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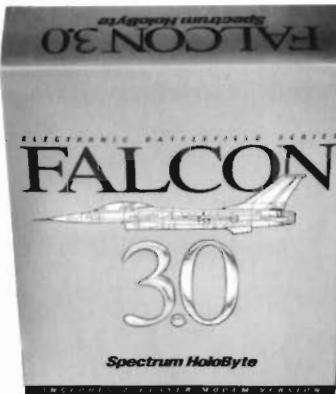
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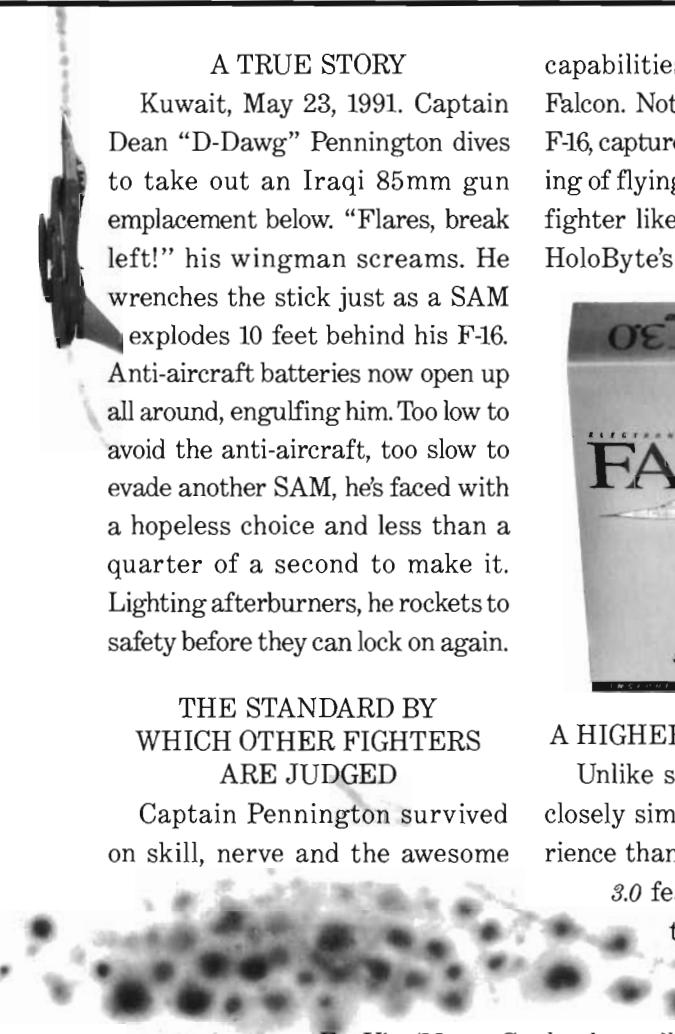
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Objects are in your future. They're here now in OLE 1.0 and 2.0, and you'll be seeing a lot more of them in future versions of Windows and Windows applications. If you want to get a jump on the twenty-first century, now's the time to get started with some object basics.

Here's the problem. Although objects are supposed to make computing easier, they're difficult to understand intellectually. This point was driven home recently while I was writing the feature "Windows Programming: From C to Shining C++," which appears in this issue. One of the goals of this feature is to give Windows programmers a road map to learning object-oriented programming, and in explaining object-oriented programming, I discovered just how hard objects are to define. This started me thinking about objects in general and what objects mean to users. Are they good or bad? Are they confusing or intuitive?

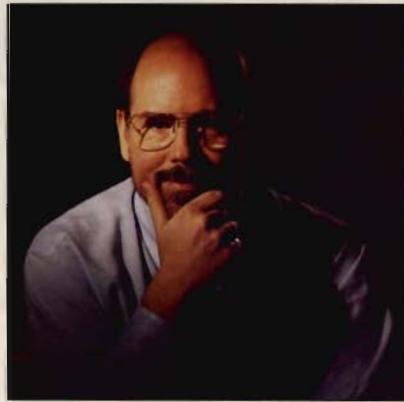
First, an object can be anything in an interface, including many things you wouldn't suspect. If you take Windows, for example, the icons in Program Manager are objects, the filenames in File Manager are objects, and the buttons in an application such as Word for Windows 6.0 are objects.

What really makes an object an object, though, is its ability to act differently (and appropriately) in different contexts. In object jargon, this ability is called polymorphism. The simplest example of this is double-clicking on an object to activate it. When we do this, we change the object's context by putting the mouse pointer over it and double-clicking a mouse button. As most of you know, if you double-click on an icon in Program Manager, you run the program it represents. And if you double-click on a filename in File Manager, you likewise run the program. You can also Alt-double-click on an icon in Program Manager or a filename in File Manager to inspect the object's properties. While Alt-double-clicking isn't exactly intuitive, it does represent a new context for the object.

Double-clicking goes beyond just

starting programs. You can also double-click on many document files to load the documents and their associated applications, and you can double-click on the desktop to summon Task Manager. There's another extension of double-clicking in Word for Windows 6.0 that's interesting. If you double-click on a blank spot on the toolbar, you'll get a toolbar configuration dialog. And try double-clicking on any window's title bar (you'll toggle between the window's maximized and restored states).

Another way to change an object's context is to drag the object from one place to another. For example, you can drag an icon in Program Manager from one group to another group to move the icon to the new group. If you press the Ctrl key while you drag



the icon, you'll copy the icon instead of moving it. You cannot, however, drag an icon from Program Manager to the Windows desktop and have it stick, and you can't drag a Program Manager icon to File Manager (though you can drag the other way, from File Manager to Program Manager). Although there's a lot you can do with objects in Windows, there are some limits to the object orientation supported in version 3.1.

So are objects good or bad? They're both. For a new user, manipulating objects may not be intuitive, and getting the hang of them may require some effort. But if you can get a grip on the way objects work and try them in all kinds of different contexts, you'll find that working with objects is fast and easy. □

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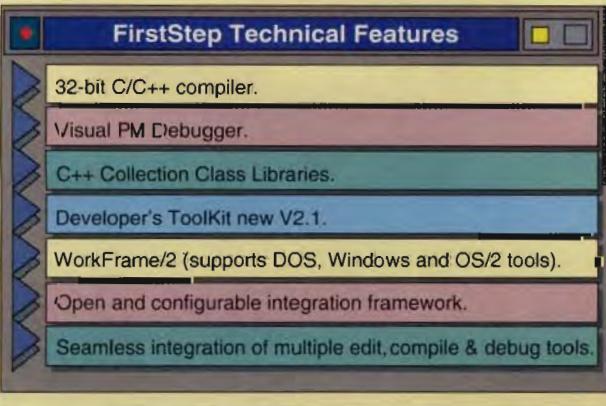
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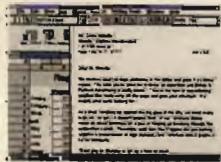


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WINDOWS WORKSHOP

Clifton Karnes

IDE SPEED-UP

At COMDEX, the promise of more hard disk speed came from two companies with hard drive accelerator products. Ontrack Systems was showing Drive Rocket (\$39, 800-752-1333), and Micro House was talking about Maximum Overdrive (to be bundled with other Micro House products, 303-443-3383).

Both of these programs do basically the same thing. If you have a compatible IDE drive, they change the amount of data the drive reads and writes at one time from 1 sector (which is the default) to 2, 4, 8, 16, or 32 sectors. Increases in speed can be dramatic, according to both companies.

I tested both programs on the two machines I use: my home system, which is a 66-MHz 486DX2 with local-bus graphics and hard disk, and my work system, which is a 50-MHz 486DX2 with ISA graphics and hard disk. Both are pretty fast computers, but I'm always looking for more speed, so my mouth watered when I heard about these products. As soon as I got home from COMDEX, I fired up Drive Rocket and Maximum Overdrive.

Drive Rocket has a well-designed installation program that lets you perform a series of benchmarks to gauge which blocking factor you use (the number of disk sectors you read at a time) and to help you get an idea of how much of a speed increase you can expect. On my machine at home, the installation program told me to use a blocking factor of 8 and to expect a speed increase of as much as 101 percent. Wow!

I installed Drive Rocket and decided to test it under Windows 3.1 by running a suite of Windows programs. Since most of the disk activity in Windows is loading applications

and documents, I ran Word for Windows 6.0, loaded three large documents, and closed the program; I ran Excel 4.0, loaded three medium-sized spreadsheets, and closed the program; and I ran Access 1.1, loaded three medium-sized databases, and closed the program.

I automated this test by creating a Recorder macro that did all the timing, running, loading, and closing. For timing, I used the Timer feature in Ascend to act as an automated stopwatch. I rebooted my computer before each test so the



machine would be in an identical state each time, and I optimized my hard drive before running the tests.

First, I ran the suite without Drive Rocket, and it took one minute and 12 seconds to complete. Then I rebooted with Drive Rocket set to its recommended blocking factor of 8. With Drive Rocket, the suite took one minute and 9 seconds. Hmmm. Hardly the speed increase I was hoping for. I decided to try some other blocking factors to see if they would make a difference. As it turned out, 8 produced the fastest results.

I ran a few other less formal benchmarks and got the same results. For example, I timed my machine compiling a C++ program and got timings that were nearly the same both with and without Drive Rocket. Overall, with Drive Rocket, my home system was about 3-4 percent faster. (Drive Rocket uses 3K of RAM; it can be loaded high.)

Next, I installed Maximum Overdrive. Its installation pro-

gram is much simpler than Drive Rocket's; you won't find all the test benchmarks, for example. But I did have one problem with it. It found the reference to Drive Rocket in my CONFIG.SYS, not realizing I had remarked the line out. It asked me if it could remove the entry and modify my CONFIG.SYS. I said OK, and the program erased my CONFIG.SYS file. Pretty rude! Luckily, I had made a copy of AUTOEXEC.BAT and CONFIG.SYS before I installed Maximum Overdrive, so I had a backup to return to.

In the benchmarks, Maximum Overdrive, which uses only about 2K, increased performance by exactly the same margin as Drive Rocket (as you'd expect)—only 3-4 percent.

My home system, which I used for these first tests, has a local-bus hard disk, which is a 32-bit interface. Because of this, it doesn't use Windows FastDisk, the 32-bit device driver. My system at work does use FastDisk, and when installing Drive Rocket, I found out that both it and Maximum Overdrive are incompatible with FastDisk. Both programs claim they outperform FastDisk, however. So I disabled FastDisk and ran my benchmarks. With Drive Rocket (and no FastDisk) the suite took one minute and 26 seconds to complete. With no Drive Rocket (but with FastDisk), the suite took one minute and 24 seconds. I also ran the same compiler benchmark I'd used on my home system and got times of one minute and 43 seconds with Drive Rocket and one minute and 35 seconds without it. For me, at least, Windows 32-bit FastDisk is faster than Drive Rocket.

Based on my experiences, I decided to save the memory and shelve Drive Rocket and Maximum Overdrive on both my home and work systems. □

Drive Rocket can show you a chart of how much of a speed increase you can expect if you install the product.



(CompuServe)

(CompuServe is not really a pair of glasses, it is an online information service.)

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FEEDBACK

Off the Grid

I read and enjoyed your section on computers, health, and the environment (March 1993, COMPUTE's Getting Started with™ Computers, Health, & the Environment, not available in all editions). In a list of "statistics to ponder" you state that a fully-equipped PC requires about 200 watts of power and that running the machine consumes 400 kilowatt-hours per year, resulting in the burning of oil that releases tons of carbon dioxide into the atmosphere.

Let's get out of nineteenth-century thinking and get into the twenty-first century. My computer doesn't cause any oil to be burned in generating electricity, as my home isn't hooked up to the grid. We run our house using solar-generated electricity. Our lights, refrigerator, computer, and power tools operate on solar. We run a light all night long in the yard, and our security lights are solar powered, with no maintenance required on our part. Every house being built today should be equipped with solar heating and solar-generated electricity. Let's start the twenty-first century right.

BILL COOPER
APPLE VALLEY, CA

Playing Games

How do I get INKEY\$ to accept input from the function keys? How can I make figures move against a graphical background? I'm writing games in BASIC, and I want to release them into shareware.

JASON BLACK
JUDSONIA, AZ

You don't get INKEY\$ to accept input from the function keys. KEY is the specialized command for reading the function keys. It's an event-trapping command. That is, you tell the program what to do, and anytime the specified key

is pressed, the command will be issued. Here's an example.

```
KEY(0) ON
ON KEY(1) GOSUB F1
ON KEY(2) GOSUB F2
ON KEY(3) GOSUB F3
WHILE A$ <> "q"
A$ = INKEY$
WEND
END
F1:
PRINT "The F1 function key was
pressed."
RETURN
F2:
PRINT "The F2 function key was
pressed."
RETURN
F3:
PRINT "The F3 function key was
pressed."
RETURN
```

The keys 1-10 refer to the function keys 1-10. Use 30 and 31 to receive input from keys F11 and F12, respectively. This chart tells the value for the arrow keys.

Up	11
Left	12
Right	13
Down	14

You can define some other keys (not many). Check QBA-SIC's Help for more information on event trapping with KEY.

Use GET and PUT to animate figures against a still background. As the game is setting up, draw or load the figures onto the graphic screen and use GET to place the figures into variables. When you place the figures on the still background, GET the background into a different variable and PUT the figure on the screen with an XOR action verb, which places only the character and not its background on the screen. When the character moves on, PUT the section of the still screen back. Alternatively, you could simply XOR the character into place and then XOR it off the

screen again (using XOR a second time restores the screen to its original appearance). The drawback to this is that the colors of the background will interact with the character's colors. Although we seem to provide GET and PUT examples with ridiculous frequency in "Feedback," what possible harm could one more example do?

```
DIM A(101), B(101)
RANDOMIZE TIMER
SCREEN 12
REM First, draw a character on the
REM screen and capture it to a
REM variable with GET.
FOR i = 0 TO 10
FOR j = 0 TO 10
PRESET (i, j), RND * 15
NEXT
NEXT
GET (0, 0)-(10, 10), A
```

```
A$ = "The XOR Method"
B$ = "Note that the image
fluctuates with the background."
GOSUB BACKGROUND
FOR i = 620 TO 0 STEP -1
PUT (i, 240 - (SIN(i / 100) * 225)),
A, XOR
FOR j = 0 TO 100: NEXT
PUT (i, 240 - (SIN(i / 100) * 225)),
A, XOR
NEXT
```

```
A$ = "The GET/PUT Method"
B$ = "Note that the image is
more stable."
GOSUB BACKGROUND
FOR i = 620 TO 0 STEP -1
GET (i, 240 - (SIN(i / 100) * 225))-
(i + 10, 250 - (SIN(i / 100) *
225)), B
PUT (i, 240 - (SIN(i / 100) * 225)),
A, PSET
FOR j = 0 TO 100: NEXT
PUT (i, 240 - (SIN(i / 100) * 225)),
B, PSET
REM Change PSET to PRESET for
REM an interesting effect.
NEXT
```

```
END
BACKGROUND:
CLS
FOR i = 0 TO 640
```

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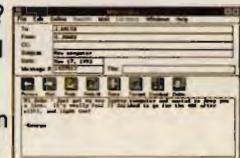
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FEEDBACK

```
LINE (i, 0)-(i, 480), i AND 15
NEXT
LOCATE 1, 1: PRINT A$: PRINT
B$  
RETURN
```

BASIC Malfunction

Suppose there's no built-in random number generator. Can you generate random numbers without it? If there's no SQR function, how can you derive a square root? Is there a way to know how long I've been using the computer?

WESLEY HO
NEW YORK, NY

This little program won't generate really random numbers, but they'll probably do the job. Just use this as a subroutine and put in a GOSUB RANDOM to return a randomlike number in the variable RANDOMNUMBER.

random:

```
counter = counter + 1: IF
counter > 5 THEN counter =
VAL(random$) * .0001
```

random\$ =

```
RIGHT$(STR$((VAL(RIGHT$(
TIME$, 2)) + 3) ^ (counter /
VAL(RIGHT$(TIME$, 2)) +
1))), 5)
```

```
IF random$ = a$ THEN
GOTO random
```

```
randomnumber=VAL(random$)
RETURN
```

Here's a program that will return any whole root of a number between .0000001 and 9999999.

ON ERROR GOTO

errorhandler:

beginning:

```
INPUT "Enter number you
want root of: "; a
```

```
INPUT "Enter the root (2 =
square root): "; root%
```

c = a: e = 0

IF root% = 1 THEN GOTO
ender

```
IF root% <= 0 OR a <
.0000001 OR a > 9999999
THEN ERROR 6
```

f = c: GOSUB mult

IF m < a THEN GOTO top1

IF m = a THEN GOTO ender

IF a < 0 THEN PRINT
"Cannot derive root of

"negative number.": END

top2:

f = c: GOSUB mult

IF m > a THEN d = c: c = c /

10: GOTO top2

top3:

f = d: GOSUB mult

IF m > a THEN

d = d - c

GOTO top3

ELSE

IF m = a OR e >= 6 THEN

c = d: GOTO ender

GOSUB reduce

GOTO top3

END IF

top1:

f = c: GOSUB mult

IF m < a THEN c = c * 10:

GOTO top1

d = c: c = c / 10

top4:

f = d: GOSUB mult

IF m > a THEN

d = d - c: GOTO top4

ELSE

IF m = a OR e >= 6 THEN

c = d: GOTO ender

GOSUB reduce

GOTO top4

END IF

ender:

PRINT a; "^(1/

"; root%; ") is ";

c

END

reduce:

d = d + c: c = c / 10

e = e + 1

RETURN

mult:

m = f

FOR mult = 2 TO root%

m = m * f

NEXT

RETURN

errorhandler:

PRINT "Error encountered."

RESUME beginning

When run, the following program will note the current time, save it in a file called TIMLOG in your root directory, and quit.

When you're finished with your work, run this program again. The program will display the elapsed time since you ran it the first time. You then have two choices: Press 1 to continue timing, or press 2 to exit the timer. If you exit the timer, the program will append the most recent elapsed time to a log file in your root directory called WORKLOG.HHH

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FEEDBACK

(which is a simple text file that can be read using EDIT or any other ASCII-friendly word processor or text editor), and it will delete TIMLOG.

Note: This program will not keep track of work sessions that last past the year 10,000 A.D. This program will not accurately track work sessions beginning in February of 2100 (or any other century year not evenly divisible by 400 unless it's evenly divisible by 4000) and extending into a later month or year. If you find yourself working around 11:59 p.m. on February 28, 2100, exit the timer program and take a break until after midnight. Tell your boss we said it was all right.

ON ERROR GOTO

```
secondhalf
OPEN "TIMLOG" FOR
INPUT AS #1
LINE INPUT #1, s$: s =
VAL(s$)
LINE INPUT #1, m$: m =
VAL(m$)
LINE INPUT #1, h$: h =
VAL(h$)
LINE INPUT #1, d$: d =
VAL(d$)
LINE INPUT #1, mo$: mo =
VAL(mo$)
LINE INPUT #1, y$: y =
VAL(y$)
```

s1 = VAL(RIGHT\$(TIME\$, 2))

m1 = VAL(MID\$(TIME\$, 4, 2))

h1 = VAL(LEFT\$(TIME\$, 2))

d1 = VAL(MID\$(DATE\$, 4, 2))

mo1 = VAL(LEFT\$(DATE\$, 2))

y1 = VAL(RIGHT\$(DATE\$, 4))

cy = 0

s2 = s1 - s

IF s2 < 0 THEN s2 = 60 + s2:

cy = 1

m2 = m1 - m - cy: cy = 0

IF m2 < 0 THEN m2 = 60 +

m2: cy = 1

h2 = h1 - h - cy: cy = 0

IF h2 < 0 THEN h2 = 24 + h2:

cy = 1

d2 = d1 - d - cy: cy = 0

dm = 31 + ((mo = 9) OR (mo = 4) OR (mo = 6) OR (mo = 11))

IF mo = 2 THEN dm = 28 - (y / 4 = INT(y / 4))

IF d2 < 0 THEN d2 = dm +

d2: cy = 1

mo2 = mo1 - mo - cy: cy = 0
 IF mo2 < 0 THEN mo2 = 12 +
 mo2: cy = 1

y2 = y1 - y - cy
 PRINT "Work time equals ";
 y2; " year(s), "; mo2;
 " month(s), "; d2; " day(s), "
 PRINT SPACE\$(17); h2; " hour(s), ";
 m2; " minute(s), and ";
 s2; " second(s)."

PRINT "To continue timing,
 press 1."

PRINT "To exit timing, press
 2."

getanotherkeypress:

a\$ = INKEY\$
 IF a\$ = "1" THEN SYSTEM
 IF a\$ <> "2" THEN GOTO
 getanotherkeypress
 OPEN "worklog.hhh" FOR
 APPEND AS #2
 PRINT #2, DATE\$, TIME\$
 PRINT #2, "Work time
 equals"; y2; " year(s), "; mo2;
 " month(s), "; d2; " day(s), "
 PRINT #2, SPACE\$(17); h2; " hours, ";
 m2; " minutes, and";
 s2; " seconds."
 PRINT #2,
 CLOSE
 SHELL "del \timelog"
 SYSTEM
 secondhalf:
 OPEN "timelog" FOR OUTPUT
 AS #1
 PRINT #1, RIGHT\$(TIME\$, 2)
 PRINT #1, MID\$(TIME\$, 4, 2)
 PRINT #1, LEFT\$(TIME\$, 2)
 PRINT #1, MID\$(DATE\$, 4, 2)
 PRINT #1, LEFT\$(DATE\$, 2)
 PRINT #1, RIGHT\$(DATE\$, 4)
 SYSTEM

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INTRODOS

Tony Roberts

OLD DOS, NEW TRICKS

Microsoft has taken the wraps off DOS 6.2, an operating system miniupgrade that's widely regarded as a bug fix for DoubleSpace, the disk-doubling utility introduced in DOS 6.0.

Although correcting DoubleSpace problems may have been the driving force behind this upgrade, DOS 6.2 includes a handful of features that will be of interest to all users—even those who don't use DoubleSpace.

First, however, let's see what changes have come to DoubleSpace.

The program now includes what's called DoubleGuard, a checksum-based system that identifies corruption in DoubleSpace memory buffers before data is written to disk. If this verification fails, the system is shut down to limit further data corruption.

DoubleGuard slows system performance slightly, but it can be turned off if you wish to run your system without it.

Other new DoubleSpace features include Uncompress and Automount.

Uncompress can return compressed drives to normal and then uninstall DoubleSpace.

Automount allows the system to recognize compressed floppy disks and other compressed removable media automatically. The new DoubleSpace includes clearer error messages, and its footprint in memory has even been reduced by a few K.

In a statement that hints at some of the rough edges users have encountered on DoubleSpace in version 6.0, Brad Silverberg, a Microsoft vice president, describes the enhanced safety features in version 6.2 as "the software equivalent of passenger-side air bags and antilock brakes to

make disk compression as easy and safe as possible."

A new general-use feature of DOS 6.2 is ScanDisk, a disk repair tool. This program works with both compressed and uncompressed drives to diagnose and correct disk errors such as lost clusters and cross-linked files.

ScanDisk can also perform a surface analysis of your media and can lock out any unreliable sectors. ScanDisk's capabilities go well beyond those of the old standby Chkdsk, rendering that familiar program virtually obsolete.

The SMARTDrive disk cache utility also has been spruced up in this upgrade, providing additional functionality as well as safety. Most notably, the program now is able to cache CD-ROM drives. In addition, SMARTDrive now has write caching disabled by default. However, if write caching is enabled by the user, SMARTDrive will flush its cache to disk before returning the user to the C prompt, preventing the loss of data that occurs when the computer is turned off before the cache is fully flushed to disk.

DOS 6.2 improves on its predecessor by allowing interactive execution of AUTOEXEC.BAT as well as CONFIG.SYS statements. This feature makes it easy to debug a troublesome startup routine. Another startup improvement allows DoubleSpace users to boot without loading DoubleSpace by pressing Ctrl-F5. Also at startup, the high-memory manager, HIMEM.SYS, now performs a more rigorous test of extended memory than occurs in most Power On Self Test routines.

Another noteworthy addition to DOS 6.2 is single-pass disk copying. DOS now makes use of available hard disk space to permit floppy-to-floppy copies without requir-

ing multiple disk swaps. And speaking of copying, the Copy, Move, and Xcopy commands will now warn a user if they are about to overwrite a file of the same name. Ingeniously, this feature is only employed with commands that are issued from the DOS prompt. Copy, Move, and Xcopy commands executed from batch files will proceed as before, without warning about overwrites. So your existing batch files will run as before, but when you use these commands at the command line, you'll be prompted before data is overwritten.

Other programs enhanced in DOS 6.2 include Defrag, which now is able to defragment disks that hold as many as 20,000 files; Windows Undelete, which no longer allows users to enter invalid filenames; and Dir, Mem, Chkdsk, and Format, which now display numbers of four or more digits with commas.

If you're a current user of DOS 6.0, you can get the Step Up version of DOS 6.2 from software resellers for \$9.95 or by downloading the upgrade files from the Microsoft area on CompuServe, GENIE, or America Online. Or you can connect to the Microsoft Download Library at (206) 936-6735. You must have DOS 6.0 running on your system to use the DOS 6.2 Step Up.

Users of earlier versions of DOS can purchase DOS 6.2 from software retailers for a suggested retail price of \$77.95. Also available is DOS 6.2 Upgrade for Dummies, which includes a copy of Dan Gookin's popular *DOS for Dummies*. The suggested price for that version is also \$77.95.

More than a bug fix, less than a new operating system, DOS 6.2 offers plenty of good reasons to move up, whether you're running 6.0, 5.0, or something still earlier. □

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**Microsoft's second
thoughts
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TEST LAB

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Reviews by William Harrel

Presentation software and computer screen shows have changed the face of business presentations. When presentation software appeared, prospective clients, boards of directors, bosses—audiences of all types—were awestruck by fancy screen wipes, fades, and glittering transitions. After that came slides with automatic build capabilities and, with the release of Microsoft PowerPoint 3.0, flying bullets. Undoubtedly, Windows' Media Control Interface (MCI) is rapidly changing the scope of business presentations.

With a sound board, speakers, microphone, and one of these 13 multimedia packages, you can really bring your presentations to life. No longer are you relegated to narrating silent, still scenes and making important points with a stick (or your finger). The right presentation software turns your PC into a motion-picture studio. Which is more effective: the presenter describing how a product works as the audience stares at a still picture, or a narrated animation of the product in action? Instead of the presenter's moving from one bar chart to the next to show trends, it's much more dramatic if the bars grow and shrink onscreen.

Most of these programs approach creating presentations

in the same traditional, presentation-program manner: Tables, charts, and graphs are plotted on spreadsheetlike data forms and then pasted into slides. A presentation is made up of several slides. (*Slide* is actually a catchall term for every output media type available, including 35-mm slides, transparencies, computer monitors, paper, and anything else Windows prints on.) In most cases, the presentation itself is managed with some form of outliner.

However, the ability to create simple slide shows is no longer enough. Even the traditional presentation packages—such as PowerPoint, Harvard Graphics, and Freelance Graphics—now support sound, animation, and full-motion video.

The full-blown multimedia programs—Action!, HSC Interactive, and Q-Media—use different types of metaphors for putting together a presentation. Action!, for example, uses a VCR-like interface that allows you to combine media clips and other presentation elements on a time line. HSC Interactive uses flow-chart-like icons that let you create a presentation simply by dragging and connecting objects along a continuum.

Interactive presentations are possible, to one degree or another, with most of the packages in this month's lineup. In interactive presentations, either the presenter or the viewer can control certain aspects of the presentation by clicking on a defined area of the screen (such as a button) or by using the keyboard. Interactivity can include, for example, playing a sound or animation file (or both simultaneously) or jumping

to different scenes or parts of the presentation.

The trick to picking a presentation package from this group is finding the one with the features that fit your needs.

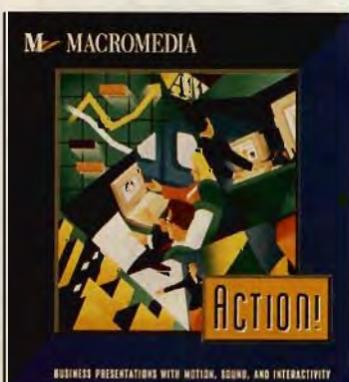
Keep in mind that the computer system you use with these programs is important for two reasons. First, since these applications are graphics-intensive (and they use Windows' color capabilities to their fullest), you should have at least a 256-color display system. Second, often output is to a screen show on your monitor; to run the screen show smoothly, you'll need a reasonably fast computer and a good chunk of RAM. Two years ago, I tested some of these programs on a 386/16 SX with 4MB RAM; it was not powerful enough to run most of the screen shows without performance lags. Nothing can ruin a good presentation faster than a long delay or an application error—just when you're about to make a crucial point.

The programs in this month's Test Lab were tested on a 486/33 with 20MB RAM, which is much more muscle than any of them should need. Though some ran better than others, they all performed well enough. Output was tested using transparency film on an IBM 4029 at 600 dpi. Screen shows were tested with a Radius MultiView 24 true-color graphics adapter on a 19-inch, high-resolution monitor. Used with the 486 and the high-end display, most of these programs turned out dazzling onscreen presentations.

WILLIAM HARREL

ACTION! 2.5 FOR WINDOWS

Action! is by no means a conventional program. Though designed to make users of the more typical slide-generating software feel at home, this program is geared more to creating presentations made up of path-based moving ob-

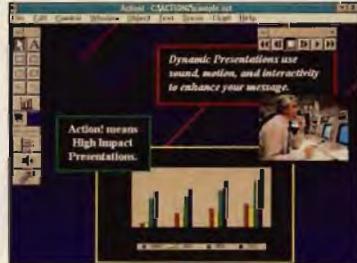


Action! 2.5 for Windows
Suggested retail price: \$299

MACROMEDIA
600 Townsend St.
San Francisco, CA 94103
(800) 945-4061
(415) 442-0200

jects, animation clips, and sound. Its versatility makes it somewhat more difficult to master than, say, Lotus's Freelance Graphics.

Action! presentations consist of components the program calls scenes, which are similar to slides in Microsoft PowerPoint, Aldus Persuasion, or one of the many other traditional programs. It's easy to place multimedia clips in an Action! scene. Simply select the appropriate icon and then click in the portion of the editing area where the clip should appear. A dialog box opens to let you choose the file, set the duration and speed, and select whether to loop the clip, carry it into the next scene, and so on. A VCR-like player allows you to play



back all or sections of your work to see how it's coming together.

Action! provides several ways to manipulate and keep track of events in your scenes. There's Content List, a feature that displays a visual tally of scene components and lets you drag and drop names to rearrange the flow. A time line shows the events in your presentation as bars on a graph. You can drag and drop events to change their sequence, and you can increase or decrease durations interactively by stretching them with your mouse. A scene sorter, similar to other programs' slide sorters, lets you move scenes to different locations in the presentation.

As versatile as Action! is, it still has some rough edges. In complicated scenes with a number of animated objects, movement is sometimes jerky. I found the man-

Aldus Persuasion for Windows 2.1
Suggested retail price: \$495

ALDUS
411 First Ave. S
Seattle, WA 98104-2871
(206) 628-2320

ual somewhat disorganized and not always easy to follow. For example, it describes tools and the application window before it gives installation instructions. (It's much better to have the program loaded and open so you can compare what you see onscreen to the illustrations in the manual.)

A good videotape tutorial covering the basics comes with the program. However, it's short and does little more than get you excited about the possibilities, rather than show you how to use the software. Action! comes with several fine templates. However, they are not used in the traditional sense. Instead, you must copy all or part of them into your presentation, rather than use the template as a shell that you flesh out with your own text and graphics.

Technical support answered quickly. I called twice and got through immediately; each time the technician was courteous and knew the answers to all of my questions.

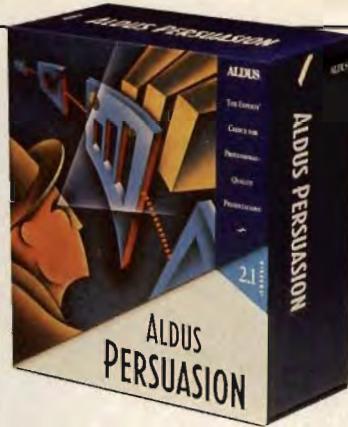
If you're looking for a full-featured multimedia presentation program that's relatively easy to use and gives you a wide range of presentation options, look no further than Action!.

Circle Reader Service Number 371

ALDUS PERSUASION FOR WINDOWS 2.1

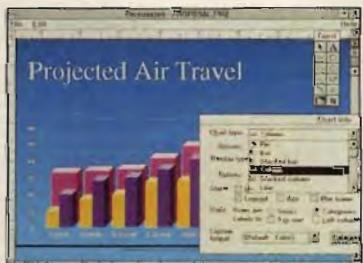
Persuasion remains one of the stalwart performers in the graphics software business.

Persuasion's tutorial and manuals are flawless, and there's a beautiful, full-color desk reference with easy-to-find command descriptions and guidelines for using the



program's templates. Persuasion runs smoothly and does what it's designed to do without a hitch. However, like a few other Aldus applications, it hasn't had a major upgrade in a while, and it's lagging behind in the features race. The good news is that a new version is in the works, but it has not been announced as of this writing.

Users of other Aldus programs should find Persuasion especially easy to use. It sports the famous Aldus pasteboard metaphor, which allows you to place objects outside the page area. The right mouse button causes the display to zoom in and out, and you can even invoke the Grabber Hand feature by holding down Shift as you drag the mouse. Persuasion's slide templates are some of the best in the business, rivaled only by PowerPoint's. DDE and OLE are supported but not during the screen



show, which means that you can forget sound and animation.

You won't find a toolbar in Persuasion; instead, there's a toolbox resembling PageMaker's with limited text and graphics options. To take advantage of most options for text, graphics, and chart-format-

TEST LAB



ting, you must wade (sometimes deeply) into the menu and dialog box system. Other limitations are that you can open only one presentation at a time and that each presentation can contain only 13 slides. Yet another drawback is Aldus's 90-day free support policy. After the first 90 days, you must either use a 900 number at \$15 a call or join a support program with fee and benefit options ranging between \$99 and \$149 per year. However, Aldus technicians are extremely well trained. Not once have I called and not had my questions answered.

While Persuasion has fallen a little behind the times, it is still a solid performer. If you use other Aldus products, you'll like this one.

Circle Reader Service Number 372

BRAVO! 2.0

At about half the price of the other full-featured presentation programs reviewed here, Alpha Software's Bravo! certainly deserves consideration. Since it is newer than many of the others, many of its options take up where other programs' options leave off.

A good example of Bravo!'s improvement over the competition is its collapsible outliner. High-end word processors can collapse or expand an outline, or hide or show subtopics and notes. This capability is handy in Bravo! because it allows you to prepare slides and speaker notes at the same time. Simply use the collapsed outline in your slides and print the expanded outline for notes.

Bravo! 2.0
Estimated street price: \$79.00,
\$39.95 for graphics add-on
including Power Fonts and Power
Album (clip art)

ALPHA SOFTWARE
168 Middlesex Turnpike
Burlington, MA 01803
(800) 451-1018

Unlike most of the other programs reviewed here, Bravo! has organization charts. In business settings, organization charts can be essential to a presentation; I've always wondered why presentation programs tend to leave them out.

An interesting feature is called DataPictures. This smart clip art—pencils, clocks, computers, and so on—adjusts itself according to the data in your data sheet to create attractive pictograms quickly and efficiently. The program ships with several examples of DataPictures, and the manual contains information about creating your own.



Pictograms aren't always appropriate, but sometimes they can really spruce up a presentation.

Bravo! also supports a wealth of graphics, data, and clip media from other programs, such as data from all the leading spreadsheets and database formats, several graphics formats, and even outlines from Word for Windows. FLI, FLC, and MMM animation files are supported, as well as Microsoft Video for Windows AVI files and most common sound formats. For file formats not supported, you can create OLE (Object Linking and Embedding) links to run clips in other programs.

Like some of the more expensive packages, such as PowerPoint and Harvard Graphics, this one lets you create hypertext links between slides; this capability allows you to jump around in an electronic presentation. You'll find this handy for illuminating points and responding to audience questions. With a feature called Electronic Chalk (similar to PowerPoint's John Madden tool), you can draw on slides.

And if all this isn't enough, the program ships with several templates and an electronic tutorial to help get you started. Technical support is free. I had trouble getting through a few times, but when I did, the help I received was topnotch.

Circle Reader Service Number 373

CA-CRICKET PRESENTS 1.5 FOR WINDOWS

Presents is part of Computer Associates' suite of economical programs in the CA-Cricket line. At \$92, it costs considerably less than most of the other programs reviewed here. While not as powerful as some of the others, it is one of the easiest to use and has enough features to get most presentation tasks done admirably.

This program provides eight different chart types and some interesting 3-D effects. There are several professionally done templates you can use to set up your presentations quickly, and ten object-oriented drawing tools—squares, rectangles, ellipses, and so on—let you add interest-



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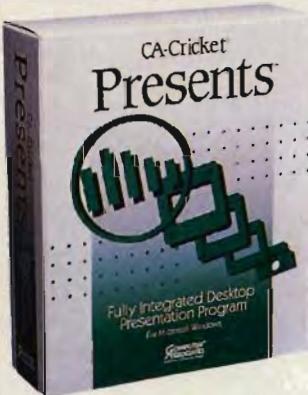
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*Dealer price may vary.

Circle Reader Service Number 203

TEST LAB



ing touches to your slides.

The program supports a wide range of graphics files; however, its multimedia support is lacking. It does not support sound and animation, which means that you will be stuck having to narrate and to add your own sound effects. However, if you're on a budget and have limited time, you may not care about multimedia: It takes time to use and to master, and it requires enormous system resources.

If you don't need much power and want to save a few hundred dollars, Presents runs well and is easy to learn. Technical support is easy to reach, and the staff seems well trained. Though expensive for the features it offers, this presentation package is uncomplicated and easy to use.

Circle Reader Service Number 374

COMPEL 1.0

Compel is a full-featured presentation package that excels at multimedia. You can easily create interactive presentations that can be run by a presenter or navigated by a viewer. Some of the key features include hyperlinking, hotwords, automatic build options, and multiple output formats.

Hyperlinking allows you to create links between graphics, such as buttons, and multimedia events or other Windows applications. You can then jump between linked objects simply by clicking on them. Hotwords and bullets allow you to create similar links between words and events or bullets and events. This exten-

CA-Cricket Presents 1.5 for Windows
Suggested retail price: \$92

COMPUTER ASSOCIATES
One Computer Associates Plaza
Islandia, NY 11788-7000
(800) 225-5224

sive hyperlinking capability lets you create highly flexible interactive presentations.

Automatic build capabilities (found in several packages reviewed here) let you create bullet builds that automatically bring in new points and gray out, or fade,



previous points. With Compel's ability to output to several different media types, you can print to slides, overheads, your monitor, or even videotape. However, one of the more versatile output options is Packaging, which allows you to compress and save the presentation to multiple floppies without losing OLE, DDE, and hyperlink pointers. In other words, when you decompress the presentation on another machine, the presentation file will know where to find all your sound, animation, and graphics files.

Compel comes with over 100MB of clip media, including over 100 sound files and 350 pic-

Compel 1.0
Suggested retail price: \$295

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es of clip art, and it supports most multimedia and graphics formats, including AVI and Kodak Photo CD. There are also more than 100 presentation templates.

Asymetrix has some of the best-trained technical support people in the business. I've never been disappointed or left with unanswered questions. While this program is not necessarily any more capable than some of the others reviewed here, it's certainly a good one—and this is only a first version. It can only get better from here.

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CORELDRAW! 4.0

CorelDRAW! is not a dedicated presentation program. Instead, the package includes a suite of graphics applications that Corel calls a graphics toolkit. Two of the applications—CorelCHART! and CorelSHOW!—provide strong enough presentation capabilities to warrant inclusion in this roundup. In fact, CorelDRAW!'s wide range of options for graphics editing and handling makes it a better value for those who need only occasional presentations.

For \$595, you get a full-featured vector draw program, a bitmap image editor, charting and on-screen presentations, graphics cataloging, a screen capture utility, an animation module, 755 TrueType and Type 1 fonts, and 18,000 pieces of clip art and clip media. However, as with most programs that try to be everything to everybody, CorelDRAW! lacks a few important features. CorelDRAW!'s presentation features do not include outlining, speaker notes, or audience handouts.

With the graphics toolkit, you create charts in CorelCHART!, drawings in CorelDRAW!, and animation in CorelMOVE!; then you compile your presentation in CorelSHOW!. The applications in the toolkit are tightly linked through OLE. CorelCHART! is a very respectable charting program that sports features missing in several of the others, such as data analysis and great mouse in-

CorelDRAW! 4.0
Suggested retail price: \$595

COREL
1600 Carling Ave. Ottawa, ON
Canada K1Z8R7
(800) 836-3729

teractivity. With the Pop-Up Menu tool, for example, clicking on objects brings up a menu that lets you perform various formatting functions for the selected object without wading through numerous dialog boxes. Clicking the right mouse button on chart ele-



CorelDRAW! is a great value, no matter what type of graphics work you plan to do.

Circle Reader Service Number 376

FREELANCE GRAPHICS FOR WINDOWS 2.0



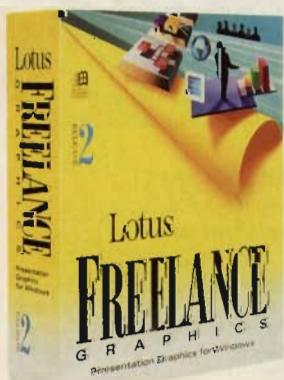
ments, such as a bar or pie section, lets you reformat the chart in several ways, including reversing data and recoloring bars by series, group, face, and so on.

CorelSHOW! is a highly efficient OLE client. It also sports several transition effects and comes with a palette of predefined backgrounds. A supply of AutoDesk Animation FLI files is also included. CorelCHART! has a few buggy export filters, which Corel says it is working on. CorelDRAW! 4.0 has had such a tremendous response that I found it practically impossible to get through to technical support, even on the 24-hour line. Sometimes you have to wait for technicians to call you back.

These few problems aside,

Besides being a very powerful presentation program, Freelance Graphics is exceptionally easy to use. The idea behind the program is that most people don't do presentations often; they do them at the last minute and don't have time (and don't want) to learn and relearn a complicated program. For this market, Freelance Graphics is nearly perfect.

Presentations are created in Freelance Graphics with templates called SmartMasters. Each group of masters contains several predefined slides set up to receive text and graphics. To enter text or a chart, all you do is click on a pre-defined portion of the slide, and the appropriate dialog box opens. In other words, you select the look (a template), choose a page layout (one of 11 styles, including graph, bulleted list, and so on),



Freelance Graphics for Windows 2.0
Suggested retail price: \$395

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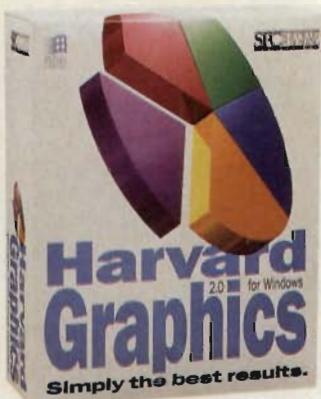
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and then fill in the blanks.

This system works well, and it is certainly easy. Freelance Graphics is great for getting presentations out in a hurry. And a welcome option that nothing else has is the ability to run screen shows from the DOS prompt instead of from Windows. There is also a QuickStart tutorial that walks you through the basics of creating a presentation.

Users of other Lotus programs, such as Ami Pro and 1-2-3, will find the Freelance Graphics interface very comfortable. The program uses the same SmartIcons metaphor. You'll also find it easy to use Ami Pro outlines and 1-2-3 data to create your presentations. The three applications are integrated quite masterfully.

Lotus is a big company. You'd think that its support lines would be swamped, but I've never had trouble getting help. When I called technical support during this review, things were no different. I got through, and my questions were answered nimbly. This is a great presentation program.

Circle Reader Service Number 377

HARVARD GRAPHICS 2.0 FOR WINDOWS

Harvard Graphics is another program that started in DOS. In fact, the people who developed Harvard Graphics for DOS wrote the book on presentation software.

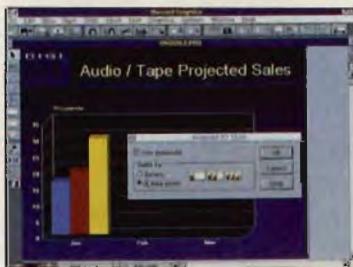
Harvard Graphics 2.0 for Windows

Suggested retail price: \$395

SOFTWARE PUBLISHING CORPORATION
P.O. Box 54983
Santa Clara, CA 95056-0983
(800) 336-8360

The first Windows version was a little disappointing—it had a clumsy interface and lacked a few important features. Version 2.0 is a vast improvement over the previous version. It's much easier to use and sports plenty of interesting features.

Two of the most impressive features in Harvard Graphics are a new icon bar, similar to Freelance Graphics' SmartIcons,



and the Harvard Graphics Advisor, which makes choosing the right chart easier and provides important advice for creating presentations. The icon bar is fully customizable—you can change options easily. The Harvard Graphics Advisor provides invaluable information about how to capture and keep an audience's attention and the differences between persuasive and informative presentations, as well as a wealth of other information that will be helpful to most occasional presenters.

HSC InterActive 1.0

Suggested retail price: \$295

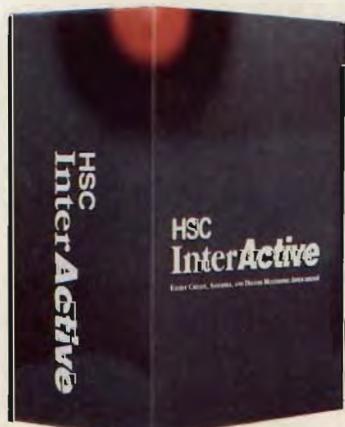
HSC SOFTWARE
1661 Lincoln Blvd., Ste. 101
Santa Monica, CA 90404
(310) 392-8441

Again, most people don't do presentations every day. Hence, it's easy to forget how to use the software. The 5-Minute Coach feature alleviates this problem. It's an interactive tutorial designed to give new and infrequent users a game plan (there are four different plans) for building a basic presentation. The 5-Minute Coach includes a presentation overview and three task-driven lessons. Yet another feature designed to shorten the learning curve, Advisor Quick Tips, helps you learn how to edit the appearance or content of your charts quickly.

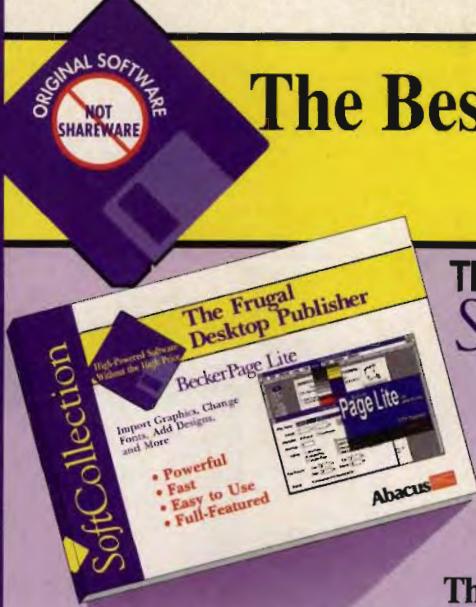
Harvard Graphics is a strong application. It supports both sound and animation embedding. You can launch other applications during your screen shows and even jump from slide to slide. These last two features help you, as the speaker, to illuminate points in your presentation and jump ahead or back to answer audience questions. The ability to open other OLE-aware applications allows you to refer to spreadsheets, online documents, reports, and so forth without leaving or closing your presentation. When you finish your reference, your presentation begins where it left off.

The technician I talked to at SPC was friendly, and my questions were answered quickly and courteously.

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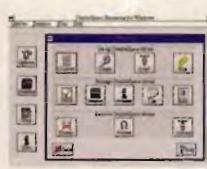
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Page C2

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HSC INTERACTIVE 1.0

HSC InterActive is a scaled-down version of AimTech's full-featured multimedia authoring software, IconAuthor. For a fraction of the price, HSC InterActive provides the same easy, icon-based authoring system, minus a few powerful (but perhaps superfluous) features, such as variable handling and other database-querying functions.

While IconAuthor works best for computer-based training, HSC InterActive is geared more to presentations—not presentations in the traditional sense, but interactive multimedia screen



shows. This icon-based approach to creating presentations makes HSC InterActive unlike any other program in Test Lab.

Perhaps the best way to describe the process of creating presentations in HSC InterActive is *icon-based programming*. Instead of stringing a series of slides or scenes together, you compile presentation elements by linking icons along a flow chart. The icons provide a visual representation of the elements in your presentation and their relationships to one another. Think of this process as programming with pictures, complete with loops, pauses, if-thens, and so on. There are icons for creating menus, playing sound and animated sequences, displaying bitmaps, and every other function the program supports.

Elements are added to presentations by dragging icons and

Micrografx Charisma 4.0 for Windows
Suggested retail price: \$495, \$149 for upgrade

MICROGRAFX
1303 E. Arapaho Rd.
Richardson, TX 75081
(800) 676-3110

placing them into the flow chart at the desired locations. Icons are defined by double-clicking on them. At first this process seems strange, but the tutorial is very good and explains concepts and procedures quite well. Within just a few minutes, the interface makes perfect sense.

The technical support people seem to know their product inside and out. I called twice and spoke with a different technician each time; neither could be stumped. The product has limitations, though; there's no charting capability. You'll have to bring charts and graphs in as bitmaps from other sources. However, an upcoming version will have charting.

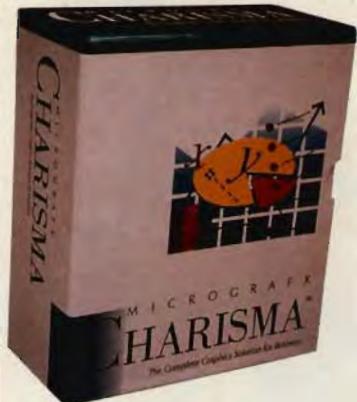
If you're looking for a simple way to author interactive, multimedia presentations, this icon-based solution is easy to use and versatile. You'll have it up and running in no time. Usually, programs this simple lack features, but this one doesn't lack much.

Circle Reader Service Number 379

MICROGRAFX CHARISMA 4.0 FOR WINDOWS

The wait is over. Finally, Micrografx has upgraded Charisma. The previous version was lagging behind; however, this new version leaps out to take a well-deserved place in the front of the pack with the latest versions of PowerPoint and Harvard Graphics.

Designed for the high-end professional presenter and corporate user, this program provides



3-D charting with full rotation and light source adjustment capabilities. In other words, you can turn your 3-D chart in any direction and control the way simulated light shines on the various 3-D planes. There is also a feature called Visual Galleries that allows you to choose a chart style you like and then fill in your own data. This makes the sometimes-complicated task of choosing the right

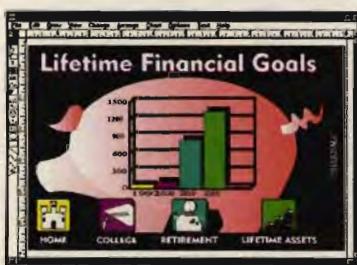


chart for the data much easier.

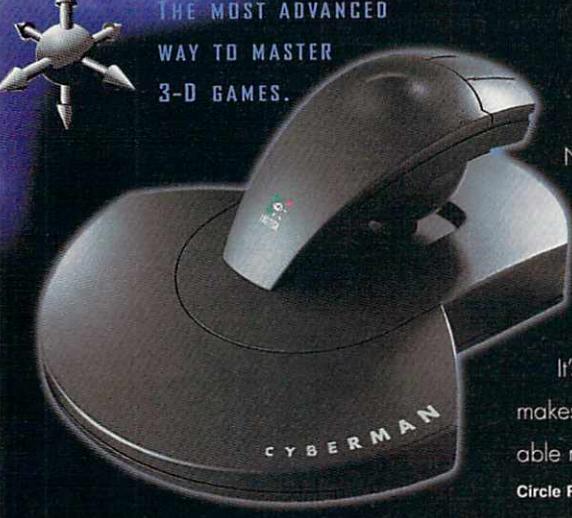
Charisma's multimedia support is quite extensive. Rather than depending on Windows' OLE (Object Linking and Embedding) for importing clip media, the program has built-in multimedia support. You can loop, clip, and adjust sound levels right in the program. For example, you can adjust the length and volume for any MIDI, WAV, or AVI file from inside Charisma, without having to use another utility.

The program ships with several professionally designed templates, called Master Styles, that make creating effective presenta-

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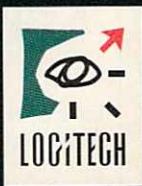


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It's also the only controller with tactile feedback that makes you a physical part of the game. CyberMan is available now at your local dealer, or call **1-800-732-2923**.

Circle Reader Service Number 123



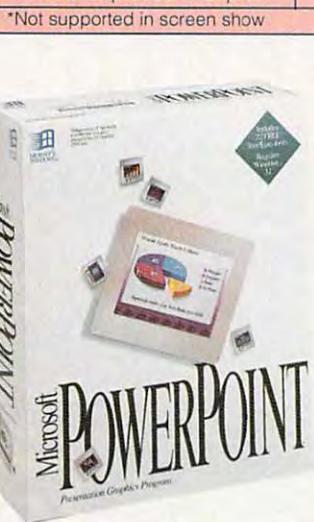
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 www.cyberman.com/media/re.cda

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SOFTWARE FEATURES	Action! 2.5	Aldus Persuasion 2.1	Bravo! 2.0	CA-Cricket Presents 1.5	Compel	CorelDRAW! 4.0
Charting Features						
Number of chart types	32	12	10	8	6	46
Number of predefined charts	0	0	67	0	34	46
Data analysis	no	no	no	no	yes	yes
Screen Show Options						
Animation files supported	FLC, FLI, MMM	FLC, FLI	FLC, FLI	no	FLC, FLI	FLC, FLI, MMM
Automatic slide builds	no	yes	yes	no	yes	no
Digital video support	AVI, QuickTime	no	QuickTime	no	AVI, QuickTime	AVI, QuickTime
Onscreen pointing	no	no	yes	yes	yes	yes
Onscreen drawing	no	no	yes	no	no	no
Remote slide shows	yes	yes	yes	yes	yes	yes
Run screen show from DOS	no	no	no	yes	no	no
Sound formats supported	CD audio, MID, WAV	*	MID, WAV	no	CD audio, MID, WAV	CD audio, MID, WAV
Number of transition effects	46	16	13	14	34	23
Speaker Support Tools						
Audience handouts	yes	yes	yes	yes	yes	no
Printable outline	yes	yes	yes	yes	NA	NA
Speaker notes	no	yes	yes	yes	yes	no
Additional Features						
Number of pieces of clip art	35	100+	81	100	400	18,000



tions a snap. Simply open the template, type in your text, add your graphics and clip media, and let the presentation rip. You don't have to worry about color schemes, font collaboration, and all those other design elements we nonartists know nothing about.

Microsoft PowerPoint 3.0 Suggested retail price: \$495

MICROSOFT
One Microsoft Way
Redmond, WA 98052-6399
(800) 426-9400

Expanded transition effects, automatic build options, and other enhancements make onscreen presentations much easier than in previous versions of Charisma. Charisma 4.0 (like many recent Micrografx upgrades) has a beautiful, friendly interface that's easy and a joy to use. The program's power is reached through simple icons and well-designed menus.

Best of all, technical support is free and available 24 hours a day, Monday through Friday. The technicians are enthusiastic and knowledgeable.

Circle Reader Service Number 380

MICROSOFT POWERPOINT 3.0

A little over a year ago, Microsoft redefined presentation software with the release of PowerPoint 3.0. Disappointed users of version 2.0 did a double-take—this vast improvement placed PowerPoint back on top of the huge presentation program market.

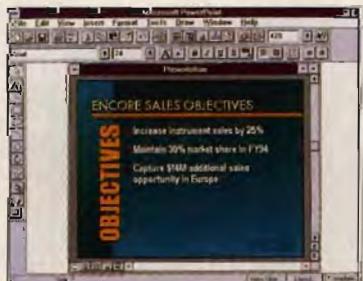
PowerPoint is the program of choice for Word for Windows and Excel users. Wherever possible, commands and menu structures are the same. Not only can you import outlines from Word for Windows, complete with text formatting and topic levels, but you can also launch screen shows from the Word for Windows outliner. And the PowerPoint outliner is WYSIWYG—you can format the text in your slides from the outliner.

The PowerPoint Viewer feature

Freelance Graphics 2.0	Harvard Graphics 2.0	HSC Interactive	Micrografx Charisma 4.0	Microsoft PowerPoint 3.0	Q-Media 1.2	WordPerfect Presentations 2.0
108	88	NA	76	84	NA	38
108	88	NA	76	100+	NA	38
yes	yes	NA	yes	yes	NA	yes
FLC, FLI, MMM	FLC, FLI, MMM	FLI, MMM	FLC, FLI	FLC, FLI	FLI, MMM	FLC, FLI, MMM
yes	yes	no	yes	yes	NA	yes
AVI, QuickTime	AVI, QuickTime	AVI, DVI	AVI	AVI, QuickTime	AVI, DVI	AVI, QuickTime
yes	yes	no	yes	yes	no	yes
yes	yes	no	yes	yes	no	yes
yes	yes	no	no	yes	yes	yes
yes	yes	no	no	no	no	no
MID, WAV	MID, WAV	MID, WAV	MID, WAV	MID, WAV	WAV	CD audio, MID, WAV
32	51	11	58	45	24	33
yes	yes	NA	yes	yes	no	yes
yes	no	NA	yes	yes	no	yes
yes	yes	NA	yes	yes	no	yes
500	536	24+	7000	573	100+	1000+

lets you see transitions before you assign them to slides. You can also jump from slide to slide to illuminate points. During screen shows, the mouse is active for pointing. However, if you need to, you can also draw on slides while the screen show is paused. Microsoft calls this feature the John Madden tool. If you make electronic presentations, you'll surely appreciate it.

PowerPoint also supports 45 transition effects, which is a great improvement over version 2.0.



And you can take your presentations on the road with PowerPoint Viewer, which has no copyright restrictions and will run either Mac or PC PowerPoint presentations.

Another slick new feature is the Shape tool. Clicking on it brings up a palette of common shapes, such as arrows, starbursts, and balloons. You can then place the shapes on your slides and edit them as desired. It's even possible to type text into the shapes and let PowerPoint automatically center it and lock it into place. In PowerPoint, not only can you change printers at any time, but you can also change templates in midstream, and the entire presentation reformats accordingly.

The only problem worth mentioning is that slides do not display properly in Slide Sorter view. The colors distort, often to the point that the slides look completely different. According to a

technician at Microsoft, it has something to do with the removal of pixels during the reduction.

PowerPoint support is excellent. I called during the peak business hours and got through at once. My questions were answered promptly and efficiently. If you need a full-featured presentation package, you won't find one any more complete than PowerPoint. It is certainly the leader in the features race. A new version may be available by the time this review appears.

Circle Reader Service Number 381

Q-MEDIA 1.2

Q-Media looks similar to Macromedia's Action! and operates in a similar fashion; however, it costs several hundred dollars less. For the reduced price, you give up several features, such as a built-in charting module and royalty-free runtime. But Q-Media's multime-

TEST LAB



dia prowess is second to none.

Q-Media is a scaled-down version of Q-Media Professional, a full-featured multimedia presentation package capable of creating interactive courses and presentations. If, after purchasing Q-Media, you decide the program is not powerful enough, you can upgrade to Q-Media Professional at a reduced rate.

This program really excels in its ability to accept slides from other presentation packages, such as PowerPoint and Persuasion. Just



create one or more slides in another package and import them into your Q-Media presentations.

Like Action!, Q-Media controls presentation events on a time line, which allows you to manipulate the duration and sequence of events graphically. When you're placing sound and animation files in a presentation, this is a perfectly logical way to organize them.

Q-Media ships with over 10MB of clip media and an assortment of templates designed for business, training, and entertainment. However, since media clips are large—up to a megabyte for a few seconds of animation or film strip—

Q-Media 1.2 Suggested retail price: \$99

Q-MEDIA SOFTWARE
312 E. Fifth Ave.
Vancouver, BC
Canada V5T1H4
(800) 444-9356

this is not a lot. You can also use clip media from several other third-party vendors and those created by other packages, such as Auto-Desk Animator or Gold Disk's Animation Works Interactive. Additionally, you can use MIDI sound files, digital video (such as Microsoft Video for Windows AVI film strips), and CD audio.

While this program is not as sophisticated as some of the other full-featured packages reviewed here, it is inexpensive and easy to use. You should consider it as a multimedia starter kit, rather than as a one-stop presentation solution. Q-Media technical support is free, and I received friendly, informed responses to my questions.

Circle Reader Service Number 382

WORDPERFECT PRESENTATIONS 2.0 FOR WINDOWS

WordPerfect Presentations is a state-of-the-art package that's ingeniously integrated with WordPerfect for Windows. If you're a WordPerfect user, this is probably the presentation package for you.

Moving text between WordPerfect documents and your presentations is a snap. Outlines creat-

WordPerfect Presentations 2.0 for Windows Suggested retail price: \$495 (includes scanner)

WORDPERFECT
1555 N. Technology Way
Orem, UT 84057-2399
(800) 321-4566

ed in WordPerfect import cleanly into the WordPerfect Presentations outline and automatically format into word slides.

This program provides an array of tools for working with graphics, including TWAIN-compliant scanning, which allows you to scan images directly into your presentations. You also get a paint program for working with bitmap images and a vector applet for editing vector, draw-type graphics. The program's Master Gallery provides an



extensive collection of colorful slide backgrounds to set the right mood for your presentation, and you can easily adjust colors and other effects.

An exciting offer from WordPerfect is the inclusion of a Logitech ScanMan hand scanner. For \$495 you get a great presentation package and a ScanMan. This is a great deal!

You also get free 800-number support, which isn't provided for any of the other packages reviewed here. WordPerfect's support people are friendly, knowledgeable, and very helpful.

Since you also get WordPerfect quality, you really can't go wrong with this program.

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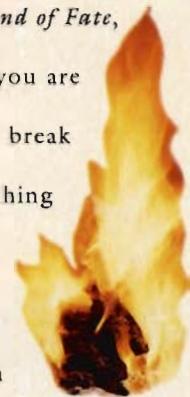


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PROGRAMMING POWER

Tom Campbell

MKS YACC AND TBASIC FOR WINDOWS

If you've read this column more than once, you're probably a pretty inquisitive person. At one point or another, you've probably asked yourself what it takes to (gulp!) create your own programming language.

Compiler writing is often thought to be one of the last black arts in the programming trade. Even though anyone who gets a degree in computer science suffers through a semester or two of compiler writing, most programmers endeavor to forget as quickly as possible what they were supposed to have learned in those classes.

Creating your own language is like drinking port. It's an acquired taste, but to those who enjoy it, it's an unforgettable pleasure worth any number of return trips. I'm one of the nut cases who enjoy writing compilers and interpreters, and I've read literally every book in print on the subject, not to mention many more now out of print.

Having done this for a few years now, I can safely assert that almost all the books are way off the mark. Most of them require that you write the whole compiler by hand, omitting such necessary tools as YACC and Lex, and few of them give you the pleasure of presenting the source code to a complete compiler. Usually, the really good stuff is left, in a phrase I've come to dread, as "an exercise for the reader."

Not that printing the source code to a compiler is easy to do. For one thing, it can take up a lot of valuable editorial pages that the publisher would rather see devoted to more "substantial" topics

such as theory and exercises left to the reader. For another, there's always a big problem in deciding what the target machine is. Make it a PC, and you leave out a lot of college students who work on Suns and VAXes.

The truth is that when I had to get the job done on my first compiler, I learned more from MKS Lex and YACC (Mortice Kern Systems, 35 King Street North, Waterloo, Ontario, Canada N2J 2W9; (519) 884-2251). A compiler is made up roughly of these parts. The scanner takes the individual characters that make up the program's keywords and other "lexical" elements (its words), such as numbers, math operators, and variable names. It converts each item into an integer identifier (such as the number 257 for PRINT_ and 256 for STRING_ in the case of the BASIC line PRINT "Hello, world."). It also associates a value with that identifier, such as the string "Hello, world." in the case of STRING_. (Often, as with PRINT, no such value is needed.) The scanner normally has little knowledge of the language and will cheerfully accept PRINT CLS WHILE + SELECT SELECT as valid input.

The parser takes these lexical elements (viewing them as their integer identifiers) and sees that they're in the right order. This is the heart of the compiler and, normally, the most difficult to write. The parser then adds identifiers such as variables and subroutines to the symbol table, and it generates code or returns an error if the parser deems the input program incorrect.

What do the oddly named YACC and Lex have to do with this? It turns out that while the parser is incredibly tricky to get right—without automated help you will almost always create a language with

invalid constructs—it is also quite amenable to being automated. This is where most textbooks get it completely wrong. They'll spend two or three chapters on archaic parsing theory, then provide little or no real code to illustrate their outmoded ideas. What YACC lets you do is create a description of the language using an extended version of the Backus-Naur Form you often see in language syntax charts, and it creates a C function called yyparse() that does all the hard work for you. Oh—you don't like C? Then use the -LP option to create a Turbo Pascal routine! Writing scanners is normally less tricky, but that also can be automated using Lex. Lex generates a C (or Turbo Pascal) routine called yylex() that's normally called by yyparse().

The MKS Lex and YACC manual is simply the best applied introduction to compiler writing I've ever seen. Starting with a simple command line calculator, it proceeds to a C-like language with functions, procedures, local and global variables, and a rich set of control structures. It has both an interpreter and a compiler. The only thing I don't like is that the assembler code the compiler generates isn't for a PC, but for an imaginary Motorola-like processor. Using YACC and Lex isn't easy, but this tutorial is great. If you're willing to spend a few months studying, you can come out

with the beginnings of your own homemade language, in Turbo Pascal or ANSI C!

I've posted a grammar for an interpreter called Tiny Basic for Windows in the file TBasic???.ZIP, where ?? stands for a version number such as 10 for version 1.0 or 21 for version 2.1. It has the C and Turbo Pascal source code for everything you need to get your own language going. □

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TIPS & TOOLS

Edited by Richard C. Leinecker

Once a Day

I've read several suggestions for batch files that execute only once a day ("Feedback," April and September 1993). I have one to offer that's both simpler and more versatile than the programs in these columns. It's called CHECKDT.BAT, and it calls ONCEDAY.BAT once a day. (*Editor's note: An indented line is a continuation of the preceding line.*)

```
@ECHO OFF
REM Save today's date to the
REM file CURRDT.TXT.
ECHO. DATE >
CURRDT.TXT

REM First, check to see if the REM
file called LASTDT.TXT
REM even exists.
REM If it doesn't, that means
REM it was never created.
REM Therefore, this must be
REM the first time
REM this batch file has run.
REM IF NOT EXIST LASTDT.TXT
GOTO NEWDAY

REM Create the QBASIC
REM program that will
REM compare the lines in
REM the CURRDT.TXT and
REM LASTDT.TXT files.
ECHO OPEN "CURRDT.TXT"
FOR INPUT AS #1 >
DATECOMP.BAS
ECHO INPUT #1, Curr$>>
DATECOMP.BAS
ECHO CLOSE #1>>
DATECOMP.BAS
ECHO OPEN "LASTDT.TXT"
FOR INPUT AS #1>>
DATECOMP.BAS
ECHO INPUT #1, LAST$>>
DATECOMP.BAS
ECHO CLOSE #1>>
DATECOMP.BAS
ECHO IF LAST$ = Curr$
THEN >> DATECOMP.BAS
ECHO OPEN
"SAMEDATE.TXT" FOR
OUTPUT AS #1>>
DATECOMP.BAS
ECHO CLOSE #1 >>
DATECOMP.BAS
```

**One more
once-a-day solution,
gleaning
precious memory,
and a README
scheme for the
masses**

```
ECHO END IF >>
DATECOMP.BAS
ECHO SYSTEM >>
DATECOMP.BAS

REM If the file
REM SAMEDATE.TXT exists,
REM then the current date is
REM the same as the last
REM date that was stored.
REM The QBASIC program
REM creates this file when it
REM runs if the comparison
REM is the same. We must
REM delete the file before
REM calling the QBASIC
REM program.
IF EXIST SAMEDATE.TXT
DEL SAMEDATE.TXT
QBASIC /RUN DATECOMP
IF EXIST SAMEDATE.TXT
GOTO SAMEDAY

:NEWDAY
REM Copy today's date file to
REM the file that stores the
REM date for later comparison.
COPY CURRDT.TXT LASTDT.TXT >
NUL
```

```
REM Here we call the batch
REM file that does your once-
REM a-day chores.
CALL ONCEDAY.BAT
```

```
:SAME DAY
IF EXIST DATECOMP.BAS
DEL DATECOMP.BAS
```

LEE KASNER
PALM HARBOR, FL

Precious Memory

Here are a couple of memory-saving tips I thought your readers could use.

Unless you actually need it, don't include SETVER.EXE in your CONFIG.SYS file. You can find out which programs it's looking for by typing *setver* at the DOS prompt with it loaded. If you're not planning to run any of the programs you see, take it out of CONFIG.SYS to save 400 bytes. It doesn't sound like much, but it might be just what you need.

If you use Windows, don't load a mouse driver from CONFIG.SYS or AUTOEXEC.BAT. Windows loads its own mouse driver, and you won't need the DOS driver unless you run a DOS application that supports a mouse. Not loading a DOS mouse driver will save about 14K.

BRUCE SHERMAN
PRESCOTT, AZ

Easy README Files

In the September issue of COMPUTE, there was a tip that showed how to make a file read itself. I don't enjoy typing out lengthy Debug files, so here's my simple solution. First, create your README.TXT file; then type the following lines from the command line.

```
COPY CON README.BAT
@ECHO OFF
TYPE README.TXT | MORE
^Z
```

The ^Z is performed by pressing F6 and Enter. There you have the easy way to create a README file. It can't scroll or display in different colors, though.

ERIC FONG
ADDRESS UNKNOWN

4DOS Fairness

In response to Scott Sumner's submission regarding tracking unauthorized booting of his system by other employees ("Tips & Tools," October 1993), his suggestion unfairly discriminates against users of 4DOS. Therefore, I'm submitting an equivalent method of tracking system boots for 4DOS users. Just make these three lines the first three lines of your AUTOEXEC.BAT file.

```
@ECHO OFF^ATTRIB -rh
LASTBOOT > NUL
ECHO Booted up on %_date%,
%_time..>> LASTBOOT
```

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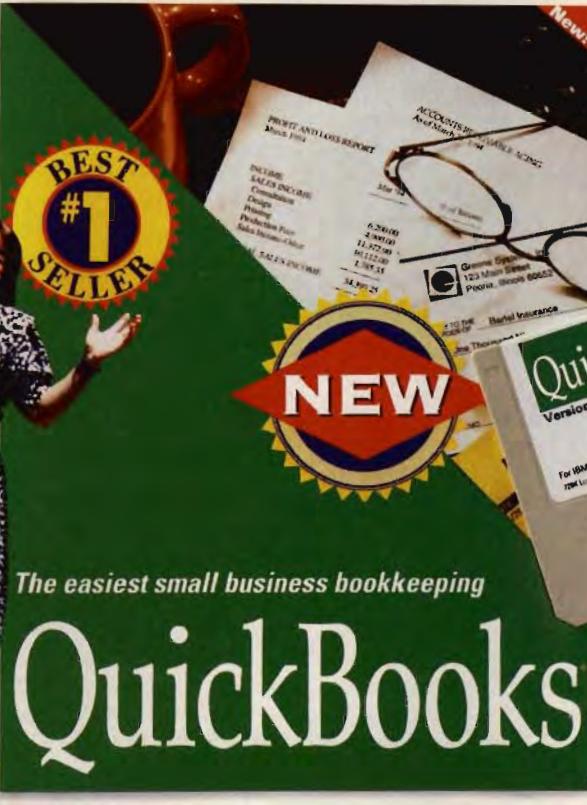
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"Super-quick!"

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Robert D. Pinson, TV Production



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TIPS & TOOLS

ATTRIB +rh LASTBOOT > NUL

Using the > NUL redirection for the Attrib commands suppresses the display that lets people know that file attributes are being changed. This tip could also be used for Ndos, packaged with newer versions of Norton Utilities.

Editor's note: In the review of these comments in relation to the tip mentioned in the October 1993 issue, two corrections that need to be made to that tip were noted. The lines REM ATTRIB +h LOGTRAIL-.TXT and REM DEL CURRENT?.BAT should have the REM command removed from the beginning, leaving the remainder of the line.

KEN SIMMONS
AUBURN, WA

A 4DOS system sleuth, keeping your mouse and screen clean, and a no-type approach to Debug scripts

Mouse Mash

If you ever notice that your mouse doesn't move the cursor on the screen exactly as it should, it's probably time to clean it. Follow these steps and be careful not to let your mouse bite you.

Make sure you have cotton swabs and a lint-free cloth. Turn off your computer. (You might want to unplug the mouse just so it's easier to get to.) If it has a cover, remove it. Turn the mouse upside down.

Remove the ball housing either by pressing the bottom and unlatching the cover or by turning it counterclockwise. If neither of these approaches works, check your manual. It shouldn't be too hard to get it open.

Once the mouse is open, remove the ball. Use a clean, lint-free cloth to clean it.

Now use cotton swabs to clean the inside parts of the mouse. Gently run the swab around the rollers. You may see a dark film on the rollers. If you do, make sure you remove it all.

Reinsert the ball and replace the ball housing. Use the clean cloth to clean the mouse case. Cleaning the work area upon which you place the mouse might prevent the mouse from getting dirty again soon. An all-purpose cleaner works well; just make sure the surface is dry and all remnants of cleaning agents are gone before placing the mouse on it.

If you unplugged the mouse, plug it back in. You should be ready to go. Repeating this procedure once a month will keep your mouse clean and operating properly.

LUKE STRATTON
GUM SPRING, VA

Clean Screens

I have found that dryer sheets not only keep clothes soft and free of static cling but are also great for dusting off monitor screens. They pick up dust and help reduce static electricity. Used ones work fine (probably even better than unused ones, since there isn't any fragrance to leave residue on the screen).

Use caution if you have an antiglare screen, since the coating might get scratched if you use too much pressure.

MATT PARSONS
RED BLUFF, CA

Scan Those Debug Scripts

In the September issue you ran a program for a file that reads itself. Although I'd never tried anything like this, it was too good to pass up. My wife was away, so there was no one to call out the numbers. I wear bifocals and am a lousy typist to boot, so I decided to scan the article. Once it was scanned, I ran it through OCR software (Perceive), picked it up in a text editor, and erased the parts in italic and other spurious characters. I saved it to a file and ran it through Debug.

It worked like a charm. Other readers with hand scanners may not have thought of this. Luckily, I recently saw instructions for setting up and running a file like this through Debug.

Editor's note: Here's a repeat of how to run a text file containing one of these scripts through Debug.

Type in the script exactly as it appears in the magazine. Don't type in the initial lines such as debug file.com and File not found, though. Omit any hyphen or colon (- or :) characters that appear at the beginning of a line. Omit the lines that say CX 0000 and Writing XXXX bytes.

Your script text file should look something like this. I took the Clkey program and created this file called CLKEY.LST.

```
e 100 b4 01 cd 16 74 06 2a e4
e 108 cd 16 eb f4 b4 4c cd 21
RCX
10
W
Q
```

The last thing you need to do is type from the command line or create a batch file that performs the following set of operations.

**TYPE CLKEY.LST | DEBUG
CLKEY.COM**

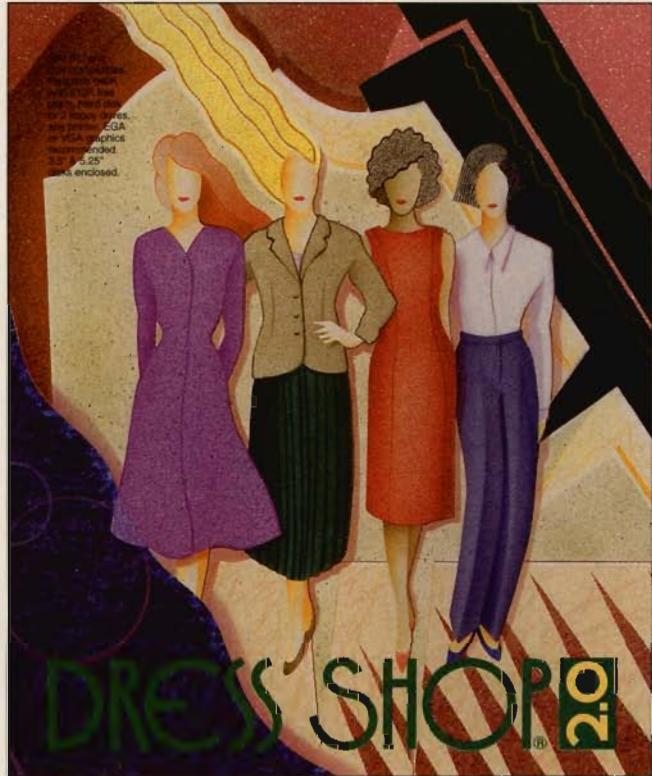
JOE M. WOLFF
NARROWSBURG, NY

If you have an interesting tip that you think would help other PC users, send it along with your name, address, and Social Security number to COMPUTE's Tips & Tools, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. For each tip we publish, we'll pay you \$25-\$50. All tips submitted become the property of General Media International. □

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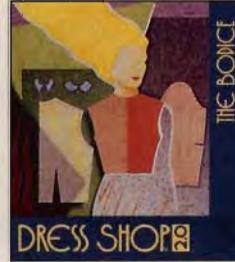
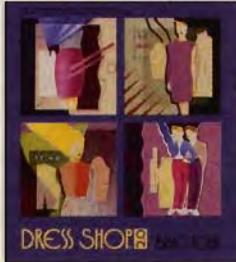
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HARDWARE CLINIC

Mark Minasi

SCSI: ASSEMBLING THE PIECES

Here are the six steps you should follow in putting together a SCSI system.

1. Choose and install a SCSI host adapter.
2. Choose a SCSI-compatible peripheral (or peripherals).
3. Select a unique SCSI ID for each peripheral that you're about to install.
4. Install the SCSI peripherals, being careful to terminate the SCSI chain properly.
5. Install the SCSI host adapter's device driver.
6. Install device drivers for each peripheral, taking care that the peripheral device drivers are all compatible with the SCSI host adapter's device driver.

The SCSI host adapter is the circuit board that acts as the intermediary between the CPU and all of the devices on the SCSI chain. As the host adapter spends much of its time playing messenger, you'd be wise to choose a swift, well-designed adapter.

The first question to ask is, "Is this adapter supported by a lot of software?" Ask the vendor if drivers for SCO UNIX, Solaris, OS/2 2.1, Windows NT 3.1, DOS, and Windows are currently being shipped. The answer should be "Of course," rather than "Soon." Even if you don't intend to use these operating systems—very few people will need all of them—you want to be sure that the vendor will provide drivers for future releases of DOS and Windows, particularly Windows 4.0, which will not require DOS.

Next, look for the architectural hallmarks associated with speed. You can buy SCSI host adapters that work with an 8-bit ISA bus, a 16-bit

ISA bus, a Micro Channel bus in 16- or 32-bit modes, an EISA bus in 32-bit mode, and even a 32-bit VESA local bus. I highly recommend buying EISA-bus PCs these days, as the EISA bus no longer costs a \$1,000 premium. If you have an EISA-bus PC, then get an EISA 32-bit SCSI host adapter; you'll see a startling difference in speed resulting in smoothness in animation.

A former colleague of mine, Rob Oreglia, once told me that when he purchased his multimedia system, he took along a copy of National Geographic's Mammals, an educational video that includes some motion scenes. As the program is DOS-based and runs on any VGA monitor, it was a snap to pop it into a test machine and run it. He said that he used it as a benchmark—if he saw any jerkiness in the animation, he wouldn't buy the system.

Another feature to look for is bus mastering. You probably know of DMA (Direct Memory Access), whereby a circuit board can get data into RAM very quickly by simply bypassing the CPU. DMA has been around for quite some time, and many peripherals use it. But while DMA allows a peripheral to write data straight to RAM or read data straight from RAM, there is no way to move data directly from peripheral to peripheral. That's the value of bus mastering. Bus mastering is a kind of enhanced DMA, offering the ability not only to transfer data to and from RAM, but also to move data directly from peripheral to peripheral. For example, it would be nice to be able to do a backup from disk to tape in the background, without disturbing the CPU. If both the tape drive and the disk drive are on bus master controllers or—even better—if both are on the

same SCSI host adapter, then it's a simple matter to move the data around without the CPU's being involved except in only the most indirect way.

Expect to pay more for higher speeds, as always. Looking at the Adaptec product line as an example, for about \$125 (street price) you can buy a 16-bit ISA card called the Adaptec AHA1522, which does normal DMA. For \$250 you can move up to bus mastering with the AHA1542C. Is the 1542C worth twice the price of the 1522? In my experience it is, but if you can't afford a 1542C, then get a 1522, because a DMA-based SCSI is better than no SCSI at all. Besides, once you have a system set up on one SCSI host adapter, then it's relatively simple to change the system over to another host adapter card later. In fact, if your new SCSI host adapter supports the same software standards as your old SCSI host adapter, you won't have to get new drivers for any of the peripherals. You'll need a new driver only for the new host adapter.

Continuing up the price scale, the EISA offering from Adaptec, the AHA1742, will set you back \$500. It's worth the money, assuming that you can afford to spend that much on a peripheral adapter board. You'll probably decide to stay with the 1542C for most workstations and put the 1742 on your servers or power workstations. The prices mentioned here include the optional software kit that includes the software for the host adapter and a suite of common SCSI peripheral types.

You may end up not using that software if you have tape drives or scanners—peripherals that not every suite of SCSI support software will control—on your SCSI bus. Consult with the host adapter's vendor before buying.

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HARDWARE CLINIC

I'll cover software in a future column, but for the moment, it's worth emphasizing that you should make sure there are drivers for your peripherals. SCSI simplifies and unifies the whole business of peripheral drivers. But there are three different (and incompatible) groups of SCSI software. You'd do well to choose one to follow and stick with it.

The three groups are the Advanced SCSI Peripheral Interface (ASPI), the Common Access Method (CAM), and the Layered Device Driver Architecture (LADDR). Both ASPI and CAM are fairly strong standards, and you can probably choose either one without regret. However, I'd recommend that you stick to ASPI-compatible drivers, because ASPI is the more popular of the two. You must find out whether the host adapter you are considering supports either ASPI or CAM. If you prefer ASPI, confirm that the host adapter will support ASPI before you buy.

SCSI has evolved considerably in the past few years, leading to different generations of SCSI coexisting at the moment in the marketplace. The first generation, dubbed SCSI (or SCSI-1, though generally it isn't identified by number) was a fairly loose set of electronic standards that failed to mandate simple things like connector types, leaving every vendor to build an interesting, creative, and incompatible incarnation of the SCSI standard.

SCSI-2 was cooked up for the obvious reason: More standardization was needed. Even though SCSI-2 is not a finished standard yet (where *finished* means "approved by governing bodies, printed up, and available for sale"), there is close enough agreement in the marketplace as to what SCSI-2 will look like that you can buy a SCSI-2-compatible host adapter today—and that would be a good idea. SCSI-2 has some positive features, including less noise on its bus and a better-defined interface. SCSI-2 also has some options that are worth considering. For example, fast SCSI is a standard that allows a peripheral to transfer data at up to 10MB per second; the standard SCSI interface transfers data at only 5MB per second. This increase in speed is accomplished without any changes in cables. Another kind of SCSI, wide SCSI or differential SCSI, uses different cables and works only with peripherals designed specifically for wide SCSI. Don't buy wide SCSI unless you know that you need it. (SCSI-3 is in the works, by the way, but you needn't worry about it . . . yet.)

If you put together SCSI-2, bus mastering, a 32- or 16-bit data pathway, and good software support, you have a good host adapter. While many good SCSI products have arrived on the market, the ones that I buy are the Adaptec products. They may not be the least expensive, but with Adaptec products you'll have the drivers you need.

Next, consider your options for SCSI peripherals. From the SCSI interface's point of view, your selection is simple: Buy only SCSI-2-compliant peripherals. (It wouldn't hurt if they had the ability, as do many, to support SCSI-1 or SCSI-2 with a flip of a DIP switch.) Make sure that the peripherals you buy can enable or disable SCSI parity, an error-checking system built into SCSI, and that they can optionally provide something called active termination power.

I'll discuss active termination power next month, but I'll tell you now why it's so important. On some kinds of systems, like an Ethernet local area network, termination boils down to a resistor: Terminators provide just enough resistance to tune a circuit's impedance to some goal value.

On the other hand, SCSI parity is an error-checking system, much like the parity used in asynchronous data communications or in memory systems on most PCs. But not every peripheral supports SCSI parity, and this leads to a problem. All of the peripherals on the SCSI chain must support SCSI parity, or none can use it. If you have four SCSI devices that support SCSI parity and one that doesn't, you must disable SCSI parity for all of the other devices. SCSI parity is required for a peripheral to be SCSI-2 compliant.

Many old SCSI-1 devices, including a number of SCSI hard disks, were built to talk to one particular SCSI controller, and this brings up a side point: SCSI has been a standard—or near to a standard—only for the past two or three years. If you try to add an old 40MB SCSI drive from a Tandy computer built in 1988 to an existing SCSI system, don't be surprised if you can't convince the drive and the SCSI system to talk to each other.

Next month, we'll continue assembling a SCSI system.

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WINDOWS PROGRAMMING: FROM C TO SHINING C++

Like great explorers and mountain climbers, programmers conquer new territory every time they sit down to write code. But sometimes the trek into the wilderness is almost anticlimactic after the months of rigorous preparation. That's what this feature is about—stocking up on provisions and gathering what sketchy charts might already exist of the territory ahead. I can't tell you what you'll make of what you find. That's limited only by your imagination and coding talent. I only promise that your journey can be either the adventure of a lifetime or a disaster, depending on how well you prepare for it.

Window of Opportunity

Windows and C++ are the two most important trends in programming today. And they're a natural combination, too, because Windows was designed from the ground up as an object-oriented environment, and C++ is the leading object-oriented programming language.

But how do you learn to program Windows in C++? There are so many possible places to start learning and so many different ways to go about it that the task can seem overwhelming. While it's true that there's no royal road to this noble goal, learning to program Windows is easier than it may at first appear.

What follows is a personal view of how to learn Windows and C++. Some people will disagree with me on the process, but it has helped me, and it has been the road taken by several successful programmers I know.

By Clifton Karnes

Get Ready for the Climb

When mountain climbers set out to conquer Everest, they don't make one long climb to the top. They set up a base camp and way stations with supplies and tents to make the climb less arduous by breaking it into phases. Similarly, the Windows/C++ Everest can be scaled in four phases, which I'm going to outline in this article. After I've talked about how to learn C++ programming for Windows, I'll discuss some C++ Windows programming tools.

As a preview, here are the four steps to programming Windows in C++:

1. Learn C.
2. Learn the Windows C API.
3. Learn C++.
4. Learn a Windows C++ application framework.

(A framework is a class library designed to produce an application of a certain type—such as a DOS application or a Windows application. The framework contains the fundamental routines for operating in a particular environment. It saves you from having to reinvent the wheel every time you create a new application.)

For the best results, you'll need to follow these steps in order and master the basics of each before you move on.

Most of your learning will be from books. Using the books correctly is important. Therefore, we'll set up base camp here by talking a little about the best way to get the most from a programming text.

- First, plan what parts of a book you're going to read (ideally, you'll read the entire book).
- Decide how much time you'll spend on each chapter and set goals for yourself, such as completing one chapter per week.
- Take the time to type in the example programs. This is the most important part of your learning. To understand why typing in the examples is so important, it might help to know that until the twentieth century, composers served their apprenticeships by *copying* musical scores created by the masters (by hand—the Xerox copier was far in the future back then). By copying successful scores, future masters would develop a feeling for what worked, and the style of successful composers would become ingrained in them. The same thing is true for programming.

You don't have to type in every listing in a book (although that is the best approach), but plan which ones to work on and stick to your schedule (doing at least two per chapter).

Windows C++ Advanced Programmer's Bookshelf

In addition to the books discussed in the text, there are many excellent advanced learning tools available. Here are five of the best.

Annotated ANSI C Standard, annotated by Herbert Schildt (Osborne McGraw-Hill, \$39.95)

This is the last word on the C language as finalized by the ANSI C Committee along with annotations by a C expert. If you have this book and K & R (*The C Programming Language* by Kernighan and Ritchie), you have the two top C references.

The C++ Annotated Reference Manual, by Margaret A. Ellis and Bjarne Stroustrup (Addison-Wesley, \$45.25)

Stroustrup invented C++, and this is an annotated version of the reference manual that appears in *The C++ Programming Language*. If you find that any part of that text needs clarifying, this is the book to which you should turn.

Undocumented Windows: A Programmer's Guide to Reserved Microsoft Windows API Functions, by Andrew Schulman, David Maxey, and Matt Pietrek (Addison-Wesley, \$39.95)

This book sparked a heated response from Microsoft; its authors prove that Microsoft uses undocumented Windows API functions in its own programs. If you really want to go beyond the official Windows programming, this is the book for you.

Windows Internals: The Implementation of the Windows Operating Environment, by Matt Pietrek (Addison-Wesley, \$29.95)

The author has found out what really makes Windows tick by disassembling its code and studying it. This is an excellent follow-up to *Undocumented Windows*.

Windows 3.1: A Developer's Guide, Second Edition, by Jeff Richter (M & T Books, \$39.95)

This is a book for advanced Windows API programmers. Richter discusses topics you won't find in other books. You will find important information on such advanced topics as subclassing and super-classing windows (including the desktop window), installing hooks, using drag and drop, and creating installation programs. There is a gold mine of useful information and code here.

Learning C

Before you tackle C++, learn C. C++ is built on C (the ++ in C++ is the C increment operator, which is intended to indicate that C++ is the next incremental level up from C), and much of what you do in C++ involves regular C programming.

Another good reason to learn C is that it's still the lingua franca of professional programming. You can find lots of third-party books, libraries, compilers, and source code in C. It has quickly become the most popular language in computing's history, and after you've learned it, you'll understand why. C's style is lean and elegant. It produces code that's much easier to read than assembly language—but the compiled programs approach the speed of assembly language programs.

If you aren't familiar with C, take a look at the following code. This is sort of the Dick and Jane of C programming in that it's virtually everyone's first C program.

```
main( )  
{  
    printf("Hello, world.");  
}
```

But how do you tackle C, and how long will it take to learn it? The best place to start is with a good book. There are several excellent texts available on C, but among the best I've seen is *The Waite Group's New C Primer Plus* by Mitchell Waite and Stephen Prata (Howard W. Sams, \$29.95). It's filled with easy-to-follow explanations, and it's packed with illustrations. If you work through this book slowly, typing in the examples and trying them, you'll wind up with a solid foundation in C programming.

A word of warning: *Don't take any shortcuts learning C*. Mastering C is the most important step in the process of learning to use C++ with Windows because it's the bedrock upon which everything else will be built. Since C is so important, I'd even consider taking a course in C at a local college. The discipline of a structured curriculum may pay dividends later.

Even if you do take a course, you should still buy *The Waite Group's New C Primer Plus* and work through it. Consider buying *The C Programming Language* by Brian W. Kernighan and Dennis M. Ritchie (Prentice Hall, \$39.95). Ritchie invented C, and this slim volume is the C bible.

Plan to spend six months to a year learning C. If you already know a structured language, such as Pascal, and you know some assembly, six

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months will probably do. Otherwise, count on a year. It will be time well spent. But also, you'll discover how much fun C can be. C is a superb language, and you may become so enchanted that you'll stop there without moving on to C++.

Learning the Windows C API

After learning C, the next step is to master the Windows C API (Application Programming Interface). The Windows API is a collection of more than a thousand functions that give you the power to manage Windows and use its resources. Most of the functions that make up the API are contained in three DLLs (Dynamic Link Libraries) that form the core of Windows: User, Kernel, and GDI. These DLLs can be found in the files USER.EXE, KRNL386.EXE, and GDI.EXE in your Windows SYSTEM directory (as you can see, a DLL doesn't necessarily have to have a DLL extension).

When you study the Windows API, you spend a lot of time learning which functions do what and which are most important.

C++ and Windows References

Here's a list of the learning tools suggested in this article.

Learning C

The Waite Group's New C Primer Plus

The C Programming Language

Learning the Windows C API

Programming Windows 3.1

Windows API Bible

Learning C++

C++ Tutorial (included with Visual C++)

Teach Yourself C++

C++ Primer Plus

The C++ Programming Language

Learning MFC

Microsoft Foundation Class Primer Inside Visual C++

Learning OWL

Borland C++ Programming for Windows

World of ObjectWindows for C++ (video)

Here's a supershort Windows program that takes the name of any program as a parameter and maximizes that program when it runs.

```
WinMain(HANDLE hInstance, HAN-
DLE hPrevInstance, LPSTR
lpszCmdLine, int nCmdShow)
```

```
| WinExec(lpszCmdLine,
| SW_SHOWMAXIMIZED);
```

Since Windows offers no way to specify that you want to run an application in a maximized window, this little program is actually useful, and it's probably the shortest Windows program you'll ever see.

This program has just one API call, to WinExec, with the command line (lpszCmdLine), which contains the name of the program and any special parameters, as the first argument and the window's size (SW_SHOWMAXIMIZED) as the second argument. Most Windows programs are much longer than this one.

Although you could skip this step of learning the Windows C API and go

Objective: Object

What is an object? And why, with computerdom's penchant for outrageously graphic and even ribald terminology, has such a nondescript term as *object* sneaked into the lexicon?

Well, an object is an object. It's a structure that's self-contained. It's a data type that can also contain other data types, and it even contains functions to act on those data types. It's hard to get a definition of *object* that's any clearer than that.

The problem in coming up with something so restrictive as a name for an object is that an object can be anything. To name something is to corner it, etherize it, pin it in a case like a dead butterfly, and pretend that you understand it. To refuse to name something is to give that thing the power of Proteus—the Greek demigod who could be and do anything because he was without set form or function.

Suppose your sister or your mother or some other member of your distaff family opened her purse and removed three objects. You probably visualize car keys, personal items, change, Chap Stick, nun-chucks, a can of Mace, a small firearm or Taser, or some other objects common to a purse. But an object could be an elephant, a Cheese Doodle, a black hole, a quark, or the cosmos.

Each of these objects, even the quark, is composed of quarks. Similarly, an object can be composed of other objects, and sometimes these objects will be of a very elemental nature.

Each of these objects has certain properties which distinguish it as an object. It is encapsulated, it inherits characteristics, and it is polymorphous (thanks to William Roetzheim's book *Programming Windows with Borland C++* for these properties).

Encapsulation means that each object is self-contained. There is no difficulty in differentiating a stick of gum from an elephant (or telling where one leaves off and the other begins). Likewise, an object in object-oriented programming must contain everything it needs in order to exist and function. It can't trail off into some other object (though it can contain other objects, just as an elephant might chew the gum). *Encapsulation* also means hiding information (you don't have to know how an object works to use it), and it means that objects keep most of their innards private (outsiders can see and interact with only the public face of the object).

Inheritance refers to the transfer of characteristics from the parents and class of an object and the object's

ability to transfer characteristics to still other objects. A pocket calculator inherits characteristics from difference engines going back to Babbitt's original mechanical calculating machine—and it passes along its characteristics to personal organizers and electronic spellers and translators. If you have an object that represents a car, it will inherit characteristics of four-wheeled objects, and in turn, its characteristics will be inherited if you want to create a specific type of car object, such as an Edsel object.

Polymorphism refers to the ability of objects to respond differently, given the same command. For example, you might have several objects that draw images on the screen: one that draws circles, one that draws rectangles, and one that draws lines. If you send each of these the same command to draw to the screen, you will have three different images on the screen. This is a little harder to put in real-world terms, but remember that basically the same action is required to operate such objects as a beer can, a talking doll, and a hand grenade—you pull the ring—but the results are related to the function of the object, not to the command.

In other words, an object is an object.

—ROBERT BIXBY



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directly to C++ and then an application framework, learning the API will ensure that you understand what's going on in an application framework when you start using it. There's another reason for learning the API, too, and it's similar to the reason for learning C first instead of jumping directly into C++. The Windows API is still the backbone of Windows. Most of the Windows code examples you see are C and API based. If you don't understand C and the API, you won't be able to understand these examples, and you'll miss some of the information.

Learning the API is a big job, but there's an excellent book available: *Programming Windows 3.1* by Charles Petzold (Microsoft Press, \$49.95). This 1000-page volume (which includes a disk) is a classic, and to learn the API, you'll need to study it carefully.

Here's some advice on approaching Petzold: If you have time, read the entire book. If not, concentrate on the first 11 chapters. These contain information on basic Windows architecture, the keyboard, the mouse, the timer, controls, memory management, resources, dialog boxes, and the GDI.

Here again, the key to getting the most from Petzold is to type in the examples from the book. If you just study the code, or load it from the accompanying disk and compile the programs, you'll get only a fraction of the value of the material. You don't have to type in every example, but you should type in at least a couple per chapter to get the most out of the book.

How long will it take to work through Petzold? Count on three months for the short course or six months for the entire volume. Learning Petzold has an added benefit: It's so comprehensive that you'll find yourself referring to it over and over again. If you know it well, you'll soon be able to solve many of your Windows programming problems. And it will continue to be a valuable reference long after you've mastered C++ and an application framework.

Another book to consider in your API apprenticeship is *Windows API Bible* by James L. Conger (Waite Group Press, \$39.95). This is the definitive reference on the API. You'll find yourself turning to it again and again.

After you've mastered C and the Windows API, you can do real Windows programming. That's just what you might want to do for a while. The majority of Windows programs available now were written using only these tools. You can do virtually anything using only C and the Windows API.

Learning C++

If you already know C, then learning C++ won't be quite the challenge that learning C was. C++ is an extension of C that does two things: It adds objects to C, and it corrects many of the problems inherent in C.

You've probably heard about object-oriented programming systems (called OOPS for short). And you may be a little skeptical about them. It's clear that OOPS are the future of programming and that C++ is the most popular object-oriented system for the near future.

Why objects? Object-oriented programming was invented to make it easier to create programs that mirror the real world. Just as our real world is populated with objects, in object-oriented programming, you create software objects that contain the crucial actions (functions) and attributes (variables) of the real-world objects they model.

Although object-oriented programming is an involved subject that's impossible to explain in a few short paragraphs, here's an example to give you a feel for what object-oriented programming is all about. If you've created a software object that models a rowboat, you could create a motorboat object by changing some of the rowboat's attributes (the material from which the boat is made, and perhaps its shape and color) and adding functions for the motor's actions and attributes. A program about cars could be assembled from carlike software objects—tires, fenders, and steering wheels. A program dealing with farming could be built from software objects that mirror real farm objects—barns, fields, cows, and the like.

To create a software counterpart of a real-world object, you have to build a system that's self-contained. As mentioned above, each object has to be able to act (functions provide this capability) and to hold information about itself (which is stored in variables). In short, each object must contain all the code and data it needs to function as a unit.

The compelling thing about objects is that programs built with them tend to be easier to create and understand because they're modeled on the behavior of real-world objects. And the programs are more robust than traditional programs because software objects are independent systems of code and data.

Another key advantage to objects, besides their robustness and ability to model real-world behavior, is their reusability. Any software object can be reused in any program and in any

context that's appropriate. And any object can serve as the parent of another. You can use one object to create an exact replica of another object (in which the child object inherits all of the parent's features), or you can modify and enhance the original object's actions (functions) and attributes (data).

How does this relate to Windows programming? Objects are central to the way Windows works. Almost every rectangle you see on your Windows screen is a window object. Every application window, client window, button, text box, combo box, edit box, and scroll bar is a window object. All of these window objects are descended from one software parent object, but each adds its own actions and attributes to those of its parent.

When you construct a Windows program in C++, you build a system of these objects.

What does a C++ object look like? As an example, here's a short class declaration taken from Microsoft's C++ Tutorial.

class Date

```
{  
public:  
    // Constructor.  
    Date(int mn, int dy, int yr);  
    // Destructor.  
    ~Date();  
    // Function to print date.  
    void display();  
private:  
    // Month integer.  
    int month;  
    // Day integer.  
    int day;  
    // Year integer.  
    int year;  
};
```

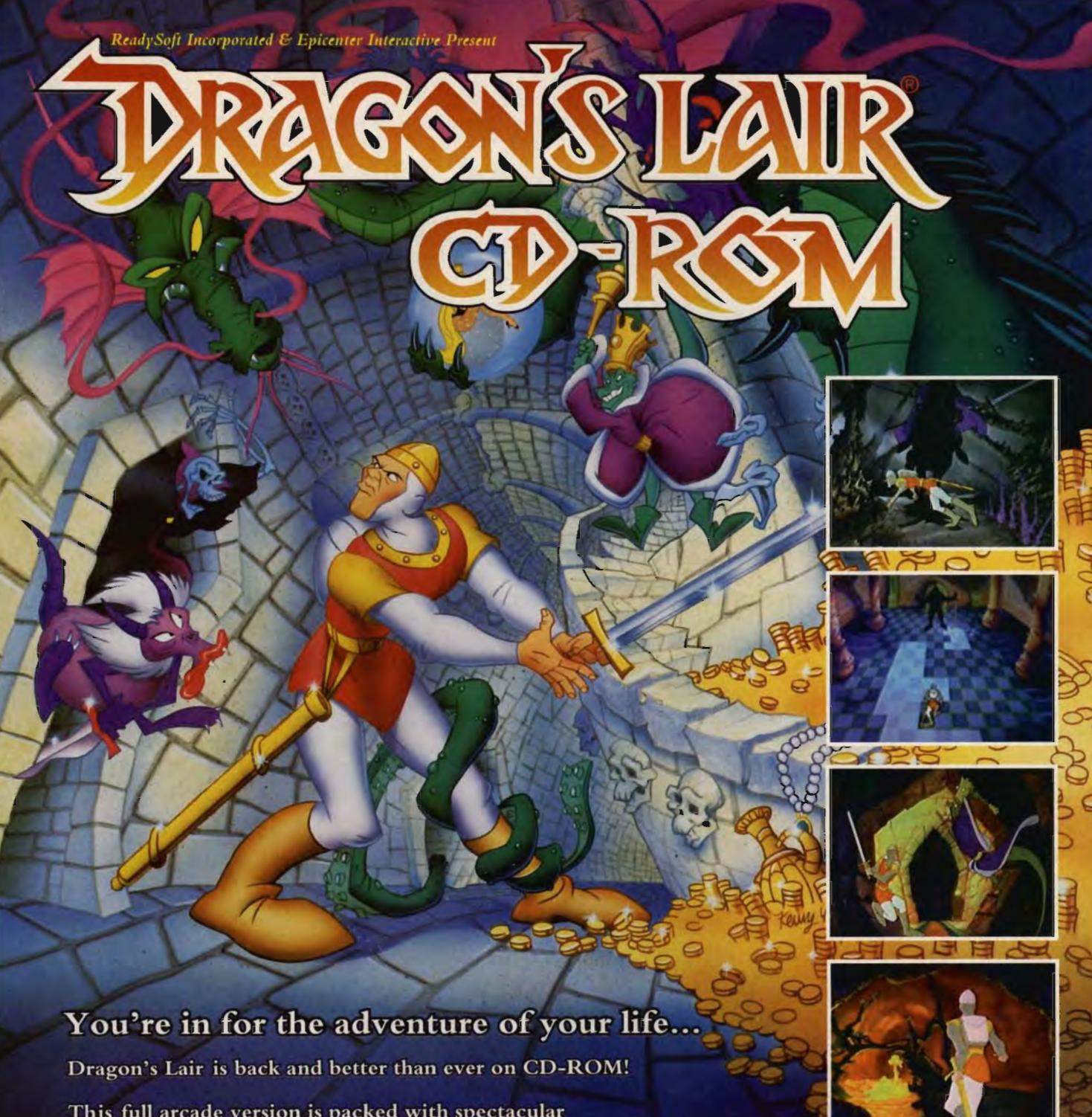
This short example demonstrates that the Date object contains both code—the functions for Date(), ~Date(), and display()—and data—the variables month, day, and year.

So how do you learn C++? There are dozens of excellent books, but I have a few favorites. If you have a Microsoft C++ compiler, you have one of them already; C++ Tutorial, which comes with the compiler, is superb. It's the fastest course in C++ I've seen, but it's still thorough. If you read this book and work through the examples, you'll have a firm grasp of C++.

If you don't have a Microsoft C++ compiler, then I have two recommendations. If your C is solid, read *Teach Yourself C++* by Herb Schildt (Osborne McGraw-Hill, \$24.95). It's an excellent step-by-step introduction that's a lot like Microsoft's C++.

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Tutorial. If your C is a little shaky, however, read *C++ Primer Plus* by Stephen Prata (Waite Group Press, \$26.95). It's a thorough, detailed introduction to C++ that does not assume that you know C. In addition to one of the tutorials mentioned above, you'll want to own *The C++ Programming Language* by Bjarne Stroustrup (Addison-Wesley, \$37.75). Stroustrup invented C++, and this volume is a must-have reference for every C++ programmer.

Learning a Windows C++ Application Framework

After you've gotten your C++ sea legs, it's time to tackle a Windows application framework. When you program Windows in C++, the most efficient way to work is to use a C++ class library that encapsulates the Windows API and makes creating programs easier.

For class libraries, there are two options: Microsoft's MFC (Microsoft Foundation Classes) and Borland's OWL (ObjectWindows Library). Both make managing all the red tape associated with Windows and C++ programming easier. Your choice will depend on several factors, but you should consider that MFC is becoming a standard and that many people feel it's superior to OWL. And MFC is quickly gaining more third-party support, including books and code. Look at both frameworks, but unless you have a reason not to, learn MFC.

An application framework makes such short work of C++ programming that the following line runs an entire Windows program.

CMyWinApp theApp;

This line creates an application object called theApp of the class CMyWinApp. Pretty cool. Of course, there's lots going on behind the scenes here, but it all comes together in the creation of this one powerful object.

If you're going to learn MFC, the best place to start is

Microsoft Foundation Class Primer by James L. Conger (Waite Group Press, \$29.95). It's the Petzold for MFC 1.0. Working through it will go a lot faster than working through Petzold, but you'll still have to dig in and get your hands dirty. Again, it's vital that you type in the program examples.

Microsoft Foundation Class Primer covers MFC 1.0. To take advantage of all of the high-level classes in MFC 2.0, you'll want to explore David Kruglinski's *Inside Visual C++* (Microsoft Press, \$39.95) next. It's a well-written, thorough tutorial on the MFC 2.0 application framework and a real gem of a book.

If you decide to tackle OWL instead of MFC, I have two suggestions. The best book on OWL is *Borland C++ Programming for Windows* by Yao and Norton (Bantam, \$29.95). Another learning tool worth considering is Borland's *World of ObjectWindows for C++* video (Borland International, \$99.95).

Choosing a Compiler

The C++ compiler you choose will depend to a certain extent on the application framework you choose—either MFC or OWL. For Windows programming, there are three

Windows-hosted environments you can choose from.

- Microsoft Visual C++ (Microsoft, 800-426-9400, \$499)
- Symantec C++ (Symantec, 800-441-7234, \$499)
- Borland C++ (Borland International, 800-331-0877, \$499)

Both Microsoft Visual C++ and Symantec C++ utilize MFC; Borland

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"Lots of games claim to be pushing the envelope—*Under a Killing Moon* blows it to smithereens!"

—William Trotter, *PC Entertainment*

"*Under a Killing Moon*...the most elaborate graphic adventure to date. A ground breaking CD adventure!"

—Joyce Worley, *Electronic Games*

"*Under a Killing Moon* combines the best elements of movies and computer games and creates an amazing interactive experience that's better than either of them. It literally pulls you into the screen."

—Denny Atkin, Entertainment Editor, *Compute Magazine*



This category-creating Interactive Movie from ACCESS Software goes light years beyond any other product labeled "interactive." *Under a Killing Moon* takes you to the streets of post World War III San Francisco and casts you into the role of Tex Murphy, Private Investigator, who first appeared in *Mean Streets*, then *Martian Memorandum*. *Under a Killing Moon* is a Virtual World full of people and places so richly detailed, you'll feel like you're actually there.

C++ uses OWL. Before talking about these products individually, let's take a look at what they have in common.

First, all three of these tools are excellent. The professional, full-boat version of each is \$499. All feature powerful Windows-hosted IDEs (Integrated Development Environment) and environments.

ments) with syntax highlighting (which puts different language elements in different colors). And all offer Windows-based debuggers and resource editors. In addition, all three let you create C and C++ programs for Windows or DOS. Each deviates a little in the way it handles C++ and Windows, but all three are compliant with C++ version 2.1.

And each of these products demands a huge amount of disk space. Symantec C++ and Microsoft Visual C++ use about 45MB each. The complete installation of Borland C++ 4.0 will take up around 75MB.

Both the Microsoft and Symantec products come in standard and professional versions. If you think you're going to stick with programming, go ahead and spring for a professional version; the extra tools and features are well worth the extra cost.

Microsoft Visual C++.

This is a superbly integrated environment. The IDE features a good editor (which can't be customized, unfortunately), with a toolbar and a Tools menu to which you can add programs. App Studio is a resource editor that edits di-

alog boxes, bitmaps, icons, menus, accelerators, cursors, and string tables. It features a drag-and-drop interface that's very simple to use. App Studio is easily the best resource editor available anywhere.

Two other major components in Visual C++ are App Wizard, which generates C++ code for several basic application types, and Class Wizard, which manages all the details of message maps and member function prototypes for your classes. These tools work together in a seamless way, and they make creating programs a joy.

Symantec C++.

This new entry into the Windows compiler market is a remarkable innovation. Symantec has gathered the best compiler components it could find and integrated them into a novel and well-designed interface.

The Symantec environment looks more like a Visual Basic workspace than a traditional C compiler. There are lots of windows and toolboxes that let you change views by dragging and dropping or clicking. This program is worth considering.

Borland C++. Borland's newest entry into the compiler market is the most customizable of the group. Its editor is very powerful, the compiler is fast, and the tools are excellent. Indeed, if you want to use OWL, Borland is your only choice (as of this writing).

It's worth noting that you can use MFC with Borland's compiler, but you have to own the MFC source code in order to do so. Borland publishes a white paper that offers details on compiling the MFC source code to use with Borland C++.

The New World

It's best not to leap into C++ or Windows programming.

Laying the groundwork by taking the preliminary steps of learning C and the Windows API will give you a foundation in programming and the environment to get you started. □

Q: What do film stars *Brian Keith*, *Margot Kidder*, & *Russell Means* all have in common?

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PERSONAL NETWORKING

WHY USE A NETWORK?

Connecting computers in a local area network lets people increase their efficiency by sharing files, resources, and more. Local area networking has attained much popularity in recent years—so much that it seems networking was just invented. In reality, local area networks (LANs) appeared more than ten years ago, when the arrival of the microcomputer gave multiple users access to the same computer.

These are three of the most common benefits of using a LAN.

- Increased efficiency
- Improved communications
- Lowered costs

LANs increase the efficiency of workers by letting them exchange data and by eliminating redundant effort. The most common means of sharing information on a LAN is the corporate database. Corporations commonly have several departments performing very different tasks, but the departments are generally working with the same type of information. A mail-order company, for example, works with customer name and address data, product numbers and pricing data, and shipping and inventory information. It makes the company far more efficient and organized to keep the data in one database, letting each user access the data that he or she needs.

LANs improve communications by offering a way of sending messages electronically. Many networks have full-fledged mail systems, called electronic mail (E-mail), through which users can send each other



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COMPUTE's Getting Started with Personal Networking was written by Anne Fischer Lent, who is coauthor of The Windows for Workgroups Bible (Addison-Wesley, 1993).

everything from corporate memos to informal hellos.

LANs save money by letting corporations license network versions of software to share among users. Likewise, there can be major savings in hardware purchasing because each network may need only one of each device. Rather than equipping each user with his or her own set of office equipment, a company can create a network consisting of a group of microcomputers with, for example, one laser printer, one tape backup unit, one CD-ROM drive, one fax machine, and one hard drive. By saving money in this way, it's often possible to purchase higher-quality equipment for the group than would have been possible for each individual.

Kinds of Networks

LANs are divided into two types: client-server and peer-to-peer. A client-server network has one or more central computers, called file servers, to which are connected all the other workstations. A workstation is a personal computer connected to a file server. The file server controls all network activity, such as who can use the system and what data users have access to. The advantages of client-server networks include control, security, and speed. Drawbacks can include high cost, difficult installation, and overdependence on a single system (the server). When the server goes down, the whole network goes down.

A peer-to-peer network is a group of microcomputers in which no single system is in charge and all workstations operate as equals. Each workstation

PERSONAL NETWORKING

can share its files and applications with any other workstations connected to the network. The benefits of peer-to-peer networking include simplicity, lower cost, ease of installation, and ease of maintenance. The drawbacks can include insufficient security, inadequate control, and lack of speed.

With the two basic types of LANs defined, it's important to understand that there are several varieties within each category, just as there's a range of uses for each type. What type of LAN you need depends on your intended use for it.

NetWare: A Client-Server Approach

Novell NetWare is an example of a client-server network. What sets the client-server network apart from the peer-to-peer network is the function of the file server. It, too, is a personal computer, but it runs an operating system such as NetWare to control the network. The file server controls all the workstations on the network in terms of how they access network resources. A network administrator manages the file server by overseeing network security, troubleshooting problems, and more.

The workstations connected to a NetWare network can still function as separate computers with their own operating systems. In fact, even when your computer is connected to a network, what you see on the screen may look the same as when you're not on a network. But when you access the file server, the work you send back and forth is subject to the rights and restrictions imposed by

the network administrator. Often, the network administrator takes care of setting users up on the network, which entails physically connecting the workstation to the file server, as well as adding the user name and assigning a password. Users generally know just enough to get their jobs done on the network, but knowing a bit more of the way the network works can sometimes help guide you to some shortcuts and quick fixes that may simplify your networking tasks.

To begin, it's important to understand how a workstation communicates with the file server. First, there's the hardware connection, which consists of a networking card installed in the workstation with a cable that connects to the file server. The second piece of the puzzle is the software. The shell is the software needed for the workstation to communicate with the file server. The network administrator loads the shell onto each workstation. The shell directs your commands either to your own workstation or to the file server, depending on what kind of command it is.

To understand how the file server stores the information you send it, think of a file cabinet as an analogy. The file server is the cabinet. Within it are the drawers, or volumes (which are the drive letters). Within the drawers (volumes) are folders, or directories. Within those folders (directories) are pieces of paper, or files.

BASIC NETWARE COMMANDS

In many corporations, the network administrator will create menus of commands for the staff to use daily to

perform their network tasks. After the administrator has created menus for you to use, you can access a particular application or tool by simply clicking on the appropriate menu item. Your job may not require you to access anything but menu utilities, but it's important that you know that you can enter commands at the DOS command line. Many powerful options await you there.

Listed below are five essential NetWare commands. If you're not already activating them through menu shortcuts, it's important that you know what they are and how to use them.

Capture

syntax: *capture option*

Use the Capture command to print screen dumps or to save data to a network file. End the capture by typing *endcap*.

To save data to a network file, type *capture cr=path* and press the Enter key. Replace the word *path* with the directory path including the filename where you want to save a file. The rest of the procedure is the same as printing screen dumps.

Help

syntax: *help command name*

As its name implies, this command gives you information about NetWare utilities, messages, and concepts.

Login and Logout

syntax: *login /option file server/name*
syntax: *logout*

This is what you do when

you turn on your PC and log in to the network. Generally, your network administrator has automated this task for you. Using Login gives you access to a file server's resources. If your name is Steven, for example, and your file server is named pirate, you type *login pirate steven*. You'll then be prompted for your password. Simply type *logout* to sign off the network.

Send

syntax: *send "message" to username*

This is the command that lets you send short messages or bulletins to other users on the network. You can send messages to individual users by their user names, or you can address them to everyone on the network by typing the word *everybody* after the word *to*.

Setpass

syntax: *setpass fileserver /username*

It's a good idea to change your password periodically, and to do so, you use the Setpass command. This command will not, however, work for those who have forgotten their passwords. If there's already one assigned to your user name, you'll need to know it before you can change it.

You also use the Setpass command to create a new password. To create or change your password, if your file server is named pirate and your name is steven, you type *setpass pirate steven*. If you're changing your password, you have to enter the old one. If you're creating a new password, just press the Enter key.

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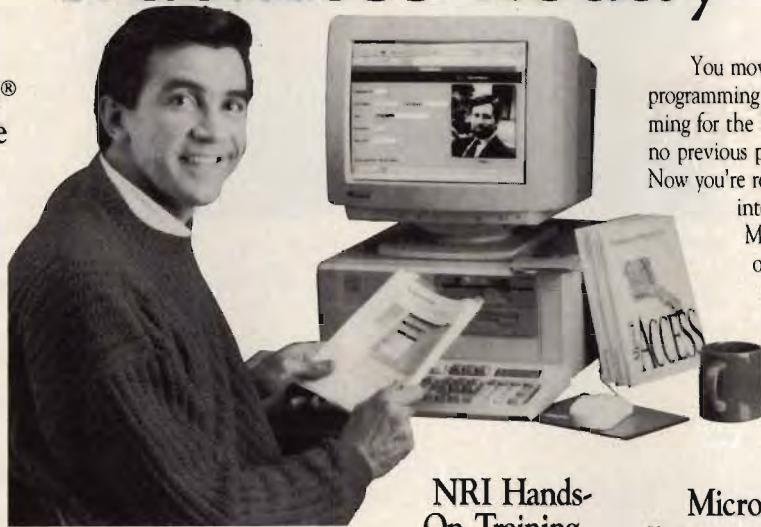
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PERSONAL NETWORKING

Who's on First?

NetWare has several utilities that give you information on such things as who you are, who else is logged in, and what level of access you have to a particular file. Below are listed nine utilities that will get you just about all the information you need.

Chkvol and Chkdir
syntax: *chkvol path*
syntax: *chkdir path*

When you need to know how full your file cabinet is, you start by opening a drawer and peering in. Chkvol and Chkdir do much the same thing. Remember that volumes are the drawers and directories are the files within the drawers. When you need to check a volume, type *chkvol*. When you need to get more specific and check directories, type *chkdir*. These commands let you see space limitations, maximum storage capacity, the number of kilobytes currently in use, and the number of kilobytes available on the volume and in the specified directory.

Fconsole

This is a menu utility, meaning that when you type it, you get a set of options in a pop-up menu. This command is commonly used by network administrators to view user connection information and to alter the status of the file server. But network users can find it useful to change file servers, view current user connection information, and view the version of NetWare currently running on the server. If you select Connection Information, you'll get a list of the names and logical connection



NetWare's Salvage helps you undelete network files.

numbers of all users who are logged in to the current file server. This list is updated every two seconds.

Listdir
syntax: *listdir path option*

For the network user who doesn't actually "own" any directories (the owner is the creator), this command is more useful than Filer (see below) for viewing directories and subdirectories, including their creation dates and rights.

Ndir
syntax: *nadir path /option*

Ndir lets you view information about files and sub-directories in a given directory, including filenames, sizes of files in bytes, dates and times that files were last modified, dates that files were last accessed, files that need to be archived, dates that files were last archived, dates that files were created or copied, attributes assigned to files, and the owners of the files. Use the Ndir option to specify which set of files you want to view in a directory. When you type *nadir*, replace *path* with a directory path leading to and including the directory and file you want to view. Replace *option* with one of the many command

options, including sort, format, attribute, and restriction options. See your NetWare documentation for more detailed information on these options.

Psc
syntax: *psc ps=printserver p=printernumber flaglist*

If you've ever sent a print job off to a network printer only to wonder if it was ever received, you can use Psc to see the status of print servers and network printers. To do this, type *psc* and replace *printserver* with the name of the print server. Replace *printernumber* with the number of the printer, if you have one. Replace *flaglist* with *stat* (for *status*), which will tell you if the printer is waiting for a job, currently printing, or offline, among other things. There are other handy flags to use with Psc. See your NetWare documentation for a complete list.

Rights
syntax: *rights path*

If you try to access a file or directory but are told that you don't have rights to it, you can check your privileges by using the Rights utility. Type *rights* and replace *path* with any directory path leading to the volume, directory, subdirecto-

ry, or file where you want to view your rights.

Slist

syntax: *slist fileserv/c*

When you need to know what file servers are connected to your NetWare network, you can use Slist to view a list of the file servers and to get information about them, including node address and status. To view information about one file server, replace the word *fileserv* with the name of that server. Include */c* (for *continuous*) as shown if you want the list of file servers to scroll down the screen without stopping.

Userlist

syntax: *userlist fileserv/name*

After you use the command Slist to find out what file servers are connected to the network, you can use Userlist to view a list of current users for a given file server. Userlist will also give you each user's connection number, log-in time, network address, and node address, and it will tell what kind of object it is (such as a printer, modem, or workstation). To use the command, type *userlist* and replace *fileserv* with the name of the file server if it's not the default server. Replace *name* with the name of a user whose connection number and log-in time you want to view.

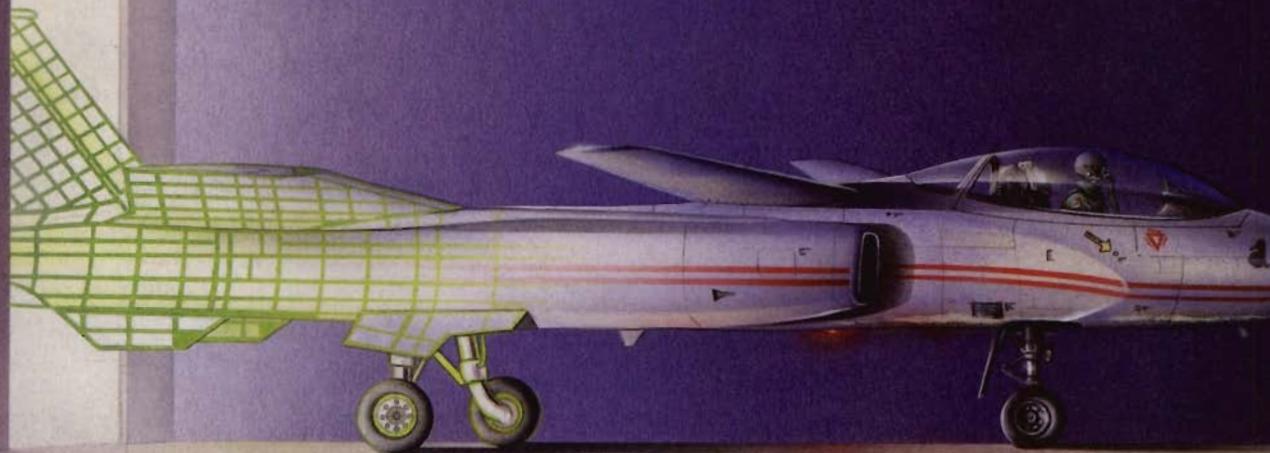
Whoami

syntax: *whoami*

If you ever need to know your user name, what server you're attached to, what version of NetWare you're running, and when you logged in, use the Whoami com-

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PERSONAL NETWORKING

mand. By including other options, such as the name of a particular file server followed by /g, you can get more specific information on what groups you belong to on that particular server. Many options offer you a range of information. Refer to the NetWare documentation for a complete list.

TRICKS YOUR NETWORK ADMINISTRATOR NEVER TOLD YOU ABOUT

Finally, you're finding your way around the network by using the commands above to call up all kinds of information. Now what about venturing beyond the menus and using NetWare commands to actually perform some network tricks of your own? Understand, however, that this is where you're stepping over a fine line and into the world of the NetWare power user, which may instill fear in your network administrator's heart. Eight tasks you can perform on your own are listed below. Assuming that your network is set up with the proper security, you shouldn't be in any danger of impinging on any other network user's workspace.

Castoff and Caston
syntax: *castoff all*
syntax: *caston*

When you're performing an operation on your computer that you really don't want interrupted by any kind of message, use Castoff. It will block messages sent from all network stations, including the file server if you type *all*, as shown above. If you want to block only the messages from other workstations and not those from the file server, omit *all*. When you're ready to accept messages

again, type *caston*.

Filer

This is a menu utility that lets you view current directory information, including who the owner of the directory is, when it was created, what the directory attributes are, the rights, and the directory's trustees. You can make changes to directories and files with Filer only if you're the owner (the person who created them). For example, you may want to specify which directories and files won't appear when someone else lists the contents. This utility is also used extensively by network administrators to set or change access privileges.

Nbackup

Network users can use this menu utility to back up information on directories where they have the right to read and scan for files. Nbackup lets you change the server you're currently

attached to and back up and restore files.

Ncopy

syntax: *ncopy path1 file name to path2 /option*

When you need to copy one or more files from one network directory to another, Ncopy is the command to use. Unlike DOS's Copy, Ncopy preserves the NetWare file attributes and so is better to use on a network. When you type it, replace *path1* with a directory path leading to and including the file you want to copy. Replace *path2* with a directory path leading to and including the volume, directory, or subdirectory you want to copy the file to. You can even rename the file at this time by just including the new filename in the path you specify.

Nprint

syntax: *nprint path option*

Use Nprint to print DOS text or formatted files from outside an application to a

network printer. When you type it, replace *path* with a directory path leading to and including the name of the file you want to print. Replace *option* with one of several options (see your NetWare documentation), including *c=* followed by the number of copies you want to print.

Purge

syntax: *purge filename path /all*

Erasing files doesn't completely delete them. In fact, you can use the Salvage utility (explained below) to bring erased files back to life. But Purge puts an end to them once and for all. Use great caution with this one, however, because you'll lose all recoverable files in your current directory if you use it alone or with *.**. Fortunately, Purge destroys only the files that you created or most recently modified.

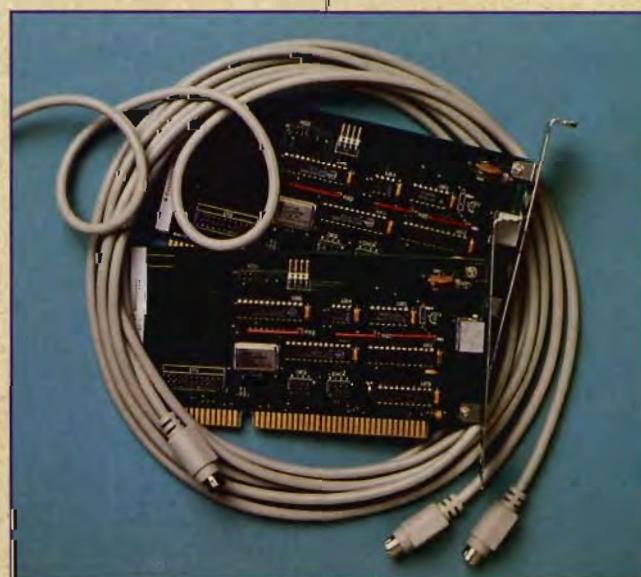
Salvage

If you've ever deleted a file and then regretted doing so, Salvage is the utility for you. From Salvage's main menu, you can choose to view all deleted files, recover or purge files that have been erased from your workstation, or restore files to their original directories or to the DELETED.SAV directory.

Wsupdate

syntax: *wupdate source path destination drive destination filename /option*

Network administrators are usually responsible for making sure that all copies of network software get updated, but sometimes you may find that your



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Coactive Connector	Coactive Computing	\$300 for two users
Windows for Workgroups	Microsoft	\$300 for two users
Personal NetWare	Novell	\$99 for one user, \$395 for five users

NetWare shell program or other files are out-of-date. You can remedy this yourself by using Wsupdate to update workstation files from the file server. Wsupdate makes sure you have the most recent copy of the required files. To use Wsupdate, just replace *source path* with a full directory path including the filename of the current file. Replace *destination drive* with the name of a specific drive, or you can type *all* to search all valid drives for the workstation. Other options are available. See your NetWare documentation for a complete list.

HOW TO CHOOSE A HOME OFFICE NETWORK

In the past, the cost and complexity of LANs limited their use to large corporations. Fortunately, today we have a range of choices in lower-cost, easier-to-use peer-to-peer networks. The new peer-to-peer networks give you out-of-the-box connectivity. You don't have to be an electrical engineer to install them, and you don't have to hire a network administrator to run them. Assuming that you have basic computer knowledge, you can hook up your own network in your home office and have all the conveniences of a LAN at your fingertips.

The benefits that you can get out of a peer-to-peer network in your home office are the same as those derived from a larger

network in a larger corporation, but on a smaller and simpler scale. Your three most common tasks are communications, file sharing, and peripheral sharing. If your home office has more than one computer, you can save money by letting them share a printer, a modem, a CD-ROM drive, and other peripherals. Home offices can also make use of E-mail, chat, and scheduling functions—though not all the peer-to-peer networks offer these capabilities.

To make a choice among the baffling array of peer-to-peer networks on the market, you must first assess your needs. How many systems do you need to connect? Will you be sharing applications or just files? Will you need a full-fledged E-mail facility that lets you send documents, or is a simple chat feature (usually allowing you to send a message of up to 40 characters) all you need? And what about future growth? Will your needs remain the same, or will you someday want to connect to a client-server network, such as NetWare? Once you've determined how much of a peer-to-peer network you need, you can focus more clearly on a smaller selection of networks. Let's look briefly at four very different offerings.

One-Man-LAN

This unique product is designed specifically for

the home office user who needs to connect more than one system for use by only one person. One-Man-LAN comes with two add-in cards, a 12-foot cable, software, and a user's guide. After installing the cards and the software, you can use your primary PC to access files on your second PC by typing *oml*. Typing *q* brings you back to your primary PC again. The interconnected PCs can be located up to 100 feet away. This product seems ideal for the home user who might have an older PC as a secondary system. You can use the hard disk on the second PC as if it were an additional drive on your primary system. One-Man-LAN also lets you access printers connected to the second PC.

Coactive Connector

Instant networking is what you can get with Coactive Computing's Coactive Connector for Windows.

This peer-to-peer AppleTalk network attaches to your parallel port, which means that there are no add-in cards to install in your system. Also included is an AC adapter for each Connector and software. Coactive Connector transfers data slowly (230.4 Kbps), but it's fast enough for file and printer sharing. The fact that this network solution is an AppleTalk network means that you can include a Macintosh with your Windows-based PCs in your home office setup. Macintosh Connectors cost only \$29 each.

Windows for Workgroups

What sets Microsoft's Windows for Workgroups apart is that, unlike the other networks, this one is Windows. It lets you run Windows or upgrade to the latest version—and have networking capability. The Starter Kit comes with two copies of Windows for Workgroups software (version 3.11); two 16-bit network cards; terminators, T-connectors, and 25 feet of Ethernet cable; an installation video; and a screwdriver. Windows for Workgroups is easy to set up and maintain, and it offers



Coactive Connector lets your PC access networked Macintosh files.

PERSONAL NETWORKING

E-mail, a schedule utility, a fax utility, and several levels of security options. The beauty of Windows for Workgroups for the home user is that when you don't have a need to be on the network, you can just use the product as Windows and run all of your regular Windows applications just as you would if you weren't on a network.

Personal NetWare

Novell's recently released peer-to-peer network, Personal NetWare, lets you add networking capabilities to DOS or Windows. Unlike Windows for Workgroups, it does not include Windows, so you'll have to install Windows and then install Personal NetWare on top of it. Like Windows for Workgroups, Personal NetWare is simple to install and maintain, although you can't get the Starter Kit configuration (including everything you need to set up a two-user network) that Windows for Workgroups offers. Personal NetWare also offers several levels of security options.

HOW TO INSTALL A HOME OFFICE NETWORK

Most peer-to-peer networks are designed to be simple to install. In reality, they do require some degree of familiarity with PCs. Most networks come with add-in cards or network interface cards (NICs). You need to install one NIC in each computer that will run on the network. Next, there's the cabling that's needed to connect the PCs. Many networks come with a minimal length of thin coaxial cable. Most network cards have built-in connectors. You just plug one connector on the

cable into the network card in one PC and run the cable to the next PC, where you use a T-connector. At the end point of the network, you need a terminator, which is a resistor that tells the electrical signals that they've reached the end.

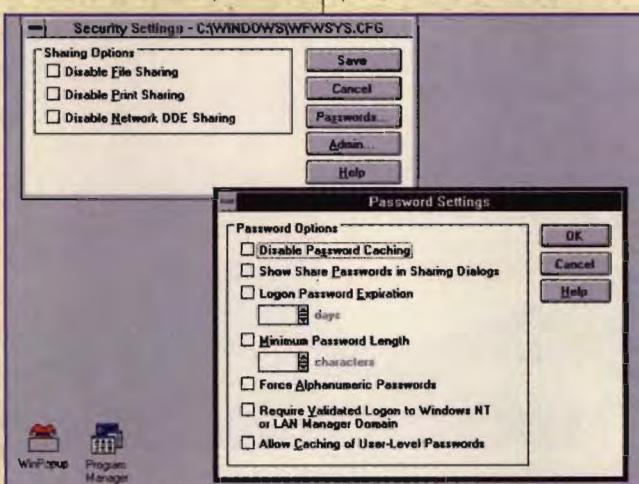
Software installation varies widely from product to product. We'll focus here on Windows for Workgroups because it offers powerful

features that make it easy to set up. It automatically configures your system, detects your hardware, and modifies your AUTOEXEC.BAT and CONFIG.SYS files for you. During the setup procedure, you'll also be asked for your name, your company name (which is optional), a name for your computer, the name of your work group, the type of printer connected to your PC, and which port the printer is attached to.

After following the installation steps, you must reboot your system to install the network drivers that are needed to communicate with other systems. You'll get a message onscreen that tells you when to do this. Make sure you've taken the last floppy disk out of the disk drive and click on the Restart button. After your system reboots, you'll be back in DOS. Just type *win* and press the Enter key at the DOS prompt. You should get the Windows hourglass on your screen as Windows loads.

Now you can go back and customize the setup in a variety of ways. You can adjust keyboard speed, change desktop colors, add a screen saver, change or create icons, and more. You'll want to pay special attention to your security needs. Finally, you'll need to familiarize yourself with the whole work group concept, including the practice of sharing files and hardware devices and communicating over the network with other users.

Networking can be as basic as hooking up the One-Man-LAN, which lets one user operate two systems. It can be as simple as installing the board-free Coactive Connector. It can be as sophisticated as the next version of Windows coupled with networking ability, as with Windows for Workgroups. Or your network can leave you room for growth, as with Novell's Personal NetWare, which gives you a path to the higher-level client-server NetWare network. Fortunately, considering the variety of sizes and configurations of home offices, there are a variety of choices among peer-to-peer networks.



Windows for Workgroups 3.11 offers several security options.

networking capability for a minimum of installation effort. Assuming that your hardware is up and running, you can now install the software. With Windows for Workgroups, you have a choice of installing it for the first time (whether or not you have Windows on your system) or upgrading to a new version of Windows for Workgroups.

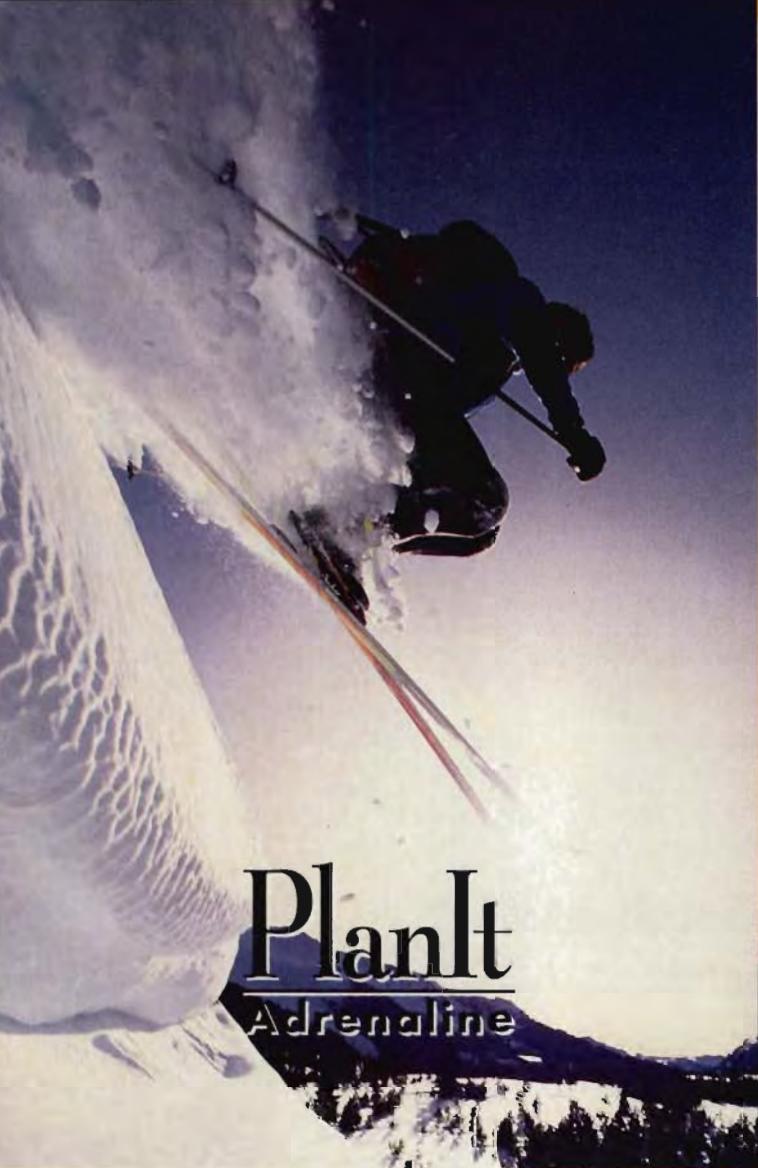
Let's assume that we're installing it for the very first time, with no previous version of Windows on the system. The installation process is as follows:

Insert disk 1 into your A drive and type *a:setup*.

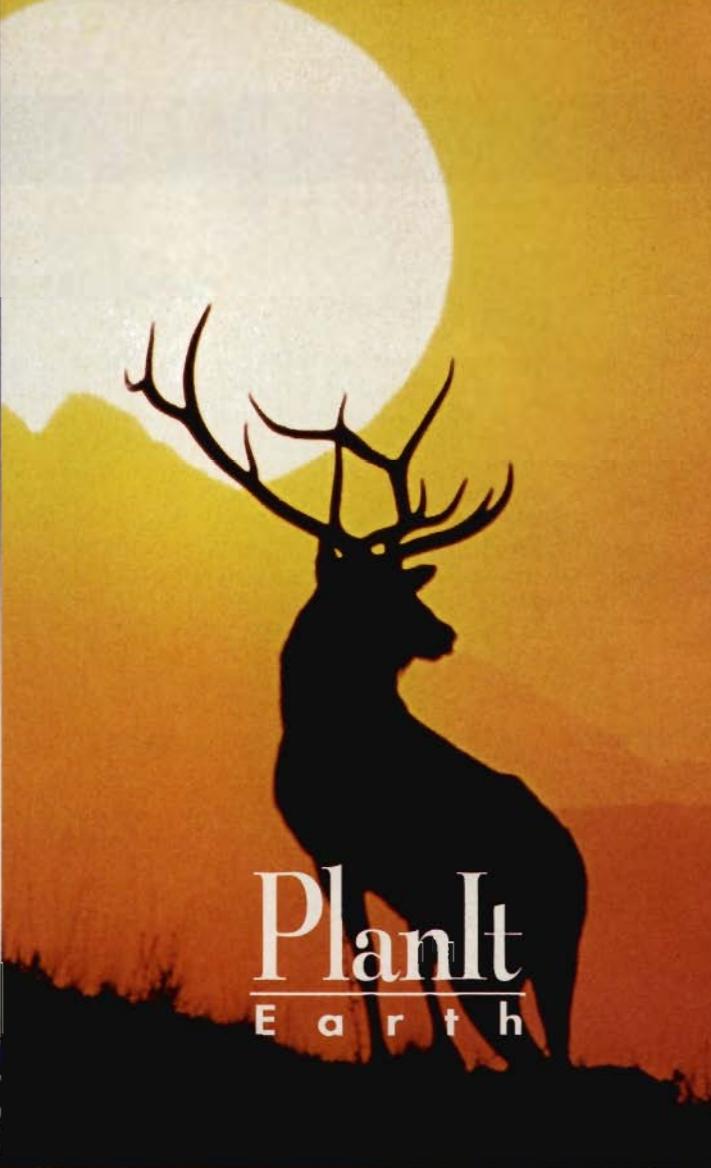
You'll be asked whether you want to use Express Setup or Custom. Choose Express because it automati-

Standard or Enhanced

You have a choice of running Windows for Workgroups in standard or enhanced mode. The difference depends on your hardware: standard mode requires at least a 286 with 2MB of RAM; enhanced mode requires at least a 386SX with 3MB of RAM. Enhanced mode gives you access to the virtual-memory capability of the 386SX, letting Windows applications use more memory than is physically available in DOS. Enhanced mode also allows multitasking of DOS-based applications. In order to share system resources, such as files and printer, you need at least a 386 processor running in enhanced mode.



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COMDEX SOUNDS OFF FAST FORWARD FOR MULTIMEDIA

BY DAVID ENGLISH

Fall COMDEX is a huge trade show. This year, the management estimated that about 170,000 people viewed over 2100 computer-related exhibits. A large portion of this normally staid convention was devoted to multimedia. In fact, the multimedia section was so big that it would have filled two-thirds of the main hall.

So what was hot in multimedia at this year's Fall COMDEX? You couldn't swing a joystick without hitting a company with a new video or sound card. Sigma Designs (510-770-0100) showed its new ReelMagic video card (\$449), which offers full-motion, full-screen playback of MPEG video files. Software support for the new format will be coming from such industry stalwarts as Access, Compton's New Media, Interplay, Sierra On-Line, and Virgin. Orchid (510-683-0300) touted its Vidiola line of video cards, which use the AuraVision chip to intelligently scale AVI files to full-screen. ATI Technologies (416-882-2600) announced its new Video Wonder (\$999), which combines high-performance graphics and motion video on a single card.

On the audio front, Yamaha (714-522-9937) announced its first sound card, the CBX-B1. It has built-in General MIDI and uses Yamaha's own DSP to offer such audio effects as digital delay, voice morphing, voice cancellation, pitch change, and surround sound. Creative Labs (408-428-6600) showed its new SCSI-based Sound Blaster 16 card (\$329.95 with the ASP chip, \$279.95 without) and announced future support for MPEG. Logitech (510-795-8500) touted its new SoundMan Wave (\$349.00), which uses Yamaha's OPL4 chip set for high-quality General MIDI wave-table synthesis.

Other sound cards at COMDEX included the AudioBlitz Classic (Genoa, 800-93-GENOA), a 16-bit sound card that sells for just \$79, and the Digital Office (Cardinal, 717-293-3114, \$359), which combines full audio and fax/data modem features on a single card.

Portable sound and SCSI cards, in the guise of PCMCIA cards, are now available from DSP Solutions (415-494-8086) and New Media (714-453-0100). Altec Lansing (814-234-1230) auditioned its new ACS3 powered speakers—with subwoofer—which will sell for about \$200.

Media Vision (510-770-8600), best known for its sound and video cards, has jumped into the CD-ROM software business with both feet. The company showed ten titles, including two action-adventure games, called Critical Path and Quantum Gate (\$79.95 each); a children's fantasy game, called Forever Growing Garden (\$49.95); a cross-country adventure game with trivia questions, called Peak Performance (\$59.95); three titles in a new children's early learning series, called Professor Gooseberry's I Can Read Club (\$49.95 each); and three titles in a CD-ROM-based daily planner series, called Personal Daily Plant (\$59.95 each).

Access (800-800-4880) wowed the crowd with its new adventure CD-ROM, titled Under a Killing Moon. It looks terrific and is currently scheduled to ship in March. General

Media Publishing Group (800-466-9435) had them blocking the aisles to see its new interactive CD-ROM games, called Virtual Photo Shoot I, II, and III (\$99.95 each). They're the follow-ups to the company's popular Penthouse Interactive (\$99.95), now available in a Windows version. One of the latest titles from VTGA Publishing Studio, Karaoke Macbeth, lets as many as ten players act and record their parts in a production of Shakespeare's *Macbeth*.

Other interesting new CD-ROM titles at COMDEX included Prehistoria (GROLIER Electronic Publishing, 800-285-4534, price not available), Total Distortion (Pop Rocket, 415-731-9112, \$99.00), Cyber-Race and Darkseed (Cyberdreams/Sony Electronic Publishing, 212-702-6273, \$69.95 each), and Library of the Future, Third Edition (World Library, 800-443-0238, \$395.00).

Disk-based multimedia software included Software Audio Workshop (Innovative Quality Software, 702-733-7854, \$599), which lets you record four simultaneous stereo tracks with a standard Sound Blaster 16, and Musicware Piano (Musicware, 800-997-4266, \$99), a Windows-based program that provides piano lessons.

It's clear from Fall COMDEX that multimedia is a rapidly increasing piece of the personal computer pie. Full-motion video, high-quality sound, flashy new CD-ROM titles, and snazzy multimedia authoring tools promise to liven up our computing lives throughout 1994.





MULTIMEDIA PC

By Richard O. Mann

If there's one thing a CD-ROM-equipped PC was made for, it's harnessing massive collections of data—placing facts, figures, images, and even trivia at your fingertips. With the prodigious storage capacity of CD-ROMs, the whole world of reference books opens up to your computer screen.

Consider the benefits of computerizing a library of reference information. *Compton's Encyclopedia* has 26 volumes; *Grolier's* has 21. I can't even guess how many filing cabinets it would take to hold street maps for the entire United States. The printed *Oxford English Dictionary* occupies 20 good-sized volumes. Library of the Future holds the contents of nearly 1000 individual books. Yet all that information takes the space of only five jewel boxes, which fit into only two inches of shelf space.

Of course, even if you did have all that information in hardcopy (and a large room to keep it in), how easy would it be to find specific items of information? Say you needed a street map of Sikeston, Missouri (as I did recently)—you'd have quite an adventure in your filing cabinets just trying to find it.

Another benefit isn't as obvious. What if you wanted to find the source of a quotation but could recall only a few key words? Or perhaps you wanted to find a word for which you knew only the definition. How about finding the name of a movie when you knew only two of the actors? The name of a city from a street name, ZIP code, or phone number? All this and more

is possible using your computer's power to search a CD-ROM database. It's the equivalent of being able to quickly scan an entire dictionary, encyclopedia, map collection, or other reference, looking for every occurrence of a single word or phrase. Information is accessible like never before.

Finally, many of these titles have much more than

new product or version seems to add new and innovative multimedia elements; it's exciting to watch the paper-based references come alive.

The only real problem here is that you probably don't have unlimited funds to buy every terrific CD-ROM reference title that appears. We've sorted through the hundreds of popular reference works to

class titles.

Street Atlas USA 2.0.

This latest version of Street Atlas USA (DeLorme Mapping, 800-452-5931 or 207-865-1234, \$169) brings you street maps of the entire United States, down to a level where streets are shown one-eighth inch wide and the onscreen map is just over one-half mile square. It's all there: street names, highway numbers, power lines, rivers, parks, and so forth.

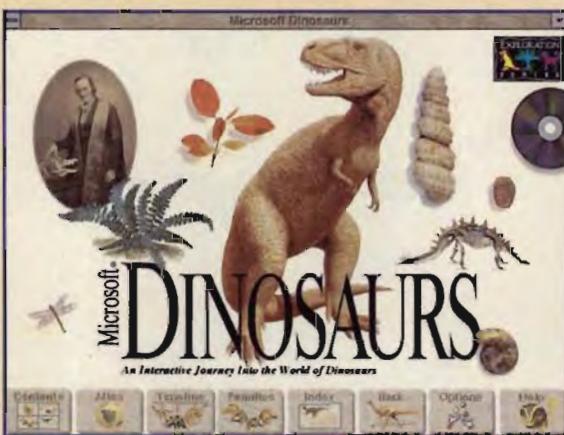
The maps start with a full United States map at a magnitude of 1. You work up through the levels of detail to magnitude 16, described above. The maps are correct and useful at each level, so you can find one that'll meet your needs.

You can also search for place names (down to towns and some features, including shopping centers but not parks), ZIP codes, and even phone numbers (down to area code and exchange). At magnitudes 13 through 16, you can also search for street names on the displayed map (about nine miles square at magnitude 13)—including specifying the block by street address.

Street Atlas USA requires Windows 3.1, puts 2.2MB of data on your hard drive, and is extremely easy to use. It's easy to see why it's been a steady bestseller since it was introduced. It's a handy, versatile tool for finding things all over the country.

Library of the Future, Second Edition. This second edition of Library of the Future (World Library, 714-748-7197, \$299) includes over 2000 individual books, stories, plays, poems, reli-

TOP TEN



CD-ROM REFERENCE TITLES

you'd get in the printed versions. The encyclopedias, for instance, provide full-motion video of historic events, animated and narrated explanations of physical processes, and many sound recordings. Atlases have photo collections, searchable databases of statistical information, and even video travelogues to accompany the maps. Each

pick ten titles that provide the most useful content, the best delivery, and the most value. You'll forgive us, I hope, for selecting three encyclopedias. You'll probably need only one, but all three are excellent—certainly in the ten top reference titles available.

The order of presentation here implies no ranking; all of these are world-

gious works, historical documents, and scientific works that would appear in about 950 volumes if you had them in printed form. They're primarily classics or historical in nature; only a small handful are from the last 50 years.

But what a treasury of wisdom, entertainment, history, and information this is! Here you'll find Shakespeare, Milton, Whitman, Chaucer, Cervantes, and Aristotle. You'll also find Jack London, Edgar Allan Poe, Mark Twain, and Louisa May Alcott. The range is incredible, from *History of the Peloponnesian War* to *The Wizard of Oz*.

For scholars, this is a dream come true. You can search for words or phrases, specifying proximity. You can perform custom searches by categories, regions, countries, ages, eras, centuries, or years. To find a quotation or discussions of certain people, events, or ideas, you merely design a search as precisely as you wish.

You can also copy a book to a hard disk or floppy disk for later use and print excerpts or whole works. Though you probably won't be sitting up nights reading these books on your computer screen (I certainly won't), having them available to browse, research, and work with will broaden your horizons. And wait till someone in the household needs to write term papers—this is an unmatched archive of source material.

Microsoft Cinemania '94. The new edition of Cinemania (Microsoft, 800-559-5577, \$79.95) will delight anyone who's ever seen and loved a movie. It's

basically a master movie reference, but the extras make it an evening's entertainment on its own.

It lists over 19,000 movies, giving basic information on each, including cast, length, director, rating, and any awards it has won. Each has a brief review from Leonard Maltin's *Movie and Video Guide 1994*. Additional reviews from Roger Ebert's

nearly 1000 still photos, 160 sound recordings of famous dialogues, 100 recordings of movie themes and songs, and 20 video clips from the classics, and it's an irresistible package.

World Atlas 4.0. For basic world maps and an extensive database of statistical and demographic information, you can't beat World Atlas 4.0 (The Software Toolworks, 415-883-3000,

place names, simple renditions of national anthems, and audio help screens. Video includes full-motion video clips of 47 cities presented in a tiny window. Surprisingly, it's big enough to give you a satisfying glimpse of the cities involved.

The statistical database, although not perfect, is both useful and interesting. It covers over 300 data categories, from the expected (population and area) to the esoteric (buffalo milk production and counterfeiting offenses). You can create graphs and statistical maps on data from categories including agriculture, crime, people, economy, education, geography, and health.

The Oxford English Dictionary (Second Edition) on Compact Disc. The OED, or *The Oxford English Dictionary*, is an international linguistic treasure, the fruits of the labor of four generations of lexicographers. It's unique. The 20 printed volumes of 1989's second edition collect the history of the English language. They include not only current definitions but the history of each word, shown in quotations from original writings going well back into the Middle Ages. All these illustrative quotes—over 2.4 million of them for the nearly half-million words in the dictionary—help fill out *The OED's* 20,000 pages.

Its arrival on CD-ROM (Oxford University Press Electronic Publishing, 800-334-4249 or 212-679-7500, \$895) is a new triumph, albeit an expensive one. Not only can you read all the entries in decent-sized

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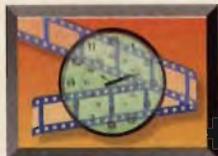
Video Companion are available for 1300 titles, and Pauline Kael's reviews appear for 2500 movies.

Cinemania also features biographies of 4000 movie personalities, each with a complete filmography listing every movie appearance. Fully half of the biographies have photo portraits.

That's a tremendous amount of material, but add

\$79.95 for Windows and \$69.95 for DOS).

World Atlas is a well-balanced source of world facts. There are better sources of maps, as these are limited to high-level maps with little detail. The multimedia elements and extensive database, however, compensate for the lack of map detail. Audio includes pronunciations of



MULTIMEDIA PC

fonts (which you can select), but you can perform powerful searches for words and phrases, using proximity parameters and a variety of other limits. You can limit your search to certain parts of speech, variant forms, etymology, and date ranges, for example. Considerable effort has gone into the search engine in The OED, resulting in faster-than-expected performance.

If your search target is more complex, there's a separate query language that will daunt all but the most adventuresome—yet it delivers the goods for truly intricate searches.

The OED on CD-ROM requires Windows and puts just under 2MB of data on your hard disk.

The New Grolier Multimedia Encyclopedia, Release 6. Each year, Grolier Electronic Publishing (800-285-4535 or 203-797-3500) adds new multimedia elements to The New Grolier Multimedia Encyclopedia (\$395). This latest version includes all the usual elements (video clips, sound recordings, animations, and SVGA photos) along with two new items: multimedia maps and Knowledge Explorer essays.

Multimedia maps are narrated explanations of history and geography illustrated with animated maps. The story of the founding of America, for example, and the country's acquisition of territory over the years becomes crystal-clear as you watch the maps change to highlight events.

Knowledge Explorer essays are narrated slide shows explaining general



Compton's Interactive Encyclopedia includes a handy Topic Tree.

topics such as music, South America, space exploration, architecture, and the human body.

Yes, the multimedia glitz abounds, but what about an encyclopedia's mission to deliver concise, factual knowledge on as many diverse topics as reasonably possible? Grolier's does well on this score, too. Its articles are appropriate for middle-school ages and above, they're signed by their authors, and they present bibliographies to lead students to further information sources.

Grolier's spends less effort on graphical presentation of its information and more effort on squeezing in information. Its time line, for instance, is merely a chronological listing of dates and events. The competition presents beautifully rendered scrolling time line charts, which necessarily include many fewer individual events.

Compton's Interactive Encyclopedia. Compton's Interactive Encyclopedia (Compton's New Media,

619-929-2500, \$395) combines a flashy, easy-to-use Windows interface with its collection of information and multimedia elements. It includes the standard multimedia items, but it uses the graphic Windows interface much more extensively than Grolier's to create a truly graphic experience right down to the instant you read the text.

Innovations in Compton's include the InfoPilot, which presents a matrix of articles. You select a topic and an article, which appears in a small center window. Four closely related articles appear in boxes at the corners of the screen. Around each of them are the titles of three related articles. The entire web of articles and titles can help you hone in on elusive facts.

Compton's also provides extra value. Until June 1994, buyers of the CD-ROM version can purchase the printed encyclopedia for a mere \$99—an outstanding buy. Also, the CD-ROM comes with a full working version of Lotus's Ami Pro 3.0, a \$495

Windows word processor, which links to the encyclopedia for automatic footnotes.

The Windows version of Compton's takes a full 4MB of hard disk space and runs a little more slowly than its competition. Generally, the articles are not as extensive as those in Grolier's.

Microsoft Encarta Multimedia Encyclopedia, 1994 Edition. While based on another print encyclopedia (the 29 volumes of *Funk & Wagnalls New Encyclopedia*), Encarta 1994 (Microsoft, 800-559-5577, \$395) feels more like something created just for multimedia. Microsoft expanded greatly upon the print version, seeking out different photo sources, for instance, for images that would translate better for computer screen viewing—with noticeably excellent results. You get more sound, more photos, and more information than from the competing products.

All of the standard multimedia elements are there. Encarta spares no effort to present video, sound, animation, and photo illustrations whenever possible. It includes, for example, spoken samples of 60 languages, 181 national anthems, 117 pieces of classical music, 179 clips of world and folk music, and 106 video clips.

Most articles have a series of illustrations—usually photos—in the left margin that change as you scroll through the article's text. The small pictures are thumbnails; you can expand most of them up to full-screen size for a better view. Virtually every screen, box, window, and article

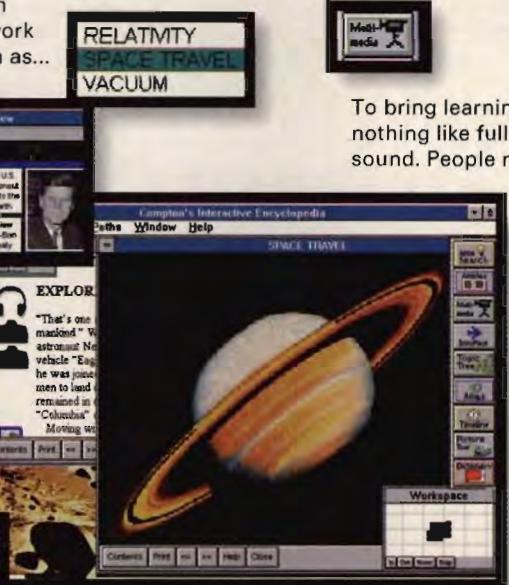
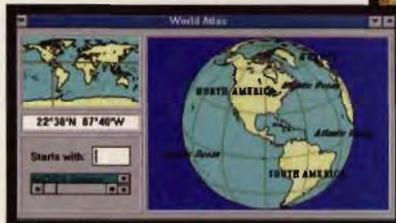
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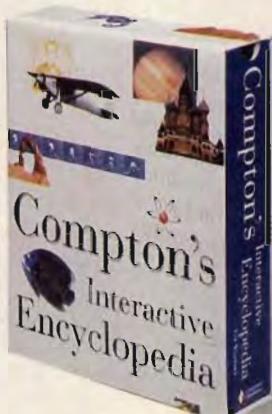


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MULTIMEDIA PC

has a printer button to allow easy printing of the material for later reference.

Encarta's basic information content is extensive, accurate, and factual. Add extensive multimedia content and inspired presentation, and you get something more than a traditional encyclopedia translated into CD-ROM. You get a new kind of colorful, vibrant, almost-live reference source.

Microsoft Dinosaurs. If you're getting the impression from these reviews that nobody does multimedia like Microsoft, you're not wrong. Microsoft Dinosaurs (Microsoft, 800-559-5577, \$79.95) is another example of taking a good concept to the limit. I've seen a dozen other dinosaur-related titles on CD-ROM this year; none is even in the same league with Microsoft Dinosaurs.

Breathtakingly beautiful 256-color paintings in virtually every window in the program set the standard for all that follows. There are five animated informational movies licensed from PBS, as well as striking footage of a dinosaur hunting in a forest with an appropriate sound track.

The heart of Microsoft Dinosaurs is its 200 information panels, each with a painting, text, and hot-spot captions leading to the 800 supporting panels. There's a lot of content here, but it's presented with engaging illustrations and in small enough bites that even kids with short attention spans won't lose interest. As you explore by following the related articles, you'll never cover the same path twice, which gives you the feeling that

Random House Unabridged Dictionary on CD-ROM

Editor's note: Just as this issue was going to press, we received yet another great reference CD-ROM. Rather than bump one of the other ten CD-ROMs, we decided to offer this one as a bonus review.

The newly revised second edition of *The Random House Unabridged Dictionary* is a 2500-page, 13-pound, industrial-strength dictionary for serious use—as reflected by its \$100 price tag. The CD-ROM version is \$79, and the package with both versions is \$159 (Random House Reference and Electronic Publishing, 212-940-7394).

Both the printed and CD-ROM versions arise from a massive electronic database that helped produce a fully revised edition in less than a year. It's up-to-date, containing newly minted words such as *car-jacking*, *bimbette*, and *fedex* (as a verb), as well as entries fresh from today's news, such as *Hillary Rodham Clinton*.

The power of computer access to 13 pounds of words is awesome. Can't remember the name of that flat pasta dish your Aunt Annette makes so

well? Try searching the definitions for the word *pasta*. You'll get 12 words, among them *lasagna*, which you'll be interested to learn is derived from a Latin word for *chamber pot*. If you can think of distinctive words that would be in a word's definition, you can find the word.

You can search definitions for strings, browse through the alphabetical word list, look up any word or phrase directly, find words you can't quite spell by using wildcards in the lookup, and find anagrams. There are no multimedia elements—no pictures, no pronunciations, no sound or video—just 315,000 words defined.

If you can't afford *The Oxford English Dictionary* or you want access to the latest words, *Random House Unabridged Dictionary* is clearly the dictionary of choice for CD-ROM-enabled computers.

there's unlimited content.

The stars of the show, in my opinion, are the Guided Tours, presented by a personable and funny animated version of "Dinosaur Don" Lessem, the founder of the Dinosaur Society. He walks you through the informational screens with humorous yet informative narration.

Microsoft Bookshelf, 1993 Edition. Microsoft Bookshelf (Microsoft, 800-559-5577, \$195) was one of

the first CD-ROM reference titles to appear—and it's still one of the best. It's not as sexy as Dinosaurs or Encarta, but it packs a lot of highly valuable information into a single easy-to-access package. Over the years, I've found myself going back to it again and again.

Bookshelf contains seven basic reference books. The American Heritage Dictionary is a competent desktop dictionary in CD-ROM form. It includes hundreds of illus-

trations, and the words are pronounced for you. You can't search by definition as you can with the other dictionary CD-ROMs, but you can use the find program for the entire Bookshelf to search for routine strings in any or all of the books. Roget's II Electronic Thesaurus accompanies the dictionary.

Bartlett's Familiar Quotations is the standard quotation book. Its entries, however, tend to be older, leading to the need for *The Concise Columbia Dictionary of Quotations*, which contains more up-to-date quotes, most of which are from living people. In Bookshelf, both of these include the original recordings of many of the quotations. The John F. Kennedy sound clips are particularly impressive.

The Concise Columbia Encyclopedia is a single volume that tries to impart basic information on thousands of important subjects. Its coverage is necessarily abbreviated, but there's a surprising amount of useful information in it, including animations explaining how things work.

The Hammond Atlas is a collection of maps with pronunciations, flags, anthems, and links to more complete data in the encyclopedia and almanac. The World Almanac contains that wonderful eclectic collection of odd and useful facts that almanacs have.

Microsoft Bookshelf is an unexciting set of routine reference books that just happens to be almost indispensable. It doesn't need a heavy load of multimedia elements; they'd just get in the way of the raw information that you need so often. □

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7th Level, Inc., 5225 San Fernando Road West, Los Angeles, CA 90039 ©1993 7th Level, Inc., Tuneland, Desktop Playground and 7th Level are trademarks of 7th Level, Inc. All rights reserved. • SYSTEM REQUIREMENTS: IBM® Tandy® or compatible 386 25 MHz or better with a minimum of 4MB of RAM, SVGA display and CD-ROM drive with CD audio connector, MPC compatible sound card, MS-DOS® 3.3 w/Windows™ 3.1 or later. Optional: amplified speakers, headphones.

Circle Reader Service Number 152

www.commodore.ca



NEW MULTIMEDIA PRODUCTS

EDITED BY POLLY CILLPAM

The Three R's

Davidson's best-selling educational programs, Kid Works 2 and Math Blaster: In Search of Spot, are now available in CD-ROM versions. Math Blaster: In Search of Spot is a learning adventure game that teaches basic math facts, problem solving, and mental math skills to children ages 6 to 12. Through four integrated activities, you help Blaster rescue Spot, who has been captured by Blaster's enemy, the Trash Alien. The program features 50,000 possible math problems, the ability to customize math data, six levels of play, and eight different subjects.



Davidson's Kid Works 2

Kid Works 2 is a creativity kit that allows children ages 4 to 12 to write, illustrate, print, and hear the stories they create. It contains a word processor, a full-featured paint program, and patented text-to-speech technologies. Children can write stories with words or icons on primary-ruled paper or a blank screen, color coloring-book pictures, or create their own paintings. They can combine the stories and pictures and have their stories read back to them.

Davidson
(310) 793-0600
\$59.95 each
Circle Reader Service Number 530



Math Blaster: In Search of Spot is now available on CD-ROM.

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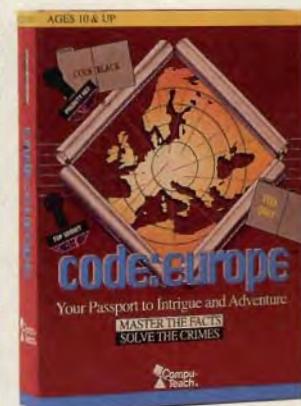
Rise through the political ranks from freshman to Speaker of the House with Software Toolworks' Capitol Hill. This product gives you the opportunity to be actively involved in the political process, with a first-person perspective of life on the Hill.

You can explore the inner workings of the nation's highest lawmaking body by voting on a bill or reviewing an operating budget. Capitol Hill uses narrated video clips, photographs, and illustrations to explore aspects of the United States legislature, such as the history and purpose of Congress, how a bill becomes law, operating budgets and average expenditures, and duties of the Congressional support staff. You can meet your political peers and engage in a walking tour of the Capitol. All of these experiences are available in the Play the Game section, where the objective is to rise from a freshman Congressional member and become Speaker of the House or Senate Majority Leader.

The Software Toolworks
(415) 883-3000
\$49.95
Circle Reader Service Number 531

I Spy

Here's a multimedia educational program that can bring Europe alive culturally, geographically, and historically. Developed for ages 10 to 16, Code: Europe features digitized voice, music, and graphics, and an instructional design



Compu-Teach's Code: Europe
that supports correlation
and memory skills.

In the program, you're a disguised International Security Council agent who

travels throughout Europe gathering "secret code" clues from a network of fellow agents posing as tour guides. The clues, which include facts about each nation's geography, history, art, trade, and culture, are based on research of 22 European countries. The program also offers maps, national anthems, and greetings in each country's language.

You're required to manage the time and currency allowed by the ISC for each investigation. A limited budget is provided for purchasing transportation and hotel accommodations in the currency of the nation being visited. You may choose to travel by foot, bus, or taxi, and to stay in the least or most expensive hotel. Experiences take place based on your choices in these areas.

Compu-Teach
(800) 44-TEACH
\$59.95
Circle Reader Service Number 532

Media Vision Does Software

Just six months after it formed a publishing group, Media Vision has announced ten new multimedia CD-ROM titles. The titles fall into three categories: children's educational programs, interactive motion pictures, and daily planning software.

The children's titles are Forever Growing Garden, a fantasy gardening adventure with over 300 screens of animation; Peak Performance, an adventure with trivia questions, video footage, and a road race across the United States;

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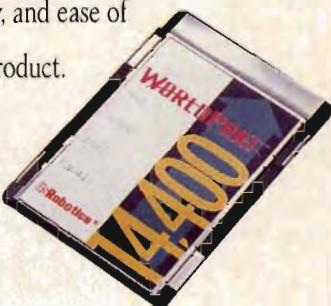
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 **USRobotics**



NEW MULTIMEDIA PRODUCTS



The Personal Daily PlanIt CD-ROMs feature voice annotation.

and Professor Gooseberry's I Can Read Club, a series of early learning CD-ROMs, including Always Arthur, Who Wants Arthur?, and Buster's First Thunderstorm.

The two interactive multimedia movies are Quantum Gate, an interactive science-fiction story that uses the VirtualCinema technology, and Critical Path, an interactive action adventure which combines motion picture, videogame, and computer-generated animation elements in a single interface.

The Personal Daily PlanIt series includes a daily planner with voice recognition, voice annotation, over 430 color photographs, video footage, and stereo sound. The first three titles are PlanIt Earth, featuring images by renowned wildlife photographers in conjunction with the National Wildlife Federation; PlanIt Paradise, an enticing collection of today's hottest swimsuit styles with models from *Swimwear Illustrated*; and PlanIt Adrenaline, featuring a variety of action sports scenes.

"The breadth and challenging scope of these initial titles will demonstrate that Media Vision has dedicated itself to becoming both a commercial force and a touchstone of artistic quality in the hardware and now software arenas of interactive multimedia computing," says Paul Jain, Media Vision president and CEO.

Media Vision
(800) 348-7116
\$49.95-\$59.95 each

Circle Reader Service Number 533

What a Trip!

Now you can have a CD-ROM with comprehensive travel information covering every state and region in America. Deep River Publishing's EVERYWHERE USA Travel Guide contains a collection of more than 3000 events, attractions, festivals, theaters, museums, historic sites, national parks, professional sports teams, and more. It has thousands of full-color photos illustrating attractions all over the United States. You'll find up-to-date descriptions, addresses,

phone numbers, and hours, as well as a locator map.

"Our goal is to provide the USA's most comprehensive presentation of interesting attractions and things to do at a price everyone can afford," says John Lincoln, Deep River's CEO. Through its easy-access Windows interface, this travel guide brings thousands of interesting bits of information to the screen in seconds. Family vacation planners can search for activities suitable for their children, and business travelers can get information about the city or state they're going to. You can use the menu of listings based on geographical area and type of activity, or you can create a custom search based on a variety of criteria.

The listed items include aquariums, zoos, theme parks, museums, science centers, agricultural fairs, festivals, historic sites, national parks, dance, music, theater, sports tours, cultural centers, and more.

Deep River Publishing
(207) 871-1684
\$49.95

Circle Reader Service Number 534

Early Reader ABC's

Here's a learning tool for children ages 4 to 7. The Big Bug Alphabet Book interactive CD-ROM is the first in a series from Milliken Publishing. The program introduces the alphabet by teaching children to identify and distinguish the letters. The characters are brought to life through animation, learning games, high-quality speech and sound effects, and original songs, creating a fun-filled, interactive experience for kids.

Included with the disc is a copy of the original full-color storybook, so children can continue to learn and enjoy the characters and story when they're not at the computer.

Milliken Publishing
(314) 991-4220
\$39.95

Circle Reader Service Number 535



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MULTIMEDIA SPOTLIGHT

By Carol Ellison

THE VAMPIRE'S COFFIN, THE LAST DINOSAUR EGG, THE HYPNOTIC HARP

The titles on the boxes of Sanctuary Woods' kids' game series, *The Awesome Adventures of Victor Vector & Yondo*, say a lot about them even if you don't look at the age rating. The experiences inside are uniquely designed for the eight-and-over set, which seems to invoke the word *awesome* with—well—*awesome* regularity. The larger-than-life quality of these animated escapades also appeals to those of us who grew up defining life with words such as *neat*.

The three Victor Vector CD-ROMs—*The Vampire's Coffin*, *The Last Dinosaur Egg*, and *The Hypnotic Harp*—are part of what Sanctuary Woods calls its I-Ventures, in which the I stands for *interactive*. They pack the fun and high adventure of a Saturday matinee serial. Each game is framed within a screen to add to the sense of video excitement. Kids click on the onscreen knobs and directional controls to move through the game. Not only do the comics-style graphics beat those you'll find on any newsprint page, but they top those of most computer games.

There's no titillating violence here. That should appeal to Janet Reno and the growing number of parents who are concerned about the knock-'em-sock-'em quality of TV and videogames. On the other hand, they don't exactly lack scary moments. Each appeals to a child's sense of adventure and mystery with elements such as vam-

pires, dinosaurs, secret codes, and gladiators.

Kids join the action as museum archivists who control the adventures of "the valiant Victor Vector and his Digital Dog Yondo." Our heroes are introduced just that way by a voice that possesses all the anticipatory inflection of a Walter Winchell or Robin Leach. It's just another of the games' matinee motifs. Voice-overs and musical scores, produced especially for the games, feature the

est, athletic, and enthusiastic." And Yondo, his Saint Bernard, upholds the tradition of Lassie, Rin Tin Tin, and countless other heroic dogs who have graced the screen with their strength, wisdom, and loyalty.

The games pit Victor and Yondo against archvillain Ram Axis, a virus spawned in the great crash of 2093, who often goes undetected by changing forms to foil their efforts. Players explore a virtual environment, clicking on images to talk to

fact with fantasy in a way that makes the games seem anything but bookish. *The Last Dinosaur Egg* and *The Hypnotic Harp* present factual information on the history, science, and culture of prehistoric times and of Rome. *The Vampire's Coffin* is replete with information about central Europe in the late eighteenth century.

Like all good computer-based adventures, these games are complex. They feature 80 to 150 interactive screens that involve a fair amount of trial and error as kids try out the different options—only to end up in a Transylvanian jail or find themselves sliding into molten lava from a prehistoric volcano.

And the fun doesn't stop when the game's over. Just as their parents could earn premiums and surprises by sending in box tops and proofs of purchase to their favorite TV heroes, young fans of Victor and Yondo can join Sanctuary Woods' Fun Club by simply registering their games. Members receive things like stickers, game clues, and previews of new games. It's a little like the code rings we could earn by mailing in Ovaltine labels.

It's this nod to nostalgia and the rich traditions of larger-than-life fantasy heroes and canine sidekicks that gives these programs a special charm. No doubt about it, the kids will soon be complaining that they can't get the keyboard away from Mom and Dad.

Sanctuary Woods Multimedia
(415) 578-6340
\$39.95 each

Circle Reader Service Number 550



Victor Vector and Yondo star in three CD-ROM games for kids.

melodramatic verbiage, hypertensive inflection, and cliff-hanger action of Captain Marvel, Superman, and the other futuristic fantasies of an earlier generation.

In each Victor Vector game, players travel through time with Victor and Yondo to recover items for the museum and prevent those items from falling into the wrong hands. Victor is a "digital agent" who looks for all the world like Christopher Reeve. He is, as the games describe him, "brave, hon-

people, gather treasure, collect props that boost or diminish their energy level and help them past hurdles later in the game, or retrieve information from Yondo's data bank collar.

Yondo's collar is one of the educational elements that kids must return to again and again to meet the games' challenges. Kids must review and use the information in the data bank to correctly answer questions, solve puzzles, and progress through the games. Sanctuary Woods integrates

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Circle Reader Service Number 108

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PRODUCTIVITY CHOICE

This Pentium-based machine sizzles with speed and power without costing a fortune.

Denny Atkin and Mike Hudnall

ALR EVOLUTION V/60

The latest and greatest in blazing speed, remarkable design, and raw power, today's Pentium machines trigger the same feelings of excitement and anticipation that you might experience examining the latest Ferrari or Lamborghini. Who wouldn't want to take one of these muscle machines for a test drive—to rev it up, feel the power, and show off just a little?

ALR puts you in the driver's seat with its Evolution V/60 PC, a well-designed Pentium-based machine—and a sizzling performer—at quite a competitive price.

Although the Evolution V sports a 60-MHz chip, it significantly outperforms 66-MHz 80486DX2 machines, thanks in part to the marvels of the Pentium processor. While the 486 chip has 1.2 million transistors, the Pentium chip contains 3.1 million. Compared to the 486's 54 MIPS (Million Instructions Per Second), the 60-MHz Pentium is capable of around 100 MIPS. The 486 has one 8K built-in cache; the Pentium has two. And whereas the 486 uses a 32-bit data path, the Pentium uses a 64-bit path, so it grabs twice the information at a time.

With a processor this fast, the speed of other parts of your system necessarily becomes a critical factor. Even though the Pentium chip has two built-in 8K caches, one for data and one for program code, you'll still need a good external cache to fully optimize the overall performance of your system. ALR delivers with an integrated 256K (15ns) read/write-back



cache, which is noticeably faster than the 486's write-through cache.

If you need this much computing power, you'll probably also need plenty of expansion and upgrade capabilities. The Evolution V has them. It comes standard with 8MB RAM, expandable to up to 128MB on the system board (our review unit arrived with 16MB). There are two half-height 5 1/4-inch bays, which you could use to install a CD-ROM drive and a tape backup or 5 1/4-inch floppy drive, and four 3 1/2-inch bays, one of them containing the standard 1.44MB floppy drive. You also get the ALR MULTUS IDE controller, which is integrated into the system board and supports up to four IDE hard drives.

The system also contains six 16-bit ISA slots, three of which have 32-bit VESA VL-Bus extensions. While it's true that Intel's new PCI local-bus architecture offers performance advantages over VESA

local bus in Pentium systems, there are many more VESA VL-Bus cards available, so the Evolution's VESA local-bus configuration will make sense for a number of consumers. ALR also offers a PCI version of its Pentium system, called the Evolution V ST.

Using ALR's PrimeLine Direct 800-number telephone service, you can custom configure the Evolution V to meet your specific needs. If you opt for the lowest-priced configuration—without monitor, video card, hard drive, DOS, or Windows—you could pay as little as \$2,495. Prices in the industry can be volatile, and companies like ALR might change a drive, video card, or other component option to offer greater performance or value. Check with ALR before deciding on a final configuration to make sure you understand all of the options and to get the most current prices.

Our review system came configured with DOS and Windows. A number of new Pen-

tium systems come with Windows NT, but DOS and Windows will come closer to meeting the needs of the typical COMPUTE reader. Our system came with a 240MB drive and a Paradise Accelerator VL Plus (WD90C33) with 1MB of DRAM. The Paradise card supports 1280 × 1024 with 16 colors, 1024 × 768 with 256 colors, 800 × 600 with 64K colors, and 640 × 480 with 16.7 million colors. Adding a second megabyte gives you more colors in the higher resolutions. Our system also came with a FlexVIEW 3X NI 14-inch SVGA multiscan noninterlaced monitor, which supports resolutions up to 1024 × 768 noninterlaced. ALR also offers the FlexVIEW 4X NI, a 17-inch multiscan noninterlaced SVGA monitor.

The Evolution V's system box boasts visual appeal as well as commendable design. A smoked plastic cover shields the system's external drive bays as well as the reset button. If you remove two screws and lift off the U-shaped section of the box that covers the top and sides, you have fairly easy access to the system board, making it a cinch to add drives or memory. The hard drive resides toward the rear, so the two 5½-inch exposed bays on the front are available for such expansion. We found only two disadvantages to this design: To install drives in the 5½-inch bays, you must temporarily remove the vertically mounted 1.44MB floppy drive beside them, and once you've installed a drive in one of the 5½-inch bays, access to the SIMM slots below is blocked. The Pentium has a large heat sink.

Our testing of various DOS and 16-bit Windows applications showed that the Evolution V was roughly 80 percent faster than an 80486DX2/66 at computation-intensive tasks. But we thought it would be even more meaningful to run some specific applications to see what kind of performance gains are possible. Imagine 2.9, a 3-D rendering package that makes heavy use of floating-point math, rendered a series of test images in just over half the time a 486DX2/66 took. Running a series of test suites on Excel and Word showed far less improvement—just under 30 percent as compared to the 486DX2/66. Both of these benchmarks made heavy use of screen and disk resources, though, which shows what sort of influence high-performance disk subsystems and video cards have on a PC's performance.

Although these test results might not be as impressive as you'd expect, the tests were conducted using standard 16-bit DOS and Windows software. To truly push the Pentium envelope, you'll need 32-bit applications compiled to take advantage of the chip's dual-pipeline architecture; these pipelines essentially allow the chip to do two things at once, speeding execution significantly. With Pentium-optimized software, you can look forward to a tripling of execution speed in normal programs and a five-fold speed-up in floating-point math.

Another ALR selling point is the company's support. ALR warrants for five years the chassis, keyboard, CPU, system board, and power supply. Associated labor costs

and some peripheral components carry a 15-month warranty. Optional on-site ProCare service is also available for a reasonable fee.

Should you run out right away and buy one of these Pentium systems? That depends, of course, on the applications you use. If you spend a lot of time doing computation-intensive work, such as 3-D rendering, image processing, CAD, or working with

Base configuration without operating system, hard drive, video adapter, and monitor—\$2,495; review configuration with DOS, Windows 3.1, 240MB hard drive, 16MB RAM, Paradise Accelerator VL



huge spreadsheets, the near-doubling in computation speed will likely make the Pentium upgrade worthwhile. But if you spend most of your time doing word processing, desktop publishing, or disk-intensive database work, you won't see as dramatic a speed-up if you already have a fast DX2 system.

If you're looking to make a jump from a slower system, though, a Pentium system like the ALR Evolution V/60 isn't dramatically more expensive than a comparably equipped 80486DX2/66—and it's likely to run state-of-the-art software with more than acceptable performance for a long time to come. □

Circle Reader Service Number 391

Plus with 1MB of DRAM, and FlexVIEW 3X NI monitor—\$3,815; to custom configure a system, call ALR's PrimeLine Direct using the number below

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ART WORKS

Robert Bixby

DTP TROUBLES

I was a man with a problem. I was designing a book cover for a book of poems in Cajun French. The author had an illustrator-friend supply me with a graphic, which I scanned at 300 dpi and imported into CorelDRAW!. Everything was going great until I started to put the title on the cover. Can you believe that out of the hundreds of fonts available to me, I didn't have anything close enough to GeoWorks' Shattuck Avenue (which was used for the main heads and the title page of the book) to use on the cover?

I checked each font methodically from Arial to Zapf Chancery. Then I realized I had an ace in the hole. Using GeoWrite, I laser-printed the title and author's name as large as I could in Shattuck Avenue; then I scanned the text at 300 dpi and imported the text as art into CorelDRAW!. It was simple once I thought of it, but it took a few minutes of sweating to come up with it. I also considered converting Shattuck Avenue to a TrueType font using AllType from Atech. Can you think of other solutions? If so, drop me a line.

Under the heading of cool stuff: Who says your Windows world has to be all work? Doodle-mation serves the same purpose as a flowering crape myrtle—it just sits there and looks beautiful. This program, from

Screen Magic (820 Florida Street, San Francisco, California 94110; 415-648-8056), lets you draw shapes on your computer screen and then animate them, causing them to rotate, grow and shrink, follow specific paths on the screen, and cycle colors. You can use the program to draw one-of-a-kind wallpaper and screen blankers or just groove on the shapes and col-

ors. Wish list for the next version: text and multiple shapes. You can have multiple objects on the screen, but they all have to be the same shape—all stars, all squares, all circles, and so forth—though you can distort the shapes almost endlessly.

The neatest thing of the month: For the minuscule price of \$399.95 (relatively minuscule, anyway), you can add still-image capture to any PC with a parallel port. Digital Vision, one of my favorite com-

panies. disk as a TIF, PCX, TGA, GIF, or BMP file. (You can use BMP files as Windows wallpaper.)

Want to capture images out in the real world? Just load the software on your laptop, plug in the card, grab your video camera, and you're on your way. The software is a little clunky, but you'll get the hang of it in a few minutes. Although the DOS software was the only kind available as this was being prepared, Digital Vision will soon release a Windows version. Strangely, though it would seem a natural, there is no battery pack for the ComputerEyes/LPT Parallel Port Color Video Frame Grabber. It has to run from a wall outlet. But Digital Vision will give you pointers on designing your own battery pack.

Speaking of video cameras, have you noticed how inexpensive they are? You can buy a VHS camcorder for as little as \$500. A camcorder is a wonderful computer peripheral. You can use it, along with an adapter board, to capture live images or images from videotape. Another author I work with had a watercolor he wanted to use on his book cover. Lacking a grayscale scanner, I decided to see how the camera would do with still images, and I'm happy to say that it worked great as long as there was enough indirect light in the room.

Have a DTP tip you'd like to share? Let me know about it by calling (900) 884-8681, extension 7010203 (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call costs 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone. Or write to "Art Works" in care of this magazine. And if you don't have a tip, call to let me know what you're up to, what software you're using, and how I can be of help.

Neatest thing of the month: ComputerEyes/LPT Parallel Port Color Video Frame Grabber



panies, has come up with a wallet-sized external image-capture card called ComputerEyes/LPT Parallel Port Color Video Frame Grabber. It plugs into your video camera and your computer's parallel port for 24-bit still-image capture.

It supports VGA, Super VGA, high color, and true color displays. The image on-screen is continuously updated from the camera. When you see something you want to capture, press the Enter key, and the frame is grabbed in 1/30 second (though it takes somewhat longer to prepare the image for display on-screen). There is also a way to capture an image in 1/60 second. Once you've captured your image, you can save it to

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DISCOVERY CHOICE

Children become tycoons as they learn how to run a dinosaur theme park in this entertaining business simulation.

David Gerding

DINOPARK TYCOON

Remember the old lemonade-stand games? Kids could run a simulated lemonade stand and theoretically learn the basics of business in the process. The earliest examples of these programs were downright dry, lacking all but the most basic graphics and featuring economic models that could, at best, be called simplistic. Students quickly lost interest in these programs because the programs lacked depth.

Enter MECC. Its latest release moves the concept of a lemonade-stand simulation into the nineties. Instead of selling lemonade, DinoPark Tycoon players are offered the tantalizing possibility of opening their own dinosaur theme park. "We know kids love everything about dinosaurs and tried to figure out how we could tie that in to a title that teaches about business," says Dean Kephardt of MECC.

Don't get the idea that this is a takeoff on the movie *Jurassic Park*. Kephardt says the program was in the making long before the movie hit the theater. In DinoPark Tycoon, there is no battle between dinosaur and man. Instead, children face a dutiful banker who will foreclose their business if they fail to make a loan payment.

Children start out with a \$5,000 bank loan and an animated screen full of storefronts that provide access to all the supplies and services needed to get their business off the ground. Operation is extremely straightforward and uses the mouse exclusively.



If young proprietors are stumped at first, an animated dinosaur appears and walks them through the program.

The first order of business is purchasing land, which kids can do in the real estate office. The cheaper the land, the more they can spend on their dino attractions, but the farther they are from the city—which means fewer paying customers. To further complicate the purchase decision, each dino species has a natural preference for one climate over another.

The next step is to obtain fencing to retain the dinosaurs. That done, kids need to hire a tour guide from the employment office and then head to Dino City, the Wal-Mart of dinosaur stores. In Dino City, children can call up facts about each of the dinosaurs they're considering.

DinoPark Tycoon forces the kids to think ahead. Some dinos eat more than others and thus cost more to maintain, for instance. The game is filled with opportunities to learn important businesslike

distinctions such as this one.

When the children click on the Park button, the park opens and the simulation begins. During the simulation, a click on the Park button reveals a bird's-eye view of the operating park, complete with animated dinosaurs.

Once the park is running, kids will spend most of their time patronizing the stores and charting the progress of the business in the office, where screens full of graphs and other information reveal ongoing success or impending failure. Sources of revenue include ticket sales and concessions; expenses run the gamut from dinosaur feed to yearly income tax and interest on that bank loan.

Kids will quickly learn by watching the graphs of revenue that attendance demand is cyclical, rising and falling with certain seasons. They can set ticket prices and buy advertising to complement these cycles.

The simulation passes in

time: Days, months, and quarters roll by as the children work through a variety of situations. Players will encounter everything from escaped dinos and sick employees to closed highways cutting off access to their park. It's the unexpected or infrequent situations that really challenge the business and child to respond and grow. A child lucky enough to generate enough revenue to afford a coveted *Tyrannosaurus rex*, for example, may be shocked when the prize attraction starts eating the other dinosaurs.

Keeping the staff paid and the dinos fed and healthy is an ongoing task that requires kids to analyze graphs and numbers and make decisions based on their assumptions. The trick is to scratch out enough profit to expand the park with capital improvements and bigger and better dinosaurs.

DinoPark Tycoon succeeds because it provides a good bit of depth to the variables found in business. There are numerous labor needs, including veterinarians, security guards, and concessions attendants. Kids will find some of these employees valuable and some superfluous, but they'll figure out



DinoPark Tycoon offers all the tools necessary to teach business basics.

which are which only through lots of experimentation.

When the park is profitable, a child can sell the business,

effectively ending the game. If the business has done really well, the player is presented with an onscreen award for best park and afforded entry into the top scores list.

MECC offers two versions of DinoPark Tycoon: a consumer retail version and a special school version. The school version includes the regular retail software as well as classroom exercises for the students and background sheets for the teacher.

Teachers are excited about DinoPark Tycoon's ability to get some business basics across to kids. JoAnna Rash, an elementary school teacher in Issaquah, Washington, got some kids together to assess the program for MECC. She says it received an enthusiastic response.

MECC's Kephart says that the classroom testing helped the company identify some additional features that would make it easier for students to use the product, including the dinosaur tour guide that assists kids in getting started. The company also added a saved game that will help children who have trouble with the game get a head start. It gives the child \$20,000 to start off with (instead of \$5,000) and a park with two dinosaurs.

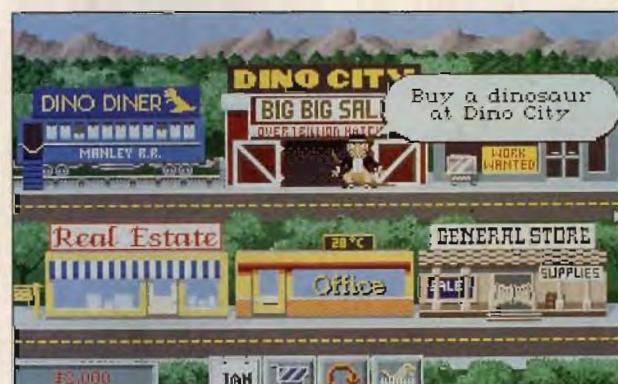
Overall, DinoPark Tycoon is highly recommended. While cartoonish rather than realistic, the graphics are colorful and engaging. MECC has done an especially good job of incorporating digitized sounds in a humorous way as well. There's also plenty of incidental animation to hold the attention of young tycoons while the simulation runs.

The game isn't entirely without arcadelike excitement.

Kids hungering for the gore in *Jurassic Park* will find pleasure in trying to squash buzzing flies between the pages of the Dino Diner menu with a quick click of the mouse. Even parents will get a kick out of this.

It's a shame MECC didn't pay as much attention to the manual as it did to the rest of the game. There's no clue given as to what's considered good business in this modeled world. It may take some kids lots of play to determine just the right mix that will

IBM PC or compatible (80386 compatible), 565K RAM, DOS 5 or higher, VGA, 3½-inch floppy drive, hard drive with 8MB free, mouse; supports Ad Lib,



drive demand. You may want to play with your children to help them past the frustration they're likely to encounter early on. Along the way, you'll probably find yourself joining in the fun—or booting the game up after the kids are asleep to try your hand at becoming a tycoon.

MECC has succeeded in creating a title that will provide fun for kids while teaching them a number of fundamental business concepts, from supply and demand to profit and loss statements. DinoPark Tycoon is an engaging simulation your young entrepreneurs will be anxious to play again and again. □

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GAME INSIDER

Shay Addams

TIE FIGHTER TAKES OFF

X-Wing, perhaps the best space combat game of all time, took off from the shelves like a runaway rocket and flew with enough momentum to launch several successful Tour of Duty disks with new missions and ships to fly as a pilot in the Rebel Alliance. Now TIE Fighter, a stand-alone sequel to X-Wing, is scheduled to take off this month. Avid space combat fans are likely to find designers Doug Hol-

Now you can take control of an Imperial TIE Fighter.



land and Ed Kilham have scored again. Like Rebel Assault, which was released on CD-ROM last November, TIE Fighter is staged in the Star Wars universe. But Rebel Assault is more of an action game than a simulation, so you can't really call it an X-Wing sequel. LucasArts lets you play the bad guy in TIE Fighter, a rare occurrence in computer gaming. You'll be flying for the Dark Side of the Force, taking on the role of a young recruit in the Imperial Forces.

There are three Tours of Duty in the game, and your commander in one is the evil Darth Vader himself. A half-dozen Imperial ship types are depicted with even better polygon graphics than those seen in X-Wing. Five of them appear as enemy craft in X-Wing, and gamers who have fought the TIE Fighters, Interceptors, and Gunboats in that game are probably so excited by this chal-

lenge that they're already on the way to the software store instead of reading this column. A new, never-before-seen TIE Starfighter may be the ultimate ride for those who dare fight for the Dark Side.

Interplay reaches for stars. Interplay's Star Reach looks at space combat from a different angle. The game is similar to MicroProse's Masters of Orion in the sense that you conquer planets and develop resources to take over the stars, but Star Reach offers a two-player option in which opponents fight action-style space battles in realtime. The game unfolds in a split-screen display; a single-player mode lets you play against the computer. Star Reach combines elements of Risk, Stratego, and Asteroids, and the game harnesses the power of 32-bit programming to deliver fast animation, 3-D ray-traced spaceships, digitized speech, and four-channel sound effects.

Waves of Tsunami games. Ringworld 2 is yet another science-fiction title headed for the stores this month, and Tsunami promises adventurers a lot more game this time. The company says that the first Ringworld, based on Larry Niven's series of science-fiction novels, "should have been postured as introductory storytelling, not hard-core adventure." Ringworld 2 will be more puzzle oriented and will offer the player a choice of three characters to play. Not only will it be harder, but it will also offer more replay value. In other Tsunami news, Jim Walls won't be doing the next Blue Force. Michael Levine, author of the novels *Deep Cover* and *The Big White Lie*, is designing Blue Force II. Walls, a retired California Highway Patrol officer who designed Sierra's first three Police Quests, is reportedly branching out to different genres within the adven-

ture game kingdom and is also working on an educational program.

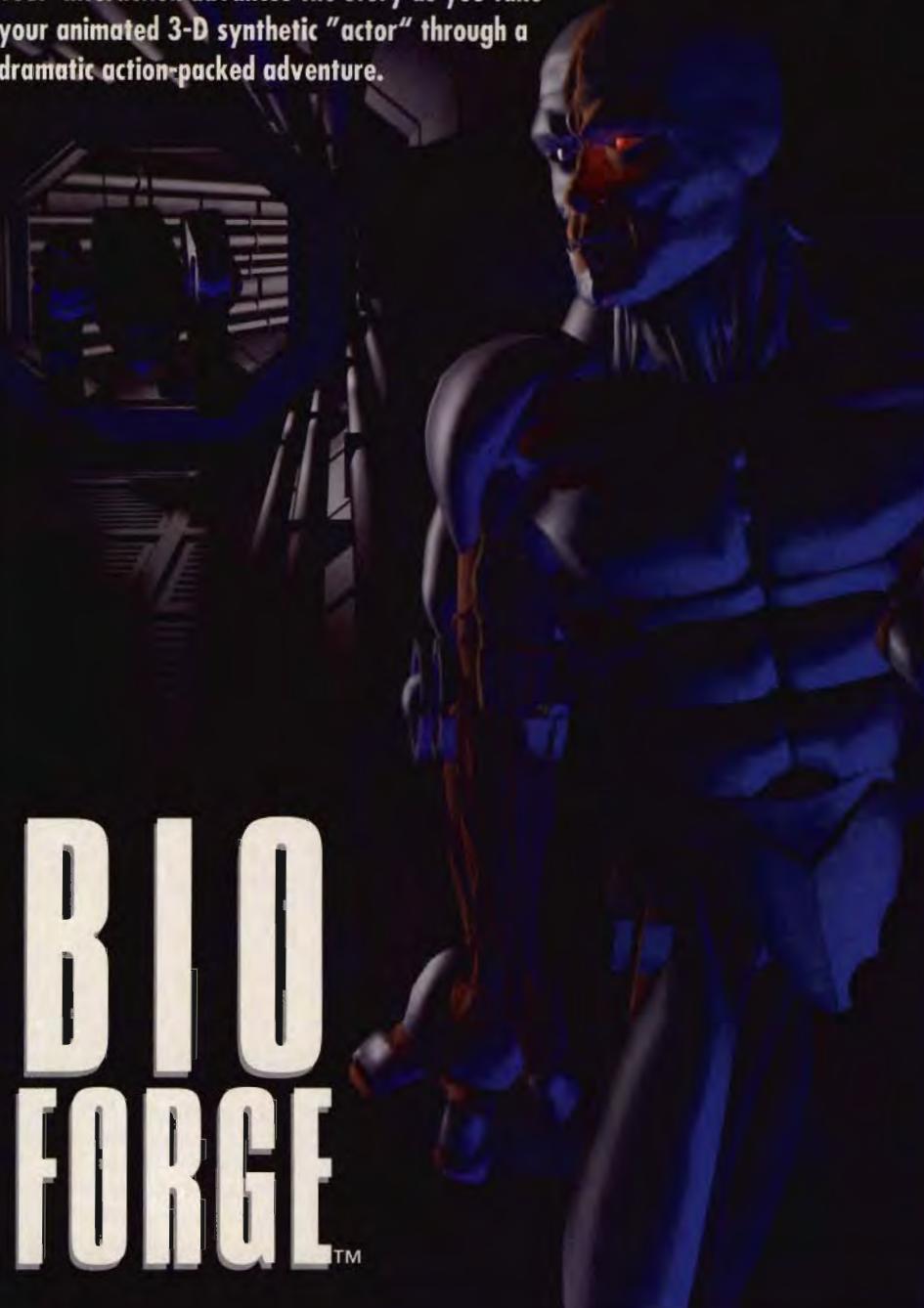
Dynamix diversifies. Dynamix is moving in new directions this year. The company plans to stick with the kind of simulations and sports themes it's done so well, while adding new kinds of games such as Explorer, a strategy game that might be described as Civilization in space. Explorer was designed by Joe Ybarra, who produced Star Flight at Electronic Arts and did The Shadow of Yserbius for Sierra. Along with Battledrome, an action-oriented robot game, Explorer is scheduled to ship in March. (Sierra, the parent company of Dynamix, also has a science-fiction game planned for March. Its Outpost isn't a typical space game; it's a realistic exploration game based on NASA technology and research.) But the biggest surprise from Dynamix—and the only thing that's made me want to even look at a 3DO machine so far—is its March-slated release of Red Baron for 3DO. This classic flight simulator has been updated with spectacular 24-bit 3DO graphics. In the past few months Dynamix has also released Stellar 7 and The Incredible Machine for 3DO.

Later LucasArts. The Dig, an adventure from Brian Moriarty and Steven Spielberg, has been delayed until later this year. It's now expected sometime this summer, and it will ship initially on CD-ROM. Two games on the way from Sir-Tech have also been pushed back until around April. Both Jagged Alliance and Star Trail, the second in the Realms of Arkania series imported from Europe, are scheduled for CD-ROM as well as floppy release. Stonekeep, Interplay's long-awaited RPG, was rescheduled for the middle of the year. □

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ENTERTAINMENT CHOICE

Stunning 3-D texture mapping, user control over almost every variable, and real-world attention to physics make this the benchmark racing simulation of the future.

Scott A. May

INDYCAR RACING

Rarely have so many creative ideas come together with such perfect precision as in Papyrus Publishing's IndyCar Racing, the new benchmark for all future driving simulations. The game was designed by David Kaemmer, author of Electronic Arts' 1989 8-bit bestseller, Indianapolis 500: The Simulation. Kaemmer combines his previous expertise with new breakthrough graphic and 3-D modeling routines, taking full advantage of today's 32-bit processing power. The results will leave you breathless.

Eight challenging tracks in the official Indy car circuit are included, and additional track disks are currently in development. All curves, banks, and dips in elevation in the actual speedways are painstakingly rendered. The available tracks offer an incredible variety of racing challenges. Tackle the mean streets of urban courses like Toronto's, famous for its hairpin turns, chicanes, and towering offtrack landscape. If speed's your thing, you can run hell-bent for glory at the all-time speed champ, Michigan's Super Speedway. Requiring something between finesse and flat-out insanity, Monterey's Laguna Seca is a 2.2-mile masterpiece of track design that's sure to be a favorite stop on your racing circuit.

But IndyCar Racing isn't just for speed demons: It's structured to offer equal appeal to desktop mechanics. Prerace options include a choice of six styles of racing chassis and five engine types. Realism settings allow you to select the race length, from 1 to 100 percent of



each track's full lap count. All races can be saved and restored in progress. You can set the weather to constant or random, including variables such as temperature, wind strength and direction, and rain. Rookies can turn off the car damage variable. This, combined with optional computer-assisted braking and autoshifting, effectively turns the simulation into a game of high-tech bumper cars.

One-player game modes include single races and the full championship season. Head-to-head games require two computers connected via null or remote modem links. Modem play is virtually indistinguishable from single-player mode: Your human opponent simply becomes part of the pack. No chat mode is available, but there are onscreen icons that alert you to broken connections. Unlike most modem-compatible games, IndyCar Racing supports COM ports 1-4 and most nonstandard IRQ settings.

The simulation's hallmark

feature is its extraordinary attention to real-world physics. Car-handling characteristics are intricately influenced by a daunting number of variables, from track grade and tire pressure to the downdraft created by a full fuel tank. Enter the garage to fine-tune your suspension, fuel load, wing settings, gearbox ratios, and tires. Every adjustment produces a realtime effect. If you find a killer combination for a particular track, save the settings to disk. Three generic presets (fast, easy, and ace) are available for those not interested in tinkering under the hood. And Papyrus's analog joystick routine should be an industry standard—it's tight, responsive, and capable of holding its calibration between racing sessions.

Key to much of the program's visual success is advanced 3-D texture mapping. The proprietary 3-D modeling engine developed by Papy-

rus is called SuperTexture, a technique that results in detailed surface texturing, rendered in realtime, from any perspective. This stunning visual trick offers the best of two worlds: the raw speed of polygon-based graphics with the color and realism of bitmapped textures.

SuperTexture is used to fill blank trackside billboards with colorful logos of corporate sponsors and to splash authentic numbers, colors, and sponsor decals onto each car. Other examples of high-speed texture mapping have less to do with cosmetic appeal than genuine on-track realism. Textured asphalt—a blur of multishaded streaks and track discoloration—creates a marvelous illusion of speed. The designers have evoked stout depth of field here; you get an honest sense of movement across a solid, 3-D foreground. It's the closest thing to the rush of real driving that you'll find on the computer screen.

The price for graphics approaching photorealism is processor speed and memory. Although the game runs well at its minimum system requirement, don't expect to use all the graphic frills without experiencing a significant drop in performance. The program detects your system's capability and automatically sets what it considers the appropriate graphic level and animation frame rate. You can tweak these settings manually from the main menu, selectively turning on or off peripheral details, and then test-drive your choices. Your first indication that graphic detail is set too high is a noticeable difficulty in steering. If you're struggling with the joystick,

tone down any nonessential graphics. Those with an 80486/33 or higher should enjoy smooth performance at maximum detail.

This game absolutely swims in cutting-edge visual effects. Some of the best are not merely aesthetically pleasing but closely tied to on-track performance. Not sure of the optimum line? Just follow each track's groove, a blackened line caused by years of constant tire friction. Take a spin through the grass, and you'll kick up a realistic cloud of dust. Slam into any solid object at top speed and expect to lose at least one tire. In a close race, accidents often result in spectacular multicar pileups, rendered with bone-jarring realism involving explosions, smoke, and tires and debris scattered down the quarter-mile stretch.

Don't expect to be the only cause of track mishaps, as in many other racing games. When you see the yellow caution flag, prepare to dodge one or more cars stopped dead. Likewise, while other simulations feature dangerously stubborn computer drivers who invite disaster by relentlessly hogging the road, the AI employed here works to avoid collisions. If you dog the driver ahead of you, he'll usually move off the line and allow you to pass. Expect both competition and professional courtesy from your fellow drivers, who are modeled after real-life veterans like Al Unser, Mario Andretti, Bobby Rahal, and Danny Sullivan.

About the only thing more exciting than driving in IndyCar Racing is watching breathtaking replays of skillful maneuvers, photo finishes, and spec-

tacular crashes. As is not the case with most efforts in the genre, IndyCar Racing's replays are limited only by available memory. Another nice touch: Replays automatically cue to the leading moments before a major event, such as a finish or a crash. If you'd like to view the entire replay, use the VCR-style interface to rewind the tape to its beginning.

Of course, only two or three camera angles simply

IBM PC or compatible (25-MHz 80386 or faster, 80486 recommended), 4MB RAM, VGA or SVGA, hard drive with 12MB free; joystick or combination steering wheel and pedal recommended, modem optional,



won't do. IndyCar Racing's replay feature records your glory (and agony) from seven spectacular positions: in-car, which is behind the right front tire; gear box, which lets you look backward; chase car; sky; blimp; and two at track-side. Capture some particularly stunning footage? You can save it to disk for later playback. About the only thing lacking here is the ability to edit replays to create full-length racing highlights.

IndyCar Racing is a major accomplishment, combining full-throttle action and strategic challenge for both new and experienced racing fans. It's one of those rare simulations that you'll grow into, not out of, as you race repeatedly for the checkered flag. □

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GAMEPLAY

Denny Atkin

SIMCITY REDUX

When Maxis announced that it was going to release a new SimCity game, I didn't expect much. It just didn't seem as if any sequel could possibly capture the fun of the original game. None of the SimSequels so far had grabbed my attention.

Well, I have some bad news. Well, bad news if you have a job, family, or any other responsibilities: SimCity 2000 is easily as addictive as the original, if not more so. I've been playing the Macintosh

identical, and commercial zones, and then provide services such as power plants, police protection, and mass transportation. But there's more lying underneath the city now—literally, since you're now concerned with sewage and plumbing!

SimCity 2000 replaces the overhead view used in its predecessor with an isometric, angled view of the city. This is just as easy to work with, as SimCity 2000 lets you view your city from any side. It makes for a much more impressive-looking town, as you can

and residential zones can be huge or tiny. You now have access to more information about city services; clicking on a police station, for instance, brings up a list containing the number of officers stationed there, the number of reported crimes, and the number of arrests made, in addition to the station's budget. You now have not only roads, but also highways, tunnels, on-ramps, and bus depots. In addition to standard commuter trains, you can also build a subway system. To power your megalopolis you can now choose from coal, hydroelectric, oil, gas, nuclear, wind, solar, microwave, and fusion plants; the more advanced plants don't come into play until later years.

More of the city's infrastructure is modeled in SimCity 2000. Education affects the makeup of your city as in real life, so you should sprinkle schools, colleges, libraries, and museums throughout the area. To support all of these, of course, your burg needs bucks, so you'll have to levy taxes. You can balance—or break—your budget using the new Ordinance feature, which lets you levy sales and income taxes (as well as the ever-popular parking fines), start government programs (such as homeless shelters, city beautification, and tourist advertising), and even legalize gambling.

All of these new options are controlled by a multiwindow user interface that's a breeze to use. Too many products that add features get unnecessarily complex (what percentage of your word processor's features do you *really* use?), but Maxis has managed to build on the foundation established by the classic SimCity without collapsing the fun factor. Bravo for what surely ranks as one of the best computer game sequels ever. □



SimCity 2000 adds plumbing, subways, and other intricacies to the popular city-building game.



version for about a week and a half now (with occasional breaks for sleeping, eating, and pretending that I'm working); the DOS version will be available by the time you read this, and a Windows version should be available this spring.

Like its predecessor, SimCity 2000 puts you in charge of designing and administering a city, trying to make the city grow while keeping the citizens relatively happy. But SimCity 2000 takes advantage of the faster, more powerful computers of 1994 and adds a new level of sophistication to the game. The basics are the same—you build industrial, res-

idential, and commercial zones, and then provide services such as power plants, police protection, and mass transportation. But there's more lying underneath the city now—literally, since you're now concerned with sewage and plumbing!

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While there are a few intolerably smug people who can easily soak up a new language, the rest of us have to work at it. Ever since the curse of Babel, people have been trying to find a painless way to acquire a second language, through techniques ranging from hypnosis to sleep-learning to the use of magic rings. It's no wonder that the personal computer has been pressed into service as a language tutor. The past several years have seen the appearance of a number of programs that purport to help you learn a foreign language; many of the newer programs take advantage of CD-ROM technology to provide digitized video and recordings of native speakers to help your pronunciation. But upgrading their systems isn't a move that many users are prepared (or able) to make yet, and while some CD-ROM programs are also available in disk format, they may

take up to 40MB on your hard drive. So the big question is whether there's anything out there that can help you get bilingual without making a big hardware investment

or further taxing an already overtaxed hard disk.

The good news first: Yes, there is. While it's not likely that any computer-based instruction can ever replace classroom or real-world experience in learning a second language, the programs covered here can be

of some help to people who wish to practice above and beyond the call of the curriculum. Even better, the largest of these requires no more than 15MB of drive space, and most require much less. The programs reflect different philosophies of

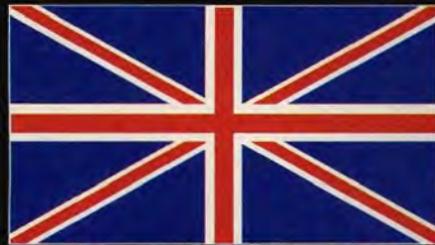
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language learning, which may be a good thing. People do, after all, have different ways of learning a subject and different reasons for wanting to know a new language. The bad news is that no matter which of these programs you choose, you're still going to have to use your brain.

A common way to begin learning a language is to memorize basic words and phrases so you can get by in a foreign-language environment. The EZ Language



series from Future Trends Software is a good place to start. EZ Language is the PC version of the traveler's vest-pocket phrase book. There is no attempt to instruct the user in grammar. EZ Language simply tells you what to say to get what you want, and it's perhaps less concerned with comprehension than with results—probably the main concern of most tourists. Once past the title screen, you enter the colorful Main menu, which consists of eight subject areas (Basic Phrases, Arrival, Eating Out, Shopping, and so on). Clicking on any of these areas will give you a series of phrases and illustrated vocabulary words; click on any of these, and you'll hear a native speaker of the language say the word or phrase (EZ Language can use the PC speaker if you don't have a sound card, though you'll have to load a driver for it). If you have a microphone to plug into your sound card, you can record and play back your own voice to check on your pronunciation. Once you have gone through the whole lesson, you'll be tested. Correct answers get a gong of acknowledgement; wrong answers get a bizarre cuckoo whistle.

EZ Language is fun to play with; interspersed with the lessons are fun facts about the country and digitized photographs of scenery. It can be instructional on a very



ESPERANTO

basic level, though you have to wonder who its intended audience is. As a phrase book, it's bulkier (and less comprehensive) than the old vest-pocket editions, and not many tourists carry their laptops everywhere they go on vacation. The tests are also occasionally so transparent that they're no real gauge of ability. If the test sentence is *Le _____ est cassé* and only one of the four English choices has a blank in it, can you guess which is correct? Users who are looking for a basic tourist-survival vocabulary will find EZ Language useful, and children just beginning in a foreign language will find it a lot of fun. But while the technique of beginning in a language by memorizing vocabulary and expressions is certainly valid, older and more serious language students will want to look for something a bit more substantial.

Torture for the Advanced

A more substantial program for building a store of words and phrases is the Word Torture series from HyperGlot (available in Spanish, German, French, and Italian). Word Torture is a high-tech take on an old language class standby, the flashcard drill. Word Torture's Preference Page lets you set up the conditions for your drill: You can choose from three vocabulary lists and decide how many words to include in the session, the order in which the words will appear (random or alphabetical), the length of the pause between words, and whether to use the flashcard or test mode. Once you're set up back at the Work Page, Word Torture will flash a word in either the original or the target language. If you're in flashcard mode, the translation will pop up in the Correct Answer window; if you're in test mode, type the answer in another window and wait for the verdict. Word Torture keeps a tab on your performance and tells you your score.

Working on the flashcard model, but taking it a step further, is the VocabuLearn/ce series from Penton Overseas. It's available in a number of languages, in both DOS and Windows formats. Beginners will probably opt for the default setup, which presents a series of English words and phrases whose foreign-language counterparts are hidden until you click them onto the screen. You may work at your own pace or click on the Scan option, which flashes the cards at you at an adjustable rate. What VocabuLearn/ce offers over Word Torture is sound. If you stick with the default word order in VocabuLearn/ce, you can use the two 90-minute cassettes that come in the package. As you click from word



Pronunciation Tutor gives you a start in learning to speak like a native.



German Word Torture drills you on your language skills using flashcard techniques.

to word, you can listen to native speakers pronouncing the words on the flashcards. Once the drill becomes too comfortable, you can go into the Options menu and liven things up a little by randomizing the order of the flashcards, changing the automatic Scan rate, or choosing to type in the correct answers. You can enable the Hint function, which supplies clues like those on "Wheel of Fortune."

Tense About Learning

English speakers trying to learn a foreign language probably have more trouble with verb tenses than with any other aspect of grammar. Consequently, one of the first tasks of a new language learner is to memorize verb conjugation tables. Tense Tutor, available from HyperGlot (in Spanish, German, Italian, and French), drills you in your understanding and listening comprehension of verb tenses. To begin, you're given a list of the tenses in the language; click on any of these tenses, and you'll be switched to the testing screen. Click on the Test Me button, and a digitized voice will speak a sentence in the language you're studying. You then respond by typing in the tense form you think you've heard. If you'd like a hint or two before you commit yourself to an answer, Tense Tutor will oblige. You can ask for an English translation of the sentence or call up a conjugation chart of the verb forms of the tense you have selected; the Comments button provides miscellaneous information about tense usage in the sentence you're working on, while Tense Help lets you review the basics of tense formation. If, despite all this help, your answer is still wrong, Tense Tutor will keep retesting

you on all the tense forms you've missed until you get them all right—or until you choose to abandon retesting and move on to another tense.

One important key to being understood—and avoiding hoots of derisive laughter—when speaking a foreign language is pronunciation, and the only way to perfect pronunciation is continual practice. This usually means spending hours listening to tapes in a language lab. HyperGlot's Pronunciation Tutor (available in Spanish and French for PC users) is useful for dedicated students who want an extra bit of practice at home. Pronunciation Tutor provides a list of click-on buttons dealing with such topics as basic vowel and consonant sounds in the language, stress and accent, combining words in phrases and sentences, and the like. Click on the pronunciation area you want to practice in, and the drill window will display a list of words, phrases, or sentences; click on any of these, and the digitized voice of a native speaker will pronounce them, singly or all at once. Pronunciation Tutor won't be all you'll need to achieve a native speaker's accent, but if you can master the pronunciation of the words in the program, you'll have made a good start toward speaking the language in a way that won't embarrass you.

Transparent Tutor

Drills such as the ones we've covered are good for pumping up your vocabulary and brushing up your grammar knowledge. But the real test of language ability is how well you can use it in conversation, reading, and writing.

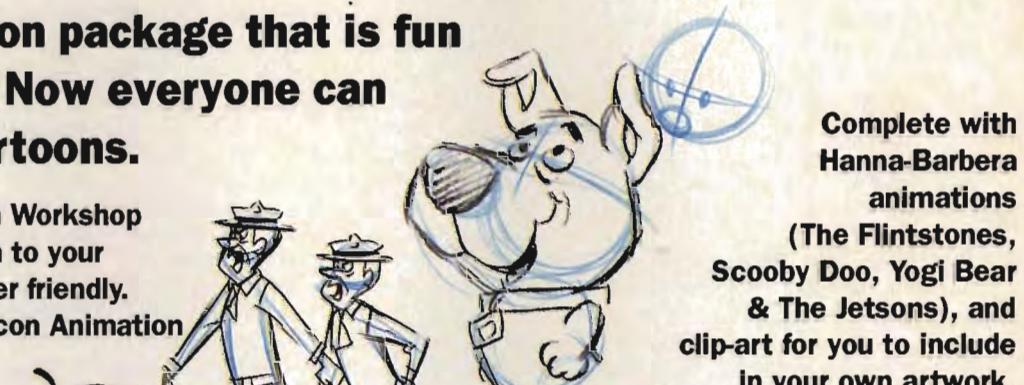
If you remember learning to read with an adult standing at your shoulder and helping you with the hard parts, you've got the idea behind Transparent Language, a foreign-language reading program whose philosophy is that you learn to read not by memorizing grammar or vocabulary lists, but by actually reading. In Transparent Language, the window in the top half of the screen contains the foreign-language text. As you tab (or click) the highlight from word to word, the five help windows at the bottom of the screen provide translations of words, phrases, and clauses, as well as further information such as etymology, case, and part of speech. The texts you'll be reading in Transparent Language won't be the simplified-vocabulary drudgery of most beginning language courses, either. You start off with the big guys: Ovid, Hoffman, Cervantes, and their peers. The idea is to start you off reading immediately, however badly, with the

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safety net of instantly available translation and commentary if you want it (and if you don't, the translation windows can be hidden).

Mindful, however, that many language students thrive on word lists and drills, Transparent Language's version 2.0 has added such features as the ability to create vocabulary lists as you read and then to print these out along with the complete foreign-language text. The program also includes Vocabulus, a game that drills you on spelling skills. The Transparent Language core program offers sample texts in German, French, Latin, and Spanish, but you can purchase other works on disk from its catalog.

Hiring a Translator

For many people, the ideal foreign-language program would be one that obviated the need to actually learn the language and, instead, simply did the translation work for them. While we're still a long way from that, there are a couple of programs for the PC that come close. The Language Assistant series from MicroTac Software (available in Spanish, French, German, and Italian) and Power Translator 2.0 from Globalink are both the sort of thing you probably daydreamed about in

your high-school language classes. Both are capable of translating from English to a foreign language and vice versa. Neither is really a language-teaching program; both are designed for people whose business involves frequent foreign-language contact, and both assume that the user has a fairly idiomatic command of the target language. Although beginners in a language should stay far away from both of these programs, more advanced students may find them to be of help in developing more effective writing skills.

Both Power Translator and Language Assistant provide rapid, approximate translations from one language to another. Not being human, neither of the programs is especially sensitive to connotation or context; they choose the most common translation for a word, whether or not it's appropriate for the context in which it appears. Both are also somewhat confused by complex sentences, so the user's manual of each application advises you to deal chiefly in simple sentences. Once the programs have produced a rough translation, you're expected to revise the translation to make it more natural and idiomatic.

Of the two, Power Translator seems

to produce the smoothest and most idiomatic initial translation—no doubt due in part to its impressive bilingual vocabulary (250,000 words and phrases). It can translate text files either sentence by sentence or all at once. But probably its most attractive feature is its ability to translate instantaneously. Simply type the word or sentence in the original language window at the top of the screen, and in a matter of seconds, you'll have a fairly approximate translation in the bottom window. If a word cannot be translated because it's not in the dictionary or if it cannot be properly inflected in the sentence as written, it's flagged in the translation. During the editing process, you can change the offending word in the original and retranslate, or you can go into the dictionary later to add the definition or revise existing definitions to meet your specifications.

Language Assistant lacks Power Translator's ability to instantly translate typed-in text; it works solely from imported text files or files created on its own internal text editor. If what you're really after is practice in learning to write a language, Language Assistant may be more useful than Power Translator. It provides a lot more online help for the writer. Whereas Power Translator presents its translation as a *fait accompli* and gives little online assistance in editing the translation, Language Assistant provides a dictionary window. As you tab the highlight from word to word in the translation window, the dictionary window displays alternate translations for the word in the original. And while Power Translator suggests that your translation is best edited in your word processor, Language Assistant's internal text editor lets you access both the bilingual dictionary and the verb conjugator to help in fine-tuning your translation. You can also make both the dictionary and the conjugator memory-resident so as to access them in most DOS word processors. The upshot of this is that while Power Translator will produce smoother, less patchy initial translations of a text, Language Assistant will actually come closer to teaching you how to think and write in a foreign language by leaving a lot of the vocabulary and connotative choices up to you and giving you the help you need to make those choices.

Making precisely those choices is the heart of language use, and the best of the foreign-language programs recognize that. Language use is, after all, a dynamic human enterprise—not something that a machine can do for you. As I warned you, you're still going to have to use your brain. □



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CASIO Z-7000 TANDY Z-PDA

Imagine a device about the same size as your schedule book that not only lets you organize your day, but will also send faxes and email, keep track of your finances, play games, and even translate languages. No, I'm not talking about a Star Trek tricorder (these gadgets won't warn you if your mother-in-law is actually a Klingon)—I'm describing Casio and Tandy's new personal digital assistants (PDAs).

Originally known as Zoomers (Tandy's unit still says Zoomer on the case, but Casio seems to have dropped the name), these devices weigh less than a pound and fit easily into a jacket pocket. Tandy's and Casio's offerings differ only in the name imprinted on the case—functionally, they're identical, so price and support are the primary considerations in choosing which brand to buy.

To use the Zoomer, you flip its case cover to the back of the unit and pop a small stylus out of a storage compartment on the bottom. There's no keyboard, so all input is done by drawing directly on the 256 x 320 pixel LCD screen. You can print text or draw pictures; text can optionally be recognized and converted to ASCII data. Unlike Apple's competing Newton, the Zoomer recognizes only printing, not cursive handwriting.

While the Newton uses a custom operating system with a RISC processor, Tandy and Casio chose an Intel-compatible chip and the GeoWorks GEOS multitasking operating system. The choice of GEOS may make the Zoomer a bit

more intimidating to those who haven't used computers, but the familiar interface actually flattens the learning curve for those of us already accustomed to PCs. The software applications built into the machine's 4MB of ROM include a calendar/to-do list, address book, calcula-

transfer its data to the full-blown desktop version of Quicken. Data and programs are stored in 1MB of RAM, 352K of which is available as a RAM disk.

One big advantage the Casio and Tandy PDAs have over the Newton is battery life. While Newton man-

dard or wireless credit-card modem. Basic file transfer software is built in. There's also a custom version of America Online built into the ROM, but it's limited to accessing email, the PDA support forums, and news services—you can't access general forums.

Not that you'd want to do much more than email with a current-generation PDA like this anyway—the Palm Computing PowerInk writing recognition just doesn't lend itself well to creating long notes. Apple's Newton recognizes entire words (or misrecognizes them, which can make for some amusing Newton party games); while this is great for creating long notes, this dictionary-based method means that many proper names and street names are going to be recognized incorrectly. PowerInk avoids this by attempting to recognize individual characters instead of entire words. It does a pretty good job—once I learned to concentrate on printing neatly, the PDA could recognize about 95 percent of the characters I wrote. When the Zoomer does get a character wrong, editing tools make it easy to correct your mistake. Nevertheless, after stopping every third word to fix a character when trying to compose an email reply, I eventually broke down and brought up the Zoomer's on-screen keyboard and "typed" the letter using the stylus.

However, if you're not transferring data to your PC, there's not necessarily a reason for having the PDA recognize all of your writing. (You can leave your writing in "ink" form, with the PDA storing it as a graphic image.) When I create address book entries, I have



The Z-7000 personal digital assistant is just the thing for storing information when you're on the road.

tor and measurements conversion tool, dictionary, thesaurus, notepad, a spelling checker, and three games. You'll also find some small but handy reference programs, such as a 1,000-word translator that features languages such as Serbo-Croatian, as well as listings of U.S. holidays and telephone area codes. Travelers with expense accounts will love Pocket Quicken, a financial manager that can

ages about 20 hours on a set of batteries, these units claim over 100 hours life off three AA batteries. After over a month of use, neither unit I tested has needed a battery replacement.

The Zoomer has communications capabilities using three ports: An infrared receiver/transmitter for exchanging data with other Zoomers, an RS-232 serial port, and a PCMCIA 2.0 slot which can accept a stan-

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REVIEWS

the PDA recognize the last name, so I can search for it, but I just leave the rest of the entry in digital ink format to avoid having to correct misrecognized numbers or characters.

Should there be a PDA in your future? Absolutely. I've found the Zoomer to be incredibly useful as a personal organizer, since features like to-do prioritization are unavailable in paper organizers. However, the Casio and Tandy PDAs represent the first generation of a new technology, and as such have problems like imperfect writing recognition (I have yet to get the thing to recognize a *K*). If you're not going to use the communication capabilities (along with AOL, wireless email and paging are on the way), these PDAs are essentially more expensive (\$630 to \$700 street price) replacements for a \$200 Wizard or \$30 paper organizer. A couple of months with the Zoomer have convinced me that the technology is viable and attractive, but unless you're a "gotta have it now" technology nut, you might be better off waiting for the next generation.

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CLARISWORKS FOR WINDOWS

Although "works" packages are often referred to as integrated software, their combined applications usually operate independently of one another, offering data com-

patibility but little or no true integration of features. ClarisWorks for Windows, however, defies this integration misnomer.

You can, for example, draw a graphic in your database reports or create a spreadsheet in a word-processing document. You still

ClarisWorks is your program; it allows you to create and edit objects without even knowing what an object is.

With programs like Word and Lotus 1-2-3, it's not uncommon to discover new features after months or years of use. Such complexity can



ClarisWorks for Windows is one of the first works applications where all of the modules are truly integrated.

create files specific to one of four application environments—word processor, database, spreadsheet, and desktop publishing—but ClarisWorks' integration allows you to easily create and edit graphic, text, or spreadsheet objects in any kind of document.

This is similar to the Object Linking and Embedding (OLE 1.0) capability of programs like Microsoft Works, but it's better because you can edit ClarisWorks objects in place. Editing with OLE 1.0 loads the object and its parent program in a separate window, forcing you to make changes outside your main document. With ClarisWorks, you make your changes without ever leaving your document window. If all this sounds rather technical and bothersome, then

be intimidating if you don't need it. Two advantages of integrated packages are that you don't pay for frills and you don't have to work around them. ClarisWorks is a set of essential productivity tools capable of meeting most personal, academic, or small-business needs. Claris hasn't tried to reinvent the word processor, database, spreadsheet, or desktop publishing program, but it has put them together in a way that's more logical and effective than with similar packages. You get an appropriate set of features with a minimum of buttons, sub-menus, and dialog boxes. This streamlined packaging results from the omission of many redundancies that larger programs offer, such as having a toolbar button and a menu command that do

the same thing.

ClarisWorks uses a true WYSIWYG edit screen, eliminating the need for a print-preview mode. You can zoom the view from 3 to 3200 percent, and you can edit your documents while displaying margins, headers, and footers. Other notable features include 100 functions to calculate or manipulate data in databases and spreadsheets; a spelling checker for all four environments that lets you easily create, import, and maintain custom dictionaries; and a bookmark for quickly leafing through records in your database.

Next to feature integration, ClarisWorks' graphics application is what really sets the package apart from other integrated programs. There are seven drawing tools, with line and fill palettes of 81 colors and 64 patterns. You can draw lines of any point size, with or without arrowheads, and menu options let you flip, rotate, group, ungroup, and align objects and text. These and other features add up to give you a basic but very capable structured drawing and desktop publishing program.

Unfortunately, there are some features missing that even a basic desktop publishing program shouldn't be without: text wrap, graphic cropping, and movable guides or rulers. With a little ingenuity, you can compensate for the lack of these features, but their absence can be frustrating, even if you do only occasional desktop publishing. There are a few other features missing from the package, such as word count, drag-and-drop text editing, and special character insertion. Claris says some of these features will be in-

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This game is not for the faint-hearted. Contains violence and some material inappropriate for minors under 18.

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cluded in the next release.

Compatibility should never be a problem with ClarisWorks. It imports and exports most popular file formats, though its only exportable graphics formats are Windows Metafile and Macintosh PICT. You can share files transparently with the Macintosh version of ClarisWorks 1.0.

At less than 4MB for a full installation, ClarisWorks is a good choice for a notebook or laptop. It's an excellent program for anyone who needs basic word-processing, spreadsheet, database, and layout capabilities without the host of complex features that accompany expensive, specialized, full-blown applications.

PHILLIP MORGAN

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TORNADO

The old infantry maxim, don't fire until you see the whites of their eyes, could easily apply to pilots of the Tornado, Britain's premier low-level fighter/bomber. Words can't describe the rush you'll feel clipping tree-tops at 600 knots or leading a six-plane interdiction strike to carpet-bomb a weapons factory at 400 feet. Spectrum HoloByte captures all the strategic nuances and white-knuckle, in-your-face action of this sweep-wing dynamo with Tornado, one of the most polished combat flight simulations of recent years.

Designed by Britain's Digital Integration, creator of Electronic Arts' F-16 Combat Pilot, the simulation successfully targets beginning, intermediate, and advanced

combat pilots. The sim is the first to spotlight the Panavia Tornado, a recent star of Operation Desert Storm, in both its GR4 Interdictor/Strike (IDS) and F3 Air Defense Variant (ADV). As the plane is best known for its deadly efficient air-to-ground strikes, the game fo-

Depends upon your rank, the Mission Planning screen allows you to plot strategies, gather intelligence data, pinpoint targets, study mission briefings, draw flight plans (way points and air patrols), verify payloads, and view weather maps. One particularly interesting feature pro-

achieve visual sightings, even at close range. Remember that you're strapped into a heavy bomber, not a nimble fighter, so don't expect to win many dogfights. The best defense is to simply hug the terrain and avoid enemy radar.

The game's biggest fault is the needless complexity of the in-flight keyboard controls. A double-sided, fold-out reference card is provided, but referencing it during the heat of battle is an awkward task. The key assignments aren't that difficult to learn, but they're burdened with finger-cramping combinations of Alt, Ctrl, and Shift keys. A keyboard overlay would help tremendously.

In-flight graphics are strictly state-of-the-art, featuring excellent bitmapped cockpit displays, especially the rear-seat weapons and navigational controls. Outside graphics are solid-fill polygons—nothing fancy, just clean and fast. The game performs well on any 386 PC, and it screams on a 486. All aircraft, ground vehicles, and weapons systems are described in detail in the superb 332-page flight manual.

Veteran air-combat fans will no doubt find fault with the simulation's slightly simplified flight model. However, the aircraft's unique design and specialized combat role should attract even the most jaded air warriors. Those new to the genre will find Tornado a combat sim they can grow into, not out of, with a nearly flawless learning curve and significant long-term challenges.

SCOTT A. MAY



You're not in the skies alone when flying Tornado—coordinated attacks are required to win the campaign.

cuses primarily on the IDS.

The program's extensive ground simulator and training missions provide an exceptional introduction to all major flight control, navigational, and weapons systems, as well as in-depth mission planning. In fact, the game's thoughtfully designed simulation mode and training exercises are what truly separate this product from its competitors. While other sims merely jettison you into crippled versions of actual missions or into unstructured free flight, Tornado offers a self-paced, comprehensive program right out of RAF flight school. Here you'll learn everything from loft-bombing and foul-weather landings to using ground-radar targeting and coordinated multicraft ground strikes.

The game's Super VGA preflight interface is striking.

vides a 3-D, virtual-reality view of any area of the map via a remote-control camera. Explore objects at close range or rocket cross-country at 800 knots. Sure, it's pure fantasy, but a lot of fun.

The selection of game options is huge, offering ground simulations (20 missions), hands-on training (10 missions), single-player missions (60, divided among three different war zones), multimission campaigns (six, on two skill levels), and Commander mode (three full-scale situations, with complex military and political strategies). There's even a two-player dogfight option, requiring either null or remote modem links, supporting up to 14.4-Kbps serial connections.

Limited external view choices during air-to-air dogfighting make it difficult to

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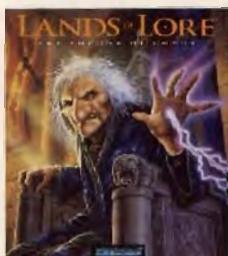


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DESIGNER 4.0

When Micrografx began rewriting Designer, its premium illustration program, in 1991, it dominated the land of Windows graphics software. But as the Richardson, Texas, company worked to build a powerful 32-bit graphics engine and an efficient new user interface, a fearsome rival appeared. The Windows marketplace was booming, and Corel Systems was there to capture a huge chunk of the territory.

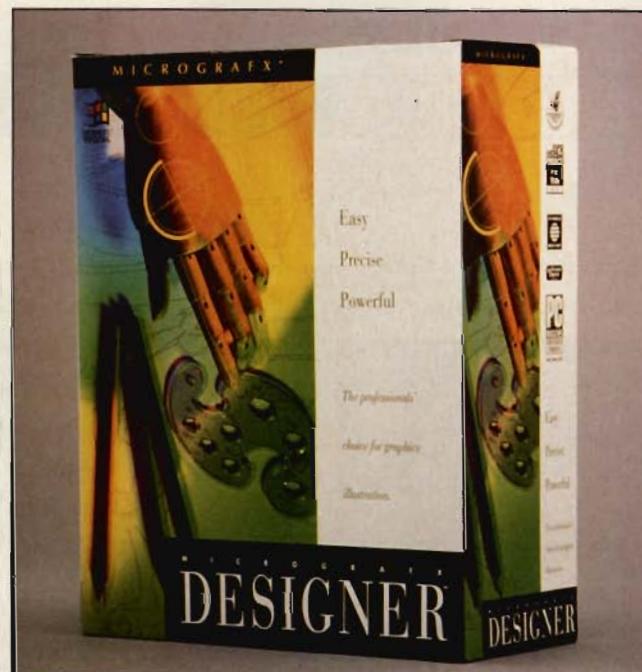
With the new Designer 4.0 pitted against a phenomenon like CorelDRAW! 4, the folks at Micrografx seem like Jim Bowie and Davy Crockett at the Alamo: outnumbered and outgunned. Compared to the Swiss Army Knife of Windows software, Designer can't match CorelDRAW!'s 640 megabytes of clip art and fonts, or features like cartoon animation and multimedia presentations. But Micrografx believes that graphics professionals, the customers who'll spend \$700-\$800 for high-end drawing software, are less concerned with those extras than with the functions needed for demanding jobs like technical illustration and graphic design. Designer's appeal comes from its flexible user interface and from the power and precision of its core drawing and designing functions.

Naturally, Designer offers the full range of 2-D graphics, with graphic primitives such as lines, polygons, curves, bitmaps, and text, as well as sophisticated warping and blending effects for more complex objects. Designer also supports 3-D shapes, with interactive control over lighting, shading, and perspective.

Advanced desktop publishing and color prepress features give the control needed for professional-quality output, and the included 24-bit PhotoMagic program handles bitmap editing.

Designer's graphics engine resolves dimensions as small as one micron or as

To meet the challenge, Designer's interface uses a toolbox at the left edge of the window, with buttons for tools such as 2-D drawing, text, and editing. Selecting a tool changes the ribbon above the drawing window, displaying buttons for specific operations like drawing



Micrografx Designer 4.0 is aimed at artists who need precision for technical illustration and graphic design.

large as several kilometers; it's precise enough for nearly any drafting or design task. For the ultimate precision in creating and modifying objects, operations can use exact numerical dimensions via the Coordinate dialog box, and dimensions can use any unit of measurement, including custom-defined units, scaled dimensions, or even nonspatial units like time and temperature measurements.

With professional tools, common tasks should be fast and simple, while features used less often should be easy to locate and learn.

rectangles and reshaping curves. But the toolbox is customizable. You can add buttons for common operations to the toolbox, where they'll always be available with a single click. Context-sensitive help aids in finding new features, as does a hint line describing the function of the button, menu item, or dialog box underneath the mouse pointer. Many operations also offer interactive previews, while a 99-level undo feature reduces the worry level when trying something new.

This isn't a program for wimpy PCs. My test system

was no slouch, with a 50-MHz CPU, 8MB of RAM, and accelerated local-bus graphics, but Designer brought it to its knees at times. Some delays came from CPU-bound operations, particularly when formatted text was involved, but most of the time memory paging caused the slowdown. Designer is quite a large program, and though Micrografx lists 4MB as the minimum needed, the main executable file alone weighs in at a Texas-sized 4.8MB. You'll find that 8MB is really the bare minimum, and if you plan on using Designer professionally, 16MB of RAM should be part of your business plan. For dealing with complex Designer illustrations, no PC is too powerful. But if you have the hardware to run it well, Designer is an excellent tool for demanding illustrators and designers.

Though it can't match CorelDRAW!'s awesome roster of accessories and add-ons, Designer handles the fundamentals of drawing and illustrating with power and precision.

TIM VICTOR

Micrografx
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GULLIVER

If you need a small nimble mouse for use on the road with a laptop or on a cluttered desk, Gulliver could be for you. It's an unusual but interesting half-size mouse with some nice software driver options.

Gulliver is about half as long as most mice, and a little slimmer and lower. The far edge slopes away like a sports car hood with the pri-



CYBER RACE™

CYBERDREAMS™
ENTERTAINMENT SOFTWARE

Circle Reader Service Number 144

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CYBER RACE - A REVOLUTIONARY 3D COMBAT AND RACING SIMULATION DESIGNED BY WORLD-FAMOUS FUTURIST SYD MEAD, WHOSE DESIGN CREDITS INCLUDE *BLADE RUNNER*, *TRON*, *2010*, AND *STAR TREK: THE MOTION PICTURE*.

Available for the IBM PC and Compatibles (August 1993), Commodore Amiga (March 1994) and Apple Macintosh (March 1994).

For further information please contact: North America (818) 348-3711 • Europe (071) 328-3267 (U.K.)

 www.commodore.ca

mary button across the front edge, a secondary one just behind it, and a small turbo button farther back (it's a gain button that toggles the mouse's speed).

The software driver for Windows includes a couple of nice touches: You can swap the primary and secondary buttons, and you can turn the mouse upside down and use it as a handheld minitrackball. With the buttons on the bottom, though, clicking in trackball mode is a drag. Another feature lets you reprogram "north" so that you can hold the mouse at any angle that's comfortable.

The mouse has a short cable for use with a laptop; it also includes a long extension cable, a mouse-port converter plug, and a small soft-sided case. The Gulliver package includes a no-sound version of Animated Desktop, a program for creating and installing regular or animated icons and cursors.

Gulliver doesn't work well on very slick surfaces, but it works fine on others, including wood and fabric—even your pants leg. The mouse tips forward if you press on the front button too hard. The cable could stand to be a bit more flexible, and double-clicking is tricky sometimes. The manual is a bit too brief and could be improved with additional illustrative graphics.

In spite of these small objections, the Gulliver mouse is nice once you adjust to it. You might find that Gulliver makes your ergonomic mouse seem like a heavy old clunker.

J. BLAKE LAMBERT

Appoint
(800) 448-1184
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Circle Reader Service Number 439



Appoint's Gulliver mouse is a tiny little controller that will work as a mouse on almost any flat surface, or as a trackball.



You must explore a beautifully rendered opera house to find the mysterious lurker in Return of the Phantom.

RETURN OF THE PHANTOM

This Phantom is just too pretty to hide behind a mask. To wander into the grand foyer of the opera house, or the maddening slime green maze below, is to wonder whether you've somehow slipped out of MicroProse's Return of the Phantom and into some luscious 24-bit im-

age. No wonder Degas is hanging around in here.

Great art is its own excuse, of course, but there's a graphic adventure here, too. It's a rather good one and has character and brains to go with its looks. It casts you as a modern-day police inspector looking into the deadly collapse of the opera's giant chandelier. It will shortly emerge that the phantom—or the opera ghost, as

he's known—has been dispatching threatening notes to the game's principals and he means business.

Phantom takes place wholly within the walls of the opera house and its rather extensive underpinnings. While the number of discrete locations may be smaller than in other adventures (and because of this), you learn the place's ins and outs more intimately—especially since the game sends you drudging hither and thither through the structure to complete relatively modest tasks. That adds to the fun later in the game when you're transported back more than 100 years to the same environs and you get to reinspect the same props in their youth.

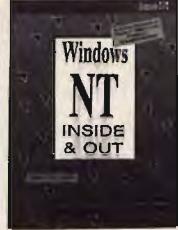
There's a sense of being very much alone in your search, to the extent that it's almost a relief to find other characters. The phantom is a peripheral figure at this stage—a fleeting glimpse, a shadow, a sound within the walls—and your first face-to-face encounter with this mystery figure will make you flinch marvelously.

You'll find yourself not minding the long treks. The interface—menus of verbs and nouns at the bottom of the screen—is unobtrusive and basic, and there's something intelligent about the writing that kept my interest. Alas, while there's delightful organ music in the game, it's hardly operatic—an odd lapse, given the subject matter. There's not much in the way of sound effects beyond the mouse squeak of doors.

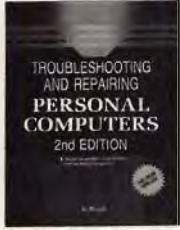
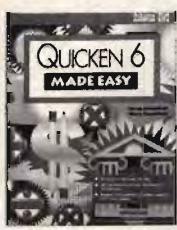
The CD-ROM version supplements the text dialogue with digitized speech throughout. It's not the first game to add full speech, but it's one of the first to do



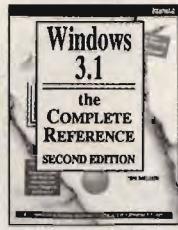
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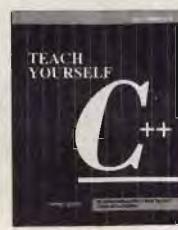
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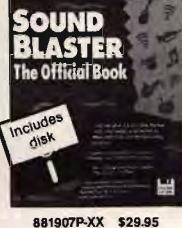
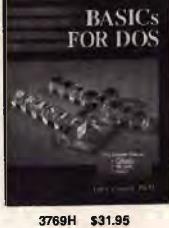
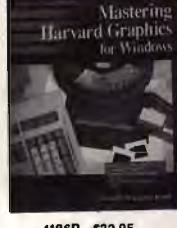
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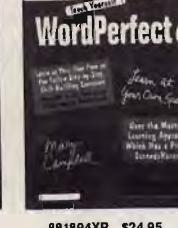
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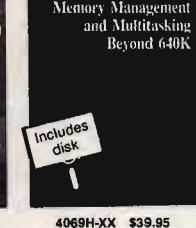
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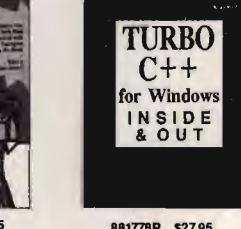
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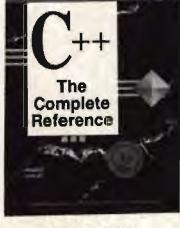
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it really well, and the speech invests the characters with much more personality than could possibly be achieved in text alone.

PETER OLAFSON

MicroProse
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THE AMAZON TRAIL

Imagine yourself deep in the heart of the Amazon rain forest. Danger lurks all around you: stinging catfish, whirlpools, disease, and even headhunters! An Incan king desperately needs someone to find some cin-



Follow me back in time through the blue mist...

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chona, a medicinal plant used to cure malaria, and deliver it to the hidden city of Vilcabamba. Can you save the king and his people?

The Amazon Trail, from MECC, is an adventure game presented in a fact-filled, educational format. In this game designed for ag-

es 10 and older, the player learns by exploring the vast jungles and rivers that make up the Amazon River basin. The game aids in the development of reading comprehension skills through the use of maps, object identification, and decision making. On your journey, you'll discover hundreds of facts about South American history and culture, as well as the ancient Incas. You'll also meet some of the actual industrialists, scientists, and explorers who left their mark on the Amazon.

Need help identifying a particular plant or animal? No problem. Just jump to the guidebook feature from anywhere within the game. There, you'll be given cor-

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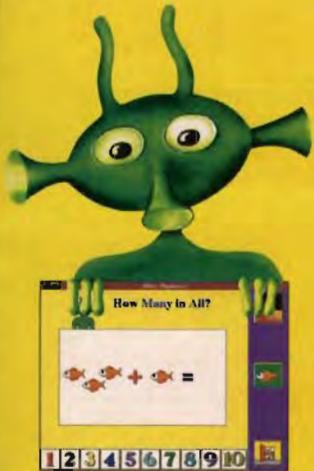
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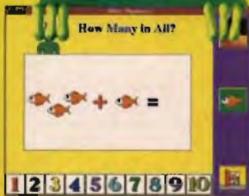
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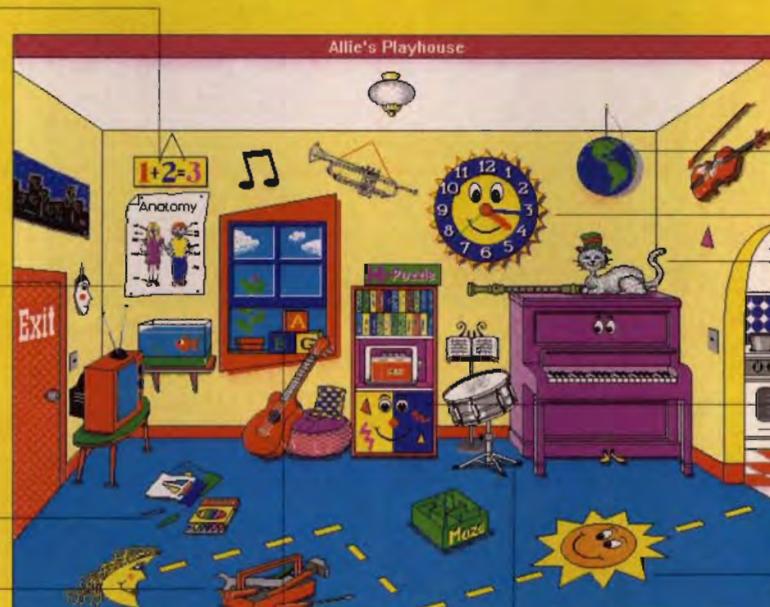


Kids love to construct and play their own musical "instrument."



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REVIEWS

rect pronunciations, detailed pictures, and brief descriptions of the plants, animals, people, and objects that you find on the trail.

Detailed graphics and 3-D animation fill the screen with lifelike images of people and villages. The animals and birds come alive in bright, radiant colors as they move through the jungle. You'll hear the sounds of the rain forest amazingly reproduced in the form of howling monkeys and growling leopards.

The Amazon Trail is a superb educational program that will surely appeal to children. Easy to play and to understand for any child whose reading skills are at the fifth-grade level or



If you don't want to wait for Chicago, you can start using an object-oriented interface now with Third Dimension.

above, this game offers a good balance of education and adventure without any complicated tasks to perform or frustrating clues to decipher. Parents and chil-

dren alike will love this entertainingly interesting offer from MECC.

ROBERT STONE

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THIRD DIMENSION

Properly equipped and finely tuned, Windows has the power and grace of a Ferrari. Too bad Microsoft chose to give it an Edsel front end: Program Manager. Clunky and awkward, Program Manager is so widely disliked that it's spawned a virtual cottage industry for replacement shells.

Sim City 2000 Design Contest

Maxis and COMPUTE Publications are looking for the very best, original cities designed with the new Sim City 2000 from Maxis. All winning cities will be included on one of COMPUTE's Winning Cities Disks. Each winner will receive \$50 plus a software package from Maxis and a game hint book from COMPUTE. So put on your city manager's hat and design your best cities.

Interested? If so, read on:

Official Rules

NO PURCHASE NECESSARY

1. Entries must be your original work and never have been distributed by electronic means. All winners will be required to affirm this in writing.

2. Submit as many entries as you want, but we cannot consider cities which have been distributed on disk or are available on any BBS or commercial telecommunications service such as CompuServe or America On-line.

3. All entries must be received no later than April 1, 1994. Print your name, address, daytime phone, and social security number along with your disk to Sim City 2000 Contest, COMPUTE, 324 West Wendover Avenue, Greensboro, NC 27408.

4. Entries must be created with either the MS-DOS or Macintosh versions of Sim City 2000. Cities created with the original Sim City will not be accepted. Entries may be submitted on either a Macintosh 3-1/2 inch floppy disk or a MS-DOS 3-1/2 inch or 5-1/4 inch floppy disk. A separate copy of this entry form must be submitted for each city submitted. Readable photocopies of this entry form are acceptable.

5. The staff of COMPUTE magazine will handle the judg-

ing. The decisions of the judges is final as to all aspects of any entry, including similarity to any entry. There will be at least five winners, but there can be as many as twenty winners depending on the quality of the entries. Winners will be selected on the basis of their originality, uniqueness, complexity, balance, general appeal and use of the new features in Sim City 2000.

6. Winners will be notified by mail by September 30, 1994.

7. The contest is open to residents of the United States and Canada, except Quebec. Full-time, part-time & previous employees of COMPUTE Publications International Ltd., General Media International Ltd. and Maxis, their immediate families and their advertising agencies, are ineligible for the contest.

8. Contestants must assign the copyright in their entries to COMPUTE using the attached form. All winning entries become the property of COMPUTE Publications International Ltd. Sorry, we cannot return any entries.

9. The approximate value of each of the prizes awarded is as follows: software \$50, hint book \$15, and cash \$50.

10. This contest is void where prohibited or restricted. All winners will be required to submit an affidavit of eligibility, including permission to use winners name and photo for promotional purposes without further compensation; failure to return this affidavit within ten days will forfeit prizes. Neither COMPUTE nor Maxis is responsible for delayed or misdelivered mail. Taxes are winners responsibility. No alternative prizes or cash equivalents of prizes will be awarded.

Every Contestant Must Fill in and Sign This Form:

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Your Name _____

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In consideration of the opportunity to enter this contest and win the prizes offered, I hereby sell, transfer, assign and convey to Computer Publications International, Ltd., all right, title and interest I possess in and to the above-titled work (the "city"), including, but not limited to, the copyright and all renewals and extensions thereof in the United States of America and all countries of the world and any and all claims or causes of action whether asserted or not relating thereto.

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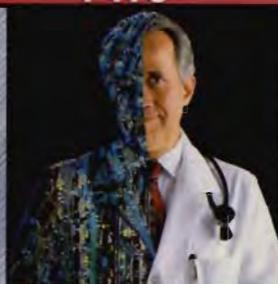


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One such product is Lucid's Third Dimension, boasting "the power of Windows" but "as easy as a Mac" to use.

Interestingly, the program beats Microsoft to the punch with many of the new features implemented in Windows 4.0. Gone are Program Manager's rigidly structured program groupings, replaced with more flexible desktop organizers. Fashioned much like the Mac's front-end system, these organizers are like customized filing cabinets, each able to hold multiple sets of drawers, folders, and data files. Such nested windows are a great boon to both productivity and desktop organization.

Third Dimension's object-oriented approach also replaces another source of Windows frustration: File Manager. Instead of navigating convoluted directory trees and dealing with cryptic DOS commands, most mundane disk activity—moving, copying, deleting, and even printing—can be handled with

the simple drag and drop of desktop icons. These and other DOS functions can also be performed in the more traditional File and Folder Manager. This feature is limited, however, lacking such standard conventions as dual directory windows—source and destination—or interactive dialogue boxes. On the bright side, the program breaks the eight-character filename barrier, allowing descriptive labels of up to 127 characters.

The product contains a host of integrated tools and accessories, including a utility that backs up, restores, and compresses data for selected files or entire drives. A task scheduler lets you run programs automatically at startup or at preset intervals. Other standard features include a disk manager (which formats, copies, and labels), a memory and system resource monitor, password protection, a Mac-style garbage manager (deferred deletion), and extensive

online help. Unique tools include a rudimentary icon animator and multiple desktop switcher. The program allows substantial user modifications of pull-down menus, pop-up dialogue boxes, display fonts, desktop colors, and file associations.

Remarkably, the product makes almost no attempt to improve the aesthetics of Program Manager. In this regard, Lucid's efforts lack the visual innovation of such replacement shells as Hewlett-Packard's Dashboard.

Although not a radical departure from the status quo, Third Dimension is ideal for anyone making the jump from Mac to Windows. Experienced users, frustrated by Program Manager but not particularly concerned with a flashy front end, should also give it a close look.

SCOTT A. MAY

Lucid
(800) 925-8243
\$89.95

Circle Reader Service Number 442

XEROX 4004

Though it prints at a soft-spoken 46 decibels, the Xerox 4004 ink-jet printer practically shouts its solidness and reliability. It offers dependable service and good print quality at a modest price, and its three-year warranty includes toll-free support and a 48-hour exchange policy.

The 4004 is obviously targeted at the PC-compatible market, with a Windows 3.1 driver disk included and a Centronics parallel port as its only interface. For compatibility with other programs and environments, it emulates Hewlett-Packard's DeskJet 500 ink-jet printer. Most DOS programs will be limited to the built-in typefaces: Courier, Gothic, and Dutch (a proportional-pitch face similar to Times), though two slots at the back of the unit can accept font cards or RAM cards for font downloads. That matters less under Windows, of course, where the full range of TrueType fonts

are automatically supported.

Like other ink-jet printers, the 4004 applies a liquid to the paper, so the paper gets soaked if the page includes large areas of solid black. Even text will smear if you don't give it a moment to dry before touching it. Liquid ink also tends to soak in and spread when it hits the page, so print quality varies with the grade of the paper. Good cotton bond works very well, but it's costly for everyday use. Ordinary xerographic copier paper is acceptable, but only when printing on the correct side. (The two sides look nearly identical to the eye when blank, but the 4004 knows the difference; humans should pay attention to the arrow on the package pointing toward the front.)

Decades of photocopier experience have taught Xerox a lot about paper handling, and it shows in the 4004's ultra-reliable sheet feeder. It finally jammed for the first time while printing a draft of this review, but the printer still earns high marks in that department. A manual feed in front handles envelopes, labels, and heavier paper.

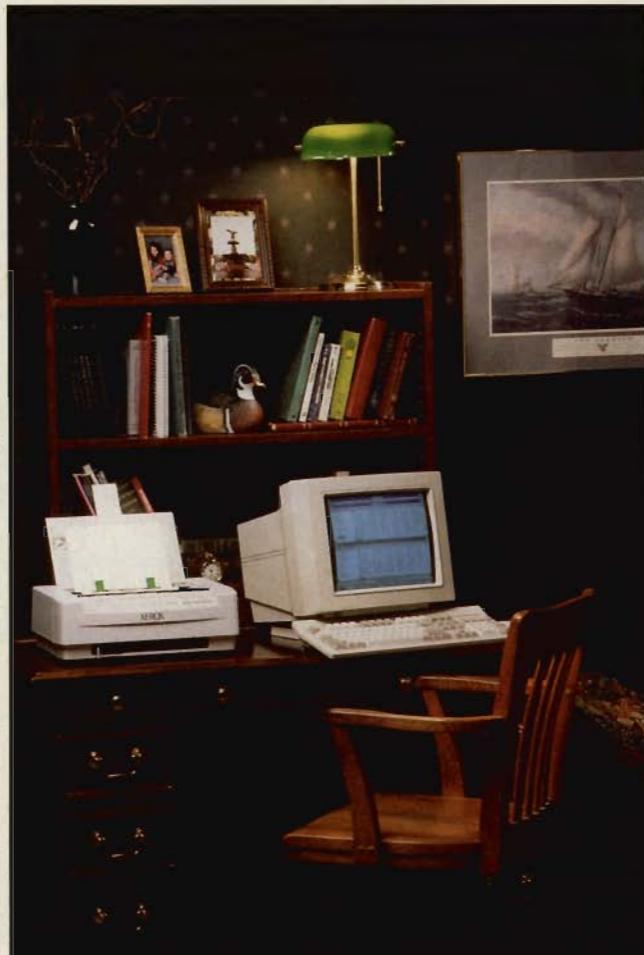
With a printing speed of about two pages per minute for straight text, the 4004 is fairly quick among nonlaser printers. On good paper, its 300-dpi resolution delivers sharp, crisp output, and black areas are always dark and consistent. At 16 inches wide and 13 inches deep, it might not conserve desk space as well as some small-footprint rivals, but for moderate volumes of high-quality printing, the Xerox 4004 is an affordable desktop workhorse.

TIM VICTOR

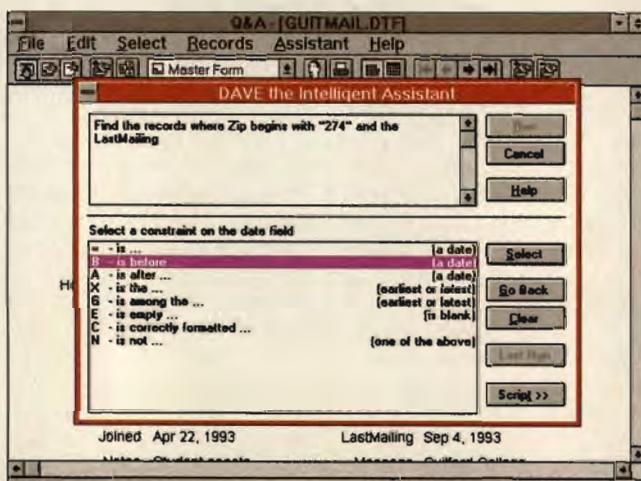
Xerox
(800) ASK-XEROX
\$299 (estimated street price)

Circle Reader Service Number 443

118 COMPUTE MARCH 1994



The Xerox 4004 inkjet printer delivers sharp, crisp output that's perfect for many home office requirements.



Q&A for Windows includes a good flat-file database as well as a nice mid-range word processor.

Q&A 4.0 FOR WINDOWS

Q&A 4.0 for Windows includes a database manager and a word processor and is aimed at the needs of individuals and small businesses. It's designed to be easy to use, but it's still a powerful product. As you might guess, the two programs together are particularly adept at mail merges (using Q&A, dBASE, or Paradox files).

Early DOS versions of Q&A let you type in questions using ordinary English to get answers. The Windows version requires you to use a certain syntax, but helps you build the phrases as you go.

Queries end up being fairly normal sentence-like constructions such as *find the records where ZIP begins with "274" and the LastMailing is before 10/1/93 sorted by ZIP*. This is often easier than filling in a query form, but you can use a form if you prefer. Q&A also lets you string together several requests into a script.

Once you get an answer table, if you edit the records, the changes apply to the original database. For example, you could type *find the records where zip is blank*, then enter the ZIP codes into the answer list where it's easiest. Many database managers require extra work to make these changes transfer to the original file.

You can view your data as a form or as a table (spreadsheet style) and can create custom forms with graphics and even buttons that run scripts. Q&A has plenty of tools for designing forms, labels, and single or multipass reports.

While Q&A doesn't claim



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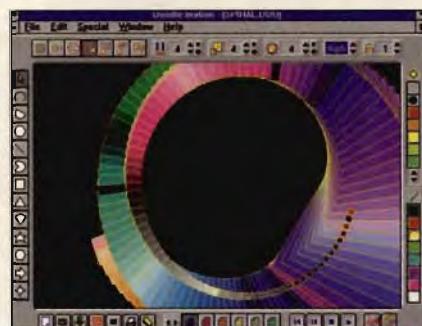
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DOODLE-MATION

What do you get when you combine pen, paper, and a wandering imagination? Doodles, of course. That almost subconscious art form practiced daily by millions of people—on napkins, phone books, or whatever happens to be handy. More than just errant scribbling, doodling can be both creative and therapeutic. Now doodle-starved Windows users have an artistic outlet with Doodle-mation, Screen Magic's engaging new software toy.

The product is essentially a high-tech melding of two venerable childhood favorites, Etch A Sketch and Spirograph. The major differences, of course, are its brilliant VGA graphics (compatible with 16 colors, but 256 colors are preferred) and stunning computer-assisted animation. The creation process is remarkably easy: Place one or more geometric shapes on the doodle canvas, and define a movement

path, shape behavior, and color scheme. Then hit the Go button and watch your creation burst to life. The 12 preset shapes are completely scalable, allowing you to bend, stretch, and shrink them to create new curves and angles. Movement paths are also quite versatile, including stationary, straight, circular, spiral, bounce, and magnetic (attracted to the mouse point-



Doodle-mation provides both a time killer and a screen saver in one package.

er). You can even draw freehand paths for the shapes to follow.

Behavior controls give your doodles animated pizazz—both beautiful and bizarre—as they hum along their merry paths. User-defined effects include animation speed, rotation, growth, and spacing between shapes. Much of the fun is simply experimenting with different combinations of object shapes, paths, and animation techniques. Even more stunning effects can be found in the color control panel, featuring two styles of color mixing (blend and sheen) and color cycling (backwave and Vegas). Other options include background, shape outline, and fill colors. Turn the color fill to transparent and change solid shapes to wireframe. All behavior and color settings can be adjusted on the fly.

Did you devise the ultimate doodle art? Save your creation to disk (with all settings intact) or convert it into a Windows screen saver. A built-in screen capture utility also lets you save snapshots of doodle screens as bitmap graphics, for gallery viewing or use as Windows wallpaper.

Though well designed, the program has a few limitations and missing features that merit serious consideration for a sequel. Most obvious is the lack of a stay-on-top, resizable doodle pad. As is, the program demands your full attention and occupies nothing less than a full-screen window. Doodling, by definition, is a multitasking activity, usually done while preoccupied with something else. Another curious oversight: You're allowed only one doodle screen saver at a time.

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Fast, fun, and completely frivolous, Doodle-mation is a nearly perfect definition of software toy. With the help of your computer's 32-bit brain, stream of consciousness artwork has never looked so good.

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FRONT PAGE SPORTS: FOOTBALL PRO

The best don't stay on top by resting on their laurels, as is proved by Dynamix with the Pro edition of its critically acclaimed football simulation. The reigning sports champ continues to blow away the competition with this terrific update to an already great game.

Those unfamiliar with this groundbreaking game should prepare to be dazzled. The program's long list of features begins with real-time gridiron action, rendered in fluid rotoscoped animation, viewed from ten playable camera angles. Take hands-on control of the action, or work the sidelines as head coach, armed with more than 1000 stock plays. You can also design your own with the point-and-shoot playbook editor, complete with on-field practice and fascinating logic-box programming mode. If number crunching's your game, take on the responsibilities of team owner and general manager. Dig as deeply into the details as you desire, including drafting, trading, training camp, substitutions, injuries, retirement, free agents, and more than 300 league, team,



Front Page Sports: Football Pro takes the classic gridiron game and beefs it up with real NFL rosters and other improvements.

and individual stat categories.

New additions and improvements to the game are plentiful, starting with actual NFL teams and player rosters. About the only things not covered in Dynamix's licensing agreement are a handful of new free agents, team logos, coaches' names, and nicknames—hence, you must manually change the generic entries for the Buffalo Bulls, Kansas City Warriors, Indianapolis Mustangs, and so on. You can also build your own league from scratch, with up to 28 teams and 1400 players, user-defined right down to uniform colors.

On-field changes include several exciting new player animations, such as leaping catches, spins, and flipping tackles. Realtime transitions between TV-style camera angles are much smoother, including an excellent blimp view with an adjustable zoom lens. The completely revamped Playbook section includes a new computer coaching profile editor, allowing you to develop intelligent strategies for more than 2500 offensive and defensive situations. The program now also produces

graphic printouts of your entire playbook. Be warned: Printing more than 1000 stock plays is a laborious, time-consuming task. The results, however, are well worth the trouble.

Other excellent new features include the ability to play 5-, 10-, or 15-minute quarters; a choice between standard and fast computer simulations; computer-generated All-Star pro games; and comprehensive career stats and player aging. Some of the most significant changes to the game aren't immediately apparent, such as the computer's vastly improved artificial intelligence. Those who find the original a little too soft around the edges will be pleased to face stiff, hard-hitting competition. About the only thing that remains on my wish list is user-defined audibles.

Simply put, Front Page Sports: Football Pro is truly a masterwork of design, function, and long-term playability.

SCOTT A. MAY

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TOM LANDRY STRATEGY FOOTBALL DELUXE EDITION

Merit Software drafts another winner with the deluxe edition of last year's popular Tom Landry Strategy Football. Designer Kerry Batts delivers a host of new features while retaining the original's proven appeal. The resulting game is indeed "better than ever," as the packaging proclaims, yet still slightly short of its goal.

All of the original game's major virtues remain intact and in many cases are noticeably enhanced: one- or two-player coaching modes, null and remote modem play, optional arcade-style graphics, digitized referee and play commentaries, printable stats, and absolutely the best mouse-driven interface in the genre. Other features held over include in-depth team ratings, scouting, injuries and fatigue, substitutions, variable coaching styles, and a what-if scenario builder.

The two most important additions to the deluxe version are a comprehensive league editor and a full 16-game season with wildcard rounds, division playoffs, and a championship game (called the Landry Bowl). The league editor makes up for the game's lack of real NFL franchise teams and players. The program defaults to generic teams modeled from 1992 pro season stats, but can now easily be modified to reflect real-life gridiron heroes. With a little research and minimal on-screen effort, you can update rosters and player attributes to '93 standings or create a fantasy league of com-

pletely original teams. Season play also corrects a major oversight in the design of the original game. The program does an admirable job of maintaining team and individual stats, from current game totals and averages to league leaders and season standings.

Still missing is a playbook editor, by now standard issue on all topnotch football simulations. This is a highly questionable oversight, particularly for a game whose main focus is the art of coaching. That said, the selection of preset plays and formations remains impressive. In fact, Landry's playbook has now grown to include exciting new offensive formations such as the Pro-I (right or left), Blue, Shotgun with Four Wide Receivers, and Trips. New plays include shuffle passes and hook-and-go receiver routes. The most profound addition to defense is the ability to pick which of your four linebackers or safety to blitz. Other options, such as backfield motion, hot receivers, double teaming, and line shifts' help turn several dozen plays into thousands of strategic variations.

Landry Deluxe proves a solid second effort, although fans hoping for a major revision may be slightly disappointed. By not taking the game its full distance, Batts essentially calls the same play twice, gaining a little extra yardage but falling short of the big score. If you liked the first release, though, you'll probably enjoy tackling the new features of this updated version.

SCOTT A. MAY

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NFL COACHES CLUB FOOTBALL

As any of us die-hard gridiron fans will tell you, there can never be enough professional football. In fact, leave it to us, and NFL players would be pounding the turf

10, or 15 minutes (exhibition games only), coaching or action mode, two skill levels, and controller type (mouse, joystick, or keyboard). If you only want to manage your team, you can stage completely computer-controlled games. A special coaching menu allows you to edit play-

out losing the data already generated. In fact, it's possible to simulate only portions of a single game and then manually take over as head coach or player.

On-field graphics are exceptional, featuring unlimited 3-D views of the action. Preset camera angles can be quickly toggled; they include offensive, defensive, sideline, coaching, press box, blimp, and ground-level views. You can also manually rotate and zoom from any of the above angles, saving up to two user-defined views. The closer you get to the action, the more detailed the graphics become, featuring a stunning combination of ray tracing and rotoscoped animation. The trade-off, of course, is speed. Closeup views may look great, but they're virtually unplayable in terms of reading the opposition or scanning the open field. Five levels of detail allow those with slower machines to trade realism for more fluid animation.

The playbook editor allows you to create new plays from scratch or to modify the built-in collection of 80 offensive and 80 defensive plays. Among the many offensive factors under your control are formations, time delays, line blocking, pass routes, hand-offs, pitchouts, motion, fakes, and timed pass patterns. On defense, options include timed delays (useful for safety blitzes), pursuit, double-teaming, bumping receivers, and zone and man-to-man coverage. With menu-driven options and a point-and-click graphic interface, play design is a snap. You can also practice a new play against any defense. Use the VCR-style instant replay and multiple camera angles to dis-



NFL Coaches Club Football is the only recent game to feature full NFL licensing of teams, players, and logos.

at least 11 months out of the year. By the same token, for hard-core computer football fans, there's always room on the roster for another pigskin simulation—especially one as well designed as MicroProse's *NFL Coaches Club Football*. Designed by Ed Fletcher and Doug Whatley, the game is the only major new contender in the genre to feature full NFL licensing: teams, players, coaches, logos, and colors. All teams feature actual 1993 rosters, with projected strengths and weaknesses (based on 1992 stats) of all the coaches and players.

One or two players can compete in either single exhibition games or full league schedules, culminating in wildcard matches, divisional playoffs, and the Super Bowl. Other play options include quarter lengths of 5,

calling tendencies in more than a dozen common scenarios. For those who love percentages and probabilities, you can even assign the same head coach to two different teams and then study the effect on overall team performance.

League play follows the real-life NFL 1993 schedules, although you can easily create your own schedules as well. Games for both player-controlled and nonplayer teams can be automatically simulated by the computer. Unfortunately, there's no option for quick resolution, so depending on your CPU speed, expect to spend from 15 minutes to more than an hour waiting for the computer to generate game results. There is a fascinating work-around to this quandary: Simulated games can be halted and resumed with-



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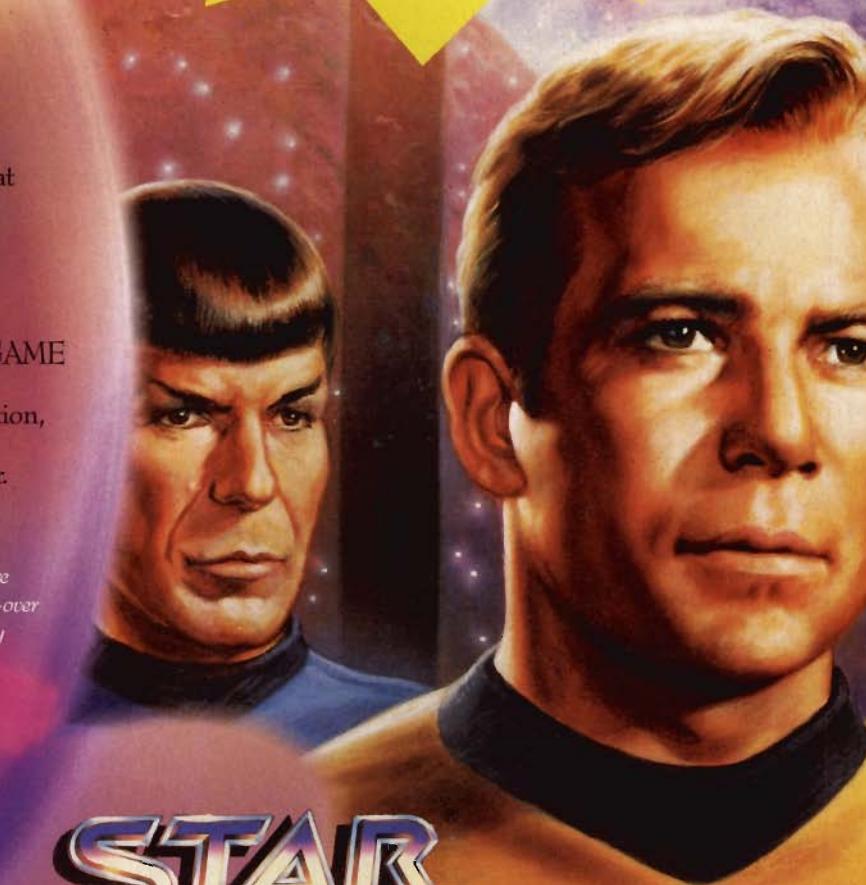
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REVIEWS

sect your handiwork.

Pure action mode is disappointing for several reasons. Foremost is the slow response to direct player input, making runs frustrating and passing nearly impossible. It's also difficult to follow the ball while it's in play—a visual nuisance compounded by inadequate depth of field, regardless of viewing angle. As an action-oriented coaching simulation, however, the game scores a huge success. Major selling points include digitized sound effects; briskly paced action, with onscreen play calling and audibles; realistic player abilities, injuries, and fatigue; and exceptionally strong computer artificial intelligence. Full statistical reporting offers in-depth displays and printouts of teams and players, covering both individual games and entire seasons.

If you're after whiz-bang arcade thrills, you'll want to look elsewhere. However, gridiron strategists with an eye and ear for dynamic action will find pulse-pounding excitement in NFL Coaches Club Football.

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What a deal! For \$49.95, you get a CD-ROM with 1000 royalty-free sound effects, a sound finder utility that lets you attach the sound effects to your Windows system events, and a sound editor that also plays audio CDs and MIDI files.

With 1000 different sounds, you certainly get a lot of variety. You'll find one elephant sound, five sets of sneezes (slow sneezes, small sneezes, large sneezes, rapid-fire sneezes, and female sneezes), seven bowling sounds (a gutter ball, a strike, a ball returning, and so on), eight screams (mostly Fay Wray-type screams), 21 science-fiction sounds, 23 horror sounds, 29 drum sounds, 43 sets of footsteps (great for radio dramas), and 99 short music clips (called IDs, they seem to be designed for television and radio news shows). Beavis and Butt-head fans will be drawn to the small selection of bodily noises, as well as the nine moans that are reminiscent of Meg Ryan's famous delicatessen scene in *When Harry Met Sally*. All 1000 sounds are

stored in both 8-bit and 16-bit WAV file formats.

You can use the sound finder utility to select the sounds by category (Ambience, Animals, Around the House, At Work, and so on) and list your selected sounds by description (Applause 80/100 people, Applause-longer 80/100 people, Arc welding torch being lit, Arcade game #1, and so on). The program also lets you play sounds randomly, browse through categories, search by keyword, attach sounds to Windows system events, and copy sounds to your hard drive.

The sound editor is actually Sound Impressions' Multimedia Sound Studio, an excellent multifunction sound utility. It looks like a four-rack component stereo system and includes a WAV editor, an audio CD player, a MIDI file player, and an audio mixer. The WAV editor is more than sufficient to let you manipulate the CD-ROM's sounds or make your own sonic creations.

Though most of the sound effects in 1000 of the World's Greatest Sound Effects are too specific for everyday use, it's still the world's greatest bargain in PC sound effects.

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MICROSOFT ARCADE

I've always been a sucker for a good arcade game. Why think when you can blast? Maybe it's because some of my first digital game experiences were bashing centipedes and blasting tanks on my old Atari 2600. When I heard that Microsoft had purchased the rights to many of these old Atari games, I couldn't wait to see the results. I wasn't disappointed.

Microsoft Arcade brings to Windows five classic Atari games. Included are Missile Command, where you must save civilization from an array of bombers, missiles, satellites, and smart bombs; Tempest, where you defend yourself from enemy aliens on a geometric playing field; Asteroids, where you blast your way through a field of space debris and vaporize the alien saucers; Centipede, where you must exterminate the invading centipedes, jumping spiders, mushroom-dropping fleas, and poisonous scorpions from the mushroom patch; and Battlezone, where you engage in wire-frame tank-to-tank combat.

Microsoft appears to have gone to great lengths to preserve the original look and feel of the coin-op originals.

Most noticeable are the early 1980s-style graphics found in Asteroids and Battlezone. There's a lot of historical reference material built into these five games. Microsoft includes, as part of each game's help file, a brief history of how the game was created and of the programmers and designers behind each project. The help files also serve as the manual for Microsoft Arcade



Centipede is only one of the classic games recreated in Microsoft Arcade.

and include information on playing each game, as well as scoring hints and winning play strategies.

You can choose whether each game is played in a window or at full-screen size. Microsoft also added the ability to customize nearly every feature of each game, including the number of lives available and the points required for earning bonuses.

In these days of virtual this and multimedia that, it's amazing how well the games included with Microsoft Arcade hold up. And there's a big improvement over the original arcade machines—you can play as long as you want without a pocket full of quarters!

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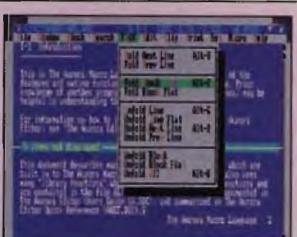
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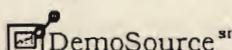


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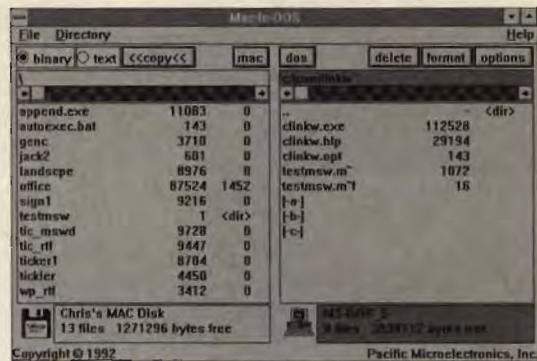
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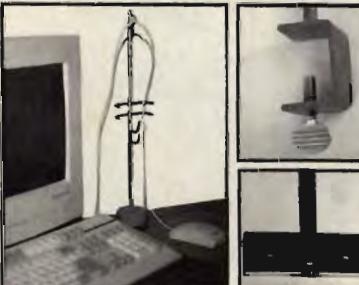
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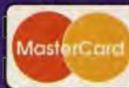
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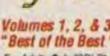
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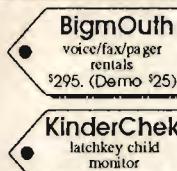
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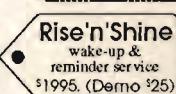
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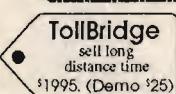
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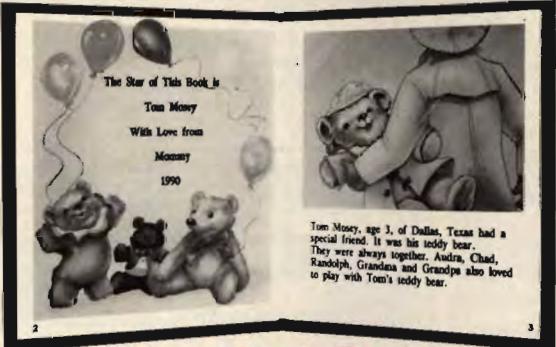
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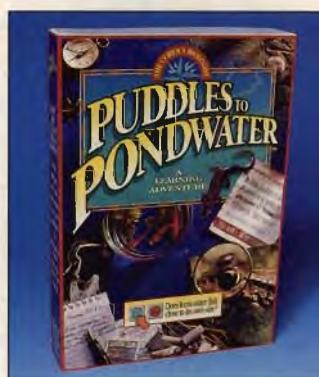
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Mac users get the first look at Voyager's newly released Freak Show CD-ROM, created by the enigmatic San Francisco band, The Residents, whose own identities remain

unknown after 23 years. Freak Show, based on The Residents' 1990 album and comic book of the same name, is illustrated in 3-D by award-winning computer graphics artist Jim Ludtke. The user interface is the freak show itself, an elaborately designed world under a big top with backstage trailers where freak show "freaks" live. You enter through the main tent, summon these people onto their individual stages for personal performances, and explore their trailers and surroundings to learn more



DX to DX2, the secret lives of Freaks and freshwater species, Compton's multimedia patent, and your IQ—PDQ

about them and their lives. Another weird addition to The Residents' lengthy repertoire, this CD-ROM will set a precedent for other musicians wanting to take their MTV experiences a step further. A Windows version of Freak Show is planned for late 1994. Contact Voyager, 578 Broadway, Suite 406, New York, New York 10012; (800) 446-2001, (914) 591-6481 (fax).

Companies or public relations firms with items of interest suitable for News & Notes should send information along with a color slide or color transparency to News & Notes, Attention: Jill Champion Booth, COMPUTE, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

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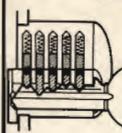
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NEWS & NOTES

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Marvelous Screen Savers

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Paper or Plastic?

To some, the idea of a cashless, checkless society in which money never passes through hands harbingered a new era of worldwide control by Big Brother. And while that thought *should* make you quake, the reality so far is that automated money management is far more practical than it is foreboding.

Intuit and Microsoft are the first to get into the act. Last fall, Intuit announced a deal with VISA that will allow PC owners to retrieve bank account information, move money between accounts, and pay their bills electronically. Microsoft announced a similar deal with National Payment Clearinghouse of Chicago, a national automated bill-paying service. In addition to convenience—such as having detailed information about your checking accounts and credit card purchases and balances—the big advantage will be in eliminating all the paperwork in money management.

But don't expect the cashless, checkless method of payment to take off quickly. Many

people in this country have never touched a PC, much less have access to one in their homes or offices; the wait could be very long.

Roots for the Future

As a new sponsor of the Global ReLeaf Heritage Program, Westlight (the stock photo agency which was the first to use Kodak's Photo CD Catalog format) has initiated a new "One Voice, One Tree" program. Each time a customer uses a Westlight image for an ad, brochure, annual report, multimedia disc, and so



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follow-up status. With a PC-based autodialing system, every call in your office can be accurately tracked for billing, and you won't have to dial a single digit, since the PC does all the work. Contact Datalogic, 3952 44th Street SE, Grand Rapids, Michigan 49512; (800) 397-2200, (616) 698-3053 (fax).

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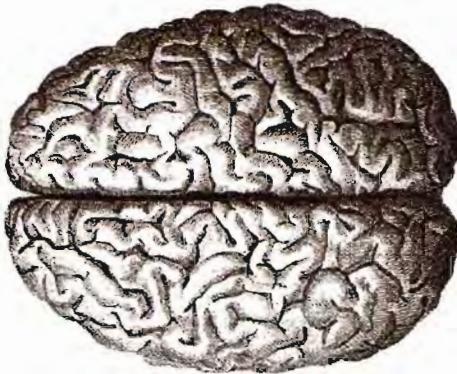
The plug-and-play universe is still expanding. Dolch Computer Systems announces the 535 PIT-VIPER, a video controller that supports virtually all flat-panel technologies in the entire industry. It supports all of the popular active matrix TFT and dual-scan STN color panels along with all available EL and Plasma monochrome panels. Designed to be an easy-to-use, plug-and-play solution, the 535 PIT-VIPER ensures a high-performance full-screen display no matter what software panel is used. And it provides for full-motion video in multimedia applications using any one of the leading video compression technologies. The 535 PIT-VIPER supports LCD with resolutions up to 1280 x 1024. It also supports high-resolution CRT monitors in VGA and Super VGA up to 1024 x 768 x 256 colors. To learn more, contact Dolch, 372 Turquoise Street, Milpitas, California 95035; (408) 957-6575, (408) 263-6305 (fax).

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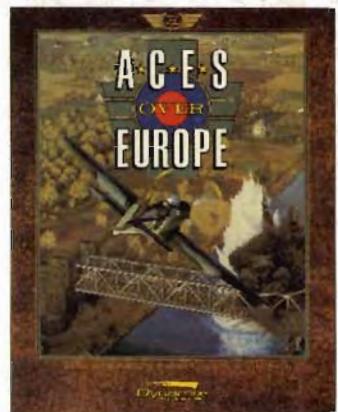
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