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SPRING 1984

THE HOME COMPUTER MAGAZINE

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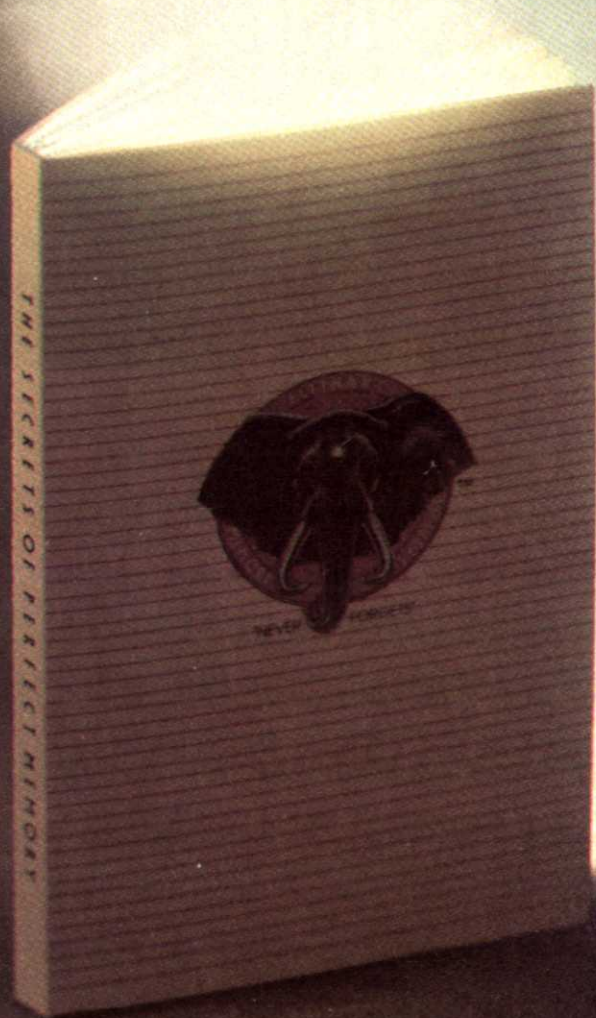
How fingerprints can
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Unretouched Kirlian
photographs of UFO's
(Unidentified Floppy
Objects)! The incredible
importance of making
copies: the Department
of Redundancy Depart-
ment—and what goes on
when it goes on! Power-
ful secret methods that
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tually prevent computer
amnesia! All this, and
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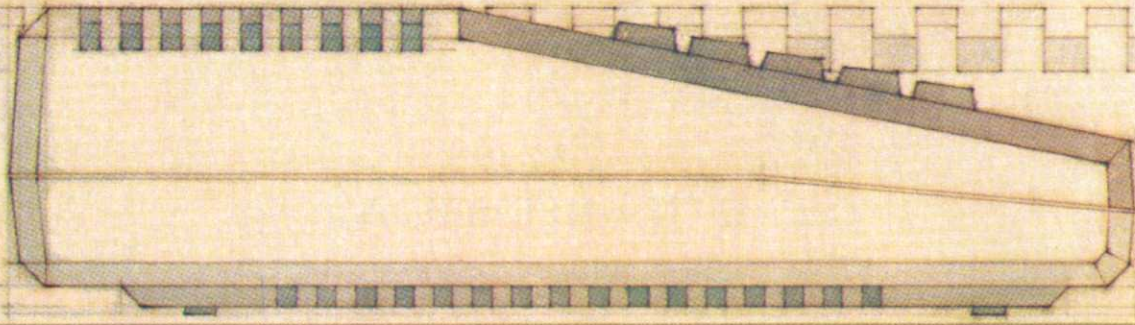
In short, it's an 80-
page plain-English,
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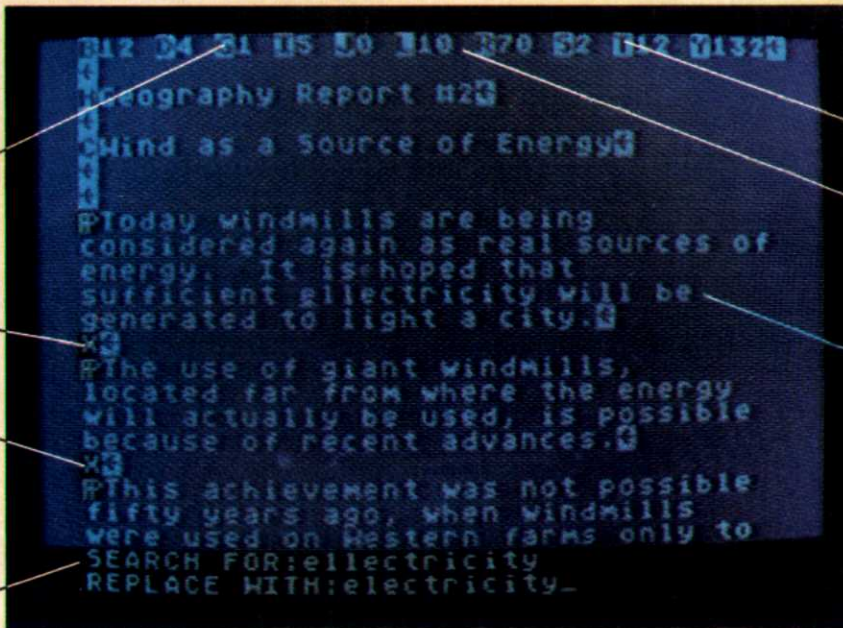
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Cover Photography: Lucasfilm's
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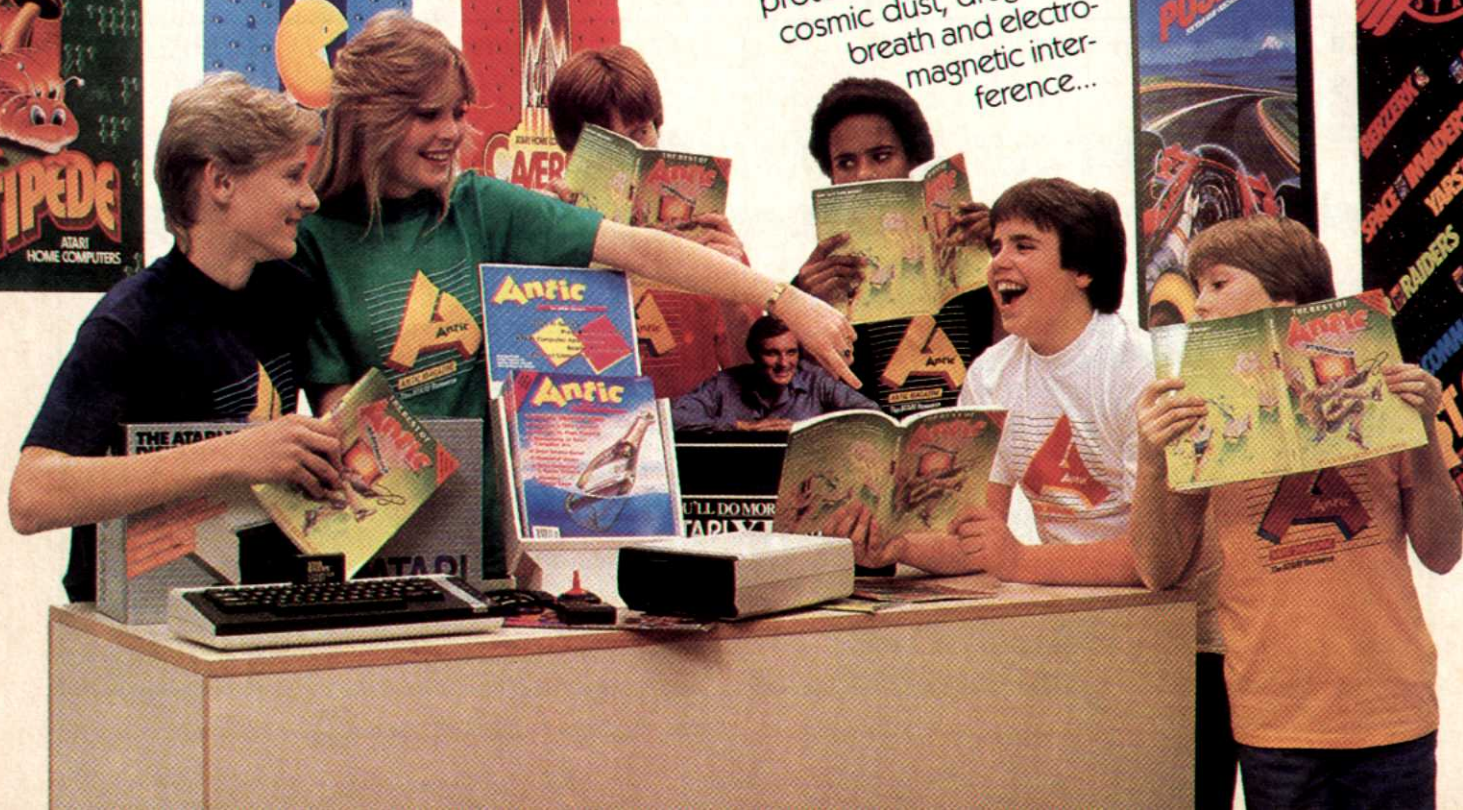
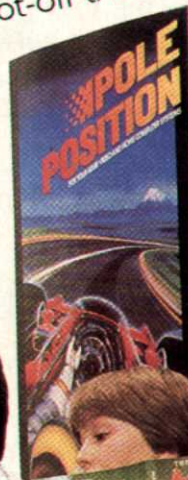
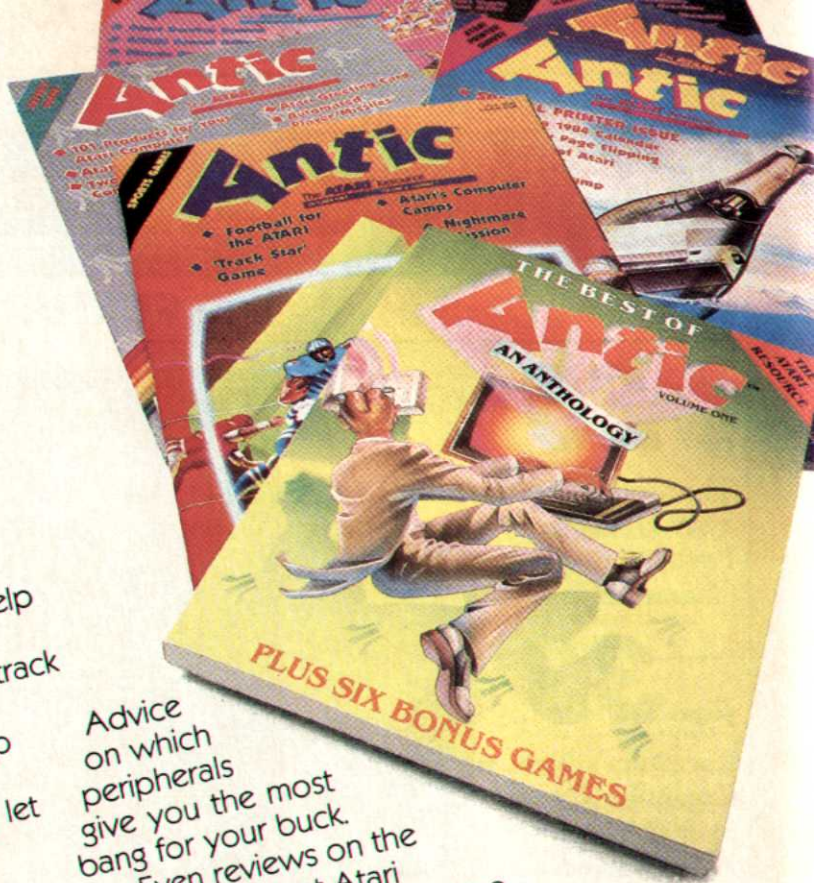
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HOW TO TURN ON YOUR ATARI

IT'S EASY. All you need is Antic, the Atari Resource. Every month, Antic is full of things that'll help you make the most of your Atari. Like home banking programs for keeping track of income and outgo. Educational programs so you can keep up with the kids. Communications programs that'll not only let you keep up with the Jones, but talk to them as well. Plus useful utilities programs and computer languages that'll help you make your computing easier and more ingenious. There are also games that'll make time fly.

Advice on which peripherals give you the most bang for your buck. Even reviews on the latest and greatest Atari computers, software, and game machines. And now Antic brings you three more ways to make your Atari useful. Namely, the Best of Antic Anthology. Antic Software, reasonably priced, of course. And the brand new, hot-off-the-presses Antic T-shirts, rumored to protect the wearer from cosmic dust, dragon's breath and electromagnetic interference...



JUST THE RIGHT VOLUME

The Best of Antic Anthology covers the most popular programs and articles from our first year of publication.

Good-for-something utilities, step-by-step tutorials, plus hold-on-to-your-joystick games, including six new Atari arcade games created specially for Antic. If you have an Atari computer, this is one book that's got you covered.



SOFTWARE AT A PRICE THAT'S NOT HARD TO TAKE

This is just part of Antic's library of public domain software, including five disks crammed-full with games like Bats, Chicken, Speed Demon, Slalom, and the ever-popular, fun-for-the-whole-family, Vultures.

You can get as many as eight of these little beauties on each disk or cassette, for as little as \$10, plus shipping and handling. That \$10 is not a typographical error, it really does say \$10. They couldn't be more inexpensive if you wrote them yourself.

SHOW YOUR TRUE COLORS

And there's no more colorful way to do that than with an Antic T-shirt. They're available in a variety of adult sizes and colors, some of which are even found in nature.

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The Evolution of Pong

The game began with a gristly wad of animal hide.

BY TODAY'S STANDARDS, *Pong* is a primitive video game. Nolan Bushnell invented *Pong* over ten years ago—a millennium long past here in the computer age, but a nanosecond on mankind's two million-year-old evolutionary clock. In the rush of technology, we've overlooked using human prehistory as an analogy of how computers have evolved to their present "prehuman" state. And what's more exciting, how computer games may evolve in the future. After all, computer games are but electronic models of our folklore, myths and fantasies.

It's ironic that the first computer game mimicked the earliest probable human game: batting a ball back and forth. Early prehumans most likely developed the idea of hitting a ball as a form of game play two million years ago. Here, at the dawn of human consciousness, I can't help but imagine the first "real-time *Pong* game."

The "ball" probably was hardly more than a gristly wad of animal hide. The game? Not much in the way of strategy. Just hit the ball with a club, the other guy hits it back and so it goes until everyone tires of the fun. A lot like *Pong*.

I don't think it was an accident that the first primitive video game computer did nothing more than bat a ball back and forth. Though our apelike ancestors' crude ballgame doesn't sound like much, it led the way to more sophisticated games. As with our primitive ancestors, the computer's ability was a considerable feat considering the cost and size of the hardware and the state of computer animation at the time. The level of game play was determined by the "size" of the computer's brain, just as in the case of early prehumans.

As computers have evolved, so have the games we program into them. Lucasfilm has developed a new computer "ballgame" that uses a split-screen to create two *personal points-of-view*—one for each player. It's a high-speed

ballgame, much like basketball or hockey played in high-tech vehicles called "Rotofoils." As a player, your view is from inside your machine—your opponent looks out from his. You can see each other. This simultaneous point of view for two players is a remarkable evolution in basic computer ballgames—like being inside the *Pong* paddle itself.

And the prospect of home computers evolving into super home computers will in turn accelerate the evolution of video games into true computer games. What's the difference? Video games suffer from the stigma that's been associated with comic books and science fiction: Popular fantasy play that must be carefully "controlled." But, the evolving computer game challenges this hackneyed notion. Computer games promise more "intellectual stimulation" and educational benefits.

It doesn't take a visionary to predict that the next generation of computer games will begin to take on the complexities of sophisticated "mind games." Hopefully, the healthy sort we use to communicate sensitive messages to one another and protect our social and economic interests. It would be interesting to encounter a computer that played

mind games as we know them. I imagine computer mind games would be educational and expansive, teaching us to better understand our complex human social life.

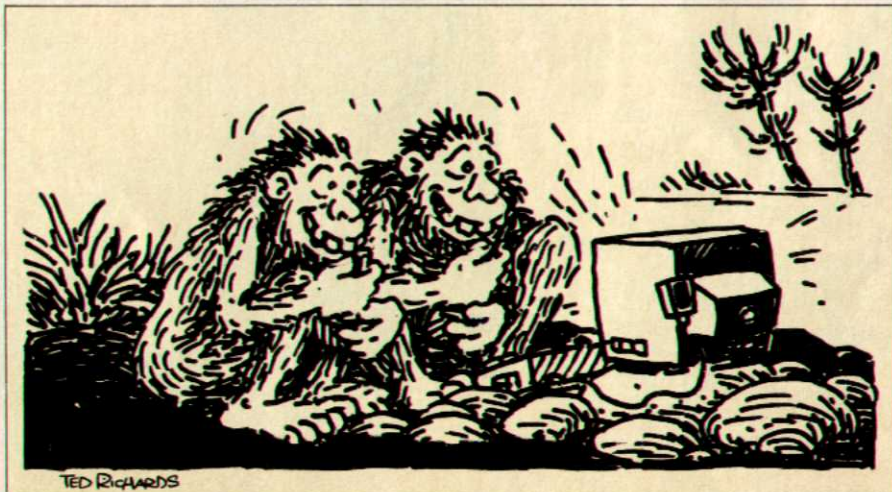
I can also imagine the popular "Calc" spreadsheets evolving into *Calc* games that not only play tough, bottom line, business games, but print out a comprehensive financial model of your business "game plan," complete with three "what if" spreadsheets. Or how about a word processor with a built-in, interactive *story generator*? Computer development is evolving in this fanciful direction.

However, before we see this, we need more than just an increase in computing power. What we lack is the sophisticated programming knowledge required to create *human models*. In other words, programming computers resourceful enough to portray *character*. Computer characters, such as the childish "JOSHUA" in *War Games*, have become stars in Hollywood films and popular network television. They may soon come to "life."

If computers evolve into affordable renditions of their fictional counterparts, then those with an appealing personality will be the most popular. I can imagine individual computers playing their own versions of *Pac-Man*. And we would see the distinctions between games and business applications begin to blur even faster than they are now. Those who may be uncomfortable with this prospect, relax. Provided a free marketplace, you could always choose a more "serious" computer. One who is concerned with the bottom line and makes no bones about it. We've come a long way since *Pong*.

Meanwhile, enjoy this special games issue of ATARI CONNECTION. ■

Ted Richards, Editor-in-Chief



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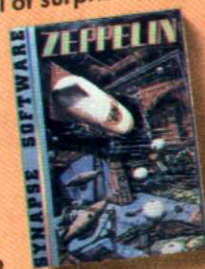
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Data Statements

Cover Letter

I received your Winter 1984 edition with the digitized image of Van Gogh on the cover. Your Table of Contents says it was rendered by Russell Brown using a Via Video system.

The obvious question is: "Does this have any relation to Atari equipment. If so, what?" The next question is: "Who can I write to for details of this Via Video system?"

The results are beautiful and are certainly an incentive to pursue computer graphics. Can you also provide some computer graphics reading references beyond those on page 38?

Alfred Kolkin
Brooklyn, NY

Russell feeds the Via Video with images generated from an Atari computer. He can add up to 16 colors to the image, as opposed to the four colors available on the average computerized "painting" program. The Van Gogh was done in low resolution mode (as is the opening illustration for "The Computer That Rolls" in this issue); the system is also capable of high resolution images.

The Via Video system is not for the home computer enthusiast. It's a commercially-used system to generate computerized images, and the price tag runs in the \$50,000-\$60,000 range. It runs on a Crommemco main-frame, using Via Video software. For those of you interested in commercial applications, contact Via Video by writing to Janice Hulse, Via Video Systems, 5155 Old Ironsides Drive, Santa Clara, CA 95050, (408) 980-8009.

Russell's favorite computer graphics book is Computer Images: State of the Art, by Joseph Deken, 1983, Stewart, Tabori & Chang Publishing, Inc., NY. It's a four-color pictorial book that discusses all forms of computer-generated art, including medicine, high-tech and sports. If you can't find it in your local bookstore, you can buy it from:

Workman Publishing
1 West 39 Street

New York City, NY 10018

The paperback edition is \$16.95 + \$1.50 postage; clothbound is \$25.00 + \$2.50 postage.

ATSPELLER Support

I was so impressed with Jason Gervich's article "Spelling Checker for AtariWriter" (Winter 1984) that I picked up the phone and immediately called the Atari Program Exchange and placed an order for *Atspell*. Imagine my surprise when I found that it did not work as claimed with *AtariWriter*. Imagine my dismay when I reread the article and realized that I should have ordered *Atspell* for *AtariWriter*!

What do I do now? HELP!

Dave Knickerbocker
Oviedo, Florida

I have had the *Atspell* program for about two months and have always had to use it by saving the *AtariWriter* document to diskette, removing the *AtariWriter* cartridge, loading *Atspell* again, and finally reloading the document to be checked.

After reading your article, I first kicked myself for not reading the *Atspell* documentation more carefully and then ran to my computer to follow your instructions. NO LUCK!

Three possibilities occur to me as having caused the problem: 1. I have an old, obsolete program (version 2.0); 2. I have a newer version of *Atspell* than you reviewed, or 3. You reviewed a preproduction release.

Can you help? While I'm very pleased with both the *Atspell* and *AtariWriter*, being able to load the dictionary prior to document creation would certainly save time and effort.

James Kieklak
Chesterton, Indiana

You have Atspell instead of Atspell for AtariWriter. The AtariWriter version works as described in the article; the just-plain-Atspell works with other Atari-compatible word processing programs, but with the loading sequence you've described.

*For both of you and anyone else having the same problem, John Cardoza, APX Product Review manager, says that you can trade in your *Atspell* diskette for an *Atspell* for *AtariWriter* diskette for*

50% of the software price (\$19.98). California residents add \$1.29 tax. Send it to:

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If you want to order APX products, call (800) 538-1862, or inside Calif. (800) 672-1850.

More Turtle Support

Arthur Luehrmann is full of beans (or turtle soup, or something less pleasant) when he complains that BASIC's control structure is nicer than Logo's for some purposes.

One of the strengths of Logo is that you can write your own control structure. If you don't like the control structure that Logo provides, you can write a new control structure which you can then use—just as if it were originally a part of the language.

You can't even come close to doing that with any other language commonly available for microcomputers.

And does anybody want to add a nicely structured Pascal-style CASE statement to BASIC? Go ahead, give it a try. I'm not gonna hold my breath, though.

Roland Hutchinson
Music Department
Stanford University

Spider Support

Thank you very much for your glowing review of our new product, the Spider Pac. Could you pass along a few new developments to your readers?

The Spider Pac is capable of handling several disc drives at a time. Our conservative outlook in the beginning was that having more than one drive on at a time might be too much of a drain on the transformer. However, after exhaustive tests we have found that this is not the case. Your readers can feel free to add as many drives as they need.

Spider Pac is also compatible with disc drives made by Rana and Trak.

Atari 600XL and 800XL models require 5VDC, while everything else, including the Atari 1200XL require 9VAC. But not to worry—our XL-DAPTOR is now available, thus omitting another transformer.

I've noticed school systems daisy chaining up to four Spider Pacs in a row. I've seen over 25 components connected in this fashion. This not only

saves the initial wiring cost of a lab, but it also allows for easy expansion or movement of the lab in the future.

David W. Brundage
Compu-Tech Inc.
Glendale, Arizona

Technical Support

A footnote in the article regarding Atari DOS 3 reads, "Atari DOS 3 is now available on diskette." I've made 15 calls on various dates and times to the toll-free number in California and have received only a busy tone.

I would appreciate any help from you in having the Atari Customer Service representative contact me.

Victoria Jung
San Francisco, California

Customer Support sends their apologies. In December, sales of Atari products were great—good for us, not so good for those who want to contact us. Many people need additional information or have problems with their new set-ups, so the 800 line has been swamped. The release of DOS 3 was postponed after our last issue went to print. On page 72 of this issue, John Clark of Technical Support wrote a product review of the 1050 disk drive, which includes information on where to get the now available DOS 3.

I would like you to recommend some books published by Atari or some other respectable company that explain the command usage of machine and assembly language.

Michael Plotnik
Brooklyn, New York

Thank you for the vote of confidence. This book list was provided by Product Support:

The Atari Assembler, by Don and Kurt Inman, Reston Publishing, 1981.

Machine Language for Beginners, by Richard Mansfield, Compute Books, 1983.

Programming the 6502, by Rodney Zaks, Sybex Books, 1980.

6502 Assembly Language Programming, by Lance Leventhal, Osborne/McGraw-Hill, 1979.

Beyond Games: Systems Software for Your 6502 Personal Computer, by Ken Skier, Byte/McGraw-Hill, 1981.

Also check out the Macro Assembler tutorial written by Chris Crawford in this issue's "Computer Classroom" for some more good reading.

(continued)

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Do you know of any clock programs that can be used while the computer is running another program, like BASIC? The time could be displayed at the top of the screen, possibly using a display list interrupt.

Paul R. Wilson
Albany, New York

Clocks using display list interrupt are not a good idea. Any clock program using a display list would have to be written into the program, and a change in the graphics mode would erase it. We are sending you Demopac #3 from Product Support which includes a Real-Time Clock program, along with other clock applications—even a chiming clock. Demopacs are available from:

Atari Consumer Product Service
Product Support Group
1312 Crossman Ave.
Sunnyvale, CA 94086

I wish to know where I could get a listing of all the PEEK and POKE locations and values.

Carl Harpring
Delta, Ohio

Product Support is going to be very busy, because that's where you can also buy Technical User Notes for \$31.90. It will describe almost everything you ever wanted to know about Atari computers.

More RAM

I have an Atari 400 computer. I want to know if I can expand my memory from 16K to 48K. Where can I get it?

Bob Stank
Baldwin, Maryland

You can expand to 48K RAM with the memory expansion kit. You can get it from your authorized Atari Service dealer, but not all of the dealers carry it. Call the Atari Customer Service toll-free line, (800) 538-8543, and ask for the name of the dealer in your area that has the kit.

I am interested in obtaining the 64K RAM expansion module for the Atari 400. I have been unable to obtain any information from Atari Customer Service. Please let me know who in my area is an authorized Atari Service representative.

Maurice D. Levy, M.D.
Topeka, Kansas

The 48K RAM Board is available for you at: Mr. Computer, 1424 Industrial Rd.,

Emporia, Kansas, 66802 (316) 342-4893. Customer Service has also written to you with the details. They have explained that dealers with the parts to install are listed in their special guide with an asterisk next to the name—something not always clear to all who answer the 800 line. They also said that the 600XL expansion module should be out around the beginning of March, and will cost about \$100.

Atari 1200 XL Support

I am the owner of a 1200XL computer with an Asta 1620 disk drive. My questions to you are these:

1. Has anyone developed a means to utilize an 80 column board in the 1200XL?
2. Will the Bit 3 80-column board work with AtariWriter or a spreadsheet program such as VisiCalc?

I truly hope you can point me in the right direction, as I have a difficult time looking at 40 columns and visualizing 80.

Karen Muffi-Stinson
Vista, California

1. Not yet. 2. No. According to the Bit 3 people, their board only works with word processing programs that are written for 80 columns, such as Letterperfect by LJK Software. As for spreadsheet applications, Bit 3 has nothing available at this time for the Atari computer.

Are there any good books that really get into the true capabilities of the Atari 1200XL? I need help. I've learned all I can on the computer, but I feel limited by the lack of support on the 1200XL.

I am also limited by rotary telephone service. Any suggestions?

Your magazine is quite a bit of help and is much appreciated.

Lou Tessier
Granbury, Texas

The Atari 1200XL has been discontinued, although it is still being sold. As a result, not many outside publishers are selling books about the 1200XL. You can, however, get the 1200XL Technical Reference Notes and the new XL Operating System Addendum again from Product Support (see above address), for \$5.27, which you have now received.

As for your rotary phone, you can use the Atari 835 modem if you have TeleLink II software—available only in the Communicator II kit. TeleLink II offers a toggle for pulse or tone settings that should work just fine on your system.

ATARI CONNECTION

Readership Survey

In order to continue giving you the best editorial and advertising information we can, we would appreciate it if you would complete the survey below. Please mail to: ATARI CONNECTION, P.O. Box 3427, Sunnyvale, CA 94088-3427.

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The Editors

-
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2. Age
 B1 10-17 _____ B7 40-44 _____
 B2 18-20 _____ B8 45-49 _____
 B3 21-24 _____ B9 50-54 _____
 B4 25-29 _____ BA 55-59 _____
 B5 30-34 _____ BB 60-64 _____
 B6 35-39 _____ BC 65 yrs. or older _____
3. Education (Last grade completed)
 C1 Grammar School (1-8) _____ C3 Attended College _____
 C2 High School (9-12) _____ C4 Graduated College _____
4. Occupation
 D1 Student _____ D5 Clerical _____
 D2 Business Mgmt/Admin _____ D6 Other _____
 D3 Professional _____ D7 Not Employed _____
 D4 Sales _____
5. Household Income
 E1 Under \$8,000 _____ E5 \$35,000 to \$49,999 _____
 E2 \$9,000 to \$14,000 _____ E6 \$50,000 to \$74,999 _____
 E3 \$15,000 to \$24,999 _____ E7 \$75,000 or more _____
 E4 \$25,000 to \$34,999 _____
6. Which ATARI Computer do you own?
 F1 400 _____ F4 800XL _____
 F2 600XL _____ F5 1200XL _____
 F3 800 _____ F6 Do not own _____
7. Which of the following peripherals do you own?

	Already Own	Plan to purchase in the next 6 mos.
G1 Cassette Recorder	_____	_____
G2 Disk Drive	_____	_____
G3 Printer	_____	_____
G4 Additional Memory	_____	_____
G5 Modem	_____	_____
G6 Monitor	_____	_____
G7 Joystick/Paddles	_____	_____
G8 Trak-Ball	_____	_____
8. Please indicate how many programs in the following categories of software you now own or plan to purchase in the next 6 months.

	Already Own	Plan to Purchase
H1 Educational	_____	_____
H2 Games	_____	_____
H3 Business Applications	_____	_____
H4 Home Management	_____	_____
H5 Word Processing	_____	_____
H6 Other	_____	_____
Please specify	_____	_____
9. Which of the following influence your software purchases? Indicate all that apply.
 J1 Advertisements in magazines _____
 J2 Advertisements in newspapers _____
 J3 Television/radio advertisements _____
 J4 Editorial information _____
 J5 Recommendation of salespeople _____
 J6 Recommendation of friends _____
 J7 Selling price _____
 J8 Other _____ (Please specify)
10. Which of the following types of formats do you use most frequently?
 K1 Diskette _____
 K2 Cartridge _____
 K3 Cassette _____
11. How many hours a week is your computer in use?
 L1 1-6 _____ L3 13-18 _____
 L2 7-12 _____ L4 19 or more _____
12. When you finish reading ATARI CONNECTION, what do you do with it?
 M1 Pass it along to another person _____
 M2 Save articles of special interest _____
 M3 Save specific advertisements _____
 M4 File it for further reference _____
 M5 Discard it _____
 M6 How many other people do you estimate read your copy _____
13. Which language do you use to write programs?
 N1 BASIC _____ N4 Pilot _____
 N2 Logo _____ N5 Other _____
 N3 Assembly _____ N6 Do not write programs _____
14. Who besides yourself uses the computer?

Relationship	Age
01 Mother	06 _____
02 Father	07 _____
03 Sister	08 _____
04 Brother	09 _____
05 Other	0A _____
-
- If you would like to participate in future surveys, please include the following:
 Name _____
 Address _____
 City _____ State _____ Zip _____

Electronic Mail

The Revival of the Fine Art of Letter Writing

by Paula Polley

It was only a year ago that ATARI CONNECTION devoted an entire issue to telecommunications. One of the most exciting of its capabilities was electronic mail, or E-mail, the way in which messages can be sent or received through computers. We talked about the impact E-mail would someday have on our jobs, life-styles—and our writing skills.

What we didn't realize was that

"someday" was just around the corner. In the short year since that issue, several E-mail services—designed specifically for home computers—have started operation.

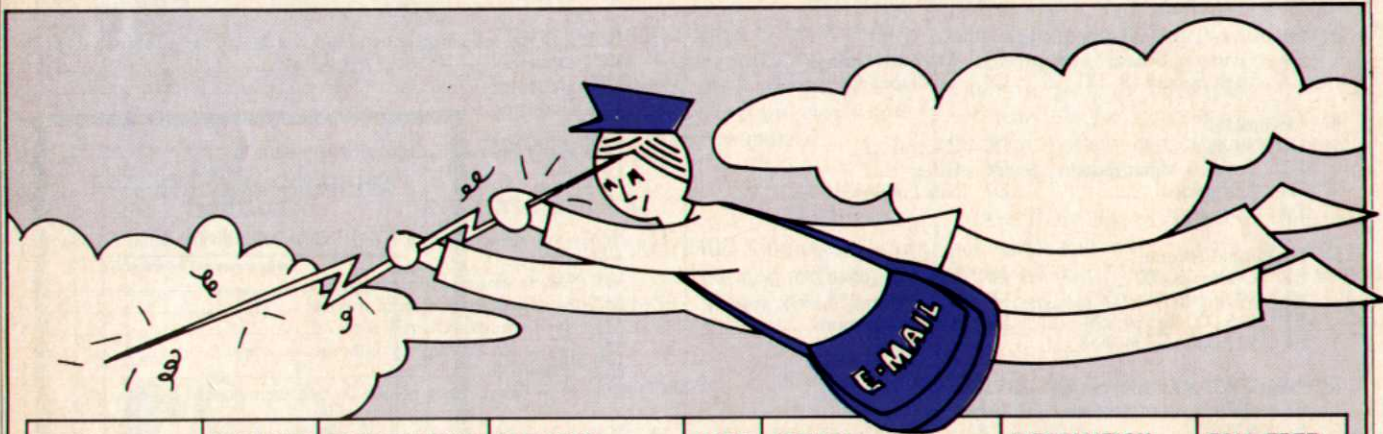
E-mail isn't new to the world of big business and high finance. International corporations and their sales forces have been corresponding electronically for years. What is new is that now anyone with a home computer, a modem and telecommunications software such as *TeleLink I*, can readily access one of the new E-mail services.

The three biggest E-mail services are offered by Western Union, MCI and The Source. The first of these stems from a communications company older than the telephone lines it utilizes. MCI is an off-shoot of a telephone company, while The Source is a by-product of an existing telecommunications subscription base.

All offer a variety of applications as well as access to news and information tie-ins. The three make it easy to sign up and get on-line; all give users the choice of sending terminal-to-terminal messages or hard copy printouts; and all offer delivery speed options. Each service spans a global network.

Western Union offers three ways to subscribe: through *EasyLink* you can store-and-forward electronic messages; the *WorldWide Telex Directory* lets you send hard copies; *EasyLink Plus* combines both these services.

The *WorldWide Telex Directory* allows you to send Computer Letters, Mailgrams, Telegrams or CableGrams. Mailgrams are just like the printouts that Western Union has routed through the U.S. mail for years—except that you yourself send them from your home



E-MAIL SUBSCRIPTION	START UP COST	CONNECT-TIME CHARGES	SERVICES	HARD COPY	SERVICE COSTS	INFORMATION SERVICES	TOLL-FREE NUMBER
EasyLink and Telex WorldWide Access from Western Union	\$25.00–\$50.00	\$.15 for @ call	Electronic Mailbox Telegram Mailgram Cablegram Computer Letter	NO YES YES YES YES	\$.24 per min. depends on no. of words \$2.40 for 1st 100 words depends on destination \$1.25 for 1st page \$.40 for @ 2nd page	F.Y.I. News and Information Service. Includes News, Business Reports, Sports and Weather	(800) 336-3797
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MCI MAIL from MCI	FREE	NONE	Instant Letter MCI Letter Overnight Letter Four-Hour Letter Letterhead/Signature	NO YES YES YES YES	\$1.00/3–5 pgs. \$2.00/3–5 pgs. \$6.00/3–5 pgs. \$25.00/3–5 pgs. \$20.00/3–5 pgs.	DOW JONES NEWS/RETRIEVAL	(800) 424-6677


computer. For faster service you can send a Telegram. If your needs are international, you can create a Cablegram. But if you want to send a regular letter, try Western Union's Computer Letter.

To send an instantaneous terminal-to-terminal message with The Source, you'd access their *SourceMail* service. For computer conferencing, you can get on *Participate*. The Source also features *Post*, an electronic bulletin board and classified advertiser; *Private Sectors*, for private corporate databases; and *Chat*, for live computer-to-computer conversations. And if you want to send an attention-getting hard copy, The Source offers *E-COM* (Electronic Computer-Originated First-Class Mail). *E-COM* prints your messages on top quality paper inside a highly noticeable blue and white envelopes and mails them first class from the office closest to the addressee.

MCI Mail offers you four ways to send hard copies. The *MCI Letter* is also sent from an area close to the addressee by first-class mail. The *Overnight Letter* is messenger delivered by noon of the following business day, while their *Four-Hour Letter* arrives in selected major cities within four hours.

A unique feature of MCI Mail is their

Speaking of Modems . . .



The New Atari 1030 Modem is the easiest way yet to send electronic messages with your Atari computer. Your telephone plugs right into the modem, which is connected directly into your computer. Its built-in software lets you dial from your keyboard.

Letterhead/Signature service. By storing your business or personal letterhead design and signature, MCI Mail uses laser technology to reproduce and post your correspondence from anywhere in the world. And for just one dollar, the *MCI Instant Letter* will telecommunicate any electronic messages of up to five pages in length.

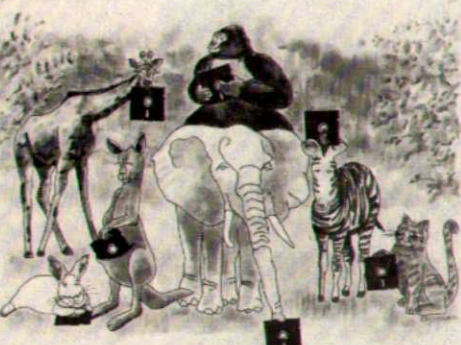
These E-mail services vary in terms of price, function and capabilities. The Source offers more options for the business oriented client. MCI Mail is prob-

ably the most accessible and affordable for home users, while Western Union may be the most effective for quick notes and important messages.

If you're interested in E-Mail correspondence, this chart can help determine which service best fits your needs. If you start utilizing your E-mail service, you may end up rediscovering the fine art of letter writing. In fact, telephone lines, the very vehicle helping to diminish the art of letter-writing, may be instrumental in restoring it. ■

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5 1/4" SSSD Soft Sector w/Hub Ring	M13AB	1.59
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NEWS

HOME COMPUTER

Edited by Elizabeth Metzger

GETAWAY! Absconds with the Third Annual ATARI STAR AWARD



Award winner Mark Reid (right) takes the prize from APX director Fred Thorlin.

HOW DOES IT FEEL TO have someone hand you a check for \$25,000? "I'm shaking all over," admitted a stunned Mark Reid, winner of this year's Atari Star Award.

The 27-year-old chemical engineer from Charleston, West Virginia was named grand prize winner in the nationwide contest sponsored by the Atari Program Exchange (APX).

The award is given for the best user-written program published by APX in the past

year. Reid's award was announced at what some view as the Oscars of programming, on Saturday, January 14, at San Francisco's historic St. Francis Hotel.

Following a sumptuous luncheon in honor of the four finalists, Atari Senior Vice-President Fred Simon announced the winner after tearing open the traditional sealed envelope.

The first entertainment entry to receive an Atari Star Award, *Getaway!* joins previ-

ous winners *Typo Attack*, submitted by David Buehler in 1982, and *My First Alphabet* from Fernando Herrera in 1981. *Getaway!* has all the elements of an action-packed suspense movie, including cops and robbers, fast cars, hideouts, and a maze of major thoroughfares and back alleys. Set in what looks to be an average American town, the game features a scrolling map filling 35 screens—not to mention such engaging touches of realism as re-

fueling stops at on-screen gas stations.

Getaway! was up against tough competition for the award. The three other 1983 finalists were James Burton, submitting a powerful graphics and animation program called *Drawit*, which offers 16 different colors; R. Stanley Kistler, for a remarkable spelling checker called *Atspell* for AtariWriter; and Gregor Novak, a physics professor who incorporated his love of centuries-old folk songs into a playful mathematics tutoring program called *RingMaster*.

A compellingly entertaining game, *Getaway!* also has an educational side; to evade capture, a user must be adept at reading maps.

An accompanying manual explains the gameplayer's predicament: "You knocked over an armored van, and now the heat's on." In a classic cops-and-robbers chase, you have to outrace sheriffs and patrol cars breathing down your neck.

There are seven levels of difficulty, starting with Lowlife, Hoodlum, and Petty Thief through to Hardened Criminal and the final, toughest level—The Boss.

While his game involves identification with admitted criminals, Reid says it has a moral element as well. "You always get caught," he explains with a smile, "which leads to the basic message: Crime Doesn't Pay."

A game with as many elements as *Getaway!* doubtless required careful playtesting, preferably by someone other than the programmer. Reid got some help from his wife, Jeanne, who also worked on the game's manual.

Where does a programmer come up with ideas for a pro-

gram good enough to win the \$25,000 Atari Star award?

According to Reid, his inspiration was a childhood set of plastic, motorized cars that included patrol models. The 1983 APX award was, he said, a dream "beyond my wildest hopes. Anyone interested in programming should give it a shot," he added. "I really didn't know anything when I first started out."

It was too early for the Reids to say how they'd be using their award money, although Reid mentioned that a new car might well be in the offing, along with the financing of a few as-yet-unidentified future projects.

And as for the award, "Well," said Reid in his soft West Virginia accent, "It certainly does give you encouragement!"

For a detailed review of *Getaway!*, see the Summer, 1983 issue of ATARI CONNECTION.

—Paula Polley and Marina Hirsch

Home Banking

The Shape of Things to Come

TIME WAS WHEN paying bills took some legwork. You wrote checks, licked the stamps, sealed envelopes, and trekked to the nearest mailbox. And for banking transactions you went to the bank, where you probably stood in line. If you didn't have a little time to spare, too bad.

For banking customers in New York and California with home computers, times have changed. New York's Chemical Bank offers Pronto, a home banking service compatible with only Atari home computers but expanding rapidly to include other makes. Citibank is also at work on a home banking service which, as of this writing, is still in the pilot stage.

For Californians, Bank of America recently introduced

HomeBanking, available currently only to northern California B of A customers. By this April, however, access to the service should be statewide.

While the day has yet to dawn when you can get cash without leaving home, services such as HomeBanking do handle most routine banking needs. With HomeBanking, you can use your computer to pay bills from any of over 200 companies listed in the bank's Payee Directory, including major department stores, newspapers, oil and insurance companies, utility and municipal services, hospitals, and a variety of financial institutions. You can transfer funds among checking, savings, Visa, and Master-

Card accounts with the B of A, find out your account balances, and review current checking account statements.

There are additional advantages with this new service. You can find out which of your checks have cleared, transmit electronic messages with your HomeBanking officer, and even schedule payments as much as a month in advance. (Which means no more late charges on your Visa account because you forgot to pay the bill in time.)

According to Maury Healy, a B of A spokesperson, upcoming additions to HomeBanking include a home budgeting service, and access to the discount brokerage firm of Charles Schwab and Company, a B of A subsidiary.

(continued)

Personal Computing Goes Public

Hardware Hits the Streets

COMPUTERS MAY SOON become as commonplace in the home as the telephone. Until then, one group of social visionaries is extending the metaphor with plans for a public access computer network in libraries, coffeehouses, even street corners, to operate like public pay phones. Community Memory, a ten-year-old Berkeley collective, is beginning a pilot project to allow anyone to tie into an open data base that will function like the classified ad, entertainment, and op-ed sections of a newspaper. For the price of playing an arcade game, users will be able to trade information on community events and public issues.

By this summer, CM hopes to have as many as 20 "information stations," with a keyboard and screen built into a cabinet or booth, around the San Francisco Bay Area. Information will flow



Hands on: St. Louis whiz kids try out Atari Adventure

directly from user to user, with local "gatekeepers" performing electronic housekeeping to keep the system running. Organized by categories ("Politics," "Guitar for Sale"), messages can only be edited by their author, though anyone can access a message and attach comments to it. The group developed original software to drive the system, which already has been demon-

strated at public gatherings.

In addition to seeking tax-deductible contributions, CM is publishing two periodicals to help launch the program: *Community Memory News* (\$1), detailing their work, and the quarterly *Journal of Community Communications* (\$14 a year), focusing on experimental information systems. For more information write: *The Community Memory Project*, 916 Parker St.,

Berkeley, CA 94710.

In a parallel development, Atari recently opened an innovative computer learning center in a St. Louis shopping area. Atari Adventure, the first in what will be a national network of 12 to 15 facilities, is designed as an alternative to conventional game arcades. People without access to personal computers can use the Atari Adventure showroom to learn BASIC or Logo programming, try word processing, or check out electronic bulletin boards. The center provides hands-on demonstrations of Atari computers and software for people previously unfamiliar with computers. But, to be sure, Atari Adventure does not forget consumers already expert in their field: adjoining each learning center will be a game room stocked with the latest in state-of-the-art arcade thrillers.

—Paul Cohen

What about the vulnerability of HomeBanking accounts? "Security is not a problem," Healy avows. "Because of our two-step identification process, we're confident this service is completely safe."

"We've had a number of firsts here," he adds. "We're the first bank to provide home services on a broad scale in California, and the first to have a system accessible to any home computer. Reception has been dramatic; people are lining up for dem-

onstrations. Bill paying, perhaps for the first time in history, has suddenly become exciting."

The excitement may be short-lived, but the convenience of new services such as HomeBanking is undoubtedly here to stay.

—Marina Hirsch

HomeBanking is priced at \$8 a month and requires a modem. Service access is between 6 a.m. and midnight, seven days a week. For additional information, call (800) 227-7788 toll-free.

SHARPEN YOUR SKILLS FOR THE SAT

WHICH OF THESE WORDS IS the opposite of *wake*: warn, freeze, sleep, trap, or eat? Which word is most similar to *guidance*: obedience, similarity, advice, militancy, or need? What is the analogy of 'mouth' to 'head': a 'group' to 'member' or 'part' to 'whole'? You'll find these and other

intellectual exercises in *Preparing for the SAT and Other Aptitude Tests* by Program Design, Inc. Whether you're a high school student preparing for the Scholastic Aptitude Test or someone who'd like to brush up on vocabulary and math skills, this program is a painless way to



Playing Games with the CIA

Prisoner 2 Outwits Would-Be Spooks

DO YOU THINK YOU have what it takes — the intelligence, cunning and resourcefulness — to work for an agency like the CIA? Playing *Prisoner 2*, a graphic adventure game from Eduware Services in Agoura Hills, California, is one way to find out for sure. That's what the CIA thinks. Reportedly, they use *Prisoner 2* for their personnel screening and training.

Prisoner 2 is an interactive instructional game, interactive meaning that the com-

puter responds to the answers you type. At first glance it appears to be much like any other modern text adventure game that incorporates detailed graphics. But *Prisoner 2* has games within games. Not only does it deal with codes, metaphors, and trial and error, but it is designed purposefully to be deceptive.

The game requires shrewd analysis, divergent thinking, and an ability to cope with inconsistencies. Eduware

employees report that the CIA uses *Prisoner 2* both to interview applicants and train budding spies in terrorist handling techniques. We also learned that *Prisoner 2* has been used in the psychiatric field to treat patients suffering from paranoia.

Prisoner 2 begins with resigning your position at a powerful high-tech company. You can quit—if you maneuver the initial maze — but they don't let you escape. You're trapped on an island

with 20 different buildings; there's a courthouse, church, school, library, bank, bar, several stores, a diner—even a theater and a circus. An anonymous island surrounded by a white picket fence.

Through the keyboard, players (job applicants, CIA trainees or psychiatric patients) can enter buildings, conduct their own investigations, and play games within the game. The activities and the answers you receive through these computer encounters of the frustrating kind, will help you piece together the information needed to escape. But according to Eduware, only 3 percent of those who played have mastered the game. And it took an average playtime of about 60 hours to escape the ever-deceptive island.

David Mullich, director of standards and procedures at Eduware, inspired by the TV series, developed the prototype of *Prisoner 2* in 1980 while majoring in computer science.

How does Mullich feel about his game's use by government intelligence agencies and psychiatrists? "I originally developed the game for fun," he says, "and to encourage original thinking. I hope these guys aren't taking it all too seriously."

—Paula Polley

Two-diskette package available from Eduware Services, Inc., 28035 Dorothy Drive, Agoura Hills, CA 91301; requires 48K RAM. Suggested retail price: \$39.95.

test your wits, sharpen your skills, and prepare for what's in store for you.

"The course is unique because it emphasizes problem-solving and test-taking skills," says PDI president John Victor. "Other computer-based SAT courses place most of—or perhaps even all—their emphasis on learning subject matter. This contradicts the purpose of aptitude tests which are designed to measure people's ability to learn, not what they have learned."

This program tests your skills in word and analogy recognition, and also number series and quantitative comparison problem-solving. It includes a cassette called *Taking Aptitude Tests*, that takes the mystery out of standardized IQ and aptitude tests and suggests strategies for answering questions.

Many of us old-timers wish we had this program when we were preparing for the SAT.

On the other end of the spectrum, PDI recently conducted a research study to see

if preschool kids benefit from using computers.

Using an Atari 400 computer and the PDI Preschool Library software series, 20 non-reading preschoolers in Stamford, Connecticut were split into control and computer groups and tested for basic concept and reading readiness skills before and after the computer was introduced.

The results? The computer group improved at a much higher rate than the control group—40 percent compared

to 13 percent. In particular, those in contact with computers improved their reading readiness skills and showed increased confidence in taking tests.

Preparing for the SAT and Other Aptitude Tests, available on diskette and cassette. Suggested retail price: \$119.95 (diskette) and \$99.95 (cassette).

For more details on PDI research, contact Program Design, Inc., 95 East Putnam Ave., Greenwich, CN 06830.

Electronic University Goes On-Line

TeleLearning Brings Knowledge Home

THIS PAST FALL A NEW university, promising to become the largest learning institution in the world, opened its doors to students. The event made headlines because the school doors are electronic—in the form of a telecommunications network allowing anyone with a home computer to subscribe to hundreds of courses and communicate directly with a professor. This "electronic university," developed by TeleLearning Systems of San Francisco, provides one-on-one, 24-hour access to instructors in more than 350 U.S. cities and 40 foreign countries.

Courses ranging from "Bicycle Maintenance and Repair" and "Designing and Selling Video Games" to "Marine Biology" and "Twentieth Century Authors" are available in cartridge and diskette form for home study. In addition, a special knowledge module acts as a direct-connect modem which, at the touch of a single button, links students with teachers. By making appointments through

electronic mail, students can take tests or ask their instructors questions and receive instant answers.

"TeleLearning involves a major technology breakthrough that simplifies telecommunications so that anybody can use the system," says Ron Gordon, the former Atari executive who now heads TeleLearning. "We've eliminated protocol codes and sign-ons and reduced the communication cost dramatically." Course fees—including communications costs—range from \$35 to \$65, and the knowledge module for Atari computers costs \$169. TeleLearning students can apply for degree credit at more than 1700 colleges through the College Level Examination Program. Gordon expects more than 500,000 students to enroll by the end of this year.

—Paul Cohen

For more information write: TeleLearning Systems, Inc., 505 Beach St., San Francisco, CA 94133. Call (800) 225-3276, or (800) 445-3276 in California.



Native Intelligence

Computer Archives Indian Heritage

CENTURIES BEFORE THE Europeans arrived, the Chippewa Indians fished, farmed, and hunted from the Great Lakes to the headwaters of the Mississippi. A transient tribe, the Chippewa changed camps with the seasons, searching for wild rice, trapping game, and harvesting maple sugar.

Through the years, much of the history of the Chippewa—ancient rituals and stories, as well as craft, tool, and weapon-making techniques—has been lost. But thanks to the Indian Education Office of Cass Lake,

Minnesota, and a much-used Atari 400 computer, Chippewa children and descendants of other Midwestern Indian tribes are learning more about their history and culture.

"We purchased the computer in January of '83," says Judy Hanks, coordinator of the program. "And we mainly use it for teaching American Indian language and history to students at the elementary or high school level."

Using the *Word Maker* program from the Atari Program Exchange (APX), Judy and her staff teach the ancient

Chippewa tribe language, Ojibwe, by assembling word lists in a spelling program.

"We think it's very important to help keep the Indian culture alive for these kids," says Hanks. "It's important for their identity as American Indian people."

The Indian Education Office also offers remedial help for students having trouble in regular academic subjects. They use the *Elementary Biology* program for exploring Odell Lake and Odell Woods, a computer model of a real lake in Minnesota. And to develop business, math and marketing skills, students play with *Lemonade Stand* and *Plant Store*, both APX products. "Kids who don't even need any help in school like to come in and play the math games," says Debbie Cameron, program instructional aide.

In the future, the staff would like to develop their own software programs to teach and reinforce the old Indian rituals, language and history. But for now, they're helping Minnesota Indian children discover their past. —Teddi Converse

USERS' GROUP TO THE STARS

Celestial BASIC Goes International

IN THE SUMMER 1982 ISSUE of ATARI CONNECTION, we reviewed a book titled, *Celestial BASIC*, which provided a smorgasbord of BASIC programs for the astronomy-minded. The book included everything from a complete list of holidays for a chosen year to horizon plots of the stars and planets for a chosen night. Even though its programs were written for Apple computers (thus requiring a little modification for use on Atari home computers), we recommended it highly.

Apparently we weren't

alone, because now comes news of a *Celestial BASIC* users' group composed of people from all over the world with all sorts of computers. "We believe this is the first users' group ever created around a computer book," says Dr. Rodney Zaks, president of Sybex Computer Books. Group focus, as those of you in Atari users' groups know, is usually on specific hardware or software, and almost always a specific company's computers.

The founder of the *Celestial BASIC* group is the

book's author, Eric Burgess, who was inundated by readers sharing their changes and discoveries, and decided to create a clearinghouse. "So many people made excellent modifications," says Burgess, "that I felt I should share that information." One example he cites concerns his program to calculate lunar eclipses. As published, only the dates of the eclipses are given, but several readers wishing to know the actual time revised his listing accordingly. Seeing their changes, Burgess not only agreed, but added moonrise and moonset times as well. He then disseminated the new program through his users' group newsletter, sent to everyone who had contacted him about his book. That newsletter is now in its third issue.

The Atari programmer will have to make a few changes in the listings given, but that only leads to better Atari programmers, and who can argue with that?

—Steve Englehart

Those wishing to join the *Celestial BASIC* users' group should write to: Eric Burgess c/o Sybex Computer Books, 2344 Sixth St., Berkeley, CA 94710.

Football Picks A Little Teamwork Pays Off

HOW MANY PARENTS wonder, after buying a home computer, what their kids will use it for, really, besides playing games? Well, soon after getting their first computer, two brothers from Berkeley impressed their folks by writing original software — *Football Picks*, a program that predicts professional football team winnings.

Football Picks is the brainchild of Chet and Tom Nelson, aged 13 and 15, respectively. Using an Atari 800 computer and a 410 cassette program recorder, they wrote the BASIC program

last summer in a "collective effort" with their father and cousin.

Once a week the brothers ask their computer to rate teams using a formula based on each team's scoring the previous week. The computer gives them the point spread for each game for the upcoming week.

"The computer does the math for us," explains Tom. "It takes us no more than a half-hour to use the program."

"Since we don't have a printer," adds Chet, "most of that time is spent copying



You bet: Tom (left) and Chet Nelson compute the odds.

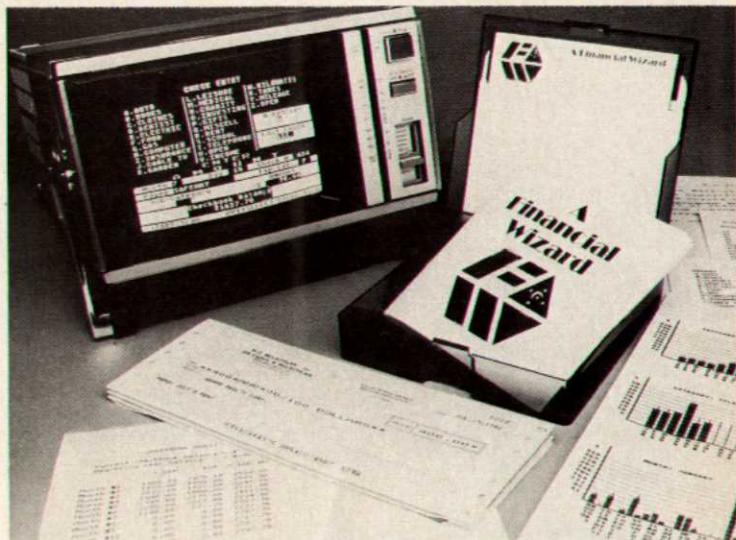
down the information."

They can then apply their insights to, say, entering a friendly wager in a football pool. "The computer has been right about 60 percent

of the time," Tom estimates. And thanks to the USFL, the Nelsons will be picking favorites almost year-round. Are you listening, Jimmy the Greek?

If you are serious about personal finance...

- **Budget Forecast**—26 expense categories
- **Check Entry**—easy data entry—scan & modify 26 major & 36 sub-categories—information block
- **Check Search**—single or multiple parameters—(up to seven) to search entries
- **Tabulations**—detailed expense vs. budget comparisons by month, year-to-date, category
- **Bar Graphs**—screen displays in graph form expenses vs. budget—by month or category—printing with graphic capable printers
- **Check Reconciliation**—fast clearing of resident checks & deposits, complete summary report
- **Checkwriter**—prints your custom checks
- **Printouts**—most popular printers
- **Multi-Colored Graphics** • **Audio Enhancements**
- **7 Utility Programs** • **User-Friendly Operation**
- **Easy To Use Instruction Manual** • **Audit Report**
- **Handsome Tinted Plastic Storage Case**



COMPUTER!

The Leading Magazine Of Home, Educational, And Recreational Computing

In a feature editorial.

"If you want to use a finance system, but don't want to spend several days trying to learn how to use one, then A Financial Wizard by Computari may be just what you need."

"The illustrated manual that comes with this program is clear, direct, and very thorough."

"It appears that this finance system was designed to achieve the best and most comfortable working relationship between the user and the program."

"The check entry routine is the most attractive feature of this finance system. Data prompts are very clear and the category item names are displayed at all times during data entry for your convenience."

"The file search capabilities of this program are superior. You are offered seven ways to look up the checks."

"The system is disk intensive. All data is saved automatically and immediately following all routines that either enter data or modify it."

"Scanning your entries is made possible by pressing START. You can see records very quickly this way."

"This is an excellent finance system—entertaining, accurate, and fun to use."

ANALOG COMPUTING

THE MAGAZINE FOR ATARI COMPUTER OWNERS

Analog Magazine in a comprehensive study of personal finance systems for Atari computers.

"A Financial Wizard from Computari is by far the best of these programs and will be the standard of comparison for the others."

"The check entry mode is easy to use..."

"The way a Financial Wizard handles your tabulations is excellent. You can chart your actual expenses vs. your budget by month, by category or year to date."

"...where it really outshines the rest is in the check reconciliation."

"In effect it gives you your bank statement on the screen, a complete list by month of all your checks and deposits."

"A Financial Wizard has one disk that does everything..."

"Graphics, while really not a factor in the quality of programs of this type, do make your budgeting chores a little more pleasant. Again A Financial Wizard comes out on top."

"Everything about this program is excellent..."

Antic

The ATARI Resource

In a Report from Antic.

"Like most Atarians, I am captivated by the graphic, color and sound capabilities of my machine. Nothing quite discourages me more than to boot up an applications program (personal, business, etc.) and to be presented with the standard graphic 'o' white characters on a blue screen."

Of course the usefulness and effectiveness of a program is of primary importance. However, enhancing the duller of applications programs with some of Atari's charms, is a great asset. A Financial Wizard, a personal finance program by Computari's Bill McLachlan, is an excellent example of an applications program that integrates many of the Atari's features into a well conceived and executed program."

"The use of color and sound in the data input prompts and error checking routines are so well done that it's quite simple to boot up the disk, follow along with the very clear documentation, and be 'up and running' in short order."

"I give A Financial Wizard high marks in ease of use, documentation and performance. If a disk-based home finance package is in your future, The Wizard should get serious consideration."

Computari's A Financial Wizard 1.5 The logical choice.

The system is designed for Atari computers having a minimum of 32K and operating from a disk drive. The cost is only \$59.95 plus \$3 for handling/postage.

If your dealer does not have A Financial Wizard... Telephone orders are accepted on Mastercharge or Visa credit cards. Mail order must be accompanied by check or money-order or credit card #.

Dealer inquiries invited.

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The Source of Business Power For Your Atari System

MMG DATA MANAGER

MMG DATA MANAGER

If you frequently find yourself looking for something, only to find it eventually, right under your nose, then MMG DATA MANAGER is for you. Organize virtually anything into a computer-searchable format, and let your ATARI do the hunting for you. This flexible database manager will allow 10 fields, with machine language sorting, on any field. In addition, you have total control of the structure of your data, allowing you to design a database with which you feel most comfortable. A special feature of MMG DATA MANAGER is its ability to select for a given value of any single field, or any combination of values from many fields. You could, for instance, determine who lived in Las Vegas, Nevada, and bought item 3145 from you, and whose last name began with SM, and whose telephone number began with (702) 87. You'll never lose track of information again. Multiple print options add to the versatility of MMG DATA MANAGER. Works with 1 disk drive.

40K \$49.95

MMG MAIL LIST

MMG MAIL LIST

Need to establish a mailing list of customers, friends, birthdays, anniversaries or Christmas cards?...or just need to organize things better?...You've got a powerful ATARI Computer...put it to work, with MMG MAIL LIST. This is by far the fastest, most versatile such program available for the ATARI. Completely menu driven, MMG MAIL LIST is extremely user friendly. Extensive error trapping prevents loss of information. MMG MAIL LIST will accept up to six different fields of any kind. The uses of MMG MAIL LIST are limited only by your imagination! You can sort on any field at machine language speeds. Imagine, being able to sort by zip code, by phone area code, by name, by recipe type! Search capability as well; if you remember only a portion of a name, MMG MAIL LIST will find all names beginning with that fragment. Adding records, deleting old records, making alterations in any of your stored information, all functions are supported, and are extremely easy to learn and use. MMG MAIL LIST will print to your screen or any printer, and any configuration of labels can be used. It will even print directly on envelopes! The best part of MMG MAIL LIST is its speed—as much as 50 times faster than competitive products. No more long waits to find information—it's all right at your fingertips! Requires 1 disk drive.

40K \$39.95

MMG FORM LETTER WRITER

MMG FORM LETTER WRITER

The product many of you have requested is now available. Designed to interface with all of the other business packages, the MMG FORM LETTER WRITER will produce a series of customized letters to everyone on your mailing list. A word processor designed specifically for letters, the MMG FORM LETTER WRITER offers full screen editing, saving and recalling letters to and from disk, and a built-in, simple to use interface which allows the sequential printing of letters to each person or firm contained in either the MMG MAIL LIST, MMG DATA MANAGER, MMG ACCOUNTS RECEIVABLE, MMG PAYROLL, MMG ACCOUNTS PAYABLE and MMG INVENTORY database. Inside addresses and salutations are automatically read from MMG MAIL LIST and inserted in each letter as it is printed. Simplifies form letter writing enormously. Requires 1 disk drive.

40K \$29.95

MMG GENERAL LEDGER

MMG GENERAL LEDGER

MMG has simplified the use of a General Ledger with this program, so that even a complete novice or a first time computer user will be able to operate this program with a minimal amount of knowledge. MMG GENERAL LEDGER is a totally menu driven, easy to use package, tailored to the small business. This package can handle up to 999 different accounts. Some are pre-defined which you can use, or create your own for your personal needs. This package can be used with any parallel printer and supports up to four disk drives. The MMG GENERAL LEDGER operates all standard reports including: Balance Sheet, Trial Balance, Income Statement and a full listing of all accounts and balances. Any report may be printed on any parallel printer or displayed on the screen. You can display any account instantly. No tedious calculations for balances or totals with the MMG GENERAL LEDGER. By using the other compatible packages, MMG ACCOUNTS RECEIVABLE, MMG ACCOUNTS PAYABLE, MMG PAYROLL, and MMG INVENTORY in conjunction with the MMG GENERAL LEDGER, you can obtain up-to-date financial information on your small business. Requires 1 or 2 disk drives.

40K \$99.95

MMG PAYROLL PROGRAM

MMG PAYROLL PROGRAM

The MMG PAYROLL package is a totally menu driven, easy to use payroll program, tailored to the small business. The program will handle up to 40 employees and performs all payroll calculations including the printing of checks.

This program can be customized to suit your own personal business requirements. It is extremely efficient and can reduce time spent manually handling those tedious payroll chores by up to 50% or more, and gives you a wealth of information at the touch of a button. The MMG PAYROLL package generates all standard reports including: Earnings Records, Payroll Checks, Check Register, Personnel History, W2 and 941 forms and allows user defined deductions. The use of machine language subroutines increases the speed of this valuable package, while at the same time allows you to change any part of the program to suit your particular requirements.

You may use the MMG PAYROLL package in combination with the MMG GENERAL LEDGER to obtain complete up-to-the-minute financial information. In addition, the MMG FORM LETTER WRITER interfaces with the MMG PAYROLL package to notify employees of tax changes, employee functions, company news, or anything! The MMG PAYROLL package requires 40K of RAM, 1 or 2 disk drives and the ATARI BASIC cartridge. A printer is optional, but recommended.

40K \$99.95

MMG INVENTORY CONTROL

MMG INVENTORY CONTROL

Complete control over both your inventory and the costs of maintaining it. Maintains inventory at cost and retail. Provides you with a wealth of information including Last Order Date and Quantity, Vendor, Re-order Point, Number of Items Sold, and much more. Will work as a stand alone package, or in combination

with the MMG GENERAL LEDGER. MMG INVENTORY CONTROL interfaces with MMG FORM LETTER WRITER to generate vendor notices, information requests and much more. Requires 1 disk drive.

40K \$99.95

MMG ACCOUNTS PAYABLE

MMG ACCOUNTS PAYABLE

Keeps track of all outstanding obligations, either alone or in combination with MMG GENERAL LEDGER. The program ages your payables and keeps you informed of discounts, dates due and monetary requirements. All record keeping, reporting, and scheduling is managed and it even writes your checks for you!

You may utilize MMG ACCOUNTS PAYABLE in conjunction with MMG FORM LETTER WRITER to create letters to creditors, bankers and much more. Requires 1 disk drive.

40K \$99.95

MMG ACCOUNTS RECEIVABLE

MMG ACCOUNTS RECEIVABLE

MMG ACCOUNTS RECEIVABLE is a totally menu driven, easy to use program tailored to the small business. This program can be customized to suit your own personal business requirements. It is extremely efficient and can reduce the time spent manually handling accounts receivable by up to 50% or more.

This program can be used with any printer and supports up to four disk drives. Design your own print formats or use the formats on the disk.

The MMG ACCOUNTS RECEIVABLE generates all standard accounts receivable reports including: Invoices, Statements, Customer Listings, and Aged Trial Balances. You can use the MMG ACCOUNTS RECEIVABLE program to generate mailing labels, sort customers, search for customers, and many other options. The use of machine language subroutines increases the speed of this valuable package, while at the same time allows you to change any part of the program to suit your particular requirements.

Use the program in combination with the MMG GENERAL LEDGER to obtain complete up-to-the-minute financial information. In addition, the MMG FORM LETTER WRITER interfaces with the MMG ACCOUNTS RECEIVABLE program to generate sales bulletins, notices, and delinquent letters for your customers. MMG ACCOUNTS RECEIVABLE requires 40K of RAM, 1 disk drive, the ATARI BASIC cartridge and any parallel printer.

40K \$99.95

MMG Business Packages are available at your local dealer or direct from **MMG Micro Software**. Just send check or money order to:

P.O. Box 131 Marlboro, NJ 07746

Or for MasterCard, Visa, and C.O.D. deliveries call:

(201) 431-3472

Please add \$3.00 for postage and handling. New Jersey residents add 6% sales tax.

MMG

micro software

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KIDBITS

FIND THE BUG WINNER

By Myrna Rae Johnson

FROM THE WONDERFUL WORLD OF WORMS, a worldly welcome! 'Tis I again, the forever faithful, vividly vivacious, Ms. Mella Dramatick, here to show you the bugs of your ways in the audacious Avant-Garde program.

It seems that a group of conservative art bugs condemned the wonderfully wacky performance of the intergalactic avant-garde artists, leaving the prospective viewers lost in space. But despite the mealy machinations of those pretentious pests, a few of you still discovered the secret of the show.

In line 50, random is multiplied by an undefined variable, the erratic R, plus 1. The variable equals zero and, as they say, nothing times nothing is nothing. That leaves the Screen Mode equal to one ($S=1$), and Graphics Mode 1 is a text screen. Hence the none-too-pretty flashing alphanumeric in the corner of the screen.

Naturally, the contemporary computer would much rather have Graphics Modes 3, 5 or 7 so it can



get to lines 60, 70 and 90. This would enable the program to generate the dynamic delight of the avant-garde artists. So if you change the *R* in line 50 to 2, you'll end up with the elaborate elegance of Graphics Mode 3 as the random graphics generator. Then you'll be pleasantly pleased by wondrous colors and shapes.

Several of you also noted that the XIO fill statement on line 190 will fill in with black until the second program pass, since it needs the color on line 220. To fix this, you should add a POKE 765, C(3) statement to the beginning of line 190, and delete it from line 200. Ms. Dramatick finds herself consistently confounded with the sharp eye of some of you little debuggers out there.

The winning solution was submitted by a not-so-little debugger, Duane Belisle of Elkhart, Indiana:

The Avant-Garde art program will be correct if you change line 50 as follows:

```
50 S=INT (3*RND(1) + 1)*2+1
```

I've had my Atari 800 approximately three months and this is my first issue of ATARI CONNECTION. I'm thoroughly enjoying both. I'm still in the process of teaching myself BASIC, although I have had some college work in FORTRAN and COBOL.

I'm 36-years-old and work as a production supervisor. I bought the Atari 800 as an educational tool for my two children (and as a toy for me), but so far

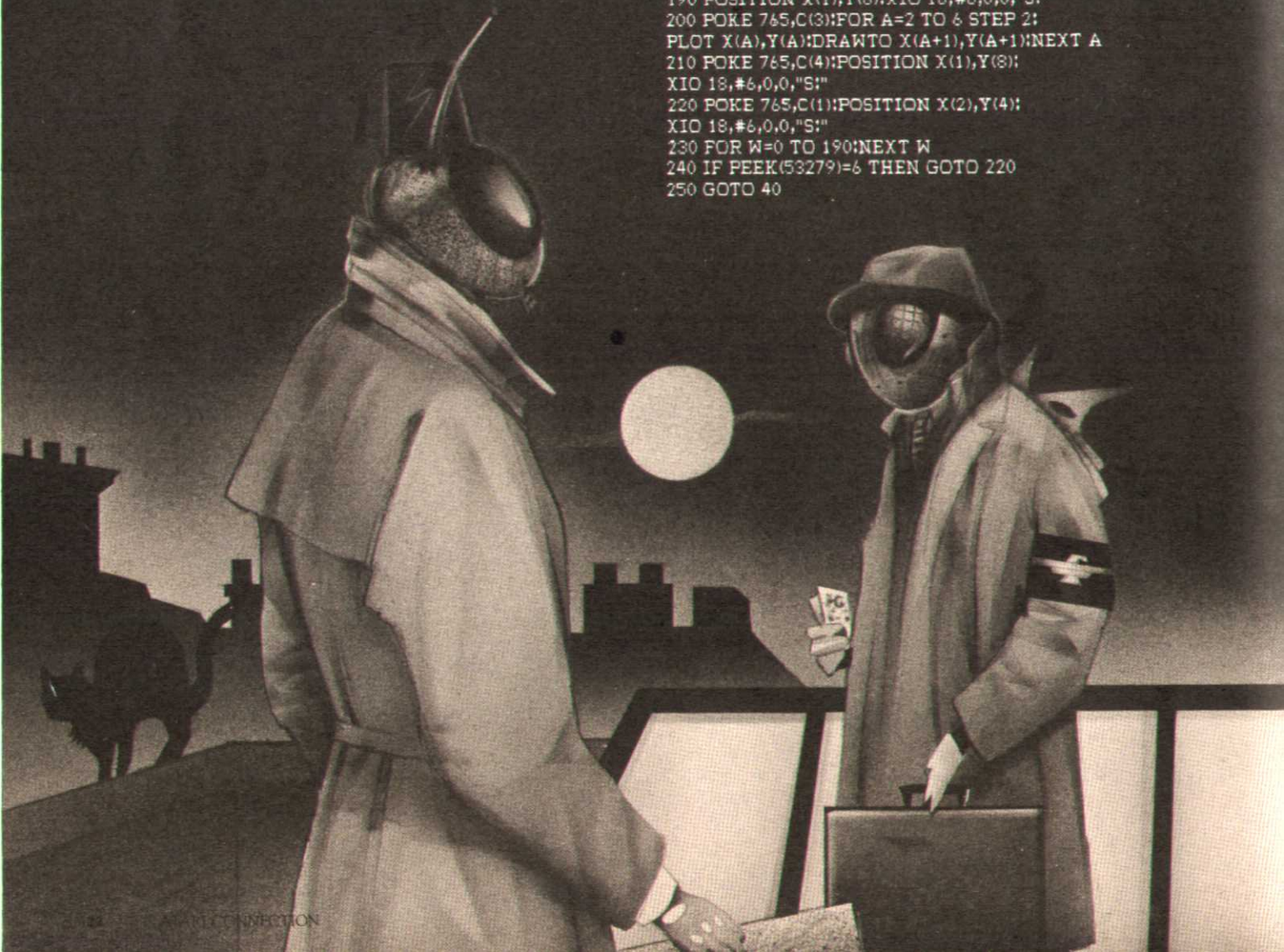
they prefer to play games on it and are not interested in programming.

*Duane J. Belisle
Elkhart, Indiana*

Due to his conquest of the conservative art bugs, Duane will receive a copy of the excellent new game, *Excalibur*, from APX.

AVANT-GARDE

```
10 REM *** Random Graphics Display ***
20 REM *** by Cassie Stahl ***
30 DIM X(8),Y(8),C(4)
40 POKE 77,0
50 S=INT(3*RND(1)+1)*2+1
60 IF S=3 THEN X=40:Y=24:GOTO 90
70 IF S=5 THEN X=80:Y=48:GOTO 90
80 IF S=7 THEN X=160:Y=96
90 GRAPHICS S+16
100 FOR A=1 TO 8
110 X(A)=INT(X*RND(1))
120 Y(A)=INT(Y*RND(1))
130 NEXT A
140 FOR A=1 TO 4
150 C(A)=INT(3*RND(1)+1)
160 NEXT A
170 COLOR C(1):PLOT X(1),Y(1):FOR A=2 TO 5:
DRAWTO X(A),Y(A):NEXT A
180 COLOR C(2):PLOT X(6),Y(6): DRAWTO
X(7),Y(7): DRAWTO X(8),Y(8): DRAWTO X(1),Y(1):
DRAWTO X(2),Y(2)
190 POSITION X(1),Y(8):XIO 18,#6,0,0,"S:"
200 POKE 765,C(3):FOR A=2 TO 6 STEP 2:
PLOT X(A),Y(A):DRAWTO X(A+1),Y(A+1):NEXT A
210 POKE 765,C(4):POSITION X(1),Y(8):
XIO 18,#6,0,0,"S:"
220 POKE 765,C(1):POSITION X(2),Y(4):
XIO 18,#6,0,0,"S:"
230 FOR W=0 TO 190:NEXT W
240 IF PEEK(53279)=6 THEN GOTO 220
250 GOTO 40
```



FIND THE BUG

IT WAS A DARK AND STORMY NIGHT. Sam hunched over a small transmitter in the back of a smoke-filled bar, tapping out the details of the latest Nazi troop movements. The secret code was new and uncrackable.

Screeching tires were heard over the soprano sound of the chanteuse singing on the piano. Voices choked into silence. Colonel Barfmeister with his sleazy minions came stomping into the restaurant and leered at the babes in sequins.

"Achtung!" Barfmeister snarled "Ve know ze spy is here, ja? Zis time he vill not get away."

Sam raced through the rest of the program. He sneaked quietly into the men's room and shoved the transmitter back into the toilet tank. He knew that his newly developed code, with its uncrackable five-digit sequences, would be a prize for Barfmeister. He tore his code into little pieces and flushed them into the Atlantic.

"Too bad," he thought, "that was the best code I've written yet."

FIND THE BUG CONTEST

If you can figure out the missing line and replace it, send your program listing to *ATARI CONNECTION* along with a short message about yourself. Future Humorists of America please note: encoded entries will not be accepted.

If your entry is correct, you'll qualify for our Find the Bug contest prize drawing for *Pole Position*.

The lucky winner will also have his or her letter printed in the next issue, along with the corrected program listing. Send your entry to:

Find the Bug
c/o ATARI CONNECTION
P.O. Box 3427
Sunnyvale, CA 94088-3427

But unheard by Sam, a faint tapping in the tank spelled out a response from British headquarters: "Play it again, Sam. An undercover bug clipped one of the most important lines. We've lost the code."

We've translated Sam's secret code into a program for Atari computers, but all we get is an error message. We can't figure out what the missing line is, or what it was supposed to do. And without it, the program's about as useful as screen doors on a submarine.

CODEBREAKER

by Dave Menconi

```
10 DIM CODE$(36),IN$(200),
OUT$(200),FUNC$(1),CLEAR$(36)
20 CODE$=
"P1QLAMZ2W0OSK8XG9I3EJDNCBVFH4R7U5T6Y"
30 CAPA=ASC("A");CAPZ=ASC("Z")
40 ZERO=ASC("0");NINE=ASC("9")
50 ? CHR$(125)? "-----CODE
MAKER-----"
60 ? "ENCODE OR DECODE (E/D)";INPUT FUNC$
70 IF FUNC$<>"E" AND FUNC$<>"D" THEN 60
80 IF FUNC$="E" THEN ? "ENTER TEXT TO
ENCODE";INPUT IN$;GOTO 100
90 IF FUNC$="D" THEN ? "ENTER CODE TO BE
DECODED";INPUT IN$;IN$=CODE$
100 FOR C=1 TO LEN(IN$);CH=ASC(IN$(C,C))
110 IF CH=32 THEN GOTO 160
120 IF CH>=CAPA AND CH<=CAPZ THEN
I=CH-64;GOTO 140
130 IF CH>=ZERO AND CH<=NINE THEN I=CH-21
140 IF FUNC$="E" THEN
CH=ASC(CODE$(I,I));GOTO 160
150 CH=ASC(CLEAR$(I,I))
160 OUT$(C,C)=CHR$(CH);NEXT C
170 ? ? :IF FUNC$="E" THEN ? "THE CODE IS:";
PRINT OUT$;STOP
180 ? "THE TRANSLATION IS:"? OUT$
```

A GIRL AND HER COMPUTER

Meet YAB Member Maria Smith

by Jamie Williams

IN A WAY, Maria Smith's great-grandmother is responsible for her being a member of Atari's Youth Advisory Board.

"She read an advertisement for Atari computer camps and mentioned it to me because she thought I might like to go," Maria recalls. "The next thing I knew, I was off to the University of San Diego for a month."

Seventeen-year-old Maria was a little nervous about what she'd find. "When I first got there, I was a little intimidated. I thought computers would be hard to learn to use. I found out pretty quickly that that's not so."

Armed with their new-found skills, Maria and a friend wrote a program that would win them first prize in the camp's programming contest.

"The program combined graphics and music to represent the friendship we feel for each other . . . we've known each other since fifth grade. The songs included 'Tomorrow,' from the Broadway show *Annie*, and 'What The World Needs Now Is Love.' The graphics were colorful pictures representing us as friends and used both our names like a crossword puzzle." Maria's award-winning program was featured in a documentary about Atari's computer camps called "The Magic Room."

It was Maria's stay at the computer camp that led to her being named to the Youth Advisory Board. "We wanted someone on the Board who had experienced an Atari computer camp," says Noreen Lovoi, a member of the Atari Corporate Communications staff who oversees the Board's activities. "Maria came to our minds immediately because of her enthusiasm and energy."

As a member of the advisory board, Maria reviews new products and helps Atari develop ideas for computers, video games and telecommunications. But that's just one facet of Maria Smith's busy life. In addition, the senior at Ygnacio Valley high school in Concord, California is interested in dancing, modeling, acting, flute, piano, working at a nearby restaurant, and "spending time with my boyfriend."

When Maria isn't doing any of those things, it's likely you'll find her at a nearby track, running. More than a few certificates and plaques won at track meets attest to her interest. "My best events are the 440 relay, long jump and triple jump."

Atari supplied Maria with computer equipment



for Board activities, including a 1200XL home computer, 810 disk drive and 1025 printer. "These days I'm so busy I mostly use the computer with *AtariWriter* word processing software to do homework and write papers for school. I'm also teaching my 11-year-old sister how to use it for school . . . she likes it a lot. My mom's trying to learn how to use it, too."

Maria says if she had enough time to really concentrate on programming, she'd like to write a program on phonics: "something that would help kids pronounce words and then spell them right. From what I've seen, those skills are really lacking in a lot of students."

To Maria, being on the Board means having a voice in decisions Atari makes about marketing certain products or implementing certain programs. She says one of her biggest concerns is "making computers available to everyone. A lot of people can't afford to go out and buy a computer, and I'm afraid they'll be left behind in a technologically advanced world. I think having access to computers and knowing how to use them will allow a lot of disadvantaged people to make a better future for themselves."

After high school graduation in the spring, Maria's plans for the future definitely include college. "I'd like to go either to the University of California at Berkeley or the University of Southern California. I haven't made up my mind about a career. The problem is, I'd like to do a lot of things. I don't want to be tied down. I'd really like to be a criminal lawyer . . . but then, I'd also really like to be a doctor. And I'd like to travel a lot, and use computers. The world's full of possibilities." ■

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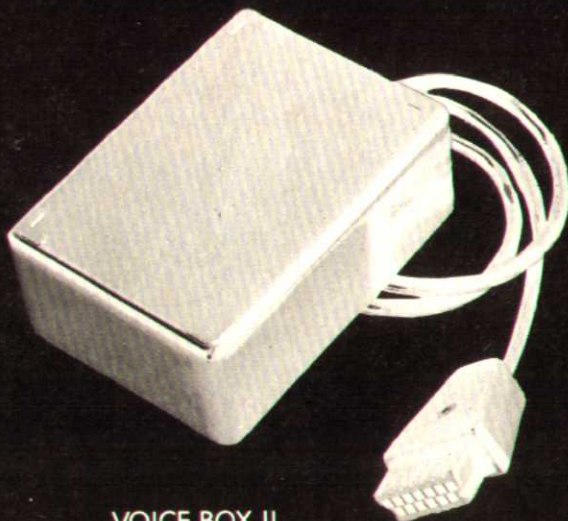
POPULAR SCIENCE—"The speech quality is excellent. Besides creating speech, the software has a bit of fun with graphics."

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THE COMPUTER THAT

Part One / by W.G. Armintrout

FIRST, YOU NEED TO ROLL up a character," I used to say to the newcomer on Dungeon Night. I would give him three dice. "Roll these for your attributes . . . Now, your attributes are strength, dexterity, intelligence, wisdom . . ."

"Slow down," he would say, scribbling. "Strength, and what?"

"That's right. Now would you rather be a cleric, a fighter, a thief, an assassin,

a Druid . . . umm, a wizard . . . ?"

"What's a Druid?" he might ask.

"A wilderness priest, sort of."

"What do they do?"

I tried to remember the rules. "Control animals, stuff like that. You can read up on it in the handbook. Fine. You're a Druid. What race?"

"Can I be a half-elf?"

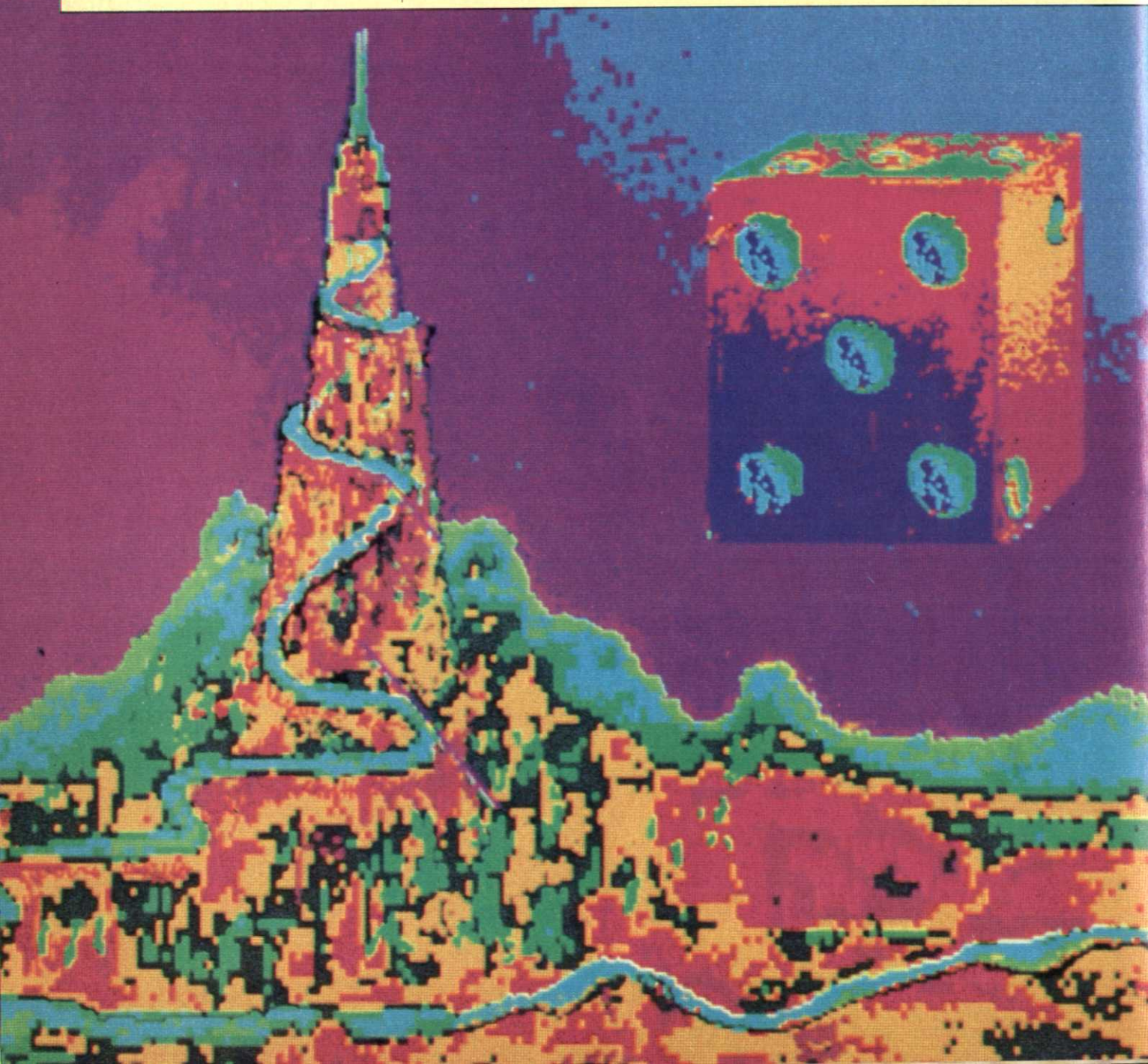
"I don't know."

I yelled across the room, "Hey, Rich, can a Druid be a half-elf?"

Rolling up dungeon characters wastes

a lot of time. I don't know whom you play with, but my group can easily go through half an evening just getting attributes straightened out and equipment selected. But as Gamemaster, I have more important things to do than find out every nitpicky little detail about somebody's Hobbit priest. I used to make all kinds of errors simply not wanting to search through pages to find the Who-Can-Be-What rules.

Now I've turned all that sort of thing over to my computer. When a new



ROLLS

Dungeons, Dragons, and Atari

player appears, I sit him in front of my television and hand him a joystick.

"You're going to generate a player character," I say. "Pay attention." I type "RUN."

"But I don't know how!" he screams.

"Just do what the machine tells you," I soothingly say over my shoulder as I walk away. And within a few minutes the newcomer has a character scribbled down and ready to go.

That's what this article is about. Character generators. Computer pro-

grams which help you to roll up a player character. They are fast, thorough, honest, and they don't need a Gamemaster (like me) to tell them what to do.

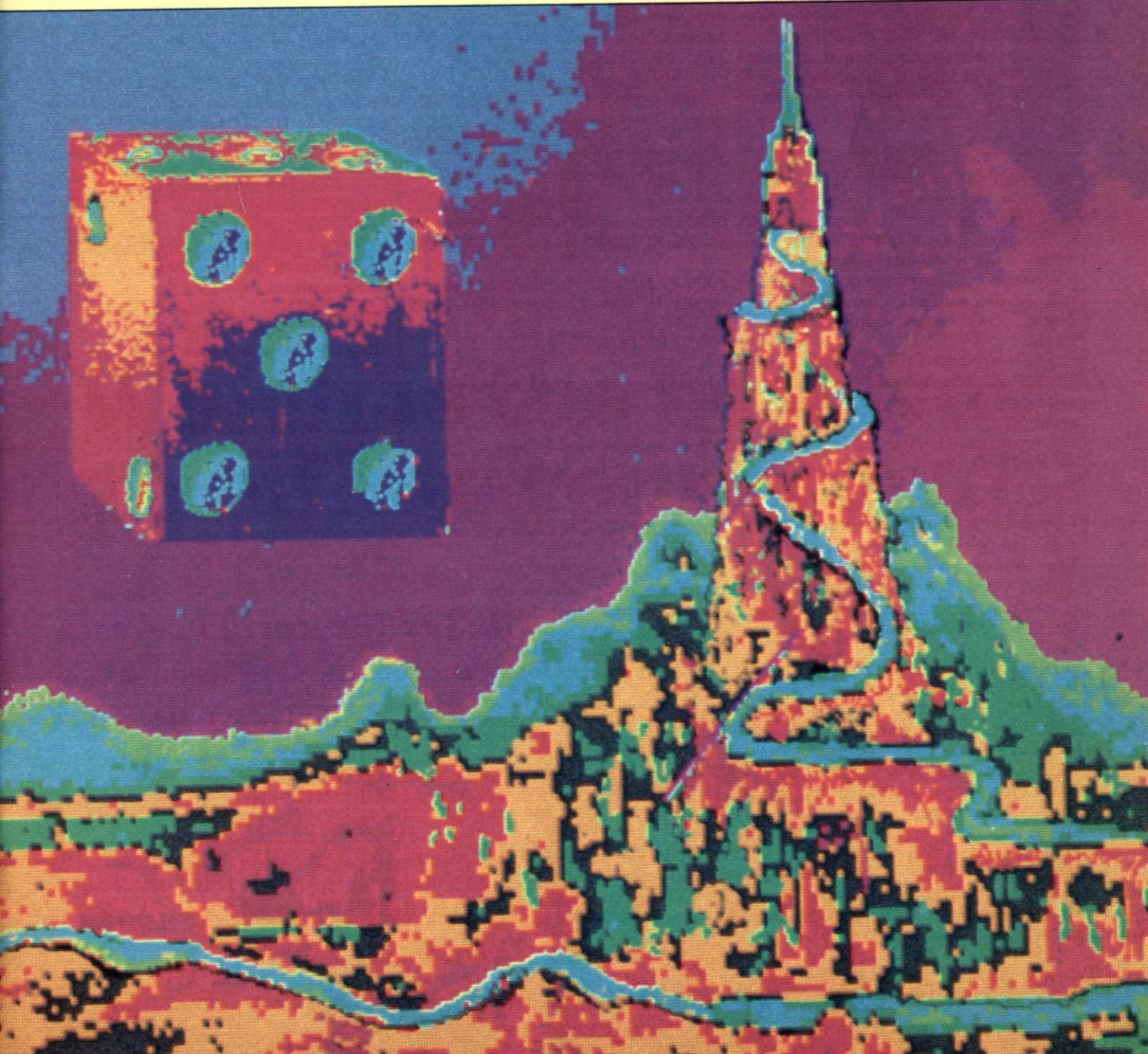
By now some of you are thoroughly confused. If you were at my house, I'd put a joystick in your hand and let the computer explain. You're not, so let me introduce myself.

I'm a Dungeonmaster. And a Gamemaster (they're the same thing).

A Dungeonmaster is an umpire for

the breed of "role-playing games" that hit the market starting around 1974. Games like *Dungeons & Dragons*, *Traveller*, *The Fantasy Trip*, *Aftermath!*, *Mercenaries*, *Spies & Private Eyes*: storytelling games.

In games like these, the Dungeonmaster invents the story setting. If he were to run, say, an adventure based on *The Wizard of Oz*, he would need to make a map of Oz, introduce the characters the players might run into—the Wicked Witch of the West, the



Wizard of Oz—and sketch in the plotlines of who-wants-to-do-what-to-whom.

The players, meanwhile, are inventing the story characters that they intend to play—perhaps Dorothy, the Tin Man, or the Cowardly Lion (but not Toto: he'd be left out as a non-player character, or NPC; playing a dog usually isn't much fun).

The process of creating a player character is called "rolling up" because, in most games, you roll dice. The dice are rolled to let a player know how smart, strong, fast, beautiful or lucky his character is.

From there the player can mold his character as he likes. Younger players tend to produce simple characters like Ivan Tirebiter and Molly Hatchet. Adults, on the other hand, might form a character as vibrant and exciting as any between the pages of a book.

As a Dungeonmaster one of my jobs is to help players see beyond the mechanics of dice rolling and number counting to create full-fledged fantasy personalities.

One of the ways I accomplish this is with my Atari computer.

There was only one factor I didn't anticipate.

"So how does it work?" asked the latest of the newcomers one night.

Teaching programming novices is not one of the things I do on Dungeon Night. "It's rather complicated," I began.

She nudged the [BREAK] key, typed LIST, and watched the program go sailing by. "See," she said, "I do know something about computers."

I reconsidered. After all she was, as we say in the fantasy hobby, a comely lass.

"Very well: Armintrout's Short Course on Fantasy Character Generation. The first thing you want a program like this to do is to explain itself. There's a cycle you want the machine to go through: explain what it's going to do, then do it, and finally show what it did."

I typed out a selective LIST, and the machine obediently reproduced a string of PRINT statements. "It starts off by explaining what it's going to do."

"That's sloppy," she said. Her fingers began to fly over the keys.

"What are you doing to my program?" I demanded.

"Straightening it." She took a careful glance at a line, then inserted an extra space into a PRINT command. "The hallmark of a neat program is that the right-hand margin looks nice and even."

"Oh, really?"

"The mark of elegance," she said, and LISTed what she had done.

```
100 REM Program Introduction
105 PRINT "{clear} {down}
Welcome to the world of"
110 PRINT "{tab}bbbFANTASY
ADVENTURE!"
115 PRINT "{down} You are
about to enter into an alter-nate
world, where fantasy exists
andbbmagic really works."
120 PRINT "{down} This
computerbbprogram will help youbbto
design, or 'roll up,' a special"
125 PRINT "characterbbto
representbbyou on yourbb
adventuresbbinbbthisbbmarvelousbb
new"
130 PRINT "world."
135 PRINT "{down} When you
arebbready to continue, tapbbthe
joystick."
140 PRINT "If you havebbnot
donebbso already,bbplug in your
joystick.;"
145 GOSUB 10015
```

"You could also save memory," she added, "by putting as many letters into each PRINT statement as possible. You don't need line 130."

"I don't care. I have 48K."

"Someday you'll care. Where does that subroutine call go to?"

I LISTed it.

```
10000 END: REM *Subroutines*
10015 IF STICK (0) = 15 THEN
10015
10020 RETURN
```

Just looking at it made my spirits rise. "That's the smartest bit of programming in this whole thing," I said.

"It's two lines long."

"Importance has nothing to do with length," I lectured. "The program was to make the computer wait while the user read the page, before continuing. I tried using a FOR/NEXT loop . . ."

"Then you wouldn't get the same time delay twice," she interrupted. "It changes depending on the temperature of the computer, where the command is located in the program . . ."

"It wouldn't work anyway," I said. "I was thinking wrong. We don't want a time delay here. What we want is an input for the user to tell the machine when he's done reading."

"Why a joystick? Why not the [RETURN] key, or [OPTION] or [START]?"

I tapped my forehead. "Psychological. Using the joystick lets people relax, and the cord lets them sit wherever they're comfortable."

"Makes sense."

"And the joystick is easier to foolproof. All we have to say is if the joystick hasn't moved yet—if the STICK function still equals 15—then

continue to wait until the user finishes reading."

"So what's next?"

"Next, we have another page of type." I requested the LIST from the machine. "Remember that explain/do/show cycle I told you about? We'll do that every time we try something new as we go through the program. Right now, it's time to explain what attributes are. After that, the machine can go and figure them out."

```
200 REM Attributes Explanation
205 PRINT "{clear} {down}
What your character can or cannot
dobdepends on his or her
ATTRIBUTES."
210 PRINT "{down}
STRENGTH:bbbmuscles,
thebbability tobblift and carry."
215 PRINT "INTELLIGENCE:
reasoning, solving pro-bblem and
speaking languages."
220 PRINT "LUCK: the ability to
be in the rightbbplace at the right
time."
225 PRINT
"CONSTITUTION:bbhealth and
endurance,bbhowbbmuchbb
punishmentbbyourbbbody
candbstand."
230 PRINT "DEXTERITY:
agility, manual dexteritybband
marksmanship."
235 PRINT
"CHARISMA:bbbpersonalbb
attractivenessbband leadership
ability."
240 PRINT "{down} All of
thebbattributes arebbgiven
abbbnumberbbbetweenbb3 and 18.
Eighteenbbis a perfect score."
245 GOSUB 10005
```

Once again, she got busy inserting spaces to even out my PRINT statements. "Where does this subroutine call go to?"

"How can I show you when you're editing?"

Couldn't you just tell me?"

I shook my head.

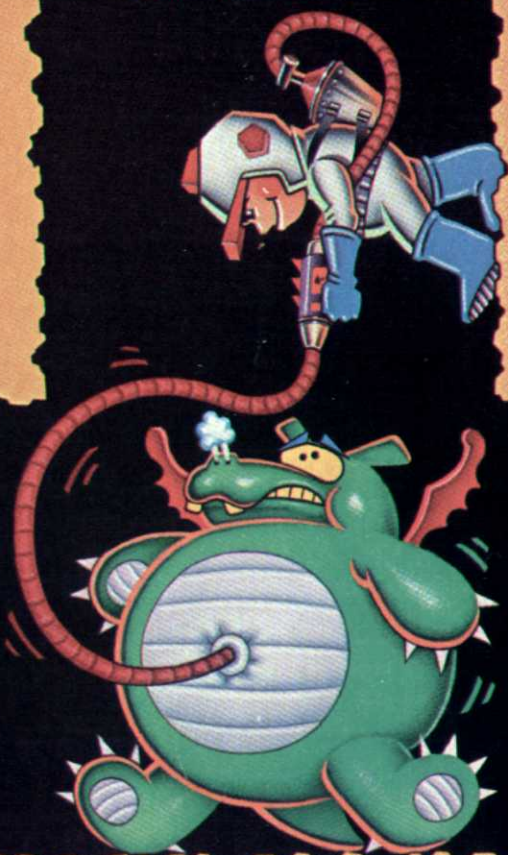
She typed a last correction into position. "Very well."

I got my hand to the keyboard, and LISTed.

```
10000 END: REM
SUBROUTINES
10005 POSITION 1,21: PRINT
"-----"
10010 PRINT "(When you are
ready to continue, justbbnudge the
joystick.);";
10015 IF STICK (0) = 15 THEN
10015
10020 RETURN
```

"Look familiar?" I asked.

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"End-of-Page," she said. "Only this time you jumped to line 10005 instead of 10015 and got the PRINT statements included."

"Righto. And from now on, whenever I come to the end of a page, I can go here and print the footnote about pressing the stick when done reading."

"OK, OK, OK, I get that." She was silent for a moment. "But why is 18 a perfect number?"

"Where?"

"That's what it says. Line 240."

"Line 240?" I looked it up. "Oh! The attribute numbers. They were designed originally around three six-sided dice. Eighteen is the best roll you can get: six plus six plus six."

"Six-sided dice?" she asked.

"Normal dice," I answered.

"You make it sound like there are other kinds of dice."

"There are. Four-, eight-, ten-, twelve-, twenty-, even thirty-sided dice. Before I had my machine, I had to own at least one of each kind. Now, I don't care."

A thought occurred to me. "Bet you can't tell me how to put dice in the computer."

Her lips puckered. "Simulating the roll of a dice," she said. "That's easy. You start with the random number function."

"OK," I said. "That gets you a number between 0 and .9999. What then?"

"Well, you multiply it by the number of sides the die has. Six."

That gets you a number somewhere between 0 and 5.99999."

"Now you add one to it."

Damn! She knew how to do it. "That's put you from 1 to 6.999."

And you hit it with the INTEGER function to delete the fraction. That makes the number exactly random between 1 and 6, integer values only. That's not very hard."

"Not everyone can figure it out," I said, and asked for a LIST. "This is the subroutine I use."

```
10025 X=INT (RND(0)*6+1) +
INT (RND(0)*6+1) +
INT(RND(0)*6+1)
10030 RETURN
```

She whistled. "You sure know how to waste memory." Her fingers began tapping at my keyboard again.

"What are you doing?"

"Conserving memory. Take a look at this."

```
10025 X=0:FOR Y=1 TO
3:X=X+INT (rnd(0)*6+1):NEXT
Y:RETURN
```

"Looks like it'll work," I admitted.

"But why does it save memory?"

"Cuts down on the constants, the sixes and the ones. They hog memory. I'd bet we just saved 20 bytes on that improvement."

"My machine has 48,000 bytes."

"Thinking like that is undisciplined. Unprofessional. You'll never make the ranks of big-league game designer like that."

"Who's trying?" I typed for another LIST.

"If your correction works, that's the part of the program that does the work the computer has been so busy explaining so far."

"Short," she said.

I shrugged. "It works."

```
300 REM Rolling up Attributes
305 GOSUB 10025: STR=X
310 GOSUB 10025: IQ=X
315 GOSUB 10025: LK=X
320 GOSUB 10025: CON=X
325 GOSUB 10025: DEX=X
330 GOSUB 10025: CHR=X
335 GOSUB 10040
```

"X is the dice roll from your subroutine," she said.

"Then you wrap up this part by showing the user what the new attributes are."

```
10035 REM Display Subroutine
10040 PRINT "{clear} {down}
FANTASY ADVENTURE/character
display"
10045 PRINT "{down} {down}
{down} Strengthbbb= ";STR
10050 PRINT "{down}
Intelligence = ";IQ
10055 PRINT "{down}
Luck = ";LK
10060 PRINT "{down}
Constitution = ";CON
10065 PRINT "{down}
Dexterity = ";DEX
10070 PRINT "{down}
Charisma = ";CHR
10075 IF TÆ0 THEN 10005
```

"But why is it a subroutine?"

"We're going to use it over and over again, when we get to languages and height and weight and races and classes. But the important thing is the system—explaining, doing and then showing. That's what makes this program work. From here on out we can just add on more modules, going through each of the three steps!"

"It's a nice little program," she said.

"Well, it may not be the niftiest piece of arcane programming you've ever seen, but everything in it works," I said. "I suppose you could do better?"

"Maybe. I don't know much about games, but I can program . . .," her voice died out as her fingers typed in

commands.

"I know where we can improve this thing!" The End-of-Page subroutine appeared on screen. She began to make alterations.

"Feedback," she said. "Under what situations are we using this routine?"

"After reading something," I said.

"What happens next?"

"You mean in the program? It either writes a new page, or it does something."

"Aha! And then?"

"It shows what it did," I said.

"So for the user, something like this happens: she finishes reading, hits the joystick, there is a pause while the computer does whatever it's doing, and then the display routine shows what happened."

"Right."

"So do you see what needs to be added?"

Nothing seemed obvious. "No."

She shook her head. "The user hits the stick; the computer goes and does something; but the user isn't sure if the computer heard him! He's still nudging the joystick, waiting for the screen display to change!"

"So . . . ?" My mind cleared.

"Yes, yes! Feedback. Give the user a signal that says the joystick has indeed been moved. The best way to do that is with sound, and we go to that subroutine from the End-of-Page routine. Like this."

```
10020 GOSUB 10030: RETURN
10030 FOR VOL=16 to 0 STEP
-2: SOUND 0,11,12,VOL: NEXT
VOL:SOUND 0,0,0,0: RETURN
```

"That's a nice touch," I looked from the television screen to my companion. "By the way, do you have a name?"

"I do," she said, smiling.

". . . ?"

"Laura." She stuck out a hand. I shook it.

"I'm the Dungeonmaster, but you can call me Bill."

"Bill." Laura glanced at the game table, and the dozen players talking back and forth and grabbing handfuls of popcorn. "Hey, we're not keeping everyone else waiting, are we?"

I looked at the time. "They can't start without a Dungeonmaster. You still have that character you rolled up?"

She nodded. "You're going to have to finish showing me that program . . . sometime."

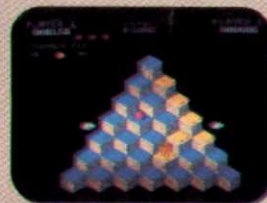
"That's a deal," I said.

NEXT TIME: Races, Professions, Height and Weight, and Languages

W.G. Armintrout is a freelance writer based in Tooele, Utah. ■



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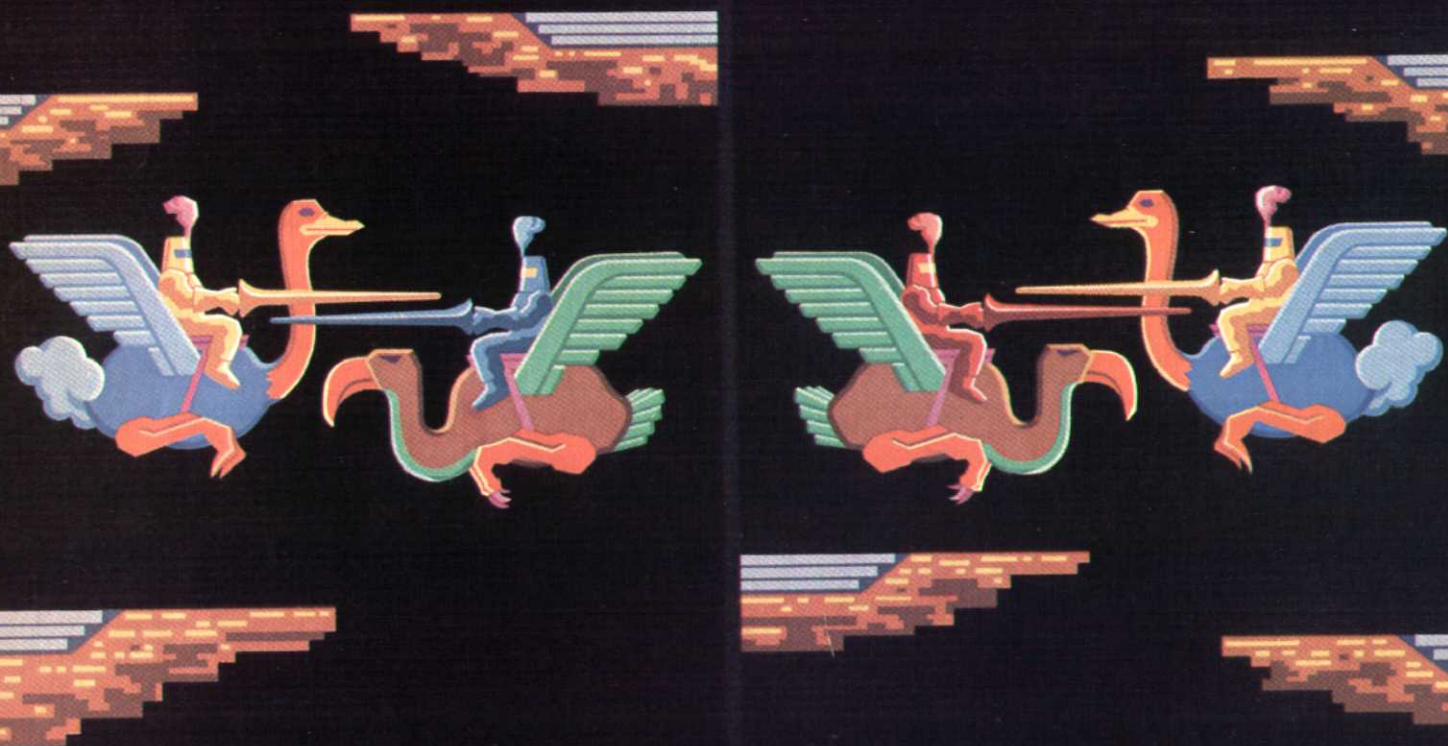
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ATARI



Lucasfilm's New World of Computer Games

"They were crazy enough to let us do it"

by Paul Cohen

EIGHTEEN MONTHS AGO GEORGE LUCAS met a lone programmer in an unmarked warehouse in San Rafael, California. Building on the strength of his computer division—the people who generated computer graphics for *Return of the Jedi* and *Star Trek* and developed new filmmaking technology—Lucas was out to create a computer games group. Its mission: create video games in the spirit of Lucasfilm—imaginative, impeccably executed and fun. The games group would be on its own, Lucas said, required only to produce the new and different. True to its charter, the group developed two games soon to be released by Atari and sure to change the nature of computer games.

The first, a surreal "ballgame," pits player against player in a futuristic ball field; the second, an incredibly realistic "space flight," simulates a tense search and rescue operation. Both bring a new dimension to home computer games—literally. They use true first-person point of view and 3-D perspective. "We all want to participate in an environment, to be a part of the game," says project leader Peter Langston, the one who recruited the team for Lucasfilm. "These games create a world for you."

Indeed. In the rescue game (first called *Rescue Mission* "until we realized that was a place on the Bowery where derelicts got soup," says Langston) players maneuver their space ship in a remarkable flight simulation, searching for downed pilots amidst a constantly changing landscape. But get this: The images are calculated "on the fly," from scratch, every frame. The effect is achieved with fractal geometry—a mathematical way of representing the natural randomness of shapes in the universe. "Fractals create an infinite richness in places you can go and things you can see," says graphics researcher Loren Carpenter. "The landscape is fully three dimensional. If you miss something you can turn around, go back and it'll still be there. The images are generated from information stored in memory."

"When you tell people the images are randomly generated, but that you can return to them, they think you're kidding," adds designer and programmer David Fox.

"How do they do it?" gasps Langston.

They do it by believing it can be done. "One of the things we were told when we started is that point-of-view games can't be done," recalls David Levine, designer and programmer of the ballgame. "But that never made any sense. We just said, 'This is a good idea, let's try it.'"

They tested the game concept for the rescue game on an Evans & Sutherland Picture System—the equipment used

to generate the holographic images in the Rebel Briefing scene in *Return of the Jedi*. Then came months of "squeezing down and speeding up" the program to fit into a 32K ROM cartridge. "We'd spend a day figuring out a way to save a couple of bytes," says Langston. Tailoring their incredibly complex program to "take advantage of the unique capabilities" of the Atari computer's 6502 microprocessor and sound and graphics chips, they managed the kind of detail that marks all Lucasfilm productions. Like the sound of footsteps as a pilot approaches your space craft; knocking on the side of your ship as he tries to board; and a big surprise you won't read about here.

"Both of our games work in the traditional computer graphics way," explains Levine. "You develop a mathematical model of your world. The program makes its own internal decisions based on that model, then shows you the world from a particular point of view. In the rescue game, it's from a single point of view; in the ballgame it's from two." And if the rescue game uses a recognizable adventure scenario, the ballgame is like nothing ever seen on a TV—it is initially disorienting. A split screen shows action from your own perspective—from the cockpit of your "Rotofoil"—and your opponent's. The object of the game is to blast the ball through a set of moving goal posts while trying to "shake" your opponent. The speed and immediacy of the game is exhilarating, as is the progressive jazz score. Between games, it actually improvises riffs contributed by some of Langston's musician friends.

All of which promises to do for the game industry what Lucasfilm has done for the film industry: rewrite the standards. "We want to do games the way the company does films," says Fox, "with a high level of quality and creativity." Like Lucas' movies, the games create a world built on illusion, fantasy and dazzling effects. "People here have a reputation for doing things that everybody said couldn't be done," adds Charlie Kellner, a programmer whose credits include the Alpha Syntauri sound synthesizer. "The people in charge were just crazy enough to let us do it. And smart enough to *require* us to do it."

Meanwhile, Gary Winnick, former Atari animator and the newest member of the group, is working on storyboards for future Lucasfilm games, and this year the group will grow to an even dozen. Langston talks about doing "other interesting things that haven't been done before"—maybe an arcade game and certainly more home games. Whatever they come up with, count on it keeping you glued to your computer. It's sure to be a major production. ■

TEN TIPS FROM THE PROGRAMMING PROS

Secrets from Lucasfilm's Game Group

WHEN THEY SAT DOWN a year ago to write a couple of "throw-aways," the people in Lucasfilm's games group had never produced a video game. They designed a couple of 3-D, point-of-view games as an experiment. It would never fly, they were told. So, they studied the Atari computer's dedicated chips and microprocessor and pushed the limits a little farther out. "Designing programs of such complexity, compactness and efficiency is a process of continuous debugging," says programmer Charlie Kellner.

This wasn't your typical solo programming—three or four people at a time would work on a program. As a group they exhibit a richness of experience and diversity of approach: They enjoy taking a lot of math and physics and making it look like magic. Constantly compressing and refining, they were able to fit each program into a 32K ROM cartridge. One programmer offers what he calls "Occam's Electric Razor": The right solution should be implementable by simple code. But it doesn't always work out that way.

Informed that Chris Crawford had converted his scrolling map game *Eastern Front (1941)* from a 48K program diskette to a 16K ROM cartridge, project leader Peter Langston says, "He must have read our Ten Tips." But they took time out to write these for ATARI CONNECTION. "The hardest part," they report, "was cutting down our list of tips to a mere ten. The five group members' programming experience totals 69 years, and many of the lessons reflect painful experience. But there are some sources of useful yet painless information: among these is *The Elements of Programming Style* by Kernighan and Plaugher."

So how do Lucasfilm's games stack up? Next issue, Chris Crawford may just review their games.

1. *First make it right, then make it fast*

When you write a routine that needs to be blindingly fast, the first step is to get it working; *then* think about speeding it up. It doesn't matter how fast your routine runs if it doesn't do what you want: Reliability is not an add-on feature, but speed can be. The same considerations apply to squeezing a big program into a small space. If you have plenty of memory space for your program and you need speed, you can unroll loops (duplicate the code inside the loop the specified number of times) and use precomputed data. On the other hand, you can generate data "on the fly," if you have plenty of compute time and need space.

2. *Fail fast (if ever)*

Tackle the hardest part of your program first and test it thoroughly before going on to the easy parts. This way you'll know as soon as possible if your idea has some fatal flaw. For example, your entire concept might be unworkable because it takes too much memory or runs too slowly. It's very discouraging to get all the easy stuff done just right and *then* discover that the "hard part" is really the "impossible part."

3. *Top down and bottom up*

Write your programs "from the top down" and "from the bottom up." First decide what results you want and work backwards to figure out what you have to do to get them ("top down"). You may then discover that you can't do exactly what you had in mind, but you might do something even more interesting if you're willing to change your final goal ("bottom up"). Repeat the cycle until you reach results you're happy with.

4. *Sound is your secret weapon*

Your game's sound is as important as its graphics. (If you don't believe this just try plugging your ears at a *Star Wars* film!) Everything that happens in your game should have its own characteristic sound. Sounds and music can set the atmosphere and make the exciting parts more involving! Plan the sounds early—don't leave them for the last minute or the last 100 bytes.

5. *Keep your sense of humor*

Video games are real-time entertainment, just as movies and the theater are. Performing artists learned long ago that if you constantly try to evoke a single reaction or emotion, people will tire quickly and stop paying attention. If the game is a tense shoot-em-up, you'll need some comic relief from time to time. Don't be afraid to be cute. On the other hand, if the game is a funny cartoon, you'll need touching moments. A little contrast can heighten any illusion.

6. *Make it real*

If you involve real-world physical principles in the design of your game, the unconscious cues from an accurate model of the universe will make the game much more realistic. On the other hand, it's vitally important to make the game work on the gut level. If the physics doesn't feel right, you might have to compromise between the "real" way and the "fun" way in order to make the game exciting to play. In one of our games, we simulated the flight of an airplane and found a realistic plane is boring to fly. But before we could fix the problem, we needed to understand the physics involved to know what (and how) to compromise. Once we looked



A Force to be reckoned with: Lucasfilm's game programmers (left to right) Charlie Kellner, David Levine (seated), Peter Langston, David Fox, Loren Carpenter (of the Graphics Department) and Gary Winnick.

closely at the physics we discovered ways to make it even more exciting than we had hoped. And, of course, we were careful to make our new system consistent, simple and believable.

7. *Make it hard*

Games need to be hard to be challenging, but the hard parts should be fun rather than frustrating. Don't make the game difficult by making the controls difficult to use or the gameplay arbitrary; instead make the game difficult by making the tasks heroic. "I finally collected all 99 treasures!" is a lot more rewarding than "I finally got the joystick to work!"

8. *Make it easy*

The program should be as easy to write, debug and modify as possible. Your time and patience are important commodities, so use the highest-level language you can get away with. If the program will work fine in BASIC, C or Pascal, then don't bother with Assembly Language. Even if you need to use Assembly Language, it is often easier and faster to program the game in a high

level language first, try out variations and improvements until you have it right, and then recode it in Assembler (see tip #1).

9. *Make it perfect*

There is no detail too insignificant to merit careful attention in a high-quality game. People will spend hours and hours playing a good game, paying intense attention to it. If you took a quick-and-dirty approach, it will show. Glaringly. Make the universe of the game rich and detailed, defining it beyond the game itself. We have a friend who makes wonderful movies, and one of the reasons they're so good is that he treats every little detail as if the fate of the whole movie depends on it . . . and he's right, of course.

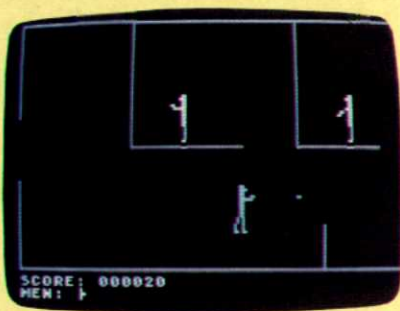
10. *Don't be afraid to break the rules*

Rules are a way to say what is *usually* true. But if you understand what the rule is based on, then you will know when you can break it. For instance, the rule "point-of-view games don't work" never sounded quite right to us.

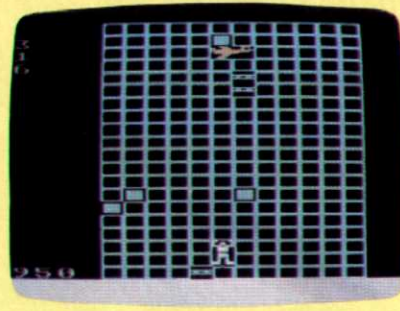
We think that what the rule is saying is there *usually* isn't enough information (visual and audio) available for people to know what's happening without some other help (like seeing yourself from behind). So we provide better information and our point-of-view games are like being there!

One or two more things . . .

In addition to our ten tips, there are two things you've probably heard countless times. (This is probably because they are true!) The first is to make a backup of your source code before you make any changes in your working program. Keep copies of your last two or three working versions so you always have the option of undoing a change that didn't go too well. The second is to document your program. You will read your source code 50 times for every time you change it. Taking a little time to write an explanation next to each section code will save a lot of time later. These two really aren't tips at all; think of them as laws. And, oh yes—the most important tip—never type your program while taking a bath or shower. . . .



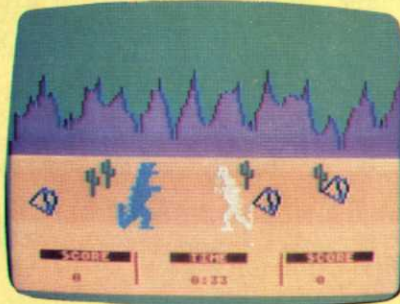
Maniac!



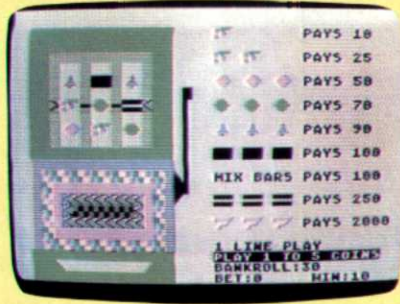
Stuntman



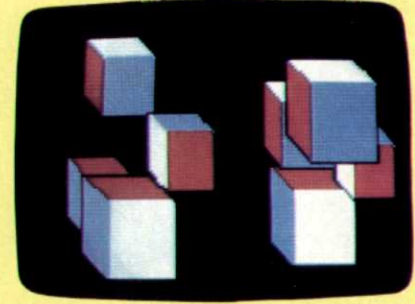
Fill 'Er Up



Dino Battle

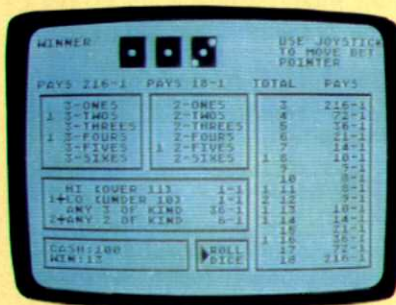


Color Slot Machine

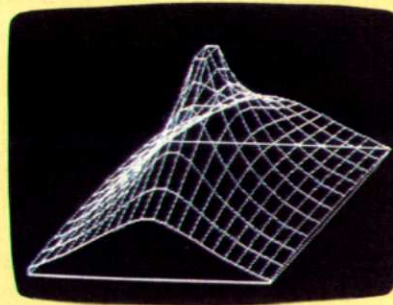


Cubes

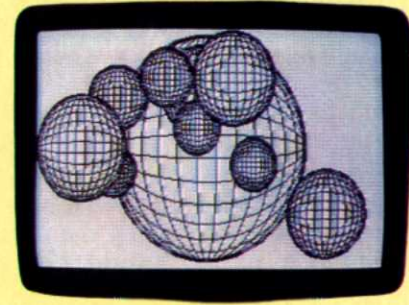
Where can you get all of these programs (and dozens more!) for only \$14.95?



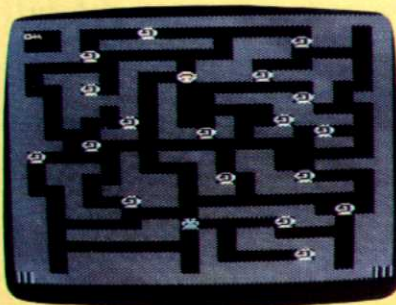
Triple Threat Dice



3-D Graphs



Sphere Demo



Leprechaun King

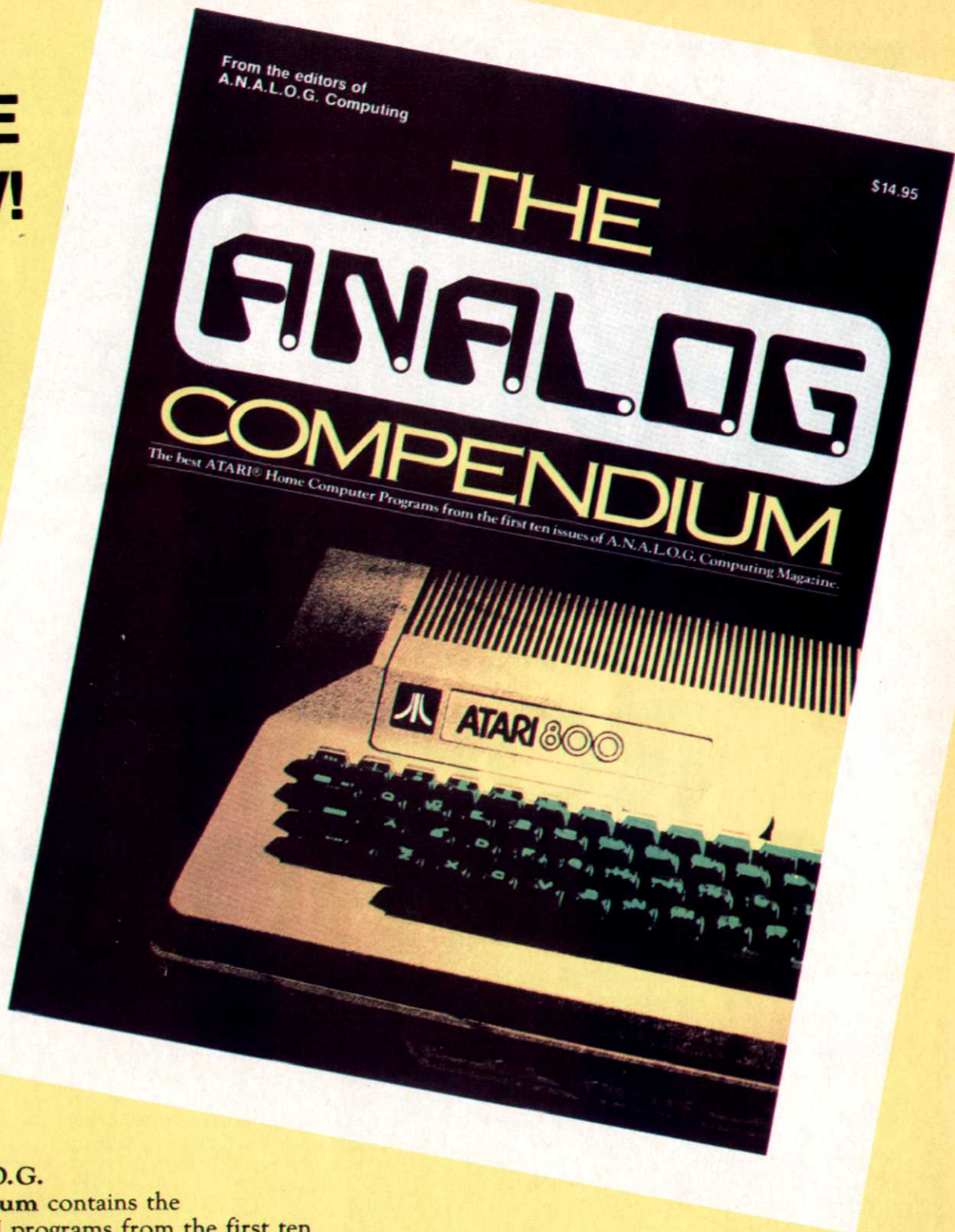


Sketch Pad



Harvey Wallbanger

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MORE THAN JUST TOOLS,
THEY'RE SERVANTS, PETS, EVEN COMPANIONS

ROBOTS COME HOME

by Jim Inscore

COMPUTERS—MACRO AND MICRO—are tools we've come to rely on, but are not quite comfortable with. Robots, however, have a niche in popular culture: we can relate to them. We fear our computers, but we love our robots.

Take HAL, the computer from 2001. Cool, rational—though fatally flawed—HAL made quick work of his human fellow voyagers in the name of saving the mission. Not much of a pal, HAL.

Compare HAL to our present vision of anthropomorphic robots, the quirky, kvetchy See-Threepio and Artoo-Deetoo of *Star Wars* fame. They are faithfully and continually just a hairsbreadth from sacrificing their circuitry to save our human heroes.

Why such a contrast? As humans we're accustomed to thinking on our feet, while we're actually engaged in some activity. Ongoing and evolving gut-reasoning. Intellectual activity in isolation—the detached logic on which computers operate—is inimical to us. The science fiction image of the living

brain in a jar horrifies us at a very deep level. While robots, like us, have to deal physically with the world, most times, again like us, they appear hesitant, awkward, halting, human. Robots follow a thought process in interacting with the environment. Far more than tools, they're potential servants, pets, even companions.

Today, robots assemble automobiles, work inside nuclear reactors, fly on the space shuttle, and help the handicapped in their homes. Their visibility is continually increasing on the job and in the home.

Robots that can serve hors d'oeuvres or navigate tie fighters are technically possible, but what are available for home use are rather more limited than their fictional and industrial counterparts. So far they can vacuum, carry things around and patrol the house for intruders. But those of us on the cutting edge of technology don't trade in practicality—we want to be alert to what's going on.

With this in mind, ATARI CONNECTION takes a look at home robotics: how to get started, what skills you need and where to go to develop those skills.

WHAT IS A ROBOT?

Several interactive systems make up a true robot that can respond to its environment and perform meaningful tasks.

MOVING

In the home a robot has to move from room to room without damaging itself or the furnishings. It needs a propulsion mechanism capable of maneuvering around furniture, through doorways, etc. The robot legs of science fiction have been discarded in favor of wheels, far less expensive than two separate "legs" that require not only electro-mechanical control but considerable computer memory as well. Some of the current home robots can roll only on smooth floors or table tops, while others with more sophisticated mechanisms can negotiate carpets and door thresholds. Stairs present a problem that most robots can't yet deal with.

FEELING

Robots require sensory devices to avoid falling down stairs or running into furniture and people. These may include visual scanners, sonar, or touch-sensitive bumpers. Some robots have radio receivers or infrared sensors to receive commands from a home computer.

ARMS AND HANDS

For household tasks a robot requires some kind of "arm." Several home robots have optional arm attachments to pour you a drink or open a door.

BRAINS OF THE OUTFIT

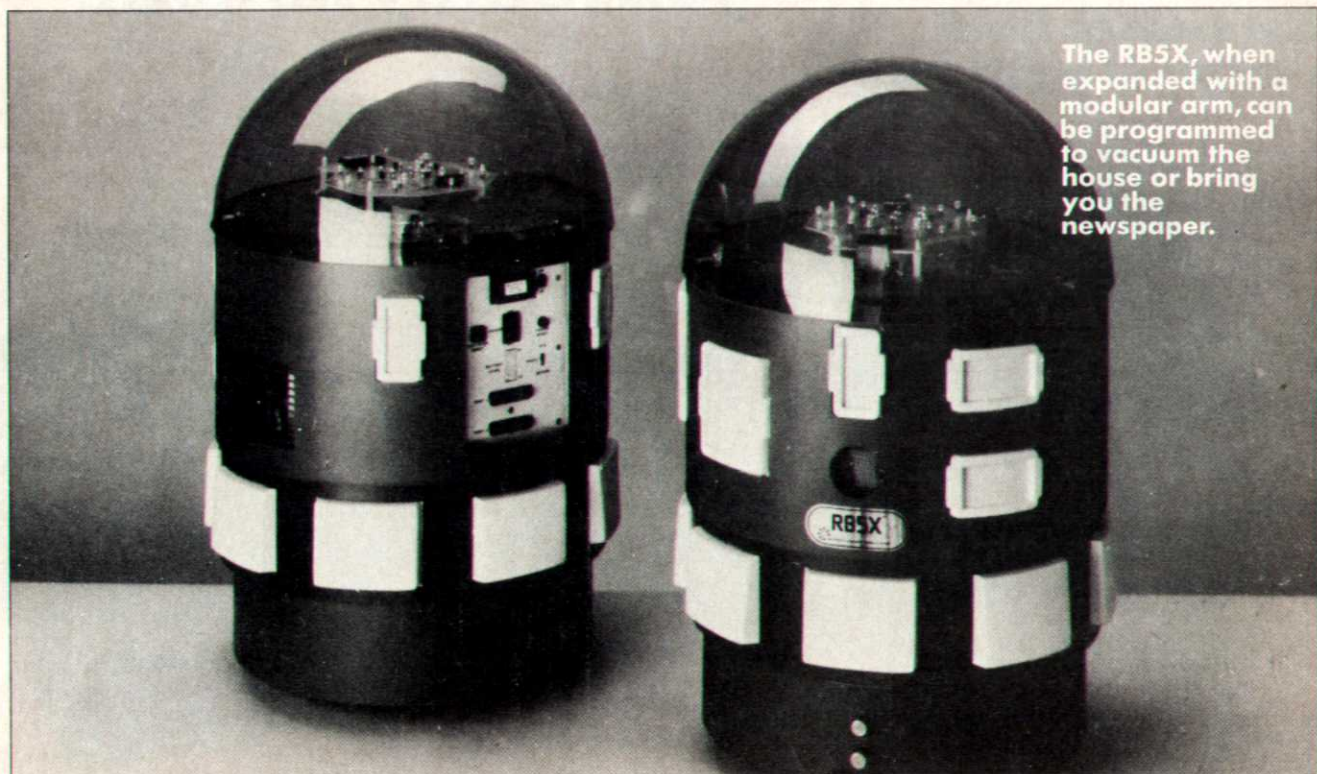
To coordinate all these systems, a robot requires a brain. The microprocessor not only made the home computer possible, it contributed to the birth of the home robot. The microprocessor in a robot performs much the same function as it does in a computer: memory access, interpreting information from sensors, and controlling its "arm" and locomotion.

GETTING STARTED

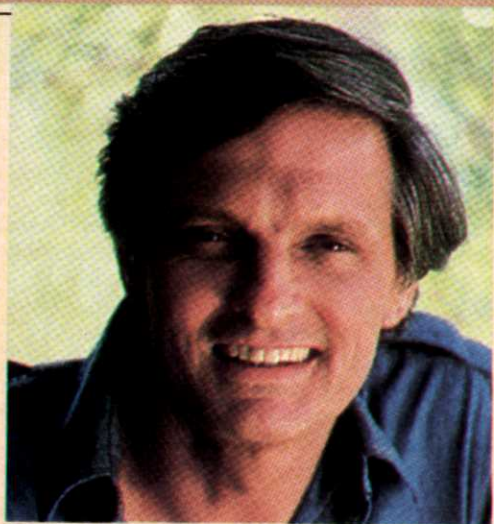
Without additional investment, your home computer can be a valuable springboard into robotics. Using the graphics capabilities of an Atari computer, it is possible to write programs that simulate many of the functions of a simple robot. For example, the collision-detection features built into the Atari computer can easily be used to simulate the sensory devices required by a home robot. You need look no farther than your favorite video game to find an example of how a robot "senses" its environment.

If you're really handy with a soldering iron and screwdriver—sort of a weekend tinkerer—you might want to design and build your own robot. It's the perfect way to make sure it has a personality of its own and, until recently, the only way to get started. But now several companies manufacture robots specifically for the home and/or educational environments. Robots are available both assembled and in kit form, and you can write your own robot programs for most of these units.

(continued on page 42)



The RB5X, when expanded with a modular arm, can be programmed to vacuum the house or bring you the newspaper.



Computer enthusiast Alan Alda uses the ATARI 800XL Computer System. Alda reports: "It's going all the time!"

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¹VisiCalc is a registered trademark of VisiCorp.
²Trademark of The Learning Company.

PROGRAMMING A ROBOT

While robots can be programmed in virtually any computer language, there are two languages with features that are ideal for programming complex commands into a robot: Logo and FORTH. Learning one of them won't make you a robotics expert, but fluency will allow an easier understanding of robotics.

LOGO

Two features of Logo make it extremely appealing for use in robotics. First, it deals with procedures. Repetitive activities—arm motions for picking objects off the floor, pathways for getting around a chair—can be “remembered” and carried out by the robot. Procedures can be defined, debugged, then set aside for recall at any time. Secondly, Logo’s “turtle graphics” provides an ideal programming environment for setting up movement. The original turtle was actually a dome-shaped robot transferred to the computer screen as the language developed. With its collision-detection capabilities, the Atari Logo programming language can be an ideal method of simulating robot activities.

FORTH

The fact that FORTH was developed for radio astronomers may not seem relevant to robotics until you remember that there are parallels. Radio telescopes follow stellar objects, interpret input and correct their own coordinates to stay on the beam. FORTH, like Logo, is a procedure-oriented language, though its commands use a more complex syntax than Logo. FORTH is available for Atari computers from the Atari Program Exchange (APX) as *Extended fig-FORTH*. The FORTH Turtle Graphics Package (diskette, APX-20157) should be quite useful to the robotics novice.

Other languages currently used in robotics include BASIC, Pascal and Assembly.

SOME ROBOTS YOU CAN BUY

Several robots can communicate with Atari computers through an RS-232 port—the telecommunications interface.

Nolan Bushnell's latest creation, the \$1,795 joystick-controlled Topo home robot, has just gone on the market and will be available soon in an Atari computer-compatible version. Featuring three on-board computers and a unique two-wheel propulsion system known as Andromotion, Topo can be programmed in the TopoSoft language, a version of FORTH specially adapted for robotics. Also available soon will be B.O.B., the \$2,500 model that can walk and talk without direct human guidance. ANDROBOT, INC., P.O. Box 9-214, San Jose, CA 95103, (408) BOB-TOPO.

Bushnell's company and Atari plan to manufacture and market Androbot's home robot products under the Atari label. Androbot's small Androman home robot is expected to be the first joint product release later this year.

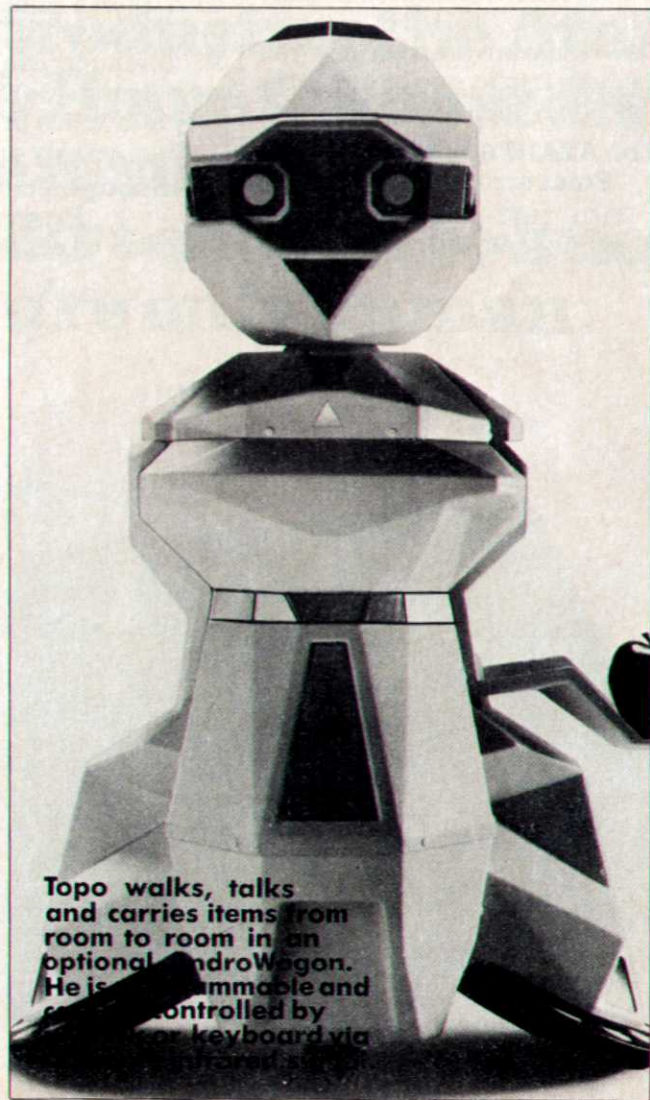
The Rhino Scorpion is a platform robot in kit form. Its on-board controls are built around the 6502 microprocessor (the same as your Atari computer). The Scorpion can learn obstacle location and avoidance via its touch sensors, read visual data with

its optical scanner, and follow tape pathways on the floor. It is programmed by a 30-instruction Scorpion language (a version of Machine language). Rhino Robots, Inc., P.O. Box 4010, 2502 S. Neil St., Champaign, IL 61820, (217) 352-8485. \$660.00.

Another RS-232-compatible robot, the RB5X from RB Robots, bears a family resemblance to Luke Skywalker's Artoo-Deetoo. The RB5X comes with its own battery charger and is capable of plugging in when its batteries run low. With a Polaroid Rangefinder sonar sensor and eight touch-sensitive bumpers, the RB5X can learn its way through any home, muttering a polite “excuse me” should it bump into an unexpected object. Programmable in NSC Tiny BASIC, the RB5X is also available with options such as a manipulator arm and a vacuum cleaner! TB Robot Corp., 18301 West 10th Ave., Suite 310, Golden, CO 80401, (303) 279-5525. \$1,795.00.

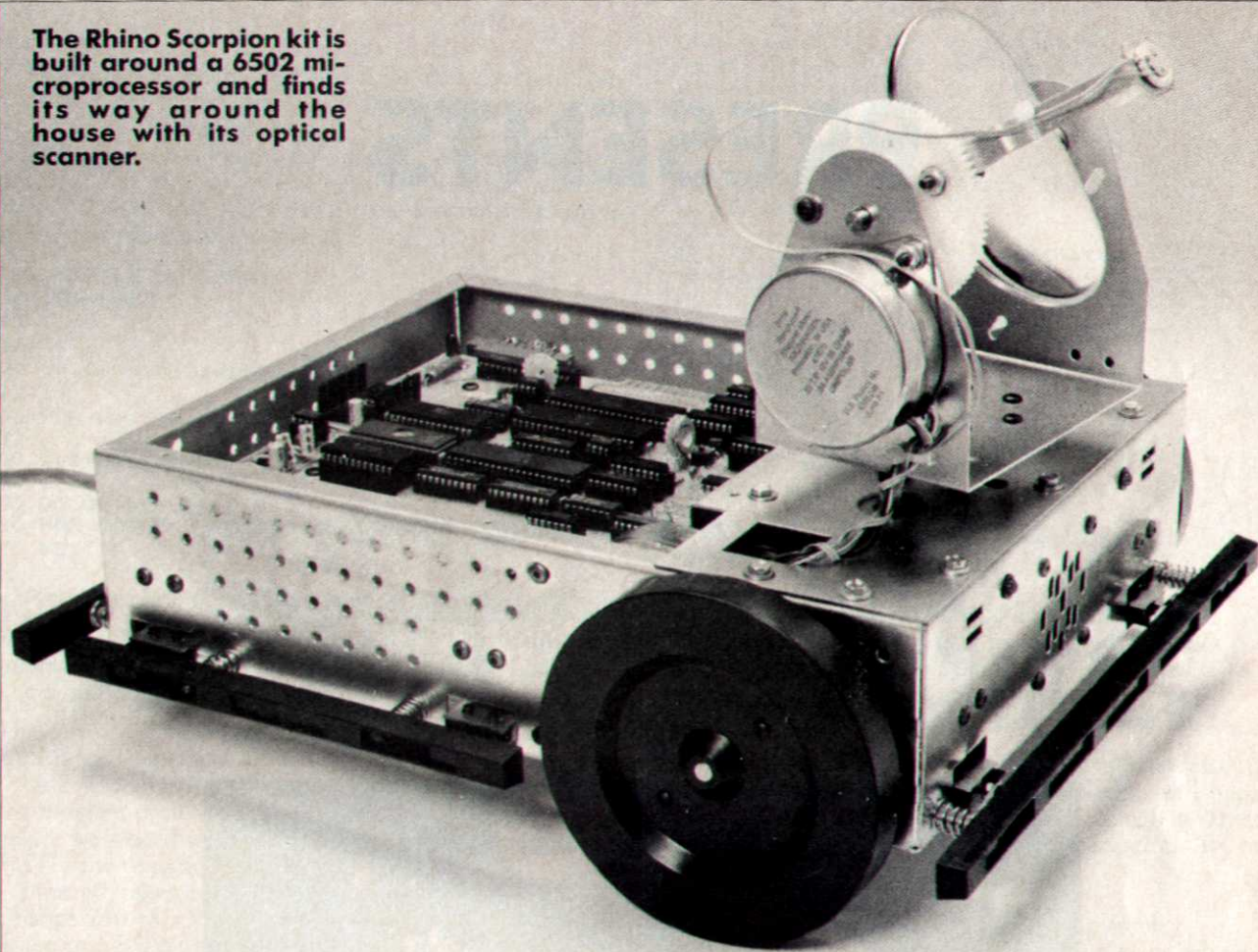
ROBOT LITERATURE

Robotics Age is the one journal currently covering the robotics revolution—research, industrial applications and hobbyist projects. Recent articles have explored robot toy engineering, personal computers for developing robotics systems, and schools offering courses in robotics. Bi-monthly issues cover new products and upcoming events. *Robotics Age*, 174



Topo walks, talks and carries items from room to room in an optional AndroWagon. He is programmable and controlled by keyboard via

The Rhino Scorpion kit is built around a 6502 microprocessor and finds its way around the house with its optical scanner.



Concord St., Peterborough, New Hampshire, \$24/year.

If the current issue of *Robotics Age* whets your appetite, try their "Best Of" collection; *In the Beginning: The Breakthrough Discoveries as Reported in Robotics Age Magazine*, edited by Carl T. Helmers (Hayden Books Co., Inc., Rochelle Park, NJ).

And for those who want to put together a robot from the ground up: *How to Design and Build Your Own Custom Robot* (David L. Heiserman, Tab Books, Inc., Blue Ridge Summit, PA) has information on power supplies, electric motors, sensors, logic systems, microprocessors, and more. *Android Design* by Martin Bradley Weinstein (Hayden Books) particularly emphasizes motion and manipulation mechanisms. For robot simulations, try David Heiserman's *Robot Intelligence...With Experiments* (Tab Books), featuring a set of BASIC programs to get you exploring.

ROBOT PEOPLE, ROBOT EVENTS

Whether you're working in robotics or interested only in current technical trends and social implications at this time, it's helpful to meet people with similar interests. The Robotics Society of America offers meetings with other robotics enthusiasts. And support services, such as local chapters, a bi-monthly newsletter and discounts on robotics publications and seminars, offer the novice a supportive, stimulating

environment. For information, contact Dr. Walter Tunick, Executive Director, Robotics Society of America, 200 California St., Suite 215, Palo Alto, CA 94306.

A number of events scheduled for this year are specifically geared toward home robotics.

The International Personal Robotics Congress will be held in Albuquerque, New Mexico, April 13-15. Manufacturers such as Androbot and Robotron are sponsors, and the event will display commercial and hobbyist robots and hold robot competitions, seminars and panel discussions. For further information, contact Joe Bosworth, International Personal Robotics Congress, 1547 So. Owen St., Lakewood, CO 80226.

Also in April, the Robot Olympics will be held in San Bernardino, California. Specifically designed for younger experimenters in robotics, this event will offer competitions for students from kindergarten through grade 12. Contact Robot Olympics Committee, Computer Center, California State College, 5500 State College Parkway, San Bernardino, CA 92407.

Detroit is the site of the eighth annual show of the Robotics Institute of America, Robots 8. Scheduled for June 4-7, this industry event will highlight the latest developments in this fast-growing field.

In November, RIA will conduct a regional show at the Anaheim Convention Center in Anaheim, California. Contact Jeff Burnstein, RIA, P.O. Box 1366, Dearborn, MI 48121.

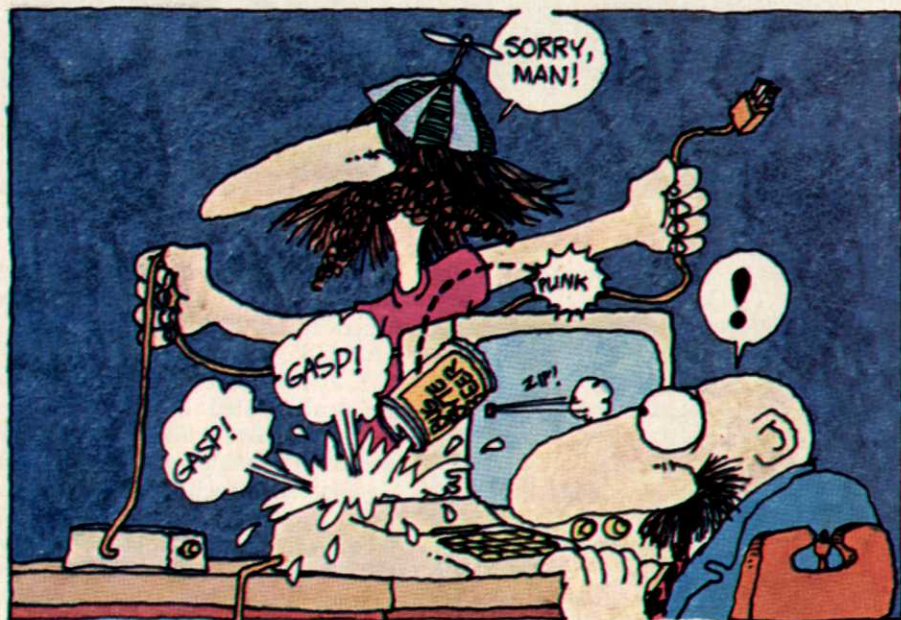
Dr. C. Wacko PRESENTS Parting Is Such Sweet Sorrow

by David L. Heller

SINCE THIS IS THE LAST TIME my handsome face will grace the pages of this austere publication, I'll leave you with some of my favorite and most memorable game-design tricks, learned after years of research, painstaking experimentation, and

heavy conceptualizing in my Jacuzzi.

In this article you'll discover the fundamentals of Movement and Joystick Control, and learn how to combine these two easy concepts to create a humungus, but simple game of your own design.



Movin' and Groovin'

This picture marks a milestone in my illustrious career. After years of searching for the answer to arcade-game movement, it all came together when Captain Action spilled a can of Bug Byte on the keyboard. Just before the computer gasped its final clicks, the cursor whizzed across the screen! REVELATION! And a broken computer. But, WE DID IT! We moved something across the screen!

I spent nights dreaming about the implications of the cursor's movement. Then one night I realized what it all meant! Because the screen is a two-dimensional surface, all references to position can be defined in terms of X and Y coordinates!

To move an object—a cursor, for instance—all I needed to do was add a change factor to the cursor's starting position. I quickly flipped open my old high-school math book and discovered that a change factor is called *delta*.

Armed with this knowledge, my movement theory became crystal clear. All I had to do to move my cursor would be to update its position on the screen continually. I rushed down to my lab and wrote a few simple position-updating formulas using the letter "D" to represent *delta*.

$$X = X + DX$$

Translated into English, this means: The new position X

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equals the old position X plus a change in the X direction (horizontal movement, across the screen).

Y=Y+DY

This equation means: The new position Y equals the old position Y plus a change in the Y direction (vertical movement, up and down the screen).

Well, that was a long, long time ago. My computer was repaired and my movement theories worked perfectly. Here, I'll show you. RUN this Simple Movement program and watch what happens. Ready?

```
0 . SIMPLE MOVEMENT
10 GRAPHICS 3
12 .
16 .
20 X=20:Y=10:DX=1:DY=0
22 .
30 FOR A=1 TO 10
32 .
40 X=X+DX:Y=Y+DY
42 .
50 COLOR 1:PLOT X,Y
60 FOR PAUSE=0 TO 250:NEXT PAUSE
70 NEXT A
```

An orange line (COLOR1) moves toward the right from the center of the screen! Cursor movement!

Line 20 first sets the cursor's starting position (X=20 and Y=10) close to the center of the screen. Next, it defines the *delta* or change: in each direction DX=1 and DY=0. The cursor will move one space at a time in the X direction with no movement at all in the Y direction.

Line 40 contains my famous update formulas! Every time the program cycles, the cursor's position is updated by the values we placed in DX and DY in line 20. Line 50 then PLOTS the orange cursor on the screen.

Line 60 slows down the movement so you can see it! Change 250 to a lower number to make the cursor move faster, or a higher number to slow the movement down.

For the benefit of all you aspiring game programmers, I've modified my Simple Movement program slightly by changing a couple of lines and turning it into a utility!

```
0 . MOVEMENT UTILITY
10 GRAPHICS 3
12 PRINT CHR$(125):PRINT "ENTER
DX,DY";
16 TRAP 12:INPUT DXM,DYM
20 X=20:Y=10:DX=DXM:DY=DYM
30 FOR A=1 TO 10
40 X=X+DX:Y=Y+DY
50 COLOR 1:PLOT X,Y
60 FOR PAUSE=0 TO 250:NEXT PAUSE
70 NEXT A
80 GOTO 10
```

It's Easy to Use!

Just enter two values, one for DX and one for DY, separated by a comma. Then press [RETURN]. Now watch the results! I wish I had a program like this when I first studied movement.

The Cursor's Behind (Blush!)

Yes, these Simple Movement programs demonstrate the fundamentals of movement. But the cursor leaves its image on the screen after it moves. To make the cursor move without leaving a trail, you've got to add two more statements to the Simple Movement program:

XB=X and YB=Y

Yep, you guessed it. In the next program, XB tags along *behind* the cursor as it moves in an X direction and erases the cursor's previous image. YB does the same in the Y direction!

```
0 . ERASING BEHIND
10 GRAPHICS 3
12 .
14 . 1. Set up X & Y's starting
locations; X & Y's movement
direction; and set XB & YB to equal
X & Y:
20 X=20:Y=10:DX=1:DY=0:XB=X:YB=Y
22 .
24 . 2. Begin movement cycle:
30 FOR A=0 TO 10
32 .
34 . 3. Set next X,Y coordinates:
40 X=X+DX:Y=Y+DY
42 .
44 . 4. Erase current X,Y
coordinates:
50 COLOR 0
60 PLOT XB,YB
62 .
64 . 5. Plot new X,Y coordinates:
70 COLOR 1
80 PLOT X,Y
82 .
84 . 6. Set next erase coordinates:
90 XB=X:YB=Y
92 .
94 . 7. Control cursor's movement
speed:
100 FOR PAUSE=0 TO 250:NEXT PAUSE
102 .
104 . 8. Recycle back to line 30:
110 NEXT A
```

Work through this program until you fully understand its logic; then modify its elements to see what will happen. Change the cursor's speed in line 100; change its direction in line 20; change the cursor's starting location. Try other graphics modes. Use your imagination.

Take Control with Your Joystick

I'm impressed! You've got that cursor going where you want it to go! Now, let's control it with this miraculous gadget.

Joystick Basics

There are either two or four joystick ports located on your Atari computer. Each joystick is referred to in ATARI BASIC as a STICK numbered 0,1,2 or 3. STICK (0) is plugged into port 1, STICK (1) into port 2, STICK (2) into port 3, and STICK (3) into port 4.

The joystick generates a specific number depending on its direction. You can use this number in your program to control what's happening. Here's how this works:

10 PRINT STICK (0): GOTO 10

Enter and RUN this one-line program. Plug a joystick into port 1, move it around and you'll see a specific value generated for each direction the joystick is moved. For example, UP=14, DOWN=11.

They're the same! Change "STICK (0)" to "STICK(1)" in this program, plug the joystick into port 2 and watch what happens!

The Little Red Button: STRIG

That little red button, sometimes called a trigger, is referred to in ATARI BASIC as STRIG. STRIG numbers correspond to STICK numbers.

Enter and RUN this program. Plug your joystick into port 1, press and release the button and watch the results.

10 PRINT STRIG (0): GOTO 10

A value of "0" is returned when the trigger is pressed. The number "1" is returned when the trigger is not pressed.

Combining STICK and STRIG

Here's a simple program that puts you in the driver's seat. You're already familiar with most of the concepts shown—I'll explain the new ones—so, enter it, RUN it and enjoy!

```
0 . TOTAL CONTROL
5 . 1. Select Graphics Mode & set up
cursor's start locations & change factors
7 .
10 GRAPHICS 3:X=10:Y=10:XB=X:YB=Y
12 .
14 . 2. Assign 'A' to equal STICK(0)
16 .
20 A=STICK(0)
22 .
24 . 3. Bouillabaisse Logic - This
tasty concept is explained below.
26 .
30 DX=(A=6 OR A=7 OR A=5)-(A=11 OR
A=9 OR A=10)
40 DY=(A=9 OR A=13 OR A=5)-(A=10 OR
A=14 OR A=6)
42 .
44 . 4. Cursor's next position.
46 .
50 X=X+DX
60 Y=Y+DY
62 .
64 . 5. Make sure that cursor stays
within boundraies of the screen.
66 .
70 IF X>39 OR X<0 THEN X=X-DX
80 IF Y>23 OR Y<0 THEN Y=Y-DY
82 .
84 . 6. Erase cursor's current position.
86 .
90 COLOR 0:PLOT XB,YB
92 .
94 . 7. Plot cursor's new position.
96 .
100 COLOR 1:PLOT X,Y
102 .
104 . 8. Set XB & YB to equal
cursor's position.
106 .
110 XB=X:YB=Y
112 .
114 . 9. Return to beginning of
program for next cycle.
116 .
120 GOTO 20
```

Bouillabaisse Logic

When I was in Paris . . . that's Paris, France, not Texas . . . sojourning at the Sorbonne, I learned an exciting concept. I think it was called either Boolean Logic or Bouillabaisse Logic. Bouillabaisse sounds better to me. Anyway, here's what it's all about: Bouillabaisse Logic is a fishy way of pointing the cursor in the direction indicated by the movement of the joystick:

```
30 DX=(A=6 OR A=7 OR A=5) - (A=11 OR A=9
OR A=10)
40 DY=(A=9 OR A=13 OR A=5) - (A=10 OR
A=14 OR A=6)
```

These lines return a value of DX and DY that's either -1, 0, or 1, depending on the direction you push the joystick. These values are used in lines 50 and 60 to determine the cursor's next position. Two examples to give you the idea:

The Cursor Moves Up: DX=0 DY=-1

If you push the joystick UP to move the cursor UP the screen, A=14 (remember, A=STICK(0)).

The number 14 is not present in line 30, so DX=0, [DX=0-0]. No movement in the X direction (across the screen).

The number 14 is present in the second statement of line 40, so DYU=-1, [DY=0-1]. Movement occurs in the -Y direction (up the screen).

The Cursor Moves to the Right: DX=1 DY=0

The number 7 is present in the first statement of line 30, and since the values returned are 1 and 0, DX=1. Movement occurs in the X direction (toward the right of the screen).

The number 7 is not present in line 40, so DY=0, since DY=0-0. No movement occurs in the Y direction.

Lines 70 and 80: These two lines are used to ensure that the cursor doesn't go past the boundaries of the screen. These expressions are set for Graphics Mode 3, which has a screen size of 40 by 24. If you use a different Graphics Mode, change these numbers to equal one less than the new screen size.

Here's How They Work . . .

If the cursor bumps into the screen's boundary, movement is stopped by making the cursor move one position away from the boundary. The rest of the program is "OLD HAT."

Duh Little Button

It's now time to get the little red button into the act. Just make these two simple changes to the Total Control program:

1. Involve the trigger by replacing line 20 with:

```
20 A=STICK(0):B=STRIG(0)
```

2. Add this line:

```
35 IF B=0 THEN DY=DX:DX=1:GOTO 50
```

Now, when you RUN your program and press the button, the cursor will whiz across the screen. AMAZING! TOTAL CONTROL.

Design Your Own Game!

Now that you know how to make that cursor move and how to control it with your joystick, you're on your way toward designing your own game.

In the Chaser program below I'll show you how to develop my world-unknown "Chasem" concept into an engrossing arcade game.

Here's the listing. I've reserved lines 20,130,140,210 and 220 for future excitement. You reserve them by typing in the line numbers followed by either a period or a REM statement:

```
0 . THE CHASER
10 GRAPHICS 0:POKE 752,1
20 .
22 .
24 . Set up the Chaser's starting
locations; and set CXB & CYB
equal to CX & CY
26 .
30 CX=0:CY=0:CXB=CX:CYB=CY
32 .
34 . Set up the Player's starting
locations; and set PXB & PYB
equal to PX & PY
36 .
40 PX=20:PY=20:PXB=PX:PYB=PY
42 .
```



```

50 A=STICK(0)
52 .
54 . Good old "Bouillabaisse Logic"
56 .
60 DXF=(A=6 OR A=7 OR A=5)-(A=11 OR
A=9 OR A=10)
70 DYP=(A=9 OR A=13 OR A=5)-(A=10 OR
A=14 OR A=6)
72 .
74 . The Player's next position
76 .
80 PX=PX+DXF:PY=PY+DYP
82 .
84 . Lines 90 to 120 make the Player
appear to leave one side of the
screen and reappear at the opposite
side.
86 .
90 IF PX<1 THEN PX=38
100 IF PX>38 THEN PX=1
110 IF PY<1 THEN PY=21
120 IF PY>21 THEN PY=1
130 .
140 .
142 .
144 . Erase Player's current
position.
146 .
150 COLOR 32:PLOT PXB,PYB
152 .
154 . Plot Player's new
position...the player is ATASCII
Code 19....a plus sign (+)!
156 .
160 COLOR 19:PLOT PX,PY
162 .
164 . Set PXB & PYB equal to the
Player's current position.
166 .
170 PXB=PX:PYB=PY
172 .
174 . Lines 180 to 240....La Petite
Bouilliabasse and the Chaser! I'll
tell you how these work below.
176 .
180 DXC=SGN(PX-CX):DYC=SGN(PY-CY)
190 CX=CX+DXC:CY=CY+DYC
200 COLOR 32:PLOT CXB,CYB
210 .
220 .
230 COLOR 42:PLOT CX,CY
240 CXB=CX:CYB=CY
242 .
244 . Return to beginning of program
for next cycle.
250 GOTO 50

```

The Chaser program has two characters: you (the Player) and the computer-generated Chaser.

Who's Who

To keep track of who's who, I've ingeniously assigned the letter P to all of the Player's movement statements (like PX), and the letter C to the statements that move the Chaser (like CX).

Familiarity Breeds Familiarity

With the exception of line 40, which sets up the Chaser's starting locations, lines 10 through 170 let you move the Player about the screen with your joystick. Sound familiar? If you don't believe me, change line 172 to: GOTO 50. RUN the program to see what I mean.

Wrapping Around Lines 90 to 120

Look at lines 90 to 120. Instead of limiting the Player's movement within the screen's boundaries, these lines make the Player appear to leave one side only to reappear at the

opposite side of the screen. This illusion is called "wraparound" in the arcade biz.

Line 180: La Petite Bouillabaisse

In lines 60 and 70 the Player's X,Y joystick movement is converted to either -1, 0 or 1. "SGN" in line 180 does the same for the computer-generated Chaser!

Give Me a Little SGN

SGN is a little-known BASIC instruction that, thank goodness, has nothing whatsoever to do with trigonometry. It is not sine/cosine stuff!

When you use SGN, as I have in line 180, it makes DXC equal either -1, 0 or 1 depending on the results of the simple math within the parentheses.

The change in the Chaser's X and Y positions (DXC and DYC in line 180) is determined by the Player's position minus the Chaser's position: $PX-CX$ and $PY-CY$. These values of change (-1, 0 or 1) are used in lines 190 through 240 to make that Chaser persistently do what it's best at—chase you!

A Full-Fledged Game . . . Almost!

Now that you understand this concept completely, let's fill in those reserved lines with a couple of LOCATE statements and other stuff, and develop a full-fledged arcade game.

Olly, Olly Come In Free!

The goal of this simple game is to reach your "Star Base" before the enemy Chaser catches you. It's modeled after the game "tag."

Here's How to Program Your Game

1. First, add line 20 to plot the "Star Base" on the screen:

```
20 COLOR 32:PLOT 2, 0:COLOR 16:PLOT 3,1
```

Color 32 (blank space) at location 2,0 erases that white cursor in the upper left corner of the screen. Color 16 (a "Clubs" symbol) plots the "Star Base" at locations 3,1.

2. Now, add lines 130 and 140:

```
130 LOCATE PX,PY,Z
140 IF Z=16 THEN POKE 710,195:POSITION
13,10:PRINT "YOU'RE A WINNER!":FOR A=1
TO 1000:NEXT A:RUN
```

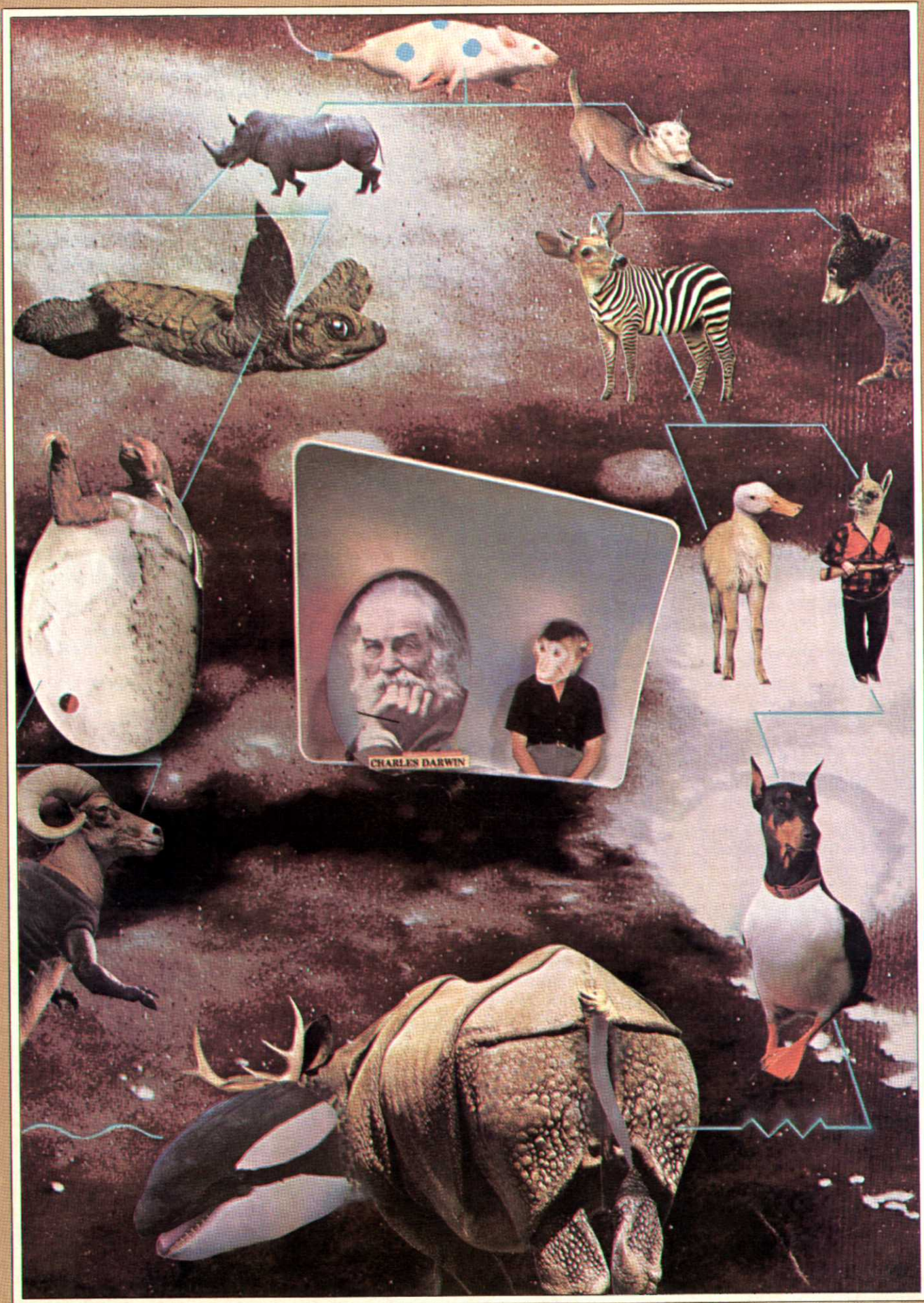
When the Player touches the "Star Base" the LOCATE statement returns a value of 16 (its COLOR), the screen turns green since $Z=16$, and YOU'RE A WINNER! Then, after a short pause, the game begins again.

3. Finally, add lines 210 and 220:

```
210 LOCATE CX,CY,Z
220 IF Z=19 THEN POKE 710,53:POSITION
15,10:PRINT "GOTCHA!": FOR A=0 TO
500:NEXT A:RUN
```

If the Chaser catches you, LOCATE returns 19 (that's your COLOR—see line 160), the screen turns red and "GOTCHA!" appears. Then, after a brief pause, the game begins again.

I hope you've enjoyed learning all the game-design basics in this short ATARI CONNECTION series. If you want to get into the heavy stuff, pick up a copy of Dr. C. Wacko's Miracle Guide at your local junkyard.



THE • GAME • OF LIFE

Playing With Evolution On Your ATARI COMPUTER

by Philip Chapnick

FOR MORE THAN FOUR BILLION YEARS the miracle of life on earth has been evolving. Scientists have made tremendous strides in articulating the principles that created this spectacular diversity out of primordial ooze. But how can one observe processes which have taken eons to develop? The incredibly long history of life on the planet makes it difficult to study the process in a laboratory. Computers are one answer. The drama of thousands of generations of evolutionary change can be recreated in the course of an afternoon through computer modeling.

For years computer simulation was the province of heavy research at places like MIT and Stanford. Systems filled whole rooms and programmers had to wait in line to test their theories. But eventually, new disciplines like genetic engineering began to uncover the secret of life. Now, by playing the evolution game you'll get a chance to see—in animated form—how the principles of natural selection combined with the laws of chance to produce evolutionary adaptation. You can watch evolution on an Atari computer in your own home.

One hundred and twenty-five years ago Charles Darwin inaugurated a new age in intellectual history. With the publication of the monumental *On the Origin of Species*, Darwin presented convincing scientific evidence for a radically different view of the human place in the scheme of things. The theory of evolution that he proposed was based on detailed observations of animals, conducted by him as a young man on his famous, five-year voyage around the world on H.M.S. Beagle.

His theory has stood the test of time. New findings have modified our understanding of evolution, but it's probably fair to say that if Darwin were around today, he wouldn't have a hard time accepting the modern adaptations of his theory.

Darwin's basic—and most controversial—claim was that all life on earth, including us humans, shares the bond of kinship; that the amazing diversity of plant and animal life can ultimately be traced to common ancestry. To explain

this enigma, Darwin argued that one species could change into another through the process of natural selection. The idea of natural selection was not new. The French naturalist Jean de Lamarck had advanced the basic concept of evolution many years earlier, and Darwin knew about competition for resources in the works of such economists as Adam Smith and Thomas Malthus. Being a superb naturalist, what Darwin contributed was strong empirical evidence to back up the theory of natural selection.

NATURAL SELECTION IN A NUTSHELL

NATURAL SELECTION is really nothing more mysterious than the observation that some members of a species are more fit than others—that is, more successful at producing offspring who survive in turn to produce more offspring. In a finite world with limited resources, each species of animal produces more progeny than can survive. Those better adapted to their environment will manage to reproduce, and their offspring breed more because, to some degree, they possess the same “fitter” characteristics of their parents. Thus, over generations, the entire population of a species can gradually evolve toward increasing fitness to the environment.

When Darwin published his theory, he knew nothing at all about genes. Gregor Mendel's experiments proving the existence of discrete units of heredity were unknown to Darwin's scientific world. But while Darwin didn't know exactly what it was that carried parents' characteristics to the next generation, he surmised correctly the three essential conditions necessary for evolution to occur.

VARIATION IS THE SPICE OF EVOLUTION

FIRST, DARWIN POSTULATED there have to be differences among members of the same species. In a totally uniform population, the principle of natural selection would have no selection range. Some of Darwin's observations came from the giant land tortoises inhabiting the Galapagos Islands off the west coast of South America. Darwin realized that the tortoises had evolved subtle changes to adapt to the varying terrain and plant life on the different islands. Because each island's tortoises were isolated from their counterparts on the others, natural selection had worked on each strain of tortoises separately, adapting the animals to the available food sources.

You can recreate thousands of generations of evolutionary change in the course of an afternoon.

INHERITANCE, ANYONE?

NEXT, NOTED DARWIN, there has to be a means of preserving the accumulated biological changes in a species from one generation to the next. This enables the favorable characteristics of the more “fit” members of the species to survive.

In 1900 Mendel's research was rediscovered, and biologists recast evolutionary theory in genetic terms. Certain facts apparent then are undisputed now. Genes are discrete packages of hereditary information passed down through the sex cells of the parents. Genes come in pairs, and it takes many thousands of pairs of genes to specify hereditary information. Every organism receives half of the complement of genes from each parent. Geneticists were able to formulate the concept of a “gene pool”: a species could be defined simply as the collection of all its genes. Or as the set of all organisms—whether cats, blue whales, or humans—that potentially can share genes.

CHANGE IS ALL AROUND

LASTLY, DARWIN REASONED that if a species is to survive, there has to be a source of genetic variation. This means the introduction, from time to time, of changed or mutant genes into the gene pool. (Today, we know that these are structural changes in the DNA molecules which store genetic information.) Evolution requires the introduction of

fresh possibilities to sustain the selection process and assure itself a source of variation within the gene pool.

By the 1930s and 1940s scientists began to synthesize Darwin's insights with the rapidly developing field of mathematical genetics. The emphasis on the mechanisms of inheritance shifted from the individual animal and its genes to the gene pool of the species. Evolution was viewed as a kind of sifting process; a constant, gradual stirring and purification of the gene pool under the pressure of natural selection. Evolutionary changes were measured by the changes in the frequency and composition of the different genes in the pool. And the focus of evolutionary inquiry shifted toward the gradual changes on the structure of the gene pool.

COMPUTER MODELS

WHILE BIOLOGISTS were applying mathematical laws to genetics, physicists were using the first computers to represent the universe in terms of mathematics. The computer was invented as a calculating engine, and its earliest application was to simulate the effects of speed and motion. As computer modeling spread to other disciplines, evolutionary biologists were provided a laboratory for testing their theories. Many of the prevailing ideas about natural selection were challenged. Today, even with the basic premises widely accepted, new interpretations of evolutionary theory are changing our views about some of the details. Until recently, scientists held that evolution proceeded inexorably in a continual, agonizingly slow accumulation of minute changes. In the new view, evolution seems to happen more in fits and starts; in relatively brief periods of upheaval—the creation of new species—followed by long periods of relative constancy. In any case, most evolutionary processes take thousands, if not millions, of years to bear fruit.

THE SELECTION GAME

THE LAWS of natural selection, like other physical laws, can be translated into mathematical formulas. The program below provides a simple illustration of how a computer can emulate the processes of natural selection. It is based on one of the delightful and thought-provoking bead games from *Laws of the Game: How the Principles of Nature Govern Chance*, by Manfred Eigen and

Ruthild Winkler. In their game, different colored beads representing a gene pool are arranged and replaced on a board according to the roll of dice. They call the game *Selection* because it embodies the necessary conditions for natural selection to occur in a simple, graphic example.

PLAYING THE GAME

THE PROGRAM uses an 8 x 8 square grid to simulate the gene pool. The different colors represent two genes competing for space in the gene pool. Each "generation" is composed of an elimination (death) round, which randomly picks one of the genes to be eliminated from the pool, and a replacement (birth) round. The new gene is selected by randomly picking a gene from the existing gene pool and duplicating it to fill the blank slot. The game proceeds generation after generation, allowing you the chance to view the changes in the gene pool. A game ends when one color dominates the board. The change has taken place.

In the first version of the game, the

Computer modeling allows scientists to study theories nearly impossible to test in a laboratory.

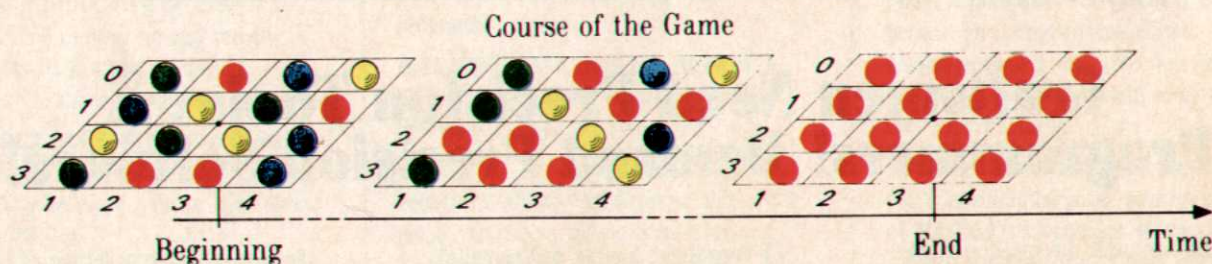
more of any given gene, the more likely it is that it will be selected, both for elimination and for replacement. This positive feedback relationship—usually referred to as a "conforming" strategy

—is characteristic of many biological systems. Even beginning with completely even distribution of genes, in the long run, a chance string of replacements and eliminations is likely to bring about the domination of one color or the other. There is no evolution without natural selection. In other words, the odds favor "survival of the fittest" rather than the random play of chance. (You'll find that this game can take quite a while, unless you start with a fairly uneven distribution of genes.)

MUTATION RATES

IN VERSION TWO, the concept of mutation is introduced. Into each birth round we add the possibility of a mutation; a third color. You can control the likelihood that a mutation will take place on a given birth round, but the actual occurrence is still a matter of chance. (The program uses the RND function to determine whether a mutation will occur by comparing a randomly generated number with the mutation rate that you enter.) You can experiment to see how the mutation

Going by the Book



Selection: The colors on the game board represent genes in a pool. The game progresses from an even distribution of genes to the inevitable selection of one gene, determined by the roll of the dice—or the Random function of the computer.

Laws of the Game:

How the Principles of Nature Govern Chance

by Manfred Eigen and Ruthild Winkler

Alfred A. Knopf Books

347 pages, \$16.95 hardcover

Harper Colophon paperback \$8.95

Laws of the Game begins:

"The history of play goes back to the beginnings of time. The energy released in the 'big bang' set everything in motion; set matter whirling in a maelstrom of activity that would never cease. The forces of order sought to bring the process under

control to tame chance. The result was not the rigid order of a crystal but the order of life. From the outset, chance has been the essential counterpart of the ordering forces."

The authors, Manfred Eigen, a Nobel laureate in chemistry, and Ruthild Winkler, creator of the marvelous games, explore their fascinating premise: a creative universe at play. From slime molds to Mozart, through hydras, hypercycles and DNA, this beautifully illustrated book is filled with insight about the most modern theories of natural phenomena. The authors' comfortable yet authoritative voice contributes much to the way we look at the role

of chance in the natural process.

The *pièce de résistance* for Atari owners are the games which clearly demonstrate the authors' main points. The games were developed before the advent of personal computers, so they are designed as bead games to be played on a board. They cry out for computer simulation, and you should have no trouble developing your own version. You can enhance their effect by using the Atari computer's great graphics and sound features. In using *Laws of the Game*—which is one of the best I've seen in the popular scientific genre—you can participate in the exciting juncture of computers and education.



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rate affects the composition of the gene pool. Try using very low mutation rates and see how long it takes for a sizable number of mutant genes to accumulate.

It is essential to introduce a source of variation into the gene pool if the species is to continue to adapt to a changing environment. This is an area of controversy in present evolutionary biology. Just how much variability is there in the gene pool of a species? And how much variability is needed for a species to remain viable under changing environmental conditions? Mutation rates can be very difficult to measure, particularly in the species nearest to most of our hearts: Figure on humans producing one mutation per 10,000 genes. Since each of us has many thousands of genes, there's a good chance we all have at least one mutant gene. Given the right conditions, it's likely that even neutral mutant genes—which control characteristics like eye color that seem to offer no selective advantage—can quickly establish themselves in isolated populations. This jibes with the fits-and-starts view of evolution. Given some changes in the environment which isolate animal breeding groups, new species could rapidly evolve given the right mutant genes in their gene pools.

SELECTION, PLEASE

IN THE THIRD VERSION, we add the element of natural selection. Now you can assign the genes different success rates, both for escaping elimination and for

**In the long run,
a single gene is
likely to prevail,
dominating
others in the
pool. The odds
favor 'survival of
the fittest' over
the random play
of chance.**

being preferentially favored in the birth round. The three different genes have differing probabilities of being passed along into the next generation. This is a simple model of selection pressure. In life, these success probabilities are related to environmental factors: some systematic, like climate patterns and food supplies; some completely random, like being in the wrong place at the wrong time and becoming dinner for a bigger animal. The process of natural selection expresses the randomness of nature and directs rather than controls it. Applying selection pressure begins a genuine evolutionary process. Different combinations of mutation rates and selection pressures, given enough genera-

tions of evolution, allow even slightly favorable mutations a chance at winning the gene game.

That random events significantly determine the course of evolution is an inescapable conclusion. The entire species of dinosaurs, for example, may have been wiped out not because they failed to evolve adaptive responses, but because of a cosmic catastrophe. Evidence suggests that an asteroid may have collided with the earth. This collision blackened the ancient skies, choked off the sunlight, destroyed vegetation and killed off the dinosaurs in a silent season or two. There's no way evolution could have anticipated that.

By playing *Selection*, you have an opportunity to see, in an easily visualized form, the interaction between chance and necessity. The program has been designed with structured techniques, so you'll find it a simple matter to modify it to make it more realistic. For example, you can change the birth round to set up variable mutation rates or different types of mutations. By increasing the complexity of the conditions for replacement and eliminations, you can aim toward more realistic simulations of the naturally occurring processes. Big computer simulations are basically just elaborate forms of the program presented here. Your Atari computer is a great tool for learning more about science and the natural world around you. This article is only a taste of the simulations you can produce with the boundless potential of your computer.

Philip Chapnick is a freelance writer and editor specializing in science and technology. ■

Rules of the Game: How to Play Selection

After you LOAD and RUN *Selection*, choose the version of the game you want to start with—One, Two or Three. Enter the number and press [RETURN].

Game One

Depending on which version you choose, you'll have to set up several basic parameters. For all games, type in a number representing the percentage of the first gene you want to start the game with. Press [RETURN]. Game One will then begin.

Game Two

If you select Game Two (or Three), you have to enter a mutation rate—a three-digit number representing the probability that a mu-

tation will occur in a given round. If you enter five, then the odds are five in a thousand that a mutation will occur in a given round. Press [RETURN].

Game Three

For Game Three, you need to answer six more requests. Enter a three-digit number representing the survival probability of a gene selected for the gene pool. This selection rate represents the influence of natural selection on the birth process of the gene. The higher the selection rate, the more "fit" the gene to its environment. If you enter 900, for example, then 900 times out of 1,000 the gene will actually make it into the gene pool. You need a rate for each

of the three genes.

Next, choose an extinction rate for each of the genes. This is a three-digit number representing the odds out of 1,000 that a gene will actually be eliminated. The higher the extinction rate, the less fit the gene to its environment.

You then have a chance to change your mind and re-enter the values. Press [RETURN] and play begins. To begin a new game, press [SYSTEM RESET].

Run through all three versions of *Selection* to see a computer modeling of the three conditions for evolution—variation, inheritance and natural selection. Things can happen quickly given the right conditions—and a little luck!

The Selection Game

Participate in the exciting juncture between computers and education.

```

1 REM "SELECTION" COPYRIGHT 1984 BY PHILIP CHAPNICK
2 REM
3 REM
4 REM ATARI CONNECTION MAGAZINE SPRING/84 ISSUE
5 REM
6 REM
7 REM ADAPTED FROM "THE LAWS OF THE GAME," BY MANFRED EIGEN AND RUTHILD WINKLER
8 REM
9 REM
10 DIM A$(1)
11 DIM BOARD(8,8)
12 MUTRATE=0
13 SEL1=1001:SEL2=1001:SEL3=1001
14 EXT1=1001:EXT2=1001:EXT3=1001
15 GENERATION=0
16 REM
17 REM
18 REM THE MAIN CALLING PROGRAM
19 REM
20 GOSUB 1000
42 GRAPHICS 3:POKE 752,1
45 SETCOLOR 0,3,6:SETCOLOR 1,9,4:SETCOLOR 2,0,10
50 GOSUB 500
60 GOSUB 600
70 GOSUB 700
80 GOSUB 800
90 GOSUB 900
92 GOSUB 2000
95 GOSUB 3000
96 GOSUB 4000
99 GOTO 70
485 REM
486 REM
487 REM THIS SUBROUTINE SETS UP THE ARRAY WHICH STORES THE GENE TYPE OF EACH
488 REM GENE IN THE GENE POOL
489 REM
490 REM
491 REM
500 GENE1COUNT=INT(64*PCT1/100)
510 C1=GENE1COUNT: C2=64-GENE1COUNT: C3=0
520 FOR X=1 TO 8
521 FOR Y=1 TO 8
525 BOARD(X,Y)=2
530 IF GENE1COUNT>0 THEN BOARD(X,Y)=1
540 GENE1COUNT=GENE1COUNT-1
560 NEXT Y
561 NEXT X
570 RETURN
585 REM
586 REM
587 REM THIS SUBROUTINE DRAWS THE BOARD
588 REM
589 REM
590 REM
600 FOR X=1 TO 8
601 FOR Y=1 TO 8
610 COLOR BOARD(X,Y):PLOT 12+2*(X-1),1+2*(Y-1)
620 NEXT Y
630 NEXT X
685 RETURN
686 REM
687 REM
688 REM THIS IS THE ELIMINATION ROUND SUBROUTINE
689 REM
690 REM
700 D1=INT(8*RND(0))+1
705 D2=INT(8*RND(0))+1
710 D3=INT(1000*RND(0))+1
720 X=12+2*(D1-1)
721 Y=1+2*(D2-1)
725 B=BOARD(D1,D2)
730 REM
731 REM
732 REM THE NEXT 3 LINES DETERMINE IF A GENE WILL BE ELIMINATED FROM THE
733 REM GENE POOL DEPENDING ON THE VALUES OF REPL1,2, AND 3, AND D3
740 IF B=1 AND EXT1>D3 THEN COLOR 0:PLOT X,Y:C1=C1-1:RETURN
741 IF B=2 AND EXT2>D3 THEN COLOR 0:PLOT X,Y:C2=C2-1:RETURN
742 IF B=3 AND EXT3>D3 THEN COLOR 0:PLOT X,Y:C3=C3-1:RETURN
750 GOTO 700
787 REM
788 REM
789 REM THIS IS THE REPLACEMENT ROUND SUBROUTINE
790 REM
791 REM
792 REM
800 DA1=INT(8*RND(0))+1
801 DA2=INT(8*RND(0))+1
805 D3=INT(1000*RND(0))+1
810 D4=INT(1000*RND(0))+1
820 B=BOARD(DA1,DA2)
823 REM
824 REM
825 REM LINE 835 DETERMINES IF A MUTATION WILL OCCUR DEPENDING ON THE 826 REM RELATIONSHIP BETWEEN MUTRATE AND D4
835 IF MUTRATE>D4 THEN B=3
838 REM
839 REM
840 REM THE NEXT 3 LINES DETERMINE WHICH GENE WILL BE ADDED TO THE GENE POOL
841 REM
842 REM
850 IF B=1 AND SEL1>D3 THEN COLOR 1:PLOT X,Y: BOARD(D1,D2)=1: C1=C1+1: RETURN
851 IF B=2 AND SEL2>D3 THEN COLOR 2:PLOT X,Y: BOARD(D1,D2)=2: C2=C2+1: RETURN
852 IF B=3 AND SEL3>D3 THEN COLOR 3:PLOT X,Y: BOARD(D1,D2)=3: C3=C3+1: RETURN
870 GOTO 800
880 RETURN
890 REM
891 REM
892 REM THIS SUBROUTINE PRINTS THE DATA ON THE SCREEN AFTER EACH GENERATION
893 REM
894 REM
895 REM
900 GENERATION=GENERATION+1
920 PRINT CHR$(125);"
GENERATION NUMBER: ";GENERATION
930 PRINT "GENE 1: ";C1;" GENE 2: ";C2;" GENE 3: ";C3
940 RETURN
990 REM
991 REM
992 REM THIS SUBROUTINE GETS YOUR CHOICES AND SETS UP THE GAME ACCORDINGLY
993 REM
994 REM
1000 GRAPHICS 0:POSITION 2,8
1010 PRINT "DO YOU WANT VERSION 1, 2, OR 3 ?"
1020 INPUT VERS
1030 PRINT "ENTER STARTING PERCENTAGE OF GENE 1"
1035 INPUT PCT1
1040 IF VERS=1 THEN RETURN
1050 PRINT "ENTER MUTATION RATE (MUTATIONS PER THOUSAND GENES PER GENERATION)"
1060 INPUT MUTRATE
1070 IF VERS=2 THEN RETURN
1080 PRINT "ENTER SELECTION RATE FOR GENE 1 (3 DIGITS-THE BIGGER THE NUMBER, THE FITTER THE GENE)"
1081 INPUT SEL1
1090 PRINT "ENTER SELECTION RATE FOR GENE 2"
1091 INPUT SEL2
1100 PRINT "ENTER SELECTION RATE FOR GENE 3"
1101 INPUT SEL3
1110 PRINT "ENTER EXTINCTION RATE FOR GENE 1,THE BIGGER THE NUMBER,THE MORE LIKELY THE GENE WILL BE ELIMINATED"
1111 INPUT EXT1
1120 PRINT "ENTER EXTINCTION RATE FOR GENE 2,THE BIGGER THE NUMBER,THE MORE LIKELY THE GENE WILL BE ELIMINATED"
1121 INPUT EXT2
1130 PRINT "ENTER EXTINCTION RATE FOR GENE 3,THE BIGGER THE NUMBER,THE MORE LIKELY THE GENE WILL BE ELIMINATED"
1131 INPUT EXT3
1140 PRINT "DONE ENTERING VALUES ? (Y/N)"
1150 INPUT A$
1160 IF A$="N" THEN GOTO 1000
1170 RETURN
1990 REM
1991 REM THIS SUBROUTINE IS A DELAY
1992 REM
2000 FOR DELAY=1 TO 50:NEXT DELAY
2001 RETURN
2990 REM
2991 REM
2992 REM THIS SUBROUTINE MAKES A SOUND
2993 REM
2994 REM
3000 SOUND 0,100*B,10,10
3001 FOR DELAY=1 TO 50:NEXT DELAY
3002 SOUND 0,0,0,0
3003 RETURN
3950 REM THIS SUBROUTINE DISABLES THE ATTRACT MODE
3955 REM
3956 REM
4000 POKE 77,0
4001 RETURN

```

Adapted from the game "Selection," in *Laws of the Game* by Manfred Eigen and Ruthild Winkler, copyright © 1981. Alfred A. Knopf, Inc. New York, NY. All rights reserved.



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COMPUTER CLASSROOM

Tracking Your Trak-Ball

by Bill Bartlett

The new Atari Trak-Ball controller gives you the potential for arcade-game action in games like *Centipede*, *Millipede* and *Crystal Castles*. While a joystick can move a screen object only up, down, left or right at a specific rate of speed, a trak-ball can be easily rolled in any direction at varying speeds moving screen objects accordingly.

So far little information is available to show Atari computer enthusiasts how to use the Atari Trak-Ball effectively in their own program applications.

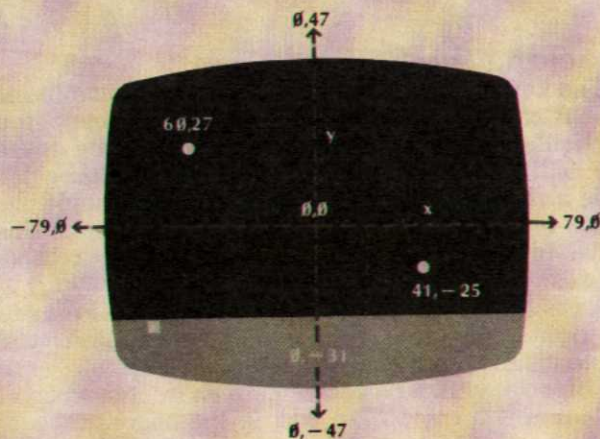
So for this Computer Classroom tutorial, I've written three programs that illustrate the trak-ball capabilities and provide you with machine language code for your own program development. (For more program applications, see "Dr. Wacko Presents" on page 44.) The first program orients you to the operation of the four bits at memory location 54016 (\$D300), known as PORTA, that reflects the speed and direction of the trak-ball. The second provides a machine language subroutine that can be used in an ATARI BASIC program to read both the direction and rate of speed of the trak-ball. The third program illustrates what happens when the trak-ball is used with player/missile graphics. All three programs are written in ATARI BASIC with machine language subroutines—the first two because ATARI BASIC isn't fast enough to react to trak-ball movement or provide a function for testing the condition of a bit, and the third because the machine language subroutine can reside in the "background" while BASIC programming operates in the foreground.

The Four Bit Registers

Keeping track of the trak-ball's movement is a complex job for your Atari computer. The eight bits located at PORTA read the status of the first two game-controller ports on your Atari computer.

There are four bits for each controller port. When a trak-ball is plugged into a controller port, the four bits keep track of the horizontal (X axis) and vertical (Y axis) direction and the speed of ball movement.

If the trak-ball is rolled to the left, the horizontal direction bit value is zero. To the right it's one. If the ball is rolled up, the vertical direction bit value is zero; down equals one. (See grid below.)



The four bits are broken down for specific jobs as follows:

- Bit 4 = vertical rate of speed
- Bit 3 = vertical movement (0 = up, 1 = down)
- Bit 2 = horizontal rate of speed
- Bit 1 = horizontal movement
(0 = left, 1 = right)

The TBALL1.BAS program listed below will help you understand trak-ball movement and how the bits of the PORTA register function. The program begins by asking for a value from 0 to 15 that will be used to choose which of the four bits to display as you spin the ball. To observe all four bits, enter 15 (15 decimal = 1111 binary). To watch only direction bits one and three, enter 5 (5 decimal = 0101 binary); for bits two and four only, enter 10 (10 decimal = 1010 binary). The program will continue to update the display until the [START] button is pressed.

```
10 REM :TBALL1.BAS
100 REM *** POKE MACHINE CODE ***
110 DATA
169,0,133,212,133,213,104,104,104,
133,203,104,104,37,203,240,2,230,212
111 DATA 96
112 FOR I=1536 TO 1555:READ
J:K=K+J:POKE I,J:NEXT I
113 IF K-2736 THEN ? "BAD DATA!":END
120 REM *** DEFINE MASK, SET UP
SCREEN ***
130 GRAPHICS 0:POKE 710,0:TRAP 130:
? "BIT OPTIONS (0-15)...":INPUT OP
131 GRAPHICS 18
140 REM *** READ TBALL & UPDATE
SCREEN ***
141 I=STICK(0):REM READ TRAK BALL
142 POSITION 0,0
150 IF USR(1536,OP,8) THEN ?
#6:USR(1536,I,8),"VERT RATE"
151 IF USR(1536,OP,4) THEN ?
#6:USR(1536,I,4),"VERT DIR"
152 IF USR(1536,OP,2) THEN ?
#6:USR(1536,I,2),"HORZ RATE"
153 IF USR(1536,OP,1) THEN ?
#6:USR(1536,I,1),"HORZ DIR"
160 REM *** CHECK FOR START BUTTON
***
161 IF PEEK(53279)=6 THEN 130
162 GOTO 140
```

Tracking the Ball

The key ingredient of a trak-ball as a controller is that it can indicate a magnitude of movement in a particular direction that corresponds to the speed the ball is spinning. The TBALL2.BAS program uses a machine language subroutine to sample the speed bits for a brief moment and then breaks this down into horizontal (X) and vertical (Y) components.

A positive X value indicates the ball is spinning to the right; a negative value is to the left. A positive Y value means down; negative Y means up.

The display is a Graphics Zero character mode of 40 columns and 24 rows. Using the horizontal and

vertical components to reposition the screen objects, the program responds by erasing the character on the screen, counting over, up or down the columns and rows and then redrawing the character.

What results on the screen is a "plus" sign moving around in clunky coordination with trak-ball movement.

The machine language code is loaded into memory at lines 110-117. This machine language code subroutine can be used in your own programs to control trak-ball movement.

```
10 REM :TBALL2.BAS
100 REM *** POKE MACHINE CODE ***
110 REM 1536-1619
111 DATA 104,169,0,133,212,133,213,
173,0,211,41,2,133,205,160,255,173,0,
,211
112 DATA 41,2,197,205,240,2,230,
212,133,205,136,208,240,173,0,
211,41,1,208
113 DATA 6,165,212,9,128,133,212,
173,0,211,41,8,133,205,160,255,173,
0,211
114 DATA 41,8,197,205,240,2,230,
213,133,205,136,208,240,173,0,211,
41,4,208
115 DATA 6,165,213,9,128,133,213,
96,-1
116 FOR I=1536 TO 1619:READ
J:K=K+J:POKE I,J:NEXT I
117 IF K-11306 THEN ? "BAD
DATA!":END
120 REM *** INITIALIZE SCREEN ***
130 GRAPHICS 0:POKE 710,0:POKE
752,1: REM BLACK BACKGROUND, NO
CURSOR
131 POSITION COL,ROW:?"+"
200 REM *** READ TRAK BALL ***
210 U=USR(1536):Y=INT(U/256):
X=U-Y*256
220 IF X>127 THEN X=X-128:IF X THEN
X=-X
221 IF Y>127 THEN Y=Y-128:IF Y THEN
Y=-Y
300 REM *** MOVE SCREEN OBJECT ***
310 POSITION COL,ROW:?" "": REM
ERASE OLD OBJECT
320 COL=COL+X:REM CALCULATE NEW
COLUMN
321 IF COL<0 THEN COL=0:REM CHECK
BOUNDARY
322 IF COL>39 THEN COL=39: REM CHECK
BOUNDARY
330 ROW=ROW+Y:REM CALCULATE NEW ROW
331 IF ROW<0 THEN ROW=0:REM CHECK
BOUNDARY
332 IF ROW>22 THEN ROW=22:REM CHECK
BOUNDARY
340 POSITION COL,ROW:?" "":REM
PRINT NEW OBJECT
350 GOTO 200
```

Moving Right Along

When the trak-ball is used to control player/missile screen objects, they move smoothly at vari-

ous speeds in all directions. The movement is smooth because a vertical blank interrupt (VBI) routine is used to erase and redraw the player at its new position.

The object that appears in the program TBALL3.BAS is a player, and since the VBI movement routine is in the background, a BASIC program can operate in the foreground.

```

10 REM TBALL3.BAS
100 REM *** POKE MACHINE CODE ***
110 REM 1536-1762
111 DATA 160,255,173,0,211,41,2,
133,203,173,0,211,41,2,197,203,240,3
9,133,203
112 DATA 173,0,211,41,1,240,16,
174,149,6,232,224,196,240,22,142,149
,6,142,0
113 DATA 208,208,14,174,149,6,
202,224,48,240,6,142,149,6,142,0,
208,136,208,205
114 DATA 160,255,173,0,211,41,8,
133,203,173,0,211,41,8,197,203,240,6
5,133,203
115 DATA 173,0,211,41,4,208,29,
174,150,6,224,32,240,49,202,142,
150,6,152,72
116 DATA 160,8,189,1,44,157,0,44,
232,136,16,246,104,168,208,27,174,
150,6,224
117 DATA 218,240,20,232,142,150,6,
152,72,160,8,189,6,44,157,7,44,202,1
36,16
118 DATA 246,104,168,136,208,179,
76,98,228,0,0,104,160,255,169,0,
153,0,44,136
119 DATA
208,250,185,219,6,153,120,44,200,
192,8,208,245,169,120,141,149,6,141
120 DATA 150,6,141,0,208,169,34,
141,192,2,169,1,141,8,208,169,40,
141,7,212,169
121 DATA 62,141,47,2,169,3,141,29,
208,169,7,162,6,160,0,32,92,228,96,2
4
122 DATA 24,24,231,231,24,24,24,-1
123 FOR I=1536 TO 1762:READ
J:K=K+J:POKE I,J:NEXT I:IF K-26973
THEN ? "BAD DATA!":END
140 REM *** INITIALIZE SCREEN ***
141 POKE 710,0:POKE 752,1:?
CHR$(125)
142 U=USR(1687)

```

A listing of the source code developed for the machine language code featured in these three programs can be obtained by writing the author at the following address:

William Bartlett
Atari Customer Relations
1312 Crossman Ave.
Sunnyvale, CA 94088

Bill Bartlett is manager of Product Support for Customer Relations at Atari, Inc.

Users' Group Update

Atari Users' Groups are among the best resources available to anyone who wants to learn more about Atari computers and their applications. Beginning this issue, we will be printing a regional directory of users' groups. Listings are as of February 6, 1984.

New England

CONNECTICUT

DP DIRECTIONS
Allen Harberg
Box 562
Bloomfield, CT 06002

CENTRAL CONNECTICUT
COMPUTER CLUB
Martin Goldstein
149 Creamery Road
Cheshire, CT 06410

ATARI USERS OF
SOUTHERN CONNECTICUT
David Liebreich
112 Hawthorne Drive
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American Can Company
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What's A Macro?

A Programmer's Guide to the Atari Macro Assembler

by Chris Crawford

NOW YOU'VE REALLY MADE THE BIG TIME. Having mastered the Assembler-Editor cartridge, you've gone out and purchased the Atari Macro Assembler. And this isn't just any old assembler—this is a MACRO assembler, just like the pros use. Nothing kiddie-toy about this baby, no siree. Why it's got macros with up to nine parameters, full-conditional assembly, variable-field definitions, SYSTEXT files, and all sorts of other really great, hairy technical stuff. There's only one small question nagging at the back of your mind:

"What's a macro?"

Of course, you wouldn't dare admit to your friends or family that you don't know what a macro assembler is. You told them that a macro is a really big micro, like in "microcomputer." Smooth move. But now you're all along with it, trying to figure out just what this macro stuff is all about.

What's the biggest problem in assembly-language programming? That's a hard question to answer because there are so many tough problems in assembly language. But the one that plagues me the most is that they're so hard to read. It's not just the strange code—LDA this, STA that, and so forth; you get used to that. The real killer is that they're so damned *long*. Pages and pages and pages. For example, the source listing for *Excalibur* is over 600 pages! Can you imagine flipping through all those pages looking for a bug?

This is where macros come in. A macro is a custom-assembly language statement that stands for a whole bunch of regular-assembly language statements. For example, I have a macro called OPEN that looks like this:

OPEN 3,4,0,D:FILENM.EXT

It replaces all of the following statements:

```
LDX #30          STA ICBAH,X
LDA #4           LDA #LOW NAME
STA ICAX1,X      STA ICBAL,X
LDA #3           JSR CIOV
STA ICAX2,X      NAME DB 'D:FILENM.EXT'
LDA #HIGH NAME
```

The macro OPEN replaces 11 regular-assembly statements. That tremendous compression will make my program much easier to read. Moreover, the macro looks and reads just like the same command in BASIC, so it's easy to understand. It takes care of a chunk of code that I know will work, clearing out excess clutter and allowing me to focus on other parts of the program, the parts that need attention.

You may be wondering where this nifty macro came from. You didn't notice any mention of it in the documentation. The macro did not come with your diskette. You see, I made it up. I designed and programmed the macro myself. That's the whole point: it allows you to create your own custom assembly-language commands.

At the simplest level, a macro is simply a stand-in for a whole bunch of little assembly-language statements. It allows you to make your source listing more readable by compacting many statements into just one. But you can go much further with macros if you take the time to learn them. A good macro facility is really a little programming language of its own. You program the assembler to write your program for you. It has an IF statement, so it can decide to write the program, depending on the situation, one way or another. It can even do looping, although it accomplishes this through recursion rather than conventional looping. Recursion is when a routine calls itself. I know it sounds weird, kind of like passing the buck to yourself. A recursing routine, however, takes a little chip out of the problem before passing it on to itself again. It's sort of like passing the buck to yourself, but taking out a nickel each time; eventually the buck is eliminated.

A common source of confusion with many beginning assembly-language programmers is the difference between a macro and a subroutine. At first glance, the two look very similar. Each one is a module that performs some standard function. You pass parameters to each one, parameters that dictate the exact nature of the function to be performed.


The difference between a macro and a subroutine arises from *when* it is invoked. A macro does its thing during the assembly process; a subroutine during the program execution. Macros show up only at the source-code level; at object code, macro results are indistinguishable from regular assembly source code.

An important consequence of this difference is that macros do not save any memory space in the final program. Subroutines are great space-savers, for they allow a three-byte subroutine call to do the work of the entire subroutine. Macros, however, expand into normal assembly-language code. They offer no object-code savings.

But they do offer tremendous *source code* savings. They make your source code tighter and easier to read. Macros don't make your program work faster or more efficiently; they make YOU work faster and more efficiently.

Chris Crawford is a game designer and Manager of the Games Research Division of Atari Inc. ■

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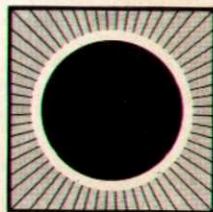
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BITS AND PIECES

DON'T STRING ME ALONG AND A POTPOURRI OF PROGRAMMING DELIGHTS

by David L. Heller

ONCE AGAIN THE RESPONSE TO our requests for programs has been fantastic! But selecting choices from the submissions has been quite a task. Don't be offended if your great program hasn't been used yet. Not to worry . . . we'll publish all the best programs in future issues.

Strings and string manipulations are always a hot topic, and in this issue we're proud to present three reader-submitted programs that manipulate strings in unique and

creative ways. After you've had fun with these three programs, review their structure. You may learn some new string-manipulating techniques that you can apply to one of your own programming projects.

To round off this edition of *Bits and Pieces*, we've included four programs that fall into no single category. They're different and guaranteed to help expand your knowledge of your Atari computer. So without further rhetoric, here we go!

FUN WITH STRING

DIRSORT

Alphabetically Sort Your Files

by Howard Chalawsky

FIFTEEN-YEAR-OLD Howard Chalawsky is a master string manipulator as you'll see after running his DIRSORT program. This little gem reads your disk directory, alphabetizes the file names, and lets you see the result on your screen or printed out on your printer.

The program is self-prompting and a real snap to use. But, more important, the DIRSORT program listing is a valuable learning tool. Howard's simple approach to string sorting can be used as part of a program of your own design.

DIRSORT was written as a subroutine. If you'd like to include it in one of your own programs, just GOSUB 30000 from your program, and change line 30270 to read: 30270 POKE 752,1:RETURN.

DIRSORT

```
30000 DIM IN$(17),FFILE$(1088),
      DUM3$(17),DUM4$(17),D$(6)
30010 OPEN #2,8,0,"E":OPEN #3,4,0,"K:"
30020 D$="D :*. *"
30030 POSITION 2,5:? "OUTPUT TO
      PRINTER? ";:GET #3,P
30040 IF P=ASC("Y") THEN CLOSE
```

```
      #2:OPEN #2,8,0,"P:"
30050 ? CHR$(P)
30060 POSITION 10,17:? "ENTER DRIVE
      NUMBER:";
30070 GET #3,D
30080 D=D-48
30090 D$(2,2)=STR$(D)
30100 TRAP 30060:CLOSE #1:OPEN
      #1,6,0,D$
30110 ? CHR$(D+48)
30120 ? :?
30130 TRAP 30150:INPUT #1,IN$:IF
      IN$(4,4)<>" " THEN
      FFILE$(LEN(FFILE$)+1)=IN$
30140 GOTO 30130
30150 TRAP 30210
30160 FOR I=1 TO LEN(FFILE$)/17-1:
      FOR H=1 TO LEN(FFILE$)/17-1:
      DUM3$=FFILE$(H*17-16,H*17)
30170 DUM4$=FFILE$((H+1)*17-16,
      (H+1)*17)
30180 IF DUM3$(3)<DUM4$(3) THEN 30200
30190 FFILE$(H*17-16,H*17)=DUM4$:
      FFILE$((H+1)*17-16,
      (H+1)*17)=DUM3$
30200 NEXT H:NEXT I
30210 ? #2:? #2:? #2:FOR I=1 TO
      LEN(FFILE$)/17:? #2;
      FFILE$(I*17-16,I*17):NEXT I
30220 ? #2:? #2;" -----":? #2
30230 ? #2;" ";IN$:? #2:? #2:TRAP
      40000
30240 POKE 752,1
30250 ? :? "      Press RETURN For
      Another";
30260 GET #3,Q:IF Q<>155 THEN 30260
30270 CLOSE #1:CLOSE #2:CLOSE #3
30280 POKE 752,0:? CHR$(125):CLR
      :GOTO 30000
```


FINDIT

Print Text Beginning at any String

by J. Shilleto

OUR SECOND "STRINGER" is from J. Shilleto of San Francisco, California. The FINDIT program offers the novel application of letting you print out a file you've created with your text editor, or a program you've created and LISTED to your disk, beginning at the string of your choice. J.S. explained it like this: "When paper caught and bunched on the wheels of my printer as it was printing a listing of a long file, I decided it was time to write a program to print from a user-selected place on the file."

The program has an immediate and practical application, and much of the code can be useful as the beginning of a self-written word processor.

The FINDIT program is self-prompting. One hint though: When the program asks for a file name, just enter its name. There's no need to enter the device ("D:").

FINDIT

```
0 REM FINDIT by J. Shilleto
10 CLR :DIM A$(1),F$(13),K$(13),
R$(13),S$(20):T=0
20 K$="D:":R$="P:"
30 S$="":N=1:COUNT=1536
40 READ BYTE:T=T+BYTE:POKE
COUNT,BYTE:COUNT=COUNT+1:
IF BYTE<>255 THEN GOTO 40
45 IF T<>8365 THEN PRINT "YOU'VE MADE
A DATA ENTRY MISTAKE!":END
50 PRINT "Name of disk file to list on printer?"
60 INPUT F$
70 K$(LEN(K$)+1)=F$:OPEN #1,4,0,K$
80 R$(LEN(R$)+1)=F$:OPEN #2,8,0,R$
90 PRINT "From the Beginning?"
100 INPUT A$:IF A$="Y" THEN GOTO 160
110 PRINT "START JUST AFTER THE FIRST
OCCURRENCE OF WHICH STRING?"
120 INPUT S$
130 POKE 849,1:POKE 850,7:POKE
856,0:POKE 857,0:POKE 858,4
140 X=USR(1536,ADR(S$),LEN(S$))
150 IF X=2 THEN GOTO 190
160 GET #1,X:TRAP 180
170 PUT #2,X:GOTO 150
180 CLOSE #1:CLOSE #2:RESTORE :
GOTO 10
190 CLOSE #1:CLOSE #2:PRINT "String
not found.":RESTORE :GOTO 10
200 DATA 104,104,133,1,104,133,0,104,
104,170,160,0,152,72,138,72,
162,16,32,86,228,201,136,240,
34,141,79,6,104
210 DATA 170,104,168,173,79,6,209,0,
240,5,160,0,76,12,6,200,140,
79,6,238,79,6,236,79,6,48,14,
76,12,6,169,0
220 DATA 133,213,169,2,133,212,104,
104,96,169,0,133,213,169,1,
133,212,96,255
```

SCRAMBLE

Scramble up Those Words

by Steven M. Gosetti

MR. GOSETTI GETS A KICK out of writing "both informative and entertaining programs." And if SCRAMBLE is any indication of Steve's programming talents, he's really into entertainment. SCRAMBLE

is a short but fulfilled program that rearranges any string (up to 256 characters in length) to confuse the most ardent de-scrambler. I entered "ATARI" and, after a short wait, was rewarded with "TAARI." Try it. You'll like it!

SCRAMBLE

```
10 REM Scramble, By Steven M. Gosetti
20 CLR :DIM A$(256),B$(256),B(256)
30 POKE 752,0:PRINT CHR$(125):PRINT
"Enter word(s) to scramble";
40 INPUT A$
50 L=LEN(A$)
60 FOR Y=1 TO L
70 B(Y)=0
80 NEXT Y
90 FOR J=1 TO L
100 C=(RND(O)*(L-1))+1
110 C=INT(C+.5)
120 FOR Y=1 TO L
130 IF B(Y)=C THEN GOTO 100
140 NEXT Y
150 B$(J,J)=A$(C,C)
160 B(J)=C
170 NEXT J
180 IF A$=B$ THEN GOTO 60
190 PRINT :PRINT "HOW ABOUT: ";B$
200 POKE 752,1:POSITION 9,10:PRINT
"Press START to Continue"
210 IF PEEK(53279)<>6 THEN GOTO 210
220 GOTO 20
```

POTPOURRI

NOW THAT YOU'VE FINISHED playing with strings, it's on to the next medley of programs.

CHEERS

by Chip Towle

THIRTEEN-YEAR-OLD CHIP TOWLE designed this short program to put the XIO (FILL) command through its paces. So, if you're thirsting for knowledge just grab a mug-full of your favorite beverage, sit down in front of your Atari computer, and enter and RUN Chip's thirst quenching program. Cheers!

CHEERS

```
5 GRAPHICS 7+16:COLOR 1
10 . 1 - Draw glass
15 COLOR 1:PLOT 40,15:DRAWTO
40,60:PLOT 41,61:DRAWTO 70,61:PLOT
71,60:DRAWTO 71,15:PLOT 41,60:
DRAWTO 71,60
20 . 2 -Draw handle
25 PLOT 72,22:DRAWTO 92,22:DRAWTO
92,52:DRAWTO 72,52:PLOT 72,28:
DRAWTO 82,28:DRAWTO 82,46:DRAWTO
72,46
30 FOR A=1 TO 1000:NEXT A
35 . 3 - Fill-up the glass
40 COLOR 3:POKE 765,3
45 PLOT 41,18:DRAWTO 41,60:POSITION
41,18
50 XIO 18,#6,0,0,"S:":FOR A=1 TO
1000:NEXT A
52 . Draw The Word 'CHEERS'
55 REM C
60 COLOR 2:PLOT 30,80:DRAWTO 20,80:
DRAWTO 20,90:DRAWTO 30,90
65 REM H
70 PLOT 40,80:DRAWTO 40,90:PLOT
50,80:DRAWTO 50,90:PLOT 40,85:
DRAWTO 50,85
```

```

75 REM E
80 PLOT 70,80:DRAWTO 60,80:DRAWTO
60,90:DRAWTO 70,90:PLOT 60,85:
DRAWTO 70,85
85 REM E
90 PLOT 90,80:DRAWTO 80,80:DRAWTO
80,90:DRAWTO 90,90:PLOT 80,85:
DRAWTO 90,85
95 REM R
100 PLOT 100,85:DRAWTO 110,85:DRAWTO
110,80:DRAWTO 100,80:DRAWTO
100,90:PLOT 105,85:DRAWTO 110,90
105 REM S
110 PLOT 130,80:DRAWTO 120,80:DRAWTO
120,85:DRAWTO 130,85:DRAWTO
130,90:DRAWTO 120,90
112 . Empty the glass & start again
115 A=41:B=18:C=70:COLOR 0
125 PLOT A,B:DRAWTO C,B
130 B=B+1:IF B=59 THEN 140
135 GOTO 125
140 FOR A=1 TO 500:NEXT A:RUN

```

Here's How Chip's Program Works

An old-fashioned mug is drawn in lines 10 through 30. In lines 40 through 50 the mug is filled with your favorite beverage using the XIO command:

1. Assign a COLOR: COLOR 3
2. POKE the value of the color into location 765: POKE 765,3
3. PLOT the top-left corner of the FILL area: PLOT 41,18
4. DRAWTO the bottom-left corner of the FILL area: DRAWTO 41,60
5. POSITION the cursor at the top-left corner of the FILL area: POSITION 41,18
6. Execute the FILL command: XIO 18,#6,0,0,"S:"

Steps 1 through 5 may be arranged in any order. Lines 60 through 110 write the word "Cheers" across the bottom of the screen. Finally, in lines 115 through 135, the mug is emptied. Hic!!

USAMAP

Drawing With Data Statements

by John Stripe

JOHAN STIPE, A PROLIFIC 14-year-old Atari programmer from Temple, Texas, sent us three outstanding programs: a history quiz game, a math quizzer and USAMAP. We're presenting John's map of the United States in this issue. It demonstrates the use of data statements to make complex drawings, and the finished product is excellent.

John told us that he spent about a day plotting each point of the map on graph paper. He then transferred all the plotted coordinates to data statements and inserted them in his program.

We've added a short "data-check sum" routine to the program. So, if you've entered incorrect data, you'll know it when you RUN USAMAP.

After you type in and RUN USAMAP, it will draw an outline picture of the United States.

Have some fun. Try adding data statements to draw in the 48 states. It's not only good programming practice, it might make a great history or geography project!

USAMAP

```

0 REM **USAMAP by John Stipe**
10 GRAPHICS 7+16:POKE 712,128
15 COLOR 1:T=0:A=2:B=1.6:C=10:D=0
20 X=5:Y=2:PLOT X*A+C,Y*B+D
30 READ X,Y:T=T+X+Y:IF X>500 THEN 80
40 DRAWTO X*A+C,Y*B+D
50 GOTO 30
80 IF T=12258 THEN GOTO 80
90 PRINT "INCORRECT DATA...RECHECK
YOUR ENTRIES":END
100 DATA 6,2,7,3,7,4,8,2,8,1,9,1,10,
2,11,2,12,2,13,3,14,3,15,3,
16,4,17,4,18,4,19,5,20,5,21,
5,22,5,23,5
110 DATA 24,6,36,6,37,7,38,7,39,7,40,
7,39,8,38,9,39,9,40,9,41,10,
42,10,43,10,43,11,43,12,43,
13,43,14,44,15
120 DATA 44,16,45,15,45,14,45,13,45,
12,46,11,46,10,47,10,48,11,
48,12,48,13,49,12,49,13,50,
14,49,15,49,16
130 DATA 50,16,51,16,52,15,53,14,53,
13,54,12,55,12,56,12,56,11,
56,10,57,9,58,9,59,8,60,8,
61,4,62,3,63,3
140 DATA 64,5,65,6,64,7,63,8,63,9,
62,10,62,11,63,13,62,14,61,
14,60,15,60,16,60,17,60,18,
59,19,59,20,59,21
150 DATA 59,22,59,23,58,24,59,25,
58,26,57,27,56,28,55,29,
54,30,54,31,53,32,53,33,54,
34,54,35,55,36,55,37
160 DATA 56,38,56,39,56,40,56,41,55,
41,54,40,53,39,53,38,52,37,
52,36,51,35,50,34,49,35,48,
35,47,34,46,34
170 DATA 45,34,44,35,43,35,43,36,
42,36,41,36,40,36,39,36,38,
36,37,36,36,36,35,37,34,
37,33,38,32,39
180 DATA 32,40,32,41,32,42,31,41,30,
40,29,39,29,38,28,37,27,
36,27,35,26,35,25,35,24,36,
23,35,22,34,22,33
190 DATA 21,33,20,32,14,32,13,31,12,
30,11,30,10,29,7,29,7,27,6,
27,6,26,5,26,4,25,3,24,3,22,
2,21,2,18,1,17
200 DATA 1,13,2,12,2,10,3,9,4,8,4,7,
5,6,5,2
1000 DATA 1000,1000

```

HEXDEC CONVERSION

IF YOU LOOK at the memory locations listed in Appendix I of your Atari operating manual, you'll see that each location is presented in its decimal and hexadecimal form.

Decimal numbers (numbers to the base 10) are the type we use all the time. When you balance your checkbook or add up your lemonade-stand profits, you're using the decimal-number system.

Hexadecimal numbers (numbers to the base 16) are used as a space-saving notation to represent the memory locations within your Atari computer. For example, the decimal number 186 is "BA" in hexadecimal notation.

If you want to program in machine language, using an Assembler/Editor, you'll have to convert decimal numbers to hexadecimal numbers. There are many charts and graphs you can use to do this job. But, to make your task easier, we've written HEXDEC.

Just type in HEXDEC, RUN it and follow the prompts that appear on your screen:

1. To convert a decimal number to its hexadecimal

equivalent, press [D] and then [RETURN]. Then enter a decimal number and press [RETURN] again.

2. To convert a hexadecimal number to its decimal equivalent, press [RETURN] then enter a hexadecimal number (don't enter "\$") and press [RETURN] again.

3. To return to the main menu, enter [Q] and press [RETURN].

HEXDEC

```

10 CLR :DIM A$(1)
20 GRAPHICS 0:POKE 752,1:POKE
710,0:PRINT CHR$(125)
30 PRINT "D+<RETURN> to convert
   Decimal to Hexadecimal. Hit
   RETURN to convert Hexadecimal to
   Decimal";
40 INPUT A$
50 IF A$="D" THEN PRINT CHR$(125):
   GOTO 390
60 REM ***HEX TO DEC ROUTINE***
65 PRINT CHR$(125)
70 CLR :DIM HEX$(10)
80 PRINT :PRINT "Enter a Hexadecimal
   Number:";
90 INPUT HEX$
100 IF LEN(HEX$)>4 THEN PRINT
   CHR$(125):GOTO 80
110 IF HEX$(1,1)="Q" THEN GOTO 10
120 A=ASC(HEX$(1,1))
130 IF A<48 OR A>70 THEN GOTO 10
140 IF A<57 THEN A=A-48
150 IF A>64 THEN A=A-55
160 IF LEN(HEX$)=1 THEN HEX=A:
   GOTO 360
170 B=ASC(HEX$(2,2))
180 IF B<48 OR B>70 THEN GOTO 10
190 IF B<57 THEN B=B-48
200 IF B>64 THEN B=B-55
210 IF LEN(HEX$)=2 THEN
   HEX=A*16+B:GOTO 360
220 C=ASC(HEX$(3,3))
230 IF C<48 OR C>70 THEN GOTO 10
240 IF C<57 THEN C=C-48
250 IF C>64 THEN C=C-55
260 IF LEN(HEX$)=3 THEN
   HEX=(A*256)+(B*16)+C:GOTO 360
270 D=ASC(HEX$(4,4))
280 IF D<48 OR D>70 THEN GOTO 10
290 IF D<57 THEN D=D-48
300 IF D>64 THEN D=D-55
310 E=A*4096
320 F=B*256
330 G=C*16
340 H=D
350 HEX=E+F+G+H
360 PRINT "The Decimal number is:
   ";HEX
370 GOTO 70
380 REM ***DEC TO HEX ROUTINE***
390 CLR :DIM Z$(1)
400 PRINT "Enter a Decimal number: ";
410 TRAP 10:INPUT DEC
420 A=INT(DEC/16)
430 B=A*16
440 C=DEC-B
450 D=INT(A/16)
460 E=D*16
470 F=A-E
480 G=INT(D/16)
490 H=G*16
500 I=D-H
510 J=INT(G/16)
520 K=J*16
530 L=G-K
540 PRINT "The Hexadecimal value is:
   $";
550 FOR X=0 TO L:READ Z$:NEXT X:PRINT
   Z$:RESTORE
560 FOR X=0 TO I:READ Z$:NEXT X:PRINT
   Z$:RESTORE
570 FOR X=0 TO F:READ Z$:NEXT X:PRINT
   Z$:RESTORE
580 FOR X=0 TO C:READ Z$:NEXT X:PRINT
   Z$:RESTORE

```

```

590 PRINT :PRINT :GOTO 390
600 DATA 0,1,2,3,4,5,6,7,8,9,A,
   B,C,D,E,F

```

Programming Tips and Ideas

1) If you have a printer, change the PRINT statements to LPRINT statements and get a hard-copy record of your conversions.

2) The HEXDEC program is broken into two segments as indicated by the REM statements in the program: A hex/dec converter and a dec/hex converter. Each section can be run independently of the other.

CRACHR

World's Smallest Character Set Utility

by David Bowman

DAVID BOWMAN'S UTILITY called CRACHR helps you redefine characters. It lets you see your character's shape on the screen while showing you the values needed for your DATA statements.

In the last issue of ATARI CONNECTION, Bill Bartlett's Computer Classroom column featured a character-redefinition program called TALKING BOXES. This program features DATA statements containing the values of each box.

Using CRACHR is easy. First, design your character(s) on a piece of 8 by 8 grid paper. Then, RUN CRACHR and transfer your creation to the computer's screen. Press the [+] key to fill in a pixel, or press the space bar to leave a pixel blank. When each row of eight pixels is configured the way you want it, the correct DATA value for that character line is printed on the screen.

Write down the DATA values and use them in your character-redefinition program to make your wildest creations come to life.

CRACHR

```

10 DIM A$(100),L(10),LL(10)
20 FOR W=1 TO 8:READ D:L(W)=D:NEXT W
30 DATA 128,64,32,16,8,4,2,1
40 OPEN #1,4,0,"K"
50 GRAPHICS 2:POKE 752,1
60 FOR Q=1 TO 8
70 PIX=0
80 FOR L=1 TO 8
90 POKE 764,255:GET #1,B
100 A$(L)=CHR$(B)
110 POSITION 1,Q
120 A=ASC(A$(L))
130 IF A=32 THEN POSITION L,Q:PRINT
   #6;"-";:NEXT L
140 IF A<>32 THEN PIX=PIX+L(L):
   POSITION L,Q:? #6;"+":NEXT L
150 SOUND 0,100,10,10:SOUND
   1,120,8,5:FOR W=1 TO 200:
   NEXT W:SOUND 0,0,0,0:
   SOUND 1,0,0,0
160 POSITION 12,Q:? #6;PIX
170 NEXT Q
180 FOR X=1 TO 8:FOR Y=1 TO 8:
   LOCATE X,Y,Z
190 IF Z=45 THEN POSITION X,Y:
   PRINT #6;CHR$(32)
200 NEXT Y:NEXT X
210 ? "Press START to draw a new
   figure"
220 IF PEEK(53279)<>6 THEN GOTO 220
230 POKE 764,255:GOTO 50

```

COMPUTER COMFORT

USING THE 1010 (OR 410) RECORDER

Or What's Better Than a 10?

by Jane Sokolow

MANY OF YOU may have noticed that the Computer Price War has not really affected any module but the computer itself. So, you may be starting your components with a tape recorder as a storage device. If so, there are probably many questions you'd like answered about this important peripheral.

What Can You Expect From A Recorder?

Like many things in life, there's some good news and some bad news. The bad news is that there is no way to quickly locate a program on tape. A disk drive, being equipped with random access capabilities, can go straight to any one of the 60+ files it remembers. With a recorder you must set your counter at the beginning of a tape, and jot down this number for your future use. Go right to this exact position when you want to load. Be prepared to wait because it takes up to ten times as long to load a program from a tape as it does from a disk.

Now, the good news. Aside from the obvious advantage of being inexpensive, tape is capable of recording voice or music along with your program. See, there are two tracks on a tape. Digital data—the specific frequencies signifying “1s” and “0s” to your computer—are recorded on the right. The left track is free for analog data—a whole range of frequencies such as music or the “voice-over” on instructional program tapes.

Why Can't I Save A Program?

We-ell, let's see. The trick in this situation is to isolate the offender. You may not have followed the correct procedure for saving a program. Please check with us or consult a reference like *Your Atari Computer* by Lon Poole. If you're convinced you have done everything right, the problem may be the recorder, the tape or the computer. Don't automatically assume your recorder is at fault.

Faulty Tape—Use short tapes! Short tapes are less prone to stretching, which can cause loading errors. If a music tape stretches, the sound wobbles. If a digital tape stretches, you've lost your program, period.

Avoid chromium tapes that can damage your heads. Use 30-minute tapes, maximum. You can locate short tapes in outlets like Radio Shack.

Sometimes brand-new tapes are so tight they don't move properly. Fast forward and then rewind them before you record. And even brand-new tapes can have glitches that prevent recording. Try another one.

POKEY Problems—The POKEY chip in the computer is the one that regulates Input/Output procedures. It is disturbed when you press [SYSTEM RESET]. This may prevent a successful SAVE and a successful LOAD. It is reinitialized with an LPRINT command. This is a BASIC command addressing a printer. If you have one, make sure it is turned off before you use this command in conjunction with tape loading. When you're ready to save or load, simply

type LPRINT and press [RETURN]. In a second or two, you will get ERROR 138. Don't be alarmed: it just means, “Hey, there's no printer,” which is correct. In the future, instead of using [SYSTEM RESET] to clear the screen, either choose the [SHIFT] and [CLEAR] keys together or GR. O, which will accomplish the same effect.

You might also have a bad POKEY. It's rare, but it happens. This might be true if you can't load anything.

Bad Recorder—If you can load your own tapes but not prerecorded ones, your tape heads are possibly out of alignment. Your own tapes will load because the recorder is reading exactly what it wrote. Commercial tapes were written at a standard setting, which the read/write mechanism in your tape heads has somehow knocked out of range, so your recorder can't read it.

If you can load commercial tapes but not your own, you'll have to do a bit more investigating to isolate the problem. Get together with someone else who has both a computer and a recorder and try different equipment combinations. (If you don't know anybody, call us about users' groups near you.) Either the read/write area of your recorder or your POKEY chip is at fault. If you can save a program with your equipment, but can only load it on someone else's computer (with your recorder), then it's the read area of your POKEY chip. If it can be read with your computer and their tape recorder, then it's the read heads in your recorder.

If you can load sometimes, but have lots of ERROR 138s, 140s or 143s, then call our toll-free number, leave a message for me, and I will assist you in finding the correct resistors, etc., to have checked.

How Come I Get Error 21 When I've Returned My Recorder Three Times?

You get ERROR 21 when you were using the BASIC procedure (CLOAD) with a data-file tape, or one written in machine language (binary tape). A binary tape has a special procedure described in the manual: remove the BASIC cartridge, turn off the computer, press the [START] key, then turn the machine back on and proceed as usual. Data files, on the other hand, must be loaded by another program. Tape B of *Touch Typing*, for example, must be loaded by the program on Tape A, Side 2.

Why Couldn't I Load A Tape In The Store Even Right Out Of The Box?

It might be the recorder, but once in a while a vendor will unwittingly make copies of a bad master. Call our toll-free number. We will assist you, and you will be helping us track down faulty program tapes manufactured by Atari.

Why Can't I Load Some Tapes On My 600XL?

The BASIC in your computer is a revision eliminating the “lock-up” problem in the old BASIC. However, this revised BASIC is 16 bytes larger than the old one; consequently, tapes with especially large programs, such as *Graphit*, *States and Capitols*, and others bump into these programs. If you have a BASIC cartridge, put it in and the tapes will load. Otherwise, call us for assistance.

Well, that's all I have room for this time. Remember, if you need assistance with any of these problems, call our toll-free numbers: (800) 538-8543; in California (800) 672-1404.

Jane Sokolow is a Product Specialist in the Customer Relations Department at Atari, Inc.

BITS AND PIECES

Submitting a Program or Subroutine to *BITS AND PIECES*

To prepare a program or subroutine for submission to *Bits and Pieces*, follow these guidelines:

1. Give your program or subroutine a name of eight or less characters.

2. Write a brief description of the task performed by your program or subroutine and describe any special features.

3. Write a few lines about yourself and how you came to develop your program or subroutine.

4. If you are a more experienced programmer, then be sure to include the following information:

- List all variables (ENTRY, EXIT, DIM)
- List all IOCBs used in OPEN statements
- Any other special routines or characters
- List the variables which may be generated by the subroutine and passed back to the main program (exit variables).

5. Send your program on cassette or diskette, along with printed listing, to:

Bits and Pieces
ATARI CONNECTION Magazine
P.O. Box 3427
Sunnyvale, CA 94088-3427

6. Be sure to include your mailing address and phone number.

Even if you don't consider yourself an "expert" or "advanced" programmer, don't be discouraged! "Bits and Pieces" is for experts and beginners alike. So don't be shy. Even novices develop programs and routines that are of interest to others.

By submitting a program, you consent to its publication and use in ATARI CONNECTION and elsewhere. Media and manuscripts not used will be returned if you include a self-addressed, stamped envelope. If your entry is published in ATARI CONNECTION, you will receive your choice of Atari software, worth up to \$30.

Sydex Commemorates "Computer Pioneer Days"

INTERESTED IN TRYING to psych out the visionaries behind that technical wonder, the microcomputer? Curious about those who started home computers clicking? Well, here's your opportunity. Sydex, an international publisher of microcomputer books, is sponsoring "Computer Pioneer Days," two conferences to be held for two days each, in Paris on May 21st and 22nd and in San Francisco on June 15th and 16th. These will commemorate the tenth anniversary of the "birth" of the microcomputer and bring together many of the talented people who have contributed to the formation of the industry.

The conferences will offer two full-day sessions featuring talks by the leaders in microcomputing—people like Atari's chief scientist, Alan Kay, who developed the computer language "Smalltalk"; Mike Markula of Apple Computers; Chuck Peddle, founder of Victor Technologies; and Seymour Rubinstein, founder of MicroPro International.

Also on the program are presentations to honor outstanding developments in hardware and software.

—Joan Delfino

For more details about location and price information, contact SYDEX, 2344 Sixth St., Berkeley, CA 94710.

ERRATA

No Connexions after the last Connection

Shortly after our Winter Issue was printed, the job market service Connexions (Telecommunications, pg. 26) went out of business. Attempts to contact the Connexions head office were unsuccessful, and there was "no new number."

...

In Bits and Pieces, the program listing for "Grapheek" (pg. 54) had two errors—line 40's data statement should be 32, not 34; the last line of the program was cut off and should have read "80 NEXT I." Also, the last line of the "Convert" program should read: 32100 ? CHR\$(125):POSITION 2,10: ? L\$;" ;V\$;"=" ";Y\$;"":POS. 20,15: ? [";Q;"] :STOP. In the "Dictator" program (pg. 54), the last line was omitted: 300 NEXT A:B=B+1 :GOTO 280.

...

In "Program Two" of Kidbits (pg. 24), line 1130 should appear as: 1130 DATA 68, 91, 108, 137, 80, 82

The Home Computer News article "Bytes of Bagels" (pg. 15) erroneously listed the helpful local dealer as "Crazy Eddie." The real dealer was Scarborough Video, where the school gets "free advice and great service." The grant that started the program was from the Montgomery School District, not the state government as was reported.

...

If you purchased the Bookkeeper Kit and did not receive the Numeric Keypad Diskette Handler that allows the use of the keypad in non-Bookkeeper applications, you may order it and the accompanying manuals by sending the Bookkeeper proof-of-purchase receipt to:

Atari Customer Relations
1312 Crossman Ave.
Sunnyvale, CA 94086
Attn: Numeric Keypad Diskette

Special Listing Instructions for Bits and Pieces and "The Computer That Rolls"

When you see:

{CLEAR} First press [ESC], then hold [SHIFT] and [CLEAR] at the same time.

{DOWN} First press [ESC], then hold [CTRL] and [↓] at the same time.

{TAB} First press [ESC], then press [TAB].

b indicates how many blank spaces to leave (if more than one) between words or characters.

Adventures and Basics

Entertainment, Education and Everyday Atari Activities



Adventures with the Atari
by Jack B. Hardy
Reston Publishing
356 pages, paperback, \$14.95.

THE POPULAR FANTASY game *Dungeons and Dragons* has spawned a new order of game players. Dungeonmasters are different, in character if not in kind, from other players in that they derive as much pleasure from creating games for others as they do playing them themselves. The role especially appeals to people whose fascination with fantasy role-playing did not end with childhood. The more successful Dungeonmasters tend to be highly imaginative, quick to adapt, expert at subterfuge and, well, quirky.

In *Adventures with the Atari*, Jack Hardy presents an intriguing image: the Dungeonmaster at the computer keyboard. It's difficult to imagine a better vehicle than the Atari computer for this type of game, where inventiveness, flexibility and vivid imagery are so important. For the Dungeonmaster, the Atari computer is more than a place to play—it's mission control for creating a whole new environment.

One of the few questions Hardy doesn't answer is why anyone would even want to be the Master of a dank old dungeon—even a metaphorical one. A dungeon where a master such as

Hardy operates is a place where everyday distinctions fade and the real and ideal come closer together. It's a place where one must constantly ask and analyze: Is that thing over there shape or shadow? Respondent or reflection? Flesh or phantasm? In the master's dungeon, there's always a no vacancy sign. The chambers are all occupied with new experiences, feelings and opportunities for learning.

Hardy's work is a virtual textbook on how to become the ultimate computerized Dungeonmaster. He walks the reader through the basic steps involved in creating computer adventures, and provides six games to try out and study. There are three interactive games and three games utilizing the extensive graphics capabilities of Atari computers. One can choose among games written in Atari Pilot, Microsoft BASIC, or ATARI BASIC. Accordingly, it's necessary to have a little experience with at least one of these programming languages. At the end of the book, the fledgling Dungeonmaster gets kicked out of the nest with enough information to create a new game.

Along the way, Hardy teaches many valuable things about programming, computers in general, and the Atari computer specifically, including character set manipulation, PEEK and POKE functions, color registers, and much more. The author gets bonus points for never falling into the trap of pedantry or succumbing to the inexplicable allure of computerspeak.

It may surprise you to learn how simple it is to make a computer adventure. The first and perhaps most creative part is building the scenario. Imagination is the only limitation. "Travel from one land to another," Hardy suggests. "Explore the human body, search the underground labyrinth of Neptune, or fly to the cloud city of Venus."

Then objectives are set for the game, and obstacles are added for complexity.

For example, the damsel in distress is on the other side of a boiling lake of acid. The Master next adds objects to allow the player to overcome obstacles. How about X-ray specs or a singing scimitar?

A map serves to show connections among the events and alternate courses of action. It can also serve as a blueprint in the design and later debugging of an adventure program. A flow chart is also recommended to each part of the program that must be included for proper operations. The flow chart is really nothing more than a glorified map.

Enter the program and try it out. This is the hard part, the debugging station. "Although you may have worked weeks on a computer adventure," Hardy says, "and tried out every possible combination of survival and death in the game, there's always a chance that something was overlooked." On the bright side, each error made and recognized can provide an insight into what it takes to make a computer do one's bidding.

The major part of the book is devoted to the six ready-made games. For easier reading, complete program listings are presented separately in an appendix. Eager adventurers can thus play and enjoy the games even before they understand the fine points of the programming.

The games are introduced by crude, juvenile drawings that, like the rather lurid front cover, detract from the offering. However, the straightforward illustrations of maps and flow charts adequately demonstrate their utility in Dungeonmaster strategy.

The three interactive games show different ways to process information. The programs are broken into the smallest subsets of statements so you can see the building blocks of the programming process and the effects of different segments on memory savings, speed of execution and other factors. The three graphics adventure games show how to become a Dungeonmaster's Dungeonmaster, adding the visual to the imaginary.

The most gratifying step for the apprentice computerized "D.M." is creating an adventure from scratch. The Creator and the Interpreter, while they sound grand, are really just simple programming tools Hardy provides for solo flights. Use Creator to develop a diskette-based adventure, and the Interpreter program to play your creation.

As Hardy puts it: Happy Hacking!

— Carlos Vidal Greth

Carlos Vidal Greth is a copywriter in Hewlett-Packard Marketing Communications.

Computers and Reading Instruction
by Leo D. Geoffrion and
Olga P. Geoffrion
Addison-Wesley
218 pages, paperback, \$13.35

CHOOSING CURRICULUM materials for teaching reading was never an easy responsibility. Enter the microcomputer age, and that task becomes even more overwhelming, if not downright confusing. *Computers and Reading Instruction* by Leo D. Geoffrion and Olga P. Geoffrion is one of Addison-Wesley's *Practical Guide to Computers in Education* series; it helps take the mystery out of integrating computers into the classroom by offering a comprehensive guide to instructional material.

As if reading the teacher's mind, the authors address the question, "How can these machines really help my students improve their reading skills?" Their answer is not by arguing for the "miracles" of the electronic classroom; but rather by presenting, through real and hypothetical examples, the pros and cons of using computers in a school setting—for teaching reading readiness, word identification, comprehension, speed reading, and remedial reading. They offer tips for evaluating software and hardware and a resource guide to public domain and commercial software.

Computers and Reading Instruction is written in clear, non-technical language that a novice can understand. This book may not pick out curriculum materials for teachers, but it does the next best thing: gives them an indispensable tool for making the best choices.
—Elizabeth Metzger

SURVIVAL ON PLANET X
by Michael Orkin and Ed Bogas
Reston/Prentice-Hall, Inc.
151 pages, paperback, \$12.95

REMEMBER THE CLASSIC NORTON Juster story, *The Phantom Tollbooth*? A bored young boy is rescued from intellectual doldrums when he goes on an imaginative, whimsical tour of ordinary things. *Survival on Planet X* takes a similar tack when it rescues BASIC programming from tedium by framing it in a fantasy story. This book offers step-by-step instructions to programs which supplement the story of teenaged Vivian who, in following a mysterious "Help" signal to the unexplored Planet X, has a series of interest-

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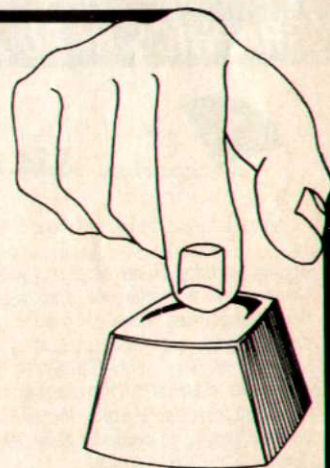
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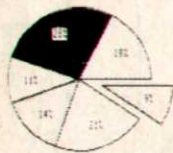
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ing adventures on the planet.

Programming instructions are interspersed with the story line. The programs illustrate events in the text, and readers are encouraged to do the programs on the Atari home computer as they read. You begin by using the word "Help" in a continuous loop. From there you progress to longer programs which include writing a poem with your name in it, some arithmetic exercises, listmaking, sound effects, graphics displays, and combinations of these.

Though no great work of literature, the story of Vivian and the lizardlike creatures she meets on Planet X is absorbing and the BASIC lessons accompanying it are simple for beginning programmers.—Randi Rohde

Rainy Day Activities for the Atari

by Nancy Mayer

Reston Publishing

156 pages, paperback, \$12.95

Rainy Day Activities for the Atari

Nancy Mayer



COMPUTER BOOKS seem to be all-inclusive these days. All kinds are available for all types of users, from the very technical to the amateur. *Rainy Day Activities for the Atari* by Nancy Mayer is a computer book for children between the ages of three and nine. The book contains over 50 programs that use letters, numbers, colors, music and designs to entertain children. No program is longer than twenty lines, so the games were definitely planned with children in mind. Most of the games require no reading ability; however, since entering the program exactly as it is written is essential, on occasion, adult guidance will be necessary.

On a stormy Saturday afternoon, I decided to put this book to the test—entertaining my children, aged three, five and eight. I soon found that many of the activities were very engrossing. The program "Hello" displayed a personalized greeting in the form of colorful graphics coupled with the kids' names. The accompanying sounds added to its appeal. The games "Snowflakes" and "Stars" provided lots of fun for the younger children. After entering the programs, the children could vary the pattern and colors of the stars or snowflakes on the screen by simply entering a number between three and nine. They had a great time seeing what each number "looked like." The eight-year-old's favorite game was "Ski," a creative program requiring the player to ski through a snow course without crashing into the snow banks. It even has successive rounds of increasing difficulty.

One of the most appealing features of *Rainy Day Activities* for the Atari is its range. Children as young as three can have fun with an adult's help, while older children can be independently entertained by the more advanced activities in the book. But don't wait for a rainy day—this is a computer book for all seasons!—Joan Delfino

BASICally Speaking, A Young Person's Introduction to Computing

by Frances Lieberman Cohen

Reston/Prentice-Hall, Inc.

144 pages, paperback, \$12.95.

AN INSTRUCTIONAL BOOK for readers of all ages, *BASICally Speaking* explains how computers evolved, what makes them work, and how to program with ATARI BASIC. The concepts are explained simply so they can be easily understood by beginning computer students. With review questions at the end of each chapter and the bulk of the book providing exercises to teach BASIC, it functions as a valuable textbook.

The first four chapters on computer history could have been condensed. But the remaining chapters are beneficial and contain valuable exercises in computer programming, including a game and a simple budgeting program.

The appendices explain in detail more complicated topics, such as binary numbers and scientific notation. There is also a glossary of terms to help with easy definition and review.

—Rosie Gourley Hitchens

PRODUCTS

REVIEW

New Products for Atari Home Computers

THE ATARI 800XL: HOW IT RATES

FINALLY I GOT my hands on a new Atari 800XL computer. And it was worth the wait. Atari pulled out all the stops to produce what I consider the perfect home and small business computer.

The Atari 800XL, like its smaller companion the Atari 600XL, offers a new improved built-in BASIC language, a HELP key, Self Test modes, an international character set, four new graphics modes, and an easy-to-use cartridge slot. The keyboard design improves on the Atari 800's layout, and includes a [CAPS] key that lets you capitalize without using the [SHIFT] bar. But this new machine, not only handsome and congenial, is powerful. With its increased memory (64K RAM), the Atari 800XL gives you increased computing capability at a reasonable price (suggested retail: \$399).

Software Compatibility

The Atari 800XL computer is the new workhorse of the Atari line and virtually all of the 2000 plus software packages written for the older 800 model run on the XL. Some companies' programs, however, don't conform to the Atari 800XL's internal configuration. Before running these programs you "prep" the Atari 800XL with *The Translator*, a double-sided disk you load before booting up your program. *The Translator* loads a new operating system that allows the software to work. It's available for \$9.95 from Atari Customer Service. Call toll free, (800) 538-8543. In California, (800) 672-1404.

Those Two Joystick Ports

Even though the 800XL has only two joystick ports on the right-hand side of the console, they can be configured for use with games that have four contestants. Built-in switching and memory keeps track of each player and continually reassigns each joystick port as the game progresses.



Atari 800XL: Built-in BASIC, 64K RAM, and more.

Reliability

I learned from Atari's head of production that the new XL series of computers are the most reliable micros on the market today. Each computer is run through its paces and fully tested before sent to shipment. Quality assurance procedures include such exotic tests as "salt-spray," "humidity" and "high temperature," usually applied to military grade equipment. This battery of tests has resulted in an "Acceptable Quality Level" (AQL) of better than 0.7 percent, which translates to less than a 1 percent average failure rate. The rest of the industry considers a failure rate of 5 to 7 percent acceptable!

Processor Bus: Window To The Future

A parallel bus connector located at the rear of the computer makes possible truly useful system expansion. Atari and other hardware developers are now working on a number of modules and add-ons to enhance the computer's

already considerable capabilities. The 800XL's promise as a powerful and useful tool can now be extended well into the future.

One Helpful Hint

When I unboxed my new computer, a single sheet of paper fell out. I very nearly discarded what turned out to be an important addendum to the Owner's Guide. Just in case you overlook it while unpacking, I'll tell you what it says: Some programs, written in machine language, won't work when the BASIC language is operating. Before you run this type of program, simply hold down the [OPTION] button during power-up. This disables the built-in BASIC, which is reactivated the next time you turn on the computer.

Some 800XL Tricks Of The Trade

KEY-CLICK ENABLE/DISABLE

The clicking sound emitted from the TV speaker each time you press a key

can be turned off by typing:

POKE 731,255 <RETURN>

To turn it back on again, just POKE 731 with 0.

INTERNATIONAL CHARACTER SET

To activate the international character set, type:

POKE 756,204 <RETURN>

To see the international character set displayed on your screen, just hold down the CONTROL button as you press each of the keys. To turn it off, and return to the normal character set, POKE 756 with 14.

FINE SCROLLING

To slow down the rate at which screen text scrolls, POKE 622, 255:GRAPHICS 0.

CURSOR WHIZ RATE

You can control how fast the cursor travels as you hold down a key.

1. Super Fast: POKE 730,1
2. Fast: POKE 730,3
3. Normal: POKE 730,5

The 800XL's are out there now. So do what I did. Place your fingers on an 800XL and give it a try.—David Heller

ATARI 1027 LETTER QUALITY PRINTER

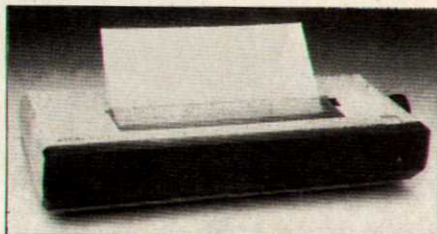
Putting Your Best Face Forward

WORKING THE PHONES at Atari Customer Service, we're the first to hear the field reports on new Atari products. And the comments I've been getting about the Atari 1027 letter quality printer range from merely "great" to "fantastic." The newest addition to Atari's printer line has the same sleek, sexy XL design as all the new computers and peripherals. It needs no interface and prints fully formed characters in Prestige Elite (12 pitch)—the same handsome typeface found in most typewriters. But the best part is the price: at \$349 suggested retail, it is by far the least expensive letter quality printer available for the Atari system.

The printer is compact—no wider and only half an inch taller than the Atari 600XL and 800XL computers. Though small, the printer weighs a solid

ten pounds and has large neoprene feet that anchor securely to your work surface. With a printing speed of 15 characters per second, it is not as fast as some dot matrix printers which can print as fast as 120 cps (but which are not letter quality). Ribbon has been replaced with an ink roller that quickly snaps into place, eliminating the mess of threading ribbon. You can expect to print 20 million characters before you need a roller replacement.

The paper feed is friction only, which means paper thickness and type is critical. Extra-heavy paper and multiple-copy forms may get jammed. The optimum thickness is that of standard typewriter paper—0.0025 inch. Labels cannot be printed, because if there is a bend, wrinkle or peeling away from the backing, the print head will snag and destroy the head or drum. Fanfold paper can be used if you strip off the pinfeed sides. However, no more than four continuous sheets should be printed at a time—the paper has a tendency to shift sideways after five or six sheets. The



printer was designed for single-sheet letterhead paper, and all standard paper of this kind will work fine.

The print head itself is drum-shaped as opposed to a daisy-wheel or a ball. Along with the standard character set, there are 29 international characters like £, Ö, ñ. You can access the international character set from BASIC or from the AtariWriter program. The print head is not changeable, so no other fonts are available. But the 1027 printer is compatible with virtually any software programs, even those that offer subscript, condensed type or other features not supported by the printer.

The owner's guide leads you through the setup with clear photographs and step-by-step instructions. A brief program on how to print using BASIC is included, but the beginner wanting to know more about printing from BASIC will have to look for additional programming help.

Of course, you could also use some electronic typewriters as printers. But these add up to at least \$800 when you include typewriter, serial interface, and Atari 850 interface. Other full-fledged letter quality printers range from \$700 to \$1400. *Consumer's Guide* has deemed the Atari 1027 printer a good value

and, judging by the calls I've been getting, consumers more than agree.

—Jim Chandler

The Atari 1027 printer is available now. Package includes an owner's guide, power supply, one replacement ink roller, a connecting cable, and one bottle of lubricating oil. Requires 16K RAM. Suggested retail price: \$349.

ATARI 1050 DISK DRIVE

Elegant AND Efficient

TO COMPUTER SCIENTISTS, elegance and efficiency are often one and the same. The goal is to fit more and more data into less and less space. The new Atari 1050 disk drive accomplishes this task inside and out, offering several improvements over Atari's previous 810 disk drives. The modern slimline matches the new XL computer series design and fits easily into office or home decor. Since the drive is only 3½ inches high, shaved down more than an inch from its predecessor's height, less overhead space is required to store the 1050 drive. This is helpful for stacking drives on narrow shelves.

But the most important difference between the old and the new is technical—the 1050 is a 'dual' density drive. This means that the 1050 disk drive is capable of reading and writing data in different densities. It can operate in the familiar single density mode or, in conjunction with Atari's new disk operating system, DOS 3, it can read and write data in the new "enhanced density" format. Both the single and enhanced density formats contain 40 tracks per diskette and 128 bytes per sector. But single density diskettes have 18 sectors per track, for a total formatted storage capacity of 88K bytes, while enhanced density diskettes contain 26 sectors per track, for a total formatted storage capacity of 127K bytes. Thus, storage capacity is increased by 39K.

Of course, the most immediately noticeable difference in the operation of the new drive is its noise level—the 1050 is very quiet. Users accustomed to the 810 drive will appreciate the lack of distracting head noise in the operation of the 1050 drive.

The new drive is as easy to set up and use as the 810 drive. The drive number is still selected with the recessed switches at the rear left-hand corner of the drive. The switch settings for drives one through four are provided in the

manual and are the same as those used for the 810 drive. The rear of the drive contains two Input/Output connections for daisy-chaining peripherals, as well as a power plug. In front is a narrow slot accepting the diskette with a click. A lever above the slot turned downward engages the drive mechanism. At this point the busy light turns on for several seconds while the diskette is centered by the drive. The drive is now ready for use. Other than the dual density capability and the mechanical differences mentioned, the 1050 operates in the same manner as the 810 drive.

Those who have purchased Atari 1050 disk drives with DOS 2 may receive a free copy of DOS 3 when it becomes available this spring by writing Atari Customer Service at:

1312 Crossman Rd.
P.O. Box 61657
Sunnyvale, CA 94088

Be sure to include the serial number of your disk drive. —John Clark

The Atari 1050 Disk Drive is now available. Requires 16K RAM. Package includes serial I/O cable, power supply, owner's guide, an Introduction to the Disk Operating System, and a Disk Operating System Reference Manual. Suggested retail price: \$499.00

ATARI 1020 PRINTER

The Wonderful World of Color

FOR CHRISTMAS many years ago, I remember receiving a couple of Spirograph games—those pen and wheel contraptions that cranked out geometric designs. It's the Atari 1020 printer that has reminded me of those intriguing old devices. Or rather it's the Spirograph designs, charts, graphs and labels that the printer creates that can be so striking in reports or call attention to bulletin board notices.

The 1020 printer produces text and graphics in different sizes through a special pen technology. It can print with any of four different colored pens and is completely programmable with BASIC, Logo or Assembly language. Any graphic designs created with Logo can be printed with the 1020 printer (ask for Demopac #9 from customer service). Of course, the printer only handles four-inch-wide paper, so your work may have to be mounted on standard stock for presentation.

The joystick sketchpad program cassette that comes with the printer seems to have a couple of glitches, mainly

with saving work onto disk. But it still allows you to create a kind of touch tablet by using the joystick to draw screen graphics which the printer can reproduce.

With a little programming, the 1020 printer will support a variety of print styles—all alpha-numeric characters and an international character set, as well as punctuation marks and other symbols. Text written in the Text mode can fill 80, 40 or 20 columns across the four-inch page. In the Graphics mode you can get another 61 sizes of type.



The printer will change pen colors on demand and can execute a number of operations consecutively. It can read an entire string and draw all the lines specified without stopping. You can plot X and Y coordinates for easy-to-read graphs, use dashes of varying lengths to distinguish lines of the same color in charts, or dotted lines to render fine-line drawings. For professional-looking graphs, you can print scale marks at any point along each axis. Sometimes you'll want to tell the printer to consider the

Figure One—Banner Program

```
5 REM PROGRAM BY ROBERT STAHL
100 X=0:Y=0:PENCOLOR=0
110 DIM MESSAGE$(100),R$(1)
120 FOR V=1 TO 100
130 MESSAGE$(V)=" "
140 NEXT V
250 ? "Enter message to be printed."
260 INPUT MESSAGE$
270 LENGTH=LEN(MESSAGE$)
280 OPEN #2:8,0,"P:"
290 PRINT #2:"P"
300 PRINT #2:"C 0"
310 PRINT #2:"Q 1"
320 PRINT #2:"S 55"
330 PRINT #2:"I"
340 FOR L=1 TO LENGTH
350 FOR WIDTH=1 TO 5
360 PRINT #2:"H"
370 PRINT #2:"M"X";";Y
380 X=X+3:Y=Y-8
390 PRINT #2:"P"MESSAGE$(L,L)
400 PENCOLOR=PENCOLOR+1
410 IF PENCOLOR=4 THEN PENCOLOR=0
420 PRINT #2:"C" PENCOLOR
430 NEXT WIDTH
440 PRINT #2:"H"
450 PRINT #2:"P"
460 PRINT #2:"I"
470 X=0:Y=0
480 NEXT L
490 CLOSE #2
500 ? "More banners " INPUT R$
510 IF R$="Y" OR R$="y" THEN RUN
520 END
```

Figure Two—Spirograph Program

```
5 REM PROGRAM BY KENT SMITH
10 DEG
20 PRINT CHR$(125)
30 DIM X(4),Y(4),S(4)
40 PRINT "ENTERING AN EVEN NUMBER OF POINTS "
50 PRINT "GIVES TWICE THAT NUMBER OF POINTS."
60 PRINT "ENTERING AN ODD NUMBER OF POINTS "
70 PRINT "GIVES THAT NUMBER OF POINTS."
80 PRINT "PRINT "ENTER POINTS (2-10) ";
:INPUT PTS
90 IF PTS<2 OR PTS>10 THEN 80
100 S(1)=1:S(2)=1
110 IF (PTS/2-INT(PTS/2))=0 THEN
C=360:S(3)=1:S(4)=1:GOTO 130
120 C=180:S(3)=-1:S(4)=-1
130 PRINT "PRINT "ENTER RADIUS
(1-100) " INPUT SIZE
140 IF SIZE<1 OR SIZE>100 THEN 130
150 PRINT "PRINT "ENTER PEN COLOR
(0-3) " INPUT PEN
160 IF PEN<0 OR PEN>3 THEN 150
170 PRINT "PRINT "1 OR 4 CONCENTRIC
FIGURES " INPUT FIG
180 IF FIG<1 AND FIG>4 THEN 170
190 IF FIG=1 THEN X(1)=0:Y(1)=0:GOTO 260
200 PRINT "PRINT "ENTER OFFSET
(1-100) " INPUT OFFSET
210 IF OFFSET<1 OR OFFSET>100
THEN 200
220 FOR A=1 TO 3 STEP 2
230 X(A)=-OFFSET*2:Y(A)=X(A)
240 X(A+1)=OFFSET*2:Y(A+1)=0
250 NEXT A
260 OPEN #1:8,0,"P:"
270 PRINT #1;CHR$(27);CHR$(7)
280 PRINT #1;"C";PEN
290 PRINT #1;"M";241+OFFSET;
";"- (SIZE+OFFSET)
300 PRINT #1;"I"
310 FOR B=1 TO FIG
320 PRINT #1;"M";X(B);";";Y(B)
330 PRINT #1;"I"
340 FOR A=1 TO C
350 X=INT(SIZE*(SIN(PTS*A)*COS(A)))+S(B)
360 Y=INT(SIZE*(SIN(PTS*A)*SIN(A)))+S(B)
370 PRINT #1;"D";X";";Y
380 NEXT A:PRINT #1:NEXT B
390 PRINT #1;"M";-(241+OFFSET);
";"- (SIZE+100)
400 CLOSE #1
```

current pen position "home position"—the point from which the pen begins the next line—to repeat the same design and create continuous "wallpaper" patterns.

At times it helps to have words printed vertically on the page to label different parts of charts and graphs. The Alpha rotate function can print text in four directions. This is useful for business applications, as well as for having fun. Ever seen those games that arrange words to represent their meanings graphically? That's just one of the printer's many pluses. The "Banner" program which creates sensational vertical nameplates (figure one) and the graphics program which sets up Spirograph designs (figure two) were big hits at my office. Even after three months, my friends are still impressed with the 1020 printer—which is more than I ever said about my old Spirographs. —Cassie Stahl

The Atari 1020 printer is now available. Requires 16K RAM. Suggested retail price: \$299.00

SOFTWARE

REVIEW

New & notable programs for your Home Computer

USE THE FORCE, LUKE

*Star Wars Arcade Game
Puts You in the
Flier's Seat*

LONG, LONG AGO in a galaxy far, far away, Atari's game developers fantasized a coin-op game different from all the rest. It would be a game with amazing sound, outrageous graphics and the thrills and chills of a real battle. It would use the story line of one of the greatest scenes of the movie *Star Wars*: Luke Skywalker using The Force to guide his starship into the deepest, darkest depths of the Death Star to foil the plans of the Empire.

And they did just that. They combined all these elements to give you the amazingly real sense of being in the cockpit of Red Five—Skywalker's fighter plane. The flight controller, a U-shaped steering wheel extremely responsive to your demands, has end-mounted fire buttons. These let you fire without getting cramps in your fingers like the average shoot 'em-up game.

The illusion-enhancing sound is produced from a chip that incorporates bits of dialogue, music and other effects taken from the movie track. Two especially fast processors—display and math—are used for the 3-D graphics.

As Luke Skywalker you must destroy the Death Star. You, the last hope of the Rebellion, must progress through three different scenarios that comprise a wave to destroy the Death Star: you shoot enemy Tie Fighters led by Darth Vader, deactivate the Death Star's gun turrets, and maneuver through the surface trench to the exhaust port. Only six shields and any bonus shields earned prevent your imminent demise.

As the inherently evil Darth Vader and his squadron of tie fighters take off from the surface of the Death Star, you must defend yourself. Fortunately, Artoo-Deetoo is navigating, leaving you free to use your guns. Aim your

sights at the first wave and hit the fire buttons. A dog fight! Your targets are the enemy fireballs—getting hit costs you a shield—and the Tie Fighters. The Tie Fighters are valuable, but Darth Vader's ship is worth more. Darth Vader is indestructible, but if you hit him he will go spinning out of control. The Tie Fighters can be destroyed by one shot: The Empire has poured its money into the Death Star project instead of fighter development.

Watch the star field to figure out where the Tie Fighters will appear on the screen. The first three waves come in from the top; later they usually make their move from the right. You can rack up points if you blast the fighters as they rise from the Death Star, but the Empire has a nearly inexhaustible supply of fighters to replace them. If you destroy



enough of them, two or three including Darth Vader will retreat for a regrouping. A good way to destroy the fighters is to aim ahead of them, letting them move into your fire.

In all waves except the first, you must deactivate the ground and tower gun turrets on the surface of the Death Star or you won't be able to get close enough for a run on the trench leading to the exhaust port. In waves two and three you control both navigation and weaponry, so be careful not to steer into one thing while aiming at another. The turrets have different patterns in the first 11 waves: from 12 to 20 they're random arrangements of the sections you've previously flown through. After number 20, according to rumor, the ma-

chine torments you by picking the arrangement with which you've had the most trouble. There is a 50,000 point bonus for destroying all the towers, and you lose shields by bouncing off a turret or by being hit by the gun turret's fireballs.

There are three targets for you in the trench: the fireball, the gun turrets in the walls and the exhaust port. You also must avoid catwalks, the Empire's equivalent of a roadblock, long enough to make it to the exhaust port at the end. The catwalk patterns are varied but some of the sections repeat in later waves. Hopefully you'll remember how you got through the first ones.

Getting points in the trench necessitates using The Force. On Lucasfilm's customized *Star Wars* game unit, The Force is a button that slows the action so players can blast away. For you, it's not so easy. You can't shoot while using The Force, so avoiding the fireballs fired by the gun turrets becomes tricky. The fireballs generally aim for the height you're at, so you have to vary your movements up and down opposite the firing. The Force is only for the confident player because it may cost you more protective shields than you can afford to lose.

The exhaust port—the target—is at the end of the trench and a message at the top of the screen lets you know when it will appear as a square on the floor of the trench. This is a one-pass event, so if you miss the port, you will lose a shield and have to start all over again at the beginning of the trench. If you hit it, it will destroy all the fireballs on the screen, so the Death Star will be just one of Luke Skywalker's memories.

Naturally, the omnipotent Empire is wise to your scheming, so they've continued building more Death Stars. As you destroy the first one another one will appear, leaving you a lifetime of Death Star destroying—assuming your shields hold out.

May The Force be with you.
—Paul Metz

Available at your local game arcade.

ATARI LOGO

The Language of Choice for Learners

WHEN THE editor of ATARI CONNECTION asked me to review *Atari Logo* I had just one reservation—trying to tell it all in 600 words. As one of the designers of *Atari Logo*, I had a lot to say on the appropriateness of Logo as a programming language for learners. *Atari Logo* is a careful implementation of the original high-level programming language—a powerful language which promotes problem solving. Its simple, interactive approach makes it easy for novice programmers to get started. But Logo also includes powerful control and data structures (modular procedures, local variables, recursion, list processing), making it a valuable tool for expert programmers. Though its best-known use is in elementary-school classrooms, Logo is also a part of many high school and college programs (naturally enough, in physics courses at MIT where Seymour Papert developed the language).

Atari Logo was subsequently developed by Papert's own Logo Computer Systems, Inc. and is compatible with other LCS versions of Logo. It is a full Logo, not just a turtle graphics package like some "Logo" products. Another plus is its format: a 16K ROM cartridge that can be used with any Atari computer. For the first time, this allows many people to learn Logo at home, instead of on complicated school and office computers. *Atari Logo* requires no peripheral equipment, though once you start writing longer programs, you'll want a disk drive or cassette recorder to save your work. And it takes advantage of the excellent graphics-animation capabilities of Atari computers—player/missile graphics, color mapping, collision-detection and sound.

To make fast collision-detection possible, *Atari Logo* introduces a new control structure called *demons*. A demon is a form of *multi-processing*, an important new idea in computer science which, until now, has not been available for personal computers. Without interfering with your regular program activity, it continually checks for a particular event. When that event occurs, the demon takes control just long enough to carry out its own previous instructions.

For a 16K cartridge to offer so many features of such a powerful language is an achievement. With a few exceptions (debugging aids TRACE, STEP, PAUSE; nonlocal exit primitives CATCH AND THROW), *Atari Logo*

offers all the features that have made Logo such an exciting language for students, educators and professional programmers. The attention to detail in the interpreter is astonishingly good considering the amount of memory available. Error messages, for example, are up to the high Logo standard of helpfulness. Other nice touches include a uniform background color in split-screen mode and varying color intensities keeping text readable as you change screen background colors.

In short, *Atari Logo*, the most powerful programming language available for inexpensive home computers, is an excellent choice for programmers of any level of expertise. The tutorial and reference manual that come with the program are easy to follow, yet detailed. A book of advanced projects in *Atari Logo* is planned for early June. In the meantime, I leave you with a small example of Logo programming.

—Brian Harvey

Available in cartridge format for home computers. Requires 16K RAM. Suggested retail price: \$74.95; \$99.95 with manuals.



Turtles at Work

This program demonstrates the collision-detection feature of *Atari Logo*. The program starts one turtle bouncing inside a square, while a second turtle fills in its own invisible square by copying the first turtle's movements.

```
TO BOXES
CS
TELL 0
SETPN 1
PD
REPEAT 4 [FD 60 RT 90]
PU SETPOS [30 20]
PD SETPN 0
TELL 1
PU SETPOS [-70 30]
LT 30 PD
WHEN OVER 0 1 [RT 170]
SETSP 15
TELL 0 SETSP 10
TELL [0 1]
END
```

The WHEN demon checks for a collision between turtle number 0 (inside the square) and pen number 1 (the lines that form the boundary of the square). When the turtle hits the edge of the square, the demon executes the instruction list [RT 170]. Both turtles turn because the last instruction in the procedure makes them active.

Give Your Computer Something Special!

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If it's from  IT'S JUST GREAT!

ATARI™ Warner Communications, Inc.

BERZERK

Your Only Choice: Fight or Flight!

YOU'RE THE LAST HUMAN in a deadly world made up of electrified mazes: In each vicious maze robot gangs constantly track you, firing lasers. Fortunately, your own laser is powerful enough to destroy them. But even if you manage to zap all the maze robots, the leader of the pack, Evil Otto, with his maniacally happy face, is still a threat. And if this invincible enemy gets you before you run out of the maze, he'll pound you to a lifeless pulp! What's a humanoid to do?

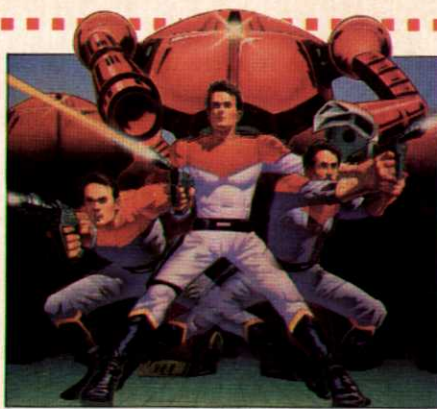
Stand and fight! But not in one place too long or it's all over. You start *Berzerk* with three lives, but you win more as you rack up points. The best strategy is to begin shooting robots and dodging enemy fire as soon as you start toward one of the three maze openings. Use the walls to hide behind, but touch them and you'll fry! And don't walk into an exploding robot—the splatter will get you too.

You score 50 points for every robot destroyed, even when the androids self-destruct by colliding with each other or with maze walls. You want to destroy every robot in a maze for bonus points. You wait at an exit for the last possible second, and Evil Otto may be just one bound away. If you manage to make a swift exit, you'll find yourself in yet another maze, guarded by more and faster-shooting robots. And you know Evil Otto inevitably will appear.

Based on the arcade classic, *Berzerk* is easy to learn but hard to master. Don't lose hope—you'll improve with experience. It's a fast-paced nihilistic scenario, suspenseful and primitive. The kind of game where players can't help but cheer the protagonist or groan miserably when he dies.



While the 2600 version of *Berzerk* has been out for two years, the 5200 cartridge is a new release. Besides better graphics and a two-player option, the 5200 game introduces a built-in voice. Players have the option of switching it off, but why would you want to? The



androidlike sound is a great clue-giver. For example, just before Evil Otto makes his appearance, you'll hear, "Intruder alert!" You'd better head for the nearest exit. But if you duck out of a maze prematurely, the voice razzes, "Chicken! Fight like a robot!"

However, the 2600 game offers 12 different play variations—with combinations of non-shooting robots, rebound Evil Otto, bonus lives and even a beginning game. Players of the 5200 version have the option of a higher-challenge starting level (with smarter, faster-shooting robots) but some of us less experienced players will miss the many variables of the 2600 version. —Randi Rohde

Atari 2600 VCS (sans voice) and the 5200 Super System (with voice) cartridge. Suggested retail price: \$26.50 and \$40.95, respectively.

WREAKING MAJOR HAVOC

Coin Op Camaraderie

EONS AGO the evil Vaxxian empire overran the galaxy, nearly destroying humanity. Most of your ancestors were enslaved and taken to Vaxx, homeworld of the Vaxxian race. Only a few scientists escaped.

Today, the empire has all but decayed. Yet Vaxxian space stations, controlled and defended by robots, patrol the galaxy, keeping your people prisoner.

The small band of earth scientists cloned you to fly your Catastrofighter through a strange wormhole in space, to lead your clone army against the dreaded Vaxxian robots, and to free your people.

You are *Major Havoc*, leader of a brave set of clones. You are them, they are you, all for one, one for all, fighting for humanity.

Major Havoc is a space epic taking you to the edge of the galaxy as you fight for your very life. Play begins in the

wormhole in space. Here, *Major Havoc* blasts off into space. The screen will show you the Tactical Scanner in your Catastrofighter, where you will get your first glimpse of the attacking mothership as it closes in. The enemy is closing in, you see the range shrinking down on the display, but you are cool. You play a quick game of *Breakout* until you are taken back to space to square off with mothership-guarding enemies like the "fishoids," dreaded fishlike robots. Beware "flyboids," which will attack in their strange formations, sometimes with the aid of the "red lines" which keep you on constant guard. Be careful as you encounter the "mazoids," spinning their treacherous space maze.

You successfully met the challenge by defeating these space encounters of the weird kind, and now your ship is in position to land on the mothership. Quickly move your controller left and right to land your fighter on the white docking platform.

Landing successfully, it's time to guide through the mothership, find the "reactoid," set it to critical and escape before it blows up. But watch out for the sentry robots known as "perkoids" and deadly fireballs called "pyroids." And as the game progresses new surprises show up in each mothership. They all know about you now, so you can be sure that the next mothership will present more nefarious enemies.

The original name for this game was *Tholian Web*, based on a *Star Trek* episode in which the starship *Enterprise* was trapped by an alien web. Gameplay revolved around avoiding the touch of the deadly web-spinning "mazoids." The game designers changed the name to *Alpha 1* when gameplay evolved into more than the web sequence, and eventually ended up with the pun *Major Havoc*.

This project took more than two years to complete and incorporated one of the largest design teams in coin-op history—an engineer, two programmers, two techs, a project leader, a graphic artist, a composer, a sound programmer, and a game-play consultant.

The game looks simple, but it contains enough new items to surprise an expert player for months. Game difficulty is ramped smoothly to get harder continuously—without becoming impossible. Special software detects if a player is "too good," and it's all done without sacrifice to the beginning player, as plenty of messages and aids exist in the lower levels.

There is something for everybody, and a new twist is always waiting for the adventurous. —Owen Rubin

Requires 25¢ and a sense of humor.

THE DIVINE MS. P

Ms. Pac-Man Comes Home

WHAT CAN I SAY about a game that practically everybody already knows? Except this: Ms. Pac-man, loved throughout the world as a dot-munching, vitamin-eating, ghost-chasing beauty, is coming home. The famous darling of the game arcades is now available for all Atari systems—home computer, VCS 2600 and 5200. All of these retain the essentials of the game—right down to the star's beauty mark and little red bow.

Some people claim there's a special way through the maze that allows you to win; much has been written to discover the precise path to follow. I just stumble through, and generally do pretty well (especially with the 2600 version). Sometimes when I eat a power pill, I try to nail each and every ghost: this can be dangerous. It helps to remember that the goal is to reach the next level of difficulty.

A classic game, Ms. Pac-man is as much fun at home as she is at the arcade. Maybe more.—Cassie Stahl

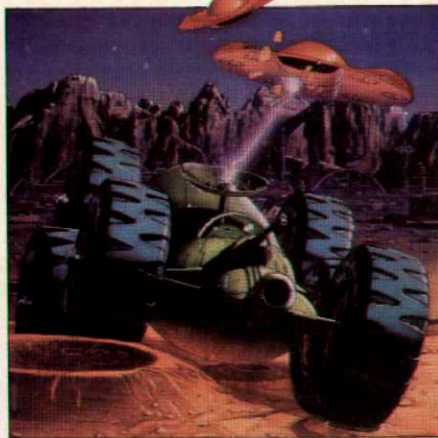


Available in cartridge format for home computers. Requires 16K RAM. Suggested retail price: \$49.95. Atari 2600 and 5200 cartridge suggested retail price: \$34.95 and \$40.95, respectively.

MOON PATROL A COSMIC "CHIPS"

Making the Moon Safe for Moonkind

THE MOON'S MY BEAT. I like it here. It's wild. It's lunatic. I do my part to tame it. Attacking outlaws in tanks, UFOs, mean-mobiles—you name it: When they hit, it's bye-bye car. Too many hits and you're out. Gotta watch the roadway obstructions,



too. Lost cars on boulders, land mines and craters. Our job: Clean up the moon. Get rid of the thugs, destroy boulders, find out where the craters and land mines are. That and... get through the patrol in one piece, kid.

Tonight's beat's quiet enough. We'll jump those craters up ahead and shoot that moon granite in the road. Don't you love the sound those rocks make when we blast 'em? Mountain ranges to the north are lookin' good. The sky's sure clear and starry tonight. Here, kid, you take over the controls. Go ahead, fool with the joystick. Left speeds us up while right slows us down. The faster you drive, the farther you jump: A good thing to know when you gotta clear two obstacles at once!

All right! Just when I was thinkin' it's too quiet out here. Those are bomb-dropping UFOs right on top of us. Don't try to dodge 'em, it's a fat waste of time. Our so-called "dodging" ability only means slowing down or speeding up. Not much help when two or three smart bombers hover overhead like killer bugs. Push that fire button, kid! Blast those goons to Mars! We've got a great firing mechanism on this baby. Press it and two shots'll fire at once—one straight up and one straight ahead. Gives you an equal chance: Blast the UFOs and fire forward at any obstacles nasty enough to be in the way.

And, kid, lemme give you some advice: Don't make the mistake of thinking that all UFOs are alike! While most of 'em pelt you with ordinary bombs, some drop missiles that form new craters which can total your nice shiny car. So, go for the crater-makers first. Wish someone had laid that on me when I was a rookie. Anyway, the moral is: Get to know your enemy—you know, psych him out—and outsmart him!

Uh oh. Now we've got a "Speeder" on our tail! Those black aliens make a game out of ramming you from behind. Well, I've got a little trick that'll take care of that extraterrestrial! When a Speeder tails you, jump up and let it

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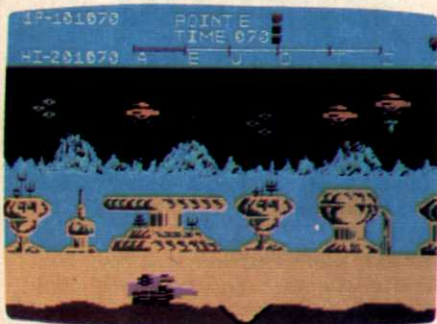
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zoom under; then zap it in your path! Takes a good sense of timing, though. Great meteors! You did it! We'll make a hero out of you yet! But don't get too cocky. Just when you think you know your stuff, another alien shows up and puts you to the test!

I'll tell you, I've patrolled this ol' moon in more than one vehicle. And each one's got its pros and cons. For instance, in the 2600 VCS machine you



push your joystick forward to make the car jump; in the 5200 SuperSystem you've gotta press an upper fire button to do that. It's easy to confuse the top and bottom fire buttons. And that kind of confusion can be fatal! You just gotta keep your cool. But the sound system's better in the 5200 model. Still, I'll take any car on the force. Patrolling the moon's more than a job, it's... hell, kid, it's my life!—**Randi Rohde**

Available in cartridge format for home computers. Requires 16K RAM. Price to be announced. Atari 2600 VCS and 5200 cartridge, suggested retail price: \$34.95 and \$40.95, respectively.

CRYSTAL CASTLES

Getting the Royal Treatment

SNEAKING ALONG THE WALLS of the maze, faces twisted into evil grins, they stalk Bentley Bear. Gulping down the precious gems tossed casually about the steps, they stop to wolf down one gem too many—leaving an opportunity for Bentley to wipe out several of the little grubbers.

The glowing red trackball becomes one with your fingers, and you're off to battle again.

Crystal Castles is a three-dimensional coin-op maze game starring gem collector Bentley Bear. There are ten maze levels. Levels one through nine contain four mazes each and level ten—the ultimate goal—has the final maze. Completing it earns you a huge bonus and a colorful display of graphics. The game also has a continuation feature that al-

lows you to play to a high level, then start a new game at the same level.

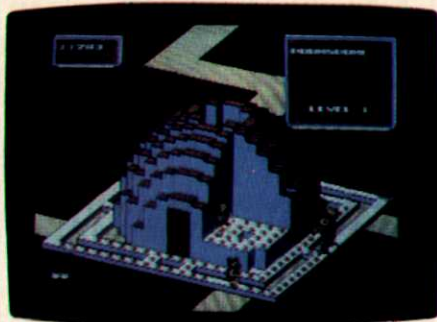
Bentley must contend with several enemies as he picks up his gems. Gem Eaters move randomly around the mazes, and Bentley can kill them only while they are eating. Nasty trees and crystal balls chase Bentley, but fortunately for Bentley, the balls are slow in moving. Two other enemies—a ghost and a skeleton—appear only on a few mazes and move randomly. And when Bentley jumps over trees and Gem Eaters, they are temporarily stunned, allowing Bentley a little time to move to safe ground.

On most mazes there is a honey pot worth 1000 points to Bentley. If left alone, the honey attracts a swarm of bees that will go after Bentley. The swarm also appears if Bentley takes too long to clear a maze.

On the fourth maze of each level, Berthilda the witch cackles gleefully, pacing the top of a wall, waiting impatiently for the bulky Bentley. Bentley runs to a corner of the maze, puts on his magic hat and sneaks up on the wicked wonder. As soon as her back is turned, Bentley runs her over. Bye bye Broom Hilda.

Wearing the hat allows Bentley to pass through any other group of enemies he encounters without harm. Unfortunately, the effects are only temporary and the hat disappears after awhile, leaving Bentley exposed to the cruel world.

Strategy for *Crystal Castles* is to develop patterns for each maze, like you did in *Pac-Man*. When you complete the first maze of a level, you can start your next level by going into the warp tunnel. In the first maze, go to the back left corner and jump (press the fire button) for the secret warp. You will hop to



the first maze in level three. In that maze, get the hat, go to the bottom of the hidden ramp and jump again, but you have to be wearing the hat for the warp to work. That takes you to level five. There you must complete the first two mazes to get to the crossroads maze. When you reach the crossroads, go to

the back left corner, jump and you will be at level seven. From there you must complete each maze to advance.

If there's a honey pot, pick it up to keep the bees from coming out. Then quickly pick up gems while dodging Gem Eaters. Gem Eaters usually move along the edges of a maze, so it's safer to stay in open areas. You get bonus points for scooping up the last gem in a maze, so make sure you get the last gem yourself.

Following patterns in the maze doesn't always guarantee success because of the randomness of the Gem Eaters. But once you trap the trees—by luring them into corners—it's not too hard to finish a maze. And with some practice, you can become really greedy and eat the Gem Eaters while they're eating gems.

Crystal Castles seems to be a simple game, but it has some features that make it appealing to all types of players. The trackball takes some getting used to. It suits the game better than a joystick, and lets you move around at your own speed.

But the excellent graphics offer the best reward for playing *Crystal Castles*. The high scorer gets his initials in the first maze as huge letters forming the three-dimensional walls.—**Eric Ginner**

Available in finer game arcades.

GETTING THE BEST TAX ADVANTAGE

New from Continental Software

LIKE MOST PEOPLE I know, I have a natural aversion to preparing tax returns. I'm also not crazy about some of those difficult spreadsheets. So, I was skeptical about abandoning my usual paper-and-pencil routine and trying a tax preparation program. But *The Tax Advantage* by Continental Software made neat work of a dirty job.

The Tax Advantage is a fast and efficient program that prompts you for all that's necessary to complete the 1040 form. Using current IRS guidelines, it then calculates the amount to be paid or refunded. The program lets you test various scenarios for claiming credits and deductions against income, enabling you to choose your most advantageous tax strategy. A lot of little touches ease your way through the process. In most cases you don't have to press [RETURN] to enter data—this alone is a time saver. And, unless you make \$10,000,000 or more, there's plenty of

space on the screen to enter numbers. The user's guide, if not exciting, is easy to follow, and once you've read it, the program practically runs itself. Still, a few tips from one who's been there may be helpful when you sit down with *The Tax Advantage*:

- Pay attention to the demonstration on the program diskette. It moves quickly, but it gives a thorough overview of the program's capabilities.
- Look at the 1040 form, handbook and schedule as you go through the program. It will help you follow your progress line by line.
- Be sure your program version reflects the latest tax laws. If you return your warranty card with \$20, Continental will send you the changes in the tax laws. Consider this part of the price of the software—obviously it's crucial to have current information.
- With serious questions you may have to get the advice of an accountant; but you still will be saving money in tax preparation charges.

The Tax Advantage definitely makes preparing your return easier and faster. If only there were some way it could make writing that check less painful. —Julie Karbo

Available in diskette format from Continental Software. Requires 48K RAM. Suggested retail price: \$69.95.

ADVANCED MUSICSYSTEM

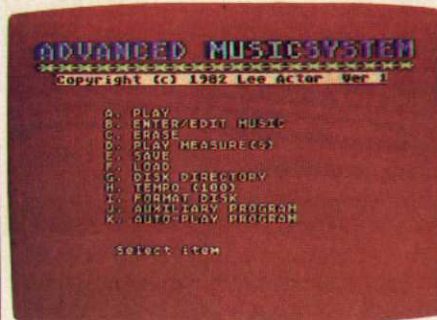
The Sound of Computer Science

SOMETHING EXCITING IS happening in music today. You can hear it in Paul Lansky's *Folk Images*, and Thomas Dolby's *The Flat Earth*. It's the sound of computer-generated music: the ability to create, store and modify music on a computer.

Unfortunately, most music-composing systems exceed most music-composing budgets, and demand an unsettling degree of technical proficiency. There are exceptional programs, however, and a very successful one is *Advanced Musicsystem*, from the Atari Program Exchange (APX).

Though not a full-fledged computer-music program, *Advanced Musicsystem* takes full advantage of the Atari home computer's sound capabilities by helping you create, edit, store and play music. It assumes you are familiar with music notation and basic musical terms. The notation goes from C1 (the lowest note on a piano) to F6 (two and a half octaves above middle C), a range of five and a half octaves.

After you load the program, a menu will offer you several options. Press [B] for the Enter/Edit mode. Enter notes by keying in their command equivalents. For example, to enter middle C as a whole note with a full dynamic level, type C4W/F7. The [4] designates the octave level, W stands for whole note,



and /F7 is the command for the highest, that is, loudest dynamic level. (These commands are explained—sometimes cryptically—in *Advanced Musicsystem's* owner's guide.)

Each time you enter a note, the program immediately reproduces the sound. Furthermore, you can either specify meter and key signature, or use the pre-established defaults; you can also use commands like TIE (to connect two or more notes together) or REP (to repeat notes). The tempo can be altered while the music is playing with a pair of paddle controllers.

But the real test for *Advanced Musicsystem* is whether it can reproduce a complex harmony. I entered Haydn's *Op. 71 #1* for piano, which took more time than I had anticipated; fortunately, once the music is entered, you can save it on diskette. After I typed in all the commands, P for Play generated Haydn's opus. And while the program plays Haydn, or any score for that matter, a simulated piano keyboard is displayed, with each note highlighted by a different color.

Advanced Musicsystem does not have "decay" commands, so the notes are more like short or long pulses than smooth, diminishing sound. But the tonal quality of the music—poor when played through a TV speaker—can easily be enhanced by connecting the computer system to a stereo (directions are in the owner's guide), where low and high frequency notes will be much more distinct and accurate.

In the Play mode, you can select and listen to any one or set of voices you want. This feature is very useful for analyzing or checking harmony for error. The editing capabilities of *Advanced Musicsystem* allow you to check harmony, modify it, and play

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back the arrangement right away. Editing on *Advanced Musicsystem* is like editing a word-processing program: You don't have to replay an entire piece just to listen to a minor change in harmony or melody.

Advanced Musicsystem also has additional modes: ERASE (to delete entered arrangements); PLAY MEASURE(S) (to play specific lines, without having to go through an entire score); AUXILIARY PROGRAM (to save memory this is a scaled-down version of the main program, appropriate for longer arrangements); and AUTO-PLAY PROGRAM (to listen to the five pieces already entered in the program; J. S. Bach's Nunkomm is the most impressive).

If you want more than four voices in your music, you can use a single- or multi-track recorder. *Advanced Musicsystem* has a synchronization command to align notes with an external recorder. You can create up to eight voices with a single-track recorder, and as many as you want with a multi-track one. This program is the first step in developing a home recording studio. In fact, Lee Actor, the author of *Advanced Musicsystem*, has made a 16-track recording containing over 16,000 notes with his program and a multi-track recorder.

For would-be composers lacking their own instruments, or the physical ability to play one, *Advanced Musicsystem* might be a godsend—Michael Howard

Diskette available from APX; requires 32K RAM, BASIC cartridge. \$29.95.

OSCAR'S TRASH RACE

Take a Grouch to Lunch



WELCOME TO THE annual Grouch Day picnic. Oscar the Grouch and all his little friends have come out in delightfully gloomy weather to enjoy the mud and partake in the main event, *Oscar's Trash Race*. All the little grouchy ones line up and when the number on a grouch's trash

can equals the number of pieces of trash—like toothbrushes and bones—dumped by the garbage truck, the lucky little grouch races to retrieve it.

Oscar's Trash Race is a challenging game for young players. It features Oscar the Grouch, the popular Sesame Street character. The main objective is to help children to practice counting skills and to recognize the relationship between numbers and numerals. The game also reinforces the concepts of up, down, right and left.

There are seven race levels for children to play. The first two are very simple and encourage the player to focus on counting and trash pickup tasks. Levels three and four introduce direction, with puddles children can either jump over or use the directional arrows to go around. Levels five through seven introduce the elements of speed and strategy. Players try to complete as many races as possible before Slimey the Worm crosses the bottom of the screen. In levels six and seven, the puddles randomly turn blue when it rains and jumping over these blue puddles wins the player two points. Also, levels five through seven can be two-player games.

It is beneficial for parents to play the game with the child because they can guide the child in gameplay, explain game rules and offer helpful hints.

For example, jumping over the puddles provides the quickest way to retrieve the trash and win the race. However, it is not as easy as one might think, and it can be quite frustrating for very young players. One helpful hint parents might suggest is to be sure that the little grouch is very close to the puddle before attempting to jump.

With a little practice, young players will soon be counting and jumping with grouchy glee.

—Rosie Gourley Hitchens

Available in cartridge for home computers in early March, price to be announced. 2600 VCS cartridge available now. Suggested retail price: \$30.45.

TEASERS BY TOBBS

A Great Skill Driller

ON THE FACE OF IT, *Teasers by Tobbs*, a new Atari Program Exchange selection, seems like just another educational children's game.

But after testing this program on some mathematically minded adults, I discovered that *Teasers* is a better skill driller than I expected. And it was

given one of four 1983 "Best Microcomputer Software of the Year" awards by Learning Periodicals (which publishes five educator and parents' magazines).



As the brunt of family jokes about checkbook balancing, I thought that *Teasers* would be a good test of fundamentals for me. The program strategy appears deceptively simple, looking like mathematical tic-tac-toe. There are two base numbers on the top and left sides of a grid. In the intersection of the grid are numbers representing the products of these numbers. Depending on the level of play, some of the answers or some of the base numbers are missing. Level one may have one or two numbers missing; by level six, there may be four or five.

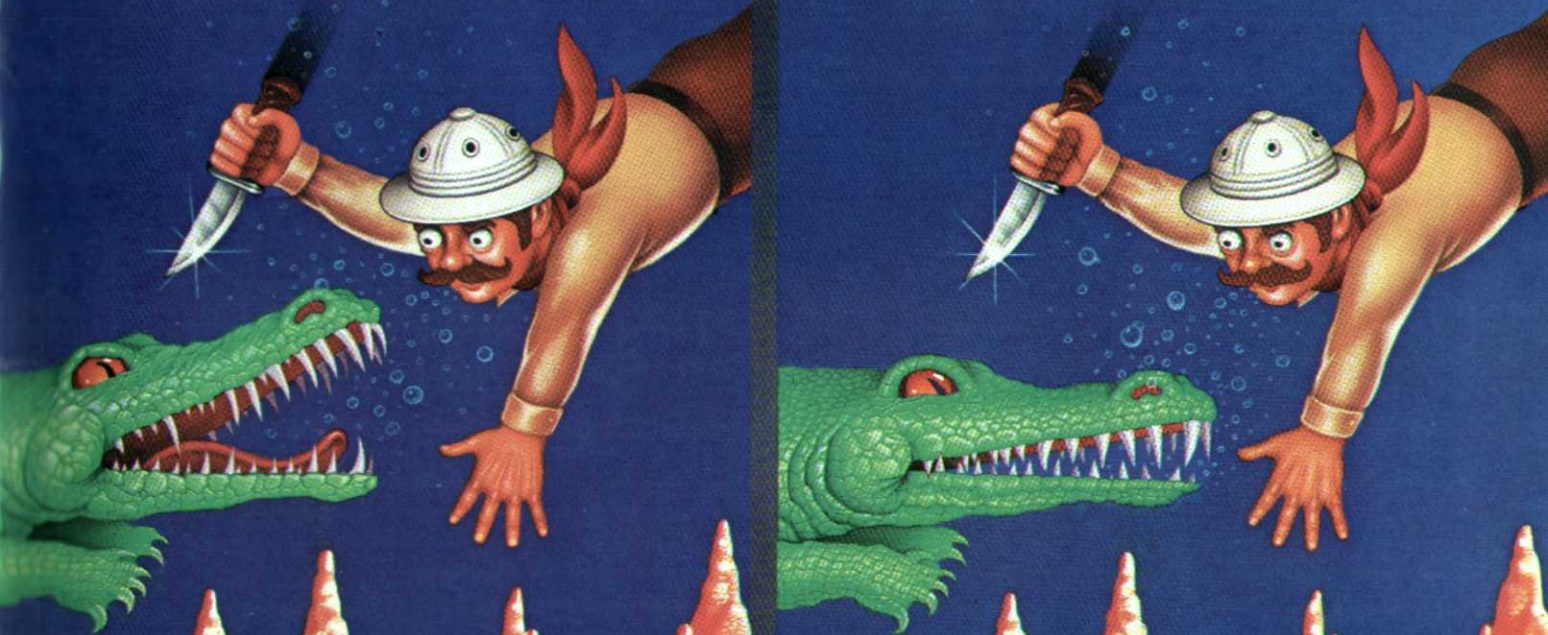
The missing numbers are called for by Tobbs, a gremlinlike critter waiting patiently in a box for you to answer. If your answer is wrong, he shakes his head—if it's right, he jumps up and down in his box.

But where the numbers are missing from is the difficulty. In the multiplication puzzle, for instance, if there's a 5 on the top, the number on the side is missing, and the corresponding number in the intersection of the grid is 60, then you have to deduce that 5 times x is 60, so the missing number x is 12. Of course, this is on levels five and six. Children on level one just have to figure out that $2 \times 2 = 4$.

To do the multiplication and addition necessary to give Tobbs the answer, I had to perform division and subtraction. APX touts the fact that this program teaches reversibility of numbers, something that's hard for children to grasp.

As for my financial analyst sister who thought this would be easy—well, she missed one. To be honest, it was only because the number was too big for the format of the program (only whole numbers 0 to 100); but tough luck, because now it's her turn to be the butt of jokes.—Myrna Rae Johnson

Available from Atari Program Exchange in diskette format. \$29.95.



Which player is snatching victory from the jaws of defeat?

Find out fast. Jungle Hunt is so much like the arcade, you can't go in green. Like the player on the left. He'll get snapped up by the crocodile with the wide open mouth. But get the croc with the partly open mouth and score 200 points, like the player on the right.

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