs* are presented to help frame the activity in a problem-solving mode.

FOCUS ON CAREER OPPORTUNITIES

The last chapter in each major section is a profile of an individual whose career is devoted to a specific aspect of the graphic communication industry. The background information shows how the individual worked into his or her present position. The educational requirements and the responsibilities of the position are described. Each profile chapter concludes with a listing of the Department of Labor job listings and descriptions for a particular segment of the graphic arts industry.

STRUCTURE OF THE TEXT

Each chapter begins with a list of instructional objectives. These objectives tell the student and teacher what will be learned by studying the chapter. The subject matter follows in a logical order, with all key terms italicized and defined the first time they are used. Photographs, draw-

ings, and tables are provided throughout the text to aid the student in understanding the material that has been presented. A four-color section is included in the chapters on color process photography.

Each chapter includes at least one suggested activity. Unique problems have been identified in the areas of packaging, general commercial printing, and recycling. In addition to these complete problem-solving experiences, many activities include a design brief. The design brief helps to frame the activity in the broader problem-solving context. Each activity was selected to be interesting and challenging to the student. The activities reinforce the key concepts presented in the text and were designed to be completed within a reasonable period of time. Each activity is headed by a list of equipment and materials required to complete the activity. A step-by-step procedure allows the student to follow the activity through to a successful completion. For many activities, worksheets to be completed by the students are listed in the materials required section. All worksheets are provided as reproducible masters in the Instructor's Manual.

At the end of each chapter, excluding the Personnel Profile chapters, a series of multiple choice and completion-type review questions are provided. The questions are designed to test the student's comprehension of the material studied in that chapter.

An appendix is provided at the end of the text and includes career information and tables of metric and customary units of measurement. A glossary summarizes the terminology presented in the text and is provided for student and instructor reference.

TECHNOLOGY EDUCATION

Technology is the human process of adapting our environment. At the most creative end of the technological continuum, people identify and create solutions to problems. There are a number of complete problem-solving situations identified in this book. The graphic communication

industry is unique in that it creates new solutions to problems daily. This is in contrast to industries where new solutions occur less frequently, such as a new genetic material or a new car design. The technological continuum also includes other creative work that focuses on getting design solutions into finished artifacts. It is only after the production of the goods that the problem-solving process is completed. Technology education is learning “to know how” humans adapt their environment and the impacts that process has on the individual, society, and the environment. This textbook poses human problems and opportunities and provides information to students so that they can “know how” the society, through the graphic communication industry, produces products that communicate human knowledge, ideas, fears, feelings, and dreams.

INSTRUCTOR'S MANUAL

A comprehensive Instructor's Manual has been prepared to help the teacher organize and present the content. Important information is presented about teaching using the technological problem-solving method. This information includes an explanation of the nine-step design/problem-solving model as well as suggestions for incorporating the problems presented in Chapters 1, 5 and 33. In addition to the answers to the chapter end review questions, the manual provides the following information, arranged by chapter, to coincide with the content of the text:

- Instructional objectives
- Chapter outlines summarizing the content for easy reference
- Computer programs which can be duplicated for paper cutting and copyfitting calculations
- A listing of the activity or activities for the chapter with the equipment and materials required and a brief introduction with suggestions for the teacher
- Answers for the activity worksheets, as required

Also included are:

- Reproducible masters for the activity worksheets to enable the teacher to prepare class sets
- Overhead projection masters
- Test questions by chapter (in addition to the questions given in the text)

SUMMARY OF TEXT FEATURES

- Unique problem-solving assignments
- Presentation of the graphic communication industry in the context of the larger information society
- Thorough discussions of the concepts of producing a printed image from design through finishing
- Presentation of environmental issues
- Up-to-date content including electronic prepress, desktop publishing, and printing techniques
- Instructional objectives
- Controlled reading level
- Interesting and challenging student activities
- Attractive, easy-to-read format with numerous line drawings and photographs
- Four-color section for color process photography
- Personnel profiles of individuals in the graphic communication industry
- Detailed glossary for reference
- Extensive Instructor's Manual to help the teacher in preparing and presenting classroom lectures and demonstrations

ABOUT THE AUTHOR

John R. Karsnitz, is a professor and chairperson of the Department of Technology Education, at the School of Technology at Trenton State College, New Jersey. He is the coordinator of the technology studies of the TSC Collegebound program. In addition, he is a manager of the TSC Summer College Press. His teaching experience spans twenty-three years at the secondary and

collegiate levels. He taught at The Ohio State University and The State University College at Buffalo, NY prior to joining the faculty at Trenton State College in 1978. Starting as a graphic arts teacher, his experience includes working in the graphic communication industry and teaching graphic communication technology and advertising design. He is a member of the International Technology Education Association (ITEA), the International Graphic Arts Education Association (IGAEA), and the Graphic Arts Technical Foundation (GATF). Dr. Karsnitz has published numerous articles in the graphic communication field, serves as a consultant, and makes frequent presentations to public school, and professional groups.

SAFETY GUIDELINES

Safety Guidelines for the Graphic Communication Laboratory

Safety rules and guidelines must be followed when working in any technology laboratory. Accidents often happen because safety rules are not followed. In addition to specific rules identified by your instructor, printed below is a list of general rules that must be followed. Information about OSHA and other environmental issues are included in Chapter 33. As you read this textbook, you will see special *Caution* notes in boxes. These notices, as well as any safety labels and special announcements made by your instructor **must be strictly observed**.

General Safety Rules:

1. Always wear safety glasses in the laboratory. Make sure the glasses fit well and have side shields.
2. Know the location and operation of the eye washing station, first aid supplies, and fire extinguishers.
3. Keep all flammable materials in non-flammable, explosion-proof cabinets and containers.
4. Always wash your hands thoroughly after handling chemicals.
5. Never mix chemicals without first getting special mixing instructions. Some chemicals when mixed have violent reactions or may form new very toxic substances.
6. Always follow instructions on the label or those given by the instructor. If you are not sure about the safe use of the chemical, ASK.
7. Always use the recommended protective equipment. When working with chemicals, you must always use safety glasses. When noted, you must use protective gloves.
8. If a spill occurs, tell your instructor and follow proper clean-up procedures.
9. Always properly close all chemicals and return them to the designated storage area.
10. Always report any accidental chemical exposure to yourself or a fellow student.
11. Always wear sound-protection devices for your ears when working around high levels of sound for extended periods of time.
12. Do not lift heavy objects or large amounts of paper. When lifting proper amounts of material, lift with your legs not your back. Get assistance when lifting bulky items.
13. Always wear proper clothing when working in the laboratory. Remove all jewelry (rings, watches, necklaces, etc.) when operating equipment.
14. Never operate a piece of equipment without first checking with the instructor. Be sure everyone is clear. Ask in a loud voice "Is everyone clear?" before starting the equipment. Never distract anyone operating a piece of equipment. Do not help someone operate a piece of equipment unless the instructor has specifically asked you to do so.
15. Always read and follow laboratory instructions. If you do not understand the instructions, ask the instructor for assistance.
16. Never use dull or damaged tools.
17. Do not run or engage in horseplay in the laboratory.
18. Use common sense. Do not take chances or rush. Take your time. Be sure before proceeding. Be serious and attentive. Ask questions.

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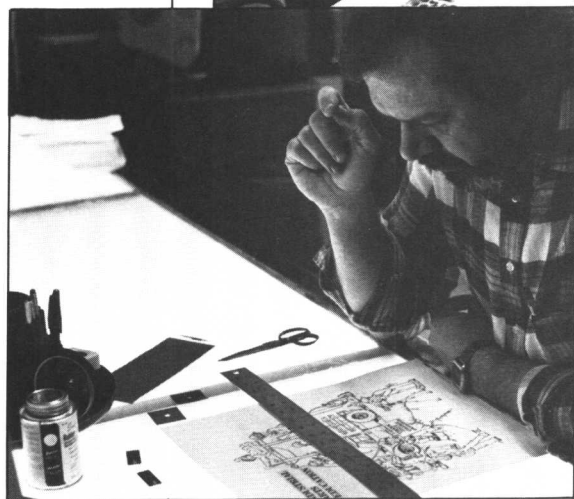
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