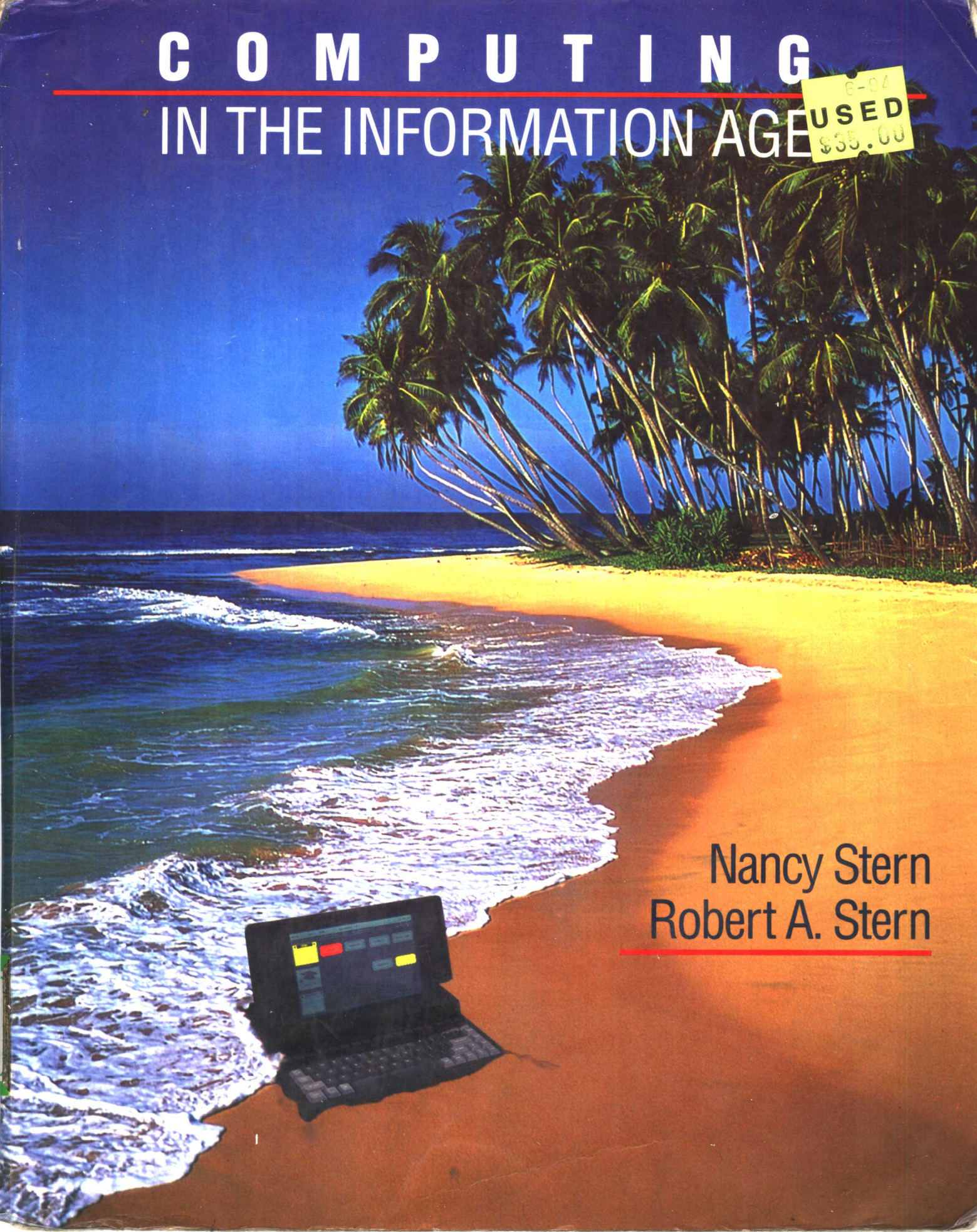
COMPUTING
IN THE INFORMATION AGE



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IN THE INFORMATION AGE

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PREFACE

We have written *Computing in the Information Age* for introductory students. While the focus is on business applications, the book, which draws on our experience as instructors and textbook authors, is appropriate for a wide range of course offerings. Our main objective is to explain computing today in a clear and meaningful way and to focus on those concepts likely to have the greatest impact as we approach the next century and the next phase of the information revolution.

▶ A More Balanced Approach to Concepts and Hands-On Training

We believe that introductory computing courses are moving into a new phase. While teaching students in a laboratory setting how to use software remains important, hands-on learning is but one milestone in the broader quest toward understanding how computers can enrich our lives, how they work, and how computer information systems can help people make decisions and solve problems.

During the past decade, the focus of introductory courses shifted from the lecture hall to the lab. We believe that the emphasis now is toward a more balanced approach, beyond the microcomputer lab and back toward concepts. Instructors are working to give their students more than hands-on experience with application software packages. While the lab remains vital, a useful text for the introductory course must offer more than tutorials with just a smattering of concepts.

Students must learn to look critically at three main elements—hardware, software, and systems—as well as at the techniques used for connecting them. Only then can they appreciate and anticipate the fruits of the Information Age.

We integrate application software concepts with our information processing focus so that students learn *why* major productivity tools and other types of programs are important. Once the student understands the applicability of the software, we present a conceptual explanation of *how* each major type of tool is used. Because instructors tend to have differing ideas about the best package to use, we keep our software discussions generic. Note, however, that we have retained an appendix on DOS as a transition to hands-on software tutorials. A *Getting Started* series on all

the major productivity tools and on Structured BASIC Programming is also available (see list on back cover).

▶ PassPort — Multimedia Software To Help Customize Your Course and Reinforce the Text

Computing in the Information Age approaches computer processing from a user perspective. We begin with the common properties of any computerized information system—hardware, software, connectivity, and people—and move on to the concepts and principles that form the basis of software applications. We use the latest technology to support our text. *PassPort: A Multimedia Tour of the Information Age* extends textbook information in the form of two add-on sets of disks that

1. Introduce productivity tool concepts (*TechTools*)
2. Provide interesting explorations of new products through *TechTours* and new technologies through *TechBytes*

PassPort is a collection of multimedia programs that uses text, graphics, photos, animation, and sound (if you have a sound board) to enhance and extend the information provided in the text. These programs can be used either in a lecture hall using a projection system, in a computer lab, or individually by students. They have been designed to allow instructors to customize their courses by using one or all of the programs depending on the course style and content.

TECHTOOLS

In the lab, instructors can teach the productivity tools they desire for word processing, spreadsheets, or database management. In the classroom, instructors can use TechTools to teach the reasons why productivity tools are so important to today's users. Each TechTool is unique in its generic approach to productivity software, focusing on the *whys* of the tools rather than the *hows* so that students really learn the significance of each tool. Instructors can also choose from a wide array of software available from John Wiley & Sons to supplement the text.

TECHTOURS AND TECHBYTES

This software emphasizes the value of technology through exploration of how computers are used in different environments. TechTours and TechBytes relate to the four themes of the text:

- **Computers Are Making the World Smaller:** The TechTour for this theme is on the air express industry and how laser guns, satellite

technology, and computers allow for fast delivery and tracking of packages enroute to a destination. The TechBytes are on smart cards, laser guns, and pen-based systems.

- **Computers Are Making the World Smarter:** The TechTour for this theme is on the Tron House, a smart house with many new uses for technology including computer-assisted cooking, electronic storage, environmental controls, and automatic gardening. The TechBytes are on smart maps, smart cameras, and robotics.
- **Computers Are Making the World More Creative:** The TechTour for this theme is on multimedia systems. The TechBytes are on CAD systems, virtual reality, expert systems, and computer viruses.
- **Computers Are Bringing the World Closer Together:** The TechTour for this theme is on electronic education and how electronic networks, computers, video, and other technologies are enabling instructors to collaborate with one another to create new course material. The TechBytes are on cellular phones, ISDN, and computing for the disabled.

All PassPort programs contain a Toolbar enabling easy access to a main menu, a glossary of key words, text page references, a Bookmark that allows place marks to be stored on selected screens, a Notebook to store individual comments, a Quiz for testing student understanding of the material presented in the programs, some critical thinking questions, and other navigational tools that make using PassPort easy and useful. PassPort requires an 80386 or 80486 computer, 2MB of RAM, and Windows 3.0 or higher.

▶ Other Distinguishing Characteristics of This Text

In addition to providing a more balanced approach and unique multimedia software, *Computing in the Information Age* offers several other features that distinguish it from other texts in the marketplace.

CONNECTIVITY AND THE HUMAN FACTOR

We go beyond the traditional units of hardware, software, and systems that appear in most books and add two very important perspectives: Connectivity and the Human Factor.

Throughout the text we emphasize connectivity and the human factor and, in addition, we focus on these topics in more detail in Part Four. For example, the networking of computers and other devices such as fax machines and CD-ROM drives has begun to change the focus of com-

puting, and we highlight how these changes have occurred and what the long-term impact is likely to be.

Similarly, social, ethical, and legal issues continue to be important topics in education, as well they should. We integrate these issues throughout the text and give them special emphasis in Part Four.

CRITICAL THINKING

The text combines a conceptual, management-oriented focus with a "nuts and bolts" approach. To achieve a proper balance, we include our traditional step-by-step, self-teaching pedagogy along with the usual set of teaching aids, but, in addition, we focus on *critical thinking*. The objective is to present issues and brief analytical problems in computing designed to get the student thinking about various topics and to ask pertinent questions relating to them. Critical thinking items appear both in text margins and in the form of brief cases at the end of each chapter. The multimedia PassPort disks also focus on critical thinking.

One main objective of the text is to help students evaluate products and resources. We focus, of course, on the state-of-the-art, but if that is all we did, the book would become obsolete very quickly. We also include techniques used by managers to evaluate software, hardware, networks, and information systems so that readers will be able to understand and assess future developments and their probable impact on society. We feature products and advertisements for students to analyze and evaluate as part of our critical thinking and product analysis focus.

In general, the goal is to examine controversies and current events in computing, to help students really understand them, and to teach students how to ask the right questions—in short, to encourage critical thinking in our readers.

APPLICATIONS ORIENTATION

Discussions of technology are integrated with discussions of applications in a meaningful way so that students are not overwhelmed by complex concepts or by an overemphasis on terms. We try to make complex concepts understandable as well as factual by presenting introductory material in a clear, well-organized manner that contains an appropriate mix of technology and applications. In this market, we believe that knowing when to stop is at least as important as knowing what to focus on. Books that "touch base" with every conceivable subject are not usually the best books. We hope we have achieved an acceptable level of in-depth discussions as well as an appropriate breadth of coverage.

FROM MICROS TO MAMMOTHS

Our book begins with the concept that all computers process data in essentially the same way, keeping in mind that the differences among categories of computers are essentially differences of degree. Since many students enter introductory courses having had some exposure to personal computers, we begin with micro concepts and build up to main-

frames in Part One. Then all subsequent chapters reinforce the fact that mainframes are simply larger, faster, more expensive, and more powerful than micros. In this way, the distinctions among computers are not cast in stone, and students gradually lose their fear about "big" machines. We attempt to make the point that with proper connectivity, it could be virtually transparent to users whether they are on a mainframe, mini (midrange), or microcomputer.

Although mainframes can be viewed as quantifiably different from micros, we also emphasize the fact that certain tasks are best performed on larger machines. We make the point that a mainframe is to a micro what a mass transportation system is to a personal car. The former is most efficient for handling the needs of the largest number of users, but it requires users to follow more rules and schedules. Many books today emphasize the micro so much that the importance of mainframes is virtually ignored. We attempt to put these types of machines and their relationship to one another back into perspective.

While we emphasize IBM micros and their compatibles when discussing personal computers, we do not ignore the Macintosh. Indeed, we highlight the features that make the Macintosh ideally suited for some applications.

▸ Pedagogy

All chapters have a common structure designed to facilitate self-study and retention, beginning with a brief description of an event or issue in computing that pertains to the chapter. The **Preview Questions** that follow relate directly to the chapter's main text sections. Answering these questions is the student's learning objective. A **Chapter Outline** appears as well, for reference.

Another feature of our text is its layered, "building block" approach to topics and themes. That is, topics are introduced in a simplified way, then expanded on at key points throughout the text.

Whenever our themes are discussed in the text itself they are identified with an **icon:**

- Computers Are Making the World Smaller

- Computers Are Making the World Smarter

• Computers Are Making the World More Creative

• Computers Are Bringing the World Closer Together

We include these icons throughout the text as pointers so that students understand that the concept under discussion is actually being developed from chapter to chapter. In this way, themes are reinforced as they apply to specific subjects.

Throughout each chapter, marginal notes called **In a Nutshell** highlight relevant material (e.g., "criteria used to evaluate computers") and include, where appropriate, brief summaries, in outline or list form, of major topics. **Looking Back** boxes provide a historical perspective on major innovations, and **Looking Ahead** boxes project into the future. Along the way, **Critical Thinking** questions challenge readers to integrate what they are learning about computers with what they know about life.

Each main text section is followed by a short **Self-Test,** with solutions, to help reinforce the material just presented. Photographs and line drawings illustrate concepts in a clear and meaningful way. Captions are detailed and clearly tie the art to the chapter.

End-of-chapter material contains a concepts-oriented **Summary** structured around the preview questions. A full **Chapter Self-Test,** with answers, follows. A separate **Key Terms** list follows and provides the text page number where each term is defined.

As a final challenge for the student, we conclude each chapter with **Review Questions** followed by a short **Product Analysis Case** relating to an event or recent innovation in computing, along with relevant critical thinking questions. This end-of-chapter Product Analysis Case summarizes and reinforces the concepts presented in the chapter.

In summary, the objective of this text is student understanding of both the "tools" and the "whys and hows" of computing. We focus on the unique applicability of computers to business and to life, the advantages we gain from knowing how and why to use computers, and the potential of computers to enrich our lives. And while *Computing in the Information Age* is more substantive than a tutorial, it is by no means an encyclopedia. Rather, we have taken great care to provide what we regard as the ideal mix of concepts that belong in the introductory course, along

with optional, add-on interactive multimedia software to supplement the text for instructors who want a more customized approach.

▶ Supplements

The following supplemental material is available to support the text:

- *Instructor's Resource Guide* includes sample course syllabi, notes to the first-time instructor, teaching tips, discussion topics, points to emphasize, common misconceptions, lecture outlines, chapter objectives, projects and activities, suggested answers to critical thinking questions, suggestions for using PassPort, and answers to end-of-chapter material as well as general guides to public domain software, journals, major products, and term paper topics.
- *Test Bank* includes approximately 150 test items per chapter (multiple-choice, true/false, and essay).
- *Computerized Test Bank (MicroTest)* is available in IBM 5¼-inch and 3½-inch disk versions.
- *Color Transparencies* include more than 75 full-color acetates of key figures from the text.
- *Student Study Guide* includes chapter outlines, key terms, fill-in exercises, sample test questions, games and exercises, and common misconceptions demystified.
- *Video Series* provide audiovisual supplements that relate directly to the text themes as well as to other issues.
- *Prodigy Demonstration Pack* includes a disk on the popular subscriber service, Prodigy, and a discount coupon for new subscribers.
- *Make Your Point Software* is an electronic slide show incorporating text and graphics that summarizes and illustrates key concepts for each chapter. This is truly a unique presentation graphics tool for the instructor.
- *Getting Started Series* is an array of software manuals offered by Wiley to supplement the text. They are listed on the back cover of this text.

▶ Acknowledgments

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We welcome your comments, suggestions, and even criticisms. We can be reached through Beth Golub at John Wiley and Sons, 605 Third Avenue, New York, NY 10158, via Bitnet at ACSNNS@HOFSTRA, via Internet at ACSNNS@VAXC.HOFSTRA.EDU, and via CompuServe at 76505,1222.

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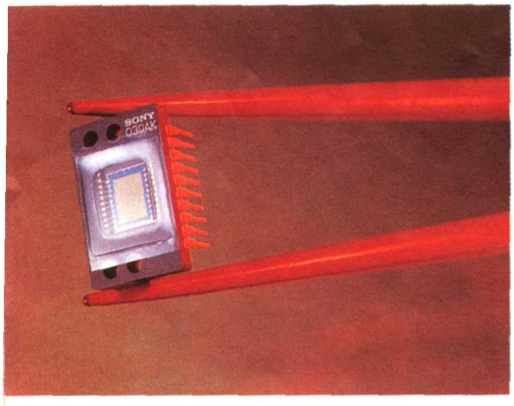
PART ONE

COMPUTERS AND INFORMATION PROCESSING

How often have you heard people say that the world is getting smaller? Of course when people say this, they are not talking about the incredible shrinking planet. Instead, they are reflecting about how technology, from transportation to communications satellites, is shrinking time and distance around the globe, for businesses and for people. Computers and information processing are at the forefront of these changes, and computers themselves are getting smaller and more portable all the time. In Part One, you will learn how computers are making the world smaller.



In the parts that follow you will learn how computers are making the world—and all of us in it—work smarter and more creatively and how information technology is bringing us closer together. You will learn the how and the why. You will learn, too, what living in this Information Age means for you—for your education, your work, your family, and your world.

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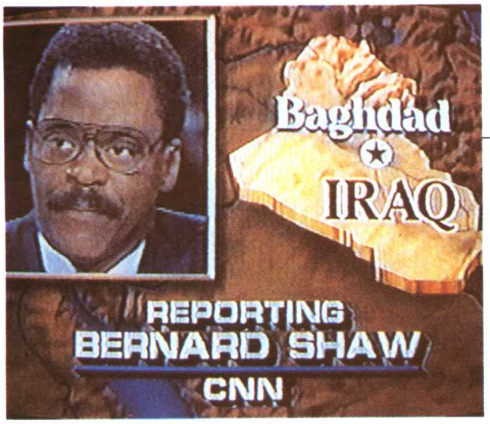
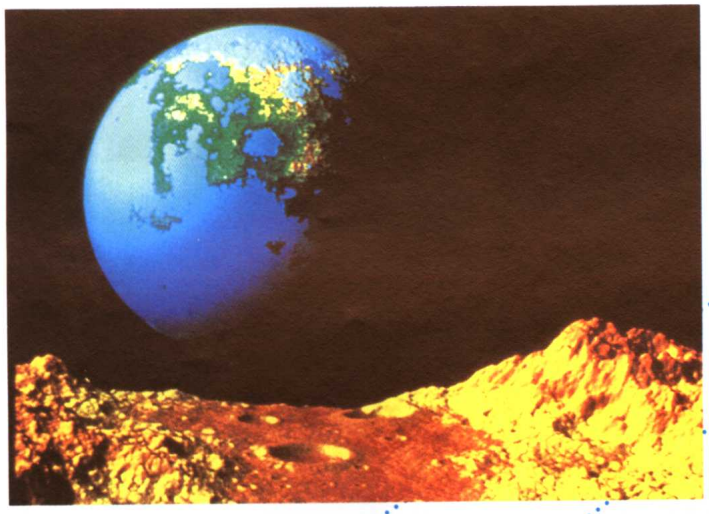
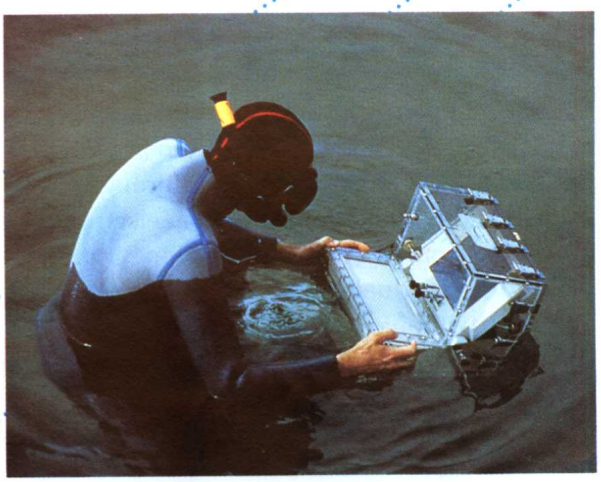


COMPUTERS ARE MAKING THE WORLD SMALLER





Maybe it first struck you as you watched the Persian Gulf War unfold on television. During the afternoon you watched a live report from Saudi Arabia, but over there it was nighttime. In Japan and Australia, it's already tomorrow. The world is getting smaller all right. Information technology makes time and distance melt away as it gives all of us access to any place on earth at any hour of the day or night.