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FALL 1984

(NO ADVERTISING)

WHOLE EARTH

Software Review

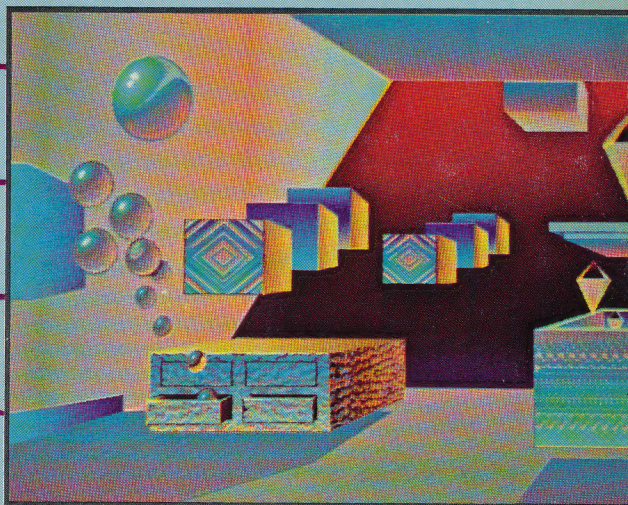
THE MAGAZINE OF FINE COMPUTING

RECOMMENDED

ORGANIZING

TOOLS,

P. 7



THE BEST LOGOS

SOFTWARE GENEALOGY CHART

CHEAP GLORY (INCLUDING MUSIC SOFTWARE)

RESEARCH CURRENT
THROUGH JUNE 1984

SOFTWARE THAT OUGHT TO BE

ART KLEINER: *Whole Earth Playing Editor* Steven Levy, a veteran freelance journalist, offers the first entry in this new regular feature — software that doesn't exist yet but should. If you can imagine a program that Ought to Be, write it up and send it in.

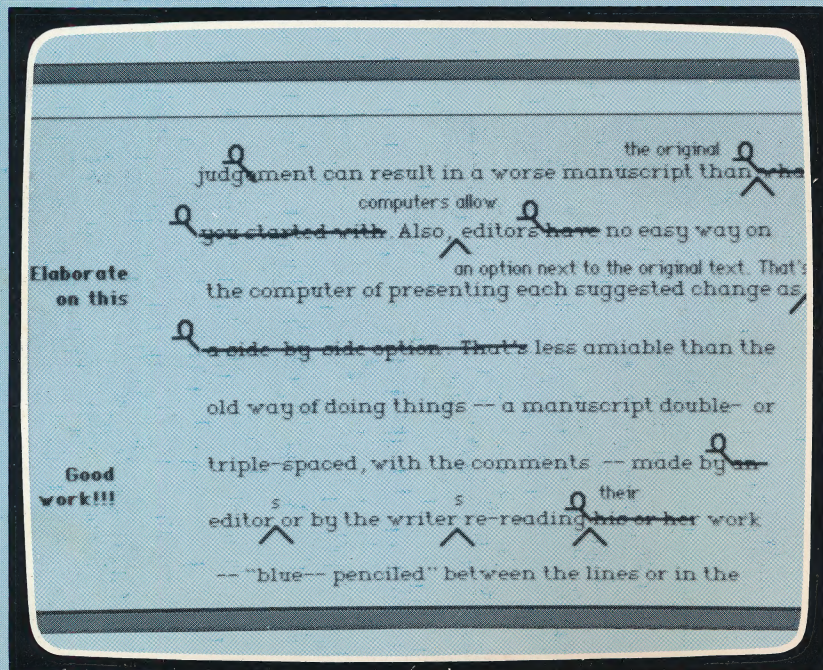
BLUE PENCIL

STEVEN LEVY: The most direct pleasure from word processing is ease of revision. But first inspiration often proves to be on the mark, and the tempting painlessness of changing a word or softening a judgment can result in a worse manuscript than the original. Also, computers allow

editors no easy way of presenting each suggested change as an option next to the original text. That's less amiable than the old way of doing things — a manuscript double- or triple-spaced, with the comments — made by editors or by writers rereading their work — “blue-penciled” between the lines or in the margin.

BLUE PENCIL puts that process into the computer. It's a full-featured, “what-you-see-is-what-you-get” word processor, but its unique advance is its “Blue Pencil Mode,” in which the copy automatically becomes triple-spaced, and — wonder of wonders — *you can write in the margins!* (Of course, it requires a bit-mapped graphic screen of higher resolution than most computer screens — Macintosh is perfect.)

When you go into Blue Pencil Mode, the program puts your comments between the lines or in the margins, using a different font (or an italic variation of your original font — your choice) for the suggested changes. You quickly isolate the text to be changed by



A sample screen showing "Blue Pencil Mode" — one typeface for the manuscript text, and a second for corrections. We designed this with MACPAINT on the Macintosh.

dragging the mouse across it, and on-screen that questionable passage appears in boldface (or whatever). To insert a word, double-clicking the mouse between two existing words places a caret in the space, pointing to the addition above.

Trying to legibly squeeze sentences between double-spaced lines has frustrated editors for years. It's no problem using BLUE PENCIL — you can set the margins of your "change" and the program will automatically word-wrap, dropping the next line of the document down to make room. The marginal comments will appear in yet a different font. (Note that BLUE PENCIL permits both "changes" — suggested replacements, additions, or deletions to existing text — and "comments," which call for further work and can even include the "Good point!"s and "Wow!"s that make a writer's day.)

BLUE PENCIL gives you several printout choices. You can print the original, with or without comment and with or without changes marked. Or you can print it *with the changes integrated* to see how it would read. You can even print a list of changes and comments without the text — BLUE PENCIL knows where they are, and provides

pages and line numbers.

The options are similar when you go over an edited BLUE PENCIL document on the computer. You can call up the document in its original form, in the Blue Pencil format with the changes and suggestions in the margins and between the lines, or with the changes implemented. Or, as with a non-automatic search-and-replace function in word processing, you can proceed to each change one by one, study it, and in a keystroke decide whether to implement the change or leave the text as it was. Even if you don't implement the suggestion, the program will "remember" it. Likewise it will save the original passage when you do make the change, and at any time later on you can access the "history" of a passage or word.

Eventually BLUE PENCIL could be used for telecommunicating, where collaborations between writers or long-distance editing relationships can take full advantage of its features. But I suspect that plenty of people will use the Blue Pencil Mode for their own drafts, to preserve the revelations that come on the first draft and to implement the wisdom that often follows. **END**

judgement can result in a worse manuscript than what
you started with. Also, editors have no easy way on
the computer of presenting each suggested change as
a side-by-side option. That's less amiable than the

**Elaborate
on this**

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the original

computers allow

an option next to the original text. That's

judgment can result in a worse manuscript than the
original. Also, computers allow editors no easy way
on the computer of presenting each suggested change
as an option next to the original text. That's less

BLUE PENCIL should
do three types of print-
outs — original manu-
script, manuscript with
correction shown, and
corrected text.

WHOLE EARTH Software Review

No. 3 Fall 1984

ART KLEINER: This issue's cover shows artist James Dowlen's interpretation of the "little boxes" of data management tools — software packages that organize and sort information. He also illustrated the rest of

Software That Ought to Be:
BLUE PENCIL
**What Book and Magazine Publishing
Can Learn From Software**
Masthead
About Access

ORGANIZING

Organizing Tools

by Tony and Robbie Fanning

The best "little boxes" (file managers),
"bigger boxes" (database manage-
ment systems), and "garbage bags"
(text organizers)

APPLE II: PFS:FILE, PFS:REPORT,
PFS:SOLUTIONS, DB MASTER 4 PLUS,
VERSAFORM, DBASE II, DATAFAX,
SUPERFILE, THINKTANK

CP/M: DBASE II, DBPLUS, CONDOR
III, SUPERFILE, NOTEBOOK

MS-DOS: PFS:FILE, PFS:REPORT,
PFS:SOLUTIONS, OFFIX, PC-FILE III,
VERSAFORM, DBASE II, QUICKCODE,
DBPLUS, R:BASE 4000, R:BASE EX-
TENDED REPORT WRITER, CONDOR
III, ASAP FIVE, SEQUITUR, DATAFAX,
SUPERFILE, THINKTANK

HP 150: PFS:FILE, PFS:REPORT, OFFIX,
PERSONAL CARD FILE, R:BASE 4000,
R:BASE EXTENDED REPORT WRITER
TRS-80 MODEL 100: DATA +, SORT2 +

**Organizing Programs as Mind-
Extension Tools** by Wayne Pendley

Trolls Under the Bridge

Excerpts from Whole Earth's
organizing tool teleconference

What They Left Out:
FRIDAY! and REVELATION

TELECOMMUNICATING

Software Reviews

APPLE II: PFS:ACCESS, APPLE ACCESS
II, PERSON-TO-PERSON

MS-DOS: IN-SEARCH, PFS:ACCESS
Telecommunicating Update

WRITING

The Shame of Word Processors

by Saul Feldman

Writing tools and telecommunications:
most don't mix well

Software Reviews

MS-DOS: PC-WRITE, DISPLAY-
WRITE 2, PC WRITER

PROGRAMMING

Software Reviews

CP/M: SMARTKEY
MS-DOS: SMARTKEY, PROKEY

THE INDUSTRY

The Genealogy Project

artwork by Larry Gonick

Our first draft of a chart of
the roots of software

Book Reviews

HACKERS, FIRE IN THE VALLEY

Breaking In by Levi Thomas

How to get an entry job in the
microcomputer industry

Inside by Richard Dalton

Trends, rumors, gossip, and guess-
work untainted by the rigors of
objective evaluation

the Organizing section that begins on page 7.

Like our first issue's cover, these illustrations were created with an IBM PC, a frame buffer, a Mitsubishi Analog RGB monitor, and Time Arts' versatile LUMENA

painting software (since reviewing LUMENA last issue, Dowlen has taken a job designing graphics for Time Arts). You can now run a version of LUMENA on the new Mindset computer — see page 121.

PLAYING

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- APPLE II: B.C.'S QUEST FOR TIRES, HEROISM IN THE MODERN AGE, THE ARCADE MACHINE
ATARI: B.C.'S QUEST FOR TIRES, QIX, THE ARCADE MACHINE
COLECO ADAM, COMMODORE: B.C.'S QUEST FOR TIRES
MS-DOS: B.C.'S QUEST FOR TIRES, PITS AND STONES, HEROISM IN THE MODERN AGE, EXECUTIVE SUITE

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APPLE II: THE MASTER BUILDER, SUNPAS, EXACT DIMENSIONS
MS-DOS: CONSTRUCTION MANAGEMENT SOFTWARE, SUNPAS, AUTOCAD, EXACT DIMENSIONS
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Languages for Thinking About Thinking: Eleven LOGOs Compared 82

by Jim McCauley

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CP/M: TLC LOGO
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Using LOGO, Making Science 92

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edited by Art Kleiner

- Eleven books on how to use your computer; four books on how to use software; two magazines; and praise for six manuals

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A beautifully crafted lightweight computer

First Look at Macintosh Software 106

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CHEAP GLORY

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APPLE II, MS-DOS: COPY II PLUS

"Or From Computer Literacy" 132



WHAT BOOK AND MAGAZINE PUBLISHING CAN LEARN FROM SOFTWARE (and a hot deal to prove it)

STEWART BRAND: A personal computer book is a contradiction in times. A book is a staid, conservative medium. Its pace is thoughtful amble, puffing its pipe, arguing over countless two-hour lunches with its New York editor, nitpicking its way through galleys, waiting for press time, waiting for distribution, waiting to be noticed. Years.

The pace of personal computers is somewhere between the speed of thought and the speed of light. Their marketplace is a melee, with new winners and losers announced every sundown. Death in the fast lane. Nothing is permanent in Random Access Memory, everything is permitted, everything is news. What's the longest you can go without logging on without losing it? Weeks.

We just finished this *book*, the *Whole Earth Software Catalog*. It'll reach you in October (September if you order direct from us). That puts it closer to computer pace than most, but what about the reader of February '84, or next summer? Bad problem, built into the medium.

We asked ourselves how *software* would deal with all this — computer magazines too hasty and fragmented, computer books too slow and out of it. Noting the pop-

ularity of LOTUS 1-2-3 and the coming of integrated all-in-one programs, we designed an all-in-one computer book. Out of 40,000 personal computer programs available we review a select 362, plus our favorite 18 computers, two score of books, and a score of magazines — the cream that rose through a year of hard separating. One computer marketplace, one reader (you), one book.

But what about February? Hey, software has new versions all the time; why can't a book? Call the authoritative 208-page *Whole Earth Software Catalog* Version 1.0. As part of the next (November '84) *Whole Earth Software Review* we could run a full listing of our then *current* recommended products along with searching discussion of the additions and deletions since the *Catalog*. Call that enhancement Version 1.1. Do it again in the February *Review*: that's 1.2. Again in

THE POINT FOUNDATION

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May: 1.3. And so
on till next year's
Catalog, Version 2.0.

Since it's a new kind
of thing, and no one else
has established the market,
make it attractive. At retail the
Whole Earth Software Catalog costs
\$17.50. Three issues of the *Whole
Earth Software Review* retail for \$15.
If we offered a 45 percent discount
on that package and added \$1.09
for shipping (where's the pock-
et calculator?), we could make
the \$32.50 value available
direct from us for \$19.09
postpaid — nearly a month
before the *Catalog* is in
the stores.

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Software Catalog* Ver-
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and 1.3. A better
deal than any com-
mercial software
that comes to
mind. See in-
side back cover
for details.

WHOLE EARTH Software Review

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ABOUT ACCESS

This example explains our format for "access" — the key information on price, hardware compatibility, copy protection, and availability that you need to choose products. The example shown here is for a software product. There will be different information provided for computer systems, books, and other types of products.

This section starts with the current version number (if there's more than one version). Then it lists the computers that can run the software and any specific requirements (memory, hardware, etc.). IBM PC- and Apple II-compatible systems are generally not indicated by specific computer brand because: (1) there are so many of them; (2) it's close to impossible to predict which "compatibles" will actually run a given program.

If you own an IBM PC- or Apple II-compatible computer, we recommend you test out each program you are considering on a computer that is configured like your own before buying it.

If the program is distributed on one or more 5¼" diskettes, no mention is made of the software medium. If it is supplied on a cassette, ROM cartridge or other medium, we'll let you know (specifically for each brand of computer).

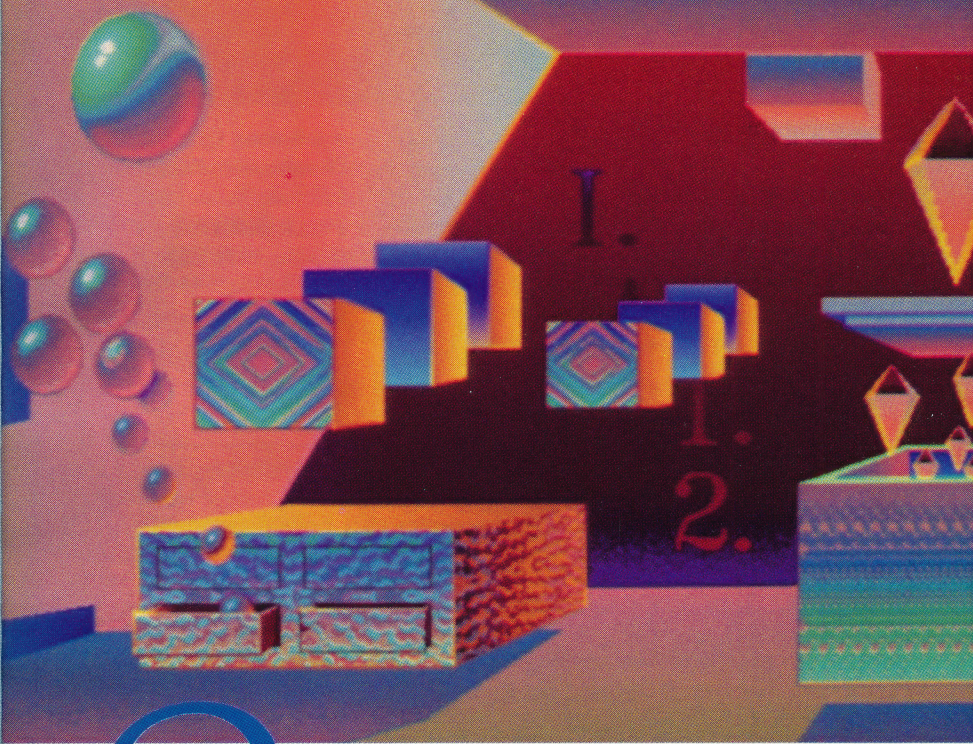
Version 4.0. IBM PC/XT (PC DOS, 192K); Columbia, Compaq, and some compatibles (192K); TRS-80 models III and 4 (48K); 5¼" disk drive and SMB hard disk. Dot matrix printer and modem recommended.

\$5995. Not copy-protected.

Small System Design, Incorporated, 1120 Oakdale Place, Boulder, CO 80302; 303/442-9454.

The price shown is the manufacturer's list price. You may be able to get the program for much less through mail order or other discount merchandisers. If the price varies, it will be indicated for each brand of computer. We indicate whether a program is or isn't copy-protected. If it isn't, you can make a copy of the program for backup or other uses.

The name, address, and phone of the company that publishes the software is shown in case you can't locate it at local computer stores or through other software dealers. Software companies are often well set up to handle phone inquiries.



ORGANIZING

By Tony and Robbie Fanning

Illustrated by James Dowlen

Information bombards us — much more than we care to, or can, sift through and remember. Only ten percent of every ton of paper going by carries interesting information. Five percent of that is useful, and we might want to look at one percent of it again. How do we find that one percent? We organize. We make lists, alphabetize and prioritize them, group similar kinds of information into piles, and throw out the garbage.

To do this, we use mundane organizing tools: pencil and paper, paper clips, forms and questionnaires, little pads of stickum-backed yellow notepaper, 3 x 5 cards, file folders, fluorescent highlighting pens, Rolodex files, notebook section separators, and file cabinets. And we

ART KLEINER: It's fitting that the pre-eminent tools for keeping track of disparate information should be evaluated by such Renaissance people as Tony and Robbie Fanning. Married to each other, they've co-authored eight books about such diverse subjects as astronomy, butterflies, fiber arts, and personal organization (Get It All Done and Still Be Human, Ballantine, 1980). They finished the latter book the same day they left on a cross-country bicycle trip. Tony has followed computers in general and these organizing programs in specific for 23 years — he evaluated them for SRI International, and now sunlights as a research scientist at Hewlett-Packard. You'll find this an uncommonly reliable set of reviews; the Fannings are not easily swayed by hype and promises.

WHOLE EARTH RECOMMENDS

"LITTLE BOXES" (File Managers)

• **PFS:FILE**
(Apple, IBM PC):
\$125-\$175, p. 10

• **PFS:REPORT**
and **PFS:SOLUTIONS**
(Apple, IBM PC):
\$99.95-\$125, p. 11

• **OFFIX (MS-DOS):**
\$99, p. 13

• **PC-FILE III (MS-DOS):**
\$45, p. 13

• **PERSONAL CARD
FILE (HPI 50):**
\$150, p. 15

• **DB MASTER 4 PLUS**
(Apple, IBM PC):
\$350, p. 15

• **VERSAFORM**
(Apple, IBM PC):
\$389-\$495, p. 16

• **DATA +, SORT2 +**
(TRS-80 Model 100):
DATA + \$59.95
SORT2 + \$29.95

"BIGGER LITTLE BOXES" (Database Management Systems)

• **DBASE II**
(CP/M, MS-DOS):
\$495, p. 18

• **QUICKCODE and
DBPLUS:**
\$295 (Quickcode)
\$195 (DB Plus), p. 20

• **R:BASE 4000**
(IBM PC):
\$495-\$795, p. 21

• **R:BASE EXTENDED
REPORT WRITER:**
\$150, p. 21

• **CONDOR III (CP/M,
MS-DOS):**
\$650, p. 21

• **ASAP FIVE (MS-DOS):**
\$275, p. 22

• **SEQUITUR**
(MS-DOS):
\$795, p. 23

"GARBAGE BAGS" (Text Organizers)

• **DATAFAX**
(Apple II, IBM PC):
\$249-\$299, p. 25

• **SUPERFILE:**
\$195, p. 26

• **NOTEBOOK**
(C/PM, IBM PC):
\$150, p. 27

• **THINKTANK**
(Apple, IBM PC):
\$145-\$195, p. 27

STILL UNDER EVALUATION:

• **ALADIN**
• **DAYFLO**
• **FRAMEWORK**
• **FYI 3000**

• **INFOSCOPE**
• **INFOSTAR +**
• **POWERBASE**
• **THOR**

EVALUATED BUT NOT RECOMMENDED

• **ADVANCED
DB MASTER**
• **AUTOCODE I**
• **CITATION**
• **DB MANAGER II**

• **DBASE DOOR**
• **DBASE WINDOW**
• **FAST FACTS**
• **FMS-80**
• **FRIDAY!**

• **KNOWLEDGEMAN**
• **MDBS III**
• **PERSONAL PEARL**
• **REVELATION**
• **SALVO**
• **THE IDEA
PROCESSOR**
• **ULTRAFILE**
• **VISIFILE**

use tricks like outlining, patterning, and shuffling. We grow used to the limitations of our tools and tricks — we know we can't easily store a particular item under several references, or automatically reshuffle a filing system, or quickly make a list of what's in a cabinet drawer.

Organizing programs can help sift information more flexibly. They exchange the familiar paper activities for new formats: lists, files, fields, records, databases, and even "computer environments." If you find the terms confusing — computer mavens might call your address book a "database" — don't worry. These programs do only a few simple, dumb things. They store away information. They sort it for you. They let you pick out what specifics you want to look up or print out.

You probably already know what you want to do — manipulate a mailing list, organize your research notes, manage a small business — but you don't know which program fits your needs. To help you choose, we divided organizing programs into two rough categories: little boxes and garbage bags.

Little boxes (called "file managers" if they're simple, "database management systems" (DBMS) if they're complex) are designed to organize structured information that can be arranged so it all looks alike — for example, rows in a table of figures or entries in a phone book. When you shop for this type of organizing program, play the numbers game. Find out the limits of a data-management program: its maximum number of files per database, records per file, fields per record, characters per field. (We list those statistics for every program recommended here.) Ask yourself, "How long will I keep my computer? How long will I use this program?" If the answer shows that you'll outgrow the program soon, consider alternatives.

We call the second category of organizing programs garbage bags. Sometimes called text organizers, they handle unstructured information of varying sizes, shapes, or types — such as quotations from books or research notes.

More than any other type of program, organizing tools require powerful or expandable computer equipment. A good rule of thumb: if the computer system requires you to use your home TV for display, stick to 3 x 5 cards. It'll be less frustrating. For business use, a main-stream computer — IBM PC/compatible, CP/M, Apple — and two disk drives are musts. Expect to soon find yourself considering a hard disk and extra RAM memory, especially if you depend on fast look-up capability. If you manage a lot of information, budget a lot of time to learn how to do it right.

LITTLE BOXES

"Beginner's Luck"

Some simple organizing programs stand out as remarkable values. You may not wish to organize your whole business using them, and you may outgrow them quickly; but they'll introduce you to ideas that will let you master more flexible industrial-strength programs later. Or they might be exactly what you need in themselves. We call the first group of file managers "beginner's luck," because they're easy to use and understand.

Good for Beginners, Maybe All You Need

PFS:FILE

Apple II/II+, IIe/IIc, III, Macintosh; DEC Rainbow; Gavian; HP 150; IBM PC/XT/compatibles, PCjr; TRS-80 models III, 4, 2000; TI PRO. Prices vary: \$125 — \$175. Copyrighted. Software Publishing Corporation, 1901 Landings Drive, Mountain View, CA 94033; 415/962-8910.

Number of files permitted per database: 1

Records per file: 1000*; 2200†

Fields per record: 1600*; 3200†

Characters per field: 840*; 1680†

PETE WENDELL: It does everything I need it to do easily and relatively quickly. And it's so simple that even my boss can use it.

PHILIP ELMER-DEWITT: Give my vote for PFS:FILE. It makes the kind of list-keeping most people do palpably easier. Still sells like hotcakes today after years on the market. I did my wedding on it (chapel seats, lunch plates, gifts, thank you notes — the perfect use for a home

database), and even my wife learned to love the printouts.

TONY AND ROBBIE FANNING: PFS: FILE is one of the simplest organizing programs to learn because bells and whistles were designed out of instead of into it. It's an ideal starter for learning about data management, and in itself it's good for just about anything you could do with paper forms, as long as the job isn't too big. (In fact, its vocabulary is that of familiar paper forms rather than the more common, mind-deadening vocabulary of data processing.)

Like forms, PFS:FILE works well when the information being organized is all of the same type: names and addresses, order information for customers, etc. You can make the blanks in its forms any size and fill them with any type of information (numbers, letters, or a combination); thus it can keep track of good-sized but discrete chunks of text,

Employee # 92139 Hire Date 7/2/61/01
 Name: Woolf, James
 Address: 9732 Sunrise Place
 City: Ridgewood State: NY Zip: 11385
 Dept: Administration Phone Ext: 210
 Job Title: Asst. Admin. Asst.
 Monthly Salary: 1000

Employee # 92138 Hire Date 7/2/61/01
 Name: Woolf, James
 Address: 9732 Sunrise Place
 City: Ridgewood State: NY Zip: 11385
 Dept: Administration Phone Ext: 210
 Job Title: Asst. Admin. Asst.
 Monthly Salary: 1000

Employee ID 98129 hired 72/09/16
Name Wolff, James
Address 9732 Sunrise Place
City Ridgewood State Ca ZIP 98122
Ext Administration Phone Ext 143
Job Title Personnel Clerk
Monthly Salary 1,000

File B:STAFF Form 8 Page 3
F2-Print Form F3-Remove Form F5-Date F6-Time F10-Continue

First you "paint" your PFS:FILE form on the screen (above). Then you use that form (right) to fill in data, look up data, print, and perform other functions.

like comments, quotations, or recipes.

The information you type into these forms (one form after another) is stored in a data file that might cover employee information for your little company, gardening books in the university library, customers of your custom sewing business, or (if you were a fat New York detective) a bedding history of your orchids.

Setting up forms in PFS:FILE is so easy that you must remind yourself to design the form carefully, because the blank form controls all the other PFS:FILE functions, such as printing or making changes. For instance, to look up a piece of information on the screen, or print it on paper, you simply fill in the specifications on the same blank form. To ask for all employees earning more than \$1000 a month, type "> 1000" in the item "Salary." You can combine conditions to select exactly the records you want. You can look at the informa-

tion on the screen, print it, or delete it.

PFS:FILE is fairly powerful, but it achieves its simplicity by limiting its capabilities — a standard tradeoff with organizing programs. When searching for forms to update, print, or delete, PFS:FILE has two speeds. The normal speed is sufficient for a small number of forms in your data file, but it slows down when the number gets large. If you will usually search by one item, make it the first item on your form, and the search will go faster because PFS:FILE uses that item as an index to narrow down the range of data it searches through.

PFS:FILE can't use more than one disk for a data file, so the number of forms you can track at once on a floppy disk system is limited to about a thousand. But you can use the program on a hard disk, which relieves both the speed and capacity problems somewhat.

* Apple. † MS-DOS.

For Convenience and Calculations

PFS:REPORT

Apple II, IIe/IIc, III, Macintosh; DEC Rainbow; Gavilan; HP 150; IBM PC/XT, compatibles; PCjr; TI PRO; TRS-80 models III, 4. \$125; TRS-80 version \$99.95. Copy-protected. Software Publishing Corporation, 1901 Landings Drive, Mountain View, CA 94303; 415/962-8910.

TONY FANNING: If PFS:FILE fits your needs, you'll probably need the separately sold PFS:REPORT, which increases the kinds of reports (printouts) your data files can produce. PFS:FILE keeps its printout capabilities simple, requiring you to design your form with items in the order you want them printed; if the first item on the form is a zip code and the name is next, that's the order it has to print. It also makes you type in the printout specifications each time, even if they're always the same.

PFS:REPORT can rearrange the items in a printout and save your printing formats for later use. It can also perform calculations like totals, subtotals, averages, and subaverages in a printout — to print

Keywords	Magazine	Abstract
ECL Memory RAMs	Data News	This article describes the use of a new ECL process to fabricate 16K RAMs for less than \$4 each.
Failure Memory PCboards	Weekly News	A problem is discussed which causes premature failure of memories due to warpage of the PC boards, especially at high temperatures.
Failure RAMs	Elec Times	An unsuspected cause of RAM failure has been traced. People have found that gamma radiation causes random temporary bit faults.

PFS:REPORT can create more complicated printouts than PFS:FILE.

a monthly summary of customer activity that averages the dollars spent per customer, for instance. It can group items by a particular characteristic — first the customers who bought your X-widget, then the Y-widget buyers.

SHARON RUFENER: I met the PFS: family at the offices of the San Francisco Fair & Exposition, an urban version of a

county fair, where everything got done on a crash basis by an understaffed group of workers up to their armpits in paperwork.

They had an Apple III with a hard disk and the PFS: software and didn't know what to do with them. Being complete computer virgins and terrified technophobes besides, they needed help, even with what might be the world's friendliest software at their disposal. And since these people needed to be self-sufficient in the future, I had to teach them to design and create their own systems. I also trained various partners to use those systems.

With PFS:FILE and REPORT, we

scheduled paid and volunteer time for hundreds of Fair workers; we sent mass and selected mailings; we monitored the entire floor plan, including space available and billing; we kept track of contest prizes and payments; we printed status reports for state officials; and we coordinated hundreds of phone calls to media contacts without anybody slipping through the cracks.

Eventually even the most computer-phobic staff member refused to give up her computer, and they got another Apple so everyone could get work out! It's a good thing we used PFS: — if we had used DBASE II or the like, the Fair never would have happened!

Easier Yet

PFS:SOLUTIONS

Apple II, IIe/IIc, III; DEC Rainbow; IBM PC/XT/compatibles, PCjr; TI PRO. \$20 per application. Twelve applications: Stocks, Home Budget, Disk Library, Home Inventory, Mail List, Employee, Payroll, Ledger, Invoices, Inventory, Checks, Tickler. Copyrighted. Software Publishing Corporation, 1901 Landings Drive, Mountain View, CA 94303; 415/962-8910.

TONY FANNING: There are always busy or just-plain-scared people who want only to get the job in front of them done, not to learn a general-purpose tool to create a specific tool to do that job. If you're one of them, and the PFS: family isn't simple enough for you but you'd still like to use it, you could try PFS: SOLUTIONS, a collection of predefined, specific applications used in conjunction with PFS:FILE and PFS:REPORT. The titles read like the definitive list of business/home organizing activities: Home Inventory, Inventory, Checks, Disk Library, Employee, Home Budget, Invoices, Mail List, Ledger, Payroll, Stock\$, and Appointments Tickler.

Each PFS:SOLUTION disk contains a form design, some sample forms for practice, and three to seven report designs. You can use these well-designed form and report "templates" as is, or modify them to your specific applications.

This home inventory form and the reports you can print from it are pre-designed PFS solutions. All you need to do is enter information.

If you outgrow PFS:FILE, you have to learn a new vocabulary to move on to more powerful programs, which usually use data-processing talk.

NAMES FOR OBJECTS

In	In DATA
PFS:FILE Talk	PROCESSING Talk
Form design	Database structure
Data file	Database
Form	Record
Page	Screen (of data)
Item	Field
Index	Key field
Report	Output, reports

Right Before Your Eyes

OFFIX

DEC Rainbow; HP 150; IBM PC/XT; NEC APC; TI Professional; TRS-80 Model 2000; Victor 9000; Zenith Z-100. Copy-protected. \$99. Emerging Technology Consultants, Inc. 2031 Broadway, Boulder, CO 80302; 303/447-9495.

Number of files permitted per database: 2
Records per file: limited by disk size; up to 1,000,000 characters
Fields per record: 50
Characters per field: 250

Reviewed by Charles Spezzano in *Whole Earth Software Review* #1 (Spring '84), page 47: "It mimics what most of us have seen all our lives — an office with a file cabinet . . . a very useful, perhaps generic tool for getting anything, anyone, any office better organized."

Count the Features and Divide by the Cost

PC-FILE III

IBM PC, compatibles (96K). \$95 contribution for disk and updates. Copy-protected. ButtonWare, P.O. Box 5786, Bellevue, WA 98006.

Number of files permitted per database: 1
Records per file: 10,000
Fields per record: 41
Characters per field: 65

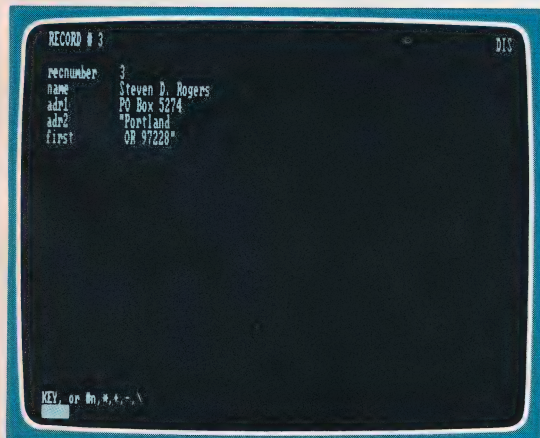
JIM CELONI, S.J.: When I first wanted to catalog my diskettes, I used my text editor, creating a file with a one-line record for each disk. To look up a program, I used the editor's search command; to update the catalog, I edited the file.

When I read about PC-FILE III, I wrote to Jim Button for my free copy; a week later I was so happy with it I sent a contribution. With PC-FILE III I could update my file, sort it by any collection of fields, find records matching any specification, and format and print a report about any diskettes. A computer-novice

friend of mine, using PC-FILE III, created a name and address file and printed three-across mailing labels the same day.

PC-FILE III is easy. You give commands by pressing a function key or typing the first few characters. Report formatting directions are cryptic but well-documented. The manual, included as a file on the diskette, is excellent: explains everything, defines terms, and gives examples without being condescending.

The program prompts you for new data clearly, though it flags input errors with only a 'beep.' It can fill in some fields such as date and time automatically. You can retrieve the most recently changed entry or the one just before it. Passwords can keep a file secure. PRO-KEY it isn't (p. 50), but ten "smart" keys (ALT-0 through ALT-9) can represent up to 75 characters each for speedy data entry or single-keystroke command sequences. Reports can include totals.



This record came from a list of volunteer reviewers for the *Software Review*. We transferred the the whole list directly from a WORDSTAR/MAILMERGE file into PC-FILE III. The only compatibility problem: the quotation marks around the city, state, and zip code. PC-FILE's transferability is one of its many remarkable features (for the cost).

other calculations, and text. You can sort fields by more than one characteristic (for example, employee names in alphabetical order within each salary level). You can send reports to a file and save report formats for continual use.

PC-FILE III's data limits are reasonable, since the file must be on one disk drive. If I approached the limits, I'd buy R:BASE (p. 13). PC-FILE III is fast enough; for big files I use a RAM disk. I run it with 128K, a double-sided drive, and an

80-column color display (you can specify foreground and background colors). You can move data between PC-FILE and VISICALC, LOTUS 1-2-3, MAILMERGE, and other programs. When you count the features and divide by the cost you get a very big number. Programmer Jim Button answered my questions promptly and incorporated suggestions into new versions. I look forward to his planned PC-CALC and PC-GRAPH.



Other File Managers

With controls less complicated than a 747 jetliner, you can organize information, select from it, sort it, and print it. Each program in this section is powerful enough for 'mid-range' organizing but conceptually simple enough to learn quickly. Remember that what is simple enough to learn quickly may be as quickly outgrown.

Touch and Roll

PERSONAL CARD FILE

Version A.01. HP 150 (256K). \$150. Copy-protected. Hewlett Packard, 11000 Wolfe Road, Cupertino, CA 95014; 800/367-4772.

Number of files permitted per database: 1
Records per file: 550

Fields per record: limited by screen size
Characters per field: 80

TONY AND ROBBIE FANNING: Apart from the fact that you can point to the screen to have information instantly expanded out and displayed, PERSONAL CARD FILE operates much like PFS: FILE. It's great for quick card-file-like look-up by people who use a computer routinely at work.

CLIFFORD FIGALLO: On the screen you see a facsimile of a rotary card file showing index tabs. Touch the "rollers" and the cards spin by. Touch a card's "tab" and the entire card appears on the screen.

You can search on any field, and very quickly on the card file's key field (displayed on the tab). You can look up a person or business by touch, and the program will automatically dial the phone number (with a Hayes-compatible modem). PCF will print data on a card-by-card basis, including the entire image of the index card. It has limited reporting capabilities, however, and once data is entered, changing the format is not advisable. Still, PCF is a natural for the HP 150's touch capabilities.

For Files Spread Over Several Disks

DB MASTER 4 PLUS

Apple II, IIe/IIc (64K, DOS 3.3, 2 disk drives). \$350. Copy-protected. Stoneware, Incorporated, 50 Belvedere Street, San Rafael, CA 94901; 415/454-6500.

Number of files permitted per database: 1
Records per file: 250 (34 megabytes)
Fields per record: 100
Characters per field: 100

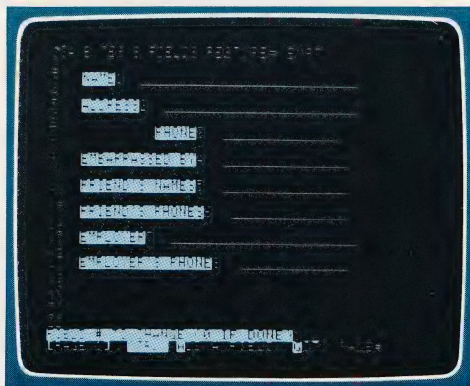
TONY FANNING: This upgrade of a file manager popular in the Apple computer world for years has many convenience features and copious documentation. Like most file managers, DB MASTER allows you only one data file; unlike most, it lets you spread that file across many diskettes. With such a large file, you'll want three or four drives or a hard disk unless you don't mind swapping diskettes constantly. (A hard disk requires a special edition of the program.)

You define the data structure with a form that you build on the screen. Later you construct similar forms, called Master Reports, for searching, printing, and updating. Searching is not particularly fast except with the primary index key, which can be a combination of fields. It offers three levels of password protection, and it can pull bite-size chunks out of

long data entry forms so you can update a few fields without having to press hundreds of carriage returns. This makes DB MASTER 4 PLUS useful in office situations where one person designs a system and other people use subsets of it.

We recommend DB MASTER on the Apple. The IBM PC version, called ADVANCED DBMASTER, is much more complex and slow, with overblown documentation, though it is competently implemented. You can do better with R: BASE (p. 20) or another database manager.

DB MASTER's basic data entry form, shown here, is easy to create and modify, using the prompts at the bottom of the screen.



An Organized Form of Record Keeping

VERSAFORM

Version 2.7. Apple II family (64K; two disk drives or hard disk), Apple III (128K); IBM PC/compatibles (128K); MS-DOS machines including TRS-80 2000; Wang; DEC Rainbow; TI PRO (256K). Apple version \$495; all others \$389. Templates: Legal/Office Manager, \$249. Purchase Order/Invoicing, \$49.95. Mailing List/Cash Receipts/Expense Journal/Checkwriter, \$39.95. Job Cost, \$79.95. Copy-protected. Applied Software Technology, 170 Knowles Drive, Los Gatos, CA 95030; 408/370-2662.

Number of files permitted per database: 1
Records per file:
depends on record and disk size
Fields per record: 50 (Apple II); 75 (MS-DOS)
Characters per field: user specified

TONY FANNING: Don't throw away your old paper forms — with VERSAFORM you duplicate them as input screens and report formats. Once it's set up, people

familiar with the paper versions can easily use the electronic versions with little training. As a standalone program VERSAFORM can make business a lot easier, but moving information from it into other programs (like a word processor) is difficult. Also, because VERSAFORM is written in the UCSD PASCAL p-system, it doesn't interact easily with programs or files in your operating system. P-system programs are often slow, and VERSAFORM is no exception.

THOMAS R. PIPER: If followed literally, without too much thinking or conceptualizing, VERSAFORM can help a variety of businesses do their workaday tasks. For example, a local coal company runs more than \$20 million of its transport tickets each year on forms designed and implemented by a low-paid secretary. They track 45 drivers and 30 trucks going to 25 major vendors.

A VERSAFORM printout (right), with automatic calculations, from the manual. This could be set up to match an existing printed form.

Use VERSAFORM to duplicate your existing forms onscreen (below). The only exception is VERSAFORM's command line at bottom.

CUSTOMER	QTY	DESCRIPTION	AMOUNT
Whyte	3	Chisels	9.00
Jones	4	Chisels	12.00
Brown	5	Chisels	15.00

	12	Chisels	36.00

Brown	2	Hammers	10.00
Smith	3	Hammers	15.00
Jones	5	Hammers	25.00

	10	Hammers	50.00

	2	Wrenches	20.00
	3	Wrenches	30.00

	5	Wrenches	50.00

	27		136.00
			=====

ALPHA TOOLS, INC.
Serving the Bay Area since 1925

Customer: [] Acct# []
Address: [] Phone []
City: [] State: [] Zip: []
Order Date: [] Clerk: []

LA	Qty	Stock#	Description	Price	Amount
1					

Sub-Total []
Tax []
Total []

CMD: * 0, C, S, A, N, B, CL, E, FF, PB, R, I, Q

and Billing

They weigh each load of coal and store customer names, billing and receiving addresses, truck numbers, driver numbers, gross weights, road taxes, reclamation taxes, sales taxes, discounts, and other shipping information, as well as variable prices of different coal grades. They continue to be amazed and delighted with what they can accomplish.

VERSAFORM's look-up tables and business-form "calculators" work superbly for the coal company's invoicing.

Later, the firm uses the reports from the same data files to manage its operations. For example, a "hailed tonnage between repairs" report is a prime indicator for each truck (sort of like reporting on mean time between repairs for computers); a driver's work-history report can be calculated for payroll (since drivers are paid by the load and mileage, not by time or on salary). I wish VERSAFORM'S fields were bigger, but its report generating is nice.

Put a Filing System on Your Lap-Sized Computer

DATA + • SORT2 +

TRS-80 Model 100 (16K; 32K recommended).
DATA +: \$59.95. DSORT2+: \$29.95. Also available for Olivetti M-10 as **DATA10**. Copy-protected. Portable Computer Support Group, Incorporated, 11035 Harry Hines Boulevard, Suite 207, Dallas, TX 75229; 214/351-0564.

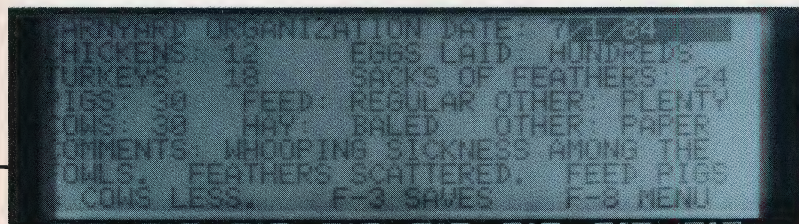
Number of files permitted per database: 1
Records per file: 60 (more with extra memory)
Fields per record: 16
Characters per field: 249

JIM STOCKFORD: A word on the great convenience of filing systems on lap-sized computers: the computer itself can be carried down rows of shelves for the tax-time countdown, or taken to the field or library for data collection. At the worksite you can enter data into fields presented by the screen, and from there on the program does the work. Isn't that better than walking around with a notebook and returning to the office to key everything in?

So far, these two programs from

the Portable Computer Support Group are the best we've seen for the Radio Shack Model 100. DATA + is a standalone filing system that allows you to print labels, listings, and forms; sort records on any of the sixteen fields by alphabetical or numerical order; and incorporate fields into text files. It also has an Add: feature that creates files and reports from unrelated records. With the built-in search features of the Model 100, DATA + is as good as many of the filing programs that run on desktop computers.

If you use DATA + for your work, you should get SORT2 + as well. It sorts DATA + files by any field. It can sort alphabetically (recognizing upper-case letters ahead of lower-case letters if you wish) or by number, and it has an astonishingly low 1K memory requirement. The manuals are beautifully simple. The factory support is friendly and immediate. Together DATA + and SORT2 + provide an excellent filing, sorting, and printing tool at an awfully good price.



BIGGER LITTLE BOXES

Database Management Systems

Database management systems (DBMS) perform all the functions of the file managers and more. But they're not easy. What distinguishes them from file managers? They simultaneously process information from more than one file, and they're often programmable, letting you query them about that information in a variety of ways.

With a database manager, you can store information in several data files and still have access to all the data in all the files, creating new files (or reports) that combine items selected here and there from any of the data files (which are often called "databases" for these more complex programs). The word used (and often misused) to describe this data handling ability is 'relational'; it refers to the ability to combine (or 'relate') information from different files that are set up in the form of tables. For example, you can combine address information from one file and sales information from another to create an invoice, if customer names are common to both.

Database management systems are direct descendants of the monster data-processing programs that once lived only on corporate mainframes. They usually require something uncomfortably similar to programming to do their tricks — including getting the information back out of the database. This makes them extremely flexible and adaptable, but often frustrating for nontechnical users. They may exact a long apprenticeship, but if you need flexibility and industrial-strength information management, you'll be glad you have a DBMS.

There are only three choices for beginners when it comes to these serious programs: (1) Decide right now that your organizing job is big and that you ought to devote a large amount of effort (and maybe a large amount of money) to mastering a powerful program. Then go do it. (2) Maybe you aren't cut out to be a computer programmer. Get someone else to set it up for you, and be happy that you can use it. (3) Forget it. You don't need the difficulty that accompanies this kind of complexity.

We're beginning to see new approaches, such as "natural language" add-ons that let you ask for information in English instead of programmer talk. They'll probably make personal computer DBMSs easily usable. We're also beginning to see good database managers included in all-in-one packages. But we're not there yet.

The Standard Against Which All Others Must Be Judged

DBASE II

Version 2.4. Apple II family, Apple III; IBM PC/XT/compatibles; most CP/M and MS-DOS machines. \$495. Copy-protected. Ashton-Tate, 10150 W. Jefferson Boulevard, Culver City, CA 90230; 213/204-5570.

Number of files permitted per database: 2
Records per file: 65,535
Fields per record: 32
Characters per field: 254

TONY FANNING: You can't even talk about personal computer databases without mentioning DBASE II. Even

satisfied users will tell why it's the most frustrating program in the world: it's so damn useful — but it's slow; it's so hard to figure out how to do what you want — but you can . . . eventually. Despite its limitations, just as with the IBM PC, DBASE became the standard against which we must measure all others, because of the widespread, consistent support that exists for it — it's a marketing success. There's love/hate from everyone who's used it.

Many people who think that 'DBASE' is the generic name for any database management system buy it only to find they can't understand it because so much of it is a programming language. Their next step is to take a course; DBASE II courses form a minor industry. There are about a dozen books on it so far. And there are outboard programs ("batteries not included") to make it faster where it's slow and easier where it's hard (see "the DBASE family," next page). DBASE II is to database programs as WORDSTAR is to word-processing programs.

Unlike such "free-form" programs as PFS:FILE, DBASE II requires a rigid data structure. You must tell it the name of a field, what kind of data will go into it (text, numeric, or logical), and how many characters the field will occupy. Data entry is reasonably easy (WORDSTAR users will recognize the editing commands), but how do you find the information once it's in? Simpler file managers prompt you or give you a form to fill in. DBASE II

gives you a dot. Period. You must type in DBASE II commands just as you would in BASIC. Just as with BASIC, you can string together a series of commands in a file and feed the file to DBASE. But isn't that programming? Right. Flexible if you understand it, frustrating if you don't. Many who have shelled out full dollar for the program never make it to the other side.

Though DBASE II is a relational database management system, in practice you can only use two files at once. It requires little memory, but sorting is slow, report capabilities are fairly rudimentary, and it requires programming for practically all but the most simple reports. Think long and hard about how you want to interact with DBASE before you buy it. If you don't want "custom" processing, you might want a simpler file manager, or one of the other DBMs reviewed in this section.

LOUIS JAFFE: PFS:FILE and its REPORT cousin are easy to learn and use (great for teaching beginners) but very limited in total capabilities compared with DBASE. DBASE is a full-fledged, high-level programming language for data manipulation. DBASE programs can be quite cranky to set up and debug, but they make possible all sorts of customized applications. Despite misleading ad campaigns that label it "user friendly," however, DBASE is really best employed by a trained programmer. It's very dependable, having been debugged through several revisions, and there is a large and growing library of DBASE programs,

You must define a rigid database structure, explicitly stating type of field, width (number of characters), and number of decimal places, before DBASE II can accept data (left). DBASE II's programming language — flexible, but difficult to learn (below).

```

CREATE
ENTER FILENAME: COMICS
ENTER RECORD STRUCTURE AS FOLLOWS:
FIELD  NAME TYPE WIDTH DECIMAL PLACES
001    TITLE C 40
002    ISSUE C 3
003    MONTH YEAR C 5
004    PUBLISHER C 15
005    STOCK C 2
006    PRICE PAID N 6 2
007    ARTIST C 20
008    WRITER C 20
009    COV ARTIST C 20
010    CHARACTERS C 50
011    STORY TITLE C 40
END NAME FIELD
011    STORY TIT C 40
012    CONDITION C 8
013    COMMENTS C 80
014
INPUT DATA NOW?

```

```

IF LESSON = '1'
IF COMMAND # CHECK
?"You didn't enter:"
?"&CHECK"
?"Please try again."
LOOP
ELSE
STORE 1 TO OK
SET TALK ON
&COMMAND
SET TALK OFF
LOOP

```


many in the public domain, which are usable without modification by any computer running DBASE.

JIM WHITESCARVER: It is the only package I've found that does just about every data-conversion task you're likely to need on a micro. Any report you can print to a file can be loaded into DBASE. If your data outgrows your spreadsheet,

you can load it into DBASE. You can capture a report on your micro from a remote host and load it easily into a DBASE file. You can reformat it, and use the data with CBASIC, MBASIC, and LOTUS 1-2-3 if desired. I'd sure like to find a low-cost DBMS that can do even some of the tricks that DBASE does, but I haven't found one yet.

Huge Follow-on Market — Because DBASE Is So Flexible, or Because It Is Incomplete?

The DBASE Family: QUICKCODE and DBPLUS

QUICKCODE: Version 2.2. IBM PC, compatibles; most MS-DOS machines. 180K. \$295. Fox & Geller, Incorporated, 604 Market Street, Elmwood Park, NJ 07407; 201/794-8883.

DBPLUS: Version 2.0. Most CP/M machines with Z80 or 8080 (64K); most MS-DOS machines (128K). \$125. Humansoft, 661 Massachusetts Avenue, Arlington MA 02174; 800/451-2502.

TONY FANNING: DBASE II is a strange mixture of flexibility and incompleteness. You can program it to do damn near anything, including creating input menus and very complex report programs. But you may not want to take the time or effort to do it. An army of add-on packages now do this for you.

QUICKCODE allows you to "paint" menus and formats on the screen; it then generates DBASE II programs that

you can use for data input and report output. As with most program generators, the result is slower operation. And it doesn't really remove the need to understand the DBASE language. The cost can be high, too. I know one sad person who paid about \$1000 for DBASE and QUICKCODE so she could generate a menu-driven application that PFS:FILE could easily have handled for \$150 — a small fraction of the cost.

Since DBASE II was originally written for 8-bit micros and never really rewritten for higher capability machines, even its 16-bit versions are slow when sorting. DBPLUS's main attractions are a flexible fast sort and the ability to compress DBASE files (for storage) to less than half their original size. Ashton-Tate's new DBASE III may remedy the sorting problem. (Many other specialized add-ons and extenders exist, including interfaces for graphics, statistics, and scientific applications.)

QUICKCODE translates DBASE II commands into this menu. As you give it instructions, it automatically creates DBASE II programs for entering, searching for, printing, and modifying data.

Number to Enter	What You Want to Do	Sort Order
(1)	o Add, Change, Find People	:EMPLOYEE
	o Form letters or forms	Last Name
(2)	o Mailing Labels or Form Letters	:ZIP
		Zip Code
(3)	o Corporate History & Financial	:CORPORAT
	o Department Memos	Department
(4)	o Add, Change, Find Departments	:DEPT
		Department
(5)	o Add, Change, Find Positions	:POS
		Position
(6)	o EEO Analysis	:EEO
		EEO Code
(7)	o EXIT to dBASE-II	:RETURN
(8)	o Completely EXIT from Personnel	:QUIT

(QUICKCODE ON)

A Faster, More Helpful New Contender

R:BASE 4000

Version 1.1. IBM PC/XT, compatibles; HP 150; DEC Rainbow; TI PRO (256K). \$495. Burroughs (CTOS); NCR (BTOS). \$795. Copy-protected. Microrim, 1750 112th N.E., Bellevue, WA 98004; 206/453-6017.

Number of files permitted per database: 40

Records per file: 2.5 billion

Fields per record: 400 (maximum of fields in database)

Characters per field: 1500

Reviewed by Clifford Figallo in Whole Earth Software Review #2 (Summer '84), page 131: "A smooth-running, well-thought-out program; it allows one to radically modify the structure and field lengths without having to totally rebuild the database."

R:BASE EXTENDED REPORT WRITER (XRW)

Specs and access are same as for R:BASE 4000. \$150. Copy-protected.

WAYNE CHIN: R:BASE XRW adds report-writing capabilities far beyond those provided in the standard package. XRW's user interface is consistent with R:BASE's — menus are used and online help facilities are available upon request. Users do not have to write a program to generate reports, as they must with DBASE II, although some 'programming' may be necessary. The body of a report can refer to more than one database, subsets and sorting are allowed, and limited arithmetical computations can be made. The report can be directed to the printer or to the screen.

Good For Manipulating Numbers

CONDOR III

Version 2.10: computers using 8080/8086 microprocessors; PC DOS, MS-DOS, CP/M-86, Xenix, TurboDos (80K).

Version 2.11: computers using Z80/8080 microprocessors; CP/M-86, CP/M, MP/M-80, CDOS, TurboDos, PC DOS, MS-DOS (64K). \$650. Copy-protected. Condor Corporation, 2051 S. State Street, Ann Arbor, MI 48104; 313/769-3988.

Number of files permitted per database: 1

Records per file: 65,534

Fields per record: 127

Characters per field: 127

TONY FANNING: CONDOR III is similar to DBASE II in operation, scope, and (in the mid-range) capability. It too allows commands for searching, updating, sorting, and so on to be strung together into

```

**          DISKETTE DATA BASE          **
*****
*
* [NAME] _____ [DISKETTE.#] _____
* [VERSION] _____ [TYPE] _____
* [BOARD] BACKUP/ORIG/WORK/DATA _____ [DISK] _____ [OF] _____
* [COMMENTS] _____
*
*****
*
* [PUBLISHER] _____
* [PRICE] _____
* [DOCUMENTATION] _____
* [DATE RECEIVED] _____
*****
Rep Mode: Ins Mode (Ctl A), Abort (Ctl C), End (Ctl E), Refresh Screen (Ctl R)
  
```

CONDOR's screen form, poised for data entry. As with many file managers and DBMSs, the same screen form could be used to look up or search for information.

programs, although DBASE offers more in its programming language. While CONDOR allows more fields per record and is slightly easier to use than DBASE II, it is generally considered slower and less flexible, and it is not as widely supported. Documentation is both copious and uneven — not unusual for a DBMS.

JOHN RICKS: After about 30 hours learning CONDOR on my DEC Rainbow, I am fairly proficient. I develop maintenance management systems for a large pulp mill. The first was a mill lubrication program with several thousand entries and more than 250 pages in the finished report. CONDOR has a very good report writer; when I need a new application of CONDOR, I design the output report first, then set up a data record to match the report. This takes about 20 minutes to prepare on the computer before I can input data.

DAVID DEGENER: CONDOR III operates by commands — 42 in all, but you use no more than a dozen very often to enter, change, and manipulate data. The commands are reasonably easy. For example, to change a group of records in a dataset (CONDOR's term for a data file) you name the fields and specify their content. For example: "UPDATE dataset WHERE field1 is blue AND field2 is red." With SELECT and PROJECT you can create new "result" datasets from records or fields in existing datasets. JOIN can combine information from two datasets with different structures when they have at least one field in common. SORT can arrange records alphabetically or numerically by as many as 32 fields at once.

CONDOR's fields are too short to manage much text, but the program is good at manipulating numbers. COMPUTE fills one field with a value computed from other fields. STAX does statistics. TABULATE summarizes, giving you totals, averages, and maximum and minimum values. And POST operates across datasets to replace, add, or subtract the contents of one dataset's fields with the contents of the same fields in another dataset — an extremely useful command for business applications.

Automatic Starter, Automatic Transmission, Instead of Crank and Clutch

ASAP FIVE

IBM PC/XT, compatibles; (192K). \$275. Copy-protected. ASAP Systems, Incorporated, 2425 Porter Street, Soquel, CA 95073; 800/247-2727. In California, 800/345-2727.

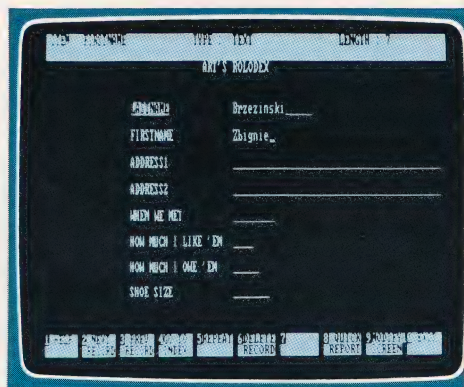
Number of files permitted per database: unlimited

Records per file: unlimited (to fit within 65K)

Fields per record: unlimited

Characters per field: 40

CHARLES SPEZZANO: Although I have semimastered several database management programs, I continued to manage my hundred or so psychiatric patient records and 300 newsletter subscriptions (SPCU; Society for the Prevention of Cruelty to Users) with only a good memory for the location of papers and an occasional frantic search for misplaced information. I'm a database resister, rather than a connoisseur. But I like ASAP FIVE very much.



Your friends all have short names — Ron, Jimmy, Nancy, Henry — so you set up a seven character first name field. Then you meet Zbigniew Brzezinski. With one function key (F9 - MODIFY FIELD), ASAP FIVE lets you expand any field length on this data entry screen. Zbigniew fits!

ASAP is a relational database management system with an automatic starter and transmission instead of a crank and clutch. Although it comes with an eighty-page manual, the twelve-page tutorial and one-page 'mini manual' are probably enough to get you up and running. Onscreen helps guide you the rest of the way. ASAP asks you straightforward questions, gives clear directions, and does as much of the work of data storage and retrieval as I can imagine a program doing.

Other database systems demand a high degree of organization from you before you even use them, but ASAP allows you to be extremely disorganized. Like my real-life habits, my ASAP databases are heaping masses of information until I ask ASAP to pull one together in some specific way. Then it gives me a particular set of facts in a second, or a longer report in a minute. It further tolerates my personal disorganization by allowing me easily to redefine fields and field entries, records, files, and report formats without losing any data. I did not have to learn to think like a database in order to use ASAP. I think like me and it thinks databasically.

ASAP's Custom Reports are designed in question-and-answer procedures; rudimentary word-processing functions are included for creating a "free-form" area of the report. You can modify Custom Report forms to add, delete, or move data and free-form text as many times as you like. You can't stack commands (it doesn't have a query language), but with ASAP FIVE you don't need to.

I asked Tom, a real estate agent, and George, a CPA, both of whom use ASAP daily, for their impressions. Tom, who had never used any other program on his IBM XT, was entering real data into ASAP after two hours of practice. George uses ASAP for everything from complex client tax records to his stamp collection. He and his staff are currently entering 300 time sheets a week, and as they approach a thousand records, the search time for a single record still appears to be in the half-second range.

A Little Slow, but Handles Text Nicely

SEQUITUR

Version 3.20. IBM PC/XT, compatibles (256K). \$795. Not copy-protected. Pacific Software Manufacturing Company, 2608 Eighth Street, Berkeley, CA 94710; 415/540-5000.

Number of files permitted per database: 256

Records per file: limited only by memory space: 8 megabytes on MS-DOS

Fields per record: 256

Characters per field: 4,000

TONY FANNING: SEQUITUR is another serious DBMS, and the very definition of a relational database management system. It has several likable features: you can enter/manipulate data in two forms, tabular or textual; you can add text to its variable-length fields as an afterthought; you can easily create detailed tabular reports of great complexity; and you don't need to write programs, since everything is presented in tables. You trade this flexibility for speed (MS-DOS machines barely give SEQUITUR the resources to do its job; 68000-based micros might make it a joy to use). You really need to be dedicated, since all this is explained with "relational-DBMS talk." A pleasant program for programmers; masterable by nonprogrammers with some effort.

DATABASE: h:sample Showing table: Products

Product: Press (F1) for help

Product No.	Product	ProductInfo	Comments
#001-72229	Paper clips	15/16"	802 gauge
#001-72230	Paper clips	1 1/4"	802 gauge
#001-72231	Paper clips	15/16"	801 gauge
#001-72232	Paper clips	1 1/4"	803 gauge
#001-72233	Paper clips	1 1/4"	801 gauge
#001-72234	Paper clips	1 1/4"	800 gauge, swch
#001-72235	Paper clips	15/16"	801 gauge
#001-72236	Paper clips	1 1/4"	801 gauge
#001-72237	Paper clips	1 1/4"	801 gauge
#001-72238	Paper clips	1 1/4"	800 gauge, swch
#001-72239	Paper clips	1 1/4"	801 gauge
#001-72240	Paper clips	1 1/4"	801 gauge
#001-72241	Paper clips	1 1/4"	801 gauge
#001-72242	Paper clips	1 1/4"	801 gauge
#001-72243	Paper clips	1 1/4"	801 gauge
#001-72244	Paper clips	1 1/4"	801 gauge
#001-72245	Paper clips	1 1/4"	801 gauge
#001-72246	Paper clips	1 1/4"	801 gauge
#001-72247	Paper clips	1 1/4"	801 gauge
#001-72248	Paper clips	1 1/4"	801 gauge
#001-72249	Paper clips	1 1/4"	801 gauge
#001-72250	Paper clips	1 1/4"	801 gauge
#001-72251	Paper clips	1 1/4"	801 gauge
#001-72252	Paper clips	1 1/4"	801 gauge
#001-72253	Paper clips	1 1/4"	801 gauge
#001-72254	Paper clips	1 1/4"	801 gauge
#001-72255	Paper clips	1 1/4"	801 gauge
#001-72256	Paper clips	1 1/4"	801 gauge
#001-72257	Paper clips	1 1/4"	801 gauge
#001-72258	Paper clips	1 1/4"	801 gauge
#001-72259	Paper clips	1 1/4"	801 gauge
#001-72260	Paper clips	1 1/4"	801 gauge
#001-72261	Paper clips	1 1/4"	801 gauge
#001-72262	Paper clips	1 1/4"	801 gauge
#001-72263	Paper clips	1 1/4"	801 gauge
#001-72264	Paper clips	1 1/4"	801 gauge
#001-72265	Paper clips	1 1/4"	801 gauge
#001-72266	Paper clips	1 1/4"	801 gauge
#001-72267	Paper clips	1 1/4"	801 gauge
#001-72268	Paper clips	1 1/4"	801 gauge
#001-72269	Paper clips	1 1/4"	801 gauge
#001-72270	Paper clips	1 1/4"	801 gauge
#001-72271	Paper clips	1 1/4"	801 gauge
#001-72272	Paper clips	1 1/4"	801 gauge
#001-72273	Paper clips	1 1/4"	801 gauge
#001-72274	Paper clips	1 1/4"	801 gauge
#001-72275	Paper clips	1 1/4"	801 gauge
#001-72276	Paper clips	1 1/4"	801 gauge
#001-72277	Paper clips	1 1/4"	801 gauge
#001-72278	Paper clips	1 1/4"	801 gauge
#001-72279	Paper clips	1 1/4"	801 gauge
#001-72280	Paper clips	1 1/4"	801 gauge
#001-72281	Paper clips	1 1/4"	801 gauge
#001-72282	Paper clips	1 1/4"	801 gauge
#001-72283	Paper clips	1 1/4"	801 gauge
#001-72284	Paper clips	1 1/4"	801 gauge
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#001-72286	Paper clips	1 1/4"	801 gauge
#001-72287	Paper clips	1 1/4"	801 gauge
#001-72288	Paper clips	1 1/4"	801 gauge
#001-72289	Paper clips	1 1/4"	801 gauge
#001-72290	Paper clips	1 1/4"	801 gauge
#001-72291	Paper clips	1 1/4"	801 gauge
#001-72292	Paper clips	1 1/4"	801 gauge
#001-72293	Paper clips	1 1/4"	801 gauge
#001-72294	Paper clips	1 1/4"	801 gauge
#001-72295	Paper clips	1 1/4"	801 gauge
#001-72296	Paper clips	1 1/4"	801 gauge
#001-72297	Paper clips	1 1/4"	801 gauge
#001-72298	Paper clips	1 1/4"	801 gauge
#001-72299	Paper clips	1 1/4"	801 gauge
#001-72300	Paper clips	1 1/4"	801 gauge

Any line in a SEQUITUR table (above) expands into a full-text record (below).

DATABASE: h:sample Showing table: Products

Product: Press (F1) for help

Product No.	Product	ProductInfo	Comments
#001-72299	Paper clips	1 1/4"	801 gauge
#001-72300	Paper clips	1 1/4"	801 gauge
#001-72301	Paper clips	1 1/4"	801 gauge
#001-72302	Paper clips	1 1/4"	801 gauge
#001-72303	Paper clips	1 1/4"	801 gauge
#001-72304	Paper clips	1 1/4"	801 gauge
#001-72305	Paper clips	1 1/4"	801 gauge
#001-72306	Paper clips	1 1/4"	801 gauge
#001-72307	Paper clips	1 1/4"	801 gauge
#001-72308	Paper clips	1 1/4"	801 gauge
#001-72309	Paper clips	1 1/4"	801 gauge
#001-72310	Paper clips	1 1/4"	801 gauge
#001-72311	Paper clips	1 1/4"	801 gauge
#001-72312	Paper clips	1 1/4"	801 gauge
#001-72313	Paper clips	1 1/4"	801 gauge
#001-72314	Paper clips	1 1/4"	801 gauge
#001-72315	Paper clips	1 1/4"	801 gauge
#001-72316	Paper clips	1 1/4"	801 gauge
#001-72317	Paper clips	1 1/4"	801 gauge
#001-72318	Paper clips	1 1/4"	801 gauge
#001-72319	Paper clips	1 1/4"	801 gauge
#001-72320	Paper clips	1 1/4"	801 gauge
#001-72321	Paper clips	1 1/4"	801 gauge
#001-72322	Paper clips	1 1/4"	801 gauge
#001-72323	Paper clips	1 1/4"	801 gauge
#001-72324	Paper clips	1 1/4"	801 gauge
#001-72325	Paper clips	1 1/4"	801 gauge
#001-72326	Paper clips	1 1/4"	801 gauge
#001-72327	Paper clips	1 1/4"	801 gauge
#001-72328	Paper clips	1 1/4"	801 gauge
#001-72329	Paper clips	1 1/4"	801 gauge
#001-72330	Paper clips	1 1/4"	801 gauge
#001-72331	Paper clips	1 1/4"	801 gauge
#001-72332	Paper clips	1 1/4"	801 gauge
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#001-72341	Paper clips	1 1/4"	801 gauge
#001-72342	Paper clips	1 1/4"	801 gauge
#001-72343	Paper clips	1 1/4"	801 gauge
#001-72344	Paper clips	1 1/4"	801 gauge
#001-72345	Paper clips	1 1/4"	801 gauge
#001-72346	Paper clips	1 1/4"	801 gauge
#001-72347	Paper clips	1 1/4"	801 gauge
#001-72348	Paper clips	1 1/4"	801 gauge
#001-72349	Paper clips	1 1/4"	801 gauge
#001-72350	Paper clips	1 1/4"	801 gauge
#001-72351	Paper clips	1 1/4"	801 gauge
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#001-72361	Paper clips	1 1/4"	801 gauge
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#001-72363	Paper clips	1 1/4"	801 gauge
#001-72364	Paper clips	1 1/4"	801 gauge
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#001-72370	Paper clips	1 1/4"	801 gauge
#001-72371	Paper clips	1 1/4"	801 gauge
#001-72372	Paper clips	1 1/4"	801 gauge
#001-72373	Paper clips	1 1/4"	801 gauge
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#001-72390	Paper clips	1 1/4"	801 gauge
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#001-72396	Paper clips	1 1/4"	801 gauge
#001-72397	Paper clips	1 1/4"	801 gauge
#001-72398	Paper clips	1 1/4"	801 gauge
#001-72399	Paper clips	1 1/4"	801 gauge
#001-72400	Paper clips	1 1/4"	801 gauge



GARBAGE BAGS

Text Organizers

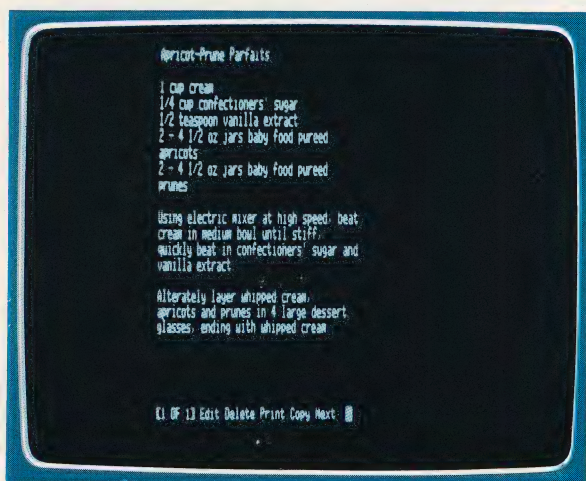
Much of what we really need to organize — words, notes, ideas — can't be categorized precisely enough to fit into tables or other rigid structures. Nor can we organize them easily with word processors, which are really tools for formatting our words on paper, not for cataloging, saving, searching, and combining them in idea blocks.

But there are programs that manage text in many of the ways that a file manager handles structured data, and there will be many more in the future. These new programs for helping us corral what we really love — our thoughts and ideas — are much more fun to use than the cut-and-dried file managers and DBMSs we might need to organize our businesses. There are three types of "garbage bags." First are programs like SUPERFILE and DATAFAX, which we might call indexers — they're electronic highlighting pens. They're especially suited to academic scholarship, and probably won't satisfy a more general need. They allow you to organize blocks of unstructured information — like long text passages — by marking key words and phrases within them. You can quickly retrieve a whole text item later by knowing only one of the key words or phrases you marked it with.

Then there are file managers that can handle blocks of text easily, allowing you to create (almost) free-form screens for entering information. PFS:FILE (p. 10) can do so within its limitations, but freer-form text-file managers like NOTEBOOK let us lay out an entry-screen form and later search for any word or phrase we entered in it. A few database management systems, like SEQUITUR (p. 23), are designed for organizing text as well as structured data. Because text can be of any length, such a DBMS must permit fields of any (variable) length, and dealing with this complication can slow performance down considerably. Finally, there are outlining tools, like the remarkable THINKTANK and FRAMEWORK. They let you arrange headlines and chunks of text in an outline form, with subordinate headline/text chunks visually "indented" under others. You can then move text easily by moving the headline associated with it — great for brainstorming and rearranging presentations, articles, manuals, and general documents.

Like a Highlighter Pen

You can enter text into DATAFAX randomly (without fields) and go back later to search for key words — all recipes with "1 cup cream" in this database, for instance. Though it's not shown here, you could highlight individual words for easier sorting later.



DATAFAX

Version 2.6: Apple II family (64K). Version 2.7: Apple III; IBM PC/XT (Pascal, 64K); Corvus Concept; Sage. \$249.
Version 3.0: IBM PC/XT (MS-DOS, 96K). \$299.
Copy-protected. Link Systems, 1452 Second Street, Santa Monica, CA 90401; 213/453-8921.

GIL SYSWERDA: DATAFAX is one of the most useful programs I have. It absorbs all the little facts I want to remember but don't know how to file. It allows very easy updating, retrieval, format-free data entry, and error recovery. It also comes with a built-in text editor. DATAFAX will not allow a database to span volumes, and volumes cannot span diskettes, but volumes can be as large as 16 megabytes, so if you have a hard disk...

The logical organization within DATAFAX is that of a folder. There can be as many folders per database as will fit. Each folder contains pages, of which, again, there can be any number. Each page contains exactly as much information as will fit on one physical screen. You enter data into pages with a text editor. There are absolutely no format restrictions except those you invent yourself. When you save folders, you save them with associated key words. These key words come either from the text (you point them out to the system) or are arbitrarily entered.

You find folders by specifying key words in logical combinations, and can then display, print, or edit them. If the system is used as intended, most folders contain only one page, and that page contains only a few lines. The key words hold things together.

If I read a magazine article (I read a lot) that I think I might want as a reference later, I enter onto one DATAFAX page the source of the article, the topic, and a very brief summary. I then key word it in every possible way. If in the future I want to know what articles (books) I have read about topics X and Y, I can find out in seconds from DATAFAX.

CHARLES SPEZZANO: Record retrieval in DATAFAX is very sophisticated. You create intricate strings of key words connected by "ands" and "ors." You can use ranges and wild cards and nested parentheses for sorting. If you know the key word, you can find a record in two seconds. Key words do not have to be added in a separate step after you create a record. Any word in your text can be easily tagged as soon as you have typed it. All these key words go into a list into which you can also add words not in the record itself.

JAMES V. MCGEE: Using DATAFAX is like writing a note to yourself and highlighting all the words you might use

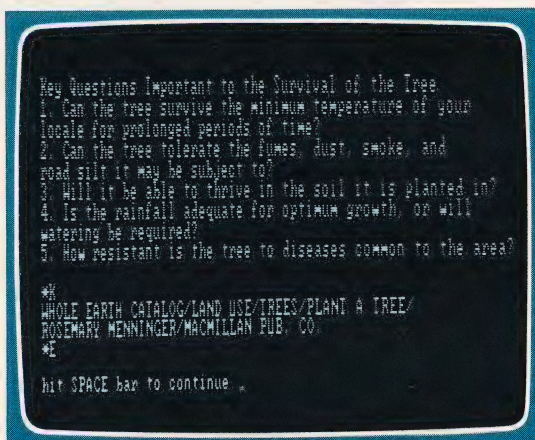
later to retrieve the note. You can start a new database without any prior planning; just load in a disk and start entering and filing data. You can let the structure evolve as your information does.

System performance is generally good, but setting up a new disk (which you must do before entering any data) is frustratingly slow. When I timed it, it took well over five minutes. If you are sufficiently impatient you may never wait to use the program itself. Also, because

it runs under the UCSD p-system, DATA-FAX uses the disks much more heavily than PC DOS programs, resulting in slower operation.

The manuals are extensive and well written in a refreshingly human and personal style. They describe other users' experiences and suggest a variety of clever ways to take advantage of DATA-FAX's unusual design philosophy — in enough depth to trigger your own thinking on potential uses.

Make Indexes of Your Existing Word- Processor Files



You type some text with a word processor (here, excerpts from books reviewed in our *Whole Earth Catalog*). Then you scan the text with SUPERFILE. At intervals, you enter *k, some key words or phrases separated by slashes, and *e. SUPERFILE sorts and indexes all those key words and phrases.

SUPERFILE

Apple; Kaypro II, 4 and 10; Osborne I and Executive; Xerox 810 (CP/M, 8" format, 64K); IBM PC, compatibles; Eagle; TI PRO; Zenith 100 (PC DOS/MS-DOS; 64K). \$195. Not copy-protected. FYI, Incorporated, 4202 Spicewood Springs Road #204, Austin, TX 78759; 512/346-0133.

TONY FANNING: SUPERFILE lets you index free-form blocks of text created with your word-processing program, rather than requiring data that's organized into fields and records. One regrettable limitation is its need to re-index whenever you modify a text block. However, it can index over more than one diskette, so a group of references can grow to a fair size and still be searchable.

PAUL DECHOW: SUPERFILE is

good for managing notes and making bibliographic records. Its biggest improvement in its new version is the automatic re-indexing feature, allowing data from a new file on the data disk to be indexed into an existing database by a quick and easy menu-driven procedure. Other recent improvements include an automatic check of dictionary and index files whenever you start it to make sure these files are intact and in good working order; a utility that appends parts of files to the ends of other files without writing over them; and the ability to keep up to 100 datafiles on a single disk (of course, databases can be made up of many disks), which takes advantage of higher-capacity disk systems.

For CP/M Computers

A typical NOTEBOOK data-entry form. It lets you fill text into large fields (like "Comments"). The menu at the bottom changes text, or takes you to another function menu, used to find other records.

Author	Fowler, H.W.
Title	A Dictionary of Modern English Usage
Publisher	Oxford: The Clarendon Press
Date	1926
Categories	language; English; reference
Comments	Of all language reference works, this must be the most idiosyncratic and the most delightful. The clarity and wisdom of the entries make them instantly illuminating, but their charm makes it impossible to return at once to the task that required the consultation.

A Left Word	T Right Word	H Up Heading	D Down Heading
V Down Line	E Up Line	B Back Record	F Forward Record
L Left Space	R Right Space	ESC Function Menu	W Switch Insert

NOTEBOOK

CP/M 2.2 machines including Kaypro II, Epson QX 10, Morrow (64K); IBM PC, compatibles (PC DOS, CP/M 86; 128K); MS-DOS machines including Victor 9000, NEC, Eagle, DEC Rainbow, Zenith Z-100 (128K). \$150. Copy-protected. Digital Marketing, 2363 Boulevard Circle, Walnut Creek, CA 94595; 800/826-2222.

CHARLES SPEZZANO: NOTEBOOK stores and retrieves text. A single record can hold up to 32,000 characters, divided among up to 20 fields. It offers online help, sorts records by any field, and allows you to edit records without damaging the database. You can retrieve records using any item in any field. The word processor uses WORDSTAR commands, and NOTEBOOK will read WORDSTAR files. Drawbacks: You cannot change data files from within the program; you have to exit first. NOTEBOOK is not the easiest program to use. There is no word-wrap feature in the word processor; each line accepts only 57 characters and the program beeps to warn you at the 54th character. To get more than 57 characters into a field you must first go into insert mode and then press the return key at the end of every line.

Unlike DATAFAX, which is menu-driven and organized around your selected key words, NOTEBOOK interacts with you by question and answer. You go to a "select" screen, which lists all the field names in your data file. You then pick a field and tell NOTEBOOK the search parameters for that field: since NOTEBOOK's forte is text mater-

ial, you often sort simply by telling it to find all those records with a particular word in that field, but you can also sort by functions (equal to, not equal to, greater than or equal to, less than or equal to, greater than, and less than). You can also sort on two fields.

DATAFAX has a much better editor than NOTEBOOK, but handles each screen of information separately. With NOTEBOOK, the whole document is continuous.

TONY FANNING: We recommend NOTEBOOK only for CP/M computers. On MS-DOS computers, go with DATAFAX or PFS:FILE.

Revenge on Your Seventh-Grade English Teacher

THINKTANK

Version 1.001. Apple II family (64K): \$150. IBM PC/XT, compatibles (256K): \$195. Copy-protected (except Apple II version). Living Videotext Incorporated, 2432 Charleston Road, Mountain View, CA 94043; 415/964-6300. Reviewed by Stewart Brand, Philip Elmer-DeWitt, and Tony Fanning in *Whole Earth Software Review* #2 (Summer '84), page 56: "It makes an onerous task — outlining — easy and adjustable."

ORGANIZING PROGRAMS AS MIND EXTENSION TOOLS

by Wayne Pendley



WHEN MY GRANDFATHER HOMESTEADED his farm in Oak Creek, Arizona, he faced the problem of tunneling a home-spun irrigation ditch through many feet of solid rock. (It was either that or the bigger problem of making gravity ignore the water while it went OVER the mountain.) The available tools were hammer, chisel, and muscle. A secondary problem arose when he tunneled far enough into the rock to lose all sense of direction and realized that he could spend far more muscle than he could afford by tunneling off-course, one hammer strike at a time. Due to minerals in the rock, a compass was not to be trusted. The solution came when he walked outside, placed his hunting rifle against a tree, aimed into the tunnel, and strapped the rifle in place. Now he could fire into the tunnel, feel the rock wall for the bullet's impact, hammer in that direction for a while, then go back to the rifle for a new bullet mark whenever the route became questionable.

"Functional fixedness" is thinking that rifles are only for hunting, or that computers are only clerical support. Functional fixedness is the phrase psychologists use to explain why so many problems remain unsolved when their solutions require tools having more common, non-solution uses. Information machines suffer from this underuse, perhaps partially due to lack of imagination, but mostly due to functionally fixed ways of considering computers' abilities.

Ask anyone who has discovered personal computers to tell you what computers can do. Usually you will

get replies that include word processing, mathematical calculations via spreadsheets, and bookkeeping or inventory control via database management software. (Occasionally someone will admit to playing games such as PLANETFALL, ENCHANTER, or WIZARDRY, but I certainly wouldn't.) Since computers are a relatively new tool, it is sensible for us to try to categorize them, assign them some role just so we know where we stand with them, and perhaps vice versa.

One arena where personal computer users suffer from functional fixedness on a large scale involves

ART KLEINER: *Wayne Pendley: graduate student in psychology, Apple II user. He asked us to cover database management tools. Sent this to help us think about the frontiers. Wayne does pursue the rigorous path he recommends herein. Uses DB MASTER; we agreed on the phone that DATAFAX would probably be better.*



There may be no more valuable tool in your life than a good database system keeping an ever-expanding, never-forgetting, totally cross-indexed catalog of your mind.

the informational-control software commonly referred to as "database management systems." These software packages are the most underutilized tools in the computer world. They originated for such problems as inventory control in shoe stores and reservation books for airlines. It's fine that computers have improved those record-keeping functions, but consider what *mental* inventory you could control. Could you use perfect retrieval of every idea you ever had and the ability to cross-index those ideas according to the project you have underway? Would musicians, poets, monks, or playwrights like a perfect catalog of every inspiration that fired their brains? Would students, teachers, or speakers like an index of every publication they might reference in the future? Would mechanics, farmers, or contractors like a perfect memory for every oddball problem they ever solved, and for how that solution might work on similar problems? These functions can presently be performed by harmonizing a human mind with a database management system.

Those who value the information in their own minds can benefit from extending their memories and retrieval abilities with a computer. First you select a worthy and affordable database package that will

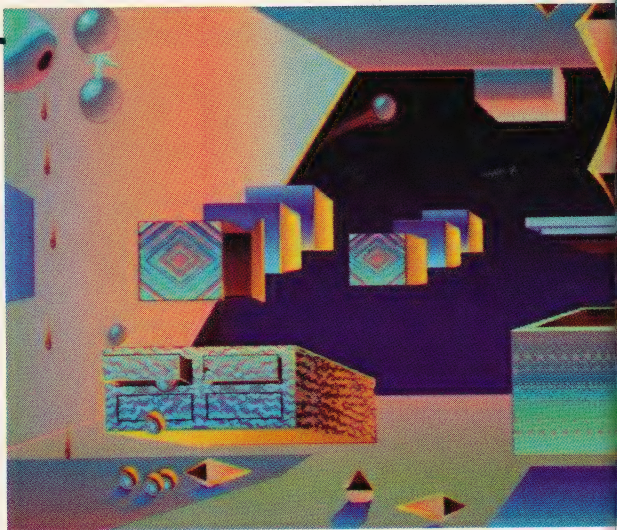
perform the filing, searching, updating, cross-indexing, and reporting you require. Second, the more difficult step, you must change your habits. You must discipline yourself to scribble down or tape record the ideas you want to catalog as they occur. This habit change is critical, because important details of information are lost from human memory in a very short time. Stick these slips of paper or tapes near your microcomputer. Last, once a week or month, discipline yourself to sit down with your database program and expand the files of your mind. You can name your inspiration file EUREKA and your future projects MANANA. In just a few months you will build up a catalog of inspirations, insights, and fertile references that you could never buy off any computer store's shelf.

If you use the product of your mind in any valued way, then there may be no more valuable tool in your life than a good database management system keeping an ever-expanding, never-forgetting, totally cross-indexed catalog of your mind. Your personal computer can serve this mind-extension role and still balance your books, explore your income tax options, and (ho-hum) type another letter.

END

TROLLS UNDER THE BRIDGE

*Excerpts from
Whole Earth's
organizing tool
evaluation
teleconference*



*By Tony Fanning, Louis Jaffe, Frank Capozza,
Tom Hargadon, Charles Spezzano, Kevin Kelly,
Richard Dalton, Mel Silverman, Alfred Lee, Thomas Piper,
Jack Powers, and Woody Liswood*

*Edited by Art Kleiner
Illustrated by James Dowlen*

LOUIS JAFFE: If **WESR** can sort out the database program situation, it will have untied the Gordian knot. Database management is far more demanding of computers and their users than word processing, communications, or even spreadsheets.

ART KLEINER: Computer teleconferences, where people read and write in a common conversation at their own convenience and pace, have proven to be one of Whole Earth's most valued knot-unravelers. Last summer, we picked a dozen writers and word-processing experts, trained them all in telecommunicating, and convened them on the EIES network (see box, page 32) for three months of fierce, fond arguing via computer. We printed the edited transcript ("The Transparent Onion") in the Spring '84 WESR.

This time, to ground our judgment of organizing tools, we invited all EIES members into a new conference. "Organizing" domain editor Tony Fanning nurtured and moderated it from February through April. It produced many of the reviews on pages 7-27, plus the general discussion here. While word processors had invited imaginative reveries of ideal possible programs, organizing tools regularly forced us back to real-world problems.



Sequitur may be elegant, dBase II powerful, and neither appropriate to collect names and addresses into an electronic Rolodex.

ART KLEINER: Here's a question a friend posed that foreshadows our evaluation task:

"Dear Art,
I have an Apple II+. I'm looking for software to run a small mail-order bookselling business. I'd like the program to accept the buyer's name, address, check amount, check number, bank number, book title, whether it's a sale or an information request, the source of the order, and the order and shipping dates. I'd like to file the orders by last name and by zip code. I'd like to print invoices and mailing labels. What do you recommend?" [Based on the conference, I eventually recommended PFS: FILE (page 10). —AK]

The request is legitimate, but I can't help wondering if he's asked the wrong question — isn't it better to see what organizing programs can do and then design your task accordingly?

FRANK CAPOZZA: I also don't know if I'm asking the right

questions. I pick up ad after ad and am not sure if the software comes close to my needs. For example, I would like to put my fire department records and reports on DB MASTER (p. 15). (Why? Because a couple of members already own DB MASTER.) Before I can lay out this basically simple task, I have to learn a piece of software. Why not prepackaged templates, at least?

TOM HARGADON: Templates for specific applications do make programs much easier to use. But there is a very thin market for any given template, and you should really see the template to see if it works for you. Sorcim says they know of a dozen good ones of the hundred for SUPERCALC. There are so many applications templates that reviewing them may be an impossible task.

TONY FANNING: I have a friend who has been working on an inventory template for small businesses in DBASE II for half a

Teleconferencing on EIES

ART KLEINER: We put this article together through an electronic conference on the Electronic Information Exchange System (EIES, pronounced "eyes"), which pioneered conferencing on computer networks. EIES is an electronic village compared

to larger computer network "cities" like The Source and CompuServe. EIES is smaller (2000 members), more tightly knit, and more strictly devoted to communication between people.

All EIES members are invited to our conferences there (membership costs \$75/month plus \$3/hour and up for connect time). For information on EIES, write Anita Graziano, New Jersey

Institute of Technology, 323 High Street, Newark, NJ 07102. We also conduct a conference on CompuServe: type GO WEC at any CompuServe prompt. For information on joining write CompuServe Information Service, 5000 Arlington Centre Blvd., Columbus, OH 43220, or call 800-848-8990. Almost any personal computer, along with a modem and a telephone, can be used to teleconference.

year. There's a lot of that going on. The Ashton-Tate folks run a regularly updated book called *Application Junction*, listing people who either have packages or are willing to write business-specific ones. Templates run to much extra money for the buyer, though. Have you bumped into people who bought \$300 screen-generating software to add to \$700 database programs so that they can turn them into \$140 PFS:FILE? Sad.

RICHARD DALTON: I think we face the "what do you need it for" question. SEQUITUR (p. 23) may be elegant, DBASE II (p. 18) powerful, and neither appropriate to collect names and addresses into an electronic Rolodex. People keep getting oversold. When you buy a "real" DBMS for a micro, you add a database administrator to the systems analyst, hardware configuration specialist, computer operator, and data control clerk jobs that a micro requires. That's not a trivial addition. Many people are better off with simple, application-specific file managers, like the HP 150 PERSONAL CARD FILE. No real planning, just add names and retrieve them when you choose.

TONY FANNING: I have one conviction that I wouldn't mind someone trying to talk me out of.

I don't think there are any *personal* uses of "organizing" software that are any better than keeping lists on paper. All the uses I've heard of are really business or business-inspired uses. Your record collection? Your Christmas card list? Come on! (Note: I have a collection of about 5000 comic books...)

CHARLIE SPEZZANO: Tony, 65 percent of all employed Americans work on creating, processing, or distributing information. Many need "personal business" organizing software. Executives inside big companies, like attorneys, physicians, or psychologists, do not really want the database managers that are used to organize warehouses. They want to keep track of client records, financial transactions, and text. They may even want creative sorting: how many head injury patients whom I referred for CAT scans showed anything positive last year? There might be, then, a wider audience for business-organizing software — for programs like THE DESK ORGANIZER, or PERSONAL PEARL, or OFFIX.

KEVIN KELLY: I think any task that would regularly require a computer to help organize it is quickly dismissed from our private lives. It's either pushed into a business, or into someone else's

business, or avoided. I define my personal life as the time that does not require a computer to make it work.

RICHARD DALTON: Tony... I used to do a fair amount of consulting and would make a blanket statement that most business people (not businesses) could benefit as much from an automated name and address list as anything else you can quickly mount on a PC. Usually, they would look at me aghast and you could read "we're paying him for *this*?" on their foreheads.

We all have massive problems with information that floats around in little stacks or big heaps and is essentially lost. Things like names and addresses are relatively structured and because of that can be readily converted to computer files with almost *any* organizing software. I have even used PERFECT FILER, which has to be about the worst package I've ever used. But there's a big payback in getting your names and addresses organized: you can then *find* someone — to call or to provide info to a co-worker. It's easy, a regular part of the business routine, and because of that, quick gratification. It also gives you ideas about what types of things to organize next.

God knows how the human mind organizes things. I've always thought the storage capacity was great but the access methodology a little shaky. That's part of the reason people have trouble looking at some generalized DBMS and applying it to work tasks. We don't have many clear analogs to draw from.

MEL SILVERMAN: When I bought my hardware (a Vector Graphic running CP/M), the word-processing software included a mailing-list package that allowed

me to "file" names, addresses, phone numbers, etc. It's a very useful little package, since I can set up a "standard" letter and pull names from the mail-list software into it. But once I put the information into a file, I can't change the file structure. If some time later on I want to add other stuff, like the person's birthday, I have to develop a whole new file, then re-enter all the data. What a drag!

I've been looking for a database package that will allow me to alter the file parameters even after I've entered data into the file. I found some literature on FMS-80, from DJR Associates, that looks promising. Has anybody any experience with it?

CHARLIE SPEZZANO: Mel, many programs can change the structure of a form you have created without losing data. FMS-80 is "first-generation" organizing software — setting up even simple applications demands systematic programmer-like thinking and discipline. It's not so difficult that a professional programmer has to design the forms and reports, but it ain't a piece of cake either.

I hate myself for throwing terms like "first generation" around, but it means that FMS-80 has been around since 1978, just one foot out of the "you had better been paying attention in programming 101" stage. I guess even DJR recognized that; they have a new Version 3, which they say has menus even a beginner can follow to get started. That would be my definition of second generation. But FMS-80 is still a full-featured, cumbersome database management system. For your task a file manager like OFFIX or PERSONAL PEARL would be adequate and would require less time and effort to use.

I made sense of the difference



Relational databases save the day for a business owner who must change the price of shoelaces after typing in fifty invoices. Instead of making fifty changes, he just changes the price once.

between file managers and database managers while reviewing PERSONAL PEARL recently. Some reviewers referred to PEARL as a relational DBMS, because it can work with more than one file (database, collection of forms) at the same time. With PEARL you can simultaneously open your "folder" (file) of customer-profile forms and your "folder" of invoices, and keep your place in one while browsing through the other. This can be a real advantage compared with a single-file manager, which forces you to close one folder and put it back in your electronic file cabinet before you can look through another one.

But most reviewers contend that PEARL is not a true relational data management system because you cannot, in one motion, update the same field in all the files that contain it. If you have John Smith's address in your customer-profile file and also on an invoice, and John moves, you have to make two changes with PEARL. Relational databases would only require one change. They save the day for a business owner who decides at the last minute to raise the price of shoelaces to \$10 a

dozen after his secretary has typed in fifty invoices with an \$8-per-dozen price. Instead of making fifty changes, she just changes the price once.

WOODY LISWOOD: I know that when I try to do complicated reports and things like including weighted averages, using data in calculations but not print, or printing data but not using it in some calculations, I find that most of the supposedly relational databases become closet file managers.

TONY FANNING: I still don't have an outstanding low-end file manager that runs on CP/M in my list (as distinct from high-end "database management systems" like INFOSTAR or DBASE II. Woody, perhaps you can recommend one? If there aren't any flagship CP/M file managers, it'd be good to know. I can't believe there aren't; I just can't point to one.

WOODY LISWOOD: Yep, still no really good file manager in CP/M. Did we recommend FILE CABINET as the best free file manager in Apple DOS II and III? If not, we should. The price is right and it is easily as good as some of the sold systems.

JACK POWERS: I have a review

copy of SALVO, yet another relational DBMS. I have only played with it for one evening, but it looks good and has one unique feature: it automatically generates a graphic representation of the relationships in it.

TONY FANNING: Jack, I would like to hear your further comments about SALVO. I scanned it and had it examined by others, and the consensus was that it was interesting but not much more useful than a handful of less pretentious DBMSs.

SALVO claims to be a "fourth-generation" DBMS, with artificial intelligence features. As far as I can see, these claims cover two aspects:

- 1) A program generator that translates what is an already well-formed database inquiry into a program, and then executes the program. Ostensibly, you can specify "in English" and let SALVO take care of the rest; the reality is that it cranks for a long time to spit out a program, even for simple stuff, and expects you to understand enough to help it along if it doesn't produce the right program on its own. The need to drop back one level of complexity when SALVO can't handle something seems to make it harder, not easier, for the beginners they *claim* this is for.

- 2) The visual representation of the database structure might be appealing to someone who already understands relational DBMSs, as a clever expression of an already understood idea. But the people they *claim* this is for will probably be fuddled by it rather than helped.

I'm sure we'll all be reading in The Magazines how great SALVO is. But I think it's schizoid, not layered, mixing so many levels of technical understanding that I fail

to see its usefulness. As usual, my rabidity is modifiable by others' experiences.

THOMAS R. PIPER: Okay, here is a small problem on the Apple II: I need a "slick" way of transferring files between THE GENERAL MANAGER (a nice if sometimes badly documented database from Sierra On-Line and WORD JUGGLER (a marvelous word-processing program from Quark Engineering). What I want to do is produce ready-made forms from a set of legal property files. It's a challenging and exciting adventure, but sometimes frustrating. Reminds me of *The Far Pavilions*. Any takers?

LOUIS JAFFE: Yours is a problem frequently encountered. The key is whether the data-base program is able to generate the required form as an ASCII disk file. If it can, WORD JUGGLER will then be able to pick up that disk file and edit it or merge it with other text.

Not being familiar with your database program, I don't know whether it has this capability. And even if it did, I wouldn't know what it was called within your program or how to invoke it. Look for something like "REPORT TO DISK" or "PRINT TO DISK." What you would really be doing is sending the ASCII characters of the reports to a disk rather than to the printer. PFS:FILE for the IIe can do it; so can DBASE II. Oddly enough, the Apple II version of PFS *cannot* do it. Good luck.

TONY FANNING: Can anyone supply an appropriate name for this situation? A friend who routinely uses mainframes at work bought a PC to share with his woman. She sells to doctors, and wanted a simple way to keep a prospect name and address list. My friend provided her with Jim

The third or fourth time you create the same application, it usually works pretty well.

Button's PC-FILE, which she agreed was easy to learn even though she had never used computers. She soon created a database structure and began entering doctors. About 50 or 60 doctors later, my friend looked over her shoulder and casually commented that she probably *didn't* want to enter names as "Dr. James Stephens," that she would do better to use the last name first because this would make sorting and selecting of names much easier for her. She knew (1) what she wanted to track and (2) the mechanics dictated by the program. Yet there was this third kind of thing she didn't know, and probably couldn't know until she experienced it or was told about it. This happens a lot when people are learning a new program. I suspect that I am talking about the real reason for consultants. . .

ALFRED LEE: I call the problem "trolls under the bridge." I think in the tale there was only one

troll, but there must be at least two, because they get you coming and going.

RICHARD DALTON: It sounds like what your friend's friend ran into was a need for "systems analysis," a still-arcane theoretical field that's been around for a while. It ties in with my favorite axiom in computing: "The third or fourth time you create the same application, it usually works pretty well."

KEVIN KELLY: I don't know the phrase but I do know the feeling. Just last week I got a phone call from a Southern Baptist evangelist. Seems someone gave him a computer to help him with his mailing list. He didn't know a thing about it but plunged in. He sorted his thousands of names in shoeboxes by their zipcodes and started entering them. "Wait," I said. "You didn't have to do all that sorting; that's what the computer's for." . . . Silence. . . "Well," he said, "Brother Kelly, that computer is ev'n more amazin' than I thought."

END

Application Junction (\$19.95) and **DBASE II** (\$495): Ashton-Tate, 10150 W. Jefferson Blvd., Culver City, CA 90230; 213/204-5570 • **DB Master** (\$350) and **Advanced DB Master** (\$595): Stoneware, Inc., 50 Belvedere St., San Rafael, CA 94901; 415/454-6500 • **The Desk Organizer** (\$298): Warner Software, Inc., Dept. Z, 666 5th Ave., New York, NY 10103; 800/223-0880 • **File Cabinet** (\$5): Apple Avocation Alliance, Inc., 2111 Central Avenue, Cheyenne, WY 82001; 307/632-8561; (\$11.50): International Apple Core, 908 George St., Santa Clara, CA 95050; 408/727-7652 • **FMS-80** (\$395-\$595): FMS Software Ltd., 54 North Main Street, Spring Valley, NY 10977 • **The General Manager** (\$229.95; \$374.95): Sierra On-Line, P.O. Box 485, Coarsegold, CA 93614; 209/683-6858 • **Infostar** + (\$595): MicroPro International Corp., 33 San Pablo Ave., San Rafael, CA 94903; 415/499-1200 • **Offix** (\$149): Emerging Technology Consultants, 1877 Broadway, Boulder, CO 80302; 303/447-9495 • **PC-File III** (\$45): Buttonware, P.O. Box 5786, Bellevue, WA 98006 • **Personal Pearl** (\$295): Pearlsoft, 25195 SW Parkway, P.O. Box 638, Wilsonville, OR 97070; 503/682-3636 • **Personal Pearl with Speedstart** (\$295): distributed by Digital Research, P.O. Box 579, Pacific Grove, CA 93950 • **PFS:File** (\$125-\$175): Software Publishing Corp., 1901 Landings Dr., Mountain View, CA 94033; 415/962-8910 • **Personal Card File** (\$150): Hewlett-Packard, 11000 Wolfe Rd., Cupertino, CA 95014; 800/367-4772 • **Salvo** (\$495): Software Automation, Inc., 14333 Proton Road, Dallas, Texas 75234; 214/392-2802 • **Sequitur** (\$795): Pacific Software Manufacturing Company, 2608 Eighth Street, Berkeley, CA 94710; 415/540-5000.

WHAT THEY LEFT OUT

ART KLEINER: It's rare to find a computer ad that blatantly lies. It's common to find ads that give the wrong impression. This regular feature will critique well-known ads in light of what we know about their products. It doesn't necessarily mean we're singling out the products as bad — just as different from their sales pitches. Your suggestions for ads to critique are appreciated.

GET EVERYTHING DONE BY FRIDAY!

FRIDAY!, from Ashton-Tate

Says the ad: "... I just follow the few English-language instructions on the screen, push a few buttons and — Zap! — I get the job done. With incredible speed because we've turned our paper files into much more efficient 'electronic files.' So whatever I need to know, I can find it in seconds..."

ART KLEINER: Incredible speed compared to paper, maybe. The most common recurring complaint from our correspondents: FRIDAY! is slow (especially compared to other file

Get everything done by Friday!



managers). It's bound to menus that make it easy to learn, but slow it down even further.

TONY FANNING: Because FRIDAY! is an applications program written in

the DBASE II language, it has all DBASE's problems — quirkiness, a tendency to hang up sometimes, and a few bugs. It slows down especially when your record count gets high.

HOW LONG IS AN IDEA?

REVELATION, from Cosmos, Inc.

Says the ad: "REVELATION uses plain English to create files, menus, entry screens, process information and generate reports. Plus, you can build, customize, and update your data base application without being an experienced programmer. . . (it) is easy to get along with."

ART KLEINER: We got mixed reviews of



How long is an idea?

REVELATION is a system of visual programming for creating, editing, and running applications. It's easy to learn and use, and it's powerful enough to handle the most complex applications. It's the only system that lets you create applications without writing a single line of code.

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REVELATION. Sophisticated users loved its flexibility and power. No one said it was easy to use or learn, and we've heard reports of poor support and poor manuals. Tony Fanning called it "micro hubris for the intermediate computer user."

SHARON RUFENER: I found it impossible to master the advanced features (relating files to each other or creating a complex turnkey application) from the tutorial and documentation alone. I called support several times and was finally told, "You can't expect to learn the program from the manuals! You have to take a seminar." The seminar was held in Washington State and cost \$2500.

ART KLEINER: Yes, some commands are "plain English": LIST, DETACH, CATALOG. Others include PGMR, FN, SM, PATRN, VOC, TCL, and Q.ACCT. You can program any command into a "plain English" word of your own choice — once you've learned what it means.

Parent company Cosmos' marketing director Steve Kruze said that dealers and distributors may offer support and seminars. They're also adding help menus and better manuals (which we haven't seen yet). But the program is still aimed at software consultants and programmers — a non-programmer could use this \$950 program as a simple file manager, but not (from what we've seen) to build or customize a relational data base. **END**

COSMOS

Seattle, WA 98108 (206) 474-9542

Continued on page 37

The Only Good Database Dialer

IN-SEARCH

Version 1.01. IBM PC, compatibles; TI Professional (192K, 2 disk drives; Hayes 300/1200/1200B Smartmodem, Novation 103/212 Smartcat, or acoustic modem). \$399. Copy-protected. Menlo Corporation, 4633 Old Ironsides Drive #400, Santa Clara, CA 95050; 408/986-0200.

ART KLEINER: People still confuse database management programs, like those in the preceding section, with online databases — the “information banks” of canned, searchable reference data that you can dial up through the telephone. Online databases use database management programs (generally those running on mainframe computers) to organize their storehouses of trivia. The confusion will get worse in the next few years as dedicated microcomputer databanks emerge. You'll buy a disk-full (maybe a laser disk-full) of information on a particular subject and download the latest corrections from an online databank once a month or so.

We're not there yet. Most dial-up databanks are still bibliographic files, the electronic equivalents of the dulldest stacks in a graduate school library. Worse still, you can't always read the full article or book online — you see an abstract and then pursue the complete reference at a real library. The search methods for finding your particular reference are cumbersome and confusing, and databanks charge by the minute, at prices high enough to dampen the spirits of even the wealthiest would-be browser. Until IN-SEARCH, if you weren't a trained professional, it wasn't worth bothering with most online databanks (except KNOWLEDGE INDEX and BRS AFTER DARK — both reviewed in the *Whole Earth Software Catalog* — for very limited purposes).

Like TRANSEND (WESR Summer '84, p. 16), IN-SEARCH is a dedicated “front end” to a particular network — in this case, DIALOG, the largest collection of online databanks. IN-SEARCH doesn't just connect you. It translates

and organizes DIALOG's arcane commands and voluminous background material, until the arduous task of searching on a particular topic is as easy as flipping through a card catalog, but much more fun. I've used IN-SEARCH for researching articles on computers and fortune-tellers; for looking up biographies, software reviews, and listings of books in print; and for rummaging through the online Encyclopedia of Associations — a guide by topic to American groups and clubs.

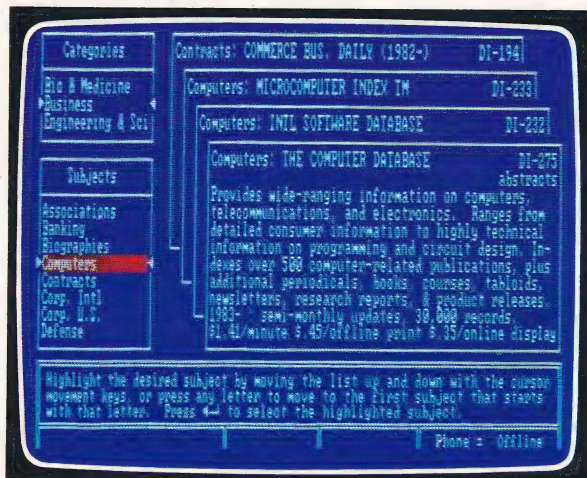
IN-SEARCH has only a couple of competitors. SCI-MATE, developed by information-retrieval pioneer Eugene Garfield, lets you store whole chunks of a remote databank in your own computer and riffle through it there. But SCI-MATE is too cumbersome and opaque to recommend. Lotus's SYMPHONY may be configurable to do the same, but it's too soon to tell. IN-SEARCH's limitation is DIALOG; there are many databanks on other systems which it can't reach. But hopefully that will change. And it's such a radical departure from most terminal programs, and such an immensely useful tool, it can't help but influence other software developers. I wish IN-SEARCH were less expensive, but if you spend more than \$1000 worth of your time a year hunting through libraries, it's worth the price now.

None Easier to Use

PFS:ACCESS

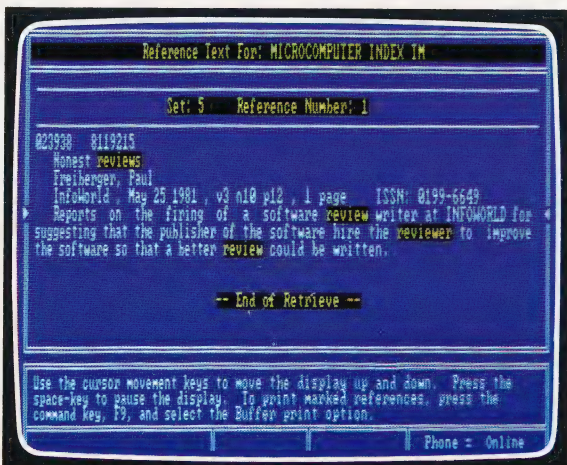
Version 1.0. IBM PC/XT/jr, compatibles except Hyperion (MS-DOS, modem, 128K). \$95. Apple IIe, IIc (modem, 128K). \$70. Copy-protected, but can be installed on hard disk. Software Publishing Corporation, 1901 Landings Drive, Mountain View, CA 94043; 415/962-8910.

If you log into a few online networks regularly from a PC or PC-compatible, and you want as little bother as possible, get PFS:ACCESS and be done with it. Like other PFS products, there's every essential feature and very little more. You can

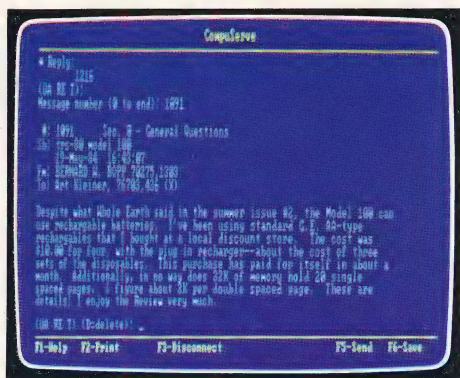


We used IN-SEARCH to hunt down articles on computer magazine ethics. Three DIALOG databanks cover the business side of computers: The Computer Database, International Software Database, and Microcomputer Index. IN-SEARCH's simulated card file had a summary of each.

We typed in our search request — the combination of terms we wanted found — while off-line (saving connect time charges). The ? at the end of each word allows for multiple endings — besides ETHICS, DIALOG will search for ETHICAL and ETHIC too. Under the "INDEX SELECTED" column, we could have specified types of information — the name of a particular journal to search in, an author's name, or a range of dates, for instance. The far right column, REFS FOUND, shows how many items IN-SEARCH found after dialing into DIALOG.



After reading eight references in The Computer Database, we changed databases — which IN-SEARCH let us do without having to retype our search request. (You can also save search requests on disk to use again.) Here's the one reference we found in the Microcomputer Index. IN-SEARCH displays it in short, medium, or (shown here) long form.



The easiest-to-use terminal program, PFS: ACCESS shows all its commands on the bottom of the screen the entire time you're connected to a remote network — in this case, the Whole Earth Special Interest Group conference on CompuServe.

log in automatically, save incoming text to disk, and send files out. The only frill is a bizarrely superfluous encryption feature — useful only between two computers running PFS:ACCESS, where electronic bystanders can also see the messages. In other words, it's almost useless, unless you think your phones are tapped.

PFS:ACCESS contains pre-written log-in commands for several networks; you create new ones by going through the motions once, and thereafter the program remembers what you did. Major limitation: you can only keep commands for ten online networks at once. Bulletin-boarders, who might dial a dozen different systems in a day, will be frustrated; file transferers, who need an error-checking protocol, won't find one here. For everyone else, it'll get you online quickly and easily.

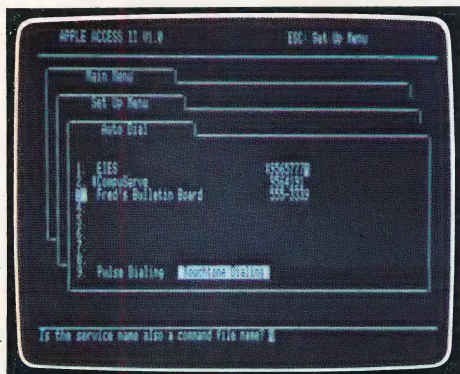
At Last! Good Complete Apple Terminal Programs

APPLE ACCESS II

Version 1.0. Apple IIc, IIe (Pro DOS, Apple Super Serial Card, 64K). \$75. Not copy-protected. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014; 800/538-9696.

PERSON-TO-PERSON

Version 1.1. Apple II family (DOS 3.3, modem suggested, 48K). \$69.95. Copy-protected. Trutech Software, 1700 Solano Ave., Berkeley, CA 94707; 415/525-4901.



ART KLEINER: In the Summer '84 Software Review we grudgingly included ASCII EXPRESS "THE PROFESSIONAL" as the best full-featured Apple terminal program, even though it's convoluted and miserably documented. Now there are two alternatives. The first, Apple's own APPLE ACCESS II, makes ASCII EXPRESS obsolete. Trouble is, it only runs on the IIc (p. 104) or the IIe with Apple's Super Serial Card.

The second, PERSON-TO-PERSON, runs on the II, II+, and IIe with a variety of serial cards and modems. It's one step less versatile than ASCII EXPRESS — no error-checking or break key — but twelve steps more comprehensible. As a

APPLE ACCESS' menus are set up as a series of index cards. Once you set up a command file for each remote network, you need only choose that network's name on the Auto Dial menu, and the program will dial up the network and log you in. You can also program APPLE ACCESS to go through these steps while you're not there.

bonus, it includes an electronic rolodex. You can pull out a name, dial the person's phone, talk to them, switch both computers to data, send an electronic message, and switch back to voice. PERSON-TO-PERSON has a good, clear method for customizing automatic log-in sequences, with an ingenious feature called "subsequences," in which you can change parts of the sequences without affecting the rest. The developers of PERSON-TO-PERSON have thought about how people keep in touch with each other, and it shows.

APPLE ACCESS II is even easier to get around in; each menu appears as a "filecard" on the screen, with previous "filecards" stacked up behind it. You can

tell at a glance where you are in the program. Dialing into remote networks is easy, and you can save or send text without backing through a series of menus. APPLE ACCESS II can filter out control characters from incoming text, send extra linefeeds after each carriage return, and transmit files with the XMODEM (Christensen) protocol. The best feature looks to be the command files — instruction files for configuring APPLE ACCESS II to run a sequence of events automatically. They're better thought-out than the command files of any similar program, except possibly CROSSTALK XVI. They could be more fully described in the otherwise excellent manual. APPLE ACCESS II is a class act.

TELECOMMUNICATING UPDATE

ART KLEINER: Since last issue's survey of terminal programs, electronic mail services, and conferencing systems, there have been some additions. Most of them made it into the forthcoming *Whole Earth Software Catalog*, including a thorough evaluation of modems by James Stockford. For now, I'll just say that if you're considering a Hayes 1200-baud Smartmodem, look instead at the MULTI-MODEM MT212AH (\$549 from Multi-Tech Systems, 82 Second Avenue S.E., New Brighton, MN 55112; 612/631-3550).

Last issue, for MS-DOS machines, we recommended CROSSTALK XVI as an expert terminal program, Hayes SMARTCOM II for beginners, and PC-TALK.III as inexpensive but limited (it can't log in automatically). Now there's a new MS-DOS version of my personal favorite terminal program, MITE (previously CP/M). It replaces Hayes SMARTCOM II on the difficult end, unless you like your terminal program to capture your whole session automatically. SMARTCOM does that and MITE doesn't. PFS:ACCESS, reviewed this issue, replaces Hayes SMARTCOM II on the easy end. MITE's new CP/M version 2.7 is also an improvement, although the addition of help menus means you can no longer always fit MITE and a word

processor on the same disk. It includes a command language to make MITE run unattended, but the language is still so weak and relatively undocumented as to be useless. If you want your telecommunicating to happen while you're away from the machine, stick with POST-PLUS or CROSSTALK XVI. That may change as MITE's manual gets updated.

There are two early terminal programs for the Macintosh — one from Apple and one public domain (see page 112). We also now have a recommended public domain terminal program for the Atari: AMODEM, suggested by Bernie Bildman. Send \$10 (and specify which type of Atari you have) to Jim Steinbrecher, 33220 Tricia, Sterling Heights, MI 48077.

On page 21 of last issue, I said *The Computer Phone Book*, a great directory of bulletin board systems, had a monthly newsletter. Author Mike Cane never started the newsletter; for up-to-date bulletin board listings, check either *Plumb* (\$26.40/year for 8 issues, from Box 300, Harrods Creek, KY 40027) or *Computer Shopper* (\$15/year for 12 issues, from P.O. Box F, Titusville, FL 32781). *Computer Shopper* has classifieds, user's group listings, many ads, and a tabloid-esque just-plain-folks orientation in its news. Highly recommended.

ART KLEINER: *I always ask prospective writers for this magazine if they're on any electronic mail networks. Often as not, they reply, "Yeah, but I can't get my word-processing program to work with it." Telecommunication enhances writing the way film projectors enhance moviemaking, but sometimes the incompatibility between writing and telecommunicating makes me feel like a cinematographer in a world full of broken movie projectors. So we opened our computers to intrepid bench-tester Saul Feldman (who had previously written for local computer magazines about writing tools and telecommunications) and asked him to determine, once and for all, which word-processing programs telecommunicate well. His answer: infuriatingly few. We can only hope the kind of information he passes on here will help writing-tool developers clean up their acts.*

THE SHAME OF WORD PROCESSORS

THEY DON'T TELECOMMUNICATE WELL ENOUGH

by Saul D. Feldman



Reviewers of word-processing programs typically consider such factors as ease of operation, speed, footnoting capabilities, and hyphenation; but rarely do they mention how well you can send your text electronically.

Most word-processing output eventually ends up in that anachronistic form technically known as "hard copy" (otherwise called "paper"). But increasingly you will want to bypass the United States Postal Service and send your words via telephone with a modem and a terminal program.

Sometimes that requires sending text files directly to another person's computer. For example, I write articles for *Computer Currents*, a magazine based 25 miles from my home. My Apple II+ sends articles to their IBM PC in the form of standard text files, which they edit on the monitor and then send electronically to their typesetter. Since we use different word processors, I must create standard text files using the ASCII characters that nearly all computers recognize, with no extra characters thrown in for specialized tasks like formatting.

There are other uses for electronic mail involving online services such as The Source, CompuServe, or MCI Mail, which allow other people to log on any time and read the mail you've sent at their convenience. If you write that electronic letter while you're logged on, you pay the service anywhere from \$6 to \$20 an hour to compose

your thoughts. Why not *first* use your word processor to write the letter and *then* get on line and transmit your text, at speeds up to 120 characters per second, much faster than you can type?

Your terminal program should be able to send the data to other computers (uploading) and capture and store material from them as

Programs that telecommunicate easily (with no modifications or extra steps):

PERFECT WRITER
VOLKSWRITER
DELUXE
PC-WRITE
XYWRITE II
(see forthcoming Catalog)

Programs that telecommunicate but require that incoming text be reformatted:

NEWWORD
WORDSTAR
EINSTEINWRITER

Programs that telecommunicate with one or more extra steps:

WORDPERFECT
SCREENWRITER II
ZARDAX
PFS:WRITE

Programs that telecommunicate only with their own terminal programs:

WORD JUGGLER IIe

Programs that telecommunicate but require that you type carriage returns on each line when you upload a file:

APPLE WRITER
HOMESWORD
MICROSOFT WORD
WORDVISION
BANK STREET WRITER

Programs that don't telecommunicate:

OMNIWRITER (HES)
EASY SCRIPT
PAPERCLIP

well (downloading). Ideally, when you upload, you should be able to save your text on disk, get on line, transmit the text, and expect that the person on the other end will see this material formatted exactly the way you sent it.

The Whole Earth Software Review assigned me to test various word processing programs on four different computers to see how well they telecommunicated. What I thought would be a simple task resulted in days of frustration.

I worked with word-processing software for four computers — Apple II, IBM PC, Kaypro (CP/M), and Commodore 64. For each word-processing program, I wrote a few paragraphs of text which I sent as messages to myself via CompuServe's electronic mail system, EMAIL. I downloaded this material, saved it with a terminal program, and attempted to reach each file with the word-processing program that created it.

For each trial, unless the manual specified otherwise, I used ordinary disk files created by each word processor. CompuServe's EMAIL requires that you insert a carriage return at least every 132 characters. I did not do this because I expected the writing program to do it for me. (Other services such as local bulletin boards or conferencing systems have different requirements; some don't require a carriage return at all, but most require one between every 80 and every 132 characters.)

Very few word processors allowed me to easily upload and download the material at the first try. If I was unsuccessful, I turned to the manual and looked for help in the index (if one was provided) under the logical headings of "uploading" or "electronic mail." Even when the material was in the manual, it was not under these topics and was often buried where I could not find it. I eventually learned to

tually learned to look under "DOS Files" or "ASCII Files." I frequently had to call the software manufacturers and ask for help. Some could suggest an immediate solution, while others said frankly it could not be done. In some cases they were wrong but, sadly, they were often right. Sometimes they couldn't imagine why I'd want to upload my files at all.

One common fix is called "printing to disk" — you set the word processor to send text to the printer, but save that text on your disk instead. Many word processors issue a carriage return only at the end of a paragraph or when you want to skip a line; however, even these programs issue carriage returns when you print that tell your printer to print the next line. Printing to disk will put the carriage returns in, and sometimes produces a "clean" file — free of formatting codes that confuse telecommunications.

The other common solution is putting in carriage returns by hand — say, at the end of every line on your screen. While ideal for sending poetry in longer documents, typing in these returns quickly becomes laborious. Once you have downloaded the text with the extra carriage returns, you must use the search-and-replace function of your word processor to delete them, before you can use the text for anything else.

By the way, on all four computers the terminal programs worked flawlessly, and the problems I incurred cannot be blamed on them.

APPLE

Modem: Hayes Micromodem II

Terminal Program:

HELLO CENTRAL!

(Howard W. Sams)

APPLE WRITER (Apple Com-

puter) was the first program I tested, and it gave me a hint of problems to come. Downloaded output looked fine, but only the beginning of each paragraph was printed. APPLE WRITER uses carriage returns at the end of paragraphs only, but CompuServe expects one at least every 132 characters. The solution was to sprinkle your output with carriage returns. Although I used APPLE WRITER II, Apple informed me that the same problems will occur with the newer version, APPLE WRITER IIe, which will also include a terminal-program enhancement.

HOMEWORD (Sierra On-Line) would not transmit at all without carriage returns. With carriage returns, transmission was fine; however, Sierra On-Line told me that HOMEWORD does not create standard text files and that some terminal programs will not transmit its output. (They said ASCII EXPRESS *does* work, but wouldn't say which terminal programs do *not* work.)

BANK STREET WRITER (Broderbund) creates binary files that would not transmit at all. There is a utility on the program disk to convert binary files to standard ASCII (text) files. This only took a few seconds but it involved re-booting the program disk. Once again, you have to put in carriage returns. Converting captured output from a remote network so you can edit it is even more of a problem. The terminal program saves the output as an ASCII file but BANK STREET WRITER cannot read it until it converts the data back into a binary file. This conversion took more than 10 minutes and broke the output into three separate files.

WORD JUGGLER (Quark) is written for the IIe and uses Ap-

ple's new PRO-DOS. Unfortunately, output would not transmit. Quark informed me that it would only work with their own terminal program, TERMINUS.

SCREENWRITER II (Sierra On-Line) and ZARDAX (Action-Research Northwest) would not transmit with their standard output. Both of these programs will allow you to convert their files for transmission by printing them to disk. Conversion in both cases was uncomplicated. With SCREENWRITER, you have to save your text to disk and then convert it. With ZARDAX, you can specify a print-to-disk file from the edit mode. ZARDAX's representative said their terminal program, ZIP-COMM, would transmit regular ZARDAX files or the print-to-disk output.

CP/M

Modem: Hayes Smartmodem

*Terminal Program: MITE
(Mycroft Labs)*

NEWWORD (Rocky Mountain Software) and PERFECTWRITER (Perfect Software) worked with no problems. NEWWORD did add extra carriage returns that you must remove before you can easily edit the file (see sidebar below).

IBM PC

Modem: Hayes Smartmodem

*Terminal Program: MITE
(Mycroft Labs)*

VOLKSWRITER (Lifetree Software), WORDSTAR (MicroPro), and PERFECT WRITER (Perfect Software) all worked with no problems. [Note: we've had problems with WordStar. See sidebar. —AK]

WORDVISION (Bruce and James) did not work. The support person said it would only work if I rewrote the program by patching part of it in hexadecimal code. Later, I found the solution documented — incorrectly — in their

THE WORDSTAR/NEWWORD FIX

ART KLEINER: Arrrrgh! You pull in some text over the network. When you edit it with WORDSTAR or its faster, more coherent clone NEWWORD, you see a carat symbol — < — at the end of each line. This signifies an unwanted carriage return which makes it impossible to reformat a paragraph to print it out, unless you laboriously remove the returns. NEWWORD has a command to do it line by line: CTRL=N. WORD-

STAR makes you futz around with the delete key.

Tony Bove and Cheryl Rhodes of *The User's Guide* (p. 102) worked out this compromise. When you bring up the file, do a global search for all paragraph ends (which might be two carriage returns, or a carriage return and five spaces). The code for carriage returns is either [CTRL-N], [CTRL-P CTRL-M], or [CTRL-P CTRL-J]. Change those to some unique set of characters (like, say,

88888). Then change all remaining carriage returns into single spaces. Then go back and change your unique 88888s to two carriage returns.

You can automate the process with PROKEY or SMARTKEY (p. 50). There are also public domain programs like ENSOFT (available on CompuServe CP/M SIG) which do it for you. It's aggravating to have to worry about it at all.

manual. Typing SHIFT-CONTROL while editing takes you to a hidden menu, where you choose a DOS File Editor Option, and then save to disk. Here again, you must insert carriage returns every 80 or so characters.

PFS:WRITE (Software Publishing) would not telecommunicate its standard files; however, it does have a simple option that allows you to print your output to disk. This added the needed carriage returns and gave flawless transmission. The instructions for this option were buried deep in the manual, meaning that most people would probably have to call the manufacturer for assistance.

EINSTEINWRITER (Einstein Corporation) would not work with its standard files; however, you can take an EINSTEINWRITER file and print it to disk (giving it a new name). This copy will upload easily; however, incoming text is broken up into choppy lines and must be reformatted. EINSTEINWRITER also has a second, simpler method, allowing you to create an uploadable copy right

from the edit mode. Again, there were no easily locatable instructions in the manual.

MICROSOFT WORD (Microsoft) would not work at first. Two different calls to the manufacturer yielded two different suggested solutions; neither created uploadable files. Stewart Brand found the solution on a new (unindexed) page (324a) that Microsoft sent as an update to the manual. When you save a document, you must tab over to the question: FORMATTED? and type N. You must still insert carriage returns in outgoing text, and incoming filenames must end in .DOC.

WORDPERFECT (Satellite Software) also did not work for me initially. Neither the program's plentiful internal help facilities nor its manual tell you clearly how to create an uploadable file. Their support person suggested that the person at the other end should also have a copy of WORDPERFECT so I could send formatted files. Barring that, I was given an involved multi-step procedure that included setting up two dum-

WORD PROCESSOR SHAME AT TIME MAGAZINE

DWIGHT ERNEST: Before I got seriously involved with microcomputers at my company (*Time* magazine), the group responsible for personal computers chose PFS:WRITE as the "informal" writing tool of choice. It was chosen on the basis of reviews in micro journals and some very facile experience. There was certainly no regard for its telecommunications ability, in spite of the fact

that one of the main reasons for using PCs was to permit writers in the field to file their stories via modem.

The you-know-what hit the fan the first time a remote user attempted to send a file created under PFS:WRITE to our editorial computers. Yes, we tried printing the PFS file on a disk file, but it produced lots of unexpected problems, like margins in the disk file and over-

printing for bold and underline. Finally someone asked Software Publishing for technical information on the internal format used by PFS to store a file. After a few hours' work by one of my programmers, we came up with our own proprietary program to convert PFS files to standard ASCII stuff suitable for telecommunicating.

Caveat emptor.

my printers and resetting the margins. Ultimately Charles Spezzano, who reviewed WORDPERFECT for the *Software Catalog*, found the solution: "Press ALT-F1 and select 2) PREPARE/PROTECT DOCUMENTS and then choose 1) STORE IN DOS FORMAT." With that, the program worked fine.

COMMODORE 64

Modem: Vicmodem
Terminal Program:
Vidtex (CompuServe)

OMNIWRITER (HesWare) would not work and the manufacturer knew of no way to get it to telecommunicate. The program creates a non-standard file that cannot be converted to an ASCII file.

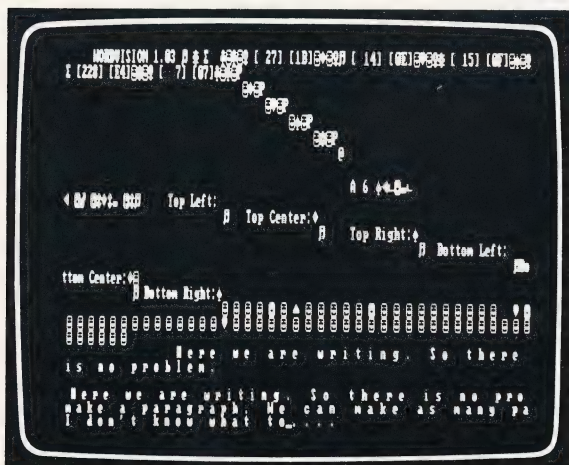
EASYSRIPT (Commodore) would not upload its standard files; however, adding carriage returns did result in an uploadable file. When I downloaded the material, a lot of extraneous symbols were added. I can live with extra carriage returns but these symbols would have to be edited out for the file to be usable.

PAPERCLIP (Batteries Included) has an easy-to-find section in the manual that tells you how to create an uploadable file. The file was easy to save and transmitted with no problems. I downloaded the file that I sent and saved it with VIDTEX. PAPERCLIP could not read the file I saved and insisted that there was a "file type mismatch."



Ideally, your word processor's telecommunications process should be simple and free. But do not take this for granted. If my experiences are any indication, you will have the easiest time with CP/M programs and you'll be out of luck with Commodore 64. On an Apple or IBM, it depends on your program and your persistence. Some programs that I could not get to work, might work with determined hacking. If your files do not upload and download perfectly, do not depend on the manual for much help, and expect to make some long-distance calls to the manufacturer.

END



This is how a WORDVISION file looks to your telecommunications program. The codes at the top set margins and formats; between each letter is a space for additional format codes (bold, italic, etc.) if needed. Omitted: the carriage returns needed by remote networks. Like most word processors, WORDVISION has an alternate "straight text" mode for storing files, a mode which meets telecommunications halfway.

A Powerful, Free Word Processor for Telecommunicating

PC-WRITE

Version 2.2. IBM PC, PCjr, and compatibles (MS-DOS, 64K). \$10 shareware, \$75 full registration, \$25 commission to those who register it, then sell copies which get registered. Not copy-protected. Quicksoft, 219 First Ave., No. 224, Seattle, WA 98109; 206/282-0452.

STEWART BRAND: This is becoming one of the most interesting programs we've seen. You can pick up PC-WRITE free at your local user group or get it direct from the author for ten bucks. The manual is on the disk — print it out and you're in business. If you like the program enough to register with the author and pay a grateful \$75, you really are in business. Copy your PC-WRITE freely to

your friends; if any of them decide to register the copy and pay \$75 to the author, you get a \$25 commission back from him for each one. Besides the down-home business opportunity that goes with registration, you also get a bound copy of the manual, the next updated version (a significant value), and telephone support.

ALFRED GLOSSBRENNER: If there's one thing that characterizes this IBM/PC and PCjr program — other than its availability for free — it is "user thoughtfulness." Unlike many commercial producers, author Bob Wallace has clearly focused his efforts on how real people actually use their software.

It's no accident, for example, that PC-WRITE's pure text files are completely clean. "In designing the program," Wallace says, "we tried our best to avoid inserting foreign codes into files. I wanted to make it easy for peo-

Not Recommended

PCWRITER DISPLAYWRITE2

PCWRITER: IBM PC/XT, portable PC (PC DOS 2.0 or 2.1, 128K, two double-sided disk drives or one double-sided disk drive and fixed disk, printer). \$199.

DISPLAYWRITE2: IBM PC/XT, portable PC (PC DOS 2.1; IBM 3270 PC; 192K RAM, two double-sided disk drives or one double-sided disk drive and fixed disk, 80-column display printer). \$299.

Both available from IBM Corporation, P.O. Box 1328-S, Boca Raton, FL 33432, 800/447-4700.

STEWART BRAND: We've touted an onion structure as the ideal in word-processing programs. You begin easily, get real work done, then peel in deeper to greater complexity and "power," working gradually into the more difficult procedures. What's the opposite of an onion? I'd say a rotten walnut. You fight to get in, and there's nothing inside. Which brings us to this new pair of programs from IBM.

The premise, announced with fanfare reminiscent of the coming of the

PCjr, is that IBM has taken its popular dedicated word-processing machine, the Displaywriter, liquified it into software and poured it into the IBM PC — DISPLAYWRITE2. For the less ambitious, apparently, there's a simpler version called PCWRITER. Both have buried within them IBM's wholly admirable speller and synonym-finder, WORD PROOF (see Software Catalog).

I tried to start with DISPLAYWRITE2, got intimidated by its huge manual (which seemed to assume that I already knew everything about the program and managed to be simultaneously condescending and humiliating), got put off that it took two disks just to boot up, and veered off to what I thought would be the dummy's version, PCWRITER. Wrong. My error. It's a completely different program, based on IBM's 5520 Administrative System. While it has a thoroughly enticing demo-quasi-tutorial disk, the program and manual seem to have been written in ancient Greek and translated by George Orwell, under extreme depression, into abbreviated Newspeak. (On PCWRITER that would be a command: ABR NSP.)

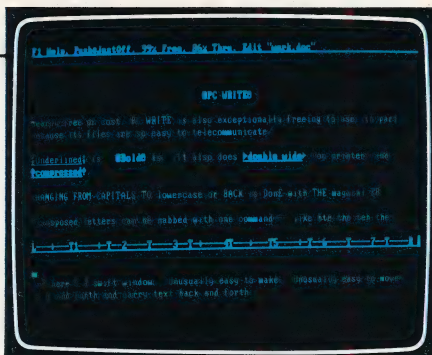
ple to use spelling checkers and database programs and to upload to mainframes." Each line has a carriage return/line feed attached to it, but that's the only non-text code. Yet, nothing has been sacrificed in the way of power or convenience.

PC-WRITE happens to be one of the fastest of all word-processing programs. In a test against WORDSTAR, it performed a search-and-replace operation nearly five times faster than the MicroPro product.

Another "freeware" program, the PC-TALK.III terminal program (WESR Summer 1984, p. 17), is especially well-suited for uploading or downloading PC-WRITE or other text files to any type of computer. Unlike some terminal programs, PC-TALK can be made to pause a certain number of seconds after transmitting each line of a text file, or it can be told to send a line only after receiving a specified character from the remote

You boot up (one disk) and fight your way through a maze of menus. One requires your "Operator ID;" another gives you a "Task Selection Menu," through which you cursor (OPT ADV) most awkwardly via Operator Profile Tasks (OPT) to arrive at your goal, Create Document (CRE). One more "Choice Field" and heaven! A blank screen, only four lines taken up with status and prompts and all. Wanna do anything besides type? Punch ESC (renamed REQUEST, and you get a list of commands: CDD, CDF, CDP, CDT (actually handy—Convert Document for Transmission), CFD, etc. — 24 of them. You have to *type in* the command for anything to happen.

If after several weeks you have chewed your way into the walnut, what nourishment lies within? No automatic reformatting—something even HOMEWORD and ATARIWRITER can manage. Hit CTRL-ADJUST and it has to go to disk to fix your paragraph. No "undo" command. No bold, anywhere. No macros for shortcutting. (There are phrase keys.) Control keys are utterly unmnemonic—CTRL-I for "underline," CTRL-W for "find." I don't like to knock



A PC-WRITE screen. From top to bottom: the program's command/prompt line, a window-full of text (showing onscreen bold and underlined), and a second window.

system. These features are particularly important during busy periods on The Source or CompuServe, when the remote systems operate slowly.

STEWART BRAND: Add PC-FILE and WORD PROOF (\$60) and you can travel a high-quality low road on PC compatibles for practically nothing.

people's hard work, but PCWRITER is an insult to the market's intelligence.

So I spent some time with DISPLAYWRITE2. Report: no joy. It does automatically reformat. It does bold—grudgingly. Still, no macros and no "undo." The manual is the most carefully terrible I've ever seen; it feels like it was written by a committee of 37 and over-seen in detail by five layers of management. It even manages to make the facile speller WORD PROOF appear difficult. Typical opacity: there's constant reference to "code" that assumes your familiarity with such a thing. The pages are printed at nonstandard right angles to the standard IBM ring binder; bad for reading, bad for holding. Nearly everything in the program is like that, awkward and tedious.

Maybe there's some extenuating circumstance in committed IBM environments that justifies DISPLAYWRITE2 — compatibility with Displaywriters or IBM mainframes or something — and my ignorance is showing. I know I would not like to work in a place that considered a program like this a good idea.

END

Organize Your Computer Environment

PROKEY

Version 3.0. IBM PC, compatibles. \$129.95. Copy-protected. RoseSoft, 4710 University Way N.E. #601, Seattle, WA 98105; 206/524-2350.

SMARTKEY II

IBM PC, compatibles; CP/M. \$89.95. Not copy-protected. Software Research Technologies, Inc., 3757 Wilshire Blvd., Suite 211, Los Angeles, CA 90010; 213/384-5430.

ART KLEINER: These "keychangers" are really customizing tools; they help define extra commands (called macros) for nearly any program you have. They make a nice compromise between the limited horizons of other people's software and the chore of doing your own programming. They'll organize confusingly diverse programs into a single syntax, streamline complex commands into one keystroke, turn calculator keypads — like those on the Kaypro — into usable function keys, and toss in frequently used bits of "boilerplate" that you won't have to type over each time.

Before you use a keychanger, get familiar with the programs you use most. Spend some time planning the changes you want to make. You can rearrange the furniture every day, but then you'll always be bumping your mental shins. Here are some examples of how people use them:

TONY FANNING: The simplest differences between programs can be deadly. In one program I use daily, a **CONTROL**Y restores deleted text; in another, a **CONTROL**Y deletes the line the cursor is in. How many times have I deleted lines forever when I thought I was bringing back text? Many. What if you could redefine what **CONTROL**Y does — or the backspace key, or any other key — so that it always does the same thing? That's what **PROKEY** does for me.

JERRY JUHL: Screenplay form requires one set of margins for description

margins is a long, boring process with **WORDSTAR** alone. With **SMARTKEY**, I finish writing a paragraph of description and hit two keystrokes. Instantly, the character name I want appears on the screen, centered and boldfaced; the margins change; and the cursor drops down two lines to the point where the dialogue should begin. To do that manually would take, oh, about thirty keystrokes.

ART KLEINER: On the IBM PC we recommend copy-protected **PROKEY**; on CP/M systems, or to avoid copy protection, we recommend **SMARTKEY**. They're the best-documented and most flexible of the keychangers we've seen. (We don't recommend **KEYNOTE**, **KEYSWAPPER**, or **SPEED KEY**.) **SMARTKEY** and **PROKEY** can both add new macros while inside another program and save whole sets of definitions in files that boot up whenever you start your computer. **PROKEY** has nice tutorials, but **SMARTKEY**'s is the first manual brilliant enough to make me want to credit the author — Paul Golding — in a review.

RICHARD PLATT: **PROKEY** uses about 10K of resident memory; **SMARTKEY** about 2.25K. Additional memory (in 1K increments) must be allotted as you add macros. Only if you create an extensive library of boilerplate paragraphs are you apt to run into trouble storing **PROKEY** in your memory.

SMARTKEY II takes a little longer to configure, but is easier to use once installed, since it uses a single key to define the beginnings and ends of macros, as well as any pauses in them. **PROKEY** uses **ALT=** to start macros and **ALT-** to end them.

Except for boilerplating, when you should use a separate word processor, you will probably create your macros in the midst of other programs as particular tasks present themselves. **SMARTKEY** and **PROKEY** both allow you to do this; but with **SMARTKEY**, if you make a

mistake in a particular string of commands, there's no turning back — you must start over. With PROKEY you can at least backspace and correct your error. And PROKEY lets you combine previously defined macros within your new one, another real time-saver. What's more, you get instant feedback with PROKEY; your commands are interpreted and executed as you record your keystrokes. With SMARTKEY, you're never sure if you made a mistake until you use your macro later.

A unique feature of PROKEY is its "one-finger off/on" mode, which allows disabled people with limited mobility (or just a mouthstick) to, for instance, type control characters by pressing control, then (instead of simultaneously) the following key.

Certain programs will not run with PROKEY; the manual mentions VISIFILE, WORDVISION, XYWRITE and "certain terminal emulators," and acknowledges problems with some ramdrives and spoolers, including Quadram's. The SMARTKEY manual mentions only that it's not compatible with XSUB and DESPOOL by Digital Research. (It could

of course be that PROKEY is more honest than SMARTKEY; no doubt both programs have undiscovered quirks.)

ART KLEINER: Keychangers work fine with most telecommunications programs, but SMARTKEY can't send macros over the phone lines to The Source. It can trigger your smart terminal program to send its commands to The Source. PROKEY will send text to The Source, but doesn't work with HAYES SMARTCOM II.

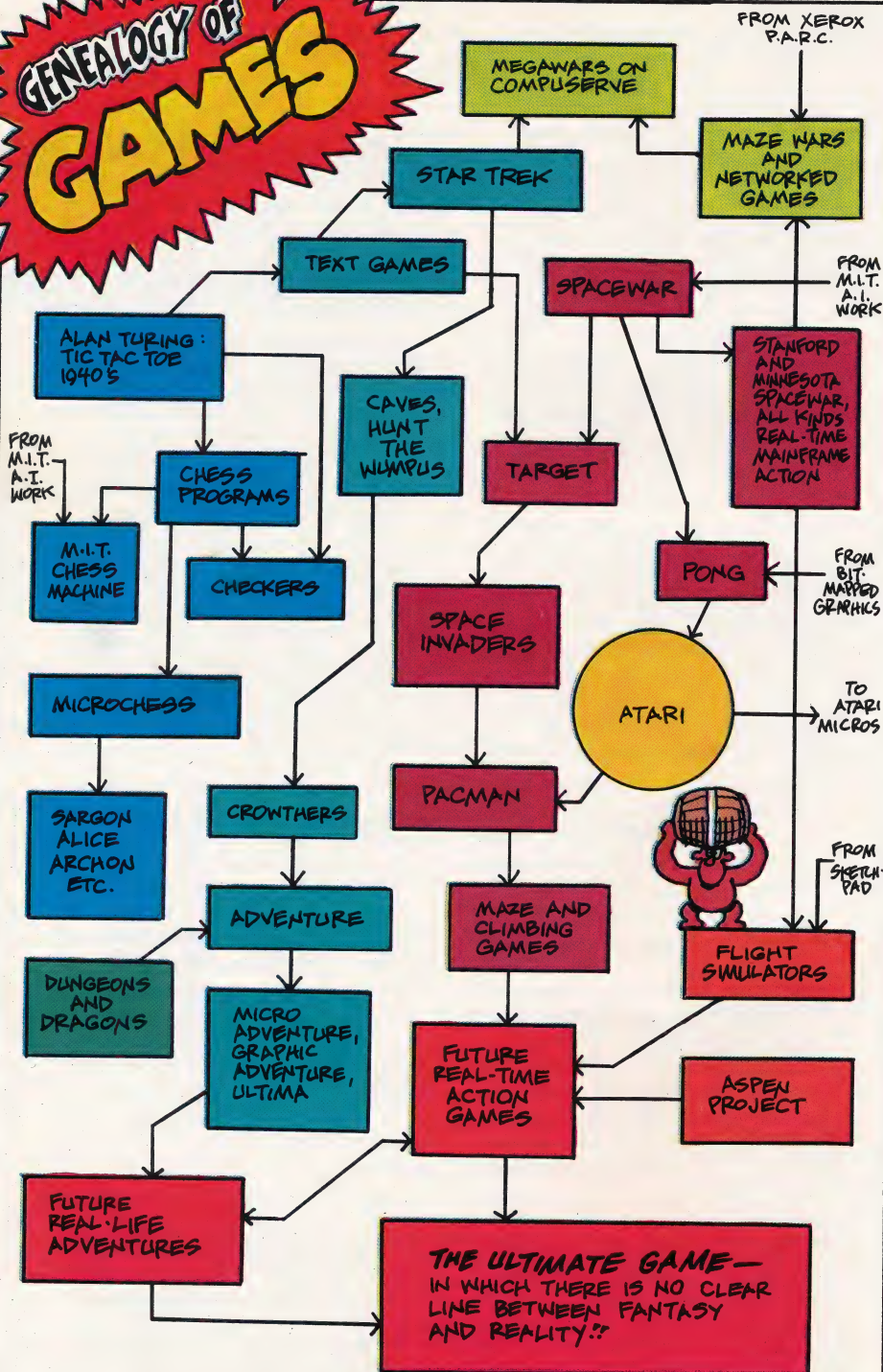
RICHARD PLATT: PROKEY 3.0 includes sample on-disk macros for WORDSTAR, VISICALC, BASIC, and DBASE II. SMARTKEY includes samples for WORDSTAR, PERFECT WRITER, SELECT, screenwriting, and the Kaypro number keypad in a separate book they sell, *Screen Smarts*. Both include Dvorak keyboard files. Articles listing macro configurations for particular programs (especially WORDSTAR), appear frequently in *PC World* and *PC Magazine*, most often written by PROKEY users. Whatever the relative merits of PROKEY and SMARTKEY now, they're in stiff competition with each other. Watch for updates.

SMARTKEY II user Andy Barrie's custom-designed template card for WORDSTAR on the Morrow MD3. The top part sits above his Morrow's five function keys. PANIC STOP is CTRL-U, the command that aborts another WORDSTAR command

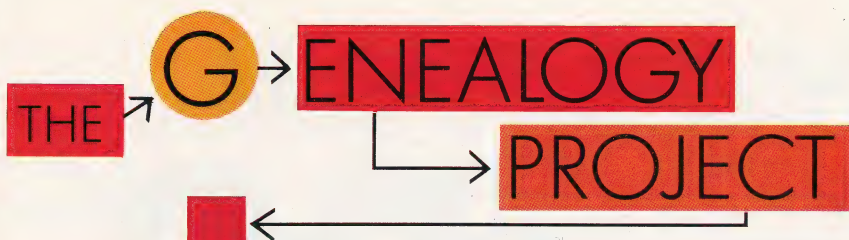
mid-stream. STANDARD FORMAT and JUST (justified) OFF & MARGIN are stored sequences of WORDSTAR formatting commands — about thirty keystrokes each. The part at bottom shows Barrie's redefinitions of some regular character keys that he doesn't need in WORDSTAR. His favorite is " \ ": "It ends a block, sends it to the bottom of the file with two lines to separate it, returns to where you were, and hides the block markers. When you get an idea that's unrelated to what you're writing, you just hit a START BLOCK command CTRL-KB, type the idea, and hit the " \ ". Your thought goes to the bottom and you keep typing where you were. The WORDSTAR sequence to do the same is [RETURN] [RETURN] CTRL-KK CTRL-QC CTRL-KV CTRL-KH CTRL-QV."

SHIFTED	DRIVE B & EDIT	JUST OFF & MARGIN	STANDARD FORMAT	SAVE & PRINT	DELETE WORD <<
	F1	F2	F3	F4	F5
UNSHIFTED	MOVE << -	MOVE - >>	SAVE & RETURN	MARGIN TAB	PANIC STOP
^ = Make "B" drive Osborne (to read Osborne text files into WORDSTAR) [= Underline] = Centerline ~ = PIP C:=B: (for backing up files in CP/M) { = New page break } = Hide printer formatting characters \ = End block and dump to end of file					

GENEALOGY OF GAMES



THE GENEALOGY PROJECT



ART KLEINER: "Why don't you do a genealogy chart," Barbara Robertson suggested, "that would show where all the personal computer ideas, innovations, and products came from?" That suggestion begat this first draft, which will eventually evolve into a *Whole Earth Software Review* wall poster.

To get this far, we invited some computer historians and computer history-watchers to join us one Saturday afternoon in May. Those who showed up were: Steven Levy, author of *Hackers* (p. 58); Paul Freiburger and Michael Swaine, authors of *Fire in the Valley* (p. 58); Howard Rheingold, author of another forthcoming book on micro-computer history; Lee Felsenstein, probably best known as the founder of the Community Memory Project and designer of the Osborne 1 computer; Steven Saunders, veteran of Xerox Palo Alto Research Center and Atari's Corporate Research Group (where he worked under Alan Kay); Robert Poor, a veteran of Lucasfilm currently with the Stanford Center for Computer Research in Music and Acoustics; and *Computer Publicity News* editor Tony Reveaux; with help from James Stockford, Barbara Robertson, Levi Thomas, and Lyn Gray of our office.

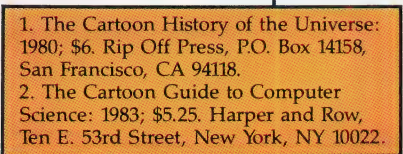
We all marked up big sheets of butcher paper with our versions of this genealogy, then tacked the sheets on the wall and compared notes. I MACPAINTed the results into something coherent and gave it to cartoonist Larry Gonick, who had

previously done the exhaustive "Cartoon History of the Universe"¹ and the funny and thoughtful "Cartoon Guide to Computer Science (from DNA to BASIC)"². Larry checked the facts further and created what you see here.

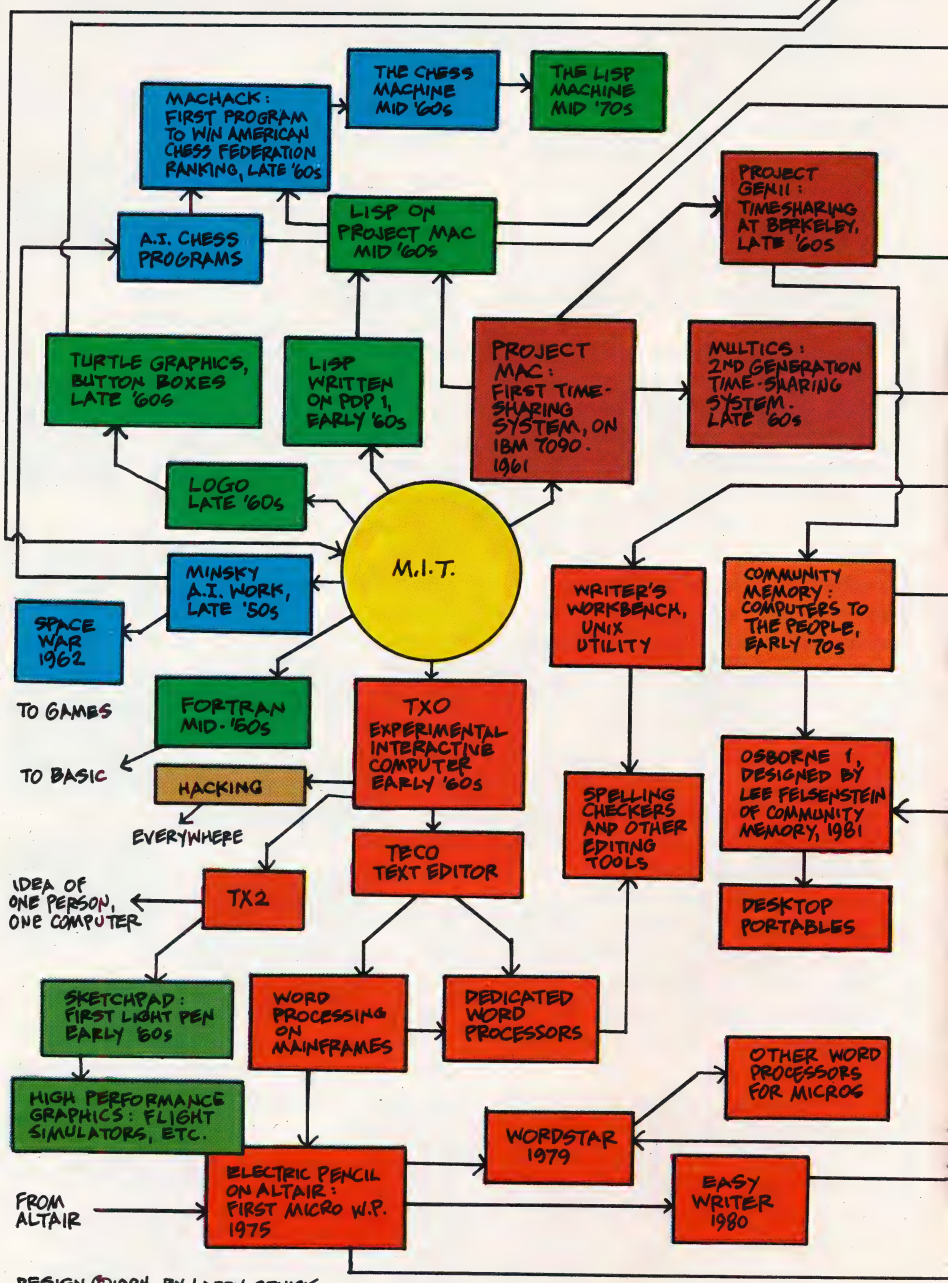
The Genealogy of Games opposite this page is relatively self-contained and chronological. You can start at the top left with Alan Turing's Tic Tac Toe (probably the first computer game) and work your way down to the Ultimate Game (which doesn't exist yet and maybe shouldn't).

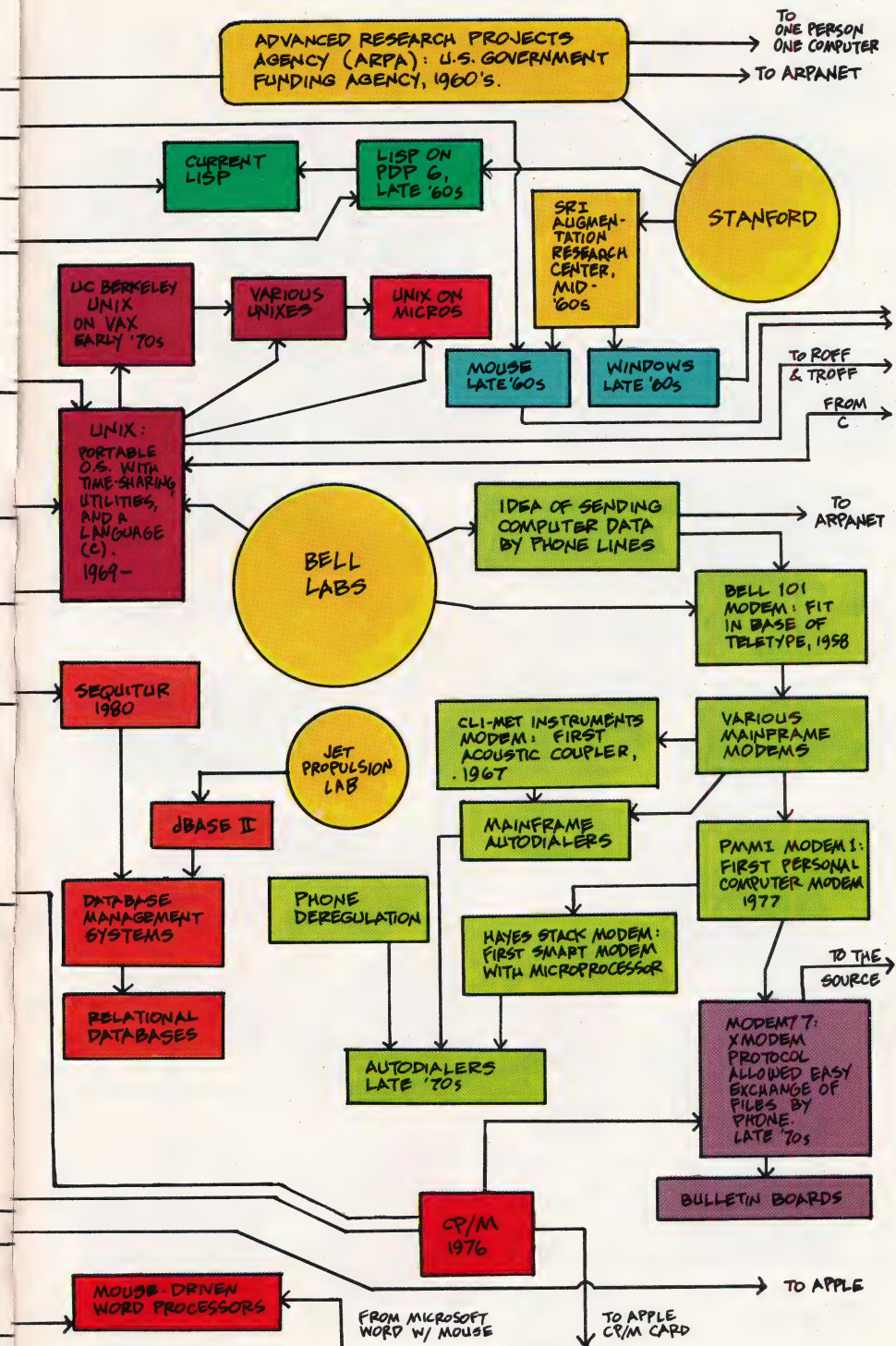
The following four pages, the Genealogy of Software, is more complex. The big yellow circles are major labs, companies, or research centers, around which innovation clusters. Most roads lead from the Massachusetts Institute of Technology (MIT), and snake through the Xerox Palo Alto Research Center (Xerox PARC). Arrows don't necessarily mean a direct connection (as in a corporate relationship). Sometimes they just mean an influence, or (even vaguer) what we thought must have been an influence.

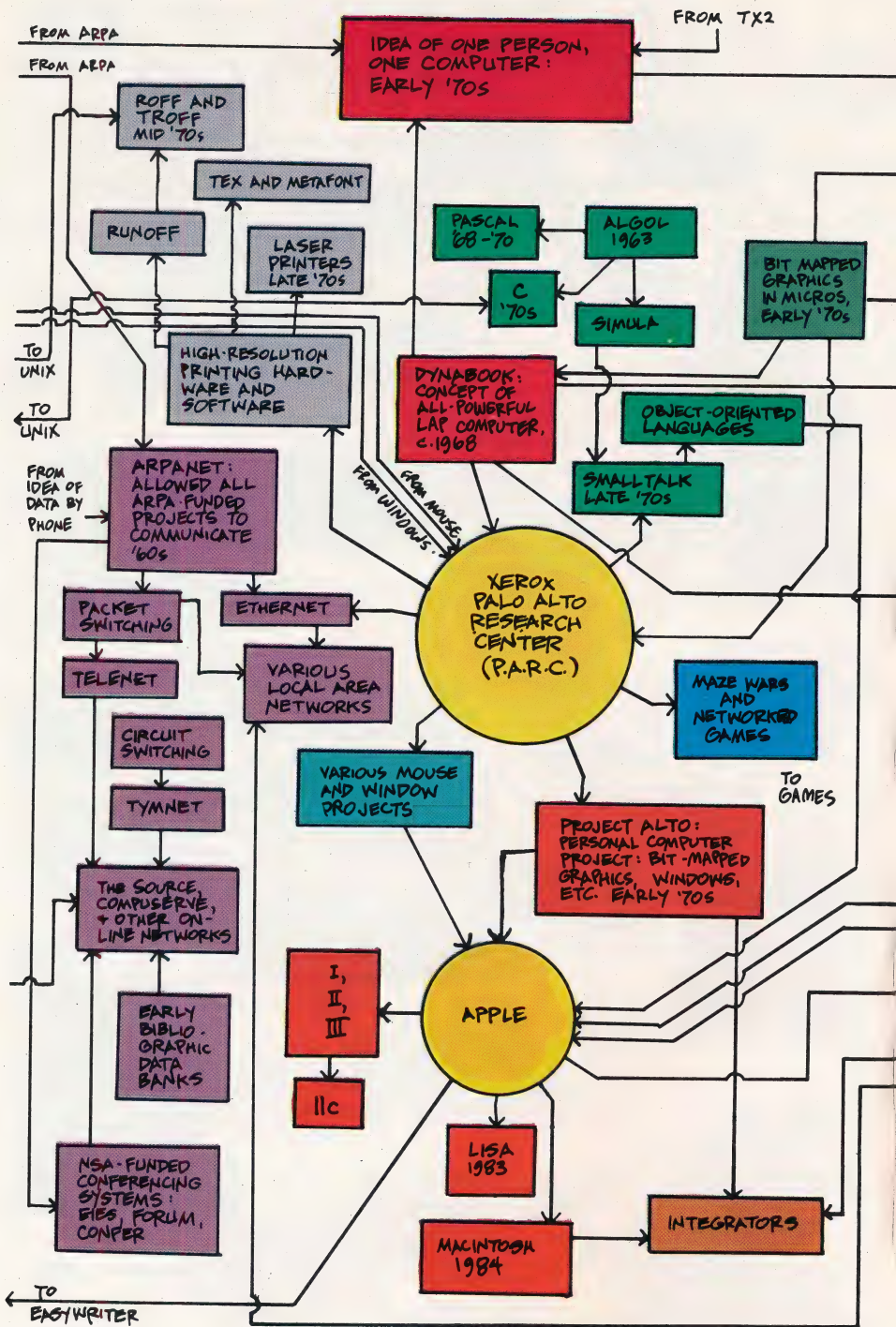
Everyone who knows anything about computing will find fault and omission in this chart. That's OK; let us know your corrections and additions. Together, we'll all make it accurate.

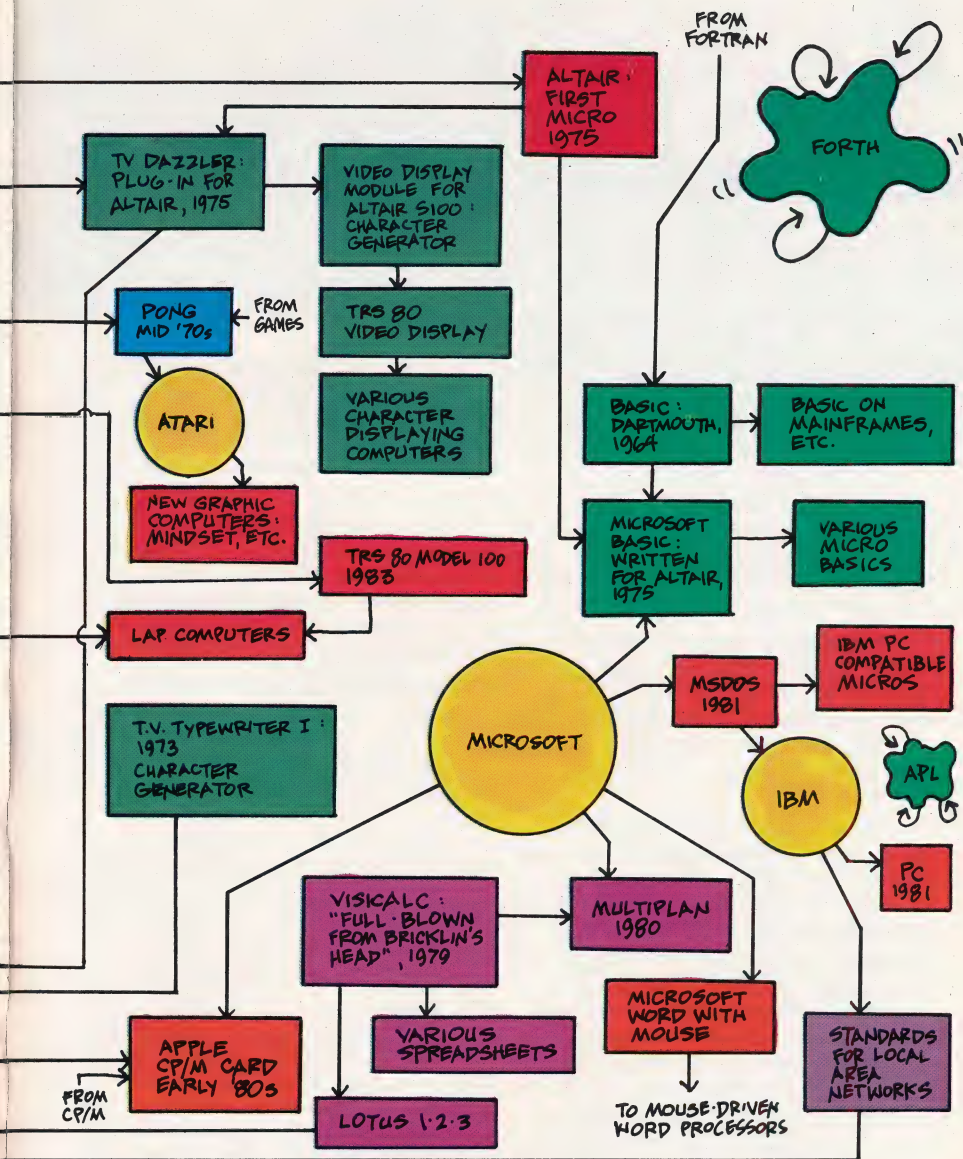
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1. The Cartoon History of the Universe: 1980; \$6. Rip Off Press, P.O. Box 14158, San Francisco, CA 94118.
 2. The Cartoon Guide to Computer Science: 1983; \$5.25. Harper and Row, Ten E. 53rd Street, New York, NY 10022.

Genealogy of Software









THE LABS

MAINFRAME OPERATING
SYSTEMS

MICROCOMPUTERS,
OPERATING SYSTEMS,
AND MICRO SOFTWARE

COMPUTER GRAPHICS

LANGUAGES

SPREADSHEETS

TELECOMMUNICATIONS
HARDWARE

TELECOMMUNICATIONS
SOFTWARE

TYPESETTING AND
PRINTERS

LANGUAGES

The Stories Behind the Genealogy: Two Books

HACKERS

Steven Levy, 1984; 460 p. \$17.95. Doubleday and Company, 501 Franklin Avenue, Garden City, NY 11530; 516/294-4400 — or from Computer Literacy (p. 132).

FIRE IN THE VALLEY: The Making of the Personal Computer

Paul Freiberger and Michael Swaine, 1984; 288 p. \$9.95. Osborne/McGraw-Hill, 2600 Tenth Street, Berkeley, CA 94710; 415/548-2805 — or from Computer Literacy (p. 132).

ART KLEINER: What makes personal computer history fascinating? It's not just unravelling which creative innovations begat what multimillion-dollar companies. Computer developers have wrestled for three decades now with a dilemma that springs from the heart of their technology: software is a product of imagination, easily accessible and changeable; but making a livelihood from it requires fixing it relatively solid in order to finish and sell it.

Steven Levy's *Hackers* is a tour de force of storytelling focused on what Levy calls the Hacker Ethic, in which information is free and the purpose of computing is to make the machines (figuratively) sing. The story picks up the Hacker Ethic close to its Massachusetts Institute of Technology origins in the early sixties, pursues it through the home brewing of personal computers a decade later, and propels it into the bizarre, esoteric world of game programmers in the early eighties. Levy, of course, is a major contributor to this magazine, but even if you distrust our objectivity, take a glance at *Hackers*. It'll hook you from the first page.

Hackers is a good introduction for anyone — computer-involved or not — to the contradictory forces battling within computer peoples' souls. But it's not a comprehensive history of the industry. *Fire In The Valley*, written by two

moonlighting *InfoWorld* editors (now at, respectively, *Popular Computing* and *Dr. Dobbs's Journal*), tells the full story from the transistor to the Macintosh. You see Bill Gates programming minicomputers at age 13 and developing the IBM PC operating system 14 years later. A surprising number of people in this infant industry have their innovative roots in the fifties or sixties. Though dryly written in places, *Fire In The Valley* is far and away the best scorecard to date. If you're already interested in computer gossip, the treasure trove of reprinted photographs will be worth the cover price.

STEWART BRAND: *Fire In The Valley* is the most hilarious and thrilling book I've read in years. The national economy winds up pivoting on the misadventures, blind faith, and blind luck of a bunch of techie hobbyists and hippies with an obsession scorned by corporate America.

Both books show how programmers wind up programming the whole damn culture.

► [Software Industry, 1982:]

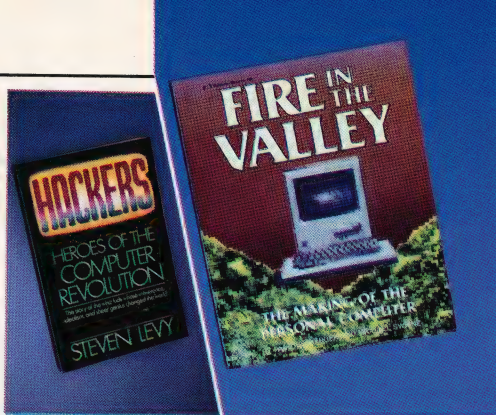
The Hacker Ethic, of course, held that every program should be as good as you could make it (better), infinitely flexible, admired for its brilliance of concept and execution, and designed to extend the user's powers. Selling computer programs like toothpaste was heresy. But it was happening.

—Hackers

► [Origins of MICROSOFT BASIC:]

In the fall of 1974, Bill Gates had left Washington for Harvard University. Gates's parents had always wanted him to go to law school, and now they felt he was finally on the right track. . . .

Then the *Popular Electronics* article [on the MITS Altair, the first microcomputer]



Steve Jobs and Steve Wozniak examining an early Apple circuit board, 1977. —*Fire In The Valley*

Margaret Wozniak



came out. Gates's friend Paul Allen ran through Harvard Square with the article to wave it in front of Gates's face and say, "Look, it's going to happen! I told you this was going to happen! And we're going to miss it!" Gates had to admit that his friend was right; it sure looked as though the "something" they had been looking for had found them. He immediately phoned MITS, claiming that he and his partner had a BASIC language usable on the Altair. When Ed Roberts, who had heard a lot of such promises, asked Gates when he could come to Albuquerque to demonstrate it, Gates looked at his childhood friend, took a deep breath, and said, "Oh, in two or three weeks." Gates put down the receiver, turned to Allen and said: "I guess we should go buy a manual."

—*Fire In The Valley*

► [MIT, 1967:]

The game Spacewar, a computer program itself, helped show how all games — and maybe everything else — worked like computer programs. When you go a bit astray, you modify your parameters and fix it. Put in new instructions. The same principle applies to target shooting, chess strategy, and MIT coursework. Computer programming was not merely a technical pursuit, but an approach to the problems of living. . . .

Slug Russell knew that by showing a rough version of the game . . . he was welcoming unsolicited improvements. Spacewar was no ordinary computer simulation — you could actually be a rocketship pilot. It was Doc Smith come to life. But the same power that Steve Russell had drawn on to make his program — the power that the PDP-1 lent a programmer to make his own little universe — was also available to other hackers, who naturally felt free to improve Slug Russell's universe. They did so instantly.

—*Hackers*

► Hackers believe that essential lessons can be learned about the systems — about the world — from taking things apart, seeing

how they work, and using this knowledge to create new and even more interesting things. They resent any person, physical barrier or law that tries to keep them from doing this.

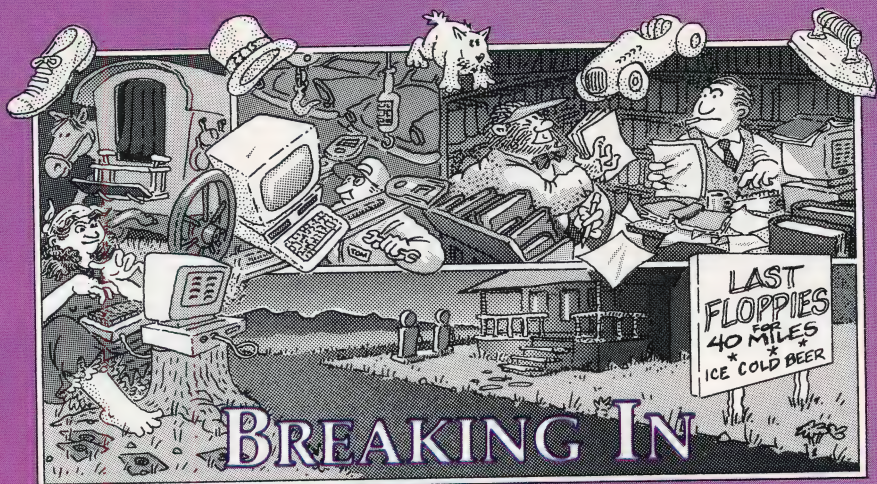
This is especially true when a hacker wants to fix something that (from his point of view) is broken or needs improvement. Imperfect systems infuriate hackers, whose primal instinct is to debug them. This is one reason why hackers generally hate driving cars — the system of randomly programmed red lights and oddly laid-out streets causes delays which are so goddamned unnecessary that the impulse is to rearrange signs, open up traffic-light control boxes . . . redesign the entire system.

—*Hackers*

► [Apple II, 1977:]

Woz and his friends were preparing a different kind of computer than the previous bestsellers, the Altair, Sol, and IMSAI. Steve Jobs and Mike Markkula felt that the Apple's market went well beyond hobbyists, and to make the machine look friendlier, Jobs hired an industrial designer to construct a sleek, low-profile plastic case in a warm beige earth color. He made sure that Woz' layout would be appealing once the lid of the case was lifted. The Apple bus, like the S-100 bus, was capable of accepting extra circuit boards to make it do interesting things, but Woz had . . . made it so that the eight "expansion slots" inside the Apple were especially easy for manufacturers to make compatible circuit boards for. They would be helped, of course, by the "open" architecture of the machine; true to the Hacker Ethic, Woz made sure the Apple had no secrets to prevent people from creating on it. Every twist and turn of his design, every coding trick in his BASIC interpreter (which would be included inside this machine, hard-wired into a custom circuit chip) would be documented and distributed to anyone who wanted to see.

—*Hackers*



by Levi Thomas
Illustrated by James Donnelly

THE AMERICAN DREAM is alive and living in an electronic cottage in Silicon Valley. Isn't it? The microcomputer industry is famous for stories of college dropouts who make their first million in computers before their classmates even get degrees. But what if you're not a "Woz" or an entrepreneur? What kind of opportunities exist for the non-degreed person without previous work-related computer experience? How do you acquire the skills needed to earn a living in the micro-computer industry?

To find answers to these questions I talked to people doing the hiring (personnel officers, computer store managers, repair shop owners), and to some people in the industry who got their start without previous experience or computer science degrees.

When I asked personnel directors about entry level positions in programming, tech writing, or computer repair, many

of them said they wouldn't consider people without a computer science degree and/or work-related experience.

But everyone else disagreed. One computer consultant who has a master's degree in computer science said, "If you want to learn about microcomputers, don't go to college." Author Russ Walter (*The Secret Guide to Computers*¹) agreed: "The university computer science programs haven't caught up with the microcomputer revolution yet. They're still aimed at the main-frame and mini crowd."

The answer: if you have neither degree nor work experience, edge past the personnel office. Contacting the supervisor of the department you want to work in can often get you an interview. A lot of successful people in the in-

ART KLEINER: Levi Thomas is breaking into computer writing with this article. She's the first of what I hope will be a series of interns with this magazine — trainees who take on evaluation or reporting assignments, work closely with editors here, and (if published) get paid at our regular rates. If you're interested, please send a note with your background and a writing sample to this magazine.

dustry literally talked themselves into their first job. I also found many companies which were less interested in formal training than in people who were able to "problem-solve," and pick things up as they went along.

Everyone I talked to agreed that a degree doesn't hurt when you're looking to advance a career, but an engineering or computer science degree isn't necessary — business or liberal arts can be as good or even better. You can earn a degree part-time or without ever setting foot on a college campus; for information on correspondence and off-campus programs, see "How To Get The Degree You Want," by John Bear, PhD.²

Most people said data-processing courses are *not* the way to break into the microcomputer industry; "outdated" and "worse than worthless" sum up the responses.



COMPUTER SALES

EXPERIENCE REQUIRED: some sales experience and/or knowledge of software, computers, and peripherals preferred, but not essential.

GORDON COOK: *For someone who doesn't have a sixteen-bit micro with a lot of software to practice on, working as a computer salesperson can provide access and experience. In this industry, you have to be knowledgeable enough to bull your way through an interview and this is a damn good place to get the knowledge.*

That comment is from a technical writer whose first job in microcomputing was as a computer salesperson at a Radio Shack in New Jersey. Most people said computer sales is a good way to break into the field, although writer Alfred Lee objected: "It's

more like selling cars than hacking." That's true — employers aren't going to hire you to "hack" all day while customers stand around noisily clearing their throats. Sales may be the only starting point for many people (especially if you live in an area without many software development companies). You can get the job with little or no computer experience, and in just a few months you can walk away from it with two very valuable assets: some knowledge of micros and software and the word "computer" on your resume.

TECHNICAL WRITER

EXPERIENCE REQUIRED: Writing skills essential. Computer background helpful.



DEBORAH HIPPLE, BRODERBUND SOFTWARE PERSONNEL MANAGER:

Someone who's knowledgeable about the industry has a greater advantage. If you've been to one of the computer shows it really helps. Just knowing the difference between an Apple and a PCjr gives you an edge, but you have to be good at the basic job you're going to perform — writing.

If you have the writing skill to take something complicated and help everybody and her brother understand it, you may get work as a tech writer without any knowledge of computers at all. Because writing documentation often means communicating to business people, a background in business may be as valuable as computer experience.

The technical writer works closely with programmers and engineers, who provide information and check the accuracy of

what is written, and marketing people, who are responsible for seeing that the documentation is both accessible and appealing.

But let's face it — the more you know about computers, the better your chances. Visit computer stores, trade shows, and friends with computers. Read the magazines.

Writing documentation is not easy. One way to prove your writing abilities to a prospective employer is to rewrite a page or so of published documentation so that it makes more sense and has market appeal.

Tech writing jobs come in two flavors, staff and freelance. The writers I talked to agreed that for the person without experience, freelancing is best for breaking in. Most companies have only a few tech writers on staff and rely largely on freelance talent. Also, giving you a freelance job is a good way for an employer to test your abilities without too much commitment — a good point to bring up in your job interview.



PROGRAMMER
EXPERIENCE REQUIRED:
programming skills.

RUSS WALTER, from *The Secret Guide to Computers*: *To become a programmer, begin by studying BASIC, then move on to the other languages, which are yukkier.*

JOHN NOZZI (COMPUTER PROFESSIONALS INC.): *I think that learning BASIC first is a big minus, because it teaches you all the wrong ways to program.*

Since even entry-level programming jobs require skills, I asked for suggestions about how best to get trained. Everyone agreed that

to learn to program, you must first get your hands on a computer — buy one, rent one, or find a way to use someone else's. Maybe your local public library or high school has one. Perhaps you and a few friends can pool resources and buy one. Be creative, be resourceful, and if you still can't get your hands on a computer, take a class.

Many community colleges and vocational schools have microcomputer classes, most of which are best judged by how much time students get to spend on the machines. A class that offers non-supervised lab time, whether with one or several kinds of computers, is ideal. Find out what the student-to-computer ratio is (one-to-one is ideal, three-to-one is a crowd unless there are additional lab hours available).

Three topics are sure to start an argument in Silicon Valley: politics, religion, and which programming language is best. Robert Poor, technical coordinator for Stanford University's Computer Music Group, described BASIC as "the easiest programming language in the world to learn, but not necessarily the best one to learn first if you want to program for a living." Most programmers say that it teaches the beginner sloppy habits because it is so forgiving — you can structure your BASIC program inefficiently and it will still run. While this is great for quick positive feedback, if you go on to learn the more marketable languages (which are more difficult), you'll have to unlearn some of your BASIC habits. (Most of the people who told me this also said BASIC was their first language.) An easy-to-learn language that teaches you the "right" habits is LOGO (see page 82).

You can teach yourself LOGO in a short time, but it is strictly a learning language and not marketable.

PASCAL, a more difficult, more marketable language than LOGO or BASIC, is "hot" these days. Though it's not easy, some people say they learned PASCAL on their own with the aid of books. Other marketable languages are C — the language in which most UNIX programs are written, and an easy language for moving programs from one computer to another — and assembly languages. One step more understandable than the binary 0s and 1s of machine language, assembly languages are made up of cryptic three-letter commands that are different for each computer-chip family (the 6502, the 8088, etc.). Assembly languages are the most tedious to learn but the most sought after by employers, because the quickest and most efficient programs can be written in them.

Once you know a programming language, take a sample of your work to software houses or consultants, who often hire freelance programmers to help them adapt software for their clients. Doug Carlston, president of Broderbund Software, said they've hired both trained "academic" programmers and hackers who trained themselves; the hackers often work out better. Their job candidates are always interviewed by other programmers, who can ask, "Why did you include this command?" If the candidate answers, "To save three machine cycles of time," or something else that shows equal proficiency, the interviewers know they've found somebody.

Some programmers end up in staff positions; the ones who can, get out and sell themselves free-

lance. "The programmer-for-hire has got to advertise," said programmer/writer Erick Wujcik. "Put ads in the local stores that specialize in your favorite brand of personal computer. And don't neglect classified ads in the local papers, user's group magazines, and any other way that computer folks communicate within your area."

You can also try marketing your own program, but don't expect to have much time left over for programming if you do. The best guide we've seen for this is *The Complete Software Marketplace*.³

COMPUTER REPAIR TECHNICIAN

REQUIREMENTS: associate degree in micro repair or electronics, or work experience.



JOE FABIANI (APEX INFORMATION SYSTEMS): *When I hire a computer repair technician, he's got to know what he's doing. That's a hard thing to demonstrate, so we start by sitting him down and asking him questions. If we point to a PC board and he says it's a memory chip, we know we've got a problem.*

For this job you just about have to have formal training. If there isn't a school that offers an associate degree in micro repair in your area, some computer repair businesses will hire TV technicians and people with associate degrees in electronics and train them to repair computers. To find out which private technical schools are worthwhile, call repair shops and find out where the employees got their training. The demand is great enough that if you follow their example, you'll probably find a job.

If you're a gonzo electronics

tinkerer who loves to learn how things work by working on them, you might be able to convince an employer that you *do* know something about electronics. Being able to read schematic diagrams is a must, and having some knowledge of the "little" things that can go wrong (cables, faulty disks, power surges, and the omnipresent "short between the headphones") might get you the job. Computer store owner John Nozzi expressed one of the biggest complaints seasoned technicians have with those fresh out of school: "The first thing they do when something goes wrong is take the computer apart and scrutinize the schematics, when the *very* first thing they should do is check out the obvious, like, is it plugged in?"

BESIDES KNOWLEDGE and training, you need something else to be successful in the microcomputer industry. Tech writer David McDonald summed up something I heard over and over again: "Technology is changing so rapidly that one must feel comfortable taking on the unknown and picking it apart until it makes sense." **END**

1. THE SECRET GUIDE TO COMPUTERS: Russ Walter, 1984; \$14. Russ Walter, 92 Saint Botolph Street, Boston, MA 02116.
2. HOW TO GET THE DEGREE YOU WANT: John Bear, PhD, 1983; \$10.70 ppd. Ten Speed Press, P.O. Box 7123, Berkeley, CA 94707.
3. THE COMPLETE SOFTWARE MARKETPLACE: Roger Hoffman, 1984; \$14.95. Warner Books, Inc., 666 Fifth Avenue, New York, NY 10103.

LAST MONTH I COULDN'T SPELL "CONSULTANT" AND NOW I AM ONE

RICHARD DALTON:

Consulting is a funny job to have. The standard gag is that "consultant" is another word for "unemployed," and in fact, that's how many people get into it. Advising new or potential PC owners is a good area if you can get people to pay enough for your time invested (tough when they may only spend \$2,000 to \$3,000 for a personal computer); working with vendors is more lucrative but you have to demonstrate your "expertise" in some field.

Corporations hire bunches of consultants, particularly in the office systems area. The best consultants understand a good deal about the business work environment, organizational issues, and even facilities impacts.

Your biggest ongoing problem will be that so

much of your time goes to managing your own business — keeping books, doing your own gofering, marketing (keeping the pipeline full enough that you don't have two great months followed by three months of starvation). That's unglamorous.

To figure out what you charge, take what you want to earn annually, divide it by 100 (for 100 workdays a year), and then fudge it a little, since you probably won't work that much while getting started. If that equals around \$300 to \$400 per day, don't be surprised.

The last couple of considerations are how willingly you adopt risk as part of your life, and how you handle disappointment (when the big engagement you really need looks great at first, then falls apart). It's a way of

earning a living that can eat up workaholics, too.

JOHN FRANCO: If you can use a few of the more popular database managers, and can split a business problem into relations and files, then all you need do to find work is get your name out there. This is best done in conjunction with a local reputable computer dealer. Such dealers have to have more answers than they know how to get, which means they will happily share their burden with you, especially if they get a finder's fee of about ten percent.

I have done this type of consulting for the past five years — I started by teaching myself DBASE II — and my customers include local merchants and a few Fortune 500s. Their microcomputing problems are basically the same.

INSIDE

A quarterly compendium of trends, rumors, gossip and guesswork untainted by the rigors of objective evaluation.

by Richard Dalton

Shocking News: most people don't care doodley squat about computing. That's based on shoppers with glazed looks intercepted during a recent twelve-store tour of computer retailing. The salespeople are tired of dreaming up answers to the "what do I use the thing for" question, and expect the PC to make it obvious. Currently, that's like asking a microwave oven what you should cook.

There should be more "purpose-built" computers: PC's that do just one or two things really well, don't cost much, and (because they aren't built to do everything you can dream up) are simple to use.

Telecommunications, for instance, is a rewarding and currently difficult thing to accomplish with a PC. Why not a machine like the \$3000 portable Hewlett-Packard 110 (which has LOTUS 1-2-3 built in) that includes **just** the writing/communicating functions at one-third the price? Forget Lotus 1-2-3. How often do you crave a spreadsheet, anyway?

You could buy a writing/communicating machine, a math unit, a drawing system, or an organizing gizmo — each one optimized for the specific task. Not everyone wants to do all these things, yet we only get to buy personal computers built with the potential for all tasks. Doesn't make a lot of sense.

* * * * *

Big Controversy in home systems is MSX, the operating system developed by the Japanese firm ASCII, in conjunc-

tion with Microsoft. It's based on the aging (but reliable and cheap) Z80 microprocessor of CP/M fame plus a graphics chip with its own display memory that takes MSX way beyond the capabilities of CP/M.

So far, there's been more noise than action about this machine. Indeed, why do we need a throwback machine at this point? First, eleven Japanese companies (many of them biggies) support the standard. Second, the systems are cheap — \$350-400 for a system with disk. Third, MSX promises some access to the CP/M and MS-DOS software already available (not complete access, but some), at this remarkable price.

But there's persistent carping from U.S. industry observers that Japanese computer companies can't sell their products here. There's some truth to that, based on past history, yet the Japanese are a patient people and creative in the ways they find to endear themselves to the U.S. consumer.

One need look no further than TVs and stereos to see how that's true. In fact, look at TVs and stereos, converging now that stereo TV broadcasts are standardized, justifying the new modular TV systems that can be integrated with sound system components. How much more difficult will it be to add a processor, keyboard, and disk to these new systems? Anyone want to bet it won't be an MSX processor tucked into the boob tube?

It would save space to have a combined entertainment/information system and the shared electronics would make it a good deal cheaper, too. It would also be a near-ideal system to integrate video discs with personal computing.

* * * * *

First reports on Sinclair's new QL, the \$500 home computer with a Macintosh-like M68008 processor (well, not

"like," but close) indicate that the four programs included (writing, drawing, analyzing, and organizing) are quite good, the operating system needs more work, and the two integrated "Microdrive" tapes (100KB each) are slow.

That's OK, the QL won't be available in this country until the beginning of 1985, so the U.K. natives get to sort out the bugs. Overall, the QL looks like an outstanding machine, especially if the disk scheduled for later release is available, or the memory-expansion option (from 128KB to 640KB) is present for the U.S. launch. Remember, the base system is but \$500.

* * * * *

If you have been waiting to get an IBM PC or one of its clones, congratulations! IBM's recent 23% discount of the PC, now almost three years old, will send a wave of price cutting through that part of the market, as PC-compatibles strive to maintain their competitive price difference vis-a-vis PC.

Now IBM doesn't decide to give up 23 points of its gross to be benevolent to consumers. Historically, IBM has cut the price of a successful product for two reasons:

1. To crunch pesky competitors
2. To reduce inventories in preparation for a new product announcement — the fire-sale motive.

It's likely that both factors were behind this recent move by Big Blue. And I expect a PC II to roll down the loading ramp in the last quarter of this year. Also expected: the II will have a different operating system but will still be able to handle PC/MS-DOS programs and IBM's PC 3270 environment.

The latter machine is a key element in IBM's corporate sales strategy and it's working — recently, stockbroker Merrill Lynch ordered 15,000 of them, for example. IBM won't leave customers like that with an "obsolete" system. The PC

3270 is built to communicate with IBM mainframes easily and will become a sort of universal engine in corporate meganetworks, assuming the personalities of minis, communications processors, and even small mainframes with specialized boards. It's not a consumer product, but then the **Fortune** 1000 is where most of IBM's money comes from.

* * * * *

Small is still, nonetheless, beautiful — and expensive. Epson just released their Elf TV that fits in the palm of your hand and costs \$500. Ridiculous! you snort. Well, maybe, but its two-inch screen is the first commercial application of a **color** LCD display and an indicator of what may be included in the next round of kneetop portable computers.

* * * * *

New systems too late for review but worth a look (if you can find them):

- SHARP PC-5000: similar to the HP-110 but less elegant and \$1,000 cheaper.
- NEC APC III: another PC-alike, this time with much better graphics, faster processing, and a lower price from the company that is the third largest PC maker in the world. (Surprised?)
- EPSON PX-8: follow-up to the portable HX-20 (which was undergunned), with up to 184KB memory, a bunch of useful software (even if WORDSTAR is part of it), and an eight-line, 80-column LCD from the company with the weirdest model-numbering conventions in the business. Price not available but relatively cheap.

The First Funny Computer Game

Thor pauses before the third challenge of **B.C.'S QUEST FOR TIRES**. If he successfully jumps across the backs of four submerging turtles, he'll next have to duck an angry woman's club.



Don Ryan

B.C.'S QUEST FOR TIRES

Sydney Development Group; Atari 400, 800, 1200; Apple II, II+, IIe (48K). IBM PC, PCjr; Coleco Adam; Commodore 64 (64K). Joystick required. \$34.95 (disks); \$39.95 (cartridges). Copy-protected. Sierra On-Line, P.O. Box 485, Coarsegold, CA 93614; 209/683-6858.

CHARLES ARDAI: Up to now, humor in computer games has generally been relegated to a witty title or a funny plot; never before has there been as hilarious a game as **B.C.'S QUEST FOR TIRES**. The title is a parody of a none-too-highly-lauded film (*Quest for Fire*). The movie dealt with the sordid, squalid details of the day-to-day lives of Stone Age people; so does the game, but in a different sense.

You are Thor, unicyclist extraordinaire (like all the game characters, Thor is from Johnny Hart's comic strip

B.C.). The love of your life, the Cute Chick, is hundreds of miles away from you. Between you and her are miles of arduous terrain, treacherous rivers, dangerous logs, potholes, low-hanging tree branches, one Dooky Bird, a giant dinosaur, and a murderous Fat Broad intent on bashing your head with her club. But for the sake of the Cute Chick, you are willing to take this journey, relying on your joystick expertise to pull it off.

Chances are you'll spend your first few games just ogling the nearly cartoon-like graphics. (I played on the Atari; the Apple version isn't as crisp.) Then you'll get into the bouncing rhythm and move further into the game. The comic touches are abundant, the humor good and juvenile. **B.C.'S QUEST** will leave you rolling in the aisles.

Your Only Offense Is Defense

QIX

Author not credited; Atari 400, 800, 600XL, 800XL, 5200 (16K). Joystick, color monitor. 5200: \$32.95; others: \$44.95. Copy-protected. Atari, Inc., 1312 Crossman Avenue, Sunnyvale, CA 94088. 800/538-8543; in California, 800/672-1404.

MYRON BERGER: This game might be the only one of its kind: a defensive graphics generator. It is also a tease. For years, I resisted the arcade charms of *MR. and MS. PAC-MAN*, *ASTEROIDS*, *SPACE INVADERS*. . . and then I saw *QIX*. Today I am a candidate for a joystick-ectomy.

The game is simplicity itself. In the opening screen you see a rectangular frame with a player squiggle on the edge, a deadly spinning bundle of sticks (the Qix) in the center, and two killer squiggles in hot pursuit of your player squiggle.

The object is to move your squiggle within the frame. The squiggle draws lines as it moves, forming shapes. As these shapes are completed, they are filled with color (unlike the rapid coin-op version, the Atari 800 computer does this very slowly), and the area they occupy is credited to the player both as points and

as a percentage of the total area within the frame. The Qix cannot move within these captured territories.

As the player advances, the Qix moves faster and becomes more dangerous. Beginning with the third screen, there are two Qixes (Qixi?); you can double your points by drawing a line to separate them.

As the player, you have no offensive weapons. Movement is your only defense, containment and engulfment your only resource. When a screen has been completed, the reward is more than points and access to the next level: the playing screen becomes a colorful mosaic, a virtual Mondrian painting created spontaneously.

Pit Yourself against Pitman

PITS AND STONES

Russ Blake; IBM PC/XT, compatibles. 128K (192K for DOS 2.0). One disk drive. \$36.95. Copy-protected. Orion Software, Incorporated, P.O. Box 2488, Auburn, AL 36831. 205/821-5113; orders: 800/821-8088.

KEVIN STREHLO: At first, PITS AND STONES seems almost too primitive to run on a computer. Its tools are a few pits dug in the sand and a camel-leather pouch full of stones. What is not primitive is the built-in opponent named Pitman — a combination of artificial intelligence and nomadic savvy who can teach you the

strategy of this backgammon-like game.

The basic rules are easy, but it will take a long time to master the game's toughest level, dubbed "brutal." So if you can't beat Pitman, find a kid to play against, preferably one you can beat for a while. Although this triumph of human over human may not erase the indignity of losing to a stupid piece of silicon, for me it had to do.

Note to PC owners with monochrome screens: PITS AND STONES doesn't rely on dazzling graphics. It looks almost as good in monochrome as it does in color.

A Game That Lets You Be Yourself

HEROISM IN THE MODERN AGE

Keith Gross, Leong Song-Lit, and Chan Siu Chiu; IBM PC (PC DOS 1.0/1.1, 64K; PC DOS 2.0/2.1, 96K), PCjr, some compatibles; Apple II family. Two single-sided or 1 double-sided disk drives. \$58.95 (IBM); \$39.95 (Apple; Life Progress Cycle sold separately for \$29.95). Not copy-protected. Pacific Infotech Corporation 10850 Wilshire Boulevard Suite 800, Los Angeles, CA 90024; 213/470-7590.

KEVIN STREHLO: The plot of this adventure game: terrorists have kidnapped the president's wife, and unless you react they'll blow up Orlando, Florida. Interesting, but secondary here to the fine character distinctions.

As entertainment, HEROISM IN THE MODERN AGE succeeds. Its multiple-choice format takes some of the "Aha!" out of adventure, but leaves the "oopses" in: I blew up the state of Florida twice, and had trouble learning the alien's

secret before time ran out. Two hints: pounding the keyboard doesn't speed game response, and think twice before flying to Bolivia.

What made the game really stand out for me, however, was a separate module called the Life Progress Cycle. After pitting my complex spies against international terrorism, I built a character based on myself and ran him through a dozen three-year life cycles as honestly as I could. I watched myself make a respectable amount of money as a writer, but only at the expense of waning creativity and time with my spouse, who left me. I found myself scrimping on reading, exercise, and socializing; in response, my character grew duller, feebler, and less outgoing. Finally, I watched him die.

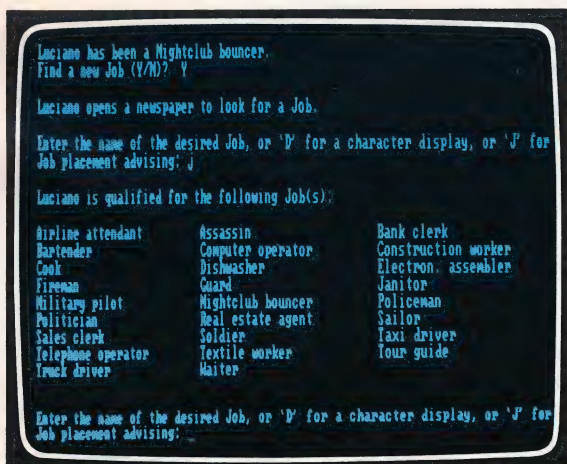
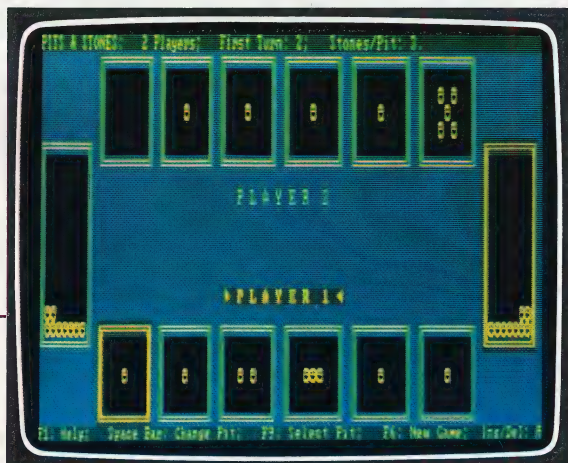
HEROISM, I admit, didn't turn my life around. But its scenario is fun, and the Life Progress Cycle made me think long and hard about my real-life character.



As you stretch the white lines to complete full boxes, they fill with color fast enough (you hope) to confine the spinning, unpredictable QIX to smaller and smaller areas.

Don Ryan

Those square areas are pits; yours at bottom, Pitman's at top. Stones move from pit to pit in prearranged patterns. If the last stone of your move lands in an empty pit, you capture all the stones in Pitman's opposite pit. Whoever captures the most stones wins.



You choose one of the program's built-in characters (like Luciano here) or create your own. Then you send them through the Life Progress Cycle. In this screen, having failed as a night club bouncer, Luciano seeks a new career.

Shoot'Em-Up Construction Tool

THE ARCADE MACHINE

Chris Jochumson and Doug Carlston; Apple II family; Atari. 48K. \$59.95. Copy-protected. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903; 415/479-1170.

JIM STOCKFORD: THE ARCADE MACHINE is a shoot-'em-up game you design to your own taste. The program is a collection of tools — which you choose as menu selections — that allow you to design a background scene and populate it with bad guys for your shooting pleasure. Fantastic, intricate, devious possibilities reflect the imagination and terminal sadism of the minds that have come to play in this workshop of destruction.

Anything worth doing is worth working at, so it will be no surprise that the program is complex — it's got to let you create three-dimensional simulations, elaborate graphics, boobytraps, smart bombs and, best of all, a cunning foe. Now that I've scared away the faint at heart, you dedicated killers will be relieved to know that the program is straightforward as well as complex. The menus lead quickly into the design areas, where you can create the landscape shapes and colors; the bad guys, their speeds, paths, and weapons; the accuracy required for them and you to destroy each other;

sound effects; numbers of lives for all concerned; and so on.

A couple of tips: as soon as you've got something you like, save it. Save things constantly. And use paper to keep track of the design of your game.

Broderbund has sponsored contests and prizes for THE ARCADE MACHINE game designers. Sample scenarios include a caveman scene with pterodactyls blasting away at you as you try to rescue ground animals. A cowboy-and-Indian setting sends predictable Indians to shower arrows on an unpredictably protective covered wagon, and innocent cacti sometimes sneak up to wreak destruction. In a Christmas scene a maniac Santa Claus flies overhead, raining explosive candy and presents on the population below.

Got a favorite holiday? A friend's birthday? Anything you'd like to see as a target? This program makes a great computerized greeting card, and the possibilities for boobytraps are hilarious.

STEVEN LEVY: ARCADE MACHINE is everything Jim Stockford promises, but I give two caveats. First, this game is geared solely for shoot-'em-ups. If you want to design those, this is your ideal palette. Second, THE ARCADE MACHINE's menu-driven methodology is not

Corporate Adventure Game

EXECUTIVE SUITE

Blair Bryant; IBM PC (64K), PCjr (128K). One disk drive. \$39.95. Copy-protected. Software Publishing Corporation, 1901 Landings Drive, Mountain View, CA 94043; 415/962-8910.

KEVIN STREHLO: Imagine a floppy-based, interactive *In Search of Excellence*. That's what EXECUTIVE SUITE sets out to be, and it manages to investigate one aspect of excellence rather thoroughly and entertainingly: how to succeed in corporate politics. If you can close your door and get your secretary to hold your calls, it's probably worth playing the game just to

see if you can nudge aside old Malcolm Farnsworth III and take over.

Should you go out with clients for drinks when your superior asks you to, even though you have a crucial report due that afternoon? The correct answer in EXECUTIVE SUITE is yes, because although it may hurt you slightly in the short term, in the long run who you know counts as heavily as what you accomplish, especially if you remember your friends later.

Whether you get fired or win advancement, you learn why, and some ex-



Two of the winners in a Broderbund contest for ARCADE MACHINE game designs: **SPACE PIRATES** by Lewis Mendez (top) and **BEACHHEAD** by Albert Lesiak (bottom).

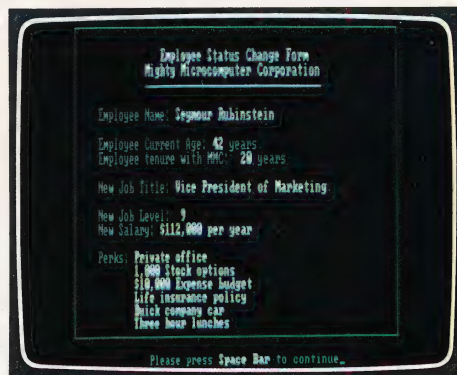
nearly as amiable as the ready-to-roll system on something like Bill Budge's **PINBALL CONSTRUCTION SET** (WESR Spring '84). Still, a nonprogrammer working conscientiously with **ARCADE MACHINE** can design one hell of a game.



planations may be surprising, particularly if you subscribe to a Japanese management approach. It may even surprise you that honesty most often proves to be the best executive policy.

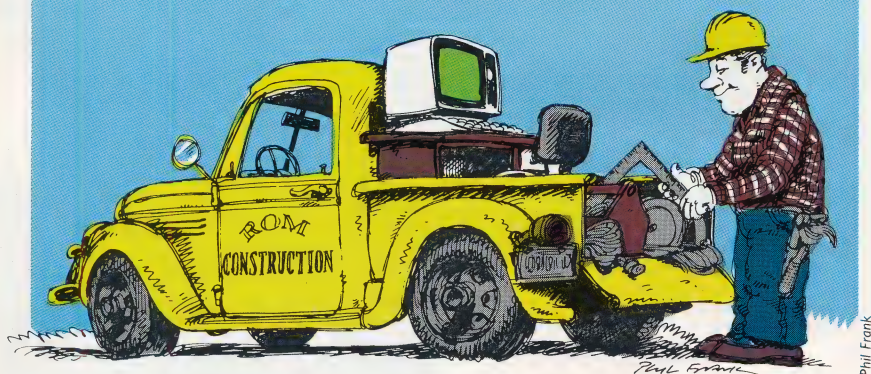
If your boss barges in while you're playing **EXECUTIVE SUITE**, you can press a function key to blank the screen. What, me play games on company time?

Each round of **EXECUTIVE SUITE** begins with this memo: your character's new position, salary, and perks.



When You Come to the Barnraising, Bring Your Micro

by Joe Troise



It wasn't all that long ago, actually. You gave the general contractor a set of plans drawn up by your architect, or maybe you picked something out of a catalog of standard tract homes. The design was unimaginative and not much concerned with energy saving. The contractor sat down, licked a pencil, made a few phone calls, and in a few hours or maybe a day handed you a single sheet of paper with twenty entries scribbled in. This was the bid. Everybody shook hands, many fingers were crossed (publicly and privately), and the tools of construction were put to work.

In 1984, with high-interest construction loans, soaring labor and material costs, and the demand for more sophisticated building techniques, it's clear that the use of footloose methods to design and build houses is risky business indeed.

Enter the micro. One could hardly think of a *better* application for the small computer than in the design and construction of buildings. Why is this so?

ART KLEINER: If you bought or ran a used car in the mid-70s, you might've used Joe Troise's two books: *Cherries and Lemons* and *Drive It Till It Drops*. More recently, Joe started working with computers, using a TRS-80 Model III to write on, and setting up micros for use by companies in the construction industry. Joe lives near our offices on the Sausalito waterfront; at our request, he assembled this first look at the best uses of microcomputers for building. More will come — especially solar and architectural graphics programs. We'll also start tackling other "vertical markets" for micro software — like law and automotive uses.

Because what the computer still does best is handle drudgery and detail, and there is plenty of both in the drawing of plans, the calculating of energy use, and the actual management of construction. Contractors, for instance, face myriad accounting, inventory, and cost-control problems that are considerably more complex than in most "blue collar" trades. For the architect, experimentation in design might be very satisfying, but correcting drawings is time-consuming and tedious. Then, too, the consequence of error is high. A concrete wall one foot too long, once hardened, is difficult to explain.

Micros are meeting the designer/builder on three primary levels: *construction management*, *solar design*, and *computer assisted design* (CAD). A huge number of programs serve these needs (with the usual varying degrees of competence), whereas a few years ago hardly anything existed on the microcomputer level. Those treated here are the best we've seen so far.

Construction Management Programs

If you're a builder grossing under \$20 million a year, a microcomputer can run your entire business for you with a degree of efficiency and accuracy unheard of with manual methods. Beyond \$20 million, a minicomputer (a small mainframe) would probably serve you better. This is doubly true if you run an interstate operation or plan a multiuser system. Micros simply do not yet handle those things well.

The construction-management programs on the market today vary widely in price, speed, and overall capability. Some, devised from larger mini or mainframe programs, are complicated, clumsy, inflexible, and heavily oriented toward accounting, which is often their strongest function. Our choices were written specifically for micros by programmers who are also contractors or who have worked with builders to develop the software. Some construction programs are suitable for the owner/builder or very small contractor only, and can't handle many complicated jobs efficiently. For instance, CP/M-based software I've seen thus far is frustratingly slow when applied to the needs of a busy construction firm.

Run Your Whole Construction Business

CONSTRUCTION MANAGEMENT SOFTWARE

Version 4.0. IBM PC/XT (PC DOS, 192K); Columbia, Compaq, and some compatibles (192K); TRS-80 models III and 4 (48K); 5¼" disk drive and 5MB hard disk. Dot matrix printer and modem recommended. \$5995. Not copy-protected. Small System Design, Inc., 1120 Oakdale Place, Boulder, CO 80302; 303/442-9454.

JOE TROISE: More than \$5900 for software?

Well, look at it this way. These 40 fully integrated programs represent a performance level approaching that of \$40,000 minicomputer systems of only a few years ago. They push the potential of the micro to impressive levels while controlling just about every facet of the construction business. In fact, the sheer size of programs like this often makes them difficult to review; however, I used this CONSTRUCTION MANAGEMENT package for a year while working with builders in Colorado. The software reflects

its on-the-job origins, having been tested and modified in collaboration with many local builders and developed in part by people who know how to swing a hammer.

The package is divided into three major components. The job-control programs generate bids (estimates, with adjustable labor and materials rates as well as variable profit and overhead costs), status reports (which can compare bids to actual costs), schedules, and four different methods of billing. The number of jobs you can keep track of is only limited by the size of your hard disk. The payroll programs keep all payroll and tax records, print checks to your em-

ployees, and feed all payroll costs to your individual jobs in the job-control programs. The accounting program (which, by the way, is not an off-the-shelf package bent to fit the construction business, but actually written ground-up for this particular application) controls your check register and payments to subcontractors and suppliers. Also featured is a full general-ledger system and a very good audit trail. The accounting programs also feed into your job-control programs.

The net effect of all this interconnection between programs is that every penny you spend is accounted for and incorporated into records and reports that logically interpret the data for you. This gives you an accurate assessment of the financial health of your business, and eliminates the hours of drudgery associated with equivalent manual systems. For instance, in a matter of seconds with one entry into the payroll program you print a check for an employee, calculate all the deductions, compute the

Wolff and Lyon, Architects



"Architractor" Tom Lyon built this house for himself in Boulder, Colorado. He estimated the retail costs, as if he were his own client, using the CONSTRUCTION MANAGEMENT programs. This spreadsheet section covers expenses; on other jobs similar spreadsheets help him put together bids.

Construction Cost Estimate

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	Materials	Labor	Base	Sub	Equip	Other	Total
BUILDING PERMIT	69.00	0.00	0.00	5,914.16	0.00	0.00	5,983.16
EXCAVATION BY MA	575.00	0.00	0.00	1,483.50	0.00	0.00	2,058.50
PERIMETER DRAIN	421.13	377.53	0.00	0.00	0.00	0.00	798.66
CONCRETE	3,875.50	2,874.54	143.75	2,300.00	0.00	0.00	9,193.79
PATIOS	262.20	278.37	0.00	0.00	0.00	0.00	540.57
WALL COATINGS AN	155.25	0.00	0.00	0.00	0.00	0.00	155.25
FLOOR FRAMING	2,593.00	2,269.29	23.00	0.00	0.00	0.00	4,795.29
SUB-FLOOR	832.50	415.83	0.00	0.00	0.00	0.00	1,048.33
PAINTING	2,976.20	2,773.11	0.00	0.00	0.00	0.00	5,749.31
NAILS & STAPLES	1,546.75	1,682.76	267.50	0.00	0.00	0.00	3,496.01
LANDSCAPING	0.00	0.00	0.00	10,350.00	0.00	0.00	10,350.00
	Materials	Labor	Base	Sub	Equip	Other	Total
Total Bid for Job -	69,514.76	38,072.50	895.85	76,549.46	0.00	0.00	185,032.57

tax records, add the payroll costs to the job or jobs where that particular employee is working, and automatically update your billing file.

Included in the TRS-80 version is a complete word-processing system (LAZYWRITER). No word processing is provided with the IBM package. Upcoming additions to both versions include critical path scheduling and a materials take-off function, both desirable in any construction software.

If you are a first-time microcomputer user, this package will be a bit intimidating. Small System Design offers excellent documentation (100+ pages) and support, but assumes that you can operate your computer already and that you

know accounting. Plan to spend two weeks to a month to get it running full tilt. You'll spend most of this time keying in all the tax and payroll data and, above all, cost information needed for estimating, such as the price you are currently paying for your materials and the labor rates of your junior and senior carpenters.

THE CONSTRUCTION MANAGEMENT programs offer no sophisticated graphics, hand-held mouse, or similar seductive gimmickry. They are straightforward, businesslike, and no-nonsense. This package is not an "aid" to your business. It literally runs the whole show, with you in the director's chair. Make damn sure you're ready for that before you buy it.

Quick and Clean Accounting

THE MASTER BUILDER

Version 1.0. Apple II+ (language card, 2 disk drives), IIe/IIc (extra 5¼" disk drive). \$800. Copy-protected. Omware, 140 High Street, Sebastopol, CA 95472; 707/823-7783.

KIRBY ODAWA: Whether you're a general contractor or a moonlighting handyman, THE MASTER BUILDER will become your most useful tool. It will balance your books, generate financial reports, create estimates, track job costs, and maintain your payroll records while you concentrate on getting the job done.

Although it is not a sophisticated accounting package, this program provides a simple system for recording payables (including subcontractors) and receivables (although you can't age them). More

excitingly, it can automatically update your job-cost records when you enter financial transactions.

You can create job estimates by entering the number and price per unit of up to 195 different items, then use your old estimates as templates for creating new ones.

Best of all, this program is as straightforward as a 16d nail. The screens appear as a series of questions or statements to which you respond, and always include explicit instructions about how to proceed. The manual is thoughtfully written, and includes helpful suggestions.

Unless you want to get fancy with your accounting system, this program will get you out of the office, fast!

Passive Solar Design

One could probably fill an entire *Review* with a listing of solar-design programs. Like construction management programs, they used to be the domain of mainframe and minicomputers, and for huge construction projects this is still true. The monstrous mound of numbers that must be crunched in energy calculations for skyscrapers, exhibition halls, or industrial complexes would keep a micro running day and night. But for modest residential and commercial architecture, programs like SUNPAS are worthwhile. Reviewer Bill Smith, based at the innovative New Alchemy Institute in Falmouth, Massachusetts, uses SUNPAS to help design and retrofit solar structures.

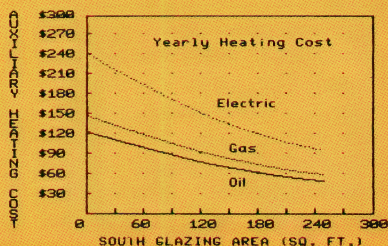
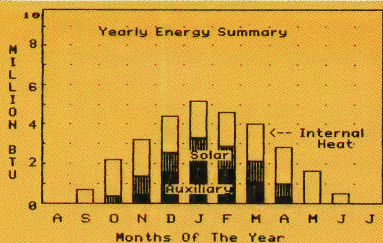
Will It Stay Warm in Winter?

SUNPAS

Version 4.0. Apple II, III, Lisa (64K, 2 disk drives); IBM PC/XT (p-System, 128K). Printer recommended. \$400. Copy-protected. Solarsoft Incorporated, Box 124, Snowmass, CO 81654; 303/927-4411.

BILL SMITH: SUNPAS fulfills a need faced by every solar designer: it will determine a building's energy performance (how much energy is needed to heat or cool the space inside it), and how changes in the design will affect its energy performance. SUNPAS is based on research done by the Los Alamos Scientific Laboratory, detailed in the *Passive Solar Design Handbook*. * This book presents the "Solar Load Ratio" (SLR) method of solar calculation, which has become the standard in the field. You can do these calculations with a hand calculator, but that method is tedious and error-prone and discourages experimentation. With SUNPAS you can redo an entire calculation in 30 seconds. To a designer, it is very satisfying to get immediate feedback on your ideas: you really learn how changes affect energy performance.

These SUNPAS-generated charts helped estimate (top) the energy needs and (bottom) how much glass to put in the south wall of a passive solar superinsulated house.



SUNPAS allows you to specify virtually any variable related to a building's energy performance. For any component you can vary the area (square footage) and the U value (the tendency of a material to conduct heat). For the entire building you can vary the air-exchange rate, internal heat gain, local climate, and average thermostat setting. Each solar collecting surface can be categorized as a sunspace (greenhouse), vented or unvented trombe wall, water wall, or direct-gain system.

Real-world constraints such as site, client preference, and budget often limit which systems are possible. Your primary use of the program may be to determine whether making any change is worthwhile.

Most of SUNPAS's shortcomings stem from inadequacies in the Los Alamos Scientific Laboratory study. The program cannot, for example, handle heat-recovery ventilation (air-to-air heat exchangers), and does not handle heat loss through basements very well.

SUNPAS contains climate data from 15 cities around the United States. Data for other locations is easily obtained, but must be entered manually.

Many similar programs give you tables of numbers to stare at, but SUNPAS provides lots of graphic output summarizing the data. Tabular data is available to accompany all graphs.

Don't expect to have this program up and running ten minutes after you get it, unless you have quite a bit of experience with solar design and thermodynamics. With a little practice and hard work, however, you can build with the confidence that the structure will need a minimum amount of heating energy, and will stay warm in winter and cool in summer. Certainly it is cheaper to make mistakes on computer printouts than to cast them into concrete.

*Passive Solar Design Handbook

J. Douglas Balcomb, et al. Volume 2 (1981; 428 p.) and Volume 3 (1983; 668 p.) \$44.50 each from Solar Energy Information Services, P.O. Box 19475, Sacramento, CA 95819; 916/739-1376.

Computer-Assisted Design (CAD) Programs

JOE TROISE: Faithful readers of the *Review* have already been introduced to CAD systems for microcomputers in the Summer '84 issue (#2), which featured AUTOCAD*, from AutoDesk Incorporated of Mill Valley, California. This program, definitely in the forefront of CAD development for the micro, already has about 1500 users, doing architectural, mechanical, and electrical design. With its new software enhancements, a complete hardware set-up, and a plotter capable of drawing full-size blueprints, this system costs \$15,000 - \$18,000, a reasonable capital investment, since AUTOCAD will do much of what systems costing five times the price will do (though not with the impressive speed of mainframe computers or true three-dimensional capabilities).

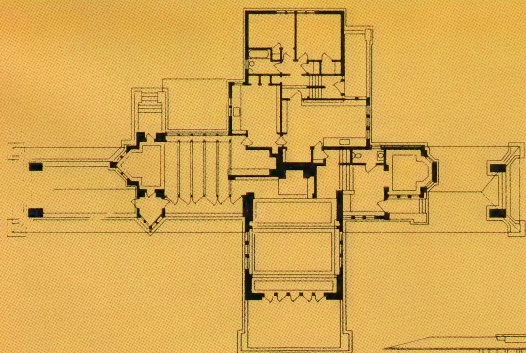
If you are currently an architectural draftsman, you might think about signing up for CAD training. A good CAD system can turn an architectural job requiring lots of repetitive or corrective drawing into an easy afternoon's work. As a pure design tool, however, no CAD system is an adequate substitute for human intelligence and imagination. (Did someone say "Wait'll next year"?)

Computer-assisted design may evolve the same relationship to drafting that word processing now has to typing. People who get used to writing on a computer find typewriters to be intuitively puzzling. The thought that one cannot simply make a line of type disappear at will or jump to some new place on the page jarringly contradicts the new reality that the word processor has created. The same may soon hold true for the movement of walls and windows.

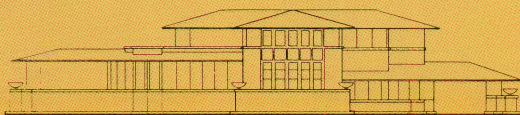
Bill Smith of the New Alchemy Institute is currently testing a lower-cost CAD system (about \$6000) called CAD-2†. It runs on Apple II+ or IIe, and is just appearing on the market. Watch for a review here soon.

*AUTODESK'S AUTOCAD: Information from AutoDesk, Inc., 150 Shoreline Highway/ Building B, Mill Valley, CA 94941; 415/331-0356.

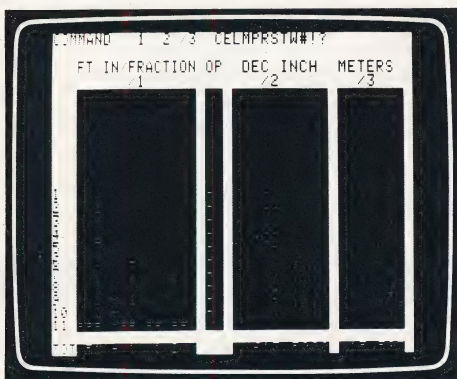
†ROBO SYSTEMS CAD-2: Information from Robo Systems, Chessell-Robocom Corporation, 111 Pheasant Run, Newtown, PA 18940; 215/968-4422.



AutoDesk put together this floor plan and elevation view of a Frank Lloyd Wright house to show how AUTOCAD can be used for architectural drawings. These images were traced with a digitizing tablet and printed on a plotter. Though it isn't used here, they could have added automatic crosshatching.



A Spreadsheet of Measurements



You type feet, inches, and inch fractions in the left column. EXACT DIMENSIONS gives you decimal equivalents (in inches and meters) in the right columns, and tallies them up at the bottom.

EXACT DIMENSIONS!

Version 1.0. Apple II family, Apple III; IBM PC/compatibles (MS-DOS). 64K, 1 disk drive, printer. \$79.95. Copy-protected. Aspen Incharge Corporation, Box 3203, Aspen, CO 81612. 303/925-3734 (information); 800/824-7888, x 175 (orders).

GREG MALKIN: For those who design or build things, I've found a great little item to add to your toolbox. It's called EXACT DIMENSIONS! and it's been very useful to me in my engineering work.

Imagine that you are building a house and need to calculate the length of a wall, taking into account doorways and other openings. By hand, adding fractions with mixed denominators is slow, boring, and open to error. With EXACT DIMENSIONS! this problem is as easy as writing down the measurements.

The program calculates with feet/inches/fractions, decimal inches, and meters. It will also automatically convert from any one of these formats to another. The display is spreadsheet style. As you enter or change figures, the total is continually updated. You can print out the worksheet and add notes and titles to provide a complete written record of the calculations.

The only limitation I found was the inability to save calculations on disk. The author says that the next version will have this feature.

THE "COMPUTERIZED ARCHITRACTOR" A New Breed of Builder

JOE TROISE: Take a general contractor who has architectural skills, add a micro and a totally integrated (as yet fictional, but not for too long) CAD, solar, and construction management software package, and someday soon you'll see a "computerized architector."

Here's a person who can operate out of a small-overhead situation while taking on a range of tasks that were unmanageable a few years ago. With accuracy and efficiency, one or two individuals can handle the roles of architect, draftsman,

estimator, expeditor, accountant, and project manager. Add a receptionist/office assistant, a job foreman, a small construction crew, and a loyal band of subcontractors, and you have a small business organization that can compete with much larger building and design firms.

John Wolff and Tom Lyon of Boulder, Colorado, already call themselves "architractors" and run their small design/build firm with the aid of an LNW (TRS-80 based) computer and Small System Design's CON-

STRUCTION MANAGEMENT SOFTWARE. In two years, the little "Hal" has become totally indispensable in cost control, payroll, and especially competitive bidding situations. With only two full-time employees, a low-rent office/studio, and a small, flexible construction crew, Wolff and Lyon are gathering awards, continually securing new clients, and producing far beyond what their size would imply.

The computer is no substitute for talent, but it's great for freeing it up.

RAM

Some remarks take on a life of their own in Random Access Memory.

ROSS PAVLAC: People think they will use windows to do several things simultaneously. What windows usually do in practice is act as a multiple place-holder (a thumb in a book) while you perform another task.

DICK BRUDZYSKI: My four-year-old won't touch quite a few educational programs. Nothing to do with a "time limit." Nothing with a "game" format. He seems to like the programs that I consider to be software for adults: PINBALL CONSTRUCTION SET, THE FACTORY, ATARI LOGO. One of the common threads is the ability to manipulate objects on the screen and put them together in new and different ways.

CHARLES MCGUINNESS: I hate the terms "uploading" and "downloading." If I say that receiving a file is "downloading," it sounds like my poor little micro is getting manna from CompuServe. Or when I "upload" a file, it sounds like the file has made the big time. These two terms represent a sort of mainframe snobbishness. Besides, in the more egalitarian transfers from micro to micro, who is "up" and who is "down"?

WOODY LISWOOD: I have recently discovered that LOTUS 1-2-3 does not always work with all printers. I cannot get it to work with a Brother HR-1, but the Brother works with all other software. You should never buy printers without seeing them work on your system in a normal mode.

WAYNE PENDLEY: Only 12 years ago the pocket calculator was a rare item. If you buy a four-year-old computer at used discount today, you will still be quantum leaps beyond the information power of the 1970s.

RICHARD DALTON: Analogy to cameras: We've got a lot of wizard Canons and Nikons in the personal computer biz, but very few automatic 35mm cameras (the kind that figure your shutter speed for you) and no Kodak Discs (which won't even let you put the film in wrong). Why is this important? Guess which categories of cameras sell best?

Word processing is still in the dark ages, fighting features jousts; telecom software is the electronic equivalent of Torquemada, and data management can only be discussed after a few drinks among very close friends. What should they be? If the camera analogy doesn't incite action, think of your humble telephone with the world's largest computers behind it, yet you contact the whole world with a few key taps (and no manual). What kind of software millennium has to happen before the Kodak DisComputer?

GLENN DIAMOND: You don't go to a new car showroom and tell the salesman that you'd like "a machine with four wheels, an internal combustion engine, and a roof over the passenger compartment." So don't tell a software salesperson that you want "a good spreadsheet." You'll end up with the most expensive item.

LOUIS JAFFE: Considering how many tens of thousands of copies of DBASE II Ashton-Tate knowingly sold to people unprepared for its complexity, they shouldn't be surprised if a number of those people decide to resell it, or to pass it around free to those who can figure out how to use it.

JAMES MCGEE: I use Ted Nelson's ten-minute rule for evaluating software: Start a ten-minute timer after you have a working diskette (which can sometimes be a 30-minute adventure all by itself). Granted that you may go far beyond this start, what can you do in the first ten minutes?

DARRELL ICENOGLUE: I'll hazard a guess that 80 percent of hardware and software reviews are written by people who don't know the product well, and haven't used it very long. My Mom used to tell me, when I began to get serious about a girl, "You should weather her through all four seasons." I wonder if there should be such a thing as a professional software reviewer, because I question anyone's ability to weather program after program through enough seasons to do an accurate review.

KEVIN KELLY: One of the most ignored (and unreported) grassroots phenomena in America must be computer user groups. If the same number of people showed up for peace or politics with as much regularity, devotion, interest, and influence, they'd be running the country.

ART KLEINER: I remember my vivid fascination with math as a teenager. Not school math — I never did learn what a calculus function was — but my own dreamy math, composed of relationships, as in the geometry of interlocking hexagons. This was a quiet, playful fascination that never found subsequent expression in my life but stayed dormant within me. I know, because it woke up immediately when I started playing with LOGO to help me edit this section.

In LOGO, I expressed relationships. Between shapes, at first. Then between those shapes and simple commands: Make a box. Move the "turtle" (the fancy name for LOGO's graphic cursor). Name your own command. Build it up out of other commands. I made processes that had to wait for cues from the audience (me) before they could spin themselves out. Then I related them to lists of words, like those I might have

LANGUAGES FOR THINKING

by Jim McCauley

LOGO IS A COMPUTER LANGUAGE DESIGNED FOR LEARNING. Like its antecedent LISP, LOGO accomplishes its tasks by manipulating lists of what LOGO people call "objects" — words, numbers, or even other lists. Lists can represent anything: databases, pictures, physical directions, music, or programs. List processors like LOGO can make programs that modify themselves while they are running, and thus act like living things.

Even more than most computer languages, LOGO is particularly appropriate for "thinking about thinking." To paraphrase Seymour Papert, one of the prime movers in the development of LOGO, the act of programming a computer often involves thinking very carefully about how the same

task would be carried out manually. The computer becomes a mirror of your own thought processes and the program a record of your problem-solving attempts.

Unlike many other computer languages, LOGO isn't picky about details: in BASIC or PASCAL, one must treat words and

entered into a database. I could have built a simple electronic Rolodex from nothing more than a dozen or so commands.

People wonder why kids like LOGO so much; after all, isn't it just a sugar-coated programming teacher? It seems more like a teacher of creativity; it's like elaborate doodles that can shift and respond. If they don't work right, LOGO invites you to toy with them until they do.

There's a bewildering variety of LOGOs. Whole Earth "Learning" editor Robert Scarola and I asked Jim McCauley, a deeply LOGO-scarred teacher trainer at the Santa Clara County Office of Education, to compare the different versions. With Pamela Sharp, an art educator with three years' worth of research on children's LOGO learning, Robert put together reviews of the best "Baby LOGOs" (p. 90), which introduce LOGO concepts to young children.

GERALD WEINBERG: Solving programming riddles is not what LOGO is about; LOGO is about trying out your ideas, learning as you discard those that lead to blind alleys, and the eventual exhilaration of finding *your own answer*.

ABOUT THINKING

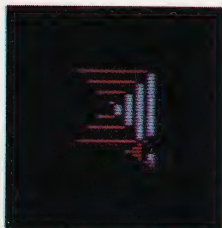
Eleven LOGOs Compared

numbers very differently from one another. LOGO allows these different types of objects to be mixed together in creative ways, but it also has good facilities for recognizing the necessary differences between them. A benefit of this relaxed approach to data is that you can begin to write interesting programs in LOGO almost immediately; there is no "threshold" of computerese to be crossed first.

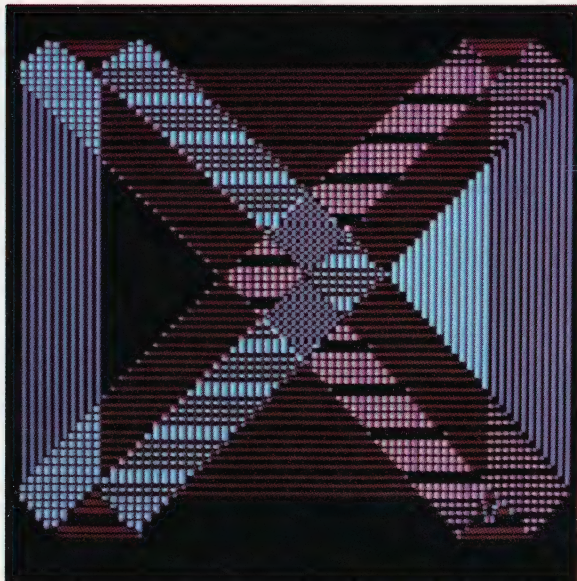
LOGO has built-in commands and functions (called "primitives") and you can also define your own (called "procedures"). Although procedures tend to run slower, you can use them to add features nearly

at will within the constraints of your hardware. All versions of LOGO reviewed here come with excellent full-screen text editors to help write and modify procedures.

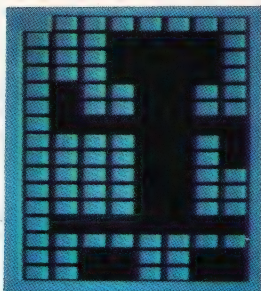
Originally developed on mainframes, LOGO has been available on micros for about three years. Each version takes advantage of the features of each computer it runs on. For example, COMMODORE LOGO, implemented on a micro with a special sound-generating chip, has a sophisticated music system. Thus (as with LISP) there is no "standard" version of LOGO, except for some common syntax and command names.



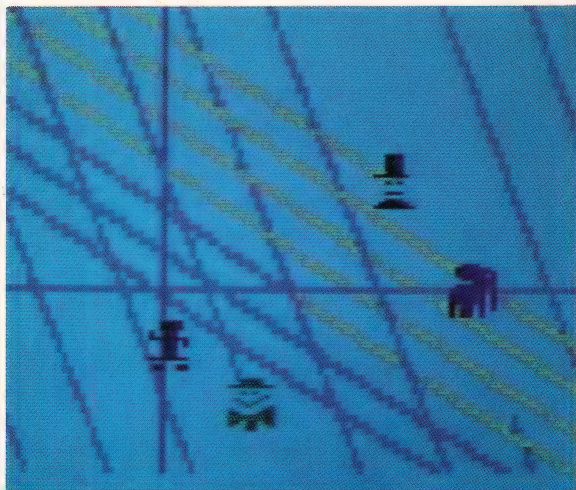
A simple turtle-spiralling program in APPLE LOGO created this complex pattern. Above, the turtle begins its path. At right, the same program after several dozen cycles. The program (called SPI) is:
 :STEP :ANGLE :INC (ask for numbers for distance, angle, and increase) PX (set the turtle to change the color of what it passes over) FD :STEP (forward) RT :ANGLE (turn right) SPI :STEP + :INC :ANGLE :INC END (add the increase to the STEP distance and start the program again). To run this pattern, you type SPI 1 90 2.



Robert Scarola



Sprites in ATARI LOGO, each paused momentarily on its colored path. We created the shapes on the grid at left (shown here: the robot), then colored and animated them with LOGO commands. They're all set to draw lines, but they could as easily be set to erase whatever they pass over. The robot and elephant perpetually travel their respective vertical and horizontal paths; the two hatted faces, moving diagonally, will overlay the screen with patterns if left alone.



Don Ryan

TURTLE GRAPHICS

By far the best known of LOGO's "microworlds," turtle graphics is LOGO's method of drawing. By issuing commands to an electronic "turtle" that can move on the screen, the user causes the turtle's multicolored "pen" to draw pictures. All current versions include very complete sets of turtle graphics commands and allow easy expansion of the language to include all kinds of drawings you define yourself. (They must be programmed as procedures, however; you don't draw freehand in LOGO as you would with a light pen.)

Because of hardware differences, the various LOGOs have different methods of controlling the turtle's colors. Changing pen colors in APPLE and COMMODORE LOGOs requires only a straightforward command like

SETPC 3, while in IBM PC and ATARI LOGOs you must specify not only the color but also which pen or palette is being changed. However, this complication is related to an advantage: ATARI LOGO offers three simultaneous pens, each of which can be loaded with any one of 128 colors.

SPRITE (MULTIPLE-TURTLE) GRAPHICS

Some LOGO systems can control more than one turtle. Usually this involves special hardware, which may already be built into the computer (Atari and Commodore) or may have to be added (SPRITE LOGO*). Only TLC-LOGO can generate an unlimited number of turtles in software (although the system slows down as more turtles are added). With

**Full program name: SPRITE LOGO for the Apple II family.*

LOGO FOR KIDS: START WITH SPRITES

BOB ALBRECHT: When people sell LOGO for use by young children, they're really selling turtle graphics — not LOGO's list-processing features. But turtle graphics can be implemented in any language, and has been in BASIC and PASCAL.

I believe turtle graphics is not the best way to introduce children eight years and younger to computers. Sprites are the best way. With sprites, multiple turtles, and a little bit of text, I would gladly give up all of LOGO's other features — the recursive power, the list processing — which even most LOGO teachers don't understand.

Unlike turtles, sprites are dynamic (they're sometimes called "dy-

namic turtles"). The static turtle lives in the central processing unit and waits for your command before it can move. Sprites live outside, in their own separate chip. You select a sprite, tell it what shape to carry, what color the shape is, what direction to move, and how fast to move. Thereafter, that sprite moves independently of anything else; you can sit there and write programs while all the 32 sprites (of TI LOGO) are going crazy on the screen. Sprites offer kids easy arcade-game action.

Too many teachers start out teaching turtles because "they're good for you." But most kids, given the choice, will opt for sprites instead, and will apply what they learn

about sprites to more formal turtle graphics later. In 15 minutes, I can teach a child who has never touched a computer to make sprites dance.

Only two inexpensive LOGOs offer accessible sprites. ATARI LOGO only offers four sprites, but it runs on a cartridge (thus not requiring a disk drive) and can detect when sprites collide. TI LOGO has 32 sprites but runs on a defunct computer, the Texas Instruments 99/44B. I don't recommend COMMODORE LOGO — its sprites are too difficult to program. I haven't evaluated LOGOs on the IBM PC or Apple II because those machines are too expensive for most kids.

several turtles you can simulate relationships between many moving objects — for example, the behavior of a predator and its prey. Each LOGO implementation allows for different numbers of turtles: Atari has four, Commodore eight, and SPRITE LOGO features 30. TLC-LOGO can handle six software turtles before things become unacceptably slow; unlike other multiple-sprite LOGOs, it allows you to type in new text reasonably quickly while each of the turtles is running its own program, instead of waiting for them to stop.

Each multiple-sprite LOGO has advantages and drawbacks. ATARI LOGO uses collision-detecting hardware built into the machine: you can arrange for specific responses whenever two turtles collide or when a turtle crosses a line drawn by one of the pens. Thus, getting two turtles to play tag in ATARI LOGO is a very different problem than in other systems. Unfortunately, ATARI LOGO left out a command that makes turtle-chases most exciting: TOWARDS, which points a turtle directly at another or at any point on the screen. You can add TOWARDS to ATARI LOGO, but it runs sluggishly. Meanwhile, ATARI LOGO and SPRITE LOGO let you set the speeds of moving

turtles. All of the multiple-turtle LOGOs let you change the turtles' shapes fairly easily.

WORDS AND LISTS

All the LOGOs have a fairly complete set of primitives — like FIRST, which hands off the first object on a list to another command like PRINT, which in turn prints it on the screen. Any missing functions can be added, but they will run more slowly; for example, in TERRAPIN and KRELL'S LOGOs you must write your own version of COUNT, which reports the number of objects in a list. ATARI LOGO is missing DEFINE and TEXT, which are useful in creating procedures that automatically define other procedures.

APPLE LOGO II sports some unique innovations: BEFOREP allows for fast alphabetical sorting, while UPPERCASE and LOWERCASE ease the task of changing capital letters to small and vice versa.

ARITHMETIC

In addition to normal arithmetic and trigonometric functions one expects in any computer language, IBM LOGO features some powerful mathematical tools: you can change the precision and format of numbers at will; natural

FOR PROGRAMMERS ONLY

JIM McCAULEY: In TLC-LOGO, like LISP, all procedures return some computed value automatically. All other LOGOs distinguish between commands (which "do something," such as move the turtle FORWARD) and operations (which "compute something" and produce a value). TLC-LOGO is

thus somewhat closer to mathematical notation than the others, which require an extra OUTPUT primitive when you define a function.

Traditionally, LOGO has been unsuitable for creating and writing data files. Only APPLE LOGO II, IBM LOGO, PC LOGO, and TLC-LOGO have

adequate facilities for these tasks, which are necessary to record information. APPLE LOGO, SPRITE LOGO, APPLE LOGO II, DR. LOGO, IBM LOGO, and PC LOGO have property lists, which are powerful devices for building databases. TLC-LOGO supplies a SMALL-TALK-style class system.


```
TO ANNOUNCE :FIRSTNAME :LASTNAME
PR [WE'RE HAPPY TO ANNOUNCE THE BIRTH O!
F]
PR (SE :FIRSTNAME "X. :LASTNAME)
PR [11 POUNDS 11 OZ]
END
```

```
?ANNOUNCE "ERIC "GEE\SILVERMAN
WE'RE HAPPY TO ANNOUNCE THE BIRTH OF
ERIC X. GEE-SILVERMAN
11 POUNDS 11 OZ
```

Making birth announcements in APPLE LOGO II. The first part defines the procedure ANNOUNCE; the second part runs that procedure for this list of words: ERIC, GEE-SILVERMAN.

logarithms and exponents are available, and a well-designed POWER function accepts fractional inputs (useful when generating musical scales based on the twelfth root of two). If you install the IBM PC's optional 8087 math coprocessor chip(2), Harvard Associates' PC LOGO is capable of very fast number crunching.

MUSIC

Simple music systems are available in APPLE LOGO II, COMMODORE LOGO, IBM LOGO,

TERRAPIN LOGO, and KRELL'S LOGO. These let you play one line of music with control over pitch and duration. COMMODORE LOGO also allows some control over the "envelope" (you can produce notes that come on slowly or fade away naturally). ATARI LOGO's music facility is the most elaborate; it allows all of the above, but also includes control over volume and distortion (handy for nonmusical sound effects for games) for two separate lines of music. ATARI LOGO can harmonize with itself.

WHICH ONE?

ATARI LOGO

Version 1.0. All Atari home computers (16K). Optional peripherals: 810/1050 disk drive or 410/1010 cassette recorder; Atari printer. \$99.95. Copy-protected. Atari, 1265 Borregas Avenue/P.O. Box 427, Sunnyvale, CA 94086; 800/538-8543 (in California, 800/672-1404).

COMMODORE LOGO

Commodore 64 (1541 disk drive). \$69.95. Copy-protected. Commodore, 1200 Wilson Drive, West Chester, PA 19380; 215/431-9100. If you are committed to Atari or Commodore, you have but one choice in each case. Fortunately, these are both fine implementations, with the added bounty of multiple-turtle control and sophisticated music systems. ATARI is the only LOGO available on cartridge; that makes it the price bargain, since it does not necessarily require the purchase of a disk drive (except to store programs on).

TLC-LOGO

Non-graphic version. All CP/M computers with Z-80 cards. \$100. Low resolution version. Kaypro 10, 2-84, 4-84. \$100. High resolution version. Epson QX-10, NCR Decision (color), Northstar Advantage. \$150. Not copy-protected. The LISP Company, P.O. Box 487, Redwood Estates, CA 95044; 408/354-3668.

Low resolution version. Kaypro 2-84, 4-84, 10. \$99.95. Deluxe color version. Kaypro 2, 4, 10, 2-84, 4-84. External monitor required. Includes color graphics board. \$299.95. Software alone: \$129.95. Board alone: \$245. Not copy-protected. MicroSphere, P.O. Box 1221, Bend, OR 97709. 503/388-1194.

TLC-LOGO comes in myriad versions. The non-graphics version has no turtles. Not recommended. The low-resolution version (100 by 160 pixels, or graphic points on the screen) comes for all Kay-

pros except the original 2 and 4. The high-resolution version (600 x 400 pixels) works on Epson and Northstar CP/M computers. NCR Decision and Kaypro owners can get it in color, but Kaypro owners will need the Microsphere color board.

IBM PC

DR. LOGO

Version 1.0. IBM PC (PC DOS), PCjr (PC DOS 2.1, 128K; B/W or color monitor). \$99.95. Not copy-protected. IBM PC/XT version (192K; IBM color graphics adaptor and graphics (RGB) monitor) \$149.95. Copy-protected (oh god!). Digital Research, P.O. Box 579, Pacific Grove, CA 93950; 408/649-3896.

IBM LOGO

IBM PC/XT (128K), PCjr (DOS2.1, 128K); 1 diskette drive. \$175. Not copy-protected. IBM Customer Relations, P.O. Box 1328, Boca Raton, FL 33432; 800/447-4700.

PC LOGO

IBM PC, PCjr (color monitor), most graphics-dependent compatibles. 64K (128K recommended); disk drive, graphics card. \$149.95. Not copy-protected. Harvard Associates, 260 Beacon Street, Somerville, MA 02143; 617/492-0660.

There are three choices for the IBM PC. DR. LOGO's requirement of 192K of memory stands against it, but a less memory-hungry version is being readied for market (we haven't seen it yet). PC LOGO runs in a mere 64K and will address up to 128K. IBM LOGO handles 128-256K. If you plan large projects in 128K, PC LOGO has the edge in usable workspace. IBM LOGO offers extra-powerful math; DR. LOGO has the advantage in debugging aids with its sophisticated windowing capabilities.

But LOGO beginners should make their choice based on documentation. DR. LOGO allows a quick and easy start; Harvard Associates' PC LOGO has a better-organized manual, but it's written for a more sophisticated audience. Like other products developed by Logo Computer Systems, IBM LOGO includes an excellent introduction to programming

through turtle graphics, but lacks any tutorial on programming with words or lists.

APPLE

KRELL'S LOGO

Version 1. Apple II, II+, IIe; Franklin Ace family (64K). \$89.95. Copy-protected. Krell Software, 1320 Stony Brook Road, Stony Brook, NY 11790; 800/24-KRELL.

TERRAPIN LOGO

Version 2.0. Apple II, II+, IIe; Franklin Ace 1000; Basis (64K; 1 disk drive, monitor). \$99.95. Copy-protected. Terrapin, Incorporated, 380 Green Street, Cambridge, MA 02139; 617/492-8816.

APPLE LOGO

Apple II, II+, IIe (64K; disk drive, color display). \$100. Not copy-protected. Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014; 408/996-1010.

APPLE LOGO TOOLKIT

Apple II, II+, IIe. Public domain; \$12.95. Copy-protected. Logo Computer Systems, Incorporated, 220 5th Avenue #1604, New York, NY 10001; 212/684-0710.

As usual, Apple owners face an embarrassment of riches. KRELL'S is inexpensive, but has scanty and shoddily-done documentation. For \$10 more, the essentially identical release from TERRAPIN is well documented. APPLE LOGO is reasonably well documented, has powerful workspace-management features, and (if you buy the additional APPLE LOGO TOOL KIT disk) contains almost exactly the same features as the TERRAPIN and KRELL'S versions. All three are well supported by independently published books.

The differences in relative power between APPLE LOGO (with APPLE TOOL KIT) and TERRAPIN LOGO are miniscule — choosing between them is a matter of style. I'd look at manuals for both and choose the most appealing. My own preference is APPLE LOGO, because I appreciate its more consistent (hence less confusing) syntax. On the other hand, the TERRAPIN documentation is more complete.

APPLE LOGO II

Version I. Apple IIe, IIc (128K; disk drive, color display; printer and mouse recommended). \$100. Not copy-protected. Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014; 408/996-1010.

If you own an Apple IIe and the extended 80-column card (which boosts memory to 128K) or an Apple IIc, you should get APPLE LOGO II. It's beautifully documented, has scads of workspace for huge projects (nearly as much as IBM LOGO), and includes a well-designed file system.

SPRITE LOGO

For the Apple II Family

Apple II, II+, IIe (3.3 DOS, 64K; color monitor recommended). \$299 (includes Sprite Logo board). Not copy-protected. U.S.A. and Bermuda: Logo Computer Systems Incorporated, 220 5th Avenue #1604, New York, NY 10001; 212/684-0710. Elsewhere: 9960 Côte de Liesse, Lachine, Quebec, Canada H8T 1A1; 514/631-7081.

SPRITE LOGO is a special and beautiful case — the most expensive (because it comes with its own Sprite board) and the

most feature-laden. It can do anything APPLE LOGO can do, and it has thirty turtles and more workspace. It is more darn fun than any LOGO I've worked with yet. I recommend it for people with a particular interest in computer animation.

Oddball Computer Multi-Sprite LOGOs

ART KLEINER: Though we haven't evaluated them, we hear there are two excellent LOGOs available on oddball (or, rather, incompatible) computers. The first is Radio Shack's COLOR LOGO, praised by Bob Albrecht in "Cheap Glory" on page 107 of this issue. The second is new; Coleco's ADAM LOGO. Both promise a plethora of sprites and both offer music. Worth checking out if you have reason for using either machine. Incidentally, the original microcomputer LOGO, TI LOGO, is still available from Triton Marketing (800/227-6900 or 800/632-4777) and it too has sprites; the computer it runs on, the Texas Instruments 99/4A, is defunct.

THE TROUBLE WITH LOGO

ROBERT SCAROLA: For would-be hackers and young computer scientists LOGO is the best bet. The computer is not just an abstract arbiter of events: the LOGO world responds concretely to each command as you enter it. (By contrast, in PASCAL, FORTH, or BASIC you must write the program first, then run it.) However, for some advanced programmers, there are several problems with LOGO, and it should not be their language of first choice.

1. For creating games

or other lengthy programs, you're probably better off with PASCAL or FORTH. LOGO is a high-level language that gives the programmer lots of help, but its syntax uses many K of RAM memory in order to be so friendly. Consequently, writing large programs is difficult (you see no commercial games or learning programs written in LOGO). LOGO itself is the game, and each LOGO user starts anew.

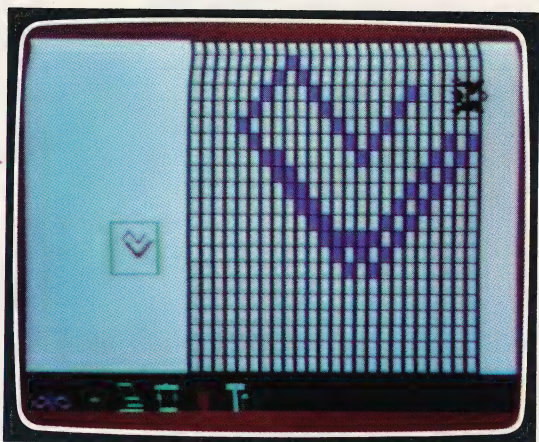
2. LOGO's inviting turtle is also its liability since many focus only on

this aspect of the language. As a result, very little documentation is available for the LOGO's list processing and more general-purpose computing aspects.

3. For more advanced programmers, LOGO's graphics language is more limited than others like GRAFORTH, which allows you to create, move, and rework three-dimensional images, offering much more realistic and functionally useful graphics and model building than two-dimensional LOGO can provide.

BABY LOGOs

The purple path represents a turtle's joystick-controlled odyssey in *TURTLE TOYLAND*. At left, the little icon representing this bit of movement; it mixes with other icons in the "toybox" to complete animated sequences.



Don Ryan

ROBERT SCAROLA: In the past year several software publishers have developed LOGO-like packages for children younger than nine years. These programs teach turtle graphics programming using simpler commands and procedures than those provided in the LOGO languages currently on the market (see pages 87-89). They strive to:

- create the "turtle" as a lifelike visual image;
- simplify the command syntax required to move/draw with the turtle (or replace it with joystick-based control of the turtle);
- make editing and getting help procedures as easy as possible;
- substitute picture menus for word menus;
- provide overlays of friendly and familiar formats for children to turtle around in (i.e., Spriteland, Filmstrips, Sketchpads, Playgrounds, etc.).

These programs all attempt to take a giant turtle step forward in the LOGO direction of reducing the distance between the abstract act of programming and the concrete act of drawing, in order to make working with the computer child's play. Some adults may find them a good first step, but most should jump right into regular LOGO programs, which move quickly beyond the graphics-oriented limitations of the "baby LOGOs."

TURTLE TOYLAND JR.

Commodore 64 (64K; joystick, color monitor). \$34.95. Copy-protected. HesWare, 150 North Hill Drive, Brisbane, CA 94005; 415/468-4111.

PAMELA SHARP: Turtle Toyland Jr. presents an (approximately) two-inch-high turtle, which moves in chunky steps that refine to more precise movements as a child's skill develops. The turtle is directed by joystick rather than keyboard. Children choose from menus of icons

(no words). In the Playground, they draw with the turtle. In Musicland, they write music. In Spriteland, they make shapes, and teach them how to move in Trainingland. In the Toybox, they combine all of the above into animated sequences of drawings and songs called Filmstrips. In I/O Land, they save and call up their work.

Making Filmstrips is creative, but leaves out a few essentials of LOGO. Instead of using language to describe movement to the turtle, the child moves

a joystick to make procedures called "dribble files," which have no programming form and can't be edited. TURTLE TOYLAND players may not understand that they're writing a program.

The software comes with a lively, colorful map of the Turtle Toyland and a clearly written manual full of icons and diagrams. Unfortunately, the manual is incomplete. Too much is left to the user to discover, and it's especially hard to get the joystick to work right. Still, this is the best elementary LOGO for nonreaders.

CYBERLOGO TURTLE

Apple II+, IIe, IIc; Apple III in emulation mode (48K). \$59.95. Copy-protected. Reston Computer Group, 11480 Sunset Hills Road, Reston, VA 22090; 800/336-0338.

PAMELA SHARP: CYBERLOGO TURTLE is essentially LOGO without the words and list processing capabilities of the "big turtles." In the place of those more advanced features, CYBERLOGO offers menus, an on-line HELP function and a special drawing program called SKETCH for the youngest of users. Single keys move the turtle forward or back, turn it, change the pen colors, or clear the screen. All the commands are listed at the bottom of the screen, along with a scoreboard to give the young artist an ongoing update of the turtle's position on the screen, in axis coordinates.

In the more advanced PLAYGROUND mode, the turtle responds to standard LOGO commands: FORWARD, RIGHT, and so on. The editing mode, called SCHOOL, is accessed through a menu or directly from the PLAYGROUND. The young programmer can call for HELP from the PLAYGROUND and from SCHOOL. HELP is a menu-driven, concise, clearly written manual on the screen. A debugging tool, STEP, helps young programmers get their procedures right.

ART KLEINER: Pamela Sharp wrote the manuals for both this program and the following one, TURTLE POWER. She claims objectivity nonetheless. More importantly, we've checked out both programs independently and recommend them.

TURTLE POWER

IBM PC/XT, PCjr (128K; disk drive; color display or TV). \$50. Not copy-protected. IBM Corporation, P.O. Box 1328-S, Boca Raton, FL 33432; 305/241-7624.

PAMELA SHARP: Because it offers almost all of the facility of LOGO except word and list processing, TURTLE POWER in the hands of an experienced child can be as challenging as any of the "big turtles." It is also one of the easiest LOGO turtle graphics packages to use, because of its menus, onscreen commands, on-line HELP, and general friendliness. You will also find an easy drawing mode that lets you fill shapes with color and a wonderful little motor function that drives the turtle around the screen.

Besides the easy drawing mode, TURTLE POWER has a standard LOGO drawing mode in which the turtle responds to single and multiple commands. Editing is done with a full-screen editor, and editing commands can be called into a window on the editing page if the young programmers need reminders. There's an on-line HELP menu available any time.

Because TURTLE POWER is written in PASCAL, another procedure-based language, it builds some habits of programming thought and invention that the other "baby LOGOs" do not — habits that youngsters who go on to professional or more "grown-up" programming may need.

TURTLE POWER has a full set of Turtle Graphics commands, but it also has this easy-drawing "sketch" mode. Shown here: the sketch menu and a simple drawing.



USING LOGO



MAKING SCIENCE

The crystal structure of a diamond, simulated with APPLE LOGO by one of Robert Scarola's students.

by Robert Scarola

LOGO CAPTURED MY ATTENTION because it promised to teach my students how to think. Traditional teaching methods had taught my students what to think. I wanted more, for me and for them.

My first introduction to LOGO's possibilities came through reading Harold Abelson's *Apple LOGO*. Abelson makes it clear that, unlike many computer activities, learning LOGO allows students to control the computer in self-directed ways. Through the manipulation of a moving point on the screen called a turtle (which responds to commands that make it move right or left, forward or back, leaving a trace of its path as it goes), students create original and sophisticated programs that do interesting things immediately. LOGO users learn, Abelson says, to combine commands into groups called procedures, and use these procedures as steps in other procedures, and so on to advanced levels of complexity. At once, students are elephant leaps beyond BASIC.

But it took reading Seymour Papert's book *Mindstorms* to really put me in touch with the revolution in teaching made possible by LOGO. Papert argues that, because LOGO provides students the opportunity to create motion and

changing shapes, it helps them to feel personally powerful: "The end product has the excitement of art, but the process of making it involves learning to think in terms of the actions and reactions of linked moving objects."

ART KLEINER: We're starting to see a few examples of this educational language LOGO being used to teach something besides programming itself. Turns out it's particularly suited to teaching patterns in natural science. Author Robert Scarola orchestrated this project while putting together the Whole Earth Software Catalog's "Learning" section; he teaches grades 1-6 in the alternative Pine Gulch School in Bolinas, California.

I was even more deeply attracted to LOGO after reading Papert. My students would no longer be force-fed "correct" theories; they would test the validity of theories themselves; they would learn to think.

So much for educational hypotheses. The question quickly became how to apply LOGO in the classroom. Papert clearly had in mind more than a mere change in pedagogy or technology. He was deeply questioning the idea that the most appropriate context for education is school. This kind of revolution is easier to write about than to make.

By August 1983, I had managed to get grant funding for one year to design a science curriculum based on computer software. Unexpectedly, in a short two months this project evolved into a determined effort to bring LOGO out of the computer lab closet.

I began in September with the idea that I could design and teach a science curriculum that somehow made use of what appeared at first glance to be a growing body of computer software developed to explore various concepts in science. I quickly discovered that most of this software was seriously flawed. It either offered graphic frosting on a cake already baked time and again by educational publishers, or it tried to represent, on the flat computer screen, the kind of tactile and sensory experiments or adventures that science students *must* have out in the real rock, dirt, plant, animal, machine world.

Two months later I realized I was no closer to producing something different for learning about science than when I began. Then one evening, rereading *Mindstorms* I came across this paragraph:

Although lip service has

been paid to the importance of science in society, the underlying methodology [of science education] is like that of traditional education: one of delivering elements of ready-made science to a special audience. The concept of a *serious* enterprise of *making* science for the people is quite alien. (p. 188)

Could I use LOGO to develop a curriculum "kit" for teaching science that would "make" science for students? Such a kit would have to be easily adoptable by the classroom teacher without a lot of extra work or preparation. It would have to encompass both the teaching of LOGO as a programming language and the relationship of the programming effort to the science topic. I decided to give it a try.

I would put LOGO in a context that did not erode its integrity as a learning tool, but applied it so that students would make their own science. This was more reformist than Papert's stated revolutionary goal for LOGO. Yet it was the only way I knew to move LOGO into the classroom, where it might have more direct impact on the way teachers teach and students learn.

I began with some broad goals:

- Throughout the kit the student must always be in control, not only of keyboard and syntax, but also of the ability to modify any procedure.
- While using the kit the teacher must not have hidden answers or assumptions steering the explorations of the students.
- The computer must be used as a tool to enhance understanding of the real world. The work with LOGO must relate substantially to field trips, hands-on experiments, and the like.

Next, I had to define the

Snowflakes designed with Apple LOGO. The branching patterns that created these snowflakes evolved from branching patterns of simulated trees and river tributaries.



scientific focus of the kit. Two books helped me greatly: *Discovering Apple Logo: An Invitation to the Art and Pattern of Nature*, by David D. Thornburg, and *Patterns in Nature*, by Peter S. Stevens. The central theme of Stevens' book is that similar patterns exist throughout nature — the Milky Way forms its swirls and spirals in a pattern not at all different from the way water spills down a drain or ferns form fiddleheads; the branching of trees, river tributaries, and arteries all closely resemble each other; crystal grains, soap bubbles, and the plates of a tortoise's shell all look alike. And all patterns in nature exist within the limits of nature's structural forms:

In the space at nature's command, five regular polyhedrons can be produced, but no more. Seven systems of crystals can be employed, but never an eighth. Absolute size decrees that the lion will never fly nor the robin roar. Every part of every action must abide by the rules.

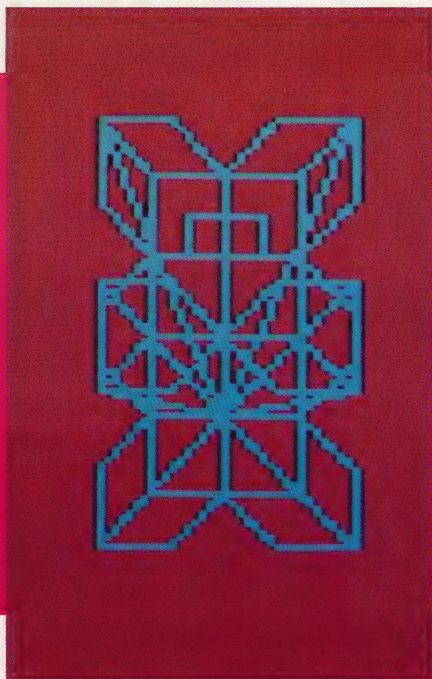
I decided to explore nature's dynamic interconnections, as

The branching patterns of trees, river tributaries, and arteries all closely resemble each other.

Thornburg suggests, through the geometric patterns and mathematical beauty in LOGO's turtle environments. Representing and simulating on the LOGO screen development patterns of many organic and inorganic natural systems in astronomy, geology, biology, and anatomy permits as never before a view of the dynamic interconnections of nature's structures. I discovered we could move from the broad perspective of galaxies and solar systems to the available world of landscapes, rocks, minerals, plants, animals, and machines, and end close to home with the body, nutrition, reproduction, bones, blood, and cells.

Over the following eight months, the kit developed into a

The children build their own turtle crystals. The younger children create crazy quilts; the older children methodically seek out the relationships of figures.



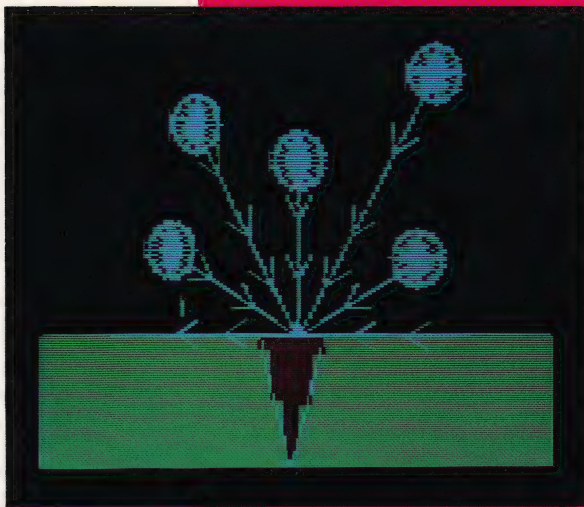
two-phase project. First, each week of the program encompassed some hands-on experience of nature: a star walk, a trip to a planetarium, growing crystals, building aquaria, planting a garden, constructing a model train set, cooking food, and so on. Secondly, I worked out assignments in LOGO that provided ways to replicate or simulate on the turtle screen the structures or growth patterns of each particular natural phenomenon. The final choice of what to do and how to do it was left up to each student and depended greatly on age (the students ranged from age seven to eleven), skill level, and grasp of the material. But in general, over the months as the topics moved from larger to smaller scale, from the inorganic to the organic, from stars and planets to microbes and cells, so the programming syntax and commands moved from the simple to the complex, from the isolated to the interrelated, from the fixed to the variable.

Salt crystals, grown in Apple LOGO. "We started with a crystal form (as in a cube)," said Robert Scarola. "Then the kids each developed a growth pattern of their own using LOGO."

The more students learned about the subtleties of nature, the more they learned about the subtleties of LOGO, and the more delicately they could represent the one through the other.

For instance: I begin in October with the study of constellations. Our class packs overnight gear for an evening of stargazing and campfires. We identify constellations, check their relationship with each other in the autumn sky, discuss myth and time, space and direction. Next day in the classroom we check star maps on the wall to locate and name favorite constellations and draw them on graph paper. We take our drawings to the computers, boot up LOGO, and, using the few commands the

Flower formation, created with Delta Drawing. The student created flower parts, then designed branching programs that grew these parts into a complete plant.



children know at this point, draw turtle star maps on the screen. As they work, the children become aware of the steps of the creative process. They must consciously decide what will be.

As the year progresses, we turn our attention to rocks and minerals. The children grow alum crystals. They look up the crystal formation in books. We spend an afternoon in the rock and crystal room of the California Academy of Sciences. We discuss how and why different crystals have different growth patterns. At the computers I tack up sheets with various crystal patterns on the wall. And the children build their own turtle crystals. The younger children create crazy quilts, one procedure sparking another. The older children are more methodical; they seek out the relationships of figures, write down their instructions, and build a series of procedures. To the more advanced I introduce the idea of variables. They love this new unlimited range. Suddenly changing one digit (by analogy, adding a new chemical to the solution) reveals an entirely new dimension of growth in their turtle microworld.

Each child plants a seed bed — eagerly handling dirt, seeds, and water — and then creates a separate, private landscape with turtle graphics.

On to plants. Each child plants a seedbed — eagerly handling the dirt, seeds, and water — and charts the growth of the plants over several weeks. I develop some procedures that create branches, leaves, and flowers. The children can modify them any way they wish (all but the youngest are now familiar with editing). Their challenge is to create a private turtle-graphics landscape by putting pieces together, much as they created their seedbeds. The landscapes come out as different as each child, as

Even robots operate according to perceivable, evident, controllable, programmable patterns.



unique as landscapes are in nature, yet all share a set of structural assumptions. By this time some of the older children are familiar enough with LOGO's syntax to think creatively in it. As ten-year-old Corio puts it, "You know the commands and you can type them in and see what they do. You don't have to have an idea before."

Towards the end of the school year we get a special bonus. I arrange a loan of an RB5X robot from RB Robot Corporation in Golden, Colorado. The robot has an uncanny resemblance to R2D2. I bring it out onto the school playground to cries of "Oh my God, what is it?" and "I thought it was a vacuum cleaner!" Thirty or forty children gather around, some looking nervously at the robot and each other, half-expecting to see Jawas and their 'droid collector appearing over the horizon. RB5X has a speech synthesizer, a built-in sonar detector, and a move-

The kids in Robert Scarola's class programmed the RB5X robot by pushing, in specific sequences, the large square white buttons on the side of its "torso." As with LOGO, the robot responded immediately to their instructions and played out the steps of their programs.

able arm capable of picking up light objects. Suddenly, our programming efforts bear directly on the real world. The children will write a program that will not only make a turtle move on the screen, but will make the robot wheel around the classroom and pick up an eraser, its LED lights blinking, motor whirring, arm extended. Even robots, these marvelous mechanical wonders of the late twentieth century, operate according to perceivable, evident, controllable, programmable patterns.

The point of all this becomes more and more obvious to me and the children. They solve LOGO programming problems (debugging) as they build patterns, learning how to think their way through to



The robot featured a programmable arm that could lift light objects.

Matt Heron

a goal. At the same time they achieve a direct, heartfelt sense of the way nature's patterns develop, and of the limitations of these patterns within the infinite possibilities of selection. Just as each crystal or plant is unique to its environment, so each program emerging from each child is unique to that child, despite the prescribed

set of structural forms he or she shares with others. Thus the children and I witness the world around us. We then mirror that world in a powerful LOGO microworld of patterns and structures that we control. Like Gods, we are able to establish the conditions of existence for an original replay of what nature has taught us.

APPLE LOGO: Harold Abelson, 1982; \$14.95. BYTE/McGraw-Hill, 70 Main Street, Peterborough, NH 03458.

DISCOVERING APPLE LOGO: AN INVITATION TO THE ART AND PATTERN OF NATURE: David D. Thornburg, 1983; \$14.95. Addison-Wesley Publishing Company, Jacob Way, Reading, MA 01867.

MINDSTORMS: CHILDREN, COMPUTERS, AND POWERFUL IDEAS: Seymour Papert, 1980; \$14.95. Basic Books, Incorporated, 10 E. 53rd Street, New York, NY 10022.

PATTERNS IN NATURE: Peter S. Stevens, 1974; \$12.95. Little, Brown & Company, 200 West Street, Waltham, MA 02154.

PROGRAM CREDITS

ROBERT SCAROLA: I taught my students on our Apple II+ and Apple IIe computers using APPLE LOGO. Some other versions of LOGO have features APPLE LOGO lacks (like the capability to easily call up preformed images called Sprites) that would have been especially useful for first-through third-grade children. And you can also get LOGO on Texas Instruments, Commodore, or Atari computers for less money than it costs on an Apple. (For comparative reviews of LOGO programs, see page 82.)

For first- and second-graders I introduced turtle graphics with DELTA DRAWING. Young children using it need only press one key at a time — D for draw, R for right turn, E for erase, and so on — to move the turtle. They can then write programs by simply pressing the number keys in order from 1 to 9, and the computer will automatically store their graphic creations as programs that can then be saved on a disk. They don't have to cope right away with the LOGO concept of retyping procedures in order to

save what has been created on the screen. DELTA DRAWING is the perfect tool for getting younger children into thinking about patterning and programming in a graphics microworld.

DELTA DRAWING: Version 2.0. Apple II+, IIe (48K; 1 disk drive, color monitor preferred); Atari 400, 800, 1200 (16K; cartridge); IBM PC, PCjr (64K; color graphics card); Commodore 64 (16K; cartridge). Cartridge versions \$39.95. Disk \$49.95. Copyrighted. Spinnaker Software Corporation, 1 Kendall Square, Cambridge, MA 02139; 617/494-1200.

The Best User's Guides

by Art Kleiner



Don Ryan

What do you want in a user's guide? I know what I *don't* want: a programming treatise. New computer owners need to learn how to use the computers — how to set up the cables, navigate the operating systems, purchase software and peripherals — but far too many so-called user's guides merely retell what you could find in any BASIC manual.

I also know I don't want a sugar-coated starter's book. I start learning a software package by pounding at it unaided; I hunger for reference books that tell, clearly and quickly, how to climb over obstacles as soon as I encounter them.

We culled these recommendations from several sources: the Computer Literacy Bookshop (see below) canvassed their customers and stock, we inquired on EIES, CompuServe, and CONFER networks, and we carefully examined the candidate volumes. In some cases — Macintosh, Commodore, Apple IIc, and IBM PC — we gave reviewers all the books we could find, and told them to come back with the best.

User's guides are a major industry in themselves. It's a shame: if the original manuals were any good, we wouldn't need them. As it is, I feel lucky to have them.

All books reviewed in this article are available from:
COMPUTER LITERACY
(see page 132).

GUIDES FOR COMPUTERS

The Best Commodore 64 Guide:

COMMODORE 64 HOME COMPANION

George Beekman, 1984; 359 p. \$19.95. Datamost, Inc., 20660 Nordhoff St., Chatsworth, CA 91311.

JUDITH LUCERO TURCHIN: It's relatively expensive — one-tenth the price of the computer — but worth it. George Beekman explains how to put the system together. He introduces BASIC programming, telecommunications, and software shopping. He reviews other

programming languages, hardware, and software (working, teaching, and playing), and wraps up by listing books, magazines, user's groups, and bulletin board systems.

Model 100's Best (So Far):

THE RADIO SHACK NOTEBOOK COMPUTER

Orson Kellogg, 1984; 118 p. \$8.95. Sybex, Inc., 2344 6th St., Berkeley, CA 94710.

JIM STOCKFORD: Easy to read and inspiring, this 120-page book is filled with tips and good advice. For instance, I had been killing files one at a time until I found a suggestion to get an on-screen list of files while in BASIC with function key one. There's an extensive list of software and hardware suppliers for the Model 100, plus a series of simple BASIC programs for printer formatting, drawing, order entry, and so on.

An Atari Compendium:

YOUR ATARI COMPUTER

A Guide to Atari 400/800 Personal Computers

Lon Poole, 1982; 458 p. \$17.95. Osborne/McGraw-Hill, 2600 10th St., Berkeley, CA 94710.

DAVID PELINKA (via EIES): The range of this book is astounding. It begins by showing pictures of the computer and peripherals and ends with a chapter on advanced graphics. In between are chapters on using a cassette, disk drive, and printer; and chapters on BASIC and sound. All sections have numerous examples, reference tables, and utility programs. Top this off with a compendium of error messages and keystroke codes, and you've got a great beginner's book, tutorial, and reference. Unfortunately, some of the hardware-specific info is out of date if you have an XL.

Best Apple Guide (With Reservations):

APPLE II USER'S GUIDE

For Apple II+ and IIe, 2nd Edition

Lon Poole, 1983; 482 p. \$17.95. Osborne/McGraw-Hill, 2600 10th St., Berkeley, CA 94710.

DAVID YU (via Computer Literacy): The book starts from the initial setup, intro-

duces simple programming concepts, and leads to advanced techniques. It gives a solid introduction to the disk operating system and programming in Applesoft BASIC and machine language, including graphics and sound. It's updated for the IIe.

ART KLEINER: Yeah (sigh), it's the best so far, but it's far too focused on programming. II+ and IIe owners deserve better. We've so far seen no good book that introduces the various Apple-compatible cards, peripherals, and operating systems, realistically appraises the purposes of each, and tells you how to set up your complete system.

Printer Help for the Model 100:

THE USER-FRIENDLY GUIDE TO LAP PORTABLES

Featuring the TRS Model 100 and the Olivetti M-10

Sam Redman and Michael Stanford, 1984; 208 p. \$19.95. Osborne/McGraw Hill, 2600 10th St., Berkeley, CA 94710.

ART KLEINER: We haven't seen this; it promises to cover what (amazingly) no other book has so far: hooking your Model 100 up to other printers or computers besides Radio Shack's own.

The Standard for MacBooks:

THE APPLE MACINTOSH BOOK

Cary Lu, 1984; 383 p. \$18.95. Microsoft Press, 10700 Northup Way/Box 97200, Bellevue, WA 98009.

DICK MacFUGETT: If the hardware interests you there are explanations of everything from how the disk drive, printer, and screen work to what happens internally when you start a program. If you're the creative type planning on doing your own programming, there's a chapter on BASIC and PASCAL. The main thrust, however, is how to use the MACWRITE and MACPAINT programs. Having this second source of information can be a big help when you're experimenting, or just plain stuck. The book is well written and attractive, and will most likely become the standard by which the many Mac books to come will be judged.

Cheap, Readable Ilc Book:

GOING PLACES WITH THE NEW APPLE Ilc

Danny Goodman, 1984; 251 p. \$3.95. Simon & Schuster/Electronic Publishing (Pocket Books), Rockefeller Center, 1230 Avenue of the Americas, New York, NY 10020.

CLIFFORD FIGALLO: Partially it serves as a promotional piece comparing the Ilc to other popular personal computers, but also as a combination computer primer, hardware description, and catalog of upcoming peripheral devices. No expansion slots to bother with, so no wild configurations to explain. Quite readable.

Superior for CP/M:

THE CP/M BIBLE

Mitchell Waite and John Angermeyer, 1983; 429 p. \$19.95. Howard W. Sams, 4300 W. 62nd St., Indianapolis, IN 46206.

ART KLEINER: CP/M's surface of limitations conceals tons of hidden tricks; for instance, the PIP command is often the best way to print a file (especially an incoming telecommunicated file). You can browse easily in this excellent book for the command you want, and always find examples of how to use it. The only thing missing: explanation of public domain utilities like D and SWEEP that make CP/M much easier to use. The sequel, *Soul of CP/M*, is strictly for programmers.

The nicest aspect of the CP/M BIBLE: its graphic design directs you quickly to the answer you want. The bold black titles, the blue screens with command examples, and the index tabs on the side of each page help you scan. There's also an excellent index.

A Painless Beginner's IBM PC Book:

THE PC DOS COMPANION

Stephen Murtha and Guy Petrie, 1983; 157 p. \$15.95. Howard W. Sams, 4300 W. 62nd St., Indianapolis, IN 46206.

SHARON RUFENER: This beginner's book will painlessly turn you into a computer literate. It provides a readable overview of the hardware and operating system scenery. For a conceptual perspective and basic understanding, this is the best, but expensive.

Best Detailed PC User's Guide:

YOUR IBM PC MADE EASY

Jonathan Sachs, 1984; 250 p. \$12.95. Osborne/McGraw-Hill, 2600 10th St., Berkeley, CA 94710.

SHARON RUFENER: If you're already literate, buy this book and become an expert. It's a good, thorough, well-illustrated owner's manual for both the PC and XT, covering hardware and use

Chapter 4



CP/M Versions:
1.3 1.4 2.0 2.2

Command Type:

Built-In

REN

SUMMARY

The REN command is used to rename files contained in the directory of a disk, and can be used at any time, regardless of the disk one is using. Once a file has been renamed, the new name will be stored on the disk until it is changed or the file is deleted. Only one file can be renamed at a time, as the REN command always requires a filespec with a specific file name. Wildcards cannot be used in conjunction with REN.

ACCESSING REN

RENAMING A FILE ON THE LOGGED DRIVE



To rename a file on a disk, a specific command format must be used. You might think that to rename something one would say the following: "Rename

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of the operating system. Many chapters have a "things that go wrong" section — very useful. Do you have printer problems (doesn't everyone)? There's a trouble-shooter's guide. How about AUTOEXEC and BATCH files to streamline your software? It's all in the book.

For Owners of Compatibles:

MS-DOS USER'S GUIDE

Chris DeVoney, 1984; 330 p. \$12.95. Que Corporation, 7999 Knue Rd./Suite 202, Indianapolis, IN 46250.

MAGAZINES

An Ongoing Series of Tutorials:

USER'S GUIDE

Tony Bove and Cheryl Rhodes, Editors. \$18/year (6 issues) prepaid. User's Guide, P.O. Box 5245, Redwood City, CA 94063.

ART KLEINER: This magazine tells how to use CP/M and MS-DOS operating systems and software. I don't read it when it comes in; I scan the contents page and put it on a shelf. Then when I have a problem with a program, I run to the shelf. Each issue is a compendium of nitty-gritty, clearly-outlined recipes for getting things done. I'd ask for a list of back issues and order from that.

Good for Finding Books:

COMPUTER BOOK REVIEW

\$15/year (6 issues). Comber Press, 735 Ekekelo Place, Honolulu, HI 96817. On-line (biweekly):

FREDERICK ZIMMERMAN (via CONFER): I read it while waiting for our Zenith 150 to arrive, and as a result was able to get things up and running with virtually no difficulty on a tight editorial deadline. Only two problems: it's MS-DOS generic, so some small details may not apply to your machine; and it was written for MS-DOS 2.0, so it's already out of date as a version 2.1 reference.



Don Ryan

NewsNet, 945 Haverford Road, Bryn Mawr, PA 19010; 800/345-1301 or 215/527-8030 in Pennsylvania.

KAREN HAMILTON: An excellent tool to help build any library of computer books. Each issue includes one- or two-paragraph reviews of many books, organized comparatively within a few specific topics. Each book is rated based on clarity, coherency, and cogency. Books range in level from juvenile to professional. Also available online (updated biweekly) from NewsNet, a newsletter-oriented online databank service for varying prices, depending on baud rate.



Don Ryan

PRAISE FOR MANUALS

(all via EIES)

PERFECT WRITER (Perfect Software; CP/M and MS-DOS)

AL LEE: Modularized, laconic, graphic, and easy to hold in one hand.
ART KLEINER: Better than the program.

MICROMODEM IIe/SMARTCOM I (Hayes; Apple II)

WOODY LISWOOD: Good use of illustrations. Class act!

ATARIWRITER (Atari)

DAVID PELINKA: Well done; provides a feature

GREAT BOOKS ON POPULAR PROGRAMS

The WordStar Favorite:

INTRODUCTION TO WORDSTAR

Arthur Naiman, 1983; 208 p. \$14.95. Sybex, Inc., 2344 6th St., Berkeley, CA 94710.

ART KLEINER: The best, everyone agrees, for harnessing this dinosaur. In our first issue, word-processing critic Peter McWilliams said he would've written his own WORDSTAR book but this one was so good he decided not to.

1-2-3 Sanity (With Disk):

THE IBM PC AND 1-2-3

James E. Kelley, Jr., 1983; 306 p. \$39.95 with disk. Banbury Books, 333 West Lancaster Ave., Wayne, PA 19087.

WOODY LISWOOD: If 1-2-3 drives you crazy with its multitude of commands and vast potential, this book presents the features along with samples on a disk of the functions. Among other things the disk contains a critical path project scheduling template; that alone makes this book valuable for the business user.

Clear dBASE Reference:

EVERYMAN'S DATABASE PRIMER featuring dBASE II

Robert A. Byers, 1982; 295 p. \$19.95. Ashton-Tate, 10150 West Jefferson Blvd., Culver City, CA 90230.

index and a quick reference card.

EASY SCRIPT (Commodore; Commodore 64)

FRED FALK: An example for almost everything, and easy to follow.

COLOR COMPUTER BASIC (Radio Shack)

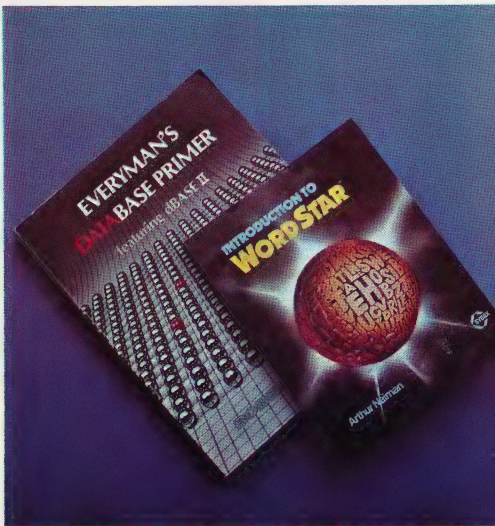
RICHARD DALTON: Any

eight-year-old, or even someone who's 30, can go through it and be writing simple BASIC programs in two to three hours, if they don't get hung up on the cutesy drawings. It's packed inside the Color Computer, and is also available separately from any Radio Shack store for \$5.95. A

wise purchase regardless of the computer you wind up with.

BUSINESSPAK + (Portable Computer Support Group)

JAMES STOCKFORD: Crystal clear instructions. A model for explaining to computer newcomers.



Don Ryan

TONY FANNING: The clearest book explaining dBASE II. It uses dBASE as an extended example while it teaches the basics of data management with simplicity and humor.

The First CompuServe User's Guide:

HOW TO GET THE MOST OUT OF COMPUERVE

Charles Bowen and David Peyton, 1984; 288 p. \$12.95. Bantam Books, Inc., 414 East Golf Road, Des Plaines, IL 60016.

ART KLEINER: Previous telecommunications books might skim over CompuServe in a dozen pages. These guys explain the system's arcane innards in detail (and only a wee bit too cutely). Somebody should do one for The Source.

A Beautifully Crafted Lightweight Computer

APPLE IIc

128K; ProDos. \$1295. Includes single disk drive. Optional: second disk drive (\$329), mouse (\$99), monitor (\$199), printer (\$299). Apple Computer, 20525 Mariani, Cupertino, CA 95014; 800/538-9696.

TOM ZITO: I'm writing this on an Apple IIc, the new little portable, which is no big deal unless you take into account that the IIc absolutely seduced me, a confirmed Apple cynic.

The first thing that struck me was the shipping box. It was printed in a screaming red color with photographs all over that explained how to hook up the computer. I could easily envision these things piled up in K-Mart's. The other smart thing was that the box contained everything needed to use the computer. The only other one I'd seen like that was Coleco's Adam. But much more software is available for the IIc than the Adam.

Once you open the box, you find a number of nice touches: The coupler that hooks up to your TV set is a beautifully crafted white plastic box that matches the IIc's finish. Ditto for the external power transformer. The box contains a set of four tutorial disks that explain everything you need to know about the IIc in particular and computers in general. I also obtained a mouse. There's been plenty of debate about the usefulness of a mouse. I've been using one for a long time now, on both an IBM PC and a MAC, and I wouldn't be without one.

The best test drive of the mouse I've seen on the IIc is a new version of ROCKY'S BOOTS. The program is supposed to teach kids some of the logical concepts involved in the design of computers, but is itself a fascinating formal voyage. Prior to this version, you had to use a joystick to pick up an object and move it around. This involved positioning the cursor over the object with the joystick and then using the fire button as a

toggle to grab and drop things. Essentially it meant taking a simple piece of human behavior — grabbing — and converting it into a complicated two-handed task, much as early digital watches required two human hands to tell time.

The mouse changes the whole routine: you slide over to the object, click ahold of it, and drag it where you want it. I challenge anyone to perform this maneuver and then say that joysticks or cursor keys are easier. I'm convinced there's nothing more natural than moving things around with a mouse, which was precisely what Doug Engelbart invented them for in the late Sixties.

The IIc weighs less than seven pounds. There's a single disk drive built into the right side, perhaps the most convenient thing about the machine. Unlike the IIe, or IBM PC, it has ports for TV or monitor, printer, modem, extra disk drive, and mouse — you don't have to buy extra boards to use these. There are also two little tabs on the top panel that change the configuration from 40- to 80-column and switch between a standard and a Dvorak keyboard arrangement. The keyboard itself is pleasant and easy to use. The touch is a bit light, much better than the keyboards on the old IIs.

The main problem is the single 143KB disk drive and the 128K of internal memory. Copying a disk requires a tremendous amount of juggling, as with the Mac. Anyone who has to do a serious amount of writing or storage will need an external disk drive.

On the other hand, most of the problems with the old Apple IIs seem to have been solved. Eighty-column capability is built-in, as are upper and lower case. The drive is quiet and seems reliable. And this little sucker certainly doesn't overheat.

The IIc is portable. It operates on 12 volts. Apple has a battery pack and a flip-up liquid-crystal display ready for fall



The basic Apple IIc — computer and a color monitor (not included in the price). The external power transformer and mouse are not shown. The disk drive is located on the right side of the computer; you can see the grey tab that ejects disks. On the screen: APPLEWORKS, an integrated word processor/spreadsheet/file manager that Apple introduced at the same time as the IIc.

delivery that will allow the IIc to go pretty much anywhere. There's been a lot of pooh-poohing of this in the stories I've read so far; the fact is that the machine really is luggable. I'm sitting on my porch as I write this, with a beer on the table next to the computer, watching the horses across the field. And I've found it easy to throw all the components (minus the monitor) into a briefcase and carry them anywhere.

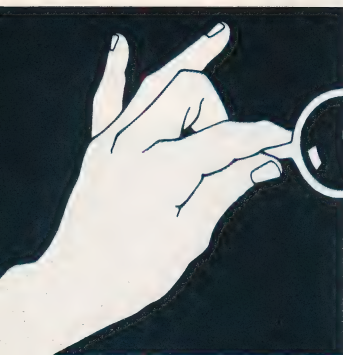
The monitor is perfectly adequate for a few hours of 80-column work; beyond that you might go bleary-eyed: there just aren't enough pixels on the display to support extended periods of 80-column work. My suspicion is that the IIc really should be used with a TV set in its 40-column mode. The most appealing thing about the IIc, beyond its looks, is the software available to run on it — all Apple-compatible software, much of it reworked for the IIc.

IIc is half the price of a similarly configured PC. And decidedly easier to use. I've been fooling around with a few

programs enhanced for the IIc: BANK STREET WRITER has evolved into a remarkably sophisticated word processor that utilizes the mouse in ways I've become accustomed to on the Mac. You can click the cursor on the command line to call most of the important functions, and use the mouse to mark for deletion, moving, or copying. It's amazing to see a computer with a chip that is technologically ten years old doing things that mimic the state-of-the-art Mac.

I'm not going to write a book with the IIc, because of its limited memory and keyboard, but I'd choose it over an IBM PC for letter writing, educational software, and game playing. It's reintroduced me to some extraordinary software that I lost track of after selling my original Apple II.

I have five computers in my office: an IBM PC, a IIc, an Atari 800, an Adam, and a Mac. For the last few months, anytime my kids come into the room, they gravitate to the IIc. I'm not sure what that means, but it means something.



Tom Parker

First Look

AT MACINTOSH SOFTWARE

ART KLEINER: The next issue of this magazine (in November) will no doubt be riddled with reviews of working Macintosh software, hopefully compared to software running on other computers. Right now (June), there isn't enough Mac software available to feature it prominently throughout the magazine. But there are pre-release versions of some packages, and early just-released versions of one or two. These preliminary reviews will help you make the decision of whether to buy a Mac. So far, in my opinion, only two Macintosh packages meet our "cheap glory" criteria and justify in themselves the purchase of this computer. Those are Apple's brilliant MACPAINT (by Bill Atkinson) and MACDRAW. More will come.

An Address/Phone/Date Jukebox

HABADEX

128K. \$199.95. Copy-protected. Haba Systems, Inc., 15154 Stagg Street, Van Nuys, CA 91405; 818/901-8828.

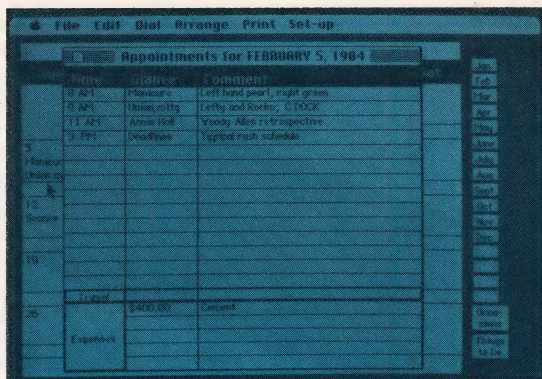
ANTHONY REVEAUX: A two-minute mouse attack gives a quick and clear idea of what HABADEX can do. With its electronic rolodex, you can call up a file of names, addresses, and phone numbers, arranged in whatever order you choose and rearrangeable with fluid ease. The date and time, driven by the Mac's internal clock, are displayed continuously. A year calendar expands (with a mouse-click) into a screen-calendar for each month, and each day in turn opens up to a page for appointments, including travel and expenses. Each time you return to the directory, a Next Appointments window displays your most imminent meetings and a Things to Do window nags you about your most pressing chores. There's

a page to register occasions like birthdays or anniversaries, and two read-only pages to check on zip and area codes.

If you pull down the print menu, you see an array of standard labels or your own custom-designed labels, and a mail-merge capability for sending form letters. With a promised \$50 HABADEX telephone adapter or with a modem (I haven't tested either but I know people who have), HABADEX will dial the phone for voice calls.

After working through all the capabilities of HABADEX, especially with the helpful manual, I found it a powerful, interactive information organizer with room for about 500 records (name/address files) per workdisk: enough for a boutique-scale small business or an active socialite, but far short of an extensive customer list, particularly since it can't spread the files of a single database across more than one

Three layers of HABADEX calendar, stacked atop each other, accessible by mouse. On top, your daily appointments; below that, your monthly calendar with the first two appointments for the day (note the box for February 5 at left). Mostly hidden, at right, are the keys on the main menu for selecting a new month. If HABADEX were less clunky, we'd be able to move the windows around on the screen and make this picture more comprehensible.



Don Ryan

disk. But HABADEX empowers the manager of any small social or political group, who can now keep track of people, sort them into subgroups, easily send out mailings, and dial selected

phones. When you have to call 35 people within an hour to cancel a meeting because the bridge is out, you'll still have time to play the piano after you and your mouse have finished.

ART KLEINER: HABADEX is cute and useful, and (perhaps its biggest plus) available. It feels a little clunky. We haven't yet seen what looks to be its major competitor, the ARTSCI MAGICPHONE. The main issue for both will be compatibility: you can mailmerge HABADEX with MACWRITE now, but will you be able to shunt your names into some unknown Macintosh file manager two years from now? Who knows? May be worth taking the chance.

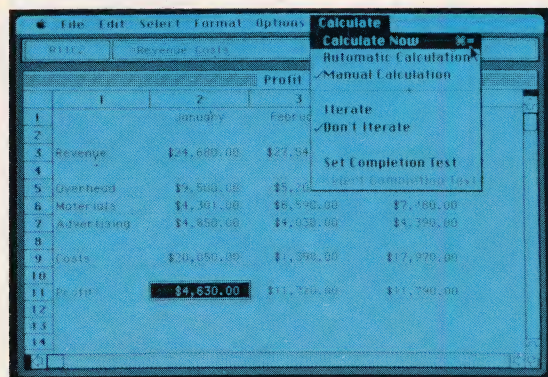
Click Calc

MICROSOFT MULTIPLAN

128K. \$195. Copy-protected. Microsoft Corporation, 10700 Northup Way, Bellevue, WA 98004; 206/828-8080.

MICHAEL COFFEY: MULTIPLAN, the first spreadsheet program for the Macintosh, makes the special features of this

computer pay dividends. The screen, for instance, is more legible than spreadsheets on most other computers, though most other computers can display more numbers at one time. The mouse works well for navigating around what could be a wall-sized spreadsheet, although it would be nice to have four arrow keys for moving short distances. MULTIPLAN



Don Ryan

MICROSOFT MULTIPLAN is shown here poised for calculation; you move around the spreadsheet and give commands by pulling down menus from the top of the screen. The black box at bottom marks the cursor; that cell's formula shows up in the window just above the spreadsheet.

handles files and printing in the standard Mac ways — clean and simple. The ever-helpful desk accessories (notepad, alarm clock, scrapbook) complement the worksheet nicely.

MULTIPLAN on the Mac should take a little less time than the several hours needed to learn most spreadsheet programs. The time savings come in the orientation phase, where most other programs ask you to learn function-key and control-key meanings; the Mac pull-down menus take over that work. The manual helps quite a bit; its design

follows that of the Macintosh and MACWRITE manuals.

MULTIPLAN has funny copy protection; you can copy most of the contents, but when you work with a copy, you must insert the precious "original" once to start the program. Microsoft sends a backup copy to customers who send a registration card and ten bucks. The company has already sent free updates to customers who bought an early version in which a bug was discovered. I used the updated version for several hours and didn't encounter any bugs.

Tools for the Draftsman

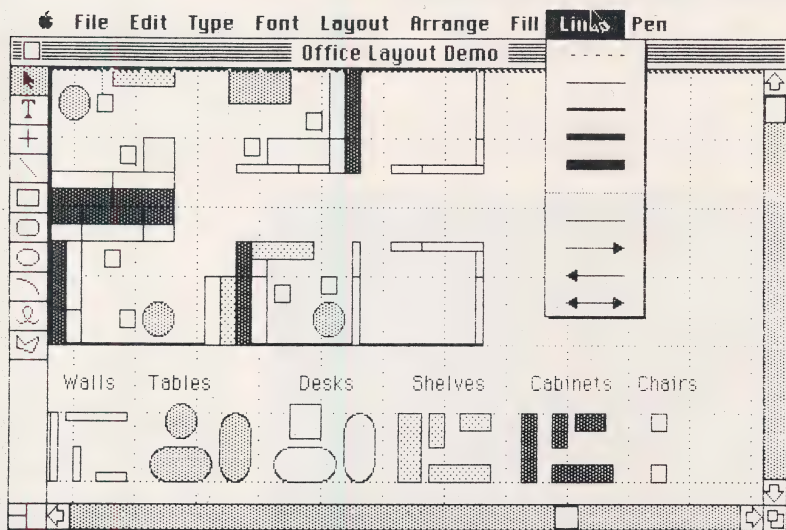
MACDRAW

128K. \$125. Not copy-protected. Apple Computer, Inc., 10260 Bandley Drive, Cupertino, CA 95014; 408/996-1010.

ART KLEINER: Folk-art researcher Tom Graves uses MACPAINT to reproduce Pennsylvania Dutch hex signs. He recently tested a pre-release (0.8) version of Apple's follow-up MACDRAW. This review covers the usable features in the

version he saw; the final version may be different.

TOM GRAVES: MACPAINT is for the artist but MACDRAW is for people who need to make technical drawings. Where MACPAINT presents you with a blank canvas, MACDRAW presents you with a sheet of blank "graph paper" (Apple calls it a grid). Instead of MACPAINT's full range of brushes, pencils, and spray cans, MACDRAW limits you to a pen which is available in several widths. MACDRAW's menu also includes



Printout from a sample MACDRAW file provided by Apple.

a small number of geometrical figures for shaping objects. You can select free-form drawing, free-form polygons, perpendicular lines, arcs, and text. As with MACPAINT, you can fill spaces with patterns, but there are only thirty-six pattern choices — some identical to MACPAINT, others different. As with MACPAINT, you can select, move, enlarge, stretch, shrink, and copy objects.

MACDRAW can also align objects to each other or to the grid. When aligning them to each other, MACDRAW matches the objects to the same contours. When aligning a drawing to the grid, you can change the angle of view. For instance, if you draw a building facade and want a bird's-eye view, line the drawing up with the top of the grid, and all the features will move so that they are in the proper relative position. You can then automatically adjust their relative sizes to compensate for the new perspective. You can then turn the grid off.

MACDRAW has its own ways of manipulating objects. You can round corners or straighten them out, change a free-form polygon into a free-form curvilinear form and back, reduce drawings or enlarge them. The screen shows a partial page at a time, and drawings may be constructed to fill up to five 8"×12" pages. The page breaks are normally shown but can be turned off. There does not seem to be the MACPAINT

FatBits function, which would allow you to modify drawings on a bit-by-bit scale, but you can copy all or part of a drawing into MACPAINT and work with it there.

Many technical drawings require measurements. With MACDRAW, you can select rulers which will appear across the top and left sides of the screen in the same manner as the cell labels of a spreadsheet. You can choose one or two different built-in rulers, or customize a ruler of your own, placing the "zero point" wherever you want it. As you move from page to page within the picture, the ruler moves with you. But you don't have to guess an object's size by comparing it with the ruler. Wherever you are, a marker line of the ruler shows your relative position. As you select items or change their size, MACDRAW flashes the new dimensions. But these object dimensions do not remain on the screen; you must re-enter them using the text function if the finished drawing requires labels. This is one shortcoming of the program.

As with MACPAINT, you can copy drawings to the scrapbook or save them to disk. You can print either the whole drawing or its first page (the upper left), a choice which will change habits; instead of putting all the labels and notes of a multi-page drawing in a lower corner as they do now, architects will begin putting their text boxes in the upper left.

The Most Compact Way to Macprogram

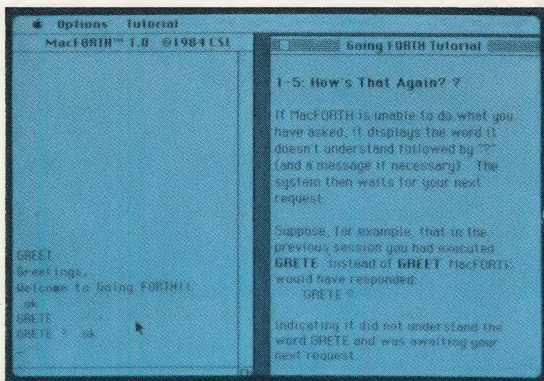
MACFORTH

128K. \$149. Not copy-protected. Creative Solutions, 4801 Randolph Road, Rockville, MD 20852; 301/984-0262.

JACK TRAINOR: This FORTH interpreter makes sense for the Macintosh. By design, FORTH is a compact language, and the Mac's 128K of memory is a tight squeeze after all the system software is loaded. MACFORTH has all the standard FORTH commands plus extensions for

most of the Mac's fancy features, and still leaves 50K of memory for your programs and data. Compare that with the 30K and 35K left by, respectively, Microsoft BASIC and MAC PASCAL. MACFORTH programs are likely to take up less space and run faster than their counterparts in the other languages.

Still, MACFORTH is FORTH — some love it; some hate it. I find MACFORTH much more pleasant to use than FORTH on older systems. For instance, the MACFORTH editor is the usual



Don Ryan

You can set up MACFORTH and its elementary tutorial in windows side by side, so that as you learn a new command you can try it out. Here, the tutorial shows what happens if you make a typing mistake.

block-oriented clunker standard on FORTH systems, but the mouse and cut-and-paste functions lend a measure of grace to FORTH editing.

The documentation tries hard, but remains frustrating. Too much information is scattered between the tutorials, reference guide, and glossary. I recommend keeping Leo Brodie's wonderful *Starting Forth* (WESR Spring '84, p. 97) nearby.

Once you're in the swing of

FORTH programming, though, MACFORTH is zippy. Just click the mouse to move between MACFORTH, the editor, and a separate window running your program. It's surprisingly easy to program your own windows, menus, and graphics — all responding to the mouse. There are things you can't do with MACFORTH LEVEL 1, such as adding scroll bars to your windows or programming dialog boxes, but overall MACFORTH has power, speed, and reliability.

An End to Old Programming Methods

MAC PASCAL

Pre-release version. 128K. \$124.95. Copy-protected. Apple Computer, Inc., 10260 Bandley Drive, Cupertino, CA 95014; 408/996-1010.

DAVID TAYLOR: MAC PASCAL is everything the hype claimed it would be. It's a programming environment that will allow a huge audience to participate in the art of creating algorithms. As a professional programmer (at MicroPro), I am convinced that MAC PASCAL will be a success.

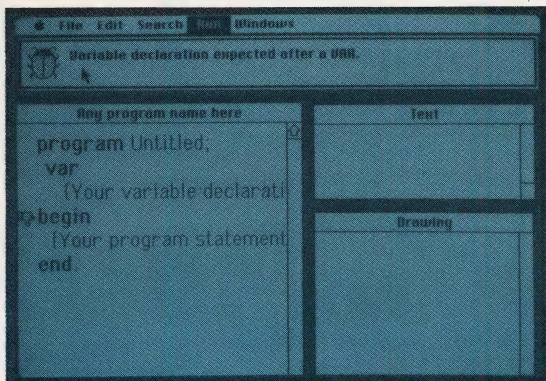
When you open the PASCAL disk from the Macintosh desktop, the three default windows are the Program window, where the program's source code is maintained; the Text window, which displays any text output from your program or any text received from the keyboard; and the Drawing window, which

holds your program's graphics output.

This arrangement allows you to type in or alter a program and immediately run it to see the results. That is all you have to know to start programming. All other implementations of this language require the programmer to know operating system commands, text or program editors, linkers, library managers, and debuggers.

As you enter your program's code, it is natural to try to format it for readability at the same time. However, you quickly discover that if you simply enter it without putting in tabs and spaces, it ends up looking good anyway, since each line is automatically "prettied" after the ENTER key is pressed. This process even highlights keywords like "begin," "enter," and "procedure." Thus you are always looking at easy-to-read codes.

A programmer would never see this screen; it shows what happens when you tell MAC PASCAL to run a program before you've typed in any program — you see the little bug at top left, informing you that you haven't listed variables yet. The main program window shows MAC PASCAL's option for large type; the two windows at right are for text and graphics that your Pascal program will generate.



If the PASCAL interpreter finds a problem with your code, a window appears with a picture of a beetle-type bug and an explanation of the problem. Point to the bug-picture and click, and the insertion point lands in the affected line. The error messages are usually helpful.

The most powerful feature of this language is its ability to use the famous Mac ROM routines as part of your own code, to help create graphics and use menus. There is also a complete library of binary floating point arithmetic routines called the Standard Apple Numeric Environment (SANE) — the first

such implementation on a microcomputer, able to compute results up to (says the manual): "9,223,372,036,854,775,807. This number is larger than the U.S. annual debt expressed in Argentine pesos."

Apple promises that a developer's version of this PASCAL will appear this year, allowing stand-alone applications. Until then, you can only run MAC PASCAL programs with the PASCAL disk in the drive.

My final reaction: sadness. Programming is so much simpler on the Mac that it surely spells the end for all the old methods.

Mac Magazines: One Handsome and Hot; One Free

MACWORLD ST.MAC

MACWORLD: \$30/6 issues, \$50/24 issues. PC World Communications, Inc., 555 DeHaro Street, San Francisco, CA 94107.

ST.MAC: \$24/year (12 issues); free trial subscription to Lisa and Macintosh owners in U.S. and Canada. Softalk Publishing, Inc., 7250 Laurel Canyon Boulevard, North Hollywood, CA 91605.

JAY KINNEY: Magazines devoted to the Macintosh, like the computer itself, are still so new that numerous changes are bound to occur in the months ahead. However, with six months under their

belts, *Macworld* and *St.Mac* — the two Mac-specific journals — have had long enough to show their colors.

Macworld, from the publisher of *PC World*, is a quality production throughout. Its premier issue gave such an intelligent and thorough introduction to the Mac that it rivaled — and in some cases surpassed — the user handbooks that come with the computer. The second issue of *Macworld* similarly presented significant tips for opening up file space on workdisks — key information that the user manual didn't specify. Helpful, well-written material like this makes *Macworld* the essential magazine

for Mac owners. Its clarity and non-techy approach also make *Macworld* an ideal introduction to this beguiling machine.

Macworld is also one of the most handsome publications on the newsstand, with a generous helping of Mac-produced art, crisp screen shots, and color photos.

St.Mac, from the publishers of *Softalk*, runs a distant second in appearance, information, and importance. Like *Macworld*, *St.Mac* has been somewhat starved for topics — with Mac software and peripherals and respective advertising appearing slowly, both magazines have

had a high proportion of editorial pages to fill. *Macworld's* solution has been to cover the basics and the initial software in copious detail. *St.Mac's* solution, alas, has been to fluff out their issues with mediocre articles only tangentially related to the Mac. Since *St.Mac* offers a year's free subscription to Mac owners, you might as well get it — a news/gossip section and Q & A column by Apple's Andy Hertzfeld do offer some helpful pointers. However, *St.Mac* will have to work hard to pull itself out of *Macworld's* shadow.

Local Hero Macs Good

MACTEP

128K; requires **MICROSOFT BASIC**.

Available on CompuServe Micronet Apple User's Group Special Interest Group (type **GO PCS-51** on CompuServe) and from some local bulletin boards. Information on CompuServe from: 5000 Arlington Centre, Box 20212, Columbus, OH 43220; 614/457-8600.

ART KLEINER: We've seen two pre-release versions of Apple's forthcoming telecommunications program, **MACTERMINAL** — looking good, but too incomplete to review yet. The only alternative we know so far is public domain **MACTEP** (TEP, I think, stands for Terminal Emulation Program). You need **MICROSOFT BASIC** (which we don't otherwise recommend) to run it. To store a phone number, you must fiddle with the **BASIC** code. It's limited — dials a modem, sends text, captures text — but easy to use.

It's recommendable if you know someone with a copy, or if you're willing to go through a fairly hacker-ish two-step process of typing in an abridged version by hand and pulling the full version out with that. No mail-order access for it yet; hence none listed above. No screen shot because it doesn't look like much; just the Mac's black nine-point New York font letters on a white background, scrolling past with your incoming text.

PHILIP ELMER-DEWITT: As I

understand the story, when Mac was first released, there was no way to hook it to a telephone line and no apparent way to write a terminal program. Apple had left it to Microsoft to write the necessary hooks into their **BASIC**, and Microsoft had left it to Apple.

One of the CompuServe Apple users, now a local hero, broke open his Mac, traced the wires, and figured out how to address the machine language stuff that controlled the baud rate. He wrote **MACTEP**, downloaded it into CompuServe, and the rest is history. Now whole packs of early Maccers are happily telecommunicating thanks to this selfless hacker, a gentle soul named Dennis Brothers.

DENNIS BROTHERS: In this age of bulletin boards, the base of public-domain software for a given computer doesn't begin to grow until communication software (preferably public-domain itself) is available for that computer. That's why I wrote **MACTEP**. Explosive growth of the software base won't occur until error-free data transfer is available. That's why **MACTEP** version 2 will include **XMODEM** and CompuServe transfer protocols.

Many dealers are giving away copies to sweeten the sales of the computer or modems. I've been offered **MACTEP** by two dealers in my area — that's a bit of an ego trip!

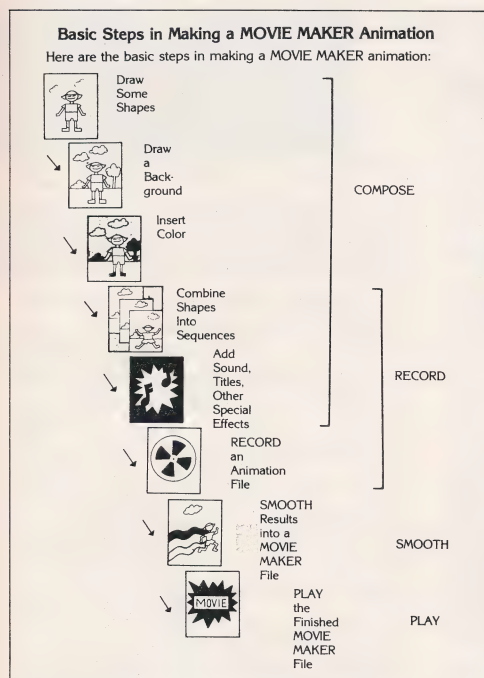
Cheap Glory

ART KLEINER: *This is one of the more loosely defined section headings you're likely to see in this magazine.*

Cheap glory is relative. For instance, the \$2800 Mindset computer qualifies — it provides graphic capabilities previously available only in computers costing \$20,000 or more. The \$200 Radio Shack Color Computer qualifies — as a first computer, for learning an easy-to-understand version of BASIC, or using an excellent LOGO. Good cartridge- and cassette-based programs qualify — they're typically half the cost of their disk-based equivalents. Great public domain programs qualify. Other programs qualify if they exalt an inexpensive computer into the best handler of that task: music on the Commodore 64, science experiments on the Atari, portable spreadsheets on the TRS-80 Model 100.

We want to locate the great inexpensive uses of computers (when linked with "glory," "cheap" is a compliment). Partly we're compensating for the (somewhat justified) criticism that we've concentrated too much on high-priced computing.

So what's your cheap glory? This section will appear regularly in future issues.



From the manual: the basic steps for making an animated sequence with MOVIE MAKER.

Not Donald Duck; Maybe Better

MOVIEMAKER

Atari 800/1200XL (48K; joystick). \$49.95. Copy-protected. Reston Computer Group, 11480 Sunset Hills Road, Reston, VA 22090; 800/336-0338.
ABE PETROW: Anyone who has had a course in animation will really appreciate this program. It takes time — there are too many features to learn in a week — but the manual is very good. This is a powerful program if you want to make short (five-second to three-minute) moving graphics with six layers of action over a moving background. You can put in titles and a four-musical-voice soundtrack. It offers zooms,

These dog images were provided in MOVIEMAKER's package, but you can easily draw your own or modify these (for instance, there's an easy way to stretch the dog out to double its length). Then you combine your images into an animated sequence.



Don Ryan

image duplicating, mirroring, and filling in shapes with colors or patterns. The graphic resolution (160 x 50) won't let you do Donald Duck, but with a little imagination and a lot of planning you can probably do something better. The basic program will keep you interested and busy for months, and a professional version is available on a licensed basis. At this time the program is only available

for Atari computers, and is reason enough to buy one.

ART KLEINER: MOVIEMAKER will soon be available for Apples, Commodores, and IBM PCs, so it may no longer be reason enough to buy an Atari. But it's the least expensive way to do relatively full-fledged animation — much easier and cheaper than drawing cartoon cells and shooting them in Super-8.

A Free Compact Calc

MINIVC

TRS-80 Model 100 (24K). Free to members of CompuServe's (p. 140) Model 100 SIG (PCS-154); membership in the SIG free to CompuServe members. CompuServe Information Service (CIS), Model 100 Special Interest Group (SIG), 5000 Arlington Centre, P.O. Box 20212, Columbus, OH 43220; 800/848-8199.

WOODY LISWOOD: A number of "calc" spreadsheet programs are available for the Model 100. When you compare price to features, however, the winner is the MINIVC program — a public domain program on CompuServe's Model 100 Special Interest Group. The cost is right: \$0.00 (not counting online time on CompuServe).

MINIVC has the right features. Its program is modular — you can omit any features you do not need. That is important for the Model 100's limited (32K) memory. With less code to store, you have room for more numbers and calculations.

MINIVC can calculate absolute values, integers (whole numbers), square roots, and averages. It can round to the



Don Ryan

MINI VC accepts text or numbers; you can't change the width of columns, but you can easily move data from one cell to another.

next greater number and do sums. The second module calculates minimum, maximum, pi, exponents, logs, tangents, and other goodies. It can also replicate formulas across the spreadsheet, insert and delete, transfer, and edit your data. By the time you read this, the CompuServe authors will probably have added more features to this effort.

One complaint is that the program shows you each cell that it addresses during recalculations, which takes a long time to do. Also, it's written in BASIC, thus slower than a machine-language program would be. And it doesn't have adjustable column widths. Other than that, no problems.

The Cheapest Terminals

COMMANDER ULTRA TERMINAL

Commodore 64 (modem). \$69. Creative Equipment, 6864 W. Flagler Street, Miami, FL 33144; 305/261-7866.

VICMODEM

Commodore 64, VIC 20. \$60. Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380; 215/431-9100.

GEORGE BEEKMAN: You can build a poor person's telecommunications package around a Commodore 64. The 64 has a responsive keyboard and a decent display (the 40-character screen width isn't ideal, but it's considerably better than the VIC's 22). Like the 64, Commodore's VICMODEM is a good tool with an amazingly low price. It's ready to work as soon as you plug it into the computer, and your phone's handset cord into it.

The VICMODEM comes with an adequate terminal program for cassettes, but it requires a cassette drive which costs as much as the modem. If you won't need a cassette drive otherwise, buy COMMANDER ULTRA TERMINAL.

It's cartridge-based and plugs into the back of the computer like a video game. It's set up to work as is, but allows you to change parameters and protocols easily to match unusual systems. The program displays an on-screen clock that tells you how long you've been online and lets you choose the display's color scheme and format. If you *do* have a disk drive or printer, COMMANDER lets you save or print your communications while they're displayed on the screen. Documentation is sparse but covers the most important points readably.

Assuming you already have a TV, you can put together a complete telecommunications terminal package with this program, a C-64, and a VIC-MODEM for about \$300.

ROBERT PURSER: Still the cheapest dumb terminal you can buy: a Commodore VIC 20 with VICMODEM. You can use either the cartridge program for \$19.95 or a cassette program that comes with it. It also comes with a terminal program in BASIC that you can key in. For \$140 you're up and running.

A Learner's Computer

RADIO SHACK COLOR COMPUTER

TRS-80 16K Extended BASIC Color Computer 2. TRS Color DOS, also runs OS-9. \$199.95.

TRS-80 64K Extended BASIC Color Computer 2. TRS Color DOS, also runs OS-9. \$259.95.

Color LOGO. TRS-80 Color Computer. Disk: \$99. Cartridge: \$49.95.

Radio Shack Analog Joystick #26-3012. Wico Joystick Corporation. Radio Shack Computers. \$39.95.

All of the above are available from: Radio Shack, 1700 One Tandy Center, Fort Worth, TX 76102; 817/390-3700.

The Rainbow Magazine. \$28/year US, \$35/year Canada/Mexico. Other countries \$65 surface, \$100 airmail. Falsoft, Inc., P.O. Box 209, Prospect, KY 40059; 502/228-4492.

ART KLEINER: Here's a guaranteed con-

troversial suggestion — the \$200-\$260 Radio Shack Color Computer. Radio Shack is scoffed at and hated for its incompatible systems, for closing its door to many software developers, and for (often) employing uninformed computer salespeople. But this reviewer, Bob Albrecht, invented teaching computing to kids and has practiced that arcane art with every beginner's computer since 1966. Now he heads a group of kids and adults who (in his words) "play-test" kids' software. He recently (and grudgingly) bought his first disk drive ever — for the Color Computer, to write a book about it.

Would I recommend a Color Computer over an Atari or Commodore? For young children, yes. To learn BASIC, yes. To run software? Probably not. If you

need a disk drive, you're better off with a Commodore or Apple IIc.

BOB ALBRECHT: We like the Color Computer. In the 22 years that I've used computers with kids, I've found no better machine for teaching BASIC to a beginner, because the programs are very easy to read and understand. (The Commodore is the worst for readability.) I can have a kid exercising control over the Color Computer — programming sounds or changing the screen color — in just one or two minutes.

What do kids who learn BASIC want to do? They want to make their own games, which requires random numbers. Let's say you want a random number between one and six. Here is the Commodore and Apple command: `INT(6*RND((0))+1`. On the Color Com-

puter, here's the command: `RND(6)`. The Color Computer's manual (see p. 103) is so good that many people don't need any other books.

The Color Computer community exists outside the normal world of computers. It has its own 9000 stores nationwide, its own literature, and its own magazines. If you look through *The Rainbow* (the best Color Computer magazine), you'll find more than 200 independent companies advertising products. There is a vast array of excellent educational software for all age levels from 2½ up.

The Color Computer has an excellent cartridge-based LOGO for children, with the emphasis on turtle graphics, in which you can have multiple turtles at the same time that influence each other

Musical Justification for Commodore

MUSICALC I

MusiCalc I. Richard Wolton. Commodore 64 (64K, one disk drive, monitor with speaker and cables). \$49.95.

MusiCalc 2 lengthens or prints MusiCalc I scores in notation, syncs to drum machines. Requires Commodore 1525, Gemini 15 with Cardco A Interface; Epson MX-80 or other printer. \$39.95.

MusiCalc 3 same requirements; \$34.95; **Template 1, African/Latin Rhythms**, \$24.95; **Template 2, Rock and New Wave**, \$24.95. Waveform Corporation, 1912 Bonita Way, Berkeley, CA 94704, 415/841-9866.

JAMES STOCKFORD: Computers are gradually becoming musicians' helpmates, but progress has been measured in small, faltering steps. When the Commodore 64 computer arrived, it promised enormous musical possibilities with its three electronic chips, each a self-contained, virtual music synthesizer. Normally, three synthesizers in a computer-controlled configuration represent many thousands of dollars. To get that combination in the Commodore 64 for \$200 — what a promise!

What a half-promise! The hardware capability had no easy software access.

The only way to make the instrument sing was to learn programming. So experienced software developers have gradually brought forward their interpretations of the software tools that musicians might want. With one recent exception, none of those music programs offered extensive, easy control over those wonderful Commodore sound chips. The exception is a breakthrough called MUSICALC.

MUSICALC presents on the display screen the image of a bank of slide controls and switches that monitor and manage each of the three sound chips' voices. All of the voices' characteristics — pitch, tone, and so on — are controllable from the keyboard in real time, which is no small programming accomplishment. This means you can change any aspect of what you're playing, as you're playing. You can construct each voice from a variety of waveforms or from a noise generator.

The program loads 32 sounds and 32 different song patterns, each of which can be composed of from one to three voices. You can change sounds and



We recommend this configuration of the Radio Shack 64K Color Computer — no disk drive, no cassette deck. All you should add is your own color TV, a cartridge version of BASIC or LOGO, your programming wits, and the Color Computer BASIC manual.

(which most LOGOs don't allow). It also has good software for kids and simple spreadsheet and file-manager programs. Most of its software is available on cassette or cartridge.

It's duck-soup simple to get a Color Computer expanded (at any Radio Shack store) or fixed (but we've never had one break down).

Instead of the lowest-priced 16K Color Computer, get the 16K or 64K Extended-BASIC versions. That extended BASIC is akin to Microsoft BASIC on the IBM PC — very different from Applesoft or Commodore BASIC. Powerful, easy-to-use commands, built into the language, can do graphics on the 16K machine that would require a 64K Apple. Music capabilities are also good.

One warning: the Radio Shack-brand joysticks are useless. They don't center themselves when you stop moving them. Either get your joystick from the cottage industry or buy Radio Shack's WICO joystick for \$39.95.

song patterns slightly or entirely by accessing menu options as the song progresses. In other words, with MUSICALC the Commodore 64 becomes a bona fide musical instrument that allows you to make the same noises as someone with three separate music synthesizers.

So why was I mad? I'm an experienced musician, knowledgeable in both electronics and computers, yet I had a complete fit the first time I played with MUSICALC. I found the user's manual terribly frustrating. The large center section that lists and describes features alphabetically is great, but the step-by-step tutorial is very long and nearly impossible to get through. One wrong key and you're lost.

When I called the manufacturer for help, I got a terrific response. Not only did they not make fun of me, they gave me a wonderful, clear brochure that spells out the basic procedures. That little brochure has now gone out to all registered MUSICALC owners. I am slightly embarrassed to confess that I now find the program quite easy to use.

Nonetheless, MUSICALC is complex. It has many menus, a very large set of commands, and nine external pro-

grams including disk housekeeping, tuning to other instruments, transposing scores, custom programming access, and so on. A file manager or word-processing program this complex would cost hundreds of dollars. I know a musician who is considered on top of things — he spent days working on MUSICALC and still doesn't have it all down.

ART KLEINER: MUSICALC I is the

MUSICALC displays a picture of a synthesizer console you control from the keyboard. The large, lined square on the right serves as a racetrack that shows the progress of each voice through the composition.



Waveform Corporation

basic program. To print out, lengthen, or synchronize scores, you need MUSICALC 2. MUSICALC 3 offers 96 musical scales and lets you remap your keyboard. They

also make two templates to play along with; more will follow, plus a keyboard and an interface for communicating with other music machines.

The Cheapest Commodore Music

COMMODORE BONUS PACK

Commodore 64. Disk Drive. \$9.95.

MUSIC MACHINE

Commodore 64. No hardware requirements. \$19.95. Commodore, 1200 Wilson Dr., Westchester, PA 19380. 215/431-9100.

GEORGE BEEKMAN: Commodore advertises a low-cost computer with an excellent music synthesizer, but doesn't tell you that you can't use that synthesizer as a musical instrument without some pretty complex software. The simplest kind of music-making program for the C-64 is one that programs the QWERTY keyboard to play notes. The user's guide that comes with the computer contains a program listing to do just that, but it's too full of cryptic graphic symbols and errors. Fortunately, a disk version of that program, excluding the errors and including several enhancements, is available as a public domain program on

Commodore's BONUS PACK. It's a good no-frills way to make your computer into a simple musical instrument, and the package also contains disk and graphics utilities as well as some games and educational programs.

MUSIC MACHINE, also sold by Commodore, is priced so low it's hard to resist. It comes in cartridge form and programs the QWERTY row of the computer keyboard to act like the white keys of a piano and the number row above to act like the black keys. Touching a key sounds a note and displays it on the screen's musical staff. Other keys control the octave level, the shape of the waveform (which controls what the note sounds like), the sustain and decay quality of each note, special effects (like vibrato and glide), the number of voices played (up to three), rhythm accompaniment, and pitch tunability.

The rhythm section is disappointing and the keyboard is awkward, but the sound is excellent. Taken as a whole, the "instrument" is easy to use, and the price is unbeatable.

2000 Drum Notes in Any Combination

DRUM-KEY

Version 1.1. Apple II+, IIe. Requires one disk drive, audio amplifier. \$169. PVI, Great Valley Parkway, Suite 10, Malvern, PA 19355; 800/441-1003 outside Pennsylvania, 215/647-3930 for help or to order in Pennsylvania, 215/296-8242 to hear the sound over the phone.

JAMES STOCKFORD: Here's a synthetic drummer that turns your Apple keyboard into a set of 28 drums. While similar to

stand-alone drum emulation machines, DRUM-KEY has three major advantages. First is its amazingly low price. Second is that it can record libraries of drum scores on disk. Third is a capable set of editing and recording programs.

You can compose drum sequences on a screen that presents a set of dual staves for musical notation, or on-screen that defines the keyboard as a set of 28 drum, hand-clap, woodblock, and other sounds. You can store up to 2000 notes,

frustrated in their attempts at getting some of this software. Recent surveys (polls taken at computer expos) have shown that less than ten percent of the users of CP/M systems are even aware that the programs exist, yet with over 2000 programs, the CP/M library is the largest of all the free program libraries.

Ethical Use

The American culture breeds two kinds of commercial extremists: those who want to regulate production and distribution for the good of the people, and those who want to make a profit on anything they can grab. Somewhere between these extremes are the two feuding camps of public domain software distributors: SIG/M and CP/MUG.

SIG/M (Special Interest Group/Micros), part of the Amateur Computer Group of New Jersey (ACG-NJ is a non-profit organization), tests public domain programs and organizes them into disk volumes. The New York Amateur Computer Club prints and sells catalogs of these volumes. Volunteers send copies of disk volumes to various distribution points (more volunteers). SIG/M offers one disk format — the eight-inch CP/M standard single-density format. Distributors offer a variety of disk formats, adding membership fees or overhead to the price per disk. In many cases the distributors operate bulletin board systems from which the software can be copied for free.

CP/MUG, supported by Lifeboat Associates in New York (a commercial software publisher), provides several disk formats for a higher price — \$13 per eight-inch single-density disk, and up to \$18 for Apple and Kaypro formats. Ed Currie, President of Lifeboat, feels justified in charging a higher price because Lifeboat promotes the public domain library worldwide, maintains libraries in several disk formats, and provides steady distribution using paid staff.

Once a program is placed in the public domain, the entire program or any portion of it can be sold without legal restrictions by anyone, with or without permission. The commercial publishers are not breaking any laws by selling disks of public domain software. There are many cases where public domain programs have been enhanced and then sold commercially. Adding documentation where none existed before is considered "enhancing" the program; therefore, some publishers feel that providing documentation warrants a higher price for the program.

The Public Domain Hit Parade

Nearly every computer user can make use of some of the *system utility* programs, which help manage disk files and computing operations, so it is not surprising to find that system utilities dominate the list

whole thing to a bassoon chorale just write "bassoon" for every instrument, push a button, and listen.

METATRAK II includes voice settings for 20 instruments, and the optional instrument disk provides 100 more. Bells, steel drums, trumpets, and woodpecker chirps are included on the instrument disk. Build your own sounds with the

tools ALPHAPLUS provides as an option. You can't do that with a tape recorder.

METATRAK II is file-compatible with all other Syntauri products, which means you can print scores or interface with the major drum machines. For \$1400 plus the price of an Apple IIe system (about \$2500) you can have your own synthesizer and studio.

Igor! Have you switched on the Atari?

ATARILAB

Science Series Starter Set

All Atari models (16K). \$89.95. Copy-protected. Atari, Incorporated, 1312 Crossman Avenue/P.O. Box 61657, Sunnyvale, CA 94088; 408/745-2000.

ERICK WUJCIK: Here's a new twist in computer peripherals: an inexpensive plug-in device that turns Atari computers into scientific instruments that can read experimental data directly from measuring devices.

ATARILAB's nucleus is its Interface Module, a box designed to be plugged into one of the joystick ports on an Atari computer. This wouldn't be possible if Atari hadn't designed the ports to be incredibly flexible — sort of like those "B" movie villains who can screw anything from a hook to a nuclear bomb into the wrist sockets of their artificial arms.

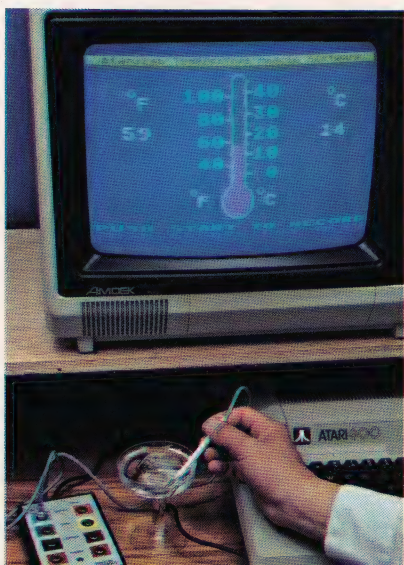
The ATARILAB Interface can plug in up to eight probes or controls simultaneously. The only device available so far, the temperature sensor, plugs into one of the two analog sockets. Other sockets allow for standard joystick control, two computer-controlled "switches," and two power sockets that will send up to five volts of electricity to another machine.

The ATARILAB Starter Set includes the Interface Module, temperature sensor, alcohol bulb thermometer, and an excellent introductory manual that works as an elementary laboratory notebook. Experiments range from simple measurement of temperature to lengthy monitoring of chemical reactions. Since the Atari monitors instrument status 60 times per second, there's room for fairly sophisticated machines.

ATARILAB functions can be read and controlled from BASIC, LOGO, or any other computer language. These programs don't have to be complicated. Most Atari languages can use the same routines described as simple (and I mean simple) BASIC programs in the ATARILAB manual. There's also a temperature analysis cartridge program and a variety of BASIC and LOGO programs for typing in yourself, all included in the Starter Set.

ART KLEINER: Atari promises eventual add-ons for measuring light intensity and sound pressure — the makings of an inexpensive home physics laboratory — plus galvanic skin response, for a cheapie "lie detector," biofeedback, and angle measurements.

Measuring the temperature of a glass of water with ATARILAB. The temperature and other sensors plug into the Interface Module (lower left). You could use this to track temperature changes in an aquarium or garden.



A Relatively Cheap Graphics/Sound Machine of Glorious Potential

MINDSET

32-256K; MS-DOS. \$1099 base price. \$1799 includes single disk drive, 96K. \$2398 includes second disk drive, 256K. Optional: mouse (\$150), GW BASIC cartridge (\$99), telecom cartridge (\$99). Mindset Corporation, 617 N. Mary, Sunnyvale, CA 94086; 408/737-8555.

LAURA SCHOLL: The Mindset Personal Computer is not just another PC. It is the only medium-resolution microcomputer in its price range capable of real-time interactive graphics that move and respond as quickly as human beings can perceive them.

ART KLEINER: The Mindset's resolution is 320 x 200 pixels. (A pixel is a graphic point — the smallest single component of a picture — on the screen.) This is less resolution than broadcast television (525 x 484 pixels), the Macintosh (512 x 342), or high-resolution mainframe computer graphics, but more than the coarse-looking low resolution of any other color computer priced under \$10,000. In black and white, the Mindset screen is finer-grained than the Mac.

LAURA SCHOLL: Like the Macintosh, the Mindset uses bit-mapped technology — a method of controlling each pixel by "mapping" or aligning it to a single location in the computer's memory. The Mindset combines this with three sophisticated microprocessors — one to run the operating system and programs, one to put images on the screen, and one to manipulate the images — plus a separate memory exclusively reserved for pictures. The result is very fast color graphics.

The Mindset's sound processor can handle four to six voices — more than any other microcomputer. This makes possible — with proper software, which doesn't exist yet — sound effects, music, and even voice synthesis.

Though Mindset's graphics are sophisticated, they're relatively simple to program. For office applications, the computer can handle multiple windows

faster than any other computer on the machine market. This \$3000 machine allows computer research and development at a level of sophistication previously available only at universities or research environments like Xerox PARC and Bell Labs.

LOUIS JAFFE: I like the abundance of video outputs (Macintosh has not even one), and advanced graphics, plus its ability to run most IBM PC business software out of the box. I'm a sucker, I admit, for that Euro-clean cabinetry. And I prefer the modularity of this system to an all-in-one box. The keyboard is heavy enough not to walk, with a sensible layout and a nice feel.

The computer (minus monitor) fits into a factory-provided, padded, aircraft carry-on-size bag with a shoulder strap. For staging presentations, just carry the machine into an auditorium or conference room, attach it to a TV, monitor, or video projector, and let fly with 512-color, animated graphics.

The Mindset's video sync input will be highly significant to video people. The computer's video signal can be edited in with signals from cameras or videotape decks. You can switch from one source to another without the picture rolling (i.e., without loss of vertical sync). Low-cost, high-quality graphics for cable TV systems are one obvious application; also multimedia shows and videoconferencing.

REBECCA WILSON: The Mindset program which so far allows a non-programmer greatest hands-on access to its color capabilities is LUMENA (reviewed WESR summer '84, p. 78): a more limited, much less expensive version of EASEL, the program with which our cover and Organizing section illustrations were created.

LUMENA provides a palette of 16 simultaneous colors which, if displayed on a composite video monitor or TV set, can be chosen from 512 possible colors, in much the same way an artist mixes paints. An RGB monitor allows



Your standard Mindset configuration: computer, keyboard, composite video monitor, and mouse. This picture shows the computer's two built-in disk drives and two rectangular slots for cartridge programs; there are also six slots for expansion hardware in back. The carrying case behind the computer holds the Mindset, keyboard, and mouse, but not the monitor. Rebecca Wilson drew the image on the screen with LUMENA and a digitizing tablet — a device like an electronic tablet and pen, easier to control than the mouse.

only 16 predetermined colors, plus 16 "dithers" (mixtures of two colors created by alternating pixels of each). Custom-mixed palettes can be stored with, or independently of, an image. Compared to EASEL on an IBM with a high-resolution graphics card, LUMENA has fewer colors onscreen at once and a more limited animation menu (which I hope will expand in future versions).

As its video sync and telecommunication capabilities develop, this system could be valuable for commercial designers. The ability to quickly run an image through a variety of color schemes or individually manipulate elements of a design could make possible long-distance electronic presentation of sketches or ideas without the cost and delays of travel or mail.

ART KLEINER: Almost no software is out yet to take advantage of the Mindset. We successfully ran MICROSOFT WORD and DR. LOGO; the company lists more than a hundred other IBM PC-compatible packages they say will work, including LOTUS 1-2-3, WORDSTAR, and the PFS: family — but not Microsoft's FLIGHT SIMULATOR.

For graphics-oriented programming, we unabashedly recommend this computer now. Artists should check it (running software) before looking at any other system. Same for architects and draftspeople (as CAD/CAM packages emerge). End users who want an all-around, easy-to-use graphics/sound machine should wait; it's not there yet. We will review Mindset software as it appears — we think the computer's important.

FOR PROGRAMMERS ONLY

LAURA SCHOLL: The Mindset is straightforward to program. Imagine a grid. Each location on the grid contains a value that tells you its color and intensity. This grid is mapped one-to-one to a corresponding (x, y) location on the display screen. Cartesian

mathematics: what could be more simple? Powerful built-in bit-moving instructions called BitBits (pronounced bit-blits) transfer pixels to arbitrary (x, y) locations, where the (x, y) values are manipulated by logical (and, or, xor) or arithmetic (addi-

tion, subtraction) operations. By combining these simple instructions you can easily produce some sophisticated results, such as rotating a picture, copying a picture, or filling it with color or pattern.

You can program the Mindset in BASIC, C, Pascal, or assembler.

RESPONSE

from our readers to the Whole Earth Software Review

THE IMPORTANCE OF DOING ACCESS

NAT MANN: Your spring '84 review of OFFIX (p. 47) says it requires 128K RAM. I ordered this software and when it arrived I noticed that it requires 192K. The company's resident expert told me there never was a released 128K version. Moreover, OFFIX won't even load on a 128K machine.

CHRISTOPHER HODGKIN: Please be more careful in specifying what is necessary to run the programs. Your review of FLIGHT SIMULATOR (spring '84, p. 107) never mentioned that one needs a graphics card and monitor to run the program. A lot of us have only monochrome monitors and boards; how about some reviews of game software for us?

ART KLEINER: *Spring '84 was*

our first issue, and we were still learning how difficult access research on software is. Reviewer Charles Spezzano saw a pre-release version of OFFIX running on 128K, but the developers, Emerging Technology Consultants, said it was too slow to release. They do refund the price if you bought it to run on 128K. Besides the programs mentioned, we listed incomplete hardware requirements for MS. PACMAN and PLANETFALL (which run on more machines than, respectively, Atari and IBM PC). Our methods are more exact now. For monochrome games, see PITS AND STONES, HEROISM IN THE MODERN AGE, and EXECUTIVE SUITE this issue (p. 69).

RALPH NADER'D BE ASHAMED

HARRISON HUNTOON: You show list prices for software. Recently I paid \$379 for DBASE II, delivered

WHY ACCESS IS HARD

KERN
PUBLICATIONS
190 Duck Hill Road
P.O. Box 1029, Duxbury
Massachusetts, 02332

We have decided not to publish the 1984 edition of "Software Writer's Market". The reason for this is that we found it almost impossible to keep up with the large numbers of companies and people who are continually entering and leaving the microcomputer industry. Rather than publish a referral guide that we know would be quickly out of date, we decided not to publish it.

If you paid by check, your refund is enclosed. If you paid by credit card or purchase order, your account will not be charged.

We are sorry for any inconvenience this cancellation may have caused you.

Sincerely,



Dr. B. J. Korites
President

in two days from a mail-order house; the list price is \$700. Retail stores do offer situations that make list prices unrealistic for comparison purposes. I hope you'll take on the job of helping users get software cheap.

ART KLEINER: We originally planned to list the least expensive mail-order price we could find for products we reviewed. So far, it's been too difficult for us to do that and still get the magazine out. We're thinking of adding a "rough market value" figure to access; but retail prices are so volatile that they wouldn't always be valid for comparison anyway. Regretfully, for now you'll have to supplement our reviews with prices in mail-order ads.

DESK WHO?

ANONYMOUS (from reader survey): Please send me the address where I can get DESK ORGANIZER (mentioned in WESR spring '84, p. 69).

ART KLEINER: It's \$298; runs on IBM PC/XT compatibles with 128K; from Warner Software, Inc., Dept. 2, 666 Fifth Avenue, New York, NY 10103; 800/223-0880.

WHY THE REVIEW CAME LATE

STEPHEN HAUST: I am dismayed to find that my charter subscription copy arrived (today) in a major metropolitan area, literally weeks after I saw copies on the shelves of a second-rate bookstore in a rural Tennessee county seat. I find this inexcusable and I really can't believe it is all the fault of the postal service.

LISL FOLSOM: While we knew delivery of the Review's first issue wouldn't be lightning-fast (our nonprofit application for faster second-class mail status required a copy of the first issue; hence, it had to travel third class), we weren't prepared for the record-breaking volume of third class mail that saturated the St. Louis Post Office during the

weeks before Christmas. Neither was the St. Louis Post Office, which became a bottleneck for third class mail delivery to break-up points further down the line.

A bigger surprise for us was just around the corner: the Review, because more than half its copies go to newsstands, can't apply for second-class status until after our fourth issue. We must mail the intervening issues third class. The good news is that issue two arrived (third class) to both coasts before its on-sale date (May 22), although those in rural county seats may have seen it briefly on the stands before receiving it. Because Christmas catalog publishers complained about ruin, the St. Louis Post Office promised to fix the problem, and it seems they did. The issue one fiasco shouldn't recur.

A LEFTHANDED IMPLEMENT

CHRISTOPHER WESLING: I was surprised to discover that nowhere in the review of the Microwriter (WESR, spring '84, p. 42) did Richard Dalton mention whether it could be used with your left hand. I think that's important, since at least ten percent of the population prefers the left hand for one-handed activities.

RICHARD DALTON: The Microwriter has a left-handed version.

RAISE HELL, YOU GUYS!

ANONYMOUS (from reader survey): I cannot emphasize enough the importance of negative critical reviews. We all know there are lots of dogs out here, and from your first issue, except for the IBM PC keyboard, you'd think the industry never made a mistake.

ART KLEINER: You'll see more negative reviews herein — usually of products too influential or popular to ignore. See DISPLAYWRITE 2, p. 49, "What They Left Out," p. 37, or the list of evaluated organizing software on page 8. But we won't go overboard; our main

purpose is still recommending the best — and we want to be sure of our opinion before panning someone.

HOW TO SLIM DOWN WORDSTAR

RICHARD D. EZZARD: In your first issue's word-processing teleconference, Peter McWilliams expressed a wish (p. 28) to remove the help menus from the operation of WORDSTAR. The experienced WORDSTAR user can indeed operate without ever being slowed down by the menus. The solution is to remove the WSMGS.OVR file from the operating disk. Once WORDSTAR knows that the messages file is missing, operations proceed with no help messages, no menus. There is a speed-up in activity because WORDSTAR never makes further attempts to access the disk to get messages.

BUYER BUY WHERE?

BRIAN WEISS: The piece on mail-order places (WESR spring '84) was very helpful. Suggestion: an extension called "Buyer Beware" in which readers report on mail-order vendors who have had delivery or other problems. *Nobody* else is policing, and it's a shame to see people continue to get mistreated.

JAMES STOCKFORD: *I'm glad you got something from that mail-order article. We've got an improved list of vendors in the forthcoming Software Catalog and will update it regularly here.*

I don't like the "Buyer Beware" idea. First off, InfoWorld regularly publicizes the names of mail-order bad guys. Second, while there are a few, rare rip-off organizations, I have received mail complaining loudly about suppliers I know to be very good. If I am not circumspect on this issue I run the risk of seriously hurting someone who is running a good business. So I have chosen to bring recommendations of good suppliers with strong track

records, rather than to look for and judge villains.

Before you spend a lot of money by mail order, call up the company. Chat. Find out who they are, let them know who you are, develop a relationship. If something smells bad on the phone, call other companies until you find a supplier who understands you and will bend over backward to help you out. These people are in the majority.

PROFESSIONAL SIMPLICITY

JOHN F. JONES (*Chinese University of Hong Kong*): In the spring 1984 issue you linked "kids" and "occasional users" with a love of simplicity, while assuming that serious writers, professionals, etc., really needed the speed and sophistication of WORDSTAR. Maybe. I wrote two books with the BANK STREET WRITER and if ever I switch it will be in favor of a program like HOMEWORD which has pictures.

FROM OUR NEW "ENABLING COMPUTERS" DOMAIN EDITOR

MARK O'BRIEN: I am grateful to Richard Dalton for saying that I'm talented, but disturbed by his assumption that I'm using more of my capabilities than you able-bodied "turkeys" (WESR summer '84, p. 1).

First, I don't know what my potential is. I doubt that anyone besides saints, astronauts, and Nobel Prize winners knows their potential. . . . The Model 100 has certainly helped me to use whatever potential I have. But who knows? A snazzier computer that remembers more and strains my eyes less could help me more.

Second, this is a form of the Generalized Compliment, something disadvantaged people frequently get. Lenny Bruce had a routine on "How to Talk With Colored People" ("Joe Louis was always

my favorite fighter"). Once I drove my power chair into a class late. It's impossible to *sneak* into a classroom in that big, noisy, weird-looking device. Embarrassed, I mumbled apologies to the professor, who proclaimed, loudly enough for all to hear, "Oh, I think you people are just great!" Us people? I was late; being disabled had nothing to do with it. . . .

An otherwise brilliant friend once told me that blind people have extraordinarily keen hearing. I know a blind woman who has heard that stereotypical idea many times. It's not true. Her hearing is worse than most people's. Able-bodied folk would like to believe that there is some mysterious compensating mechanism that makes up for the disability. Wouldst that there were.

Third, I just don't like to hear able-bodied people use us to put themselves down. If you want to berate yourself, go ahead, but don't drag me into it. Disabled people are just people, in no ways morally or intellectually superior to anyone. I've known some crummy disabled people. If able-bodied people are to accept us for our virtues, they must know that we also have faults — otherwise, they won't believe that we're human.

WITHOUT VISIBLE SUPPORT

TOM JORGENSON (WIZARDRY SOFTWARE): Here is something that should be brought into any software review these days. Some of the bigger software houses only offer "limited support" of their customers. In the case of MicroPro's WordStar, it means they send you back to your dealer. If you call them, you get "MicroPro does *not* support end-users." If you persist, they suggest that you pay to join the MicroPro User's Group — hardly generous, considering that WORDSTAR is a \$395 package.

Peachtree gives you 90 days to ask questions, after which they charge \$75-\$300 per program for an additional year of support. I know of one individual who bought the additional support; they couldn't answer the questions he asked.

Software reviews should describe how support is provided, and whether there is any charge, and the review process should involve several attempts to get assistance on both simple and complex problems.

ART KLEINER: *Ideally, we should check support on all business packages we review. In practice, we end up checking some packages and relying on gossip for the rest. If we hear (reliably) or find ourselves that support is bad, we always mention it. Meanwhile, it isn't just software companies which need to provide better support:*

WOODY LISWOOD: *We got a new Compaq. THE ACCOUNTING PARTNER, which is the accounting package my wife likes (she is a CPA), would not address the screen properly. There is a terminal install program for computers not listed in the main menu. Easy to do. Got out the documentation. What, no technical details from Compaq? Well, probably most folks don't need them, want them, or even understand them. Called Compaq. They refused to give them to me and said that I would have to get that from my dealer. So I called the dealer. No response. Called back. Technical guy left without returning my call. Got another technical wonder. He said to hold on. Got out the Compaq dealer manual, read some to me, and asked me what it meant. Tried to convince me that I could send a CONTROL-71 in decimal. Tried to tell him that the control characters had their own decimal equivalents. No luck. Gave up. Called the folks who produced the software (Star Software). They asked if I had sent in my 40 dollars for the first-year support. I went slightly berserk. Said that we (the CPA part) needed no support. I was asking a question which*

should have been in the original set-up program. After some conferencing behind the scenes, I was denied support since I did not need their insurance policy. So, in effect, they sell their program through dealers, then demand an extra \$40 to answer questions about it.

TERMINAL IGNORANCE

PETER ROWLEY: The second issue of the *Whole Earth Software Review* contains reviews of several communications programs, but doesn't mention the subject of terminal emulation — quite disappointing.

ART KLEINER: Terminal emulation means the ability to make your micro mimic a direct-wired terminal for specific mainframes (so you can do things like edit a previous line on the screen). Which of the 60 or so dedicated mainframe environments did you want us to cover? Probably a sidebar should have noted which programs claim to handle emulation well (we have no mainframe access and can't test it). Those are: CROSSTALK XVI (Televideo 910/920, IBM 3101, Adds Viewpoint and DEC VT-100); PC-TALK.III and MODEM7 (there are public domain terminal emulation add-ons on CompuServe SIGs); ASCII EXPRESS "THE PROFESSIONAL" (Hazeltime 1500, Soroc IQ-120, DEC VT-52, ADM-3A, Hazeltime 1510, Adds Regents or Viewpoint, Televideo 912, Datamedia, IBM 3101, Heath H19), APPLE ACCESS II (VT100 and VT52) and MACTERMINAL (VT100 and IBM 3278). Whew!

BEATING A DEAD COMPUTER

PAUL NAITOH: I was struck with the fact that all discussions are centered on currently popular computers, such as the IBM PC. In your teleconference on word processing (spring '84), WORDSTAR is mentioned many times, but no mention is made of SCRIPSIT (for the Radio Shack TRS-80 Model II, III and 4). Perhaps few TRS-80 owners are in-

volved actively in creating the WESR? Is it your guideline not to talk about older/"deceased" computer lines? For instance, TRS-80 Mod II is officially "dead" but there are thousands of owners still using them, and the programs for Mod II need evaluation.

ART KLEINER: I'd love to have reviews identifying great TRS-80 products. But there are problems. We can't easily get the software; Radio Shack is as uncooperative with us as with most other publications. Our existing reviewers don't use TRS-80 machines much, and generally aren't impressed with the available software when they do. The best we've seen is like CONSTRUCTION MANAGEMENT SOFTWARE (p. 75) in this issue — it began on TRS-80's, then evolved to an MS-DOS package; now the company is reluctant to admit they still sell the Radio Shack version. There's very little software overlap with other machines (even less than Commodore), and there seems very little reason to buy a TRS-80 Model II, III or 4 now. Our advice to owners of those computers: get CP/M adapters. If you disagree, we're willing to listen, but it'll take some convincing.

SOMEBODY LIKES US

AL KRAUSS: Aside from complimenting you on the overall quality of your new magazine, I want to say that there is something in the atmosphere, the tone, of *Whole Earth Software Review*, which is like a healing balm of humanism in the searing silicon desert.

Not to say that other publications do not use humor, or "sincerity," or technical "objectivity." It's just an intangible something with you guys, which is a "we're all in this together to help make this a better new world" kind of feeling, rather than the "well, here's my viewpoint, and I get paid lots of bucks to put it out, and *caveat emptor* to you, buddy."

END

GOSSIP

ART KLEINER: "As a reader and a consumer," wrote editor Phil Lemmons in the April *BYTE*, "you have a right to know whether you can rely on the honesty and objectivity of articles in this and other personal computer magazines." Then editor Stewart Alsop followed up in the June 4 *InfoWorld*: "We're doing our best to provide a useful, competent service to our readers, but we still have lots to learn."

Since I read both magazines, I'm grateful they took the trouble to spell out their policies. Magazines that review software are under enormous pressure from software companies, who may have thousands of dollars at stake in an opinion. It takes more than a casual attitude to keep reviews clean and trustworthy.

Here are our policies:

► The *Whole Earth Software Review* accepts extended loans, donations, and editorial discounts on hardware (*BYTE* and *InfoWorld* accept extended loans). We could never otherwise afford the hardware we need to evaluate with. Gifts to us are tax-deductible (we're nonprofit), and we always publish donors' names in the next *Review*. So far, it doesn't seem to have affected our judgement; Hayes gave us ten 1200-baud Smartmodems which we've depended on since last May, but we ended up recommending the MultiTech instead.

► We let staffers or reviewers accept gifts, discounts, or free units from reviewees. (Neither *BYTE* nor *InfoWorld* do.) However, we publish the facts about such gifts alongside any related reviews. So far the problem hasn't come up.

► We don't let reviewers keep software (*InfoWorld* does; *BYTE* doesn't). We keep the copies in our library so we can compare them to new competitors' products. Everyone who sends us software gets a thank-you letter saying that we won't copy it outside our staff or use it for any-

thing but evaluation, although sometimes doing *Whole Earth* business is part of evaluation. (Vendors who sent software between March 1 and July 30 got delayed notes because of our *Catalog* pressures.)

► Since we don't have advertisers, no fear of their pressure — a major issue for most computer magazine editors. (*BYTE* said advertisers do not influence their editorial copy; *InfoWorld* conspicuously didn't mention advertisers at all.)

► We do our best to check reviewers' connections to the products they review. Usually our own domain editors or staff corroborate an evaluation before we print it; sometimes we ask the semi-regulars whom we know via computer network. When a good product is reviewed well by someone connected with it, we'll say so (as we did with Pamela Sharp and her "Baby LOGOs," page 90). *BYTE* and *InfoWorld* seem to have roughly the same policy.

► Starting this issue, we clearly identify all reviews of pre-release versions. (Neither *InfoWorld* nor *BYTE* mentioned this.)

► We acknowledge our mistakes and — when confronted with new information, new versions, or new competitors — we re-check our opinions. We have to do this; a great package in January may be inferior by July. Last issue we recanted on recommendations of QUICK BROWN FOX and VOLKSWRITER. (Neither *InfoWorld* nor *BYTE* mentioned follow-up.)

I think if we don't spell out our policies and follow them, we hurt ourselves. Readers ultimately know if a magazine's approach isn't honest, especially in a gossipy field like personal computing.

This fall issue is transitional, because starting next quarter we become the "enhancement version" of the *Whole Earth Software Catalog* (for more on that, see page 4). Most

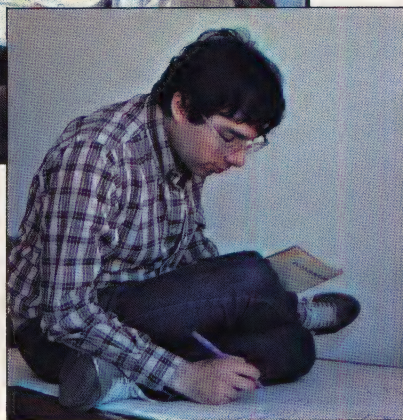


Levi Thomas

Catalog domains — Playing, Writing, Organizing, Drawing, Telecommunicating, Programming, Learning, and Hardware — will be covered each issue, with new items and update news about the old stuff. Three domains — Accounting, Analyzing, and Managing — seem to be coalescing into one large domain, still to be named, with the working title *Business Computing*.

Regular *Review* features will continue — RAM, What We Use Ourselves, Inside, Software That Ought to Be, What They Left Out, Cheap Glory, and Response. I hope Response in particular will be a place for you to check us on our opinions: "How come Whole Earth doesn't like MULTIMATE?" The appropriate domain editor will respond.

This issue is transitional in a couple of other ways. Two of the people who helped most to cement the foundation of the *Software Review* are leaving this quarter. Lisl Folsom, architect of our subscription system and in-house arranger of newsstand distribution, is becoming an independent circulation consultant. First stop: *Mother Jones* magazine in San Francisco. Cindy



Levi Thomas

In June we invited ten computer historians and history-watchers to collaborate on a chart of the genealogy of software. Pictured above: Paul Freiburger, Michael Swaine, Howard Rheingold, and artist Larry Gonick; below, Steven Levy. For the results, see page 52.

Craig and David Burnor are dividing her work.

Kathy Parks, who created the Whole Earth Software Library and our "access" process for checking price and availability, moves to Southern California this month, where she will join her family in an import business. If they appreciate her half as much as we do up here, she'll be in a very happy workplace. Lyn Gray, office manager until now, will take over access and the library.

And these two role changes are worth mentioning: Matthew McClure, the former editorial linchpin of the *Whole Earth Software Review*, has

taken on managing editorship of the *Whole Earth Software Catalog* — keeping track of 5000 shifting details every minute instead of merely 500. Jim Stockford, former quick-acquisitions honcho (he called hundreds of software companies asking for the latest version of their current product), is now the *Review's* assistant editor. If you send a manuscript in to the *Review*, your reply will probably come from Jim. **END**

CASH FLOW WHOLE EARTH SOFTWARE REVIEW & CATALOG March—May 1984

INCOME

Subscriptions	\$ 42,934
Back Issues	1,505
Direct Distribution	4,456
National Newsstand Distribution	32,500
Interest	856
Miscellaneous	290

TOTAL INCOME	\$ 82,541
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EXPENSES

Salaries	\$110,276
Writers/Contributors	5,520
Production Supplies	2,817
Printing (Magazine)	28,936
Subscription Fulfillment	4,573
Subscription Promotion	29,406
Distribution	3,828
Office, Computer Supplies	3,620
Equipment Rent/Maintenance	1,580
Telephone	5,241
Networks	3,208
Postage	2,339
Travel/Entertainment/Auto	3,706
Rent & Maintenance/Utilities	11,675
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Miscellaneous Other	3,918

TOTAL EXPENSE	\$220,994
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POINT CORPORATE	29,789
CAPITAL EXPENDITURES	2,970

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Accounts Payable	- 72,988
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FORTHCOMING TOPICS

(Please send your suggestions and reviews)

- Wonderful packages — our recommendations of combined computer hardware and software for particular purposes.
- The great utilities — not programmers' tools, but software that makes it easier to use your other software.
- Can we really recommend an operating system besides MS-DOS for the IBM-PC?
- MACPAINT clones on other computers.
- The best joysticks.
- Software for creating your own bulletin board — and the political/legal issues involved.
- Computer strategies for schools.
- Chameleon devices — benchtest evaluations of hardware that make one computer run another computer's software.
- Relatively easy-to-use local network software — is there any yet?
- Medical self-care and professional care software.

HOW TO WRITE REVIEWS FOR THE WHOLE EARTH SOFTWARE REVIEW

1. Recommendations from readers are the foundation of our magazine. Please tell us about what you like — a software package, computer accessory, online service, book, magazine, or other computer-related tool. Your reviews, if printed in the *Whole Earth Software Review*, are recommendations that help other people make good choices.

2. What to include in the review: What the item is good for. Who it's good for. How it changed your work and life for the better. Which types of tasks the product *isn't* good for, and what other product is better. How it compares to similar products you've seen. If there are two or more distinct versions of the same product, which one is better and why.

3. Review length: 250 words or less — one double-spaced typewritten page. Shorter is better. If it's longer, we'll probably edit it down.

4. Please provide this access information separately from the text of your review: product name; version number; author's name; publisher's name, address, and phone number; price you paid and approximate date you bought it; and (to the best of your knowledge) what hardware the software runs on. We cross-check all this information ourselves, but any information you can provide helps us enormously.

5. Style: The best reviews are like short letters to friends. Be personal, encouraging, enthusiastic, and densely informative. Avoid technical esoterica and jargon. Explain clearly what the program does; don't write a tutorial. Mention flaws if they're important or interesting, but don't let mundane nitpicking overwhelm the review. Sum up with your overall impression, not a criticism.

6. Avoid queries about reviews. If you're not sure whether we've

reviewed the item, go ahead and send it in. If we like your style, we'll ask you for more reviews. For longer articles or comparative surveys, ask us before you do much research.

7. How to send it: regular mail to

Editor, *Whole Earth Software Review*
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Sausalito, CA 94965

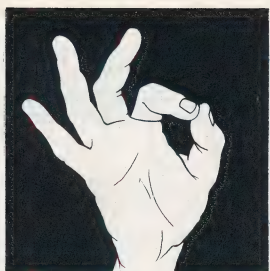
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8. "How a bill becomes a law": When you send a review, we let you know immediately if it's a possibility. Then we send for and evaluate the product ourselves — which can take a month or more. You may not hear from us again until you receive a tear-sheet and payment upon publication.

9. Payment: \$10 for a suggestion that ends in a review; \$20 for a review we use; \$30 for both together (or for a review we commission). Articles range from \$50 to \$400. We only buy first North American rights, but reserve the right to reprint material (often with repayment) in our own publications.

10. Will you still love us if we reject your offering? Sometimes we may not include your favored program for a reason we don't have time to explain in our short rejection notes. Nonetheless, we are grateful for all reviews and suggestions. Mail is the basis of our authority, and this magazine could not do its job right if it weren't for the strangers who share with us their critical perceptions.

—Art Kleiner, Editor



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KATHY PARKS: One of my first actions as librarian at the *Whole Earth Software Review* was to destroy the master disk for the library's APPLE WRITER IIe, leaving us with the one remaining copy provided by Apple. This was a program disk that I wanted to use. Since my careless error left the library without the safeguard of a backup disk of a program, I felt pretty bad. I was thinking of buying a replacement, so I greeted the

arrival of a copy utility called COPY II PLUS with a lot of hope and little know-how. The manual turned out to be clearly written, and with this program I saved the disk.

COPY II PLUS has proved so simple to use that I prefer its copy function to that provided on the Apple DOS 3.3 disk, and I usually introduce the program to people who ask me how to format a disk or make backup copies. The instructions on-screen, combined with the user guide and frequently updated supplements make COPY II PLUS foolproof. The program has additional programming features which I have yet to explore. At \$39.95 it is inexpensive insurance for a software collection.

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What do you think of the tone of what you read in the *Whole Earth Software Review*?

Too technical; requires too much background to grasp easily _____

Not technical enough; doesn't cover material in enough detail _____

Appropriately technical _____ Other _____

Were the articles in this issue valuable?	Yes	Somewhat	No
Software that Ought to Be			
Organizing Section			
Trolls Under the Bridge			
What They Left Out			
Telecommunicating Section			
The Shame of Word Processors			
Writing Section			
Prokey/Smartkey			
Genealogy Chart Project			
Breaking In			
Inside			
Playing Section			
When You Come to the Barnraising . . .			
Logo Section			
The Best User's Guides			
Hardware Section			
Cheap Glory			
Macintosh Software			
Response			
Point Foundation			

Any other comments? _____

Thanks for your help. We welcome letters and reviews of programs or other products you think are unusually good. Write us (*Whole Earth Software Review*, 150 Gate Five Road, Sausalito, CA 94965), or if you can telecommunicate, send us a message via The Source (PS0008), CompuServe (76703,436 or type GO WEC at any prompt), MCI MAIL (AKLEINER) or the EIES Network (account numbers 866, 226 or 324).

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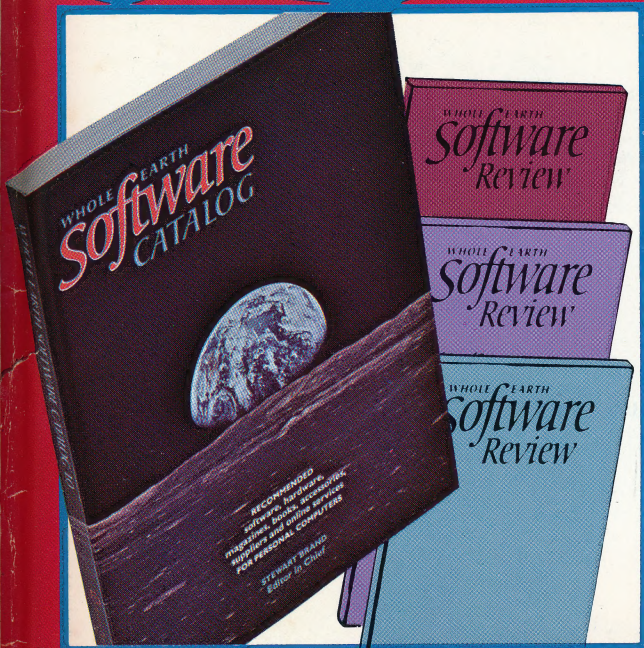
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24 Not The Classifieds

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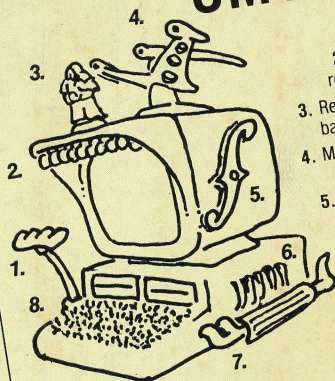
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