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The Personal Computer Book

Complete with Brand Name Buying Guide

By the Author of *The Word Processing Book*

Peter A McWilliams

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The Nashville Tennessean: "A very rare beacon of literacy in the near-illiterate high-tech sea. Reading McWilliams, in contrast with most computer authors, is such a pleasure that his books ought to carry a warning label."

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Cleveland Plain Dealer: "McWilliams combines a breezy, entertaining style with brief, understandable explanations of how computers and software work and an extremely useful brand-name shopper's guide."

Changing Times: "A fun and painless way to explore the world of bits and bytes. The best computer book of the year."

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The Personal Computer Book

Peter A McWilliams

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Other Books by Peter McWilliams:

The Personal Computer in Business Book
The Word Processing Book
Personal Computers and the Disabled

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For Fran Howell

with gratitude.



The Personal Computer Book



Introduction

This is a book for people who know little or nothing about computers, personal or otherwise.

It's for people who have had their curiosity piqued by the televised endorsement of computers by such diverse personalities as Alan Alda (who else?) and Charlie Chaplin. It is a book for those who, watching these commercials, have asked themselves, *"Charlie Chaplin?"*

It's a book for those who wonder what personal computers are, what they have to offer, and what these offerings will cost.

It's for people who have had their "computer literacy" questioned by such literary giants as *Time*, *Newsweek*, and *People*.

It's for people who don't know the difference between a microprocessor and a microorganism — who think a "Pac-Man" is a member of the Sierra Club.

Finally, and most importantly, it is a book for people who aren't all that serious about the whole computer thing. I am reminded of the late Alan Watts, who said that he was not *serious* about his work, but that he was *sincere*. I am sincere in my admiration of personal computers as powerful tools, and I am sincerely amused by those who take these tools too seriously.

In researching this book, it was necessary to attempt reading the other introductory books on personal computers. One claimed that computers were the most important invention since fire, or perhaps the wheel. I only got through three or four more pages of that book. Another said that computers were the most important step, evolutionwise, since our ancestors jumped out of the trees. I stopped reading that one right there.

Having, in my own haphazard way, studied computers for the last several years, I find it difficult to accept as a guide anyone that *serious* about computers.

If I were to look upon the time line of humanity, and were asked to locate an evolutionary turning point that most closely resembles the advent of personal computers, I wouldn't have to go back any farther than thirty years — the popular

acceptance of television. Television was successfully demonstrated in 1927 and made commercially available in 1941, but it wasn't until the late 1940s and early 1950s that television became truly popular. (In 1946 there were 10,000 TVs in the United States. By 1951 there were 12,000,000. In 1958 — 50,000,000.)

Few will deny the impact television has made upon the United States and most of the industrialized world. Observing us coolly from north of the border, the late Canadian philosopher Marshall McLuhan noted that the world had become a global village.

I do not think, however, that television rates the same niche in the evolution of the species as fire or learning to walk on two legs. Nor do personal computers.

As with all the technological advances of the last hundred years — typewriters, telephones, electric lights, phonographs, automobiles, airplanes, movies, radio, television — personal computers will change our lives, and our lives will change them.

In some areas, personal computers will prove so invaluable that they will soon be considered a necessity — small businesses for example. Big business simply could not continue without their big computers. (It is estimated that duplicating the daily output of all the large computers in the world would require three *trillion* clerical workers.)

Word processing, accounting, cost projections, inventory control, and similar functions are handled so swiftly and effortlessly by personal computers that, within a few years, the small businessperson will be as addicted to small computers as the big businessperson is addicted to the big. (See the chapter on *Personal Computers in Business*.)

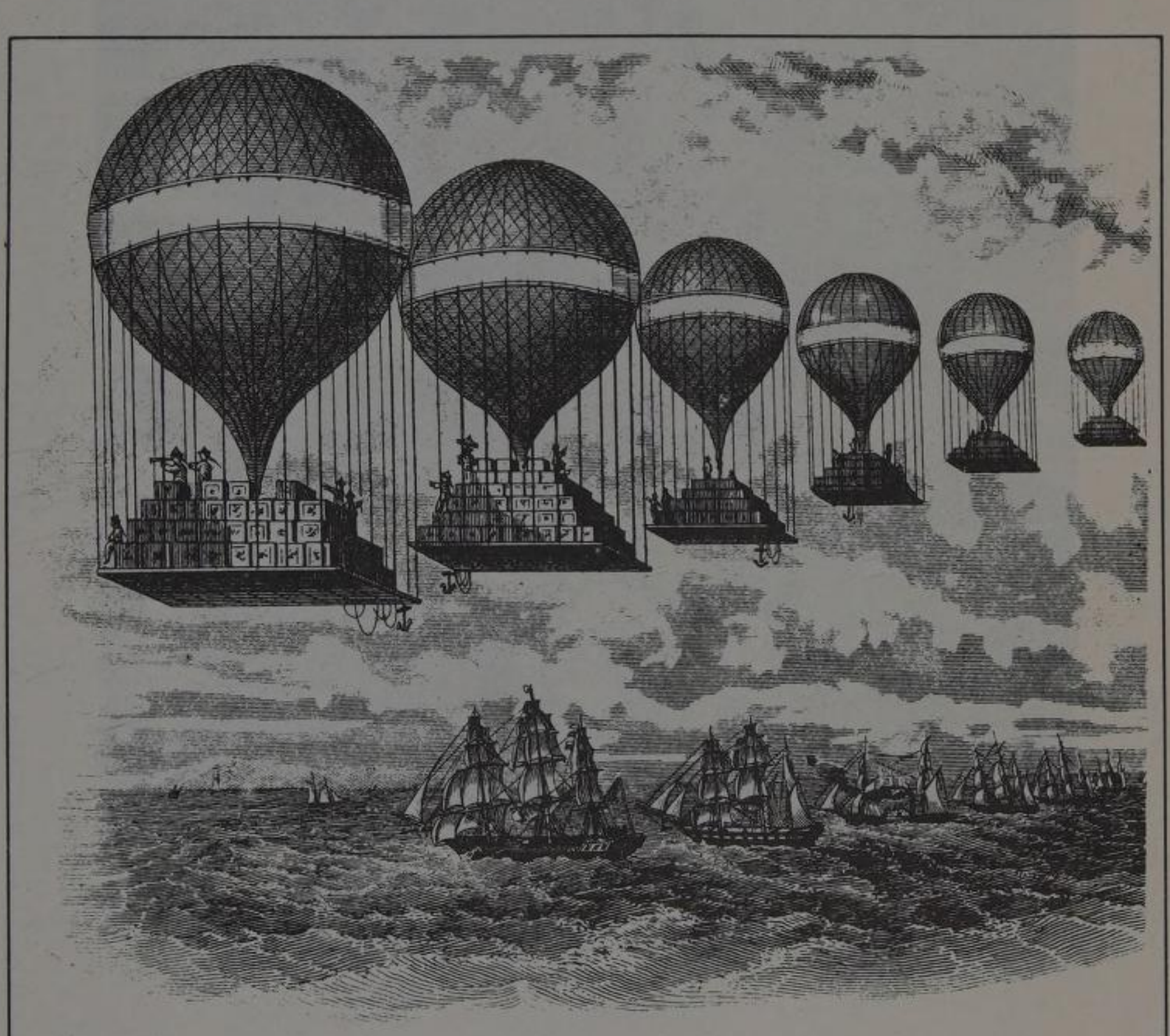
In other areas, personal computers will prove so unnecessary as to be considered a nuisance — reading the daily newspaper, scheduling appointments, filing personal income taxes, locking the doors at night, or turning the coffee on in the morning. (See Chapter Ten, *What Personal Computers Do Not Do Well.)*

In most areas, however, true to its name, the value of a personal computer will depend upon the personal interests of the person using the computer. Personal computers play

games — from chess to Missle Command — better than anything else around. But you must fancy games. They will chart your biorhythms with great accuracy. But you must care to know what your biorhythms are. Using a telephone to plug into a large computer, you can research any subject imaginable. But first, you must have something to research.

For the most part, personal computers will prove their worth to the degree that they fit into your daily life, not to the degree that you adapt your life to be more in step with The Computer Age.

In this book, we'll explore the things that personal computers do — the things they do well and the things they don't do well. You can decide if any of these accomplishments warrant inviting this latest prodigy of the industrial revolution into your home or office.



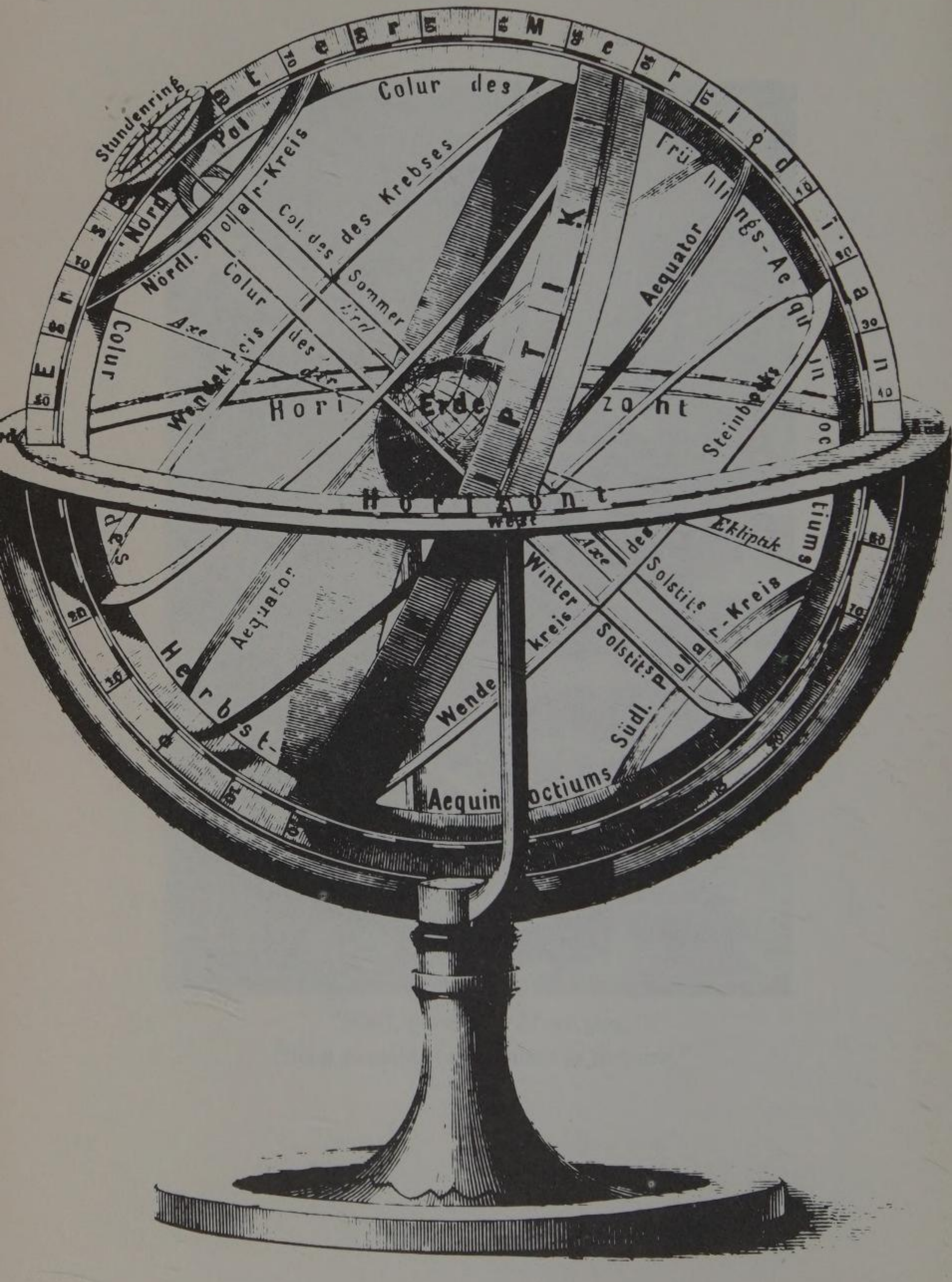
COMPUTERS BY BALLOON.



"Well, of course I love you.
But a personal computer is forever."

PART I

All About Personal Computers


Stundenring
Pol
Nord
Nördl. Polar-Kreis
Colur des Krebses
Col. des Sommer
Colur
Axe
Wendekreis
Horizont
Erde
Colur des
Frühlings-Aequator
Aequator
Steinbocks
Ekliptik
Solstitial-Kreis
Winter
Wende
Aequinoctiums
Südl.

Chapter One

The Personal Computer

Before exploring what these E.Ts. called P.Cs. do, let's take a look at what they *are*.

Like most machines, personal computers are made up of metal, glass, paper, and plastic—with an occasional exotic-sounding substance like phosphor thrown in for good measure.

If you feel intimidated by computers, there's no need to be. They are constructed of the same bits and pieces as televisions, typewriters, and tape recorders.

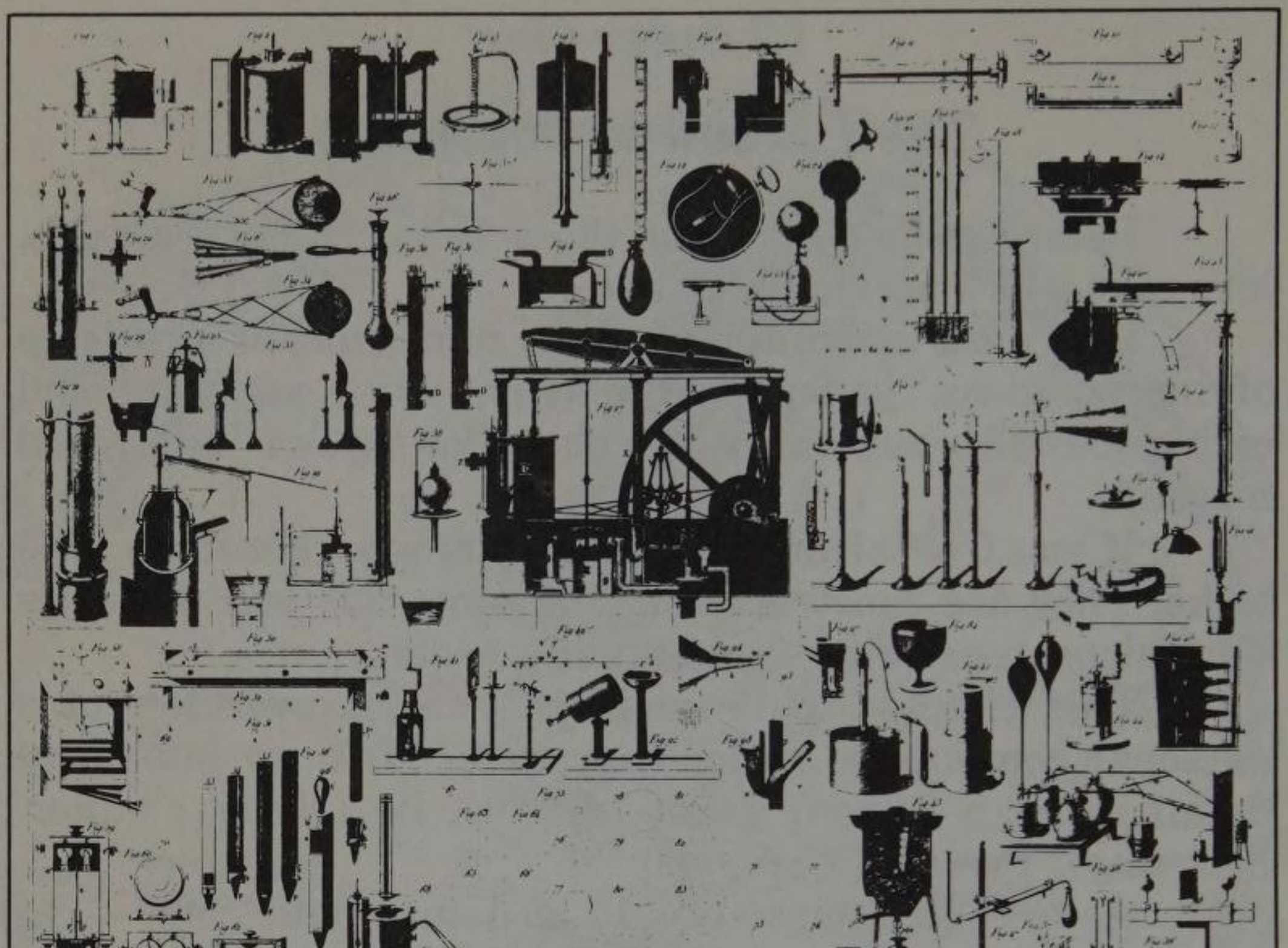
This chapter will provide a general overview of a personal computer's component parts. We'll go into more detail, from a buyer's point of view, in a later chapter, *Selecting a Personal Computer*.

As we go along, I will also introduce you — as painlessly as possible — to that collection of jargon, technical terms, and buzz words known as **Computerese**. There's nothing to be intimidated about here, either. The people who created Computerese are far less intelligent than you. How do I know they are far less intelligent than you? Because, considering the mishmash of tortured conjunctions and fractured idioms they have jumbled together, it's obvious that they are far less intelligent than anyone.

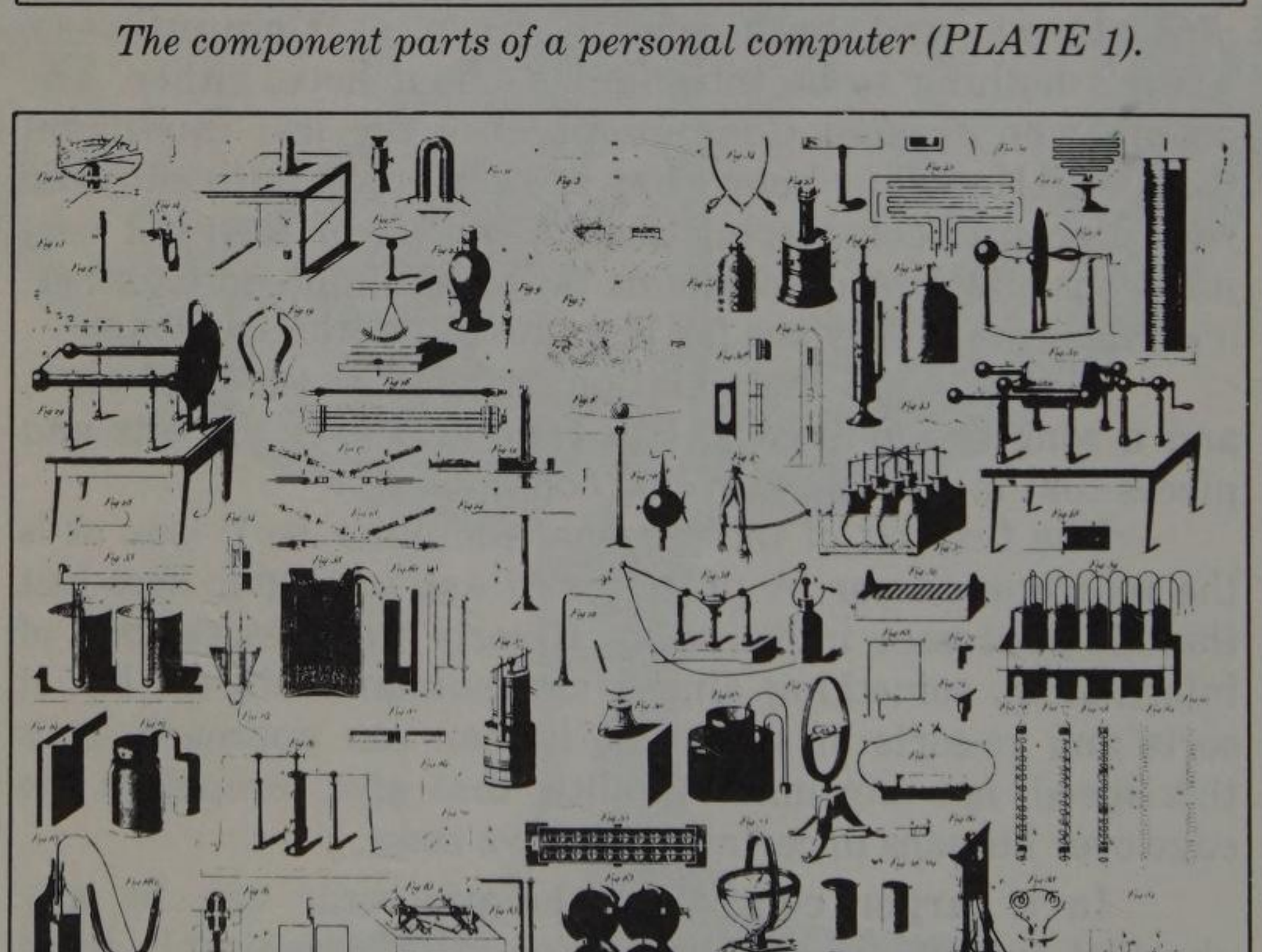
And so, with intimidation on hold, heads held high, and a song in our hearts, let's take a look at the bits and pieces that make up a personal computer.

The first bit of the personal computer we'll look at is the **microprocessor**. A processor in *any* computer does just that: it **processes** information. It sorts and re-sorts bits of information, something almost any human could do, but it sorts and re-sorts at speeds no human can approach. It is this speed, not any innate ability, that give computers the edge over humans in certain repetitive tasks.

In a larger computer, the processor can be any physical size at all. A large corporation can simply lease another floor to put it on. In a personal computer, a processor can be only so large or it stops being a personal



The component parts of a personal computer (PLATE 1).



The component parts of a personal computer (PLATE 2).

computer and becomes a coffee table. Once processors became small enough they were dubbed *micro*processors. (In the world of electronics, when something is made small it is prefaced with *mini*. When it is made smaller it is prefaced by *micro*, and when it is made smaller still, by *mini-micro*. I am sure before the decade is out we will see *micro-micros*, *mini-micro-micros*, and *micro-micro-micros.)*

Some microprocessors are basic affairs, designed for a specific function within a specific product. A microprocessor inside a hand-held calculator, for example, may be constructed to simply add, subtract, tell the time, and play a heart rending version of *Clair de lune.*

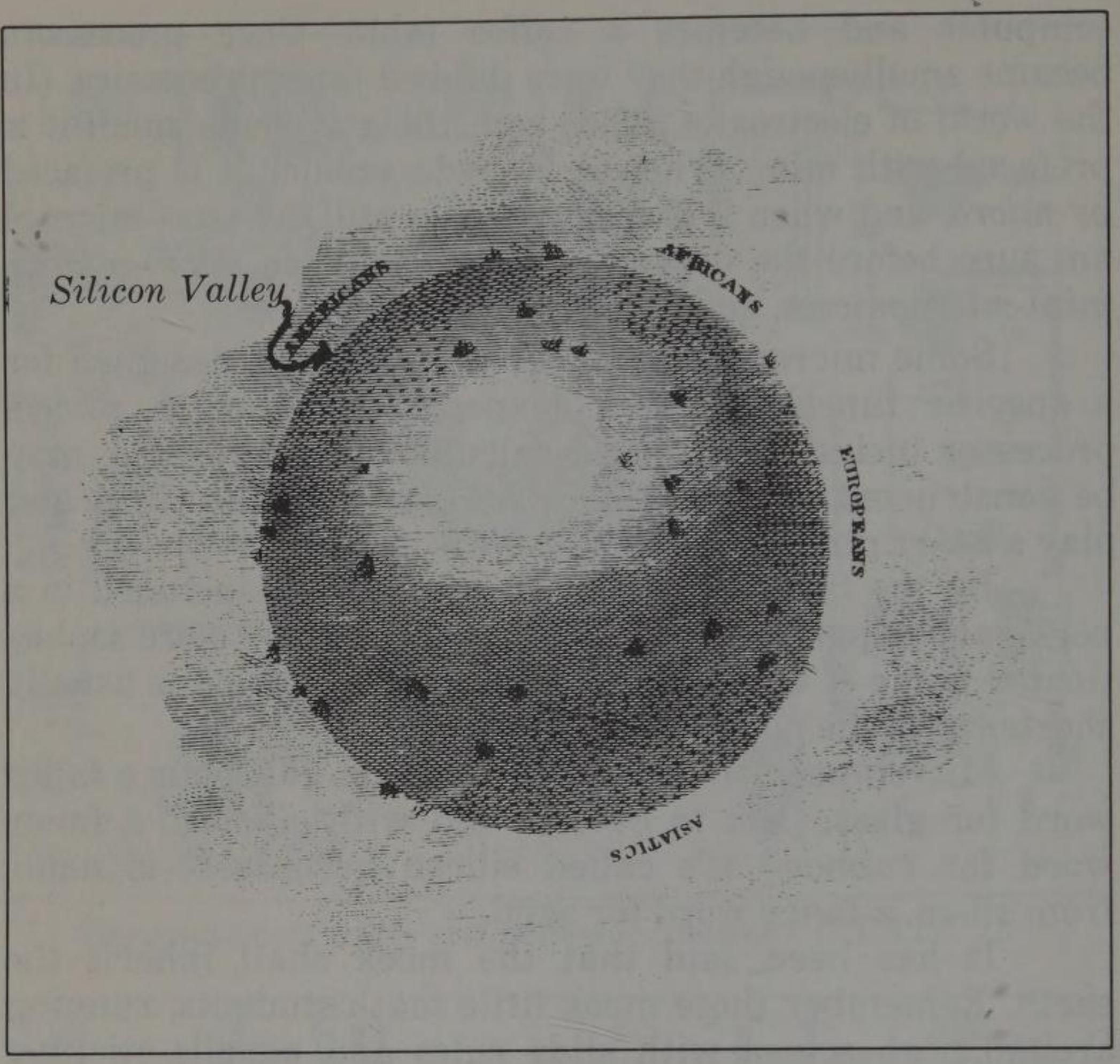
By the time they mature enough to be included in a personal computer, microprocessors assume the more sophisticated name of **Central Processing Unit**, which is usually shortened to the not-so-sophisticated **CPU**.

Microprocessors are made of silicon. Silicon is a fancy word for glass. (Not to be confused with *silicone*, a fancy word for rubber.) It's called silicon because it is made from silica, a fancy word for sand.

It has been said that the meek shall inherit the earth. Remember those meek little math students, running around high school with slide rules and pencils sticking out of their shirt pockets, the ones the jocks labeled nerds, the ones who never dated because (a) no one would date them and (b) they were always in the basement working on their science project? Well, those meek have inherited the earth, the sand to be specific, silica to be more specific.

They have inherited, too, a chunk of actual earth in California called Silicon Valley (not to be confused with Silicone Valley, a section of Beverly Hills reserved for plastic surgeons and their more affluent clients). In Silicon Valley the nerds have become rich with their science projects, and the former jocks all over the country are trying to save enough money to buy one of these mass-produced projects for their children.

A microprocessor is very smart but has very little memory, rather like a genius with amnesia. To remedy this situation, two kinds of memory are combined with the Central Processing Unit in most personal computers.



The first is known as **Read Only Memory** or **ROM**. This memory can be "read" by the microprocessor, but the microprocessor cannot "write" anything onto that memory. (*Reading*, meaning taking information from, and *writing*, meaning adding information to, are computerdom's token nods to a form of literacy other than computer literacy.) The microprocessor, then, is free to take information *from* ROM but it cannot add information *to* it.

The information in ROM is placed there — permanently — by the manufacturer. ROM is there like a helpful nurse, telling the amnesia-bound genius how to brush his teeth, get dressed, and otherwise prepare for the day. When electrical current first passes through the CPU, it will wake up and ask ROM, "What do I do now?" ROM will tell it, CPU will do it, and then ask, "What do I do now?" ROM will tell it, CPU will do it, and so on. ROM is, in other

words, **programmed** to get CPU going in the morning and to help with certain basic functions during the day.

At a certain point, however, CPU will have done everything ROM has been programmed to ask it to do. CPU is washed, dressed, and ready for the day — but what will that day consist of? CPU asks ROM, "What do I do now?" and ROM replies, "Ask RAM."

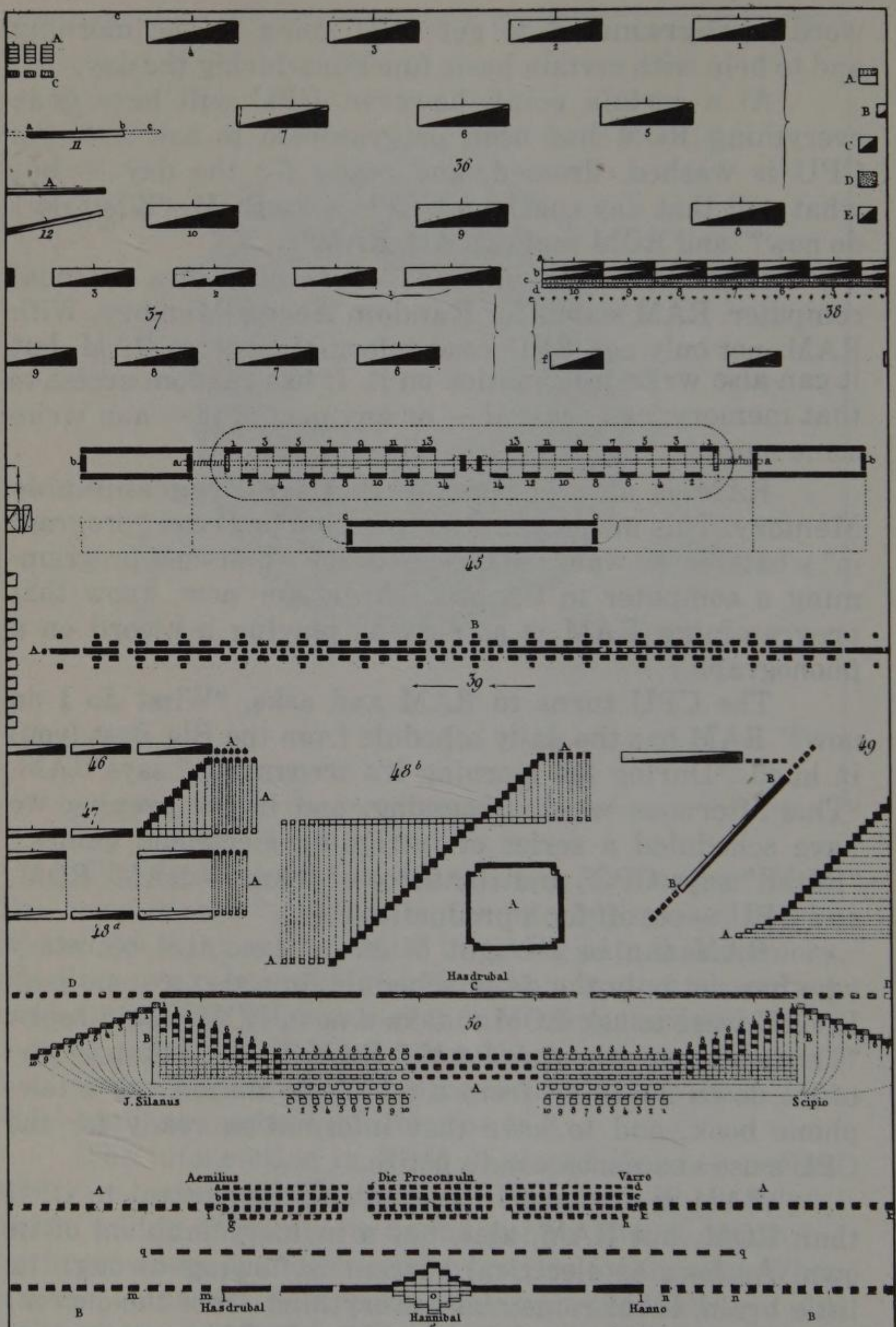
RAM is the second kind of memory in a personal computer. RAM stands for **Random Access Memory**. With RAM, not only can CPU read information from RAM, but it can also write information on it. It has random access to that memory; can erase it — or any part of it — and write some more.

RAM is also referred to as **User Programmable Memory**. This means that the user (you or I) can "program in" whatever we want the CPU to do. (We'll discuss programming a computer in Chapter Three. For now, know that programming RAM is as easy as playing a record on a phonograph.)

The CPU turns to RAM and asks, "What do I do now?" RAM has the daily schedule from the Big Boss (you) in hand. "During the morning it's accounting," says RAM. "This afternoon word processing, and in the evening we have scheduled a series of intriguing electronic games." "Right," says CPU, and the three of them — RAM, ROM, and CPU — set off for a productive day.

RAM can be thought of as an executive secretary who has not only the daily schedule, but also a steno pad. If CPU were to ask ROM to take a note, ROM would reply, "That's not my job. Ask RAM." RAM is more than happy to jot down anything from a telephone number to a telephone book, and to have that information ready for the CPU's use at a nanosecond's notice.

RAM is obviously a more versatile servant to CPU than ROM, but RAM, alas, has a memory problem of its own. As long as electrical current is flowing through its little brain, RAM remembers everything. Once the current is withdrawn, RAM forgets it all. (ROM, on the other hand, remembers how to get CPU up and dressed, current or no current, indefinitely.) Every time a computer is turned



Here we have a diagram of the inner workings of a personal computer.

off, it's a blank tabula rasa for RAM.

There must be a way, then, to (a) save the information in RAM before turning the power off and (b) loading information back into RAM after turning the power back on. That way is either cartridges or magnetic media.

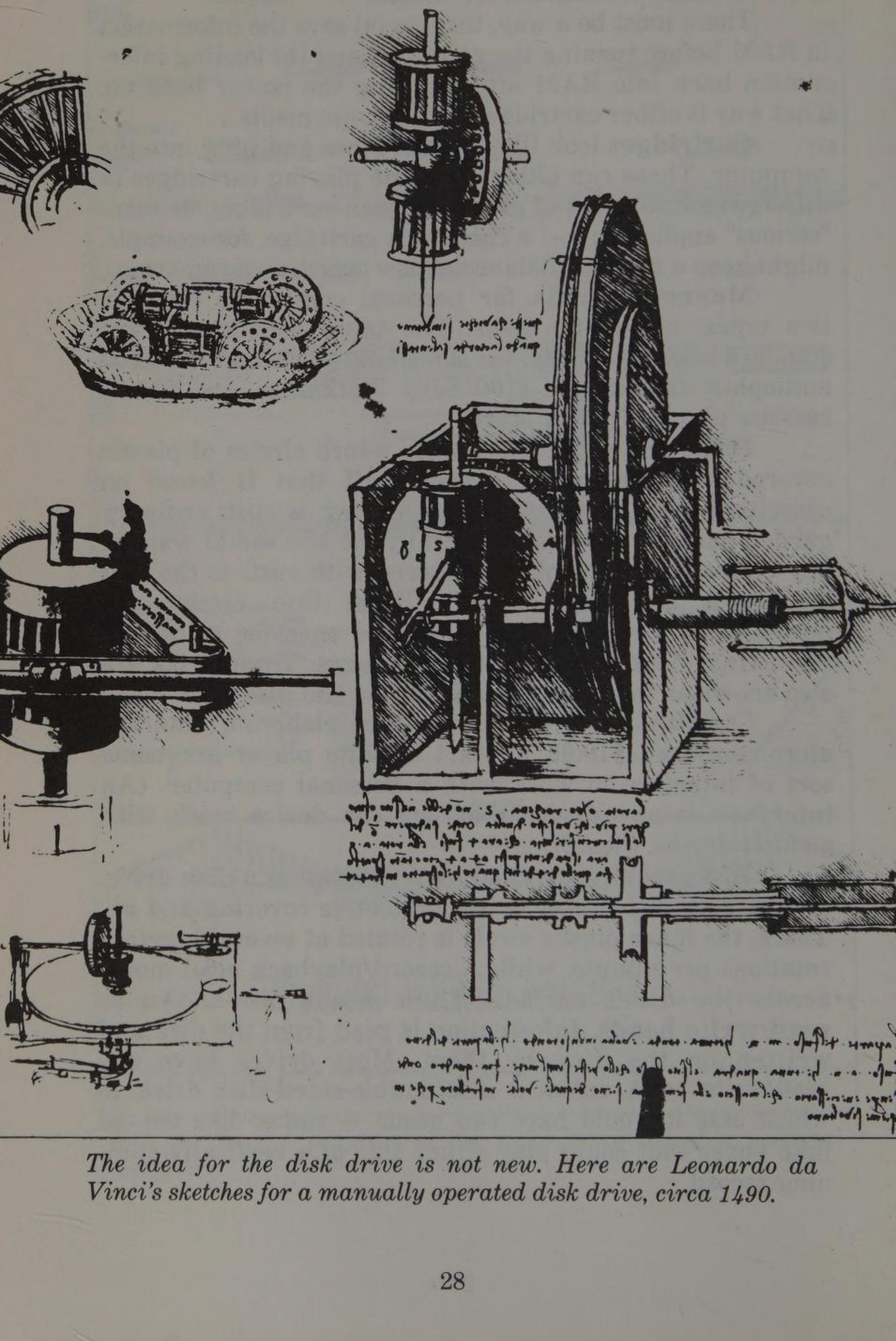
Cartridges look like 8-track tapes and plug into the computer. These can either be game playing cartridges (a different game or set of games on each cartridge), or more "serious" applications — a checkbook cartridge, for example, might keep a running balance of how overdrawn you are.

Magnetic media for personal computers come in two types, tapes and disks. The tapes used are of the standard cassette variety, the same kind you'll find in $4,000 audiophile tape decks, $100 Sony Walkmans, and $19.95 cassette players from K Mart.

Disks are either 3½-, 5¼- or 8-inch circles of plastic covered with the same brown stuff that is found on cassettes. (The brown stuff, by the way, is rust; ordinary garden-hose variety rust. Naturally, no one would want to pay $5 for a piece of plastic covered with rust, so the rust is known as "iron oxide.") These thin circles are permanently enclosed in a cardboard envelope to protect them from dust, dirt, and sticky fingers. These disks are also known as **floppy disks, minidisks,** and **diskettes.**

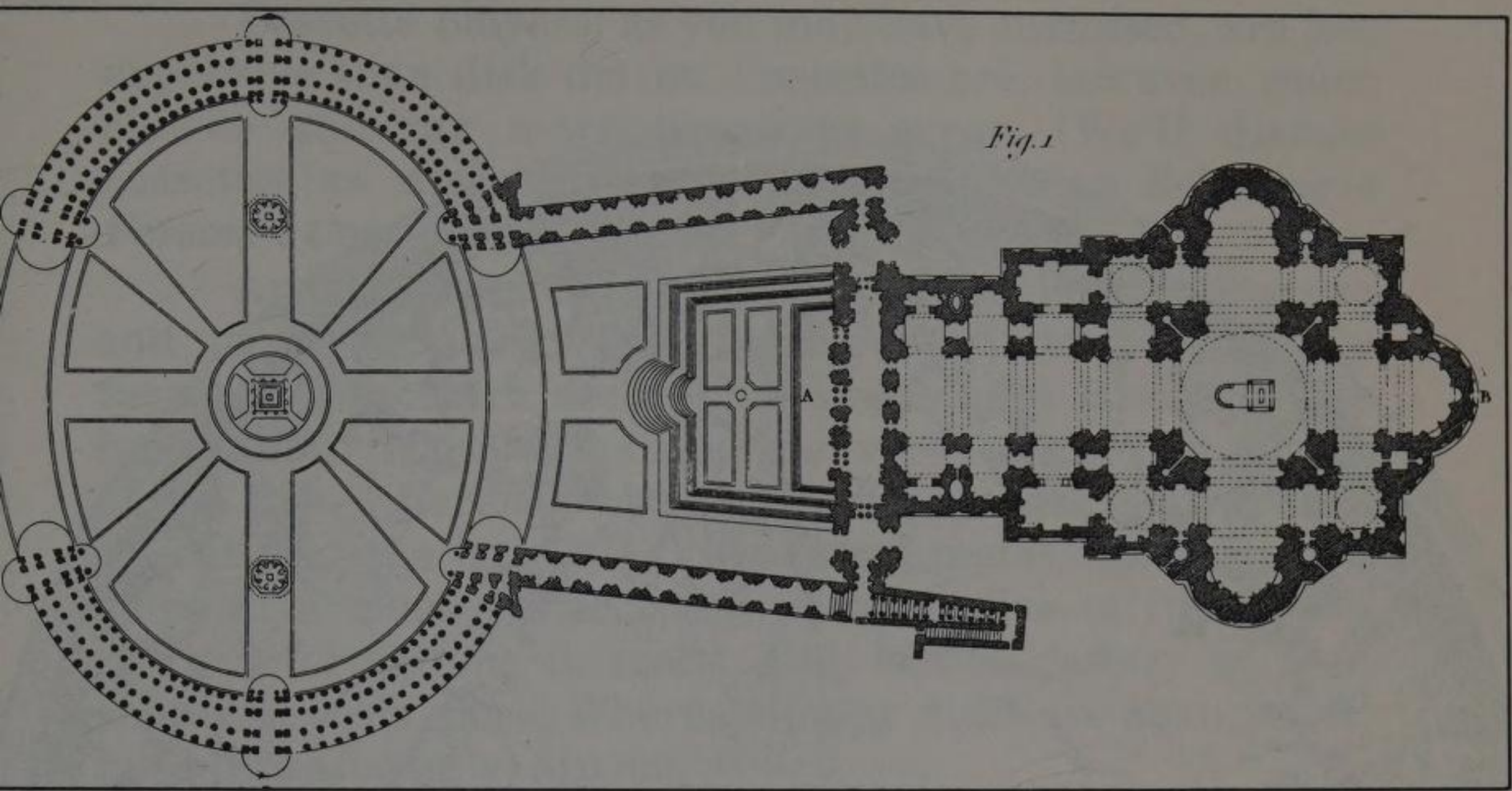
Cassettes require nothing more elaborate than the aforementioned $19.95 K Mart cassette player and some sort of interface to work with a personal computer. (An **interface** is any device that lets one device work with another device. Clear?)

Disks require a special player known as a **disk drive.** A disk goes into a disk drive, protective covering and all. There, the inner plastic circle is rotated at several hundred rotations per minute, while a record/playback head moves across the disk's surface. These heads are known as **read/write heads.** Information is read from the disk and written on the disk by them. Most drives have one read/write head, unless it is a **double-sided** disk drive, in which case it would have two heads — rather like the old juke boxes that could play either side of a vertically spinning record.

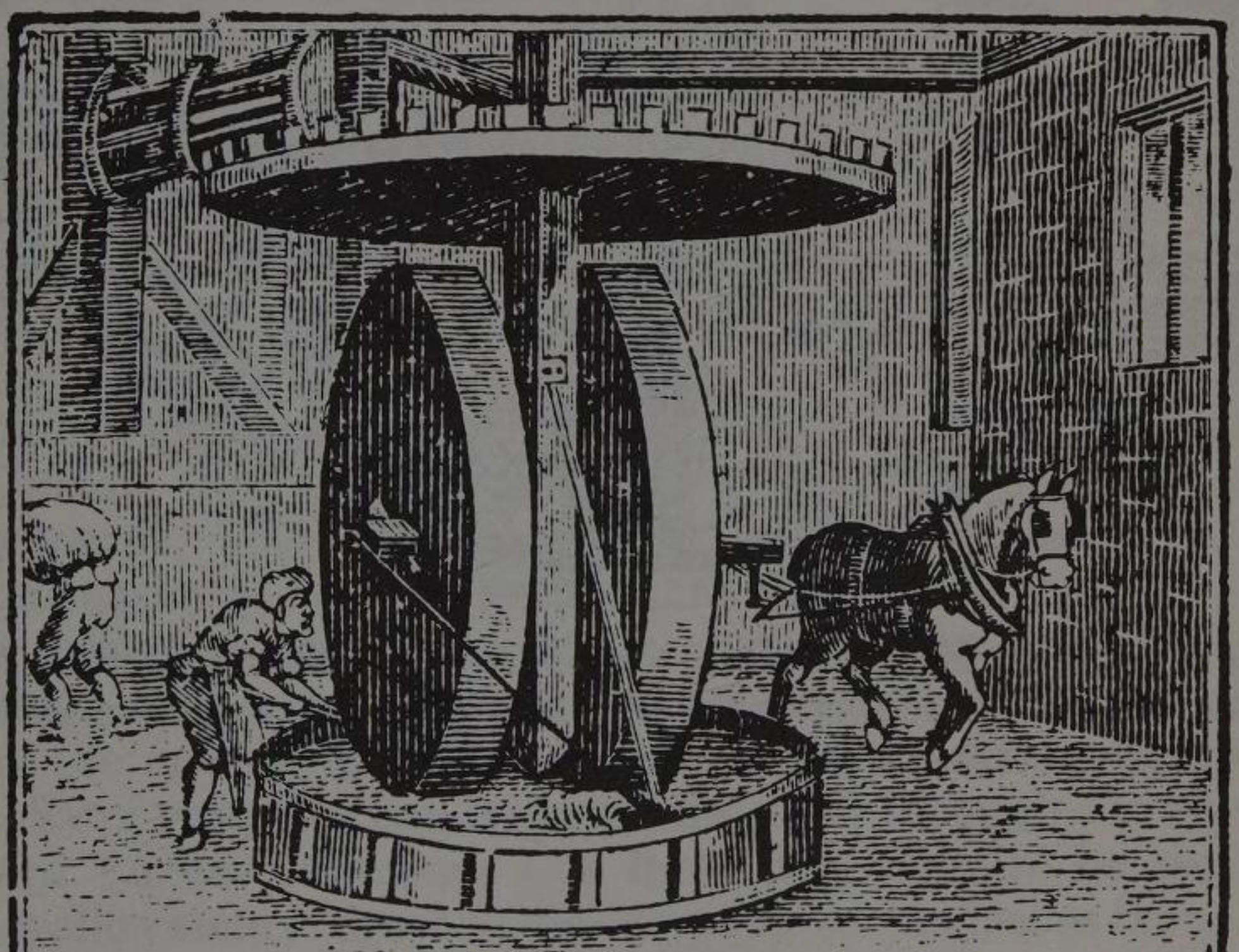


The idea for the disk drive is not new. Here are Leonardo da Vinci's sketches for a manually operated disk drive, circa 1490.

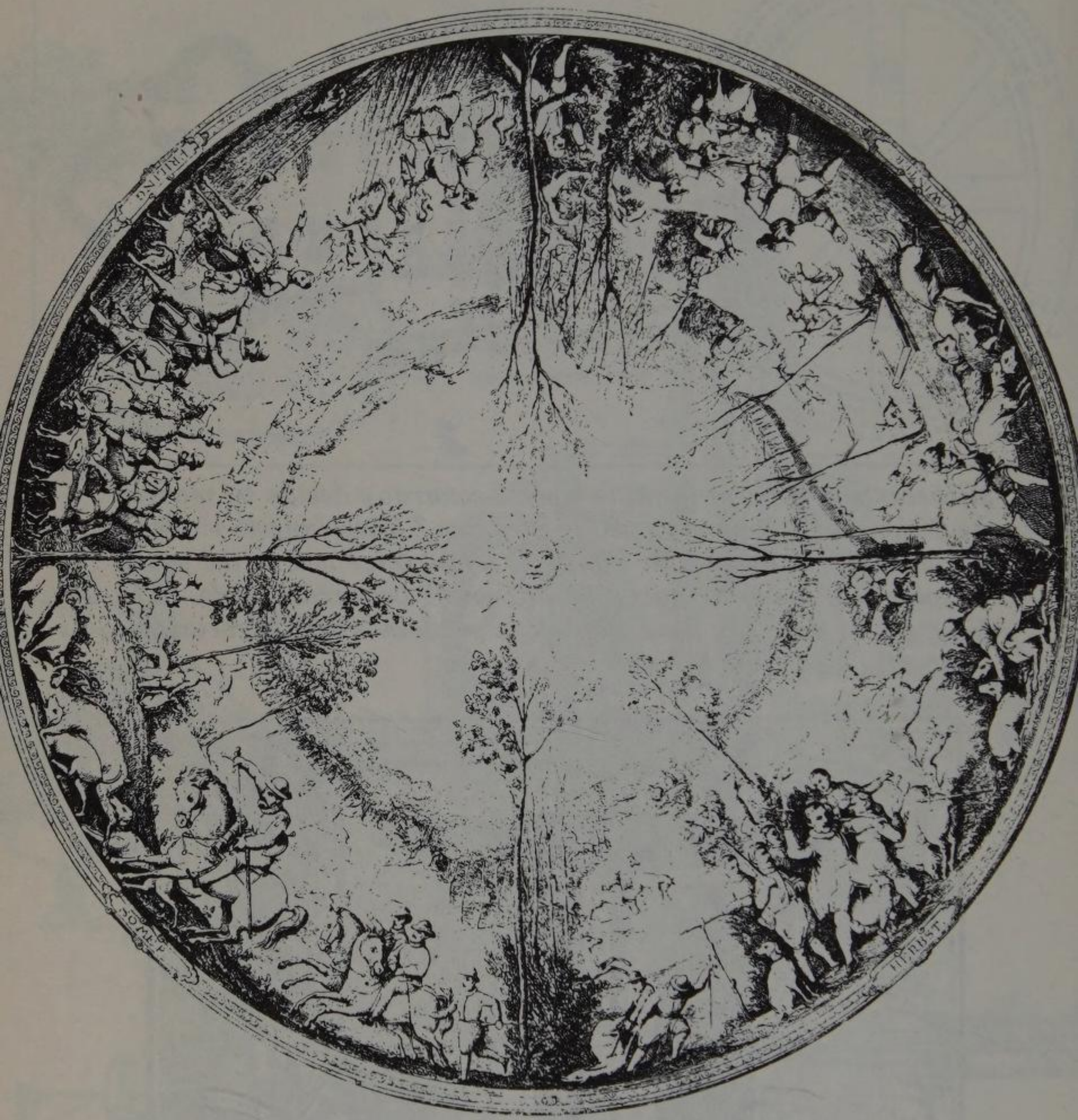
Fig. 1



Michelangelo tried to improve upon Leonardo's design by making the disks oval ("More esthetically pleasing," Michelangelo wrote in his journal). Leonardo, in Florence, sent a terse note to the young sculptor in Rome: "Whatsa matta you?" Leonardo wrote, "The diska drive, shesa my idea. You keepa you hands off." Michelangelo eventually found another use for his design.



Early disk drives required one full horsepower to operate.



How information is stored on disks: Here we have the disk for the video game "A Weekend in the Country." As you can see, everything is made small so it can fit.

Cassette players, as you may have surmised, are less expensive than disk drives. Cassettes are, however, much slower and far more prone to error. (We'll discuss cassettes vs. disks further in the chapter on *Selecting a Personal Computer.*)

Another kind of magnetic medium becoming more and more popular with personal computers, especially personal computers used for business applications, is the **hard disk.** Hard disks operate very much like floppy disks. The difference between a floppy disk and a hard disk is that the hard disk is made of metal, not plastic; it spins at a much faster speed; it holds five to fifty times more information; it reads and writes faster; and, of course, it costs more. Whereas floppy disks are changeable, hard disks (usually) are not.

With magnetic media we have a way of getting information into RAM when we turn the computer on, and a way to store information from RAM before we turn the computer off. But how do we fiddle around with the information in between times? What we need are some **input devices.** That's where keyboards and joysticks come in.

A **keyboard** is a board with keys on it, like the keyboard on a typewriter. Each key represents a letter, number, bit of punctuation, or symbol of some kind.

Less inexpensive personal computers ($300 and up, in most cases) use mechanical keyboards that more closely resemble the action of a typewriter. Each letter, number, or symbol has its own plastic key. This key is attached to an electrical switch. Each time a key is depressed, contact is made, and a keystroke is registered. Mechanical keyboards, also known as "full stroke" keyboards, are much easier to use than are the membrane variety.

With a keyboard, almost anything can be communicated to a computer. Words, numbers, symbols, which way the spaceship should go, when it should fire, and so on. Even graphics can be communicated through the keyboard. (A device known as a **light pen** can also be used. This allows one to draw on the computer screen just as though it were chalk on a chalkboard.)

Serious game players, however, will require a **joystick**. A joystick is a little box one holds in one's hand. A stick protrudes from this box, as do one or more buttons. If one pushes the stick up, the spaceship (or submarine or boxer or chess piece) moves up the screen. When the stick is pushed down, the spaceship *et al* moves down. The same is true of right, left, diagonals, and circles.

When the button is pushed, a missile is fired (or a torpedo is launched, or a punch is thrown, or a move is finalized). All this stick moving and button pushing has been observed to create the emotion of Joy in certain humans, hence the term joystick.

Input devices — keyboards and joysticks — get information into the computer. How do you suppose we get information out? You guessed it: **output devices**. These include video screens and printers.

The **video screen** on a personal computer looks just like the screen on a television set — in fact, the video screen on some personal computers actually *is* a television set. A wire connects the personal computer to the antenna of a television and the computer literally broadcasts a signal to the TV.

A video screen is also known as a **CRT**, which stands for cathode ray tube, which is the kind of tube a TV picture tube really is.

The video screen (or **video display**) of more sophisticated personal computers is not a computer-by-day and a television-by-night. These video screens are known as **monitors** and are connected directly to the computer. Monitors display better images than do moonlighting televisions.

The display can be either in color or **monochrome**. Monochrome simply means "one color." Monochrome colors for personal computers are green (dark green background with lighter green lettering), amber (dark amber background with lighter amber — almost yellow — lettering), and the ever popular white (white lettering against a basic black background.) Most computers allow the screen display to be reversed so that dark characters can appear against light backgrounds.

Color video is everywhere. We're so used to seeing color when we look at a video screen that some advertising agencies, in yet another desperate attempt to attract our attention, are now producing television commercials in black & white. For games, graphics, and the education of younger children, color video is certainly the way to go. For words and numbers, however, monochrome displays offer sharper character display.

Video displays are ephemeral. Like RAM, once the power is turned off, the video screen forgets. A more permanent method of "outputting" information is found in the **printer**. A printer, naturally, prints things.

A printer is known as a **peripheral**. It is so named because it is peripheral to the use of the computer — useful, but not necessary. At one time, almost everything other than CPU, ROM, and RAM were considered peripherals. As personal computers have gotten more sophisticated, the line between "the computer" and "its peripherals" has blurred. Is a disk drive a peripheral? A keyboard? A joystick? People have differing opinions. Most people do, however, draw the line at printers. (An "all in one" personal computer might include everything we've discussed thus far, but would not include a printer.)



There are two kinds of printers, dot matrix and letter quality. **Dot matrix** printers form characters with little dots, very much like the signs on banks that tell the time and temperature. Dot matrix printers are not the greatest for correspondence, but are necessary for intricate graphics.

For correspondence (letters, reports, and such) one would need a **letter quality** printer. These print a bit slower and cost a bit more than their dot matrix cousins, but the quality of their type rivals that of electric typewriters. This is because they type one character after another, just like a typewriter. Printers made especially for computers are constructed for continual full-tilt use, something most typewriters are not. Further, computer printers are designed to use some features not generally available on typewriters, such as boldface printing.

Also available are ink jet and laser printers. As the cost goes down, these should find their way into (or should I say onto) more and more personal computers.

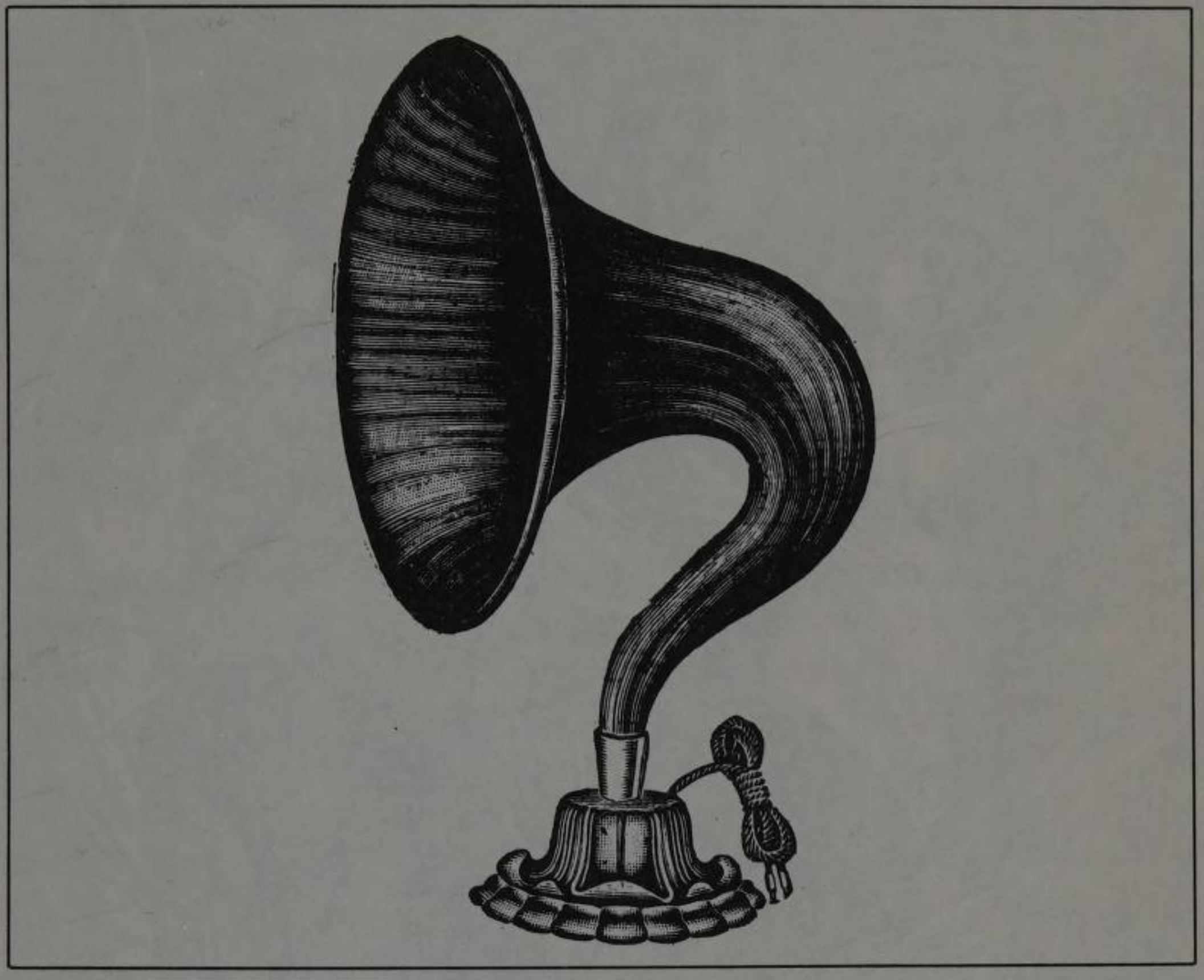
Another popular peripheral for the personal computer is known as a **modem.** A modem attaches to the computer and to a telephone. It allows one computer to be connected, over phone lines, to another computer. (The other computer requires a modem as well.) When connected, information can flow back and forth between computers.

The process modems use to transmit computer information over ordinary phone lines is called *modulation.* (Modulation also takes place with information before it can be broadcast over the airwaves. The "M" in AM and FM stands for modulation.)

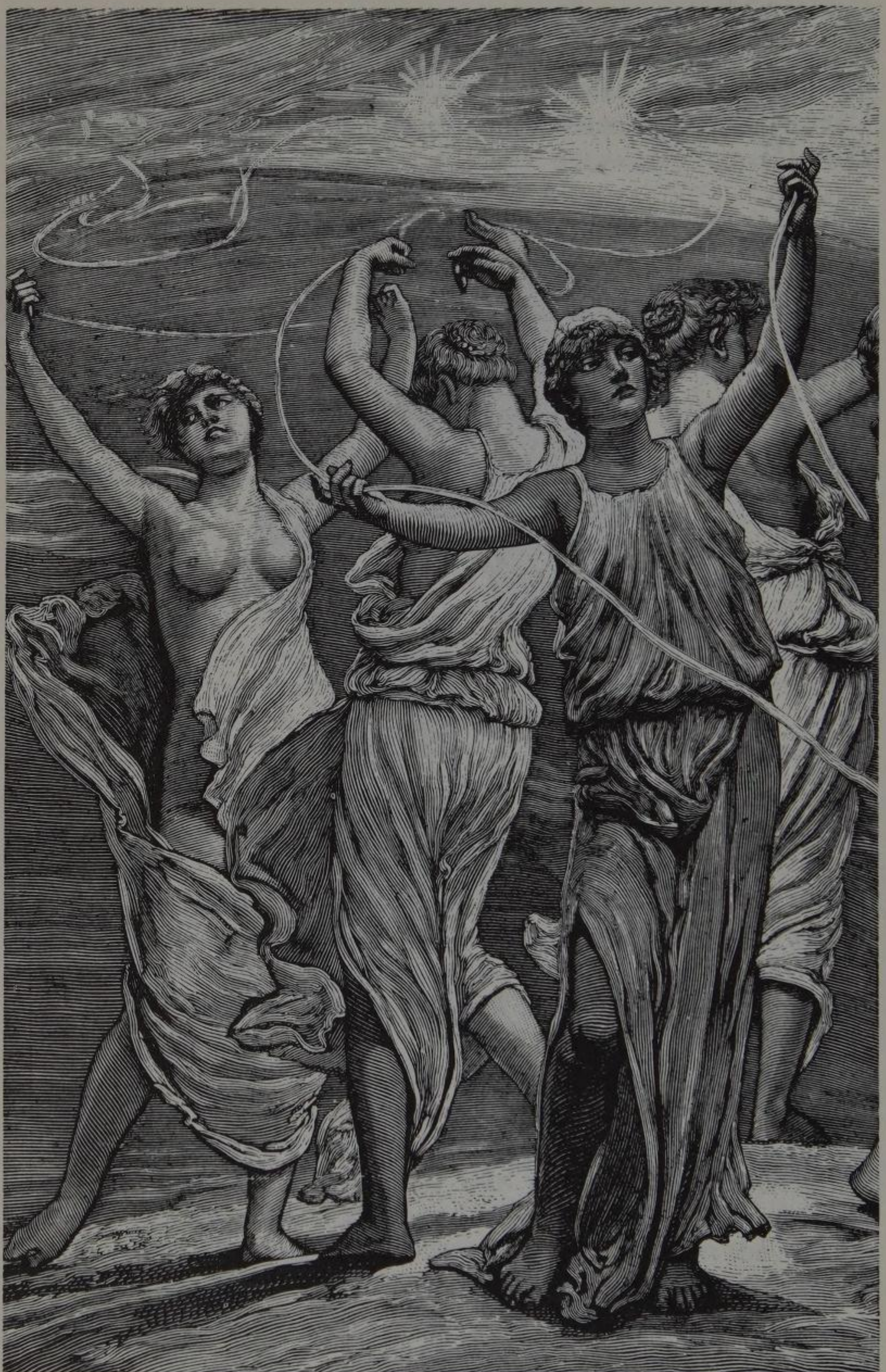
A modem takes information from the computer, modulates it, and sends it over the phone line. A second modem at the other end *de*modulates the signal back into a form the receiving computer can understand. "Mo-dem," then, describes what a modem does — *mo*dulate/*dem*odulate.

A modem puts your computer in touch with the world. We'll discuss the practical benefits of this ability at various points throughout the book, especially Chapter Four.

And there we have it—the personal computer. How personal computers work and where they came from is discussed in the next chapter. What they do is discussed in Part II. How to select and purchase one is the subject of Part III.



In the 1920s, this was one of radio's most popular "peripherals." Prior to the loudspeaker, all listening had to be done through headphones. Considering its potential, personal computing is about where radio was in the early 1920s.



Making phosphor.

Chapter Two

An Incomplete and No Doubt Inaccurate History of Personal Computers Including Some Basic Information on How They Work

Boy, I sure wish I had Mr. Wizard to help me with this chapter. Somehow Mr. Wizard made "the magic and mystery of science" understandable and, even when it wasn't understandable, at least it was fun.

If this were television, there would be a shot of me, leaning pensively on the edge of my keyboard, saying "Boy, I sure wish I had Mr. Wizard to help me with this chapter," and suddenly Don Herbert would appear, maybe in a white lab coat, maybe in a suit, and I would become Everyperson and he would become Mr. Wizard, and tell us all about how computers work.

Alas, this is not television, this is a book, and nothing appears suddenly during the writing of a book other than creditors. If this book ever becomes a TV show, maybe the budget will permit Mr. Wizard to join us.

It would be nice to have Sir Kenneth Clark of *Civilization* stop by, too. Lord Clark could show us, through the sketches of Michelangelo and the paintings of the Louvre, how computing has developed through the ages. *Computization* we'll call it. Besides, it's always good to have a "Sir" on the show.

Until that time we'll muddle through on our own, knowing that somewhere, somebody must know how to make all this stuff clear.

This is an optional chapter. You will never need to know *how* computers work. All you need to know is *that* they work. (They do.)

Somewhere along the line you may want to learn how to *operate* a computer, but that is very different from how a computer operates. How a computer operates is of no practical value whatsoever — unless you're a computer designer.

Most of the books and articles written about computers have been written by scientists — or worse, by people trying to *sound* like scientists — and what scientists find necessary to know they assume everyone will find necessary to know. We don't.

How many people know how their refrigerator works? Let's have a show of hands. Your cassette tape recorder? Your car? Your houseplants? Your liver? Does it really matter if you don't? All that matters is that you know how to run it, play it, drive it, water it, or leave it blessedly alone so that it can operate as designed, unmolested.

At some point, even the most educated among us must say, "I don't know how it works" to some essential bit of machinery, and somehow that ignorance doesn't stop the machine from working. Somewhere there is an expert who does know how it works — or at least how to fix it — and that's all that's necessary.

And so it is with computers. That there are silicon chips sorting and re-sorting billions of binary bits per nanosecond is of no practical concern to the corporate attorney playing Pac-Man or the teenager using a computer to write his first love poem.

The much-used phrase "computer literacy" has little to do with knowing what goes on inside the machine. It has to do with getting what you want *into* the machine and getting what you want *out of* the machine, and feeling comfortable enough about this process of in and out to occasionally enjoy it.

"Turn the machine on, put the record on the turntable, put the needle on the record, and adjust the volume to your taste" is all one needs to know about a phonograph to enjoy everything from Bette Midler to Gustav Mahler.

The fact that sound is made up of vibrations, and that these vibrations are captured in the grooves of the record, and that the needle vibrates when going through the grooves, and that the vibrations when amplified recreate the original vibrations and therefore the sound of the original Performance, is not necessary to know.

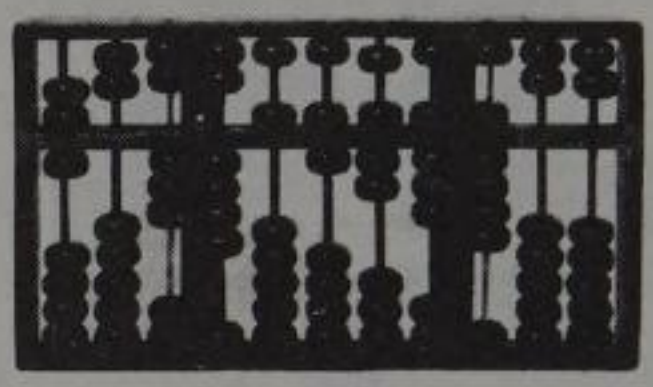


It can, however, be interesting. A *National Geographic Special* on how the human body works can be fascinating, even though we've been successfully operating our bodies for years without all those microscopic, time-lapsed, animation-enhanced "hows."

And so it is with the hows, as well as the history, of computers. (The hows and the history of most machinery is intimately connected.) What follows are some hows and some history of computing, presented in no particular order and selected because I found each of them for some reason interesting. This is decidedly not a comprehensive overview

of the history and internal functioning of computing machines. It's more a collection of computer trivia.

If your eyes begin to glaze or your mind begins to drift during any of these points, don't bother to refocus and reread, just skip to the next point. If you drift on several points, skip to the next chapter. This information is not in the least essential to selecting, purchasing, operating, and enjoying a personal computer. Like all trivia, it can be interesting but it is, in essence, trivial.



• The first computer was the abacus. The abacus is from the Orient, although its name comes from the Greek word abax, meaning a calculating table covered with dust, which was named after the Hebrew word for dust. The abacus is more than 5,000 years old and is still the primary form of "number crunching" in many parts of the world. (Although the 1982 Chinese census was counted on modern computers, the census preceding it was computed on the abacus.)

The abacus is not only one of humankind's first complex machines, it's also the first mechanical device listed in most dictionaries.

• The next major breakthrough in computers came a scant 4,600 years after the invention of the abacus. In 1642, French scientist Blaise Pascal invented an "arithmetic machine" to help in his father's business. (A father's necessity was the mother of this invention.)

The machine had eight wheels, each wheel having the numbers 0 through 9 painted on them. The wheels were attached to gears and the gears attached to each other in such a way that simple addition and subtraction could take place by dialing the amounts to be added or subtracted. Its size made it the world's first non-portable computer.

Blaise Pascal was honored by having a high-level computer language — Pascal — named after him. (I understand that a low-level computer language, Blaise, is in the works.)

• In 1694, 52 long years after Pascal's arithmetic machine, the German mathematician Gottfried Wilhelm Leibniz unveiled his 23-year pet project, the Stepped Reckoner. This machine was designed to not only add and subtract, but to multiply, divide and extract square roots. This was a major advance in features, and there was only one thing wrong with the machine — it didn't work.

It did, however, introduce a new concept to "reckoning," and that was "stepping." The concept was to break a mathematical problem into smaller steps, steps so small that the average human would find following that many steps tedious and time-consuming, but steps that a machine could do rather quickly and without noticeable signs of boredom.

Whereas Pascal used ten symbols in each mathematical problem (0, 1, 2, 3, 4, 5, 6, 7, 8, and 9), Leibniz used only two (0 and 1). The former system is called the decimal system (dec meaning ten) and the latter, binary (bi meaning two).

It is far easier for a machine to keep track of only two variables than for it to keep track of ten. Two variables can be represented in very concrete terms — on/off, yes/no, black/white, in/out, up/down, open/closed.

Absolute, concrete terms are something machines like. The gradation of information that humans enjoy machines don't. It is not surprising that a Frenchman devised a gradation machine (0 through 9 in gradual increments) while a German introduced an absolute machine (0 and 1 and that's that). It would later take an Englishman, George Boole, to massage the Teutonic and the Gallic approaches into the system of logic modern computers would eventually use.

• We all know how the decimal system of numbers works — it's the system of counting we use all the time. We have ten symbols (0, 1, 2, 3, 4, 5, 6, 7, 8, and 9). Whenever we use up all the symbols we must start com-

bining symbols to indicate amounts larger than 9. We do this by columns. The right hand column represents the symbol itself. The column to the left of that represents ten times the value of that symbol. The column to the left of that represents ten times ten, or one-hundred times the number. Each column to the left represents an additional ten-fold increase. (Remember, if you start to drift, move on to the next point. None of this is necessary.)

The first four columns of the decimal system are:

THOUSANDS HUNDREDS TENS ONES

To write "eight" one would put an 8 in the ONES column. To write "eighty," or ten times eight, one would write an 8 in the TENS column and a 0 in the ONES column. The long way of reading that would be "Eight TENS and Zero ONES." (Is anyone besides me having flashbacks of second grade?)

The binary system works in the same way, except that there are only two symbols, 0 and 1. As in decimal, the 0 is used to represent nothing. Therefore, after indicating only *one* variable, the binary system needs a new column. The new column, to the left, indicates a number twice as large as the number in the first column. The next column to the left indicates a number twice as large as the preceding column, and so on.

The first four columns of the binary system would be:

EIGHTS FOURS TWOS ONES

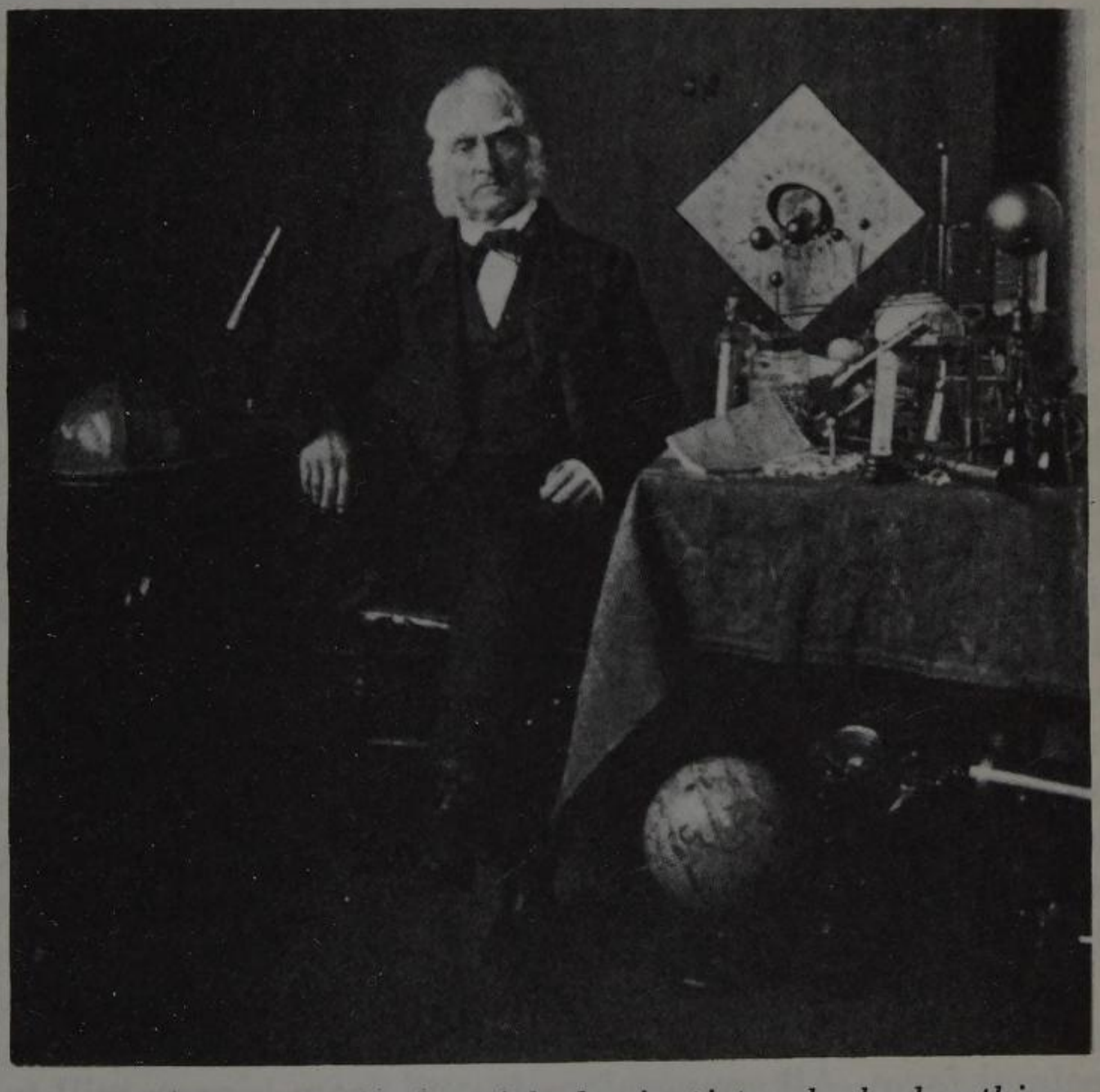
"Eight" in binary would have a 1 in the EIGHTS column, a 0 in the FOURS place, a 0 in the TWOS place and a 0 in the ONES place. The long way of reading that would be, "One EIGHT, zero FOURS, zero TWOS, and zero ONES." It would be written 1000. "8" in decimal equals "1000" in binary.

Before we attempt to represent "eighty" in binary, let's first count from zero to ten in binary.

Zero would be 0. One would be 1. So far so good, but

already we've run out of symbols, so we must add a column to the left. Two would be 10 (one TWO and zero ONES). Three would be 11 (one TWO and one ONE). And again we've run out of symbols. We add an additional column and write 100 (one FOUR, zero TWOS and zero ONES). Five is 101 (one FOUR, zero TWOS, and one ONE). Six is 110 (one FOUR, one TWO, and zero ONES). Seven is 111 (one FOUR, one TWO, and one ONE). Again we've run out of symbols, so we add a column, and return to our old friend 1000 (one EIGHT, zero FOURS, zero TWOS, and zero ONES). Nine is 1001 (one EIGHT, zero FOURS, zero TWOS, and one ONE). Ten is 1010 (one EIGHT, zero FOURS, one TWO, and zero ONES).

To get to "eighty" does not require as many columns as one might think, since each time we add a column to



One of the many distinguished scientists who had nothing whatsoever to do with the development of the computer.

the left it doubles the value of the column immediately to its right. The column to the left of EIGHTS would be SIXTEENS, the column to the left of that THIRTY-TWOS, and the column to the left of that SIXTY-FOURS. It seems that extending the columns this far to the left should give us "eighty."

SIXTY-FOURS	THIRTY-TWOS	SIXTEENS	EIGHTS	FOURS	TWOS	ONES

It becomes sort of a puzzle (the sort of a puzzle which I, by the way, dislike) — "Using a maximum of one number from each column, arrive at the number 'eighty.'"

Let's see, a SIXTY-FOUR and a THIRTY-TWO would give us ninety-six. Over the top already. A SIXTY-FOUR and a SIXTEEN equal — ta-da — eighty. (Boy, did we luck out on that one.) So, we would write "eighty" in binary 1010000 (one SIXTY-FOUR, zero THIRTY-TWOS, one SIXTEEN, zero EIGHTS, zero FOURS, zero TWOS, and zero ONES).

(Challenge: Write the number "twenty-seven" in binary numbers.)

It would seem as though one would require reams of paper to record large numbers in binary. Actually, this is not the case. Because the columns continue to double as they move to the left, the binary system becomes increasingly compact. Whereas it takes seven binary columns to write the decimal number 64 (1000000), it takes only forty binary columns to write the decimal number 549,755,813,888 (1000000000000000000000000000000000000000).

Do you need to know any of this to operate a personal computer? No. None of it. It will, however, help answer the question, "Why are there 64K in the memory of my computer?" Because the Kilobyte ratings of computer memories are usually equal to a binary column number (4K, 8K, 16K, 32K, 64K, 128K, 256K, and so on).

Your computer will accept information in standard decimal form and return processed information in standard decimal form. All conversions to and from binary will take place within the computer.

(Answer to the challenge: "twenty-seven" binary is 11011.)

• A computer is very simple minded. It knows only two things: Yes and No. There are no Maybes. A circuit is either open or it's closed. There is no little-bit-open or almost-closed. It's black or white, no gray whatsoever. It's 0 or 1.

There are two reasons why computers can do all that they do knowing as little as they do.

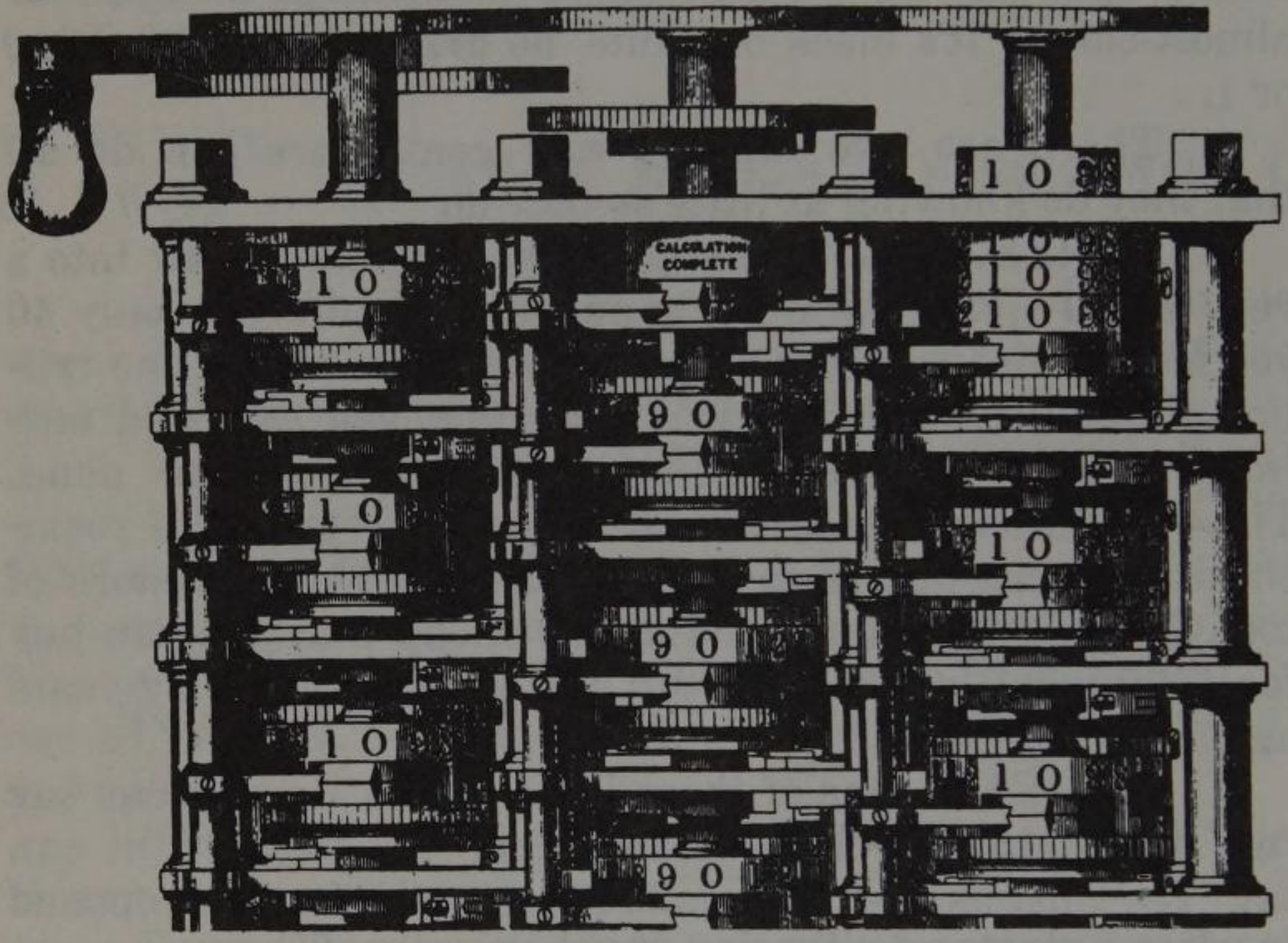
1. SIZE. A great many yes/no circuits can fit into a very small space. As we saw above, it would take only 40 yes/no circuits to write all numbers from one to one trillion. Computer technology is such that you can hold *millions* of these yes/no circuits in the palm of your hand. This miniaturization allows the computing power of room-sized 1950-computers to fit into the pocket calculators of today. These yes/no circuits are so cheap that you can buy for $100 what would have cost you $1,000,000 thirty years ago.

2. SPEED. One of these little yes/no circuits can say "no" faster than Debbie Boone. Properly induced, it can say "yes" just as fast. This is because each circuit is opened or closed electronically, not mechanically. (There are not millions of little fingers turning millions of little switches on and off.) This means that computers compute at speeds approaching one-fourth the speed of light. In fact, most of the time a computer takes to compute something is in interacting with a mechanical device, such as a disk drive or a joystick.

The speed at which computers operate is so incomprehensible that someone devised this comparison: If you were interacting with a computer — you giving the computer data, the computer giving you data, back and forth — it would take you each time, in the computer's time frame, *eight years* to respond. Having to work as they do with binary numbers and human beings, it is fortunate that computers are not easily bored.

• It was the lack of these two elements, size and speed, that prevented Charles Babbage from constructing a fully functioning personal computer almost 150 years ago.

By 1835 Babbage, an English inventor, had conceived an "Analytical Engine" that incorporated almost every other element of computing, including programming, memory, printout, and the ever-popular punch cards.

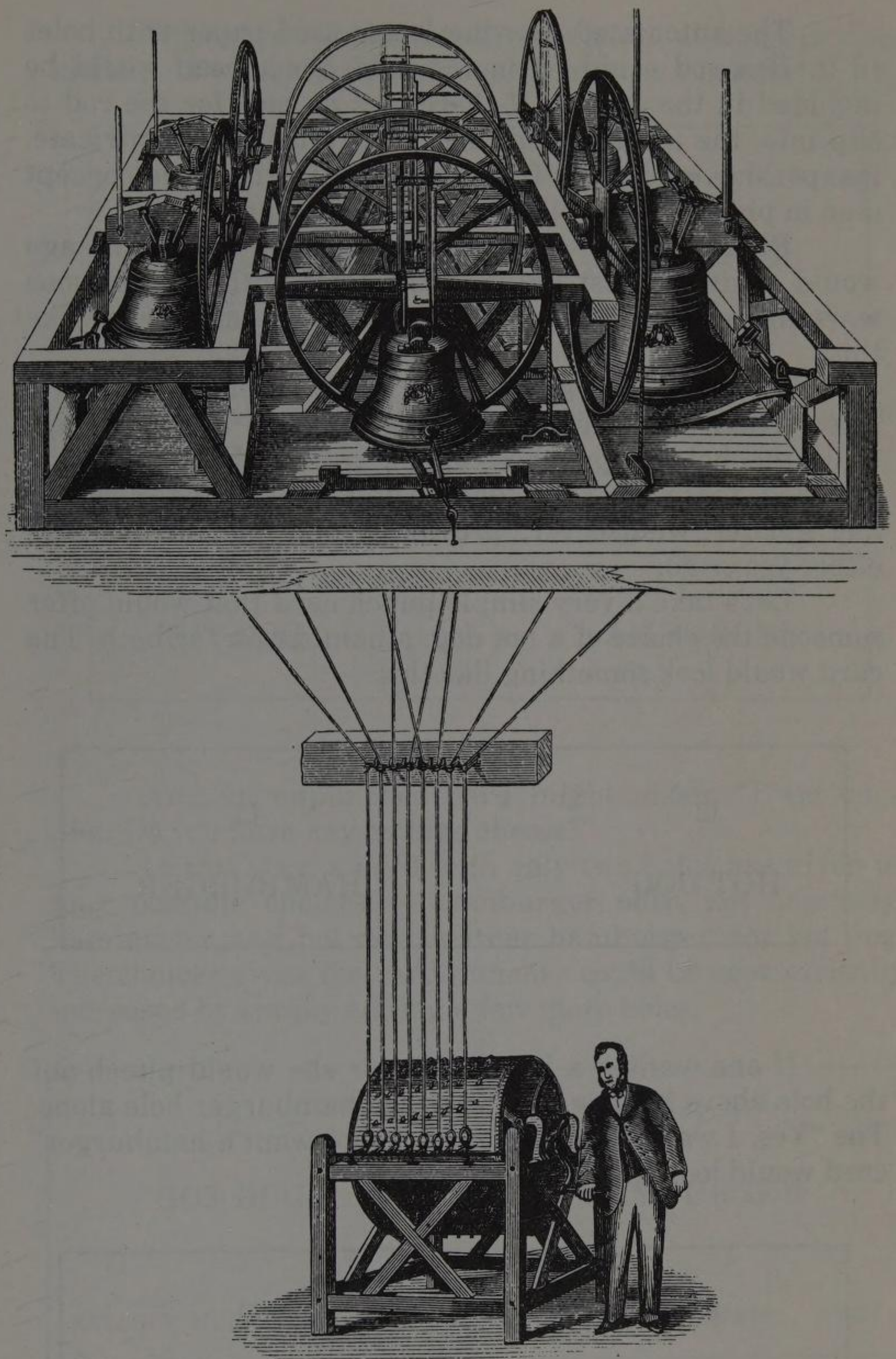


A small portion of Babbage's Analytical Engine.

But Babbage lacked the technology of size and speed, and his 1835 invention of the computer would go unnoticed and forgotten until his writings were rediscovered in 1937.

• Babbage used punch cards borrowed from the Jacquard loom, which Jacquard borrowed from the Vaucanson loom, which Vaucanson borrowed from the Bouchon loom, which Bouchon — the son of an organ maker — borrowed from the automated organ. (This organ to loom to computer connection is delightfully delineated in James Burke's *Connections*, both on the PBS television series and in the Little, Brown and Company book.)

Back in the days of the automated organ (the sixteenth century, give or take a century) a peg was placed on a revolving cylinder for each "yes." As the cylinder turned, the peg would strike a note. This same principle is used in music boxes today.



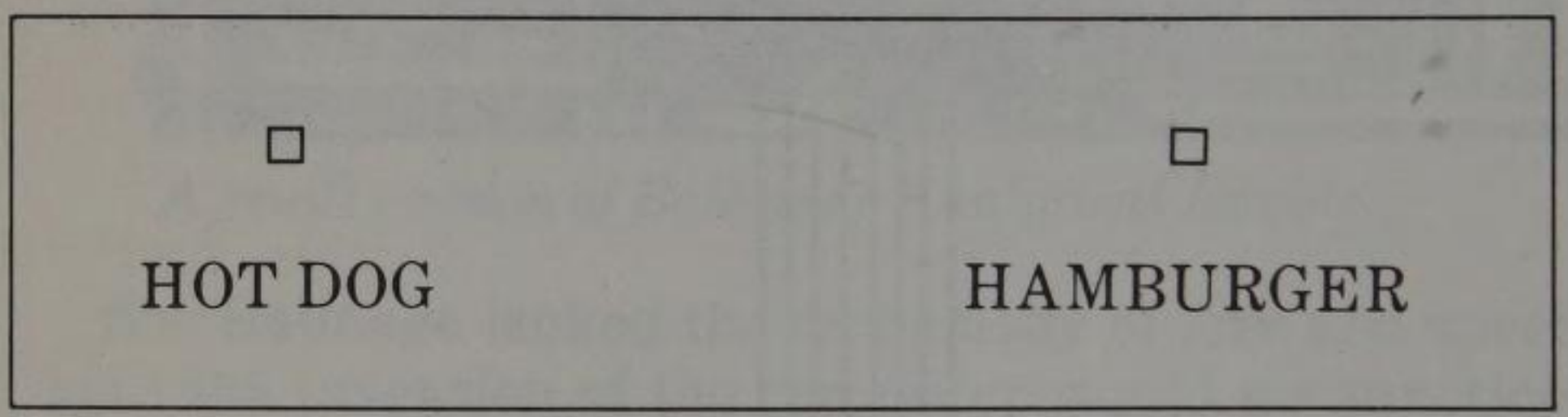
Each time a peg on the drum of this automated bell-ringer pulls a string, the bell attached to that string rings.

The automated weaving looms used paper with holes in it. If a rod could fit in the hole, the thread would be included in the design. If there was no hole for the rod to slip into, the thread would not. This allowed for intricate, inexpensive, and error-free weaving. It's the same concept seen in player piano rolls and computer punch cards.

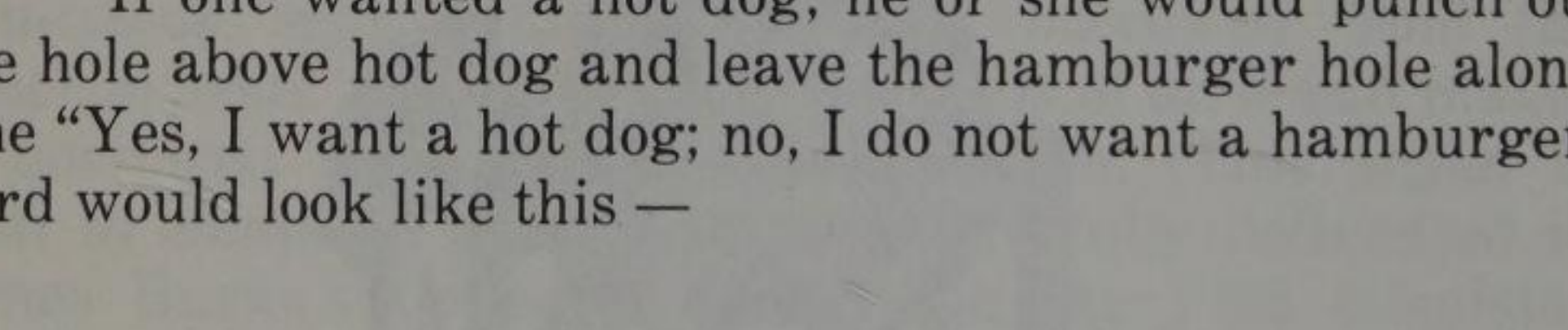
Punch cards — which until just a few years ago would arrive almost daily in the mail with the ominous warning not to fold, spindle, or mutilate them — work like this:

The card is designed with room to punch out little holes. These holes represent a basic yes/no binary circuit — if the hole is punched, that's yes; if the hole is not punched, that's no. These holes could be assigned to record any answer whatsoever, providing that the answer was either yes or no.

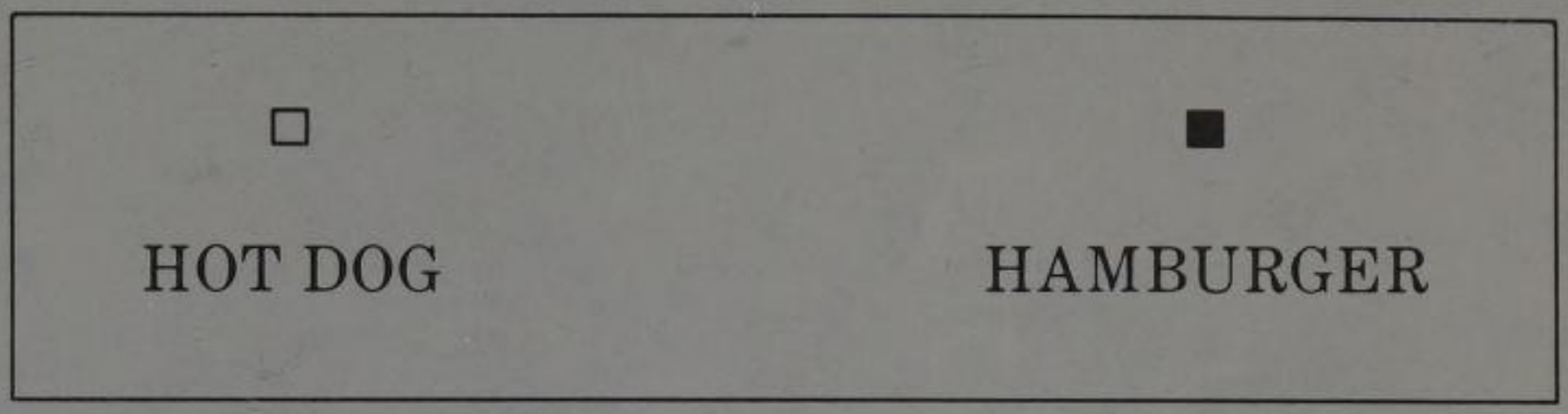
Let's take a very simple punch card that would offer someone the choice of a hot dog, a hamburger, or both. The card would look something like this —



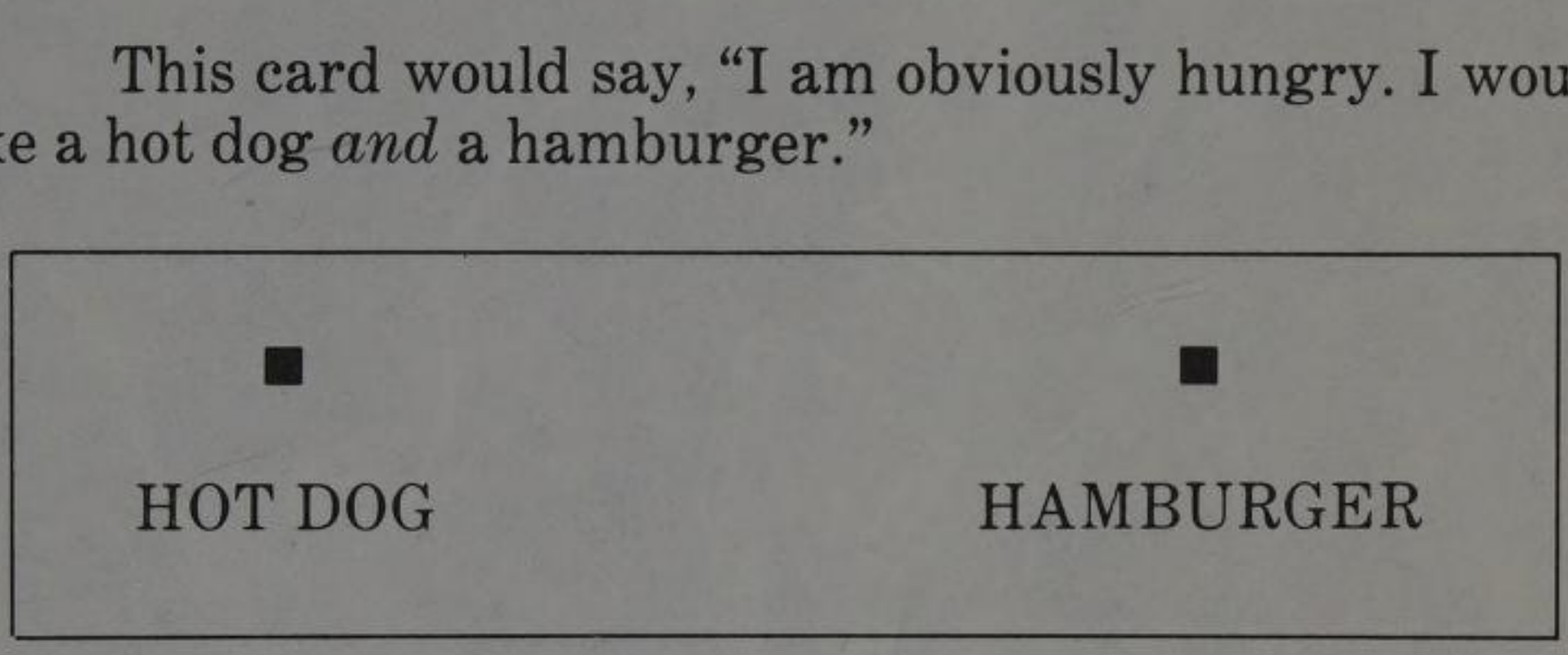
If one wanted a hot dog, he or she would punch out the hole above hot dog and leave the hamburger hole alone. The "Yes, I want a hot dog; no, I do not want a hamburger" card would look like this —



This card would communicate to a computerized kitchen, "I would like a hamburger but not a hot dog":

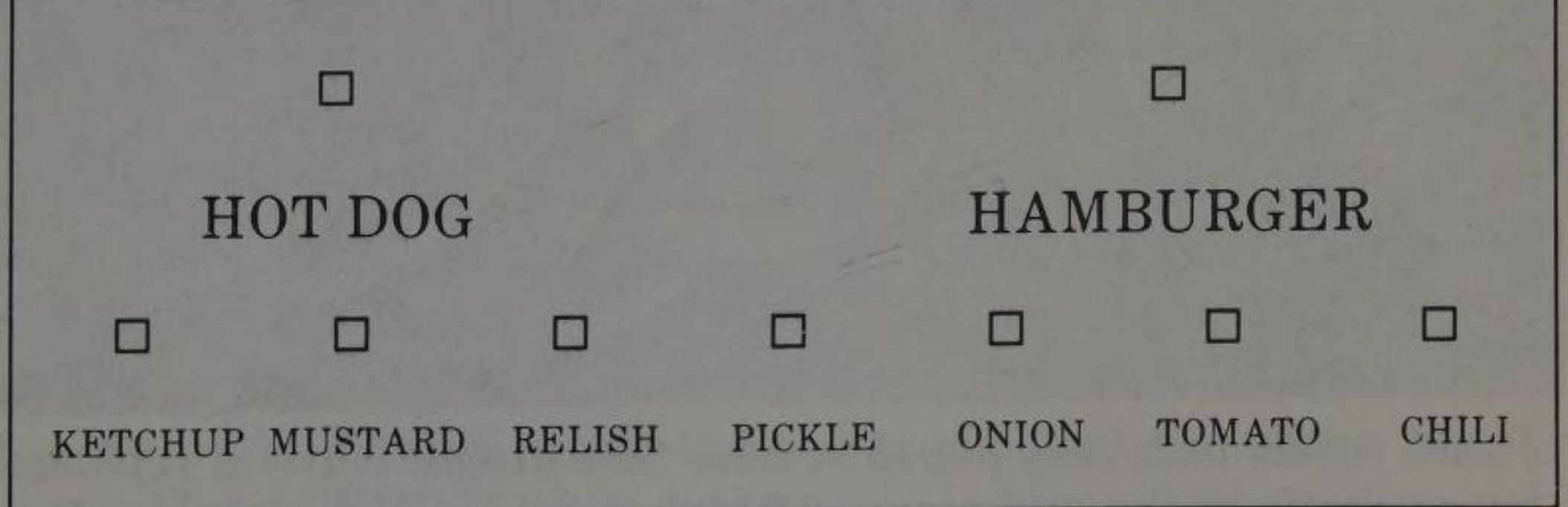


This card would say, "I am obviously hungry. I would like a hot dog *and* a hamburger."



And an unpunched card might mean, "I am on a diet. Do you have any cottage cheese?"

In this way, a card with only two holes has given us four possible choices — hamburger only, hot dog only, hamburger and hot dog, neither hamburger nor hot dog. The choices given the card puncher could be geometrically increased by simply adding a few more holes.



This would offer a range of choices from nothing, to a hamburger *and* a hot dog with everything.



Punch cards, once very popular, have been almost entirely replaced by magnetic disks and tapes. IBM is in the process of recycling billions of these cards. To get some cards for your bird, write IBM, Boca Raton, Florida.

• The 1880 census in the United States took eight years to count. What with the tired and the poor and the huddled masses steaming to America from the teeming shores of Europe, it was estimated that the 1880 census would be counted by 1902. At that rate we would know, by 1985, what the population was in 1930. A better way of counting and sorting was needed and was duly discovered: The 1890 Census Machine.

John Shaw Billings, a medical doctor and lieutenant-colonel in the U.S. Army, came up with the idea of using the punch-hole cards to speed people counting, and turned the project over to Herman Hollerith.

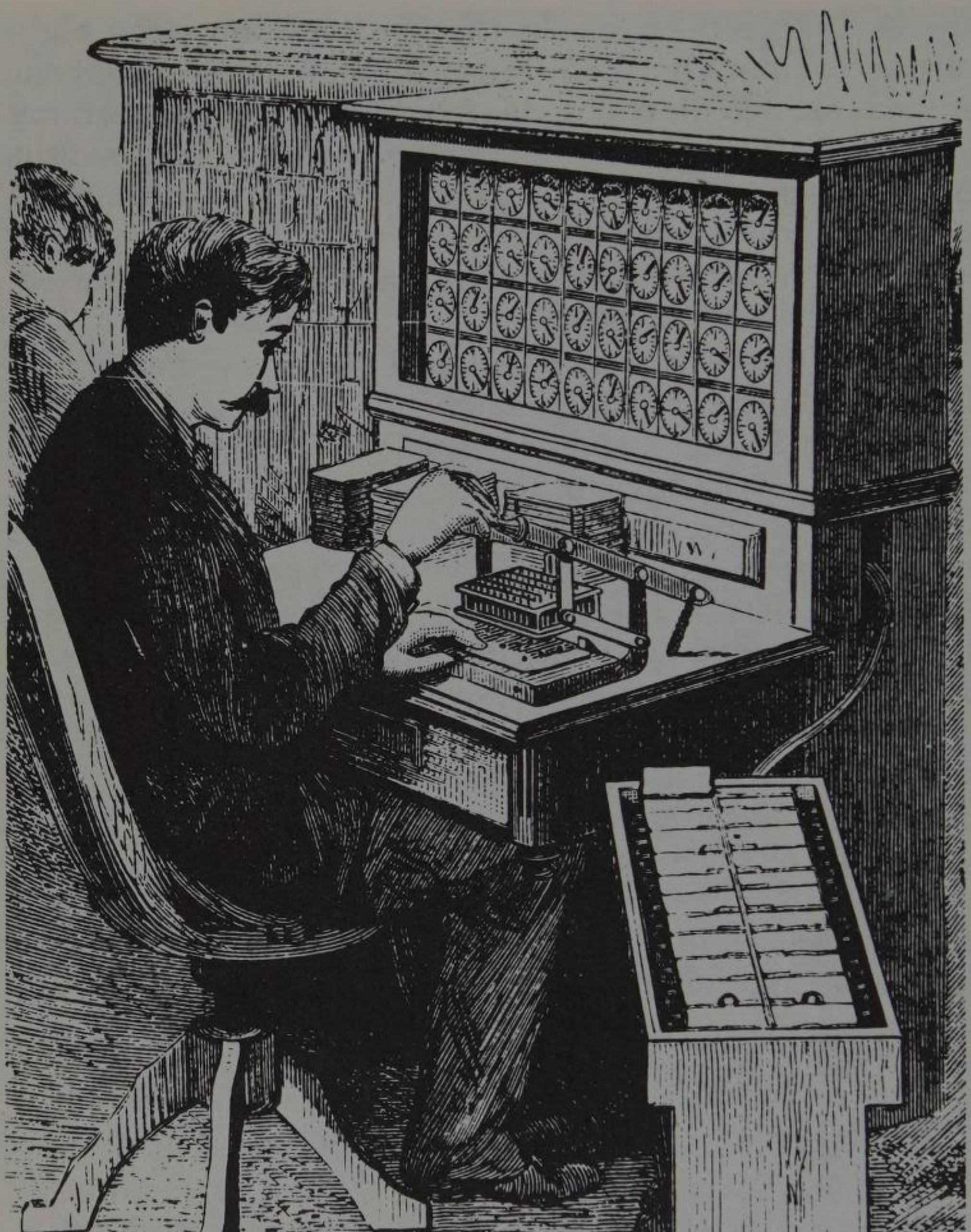
Hollerith designed cards that the census takers could carry with them and punch in the field. The cards included information on sex, age, birth date, nationality — the standard census data. Then the cards were processed by a machine. Each time a hole was in a card, a metal rod would pass through, complete an electrical circuit, and the data was tabulated. However primitive, and although the balance of this computer was purely mechanical, this was the first use of an electric circuit in computing.

The 1890 census was completed, thanks to the computer, in less than three years. In 1911 Hollerith joined with the Computing Tabulating Recording Company, which later became IBM.

• The next two advances came from those hotbeds of progress, war and universities.

By 1939, IBM had become a grand American institution. It joined with another grand American institution, Harvard, and together they made a computer, the Mark I. Partly electrical and partly mechanical, it was the world's largest adding machine. It was fifty feet long and eight feet high. It could add, subtract, multiply, divide, and — most importantly — make mathematical tables. The tables were used by the military in World War II. It told them, for example, where to aim a gun so that the shell and the enemy plane would reach the same place at the same time.

Until WW II, big guns were only asked to fire on stationary objects, like buildings, or on slowly moving objects, like ships. Airplanes moved at several hundred



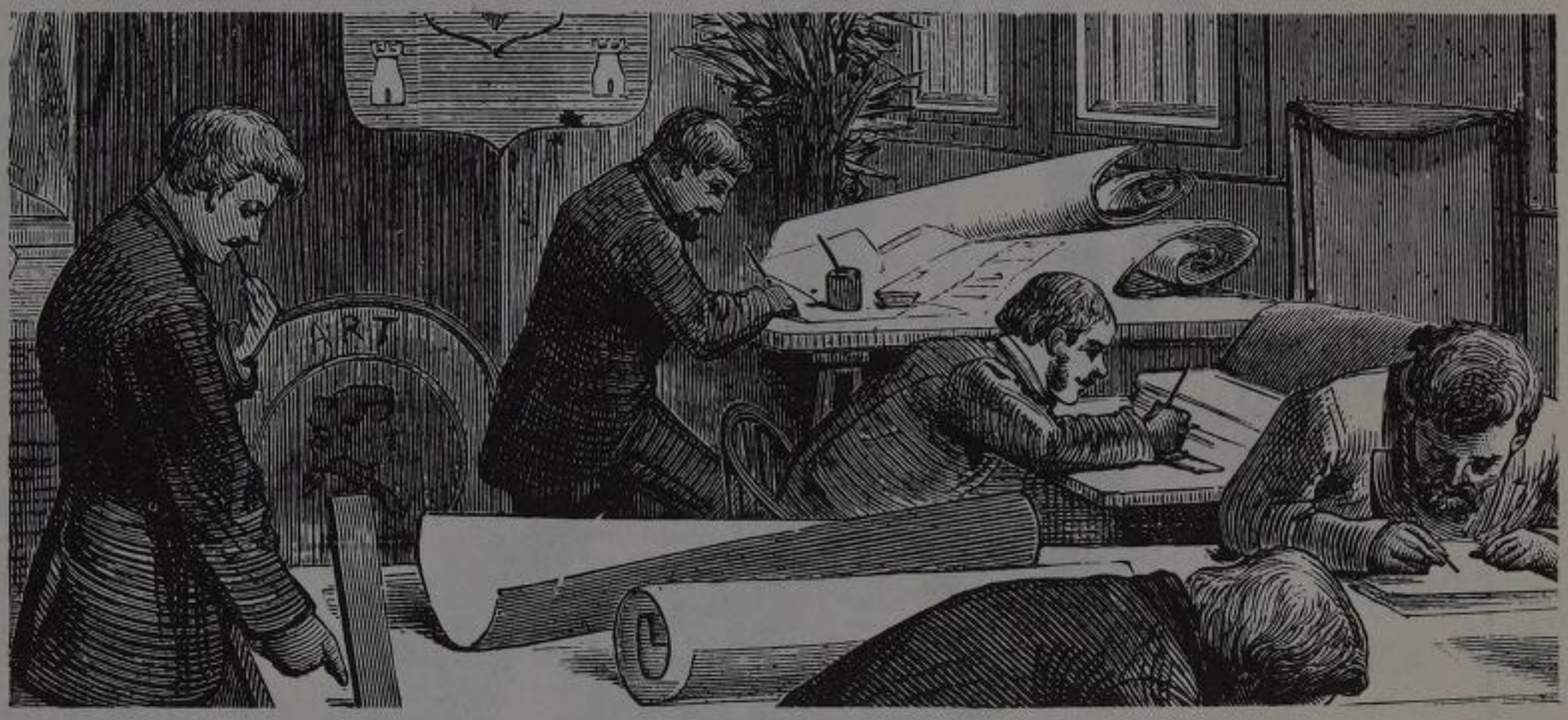
The 1890 Census Machine.

miles an hour. The gunner needed to know *exactly* how far in front of the plane to aim. Hence a book of intricate tables was devised that almost required a computer to interpret.

Meanwhile, the University of Pennsylvania, not to be outdone, was working on the first fully electronic computer, the ENIAC (Electronic Numerical Integrator and Calculator). Was this, too, the birth of computer jargon?

The ENIAC took up 3,000 cubic feet (some computer *stores* today are smaller than that), weighed 30 tons, and used 18,000 vacuum tubes. On the average, one tube failed every seven minutes. (When they say that computers today are very reliable, they may be comparing them to the ENIAC.)

The ENIAC was a big hit. When it was first plugged in in 1946 (the year my parents got married — ah, memories) it spent two hours doing nuclear-physics calculations that would have taken 100 engineers one year to compute. How many hours it took ENIAC to come up with *that* statistic we will never know.



Hard at work, designing the first IBM at Harvard.

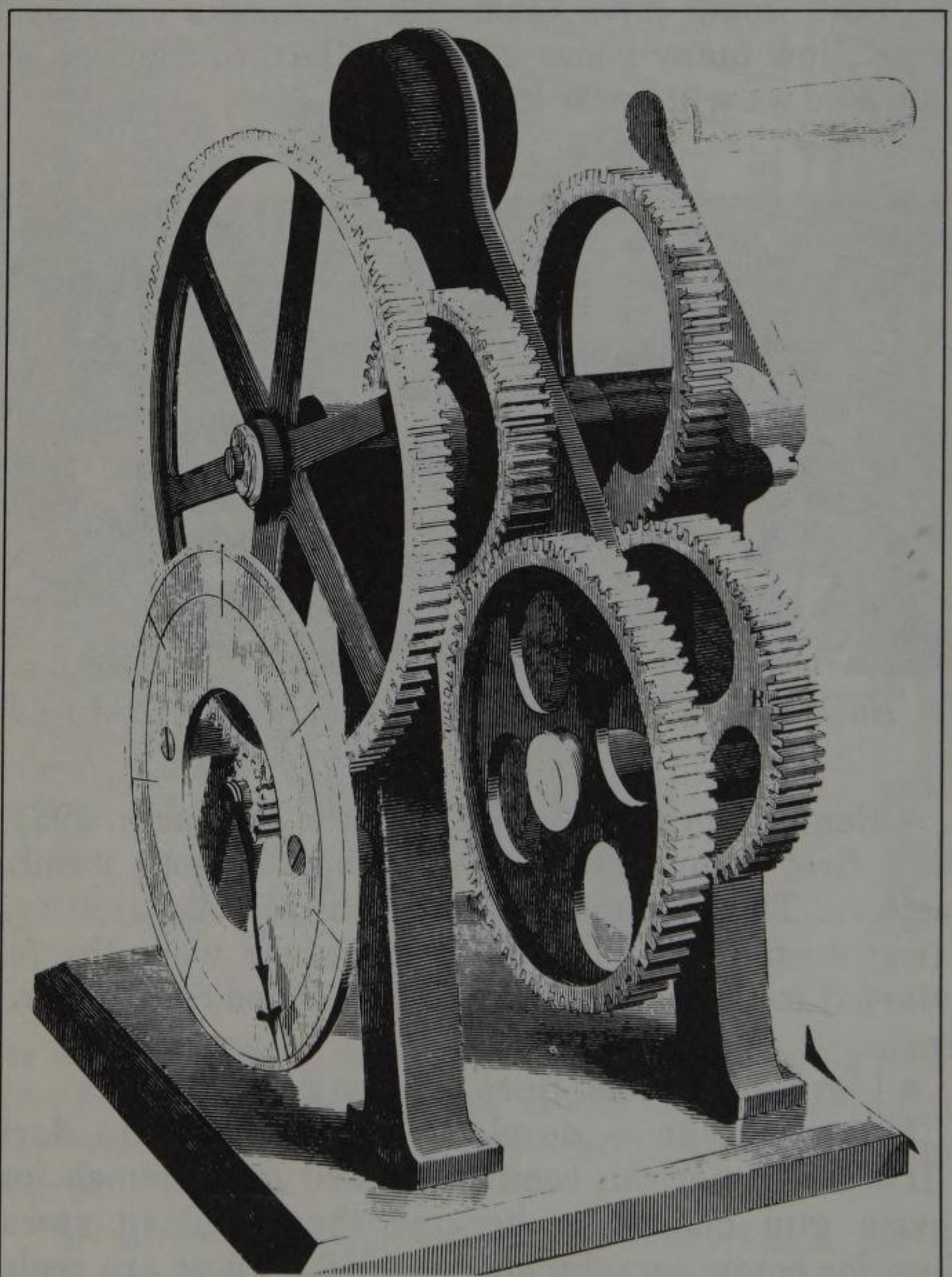
• Remington Rand introduced the Univac in 1951. It was the first computer that could handle both numbers *and* letters. The computer was taught to read and write. The first customer in line for the Univac were the folks who started it all back in 1890 — the United States Bureau of Census.

• I love full circles. Here are two more.

Magnetic tape — developed by the Germans during WW II while American computers used paper-punch input to devise gun charts — became the standard storage medium for computers during the 1950s. Those are reels of magnetic tape spinning in the science fiction movies of the period.

The Japanese, still happy with their abacuses, took a neglected invention from the Bell Laboratories — the transistor — and revolutionized the world with it. It began with the transistor radio in the late 1950s and moved to computers in the early 1960s.

Each small, cool, inexpensive, reliable transistor replaced a large, hot, expensive, volatile vacuum tube. Computers became smaller, cooler, less expensive, and more reliable.



The inside of a transistor as seen through an electron microscope. (Scale: 1 inch = 4 miles)

• The late 1960s saw the development of the silicon chip. Each chip, the size of a postage stamp, held the computing power of thousands of transistors, which had replaced thousands of tubes. The ENIAC's 18,000 vacuum tubes and the 30 tons of wiring necessary to connect all those tubes could now fit on a table top.

• The first personal computer was introduced in 1975. The Altair 8800 was a kit offered to hobbyists. It was remarkably — and surprisingly — successful.

Soon the Apple — named after one of its inventor's summer job in an apple orchard — made its debut. It cost $666.66. The Apple was born with a case of the cutes from which it has yet to recover.

Tandy Radio Shack, combining its hobbyist beginnings and its knowledge of marketing electronics to a mass audience, introduced the TRS (Tandy Radio Shack) 80 Model I.

Commodore, maker of hand-held calculators, took the plunge and introduced the PET.

Then the rest of the world jumped in. Entrepreneurs, corporations, shamans, geniuses, bankers, San Fernando Valley housewives, adding machine companies, photocopy companies, and, finally, IBM, all introduced personal computers or peripherals or programs to a waiting but cautious world.



"The equivalent of 10,000 transistors in this little thing? Amazing."















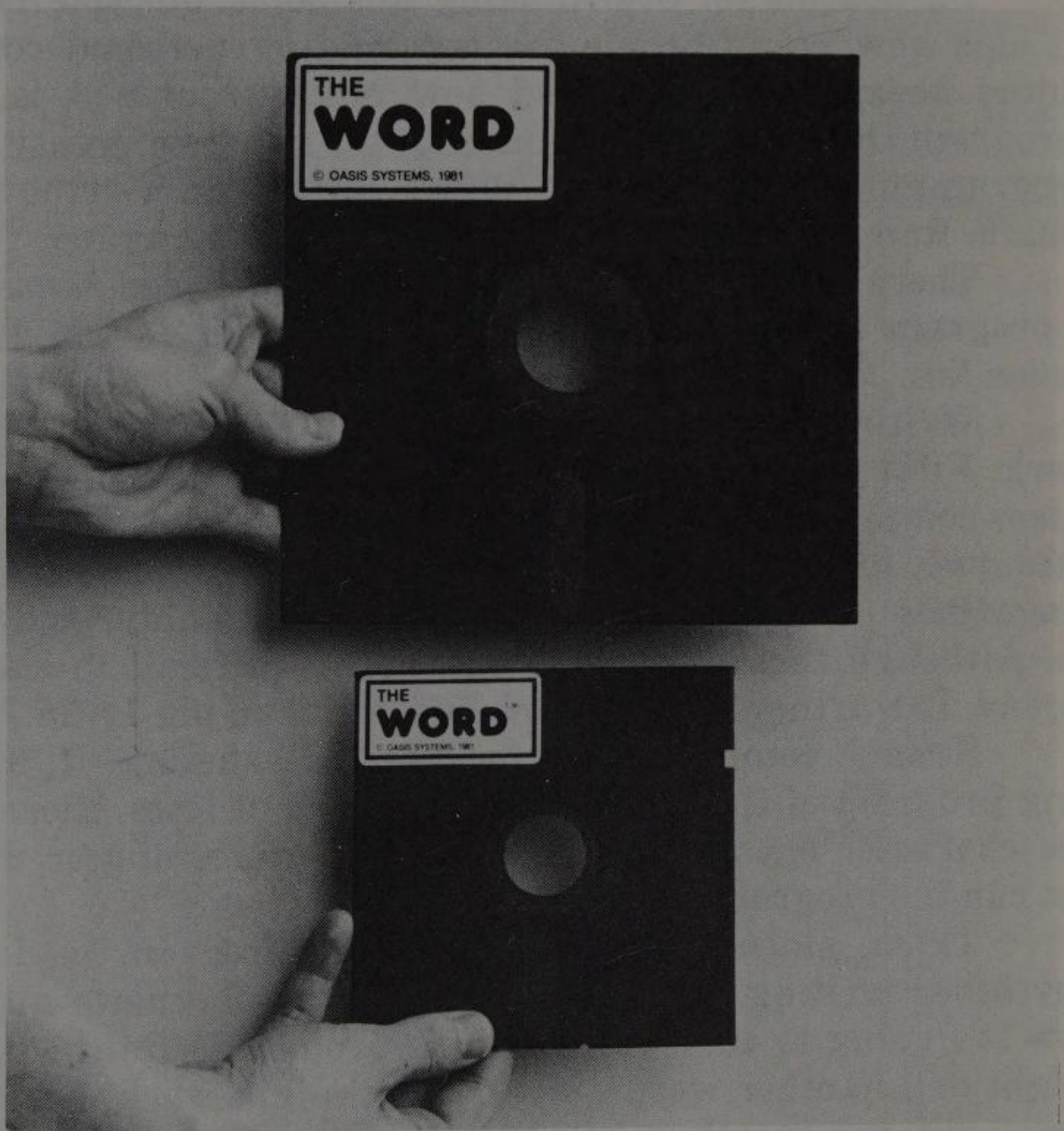


Chapter Three

Of Programs and Programming

There is a misconception in the land. The misconception says that, in order to program your computer, you must learn something special, like programming. You don't.

To program a computer, all you need to do is put a disk in a disk drive, or put a cassette in a cassette player, and push á button. That's it. Within a short period of time (several seconds for the disk; several minutes for the cassette) your computer will be programmed.



Here is a program called The WORD. It is available on either 5¼- or 8-inch disks. The program will, within seconds, turn a personal computer into a 45,000-word spell-check dictionary.

A personal computer is like a TV. In order to watch a program on television, all you do is turn it on and set the dial. To change programs, all you do is turn the dial or, more frequently these days, push a button. If none of the programs offered by the stations appeal to you, you can program the TV yourself by playing a video tape or a video disk.

It's precisely the same with a computer. The difference is that, more often than not, you'll start by playing a tape or a disk. (In the world of personal computers one does not *play* a program, one **runs** a program. You would *run* a checkbook program or *run* a word processing program.)

Pardon me for over-making this point, but you have no idea how many people are terrified by personal computers because they've heard how much trouble it is to "program the thing." Programming the thing is as easy as programming your cassette player to play a Beethoven sonata. Running a program is as easy as playing a tape.

There is a great difference, however, between *running* a program and *writing* a program, and therein the confusion lies.

Writing a program for a computer takes a lot of work. First you must learn a computer language. Like any alien, computers have their own languages. These are the ones you may have heard bandied about in computer magazines — BASIC, Fortran, Pascal, Assembly, and so on. Although these languages are not as difficult to learn as, say, Latin, they are far more difficult than pig-Latin.

Second, computers are precise and exacting. If, in a long program of thousands and thousands of lines, there is *one* character out of place, chances are the computer will not run the program properly.

Third, since writing a computer program is, like any other writing, a creative act, one never knows quite how it's going to turn out until the product is finished. It might not, in other words, work. Or it might work in some parts but not in others. Or it might work the first five times but not the sixth. Or....the variety of ways in which a program *won't* work is infinite.

| | | |

The causes of these irritating and often unpredictable program failures are many and varied, but they all fall under the general classification of **bugs.** The painstaking process of removing bugs is known as **debugging.** Trying to get all the bugs out of some programs is like trying to get all the bugs out of a picnic.

It is little wonder, then, that writing programs has a generally negative reputation among ordinary humans, rather like the reputation the Polar Bear Clubs have. I cringe when I even *think* about the news footage of those people, in bathing suits, cutting holes in the ice and jumping in. *Voluntarily.* I likewise cringe when I see a program printed in a computer magazine — page after page after page of numbers, jargon, and meaningless symbols. The thought of having to copy — much less write — all of that nonsense is enough to put a person off computers permanently. (Alas, in too many cases, I fear it already has.)

This is further complicated by the choice of words those who write programs use. Generally, they don't say, "I had such trouble writing a program last night." Instead, they say, "I had such trouble *programming my computer* last night." (Emphasis mine.) This is like a Polar Bear Club member casually mentioning that he or she "went for a swim." In February. In Vermont.

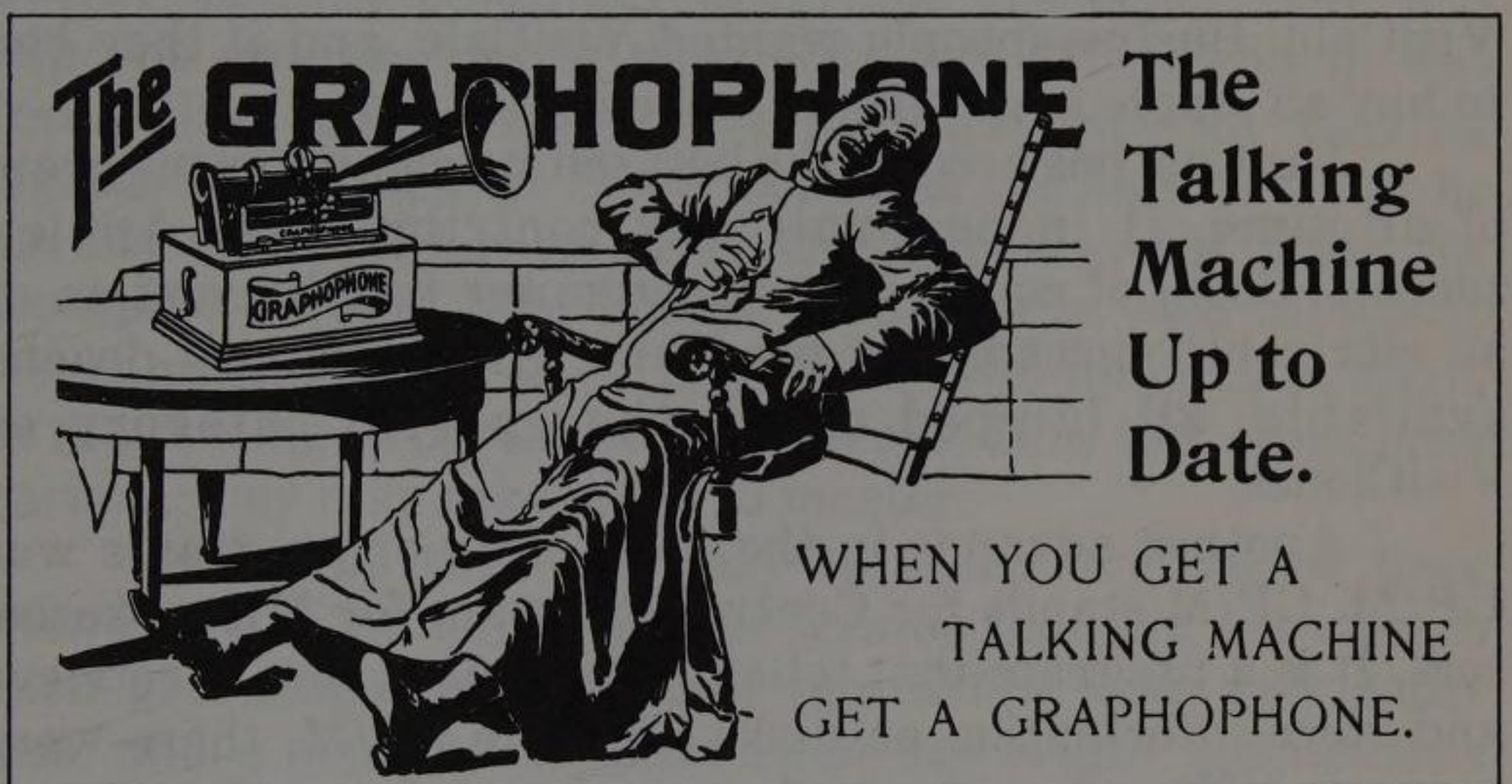
It should be pointed out that some people *like* jumping in cold water, and some people *like* writing computer programs — and some people like heated swimming pools and prewritten, pretested programs. I don't think you'll have much trouble guessing which category I fall into.

Writing a program for a computer is the same as making your own program for television. It can be done and it can be fun, but if you're like most people, the majority of what you watch on television was made by others, and the majority of what you run on your computer will be written by others.

There was a time — only six or seven years ago — when there were no prepackaged, commercially available computer programs. This was because there were so few personal computers. (The first one, you'll remember, was introduced in 1975.) Besides, at that time small computers

were in the hands of the hobbyists, and programming the computer was *part* of the process. Back then you might just as well have asked someone to come in and do the soldering on your Heathkit as buy a prewritten computer program.

This corresponds to the early days of recorded sound. After Edison invented (almost by accident) the phonograph, the only practical use he could conceive for the device was as a dictating machine. For the first decade or so, the average library featured more homemade recordings than store-bought. "Grandma Parkins on her 80th birthday." "Uncle Seth sings 'Oh Susanna.' " "Reverend Thompson readin' from the Holy Writ."



John Philip Sousa and Caruso did for the phonograph what Milton Berle and Sid Caesar did for television or VisiCalc did for personal computers. People wanted the *program* so much that they were willing to buy whatever machine was necessary to play the program on. (The machines — phonographs, TVs, computers — are known as **hardware** and the programs — tapes, videodisks, records — are known as **software.**)

VisiCalc is a program that allows one to enter column after column of interrelated information — an electronic version of the spreadsheets businesspersons have been using for years. The difference with VisiCalc is that, when a change in one figure in one column is made, all the other

figures in all the other columns change accordingly, automatically, instantly.

Now this may not mean much to ordinary folk, but to businesspeople this was a breakthrough in trade on a level with, say, opening the Suez Canal. Hours of figuring cost projections eliminated. Days of waiting for revised estimates reduced to seconds. The all-important "bottom line" was never more instantly reached, and the hundreds of components that resulted in the bottom line were never more manageable.

VisiCalc was designed to run on the Apple II computer. The whole package — VisiCalc, Apple and video screen — ran around $2,500. *Never mind* $2,300 of that was for the Apple and the video screen and $200 for the VisiCalc. Businesspeople wanted VisiCalc, and if they had to buy an Apple to go with it, so be it.

VisiCalc has become the best selling computer program of all time. It in no small way contributed to Apple's success. Soon, of course, every computer had its version of an electronic spreadsheet program. There are now dozens available, all lumped under the general category of VisiClones.

Another advance in the marketing of programs was **CP/M**. CP/M stands for Control Program for Microprocessors. It is a program that tells the computer how to retrieve and store information on disks. Prior to CP/M, there were several different systems for storing information — all incompatible. (Apple, Radio Shack, IBM, and Commodore still use incompatible formats.) CP/M allowed the smaller computer manufacturer to offer a machine with a standardized disk operating system. If a machine was "CP/M compatible," it could run almost any program written in the CP/M format.

When the IBM PC computer came along, and clones of it sprang up, MS-DOS became the popular operating system for IBM-like computers, much as CP/M was the system for other machines. **MS-DOS** stands for Microsoft Disk Operating System.

With thousands of Apples, IBMs and CP/M-based computers in the field, it became profitable for companies

to market software — and so they have. Today there are thousands of prewritten programs, covering a wide range of subjects, from games to business to ecology. We'll discuss some of these in the chapters that follow, although a full review of all available programs is far beyond the scope of this book.

There is a difference, however, between running a computer program and watching a television program. Computer programs generally require some interaction, whereas television programs will go on and on, totally oblivious to what you are or are not doing.

Learning to interact with a computer program, like learning how to use any tool, can take from one minute to several months. Computer programs are tools. They will help you get your work done with less effort and in less time. Like tools, computer programs come in varying degrees of complexity. Some tools, like the hammer, can be learned within a few minutes. Other tools — the lathe, for example — would take longer. And so it is with computer programs. Space Invaders might take two minutes to learn, an accounting program several weeks. But, like tools, once learned, they may take years to master.

Programs that are easy to learn are called **user friendly**. I'm not sure what programs that are not easy to learn are called, but I've run into a few user unfriendly ones, and a couple that have been downright hostile. One must be careful, however, that the friendliness does not become a burden after one learns the program. The training wheels on a bicycle are helpful but, if not eventually removed, may prove cumbersome.

Learning to operate a new program will require time. Even if you already know how to drive, learning the locations of the various knobs and dipsticks on a new car will take some study and patience. If you've never driven (i.e., operated a computer) before, the investment of time and patience will be greater.

Programming a computer is effortless, learning how to use that program will require some time and study, but you will never, ever — unless you really want to — have to write that program yourself.



"You know, Santa, if I had a personal computer and a modem, we could handle next year's gift list with a great deal more efficiency."



Chapter Four

Data Banks

Data banks are like money banks. Money banks gather, store, and distribute money; data banks gather, store, and distribute data.

Data are (yes, "data" is a plural, the singular being "datum," although the use of "data" as a singular is becoming more widely used) anything that goes into a computer, everything stored in a computer's memory, and anything that comes out. "Data" is a general word, like "writing," that covers a broad spectrum of information.

A personal computer can store a limited amount of data — limited in not only amount, but also timeliness. Larger computers (known as **mainframe** computers) can hold almost unlimited amounts of information, and the operators of large computers can afford to have that information constantly updated.

One could not buy a program that would give up-to-the-minute stock market information. One could not buy a program that told the ongoing happenings in, say, Pakistan. One could not buy a program that gave the current price of gold, or the temperature in Tokyo, or which market in town had the lowest price on canned orange juice.

You could, however, rent time on a larger computer that *could* tell you all that — and a great deal more.

There are companies whose business it is to maintain massive amounts of information on a vast variety of subjects, and to rent access to that information by the hour.

The three largest data bank companies are CompuServe, The Source, and The Dow Jones Information Service. CompuServe and The Source offer a potpourri of information, while The Dow Jones Information Service, as you may have guessed, specializes in business — and especially stock market — news. (The Dow Jones company publishes *The Wall Street Journal* and is the instigator of the famous Dow Jones stock market averages — "The Dow Jones Industrials are up one-half point in heavy trading.")

To use the services of one of these data banks is

relatively easy. First, you'll need a modem so that your computer can send and receive information (data) over regular telephone lines. Some personal computers require, too, that you run special "communications software" whenever you use a modem.

Then you dial the local telephone number (or the toll-free WATS number) of the service you want, and enter your identification number and password (given to you when you subscribe to the service). That's all there is to it — you are then "online" with the world, or at least as much of the world as a given data bank is willing to offer.

Let's take a closer look at the three most popular data banks.

The Source is owned by *Reader's Digest*, "From condensing articles to expanding the limits of personal computing, *The Reader's Digest* is serving *you*."

To subscribe to The Source, one must fill out an application and pay $100. "Can't I just give you my Visa card number over the phone, and you give me an account number and a password?" I asked when I called to subscribe.

"Oh, no," the woman at the other end responded, almost shocked by the impropriety of my question. "We must have a signed form on file before you can use The Source." She articulated the words "signed form" particularly well, as though she were talking to someone who was not very good at understanding English.

A bit more than a month later my unsigned form arrived in the mail. I signed the form, returned it, and two weeks later a notebook arrived UPS.

The notebook was a standard three-ring binder with elaborately printed pages telling everything The Source had to offer — and a few things The Source did not have to offer.

It seems the *New York Times* had removed their data bank from The Source because the *New York Times* rented their data bank at more than $100 per hour and The Source was renting it for less than $25. This was fine as long as The Source specialized in those "toy" home computers but, as personal computers grew more sophis-

ticated and widely used, the *NYT* found that more and more people were dropping the $100-plus service and getting the same information from The Source for under $25. The *Times* dropped The Source.

Dropped by The Source was a rather interesting plan called Legis-Slate that would have allowed one to track any piece of legislation through any state or federal legislative body. It sounds like an ambitious project, and it was — a bit too ambitious.

The Source still has a great deal to offer, including the news of United Press International, detailed stock market reporting, and a vast assortment of programs and information services for both home and business.

After some fiddling (data bases require that one use a **dumb terminal**, or its equivalent — and some smart computers struggle against ever becoming dumb again), I entered my ID number, then my password (if "GNLQFC" qualifies as a word), and I was "online" with The Source.

I was welcomed to The Source and urged to check the monthly discount specials offered by Comp-U-Store, The Source's at-home shopping service. I was then presented with The Entry Screen.

The entry screen gives one the choice of having an overview of The Source, instructions on how to use The Source, being shown The Source Main Menu, or going directly into the Command Level.

A menu in computing, like a menu in a restaurant, lists all that's available. The command level lets one bypass the menu and go directly into a program, rather like saying to the waiter, "Skip the menu and bring us two cheeseburgers."



The Main Menu on The Source looks something like this:

1. News and Reference Resources
2. Business/Financial Markets
3. Catalog Shopping
4. Home and Leisure
5. Education and Career
6. Mail and Communications
7. Creating and Computing
8. Source*Plus

These are the general headings under which hundreds of other choices are listed. If one were to choose "Home and Leisure," for example, the secondary menu would read:

1. Games
2. Advice & Horoscopes
3. Travel & Dining
4. Entertainment
5. Home Finance

Each of these choices would have an additional menu, and so it would go until, by a process of refinement, one would arrive at the information or program one wanted.

From the main menu I chose #6, "Mail and Communications." The Mail and Communications sub-menu was:

1. Mail
2. Chat
3. Post

Simple, direct — and I knew nothing more about The Source's "Mail and Communications" services than I did before. I pushed "1" for Mail. I was told, by yet another menu, that I could check my mail, or send mail to someone else. I love mail, so I thought I would check my mail. This being my first ten minutes on The Source, naturally, there was no mail. "You have to send a letter to get a letter," as my mother used to say. Still, I thought there might have

been a welcome note from someone at The Source, something akin to the free box of chocolates you get when you check into the Ritz Carlton in Chicago.

But, no, there was no mail. Did I want to send a letter? I had my choice of anyone on The Source. The trouble was I didn't *know* anyone on The Source. For a moment I considered sending a letter to myself, but then I thought that the computer at The Source might think me pathetic, so I decided not to.

I went on to #2, "Chat." Chat allows one to have a video-to-video discussion with anyone who happens to be online with The Source at that time. Again, not knowing anyone on The Source severely limited my use of this feature. (I later discovered that, by using Directory, one can find out the ID numbers of everyone online who has an interest in, say, photography. You can also list yourself and interests in the Directory and who knows? Maybe someone will call and Chat with you.)

I moved along to #3, "Post." Post is sort of an electronic classified ad section. One can post a message in any of 75 categories, such as art, antiques, automobiles, and so on. I went right to "dating." I was told there were 27 entries. They were rather mild, compared with some "dating" classifieds I've read, but not bad considering the source of The Source is *The Reader's Digest*. "Ever made it with a programmer?" one asks. "Two women want to meet straight men in San Francisco," reads another. (Good luck.)

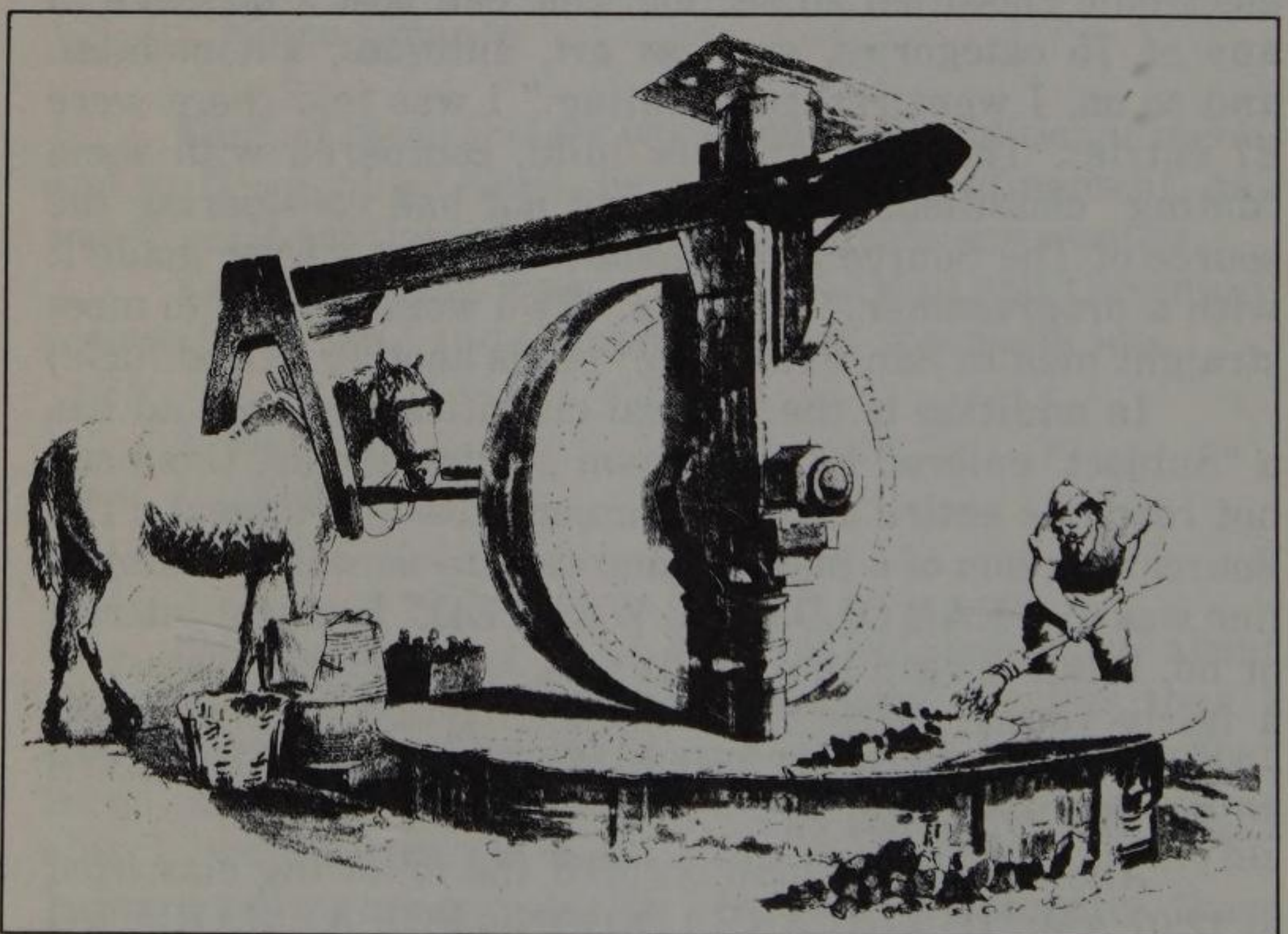
In addition to the general classification, each ad has a "Subject" entered by the person placing the ad. One need not read the entire ad if the subject does not appeal. (The Source's version of a plain, unmarked envelope?) One subject line was "1 YEAR OLD GIRL WANTED!" Prurient interest or no, I had to read that ad. It was, as expected, placed by a fairly young, fairly inexperienced typist. The ad itself read, "IF ANY GIRL OUT THEERE IS 14 AND LIKES GUYS PLEASE CONTACT ME."

Another young man entered the following classified at 12:07 AM: "IF YOU ARE LOOKING FOR A CHARMING 17 YEAR OLD DO NOT HESITATE TO GET IN TOUCH WITH ME." He either thought his message could stand a

bit of clarification, or was it just the impatience of youth?, because at 12:16 AM he was back with another ad, "IF YOU ARE LOOKING FOR AN ATTRACTIVE 17 YEAR OLD MALE THEN GET IN TOUCH WITH ME." Androgynous charm or masculine straightforwardness, one has one's choice.

I do not mean to imply that The Source is merely a video version of a singles' bar (although they do feature extensive information on wine). No, there's Jack Anderson, too. And weather, sports, dining guides, movie reviews, commodity prices, and on and on and on.

I recommend calling The Source directly (toll free 800-336-3330) and asking for their current catalog of rates and services. If you are not happy with The Source within the first 30 days, the $100 registration fee is refundable, less charges for actual online time. If you are not happy with The Source any time after 30 days, you can register a public (public to all other Source subscribers) complaint on a bulletin board known as "Gripes."



The computers used at data banks have large disk drives that permit almost unlimited storage.

More liberal than The Source with their initial sign-on policy is CompuServe. All it takes is going into your local Radio Shack store and plunking down $19.95. You can't get more liberal than that. Finding a Radio Shack store that *has* the dumb terminal package (the package for computers other than Radio Shack computers) is another matter. One Radio Shack Computer Center — in Beverly Hills no less — didn't have it. "When will you get one in?" "Oh, in two to four weeks."

I decided to let my fingers do the walking to the other Radio Shack Computer Centers, and found one that had the dumb terminal package. I talked to a salesman — let's call him Ollie — and asked him to hold one dumb terminal package for me.

When I arrived at the store, Ollie was especially happy to see me. Were things that tough that the commission on a $19.95 sale would cause such friendliness? He said he was holding the dumb terminal package for me and would be right out with it.

Moments later Ollie wheeled out a box the size of a small dishwasher. "Here's your dumb terminal package," he announced proudly.

Now, I was an assistant manager of a Radio Shack store in my younger, more desperate days, and I knew that Radio Shack wouldn't sell the *box*, much less the contents of a box that large, for $19.95. What he was trying to sell me was a dumb terminal. "No, I want the package for CompuServe," I explained.

"Yes," Ollie said, still counting his commission, "This gets CompuServe. This gets Dow Jones (I am convinced he thought Dow Jones was a TV program like *Barney Miller*). This gets everything." Before he could tell me about the Radio Free Europe option, I explained that I already *had* a terminal, and all I wanted was an ID number and a password.

Another salesman, thankfully, overheard my comments. He pulled a notebook off a shelf and showed Ollie what I was looking for. There was joy as understanding dawned in Ollie's eyes, followed by disappointment as he realized his commission would not be as great as he had hoped.

While Ollie calculated the sales tax (and his commission) on $19.95, I opened the package and read a little. It was a standard Radio Shack software folder they must produce by the millions. It had a three-ring binder with two slim booklets in it, one describing CompuServe, the other describing The Dow Jones Information Service. The inside front cover had eight cassette tape pockets standing empty. (Radio Shack still markets a great many programs on cassettes.)

A sealed packet contained my ID number and password. I knew this because the packet clearly stated: "For security reasons your User Identification Number and Secret Password should be kept separate. Memorize your Secret Password, then keep it in a safe place." One's brain is not a safe place, I take it.

The packet also said, "Obtain the local network telephone number for your area at the point of purchase." Ollie asked for $21.24, so I assumed that this was my point of purchase. I showed Ollie the sentence. He read it and gave me a number. I wrote it on the packet. I apologized for the mix-up, took my change, and went home.

The basic CompuServe package includes one hour on both CompuServe and The Dow Jones Information Service. These hours must be non-prime time — after 6 PM for CompuServe and after 8 PM for Dow Jones, anytime weekends and holidays.

Somewhere around seven that evening I put my computer into the dumb terminal mode (after doing it once for The Source it was easy) and called the "local network telephone number." Ollie answered. He had given me his phone number.

"Ollie," I said, "Do you have the number for CompuServe?"

"Oh, yes," he said, and rattled off another phone number. With minor trepidation I dialed the number. Would it be his sister? Another phone in his house? A deli? New Delhi? One thing was certain: it was not going to be CompuServe. It wasn't. It was the Radio Shack Computer Center.

Not prepared for an elaborate explanation, I blurted

out, "What's CompuServe's number?" The salesperson gave me a phone number, I checked to make sure it wasn't Ollie's, and dialed it. I got the welcome, high-pitched noise that means "The computer on this end of the line is ready. Turn on your modem." I did, and was online with CompuServe in a matter of minutes.

(If you have trouble getting connected with or operating The Source, they supply a toll-free number. CompuServe had no such number.)

The CompuServe main menu was:

1. Newspapers
2. Finance
3. Entertainment
4. Communications
5. CompuServe User Information
6. Special Services
7. Home Information

9. MicroNET Personal Computing

What the phantom "8" once represented is never told. Did the *New York Times* pull out of CompuServe, too? Could there have been a run on the data banks?

Although it covers the same basic territory as The Source, CompuServe appears to be a marginally lighter-weight information service. Still, it's fun, and certainly worth $19.95 for a trial hour of poking about its programs and services. (A booklet on CompuServe's offerings is available from Radio Shack, Fort Worth, Texas, 76102.)

The Dow Jones Information Service, on the other hand, is heavyweight all the way, and I mean heavy in the heaviest sense of the word. This is big time, big business, and it's very serious. No *Off The Wall Street Journal* here.

The Wall Street Journal is represented, as are *Barron's*, the *Dow Jones News Service* (known around the Big Board as the Broadtape), and transcripts of the television show *Wall Street Week.*

Also available are stock market quotations (delayed 15 minutes, as they are on all services), plus in-depth finan-

cial reports on all New York and American Stock Exchange companies and 800 selected over-the-counter companies.

The Dow Jones Information Service has a toll-free customer assistance number, but its hours do not include late-night nor Sundays. They are reachable at 800-257-5114.



"Hello. Dow Jones Information Service. Computer Room. Tim speaking. Oh, hello, Mr. President. No, there's been no sign of an upswing in the economy in the last 45 minutes. Yes, sir. We'll call you just as soon as it happens. Thank you, sir. Goodbye."

Data Banks

Between programs you buy and run, and data banks which you rent by the hour, the personal computer becomes a powerful tool, one that is capable of doing all the things for home, business, and education we're about to explore in Part II of this book.



"If I had a computer,

I'd com-pute in the morning,

I'd com-pute in the evening,

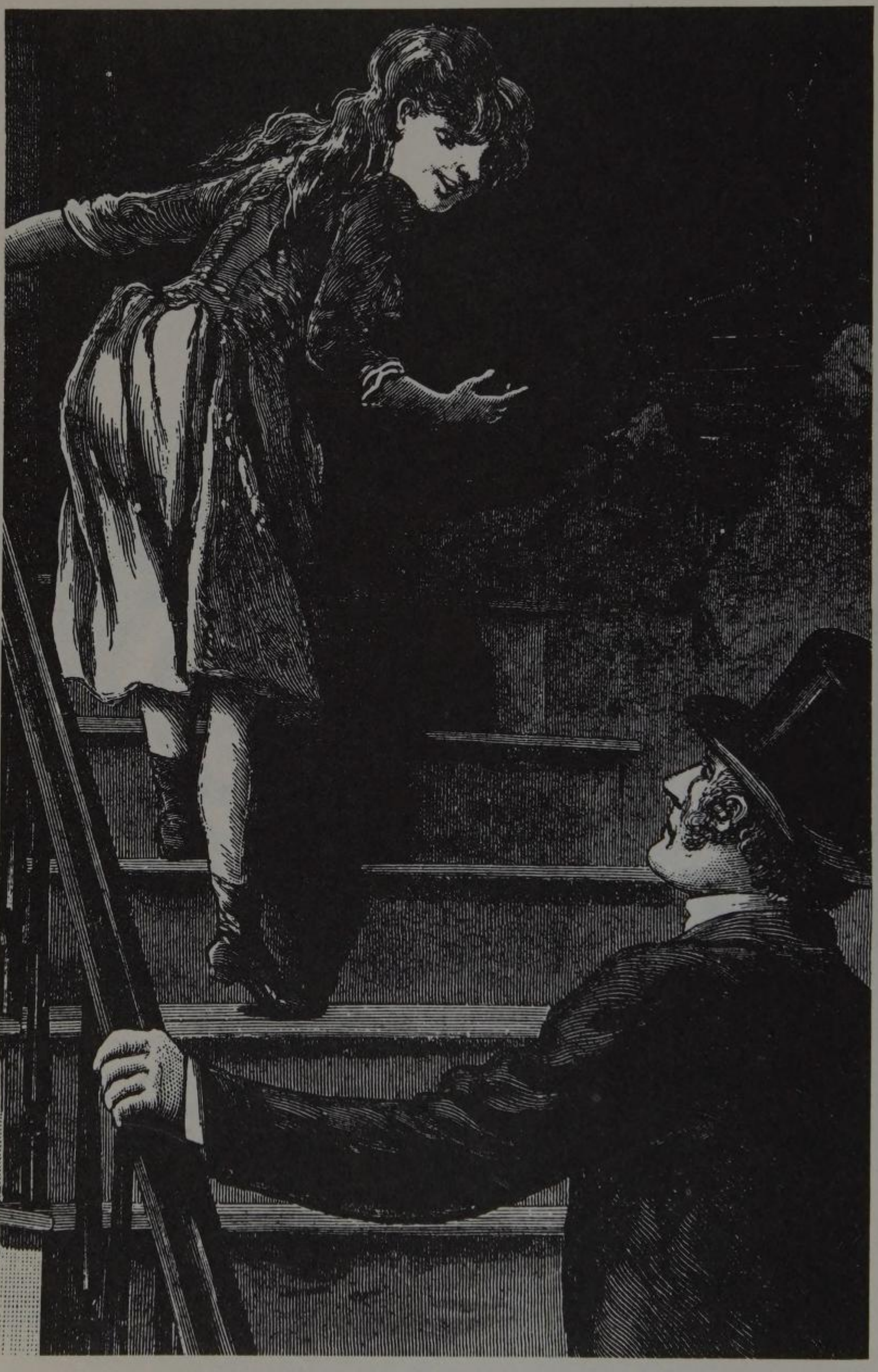
All over this land . . ."



"You promise me a computer and what do I get? Nothing. Get off the cat. Nothing. That's what I get."

PART II

The Uses of Personal Computers



"Come on up. I'll show you my Atari."

Chapter Five

An Overview of Part II

Personal computers are just that — personal. People buy — or do not buy — personal computers for the same sensible or capricious reasons that they, say, get married, or move to New York, or buy a new car.

For some people, the fact that a computer can do just one thing is enough. Young people fall in love with a specific video game with the same passion that previous generations pined away for little red wagons or model trains. If having 24-hour access to that game means owning a computer, so be it. Businesspeople might find the ability to send and receive electronic mail more than worth a personal computer's cost. The fact that a personal computer can process words ten times more efficiently than even the best electronic typewriters is all that many writers need to know.

Yet, for most people, the decision to buy or not to buy a personal computer is less clear cut. Yes, it would be *nice* to have a machine that does this and this and this, but is it worth $5,000, or $3,000, or even $99.95? And if money is not an object, then time is. Is it worth the time it will take to learn how to use this new gadget? That espresso machine from Christmas, 1979, is still sitting in the kitchen cupboard, and it has yet to make a single cup of coffee.

For most people, the decision to buy a personal computer is a process of crystallization. When a crystal is formed, say an ice crystal, the temperature of the water falls and falls, the molecules move slower and slower, yet it remains water. Then, suddenly, around 32° F — or 0° C, for you metric fans — the liquid turns to solid and a crystal is formed. The water does not become harder and harder, like drying wax, until it's eventually solid. One moment it's a liquid, the next moment it's a solid. The water has crystallized.

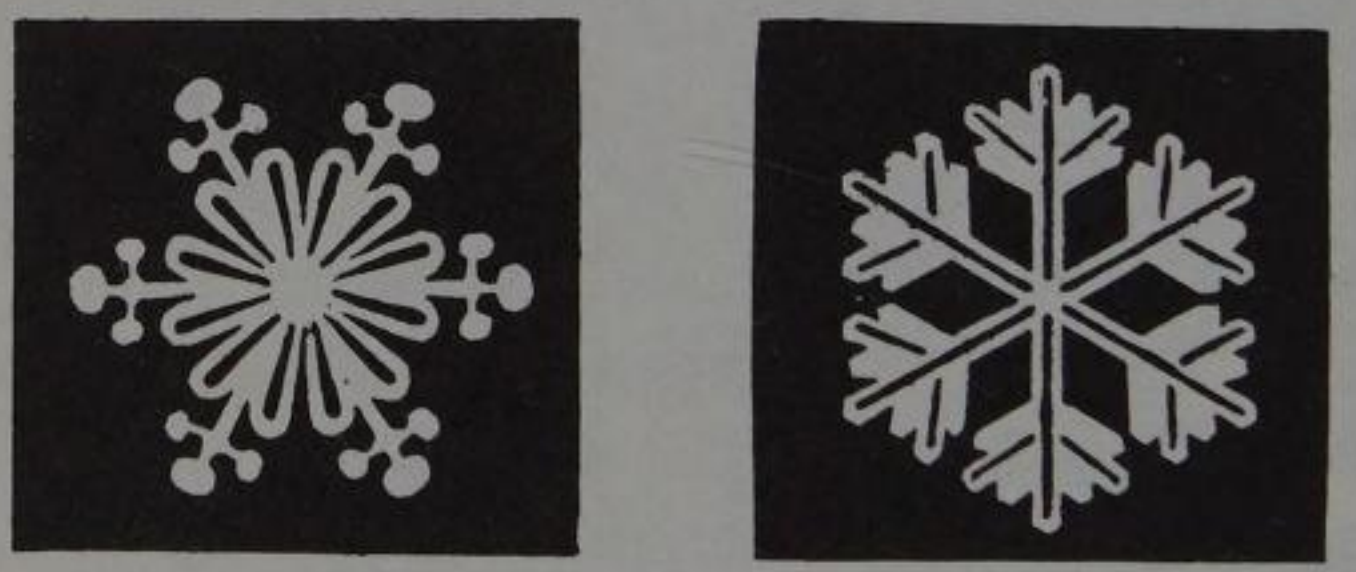
I have observed people, while deciding to buy or not to buy a personal computer, go through the same process. You hear about personal computers for the first time —

some mention of corruption in Silicon Valley on *Sixty Minutes* — but the water temperature remains a balmy 72°. (Since we have, as a nation, officially abandoned metric, all temperatures given will be in Fahrenheit.)

Then you hear about computer games, electronic mail, discount shopping. The water falls to a nippy 53°. Then someone actually *demonstrates* word processing, accounting, electronic spreadsheeting. The temperature dips to 39°.

Then a friend says how much fun he had "chatting" with a stranger in Oregon. Another friend said she made an airline reservation without having to be put on hold and listen to Muzak courtesy of the Friendly Skies. Yet another friend tells how he lost at chess, but he lost to a computer program that beat Bobby Fischer. The water drops to 34°, and the Polar Bear Club Members arrive en masse.

Finally your grandmother calls and says that she stayed up until 3 AM playing Ms. Pac-Man. That does it. The temperature falls to 31°. The crystal has formed. Your next major life project: Get a computer.



The next several chapters are designed to lower your water temperature. Even if you are already below the critical 32° mark, it might pay to read through this part of the book. The chapters *What Personal Computers Do Not Do Well* and *The Drawbacks of Personal Computers* may raise the ambient temperature a few degrees; and making the rounds of computer stores can be like high noon on the Sahara.

The uses of personal computers have been arbitrarily divided into several chapters, exploring the benefits of personal computers in the home, in business, in education, word processing, and games. This is an overlapping group

of headings. Certainly word processing could take place in business, in the home, and in education. Games, too, could fit into the same three categories. Education — especially with personal computers — need not be limited to schools; there's lots to learn and teach in the home and in business.

Above all, please do not use this section as the definitive guide to what personal computers can and cannot do. Even as I write it, it is obsolete. Each day, dozens of new programs are introduced. Each week, several new features are offered on data banks. Each month, a new peripheral or a new personal computer expands the dimensions of personal computing.

Please view this section, then, as an introductory overview. In a few years, this part of the book will appear as silly as the middle section of the 1950 edition of *The TV Book* as it attempted to describe the 1949 television season.

As programs and data banks continue to grow, so does the appeal and usefulness of personal computers.



"Frankincense is very nice, but I was sort of hoping for an Atari."



An early tabulating computer.

Chapter Six

Personal Computers in Business

1890 Immediately following the triumphant success of the Census Machine, the first place computers went, naturally, was business. The company Herman Hollerith, inventor of the 1890 Census machine, joined did not eventually call itself International *Business* Machines for nothing.

The computers of the early 1900s were nothing more than tabulating machines, and there was little need for tabulation in the home. The 'rithmetic third of the three Rs was more than enough to handle domestic calculating needs.

Besides, even if uses for a computer in the home *were* found, the consumer market was glutted by far less expensive — and far more useful — inventions. The telephone, gramophone, electric light, automobile, washing machine, gas stove, and radio — not to mention indoor plumbing and central heating — were of more interest to the average householder than a faster way to count.



The **FIRST FLUSH**

Business did have a use for the computer, but it did not adopt the new machine all at once. In the first place, computers didn't do that much. One would have to have needs as specific as the U.S. Census Bureau's to require a computer. In the second place, labor was cheap. Why pay vast amounts of money for a machine to add, subtract, and count when qualified bookkeepers could be had for twenty cents an hour?

As the years went on, however, the computer's capabilities rose — as did the minimum wage — and by the time IBM joined the hallowed ranks of the Fortune 500, one would be hard pressed to not find at least *one* large computer in each of the other 499 companies.

When the personal computer arrived on the scene in the middle of the 1970s, computers were an accepted part of Big Business. The idea that a computer cost hundreds of thousands of dollars and that it had to be programmed at a cost of many thousands more, was so ingrained in the psyche of Big Business that personal computers, costing less than $5,000 — and a prewritten program costing less than $500 — were, for the most part, ignored.

But soon, inroads were made. By the late 1970s there were three types of computers: mainframe computers, costing from $20,000 on into infinity; minicomputers, costing from $5,000 to $20,000; and microcomputers, costing less than $5,000. For a while (a time span that seemed like decades but lasted only a couple of years), the formula was set: If you were a big business you bought a mainframe, if you were a small business you bought a mini, and *nobody* in business bought a micro. To buy a microcomputer for a company was like buying a manual typewriter — no one who was serious about business would even consider it.

VisiCalc, the electronic spreadsheet program mentioned in Chapter Three, changed all that. It was acceptable to buy a microcomputer — usually an Apple — because it performed a necessary financial function that no other office machine could duplicate. The only rule was that the micro be treated with the respect due any other office machine, and not with the respect due a computer. One could speak fondly on one's Selectric or Xerox or Apple,

but one must never hold one's micro in the same reverent light as one would hold The Mainframe.

As programs developed, the businesspersons found that their micros could do far more than electronic spreadsheeting and games. By the time micros stopped being called micros and started being called personal computers, a small computer was an accepted — and invaluable — part of all business, large and small. The final nod of acceptability was given when IBM — *the* IBM — introduced a personal computer of its own.

The most obvious beneficiary of the personal computer is the small businessperson. Finally, the benefits (and, alas, headaches) of the computer age are available to even the smallest of small businesses.

A single personal computer can handle accounting, inventory control, word processing, financial projections, and so much more. For the past thirty years these have been the domain of the large computer in the large company, and the cause of endless paperwork in the small company. (Payroll, for a small company, is still best handled by one's bank.)

As it did in big business, a computer can save a small business large amounts of money, while simultaneously increasing productivity.

A gradually expanding one-person company might find a personal computer would delay the hiring of a second person for some time. Word processing speeds correspondence and accounting eases billing such that a one-person company can remain a one-person company through a doubling or even a tripling of business.

A two-person company (The Boss and The Secretary) might never need to become a three-person company. The Secretary can process so much more information with a personal computer — providing he or she can pry The Boss away from stock market analysis or Missile Command — that the need to become a three-person company might be indefinitely postponed. The Boss might even want to get a personal computer for him- or herself.

A three-person company (The Boss, The Secretary, and The Bookkeeper) would find one computer a help, two computers a blessing, and three computers a luxury. The Secretary could do word processing, The Bookkeeper accounting, and The Boss could keep an eye on the commodities market without disturbing the flow of either correspondence or receivables.

In the small companies noted, each personal computer will roughly double the output of The Secretary and The Bookkeeper. The Boss, due to the intrinsic nature of bossdom, could find his or her productivity increased tenfold — or may find the personal computer just an expensive toy. Given that The Boss's productivity remains the same, a personal computer could allow two persons to do the work of three, and three to do the work of five.

After three, however, one reaches a point of diminishing returns. As companies grow, it is necessary to add personnel who are not aided by the addition of a personal computer. Maintenance, messengers, envelope stuffers, warehousing, and similar physical activities are not within the domain of a personal computer's enhanced efficiency.

A salesperson would find that the primary benefit wrought by personal computers is their ability to churn out masses of personalized letters. This would no doubt increase sales, but a salesperson would still spend most of the time on the phone or on the road.

For The Secretary and for The Bookkeeper, almost without exception, the personal computer would be a Godsend.

The benefits personal computers offer The Secretary we'll discuss in the chapter *Word Processing*, and the benefits to The Boss we'll explore later in this chapter, when we look at personal computers in the executive suite. But, for now, let's see what favors personal computers offer the typical small business bookkeeper. At the same time we'll look at the fears office workers have of computers, where they come from, and how to eliminate them.

A Course in Practical Salesmanship Tuition FREE~All Expenses Paid

IN these times of keen business rivalry, the services of the Trained Salesman command a high premium.

The Oliver Sales Organization is the finest body of Trained Salesmen in the world. It is composed of picked men, and is under the guidance of Sales Experts.

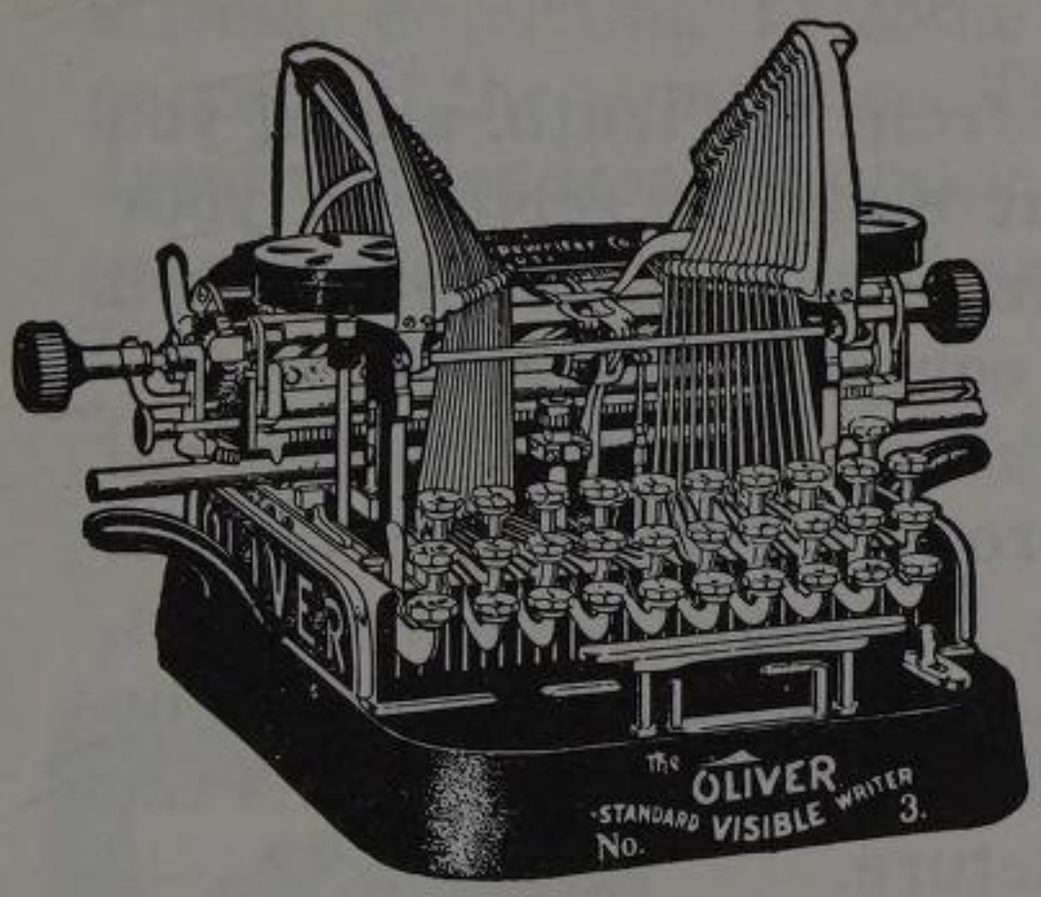
In less than ten years it has placed the Oliver Typewriter where it belongs—in a position of absolute leadership.

Its aggregate earnings are enormous and the individual average is high.

The scope of its activities is as wide as civilization and the greatest prizes of the commercial world are open to its membership.

The organization is drilled like an army. It affords a liberal education in actual salesmanship, and increases individual earning power many per cent, by systematic development of natural talents.

Its ranks are recruited from every walk of life. Men who had missed their calling and made dismal failures in the over-crowded professions have been developed in the Oliver School of Practical Salesmanship into phenomenal successes.



The Oliver Typewriter puts the salesman in touch with the men worth knowing—the human dynamos who furnish the brain power of the commercial world.

Because every Business Executive is interested in the very things the Oliver stands for—economy of time and money—increase in efficiency of Correspondence and Accounting Departments.

The OLIVER Typewriter

The Standard Visible Writer

is simple in principle, compactly built, durable in construction, and its touch is beautifully elastic and most responsive.

In versatility, legibility, perfect alignment, visibility, etc., it is all that could be desired in a writing machine.

It's a constant source of inspiration to the salesman, as every day develops new evidence of its wide range of usefulness.

Just as the winning personality of a human being attracts and holds friends, so does the Oliver, by its responsiveness to all demands, gain and hold an ever-widening circle of enthusiastic admirers.

If you wish to learn actual salesmanship and become a member of the Oliver Organization, send in your application **immediately,** as the ranks are rapidly being filled.

You can take up this work in spare time, or give us your entire time, just as you prefer.

Whether you earn $300 a year, or **twelve times** $300 a year, depends entirely upon **yourself.**

We offer to properly qualified applicants the opportunity to earn handsome salaries and to gain a knowledge of salesmanship that will prove of inestimable value.

Can you afford to vegetate in a poorly-paid position, when the way is open to a successful business career?

Address at once.

THE OLIVER TYPEWRITER CO., 161 Wabash Ave., Chicago

WE WANT LOCAL AGENTS IN THE UNITED STATES AND CANADA.
PRINCIPAL FOREIGN OFFICE—75 QUEEN VICTORIA ST., LONDON.

[1906]

The language of accountancy is numbers. Objects the size of locomotives are reduced to model numbers and inventory figures. Everything is broken into its smallest components, and each component has a part number. Pieces of paper are referred to by check number, invoice number, and purchase order number. Each transaction has a transaction number, each service a service number, and each employee an employee number. To a bookkeeper, God is the ultimate accountant, because it is said that He has numbered even the last hair on our heads.

Computers, like bookkeepers, take particularly well to numbers. All the figuring, copying, and keeping accurate track of ciphers is what computers were created to do, and they do it magnificently. They do it so well, in fact, that the superior speed and ability computers have over humans in this area has given rise to the various boogie-man-computer-taking-over-the-world scenarios.

And it is this very fear of "taking over" that can keep a personal computer at the door of an accounting department, longing to get in. The bookkeeper may fear that, once he or she has taught this "thing" everything about the financial workings of the company, the position of bookkeeper will be replaced by a four-dollar-an-hour typist.

Nothing could be further from the truth, and if you are an employer looking to cut costs by *replacing* your bookkeeper with a personal computer, you might as well abandon that idea right now. A company needs someone — a human being someone — to keep track in a numerical way of the ebb and flow of products, materials, people, time, and, of course, money. A computer cannot do this, but a computer can *assist* a human in doing this by removing the miasma of repetitive detail that prevents the human from seeing the larger picture.

In a small company, it is important that the person operating the "accounting computer" has a firm grasp of standard accounting procedures, as well as a knowledge of how company money came and went before the computer came along. The personal computer is an efficient tool in bookkeeping, just as are pencil and paper and general

ledger books and electronic calculators. Tools require humans to work them and, the more skilled the worker, the finer the end result.

Another fear many people have is the fear of the unknown, and computers, more than anything, represent "the unknown." Paper is knowable. You can touch it, feel it, write on it, read from it, stack it, file it, fold it, spindle it, mutilate it, and throw it away when you're done with it. But a magnetic disk? A piece of plastic or aluminum covered with rust? "*This* holds the equivalent of fifty general ledger pages? And *this* holds the entire customer file, complete with credit ratings and records of orders and payments for the past five years? And *this* holds the entire inventory, with cost-per-piece, supplier, and year-to-date sales for each item? I want nothing to do with it."

More mysterious is what goes on *inside* the computer, in those dark places where the sacred one-through-nine are transformed into zero-and-one; where precious digits go through the rather violent-sounding ritual of "number crunching."

Fear of computers is very real. It even has a name, cyberphobia — from the word cybernate, meaning to control or become controlled *by* (evil, evil) a computer. This fear affects, according to some estimates, as much as thirty percent of the population. Those thirty percent would never dream of reading this book, any more than people with an even more widespread fear would ever consider reading **The Spider Book**.



An illustration from "The Spider Book."

At work, however, if the boss brings in his or her pet tarantula — or his or her pet computerization project — the employee has three choices: find a new job, find a way to conquer the fear, or find a way to kill the thing. One never knows how a cyberphobic employee will respond, and it is a wise and compassionate employer who has a gradual plan for introducing personal computers into the mainstream of company life.

Here are some suggestions on easing computers into the workplace.

1. Start by dropping subtle hints. In the middle of a task that a worker finds particularly dull and time-consuming, casually mention, "If we had a computer, we could get this done in ten minutes." Computers can and do eliminate dozens of boring and repetitive office procedures, and the thought that one never again had to alphabetize the mailing list or add an endless column of numbers might spark some curiosity about this awful machine.

2. For every task you point out that a computer can do, point out three that it cannot. Whenever an employee performs a task that required ingenuity, intelligence, wit — or even hands — be sure to say, "We'll never replace *you* with a computer!" Be sure to stress the "you." This is known as positive reinforcement. It is important to get across the point that personal computers in small businesses do not replace people, they help people do their jobs easier, faster, and better.

3. Talk to people about the *idea* of getting a computer. Do not announce one day, "You're getting a computer — what kind do you want?" To some people that's like announcing, "We're moving to Afghanistan — how do you want to get there, by boat or by plane?" Start slowly with the concept, and build from there.

4. Discuss *programs* rather than *computers*. Computers are, to most people, fairly uninteresting machines. It's the *programs* that do the work, and in that lies the fascination. Point out what a spell-check program or an electronic spreadsheet program or an accounts receivable program might do and how it works.

For example, the PeachTree Software Company has

Invoicing and Inventory programs that tie into their Series 8 Accounts Receivable program. These programs have speeded up the processing of invoices by several magnitudes around Prelude Press.

The customer's name and address are added only once. At that time discount percentage, credit limit, billing terms, and other information specific to that account are "keyboarded in." The customer is assigned a code name or number — "BD134" is the code we assigned to "B. Dalton Bookseller Store #134," for example. (It's in the Puente Hills Mall, Pomona Freeway at Azusa, in beautiful City of Industry, California, for you bookstore trivia fans.)

For the purposes of this demonstration, however, let's create a mythical bookstore, The Mythical Bookstore. The customer code for The Mythical Bookstore is MYTH. Let's say The Mythical Bookstore sends in an order for five copies each of **The Personal Computer Book** and **The Word Processing Book**.

Standard accounting practices would require checking the credit rating of the store (do they have an outstanding balance due? Is it overdue? Does this order take them over their credit limit? What discount do they get?); filling out a shipping order; filling out a packing list; filling out a shipping label; figuring out the amount due; writing an invoice; recording the amount and date of invoice on the customer card; adding the amount of the sale to the daily order sheet (which will eventually be added to a periodic order sheet, which will eventually make its way to the general ledger); deducting the number of books ordered from the running inventory report (which eventually makes its way to the master inventory report); filing a copy of the invoice; and sending a copy of the invoice to The Mythical Bookstore.

With that amount of paperwork to ship ten (or two) books, it's little wonder that small publishers — like small businesses everywhere — find it, shall we say, a challenge, making ends meet.

With the PeachTree Invoicing and Inventory programs, however, processing an order is quite a different matter.

To check the account's financial status, one types in "EC" for "Examine Credit." The program then asks for the customer code. We enter MYTH. In a moment, all the pertinent data concerning The Mythical Bookstore is displayed on the screen, including address, credit limit, date of last debit, amount of last debit, date of last credit, amount of last credit, year-to-date sales, year-to-date payments, and so on. (At this point, by the way, the human element comes irreplaceably into play: Should we send ten more books or should we not?)

One exits the Examine Credit mode by hitting the ESCAPE key (a key found on almost all personal computers that, as the name applies, will get you out of things). One then types "EN" for "ENter Invoices." (Yes, they do have an "ET." It's for "Enter Transactions.") Once again one is asked for the customer code. Again, we type in MYTH.

The date, which was keyboarded into the computer when it was first turned on earlier in the day, is automatically entered as the invoice date, although this date can be easily changed. (Whenever a program automatically selects something, it is known as the **default** setting. It saves adding frequently used parameters — such as dates in accounting or margins in word processing — over and over again. Defaults can generally be overridden by a simple command or two.)

The program remembers the last invoice number and assigns, as a default, the next available number. The shipping and billing address of the store are displayed, as are the discount, invoice date, terms, and so on. If all of this is acceptable, one moves to entering an invoice; if not, one can change anything on the screen.

Let's assume all the default settings and information from the customer file are accurate. To enter five copies of **The Word Processing Book**, one types the department code (which we have assigned as a dash, since we only have one department) and the product code ("WP" in the case of **The Word Processing Book**). One then enters the number of copies ordered (5) and moves on to the next title, **The Personal Computer Book.** The department is, again "—" and the product code, in case you haven't guessed, is

"PC." The number ordered, five, is entered, and the only remaining factor to add is the shipping charge. (The books are for resale, so they are not taxable.) The rest of the invoice — including all figuring — writes itself.

The entire invoice printed below was written using only the following commands: EN, MYTH, -WP, 5, -PC, 5, and 2.43.

```
Prelude Press
Box 69773
Los Angeles, California
90069

                                        INVOICE NO.: 575757

                                      INVOICE DATE: 11/26/82

                                           PAGE: 1

     The Mythical Bookstore                 The Mythical Bookstore
SOLD 11011 Made Up Road               SHIP 11011 Made Up Road
 TO  Fabrication, Utah                 TO  Fabrication, Utah
     12345                                 12345

 SHIP VIA.:                            CUSTOMER ID..: MYTH
 SHIP DATE: 11/26/82                   P.O. NUMBER..:
 DUE DATE.: 12/26/82                   P.O. DATE....: 11/26/82
 TERMS....: 0-30-30                    OUR ORDER NO.:
                                       SALESMAN.....:

PRODUCT I.D.      DESCRIPTION        ORDERED  SHIPPED U/M UNIT PRICE  AMOUNT TX

- WP              Word Processing Book  5.00    5.00 EA      5.37      26.85
- PC              Pers. Computer Book   5.00    5.00 EA      5.37      26.85
FREIGHT           Shipping                                              2.43

                                                  NET AMOUNT:           56.13
                                                         TAX:            0.00 *
                                                   TOTAL DUE:           56.13
```

If that weren't enough, the program also removed five copies of each title from the inventory figures, posted the debit against the store, and recorded the entire transaction in a temporary file that can later be added — automatically, of course — to the general ledger.

Similar descriptions of programs and the benefits they offer should be enough to coax all but the most critically cyberphobic into the computer age.

5. (Four was a long one, wasn't it?) Whenever possible, let the operators choose their own program. The choice of the computer itself is probably best left to The Boss for all those Boss-type reasons — cost, service, availability, do-I-have-a-brother-in-law-in-the-computer-business — and it's a good idea to get the same make and model computer for everyone.

Fortunately, the more business-oriented personal computers do both accounting and word processing with equal ease. The peripherals for each machine might vary — accounting might require a hard disk while word processing might only need floppies, but word processing would require a letter quality printer while accounting might only need a dot matrix — but the basic computer itself should be the same.

This allows for multiple-machine service contracts, second system discounts, employees feeling comfortable with each other's machines, the availability of at least one back-up computer during breakdown, the ability of machines within an office to communicate more easily with each other, and so on.

The software, however, is another matter. Who knows better which accounting program will meet the company needs than The Bookkeeper? And who already knows more about the way words are processed in the office than The Secretary?

Personal computer programs that do the same things might do those things in very different ways. Personal computer programs have, yes, a personality, and that personality will have to interact with the personality of the person operating the program. It's best to let the person who will be interacting the most choose the program he or she will be interacting with.

Also, selecting an accounting or a word processing program is no easy matter, and being given the task will get a possibly reluctant employee more involved with the idea of personal computers long before the computer even arrives.

6. Give your employees time. Give them time to explore, compare, and select their programs. Give them time to read up on personal computers and their uses. Give them time to visit computer and software stores.

When I say give them time, I mean give them *paid* time. Give them one or two afternoons a week to do nothing but explore the land of computers. This might mean reading, this might mean visiting stores, this might mean lying down with a cold compress on the head. Let their readiness, their crystallization process, come in its own time — but let it come on company time.

When the computers and programs finally arrive, give them time to play with the computers, fiddle with them, learn the basics. Do not expect any output from the computer for a while. A program is a complicated — and often frustrating — thing to learn. If there is pressure from The Boss to turn out a trial balance or a mass mailing, well, you remember about the straws and the camels.

The best way to learn a program is by doing — trial and error — and in doing, some work might get accomplished, but don't rely on it. During training time, work will, in fact, be slower than usual. (Some recommend that a dual set of books — one on the computer and one on paper — be kept for at least six months *just in case*.)

7. Reward your workers for acquiring a new skill. This might mean a raise or an extended lunch hour or a bonus or however you wish to acknowledge that you have not only a Secretary and a Bookkeeper, but also two skilled Computer Operators as well.

Small computers are not just for small companies. More and more, personal computers are making their way into all levels of business, large and small.

In the executive suite, managers are finding that the financial services offered by The Dow Jones Service, CompuServe, and The Source to be invaluable. Like an answered prayer one never thought to pray, executives are peering into video screens from coast-to-coast and sighing, "How did I get along without it?"

The news, travel, stock quotations, research, shopping, and electronic mail features of the various data banks can be valuable and, every so often, a game or two might be in order.

The programs for the personal computers of managers and executives is vast. After the success of VisiCalc, software vendors stumbled all over each other to offer not just electronic spreadsheets, but financial projection and business planning programs of all sorts and sizes.

These programs are designed to be run by the executive personally — not handed to an underling with the instructions, "Run these figures through the computer." The difference between direct contact with the program, and being one or more levels removed is remarkable. Direct contact encourages fiddling, nudging, experimenting, trial runs, and the sort of creative fooling around that sometimes results in a work of genius.

"Hands on" computer operation in the executive suite also removes the time lag between the idea and the "numbers." Figures can be figured on the spot — no two hour or two day wait while someone visits the mainframe.

Once executives become comfortable with their personal computer, they might even try a little (shhh) word processing. Few will admit to it, of course. Typing is for typists, not for bosses. However, a great many people find that their thoughts are not as clearly communicated through dictation as through the more traditional method of pen-to-paper. Most of these executives will find that writing on a personal computer is even more productive than writing by hand.

Someone once said that if correspondence is a part of your job, you are a professional writer. There are few professional writers I know who can successfully dictate. Most try it out, but return to the pen or the keyboard. It seems to work better that way. Many executives who try word processing find that they prefer it to dictation for important letters, proposals, and reports.

Most people tend to overwrite, and the speed with which one can remove the excess on a personal computer is

remarkable. More about this in the chapter on word processing.

Outside the executive suite, personal computers are finding a home on other levels of big business as well. Various departments in charge of this or that find a personal computer programmed to do this or that as useful as the adding machine is to the accountant or the typewriter is to the secretary.

Cost projections, amortizations, research, airline reservations — the list is endless. Chances are, whatever a department does, there's a computer program — on disks or in a data bank — that will help do it better, faster, and easier.

Word processing is one of the things personal computers do best. Every expensive electric typewriter you see is a perfect place for a personal computer running a word processing program. The reasons for this are detailed in the next chapter on word processing, but let's consider for a moment word processing specifically in the large corporation.

Here, reprinted from **The Word Processing Book**, are six reasons why twenty personal computers with word processing programs *might* be a better buy for a large corporation than one large computer with twenty terminals.

1. It takes a long time, a lot of money, and an unbearable amount of expert consultation to decide which large computer to buy. Further, it is often difficult to justify the expense of buying a large computer for word processing alone. Higher-ups will say "Well, we already have a computer. Let's use that one." The computer in the data processing department may be ill suited for word processing, or may be too small to add a dozen extra terminals. And how do you prove it will do any good once you got the big computer? This takes yet another study, and another study takes more time and more money. And on and on and on.

Buying a personal computer or two, and having them replace a Selectric or two, is not difficult. Within six months you'll have information, from within your own company, on how they are doing. If the results are positive, then several more machines can be added. If the results are

favorable six months later, you can get a word processing computer for everyone. It'll take a year, but that will be less time than most corporations spend researching and buying a large computer.

2. There is a fear of computers among some office workers. In starting slow, you can give word processors to those who are anxious to have them. They will use them well, the fearful will learn that there is nothing to fear, and within a brief period of time, the formerly frightened will be demanding a computer of their own.

3. How often have you heard the phrase "Our computer is down?" Like most of us, computers do "get down" from time to time. If twenty people are dependent upon one computer for all their word processing needs, you can imagine what happens when the one computer stops



Why couldn't they offer the choice, "experienced and clean?"

working. If, however, you have twenty separate computers, and one breaks, it's hardly noticed. In larger corporations, having an extra word processing computer "in reserve" would be a justifiable — if not intelligent — expense.

4. Since a word processing computer is nothing more than a personal computer programmed for word processing, it is very easy to run other programs and have the computer do almost anything else. One executive, for example, might need to have accurate stock market quotations. Another executive might find financial projections using one of the many electronic spreadsheet programs invaluable. A third might need ongoing airline information, a fourth might use electronic mail, and so on.

Rather than a terminal attached to an inflexible large computer, you have the advantage of many small computers and the flexibility they offer.

5. If it happens all at once, the transition from individual typewriters to one large computer can be a nightmare. The addition of individual word processors can take place gradually, over a period of time, and the overall workflow of the office need not be disturbed.

6. Twenty personal computers, complete with printers and word-processing software, even at $6,000 per setup, would cost $120,000. You can *easily* spend that much money researching, purchasing, and programming a large twenty terminal computer.

There are situations in which it is far more economical to buy one large computer. I mention the advantages of individual word processing computers because, if you call in a word processing expert who has spent the last ten years installing nothing but large-scale word processing operations, it is doubtful that he or she will mention any of the above. It is, in fact, possible that he or she might not even *know* any of the above. Personal computers have been around for very few years. Many of the Big Computer experts continue to look upon them as toys.

But toys they are not. Personal computers are tools, and it's been a long time since a tool as varied, versatile, and infinitely useful to the business community has come along.


GH

Chapter Seven

Word Processing

Having written an entire *book* on word processing, I want this chapter to be complete. I wish there were a way to print the entire contents of **The Word Processing Book** here, complete with Dore etchings and turn-of-the-century typewriter ads, but that would make this book twice as thick (and twice as expensive).

Maybe I could reproduce it in miniature, like the twenty volumes of the *Oxford English Dictionary* reduced to two volumes and a magnifying glass. But then the magnifying glass would make this book thick and expensive, too.

In addition, I suppose there are some people who don't want to hear as much as I have to say about word processing. Some people just want a nice, simple overview so they can go on to the chapter on games. So, here's a nice, simple overview, and for those who want to know more about word processing, well, I can recommend a great book on the subject.

Computers, as we have discussed, are good at processing numbers. Numbers go in one end, get sorted and re-sorted (processed), and come out the other.

Computers are good, too, at processing words. They do this, as you may have guessed, by turning words into numbers. To be more accurate, computers turn *letters* into numbers.

To symbolize all of the letters, numbers, and punctuation marks of the English language, we would only have to assign, say, one hundred binary numbers. (26 upper-case letters, 26 lower-case letters, the numbers 0 through 9, and 38-or-so punctuation marks.)

The accumulated literary output of humankind — from **The Bible** to Dante to *The National Enquirer* — could be written using only the symbols 0 and 1.

(A computer could process a language with a more intricate set of characters — such as Chinese or Japanese — by simply assigning a different binary number to each character. The problem, of course, is getting all those char-

acters on a *keyboard*. In Japan, one of the most technologically advanced nations on earth, the majority of business correspondence is still done by hand.)

While using a personal computer to process words, you would never know that your deathless prose was being reduced to a succession of 1s and 0s. You type on the computer's keyboard — which is like the keyboard on any typewriter — and words appear on the video screen.

Since the words on a video screen are written with electrons on phosphor, and not with ink on paper, changing the words is easy. This ability to effortlessly change whatever has been written is central to computerized word processing's power and popularity.

The processing of words, however, does not take place in a computer. Word processing takes place in the human mind. The computer is simply a tool to help recall what has already been written. If you look at the sentence, "To be or not to be; that really is the question," and decide to remove the word "really," that processing of words took place not on paper or on a computer screen, but in the mind.

Writing is like sculpture. Michelangelo once said that he saw a form within the marble, and all he did was remove everything that was not the form. And so it is with writing. From the words in one's vocabulary, one selects a clump of them that best fits the idea at hand. Then, by a gradual process — known as polishing in sculpture and editing in writing — the excess is removed and the final work stands alone. This process is as true of writing a letter as it is of writing a sonnet.

Once one sees how easy the removal of the unwanted verbiage is, it becomes easier to get the words out of the mind and into a concrete form. Many people think that writing must flow from the mind preedited and perfected. The inability to meet this impossible task is a major cause of writer's block, abandoned novels, and unanswered correspondence.

Waterman's Ideal Fountain Pen

The pen with the Clip - Cap

IN PROCESS OF MANUFACTURE AT THE JAMESTOWN EXPOSITION



CHANGES of TIME and GENIUS

YOU will find entertainment and instruction by visiting our booth at the Jamestown Exposition, and seeing us manufacture the best fountain pen in the world. Waterman's Ideal Fountain Pen will hold a new interest for you when you understand how the vulcanized rubber and solid gold from which it is made are moulded and shaped to make your writing easy. Look for us at

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Manufactures and Liberal Arts Building

When you pay us a visit we will present you with a very dainty and useful celluloid bookmark souvenir, one which will not only keep your place when reading, but which will also remind you to keep in a convenient place the world's best fountain pen. This souvenir will also be mailed free on request.

L. E. WATERMAN CO., 173 Broadway, New York
8 School St., Boston
209 State St., Chicago
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136 St. James St., Montreal

How an inexpensive word processor is manufactured.

A personal computer offers a midway point between the finality of ink on paper and the capriciousness of thought in the mind. On a video screen, the words are there, but because they are so easily changed, it's almost as though the "bad" ones (the ones that will eventually end up *not* there) don't count. At the same time, the "good" words (the ones the Almighty intended to be there all along) are preserved. Once *all* these words are down, separating the wheat from the tares becomes a comparatively easy task.

After perfection has been reached, the personal computer's printer will type one copy or one thousand copies at speeds sometimes faster than 500 words per minute.

In addition to flexibility, personal computers offer speed.

For example, take a program known as The WORD Plus. (It used to be called "The WORD," then they improved it and it became "The WORD Plus." When they improve it again, I have no idea what they'll call it — "The WORD III?" "The WORD Plus Plus?" "The WORD Plus Some More?" Time will tell.)

First you run a word processing program and write something with it — a letter, a novel, a poem. Then you run The WORD Plus. It will, for example, count the number of words you have written. It took The WORD Plus less than six seconds to tell me that there are 1,672 words in this chapter.

Giving it another command, The WORD Plus took another five seconds to tell me that this chapter had 534 unique words. (By using 534 words, I repeated some of them and came up with a 1,672-word chapter.) Then The WORD Plus checked each and every one of those 534 words against a 45,000-word dictionary, and printed a list of all the words that did not match (indicating possible misspellings and typos). The WORD Plus did this task, which would have taken me — at the rate of two words per minute — almost five hours, in 47 seconds.

The WORD Plus will look up a misspelled word and give several alternate (correct) spellings. If the misspelled word were "thier," The WORD Plus would recommend "their," "thief," and "tier." This looking-up takes five

seconds. It takes me more than five seconds to find my dictionary, much less a word in it. After the user selects the correct word from the list (as bad as I am at spelling, I know the word I'm looking for is "their"), The WORD Plus *replaces* the incorrect word with the correct word in the text. There were 23 incorrect words in this chapter. The WORD Plus replaced all 23 of them with their acceptable-to-Mr.-Webster spellings in less than 40 seconds.

These examples of speed are not just indicative of The WORD Plus (although it is a remarkably fast program). It is simply an example of the speed with which personal computers operate when doing specific, repetitive tasks.

Most word processing programs have a feature known in Computerese as **global search**. Global search will find anything within a document in a matter of seconds. (In word processing, whatever you happen to be working on is known as a **document**, a **file**, or **text**.)

If you wanted to return to the point in a long document in which you were writing about Pittsburgh, all you'd do is ask the word processing program to find "Pittsburgh." Before you could spell Pennsylvania, the program would deliver you to Pittsburgh. If that wasn't the specific mention of Pittsburgh you were looking for, with a simple command global search would take you to the next occurrence, and so on.

Most word processing programs can find something, then replace it with something else. This is known as **global search and replace**. Margaret Mitchell's publisher would have found global search and replace delightful. The original name for the heroine of **Gone With the Wind** was Pansy O'Hara. Just before going to press, Ms. Mitchell changed the name to Scarlett.

An improvement, I'm sure we all agree. Can you imagine Clark Gable passionately clutching Vivien Leigh while Atlanta burns and saying, "I love you, Pansy." But can you also imagine the work some lowly copy editor at Macmillan must have had finding every occurrence of "Pansy" and changing it to "Scarlett?" Might as well try changing the word "sin" to "mistake" each time it appears in **The Bible**.

With global search and replace, one would ask the word processing program to find "Pansy" and replace it with "Scarlett." This process could either be automatic, or the replacement could take place selectively, the operator being asked by the program each time, "Shall we replace this one?" The latter avoids unintentional replacement, and would eliminate such sentences as, "Scarletts bloom in the spring, and Aunt Pitty Pat wore some nestled in her hair."

The search and replace function comes in handy while doing form letters. A letter written to Larry could become personalized to Mary within a few seconds. Each would have a personally typed letter — personally typed by your personal computer, that is.

Some programs allow you to merge an entire mailing list into a form letter, automatically replacing name, address, and any other information that changed from letter to letter. The computer would turn out page after page after page of individually typed letters.

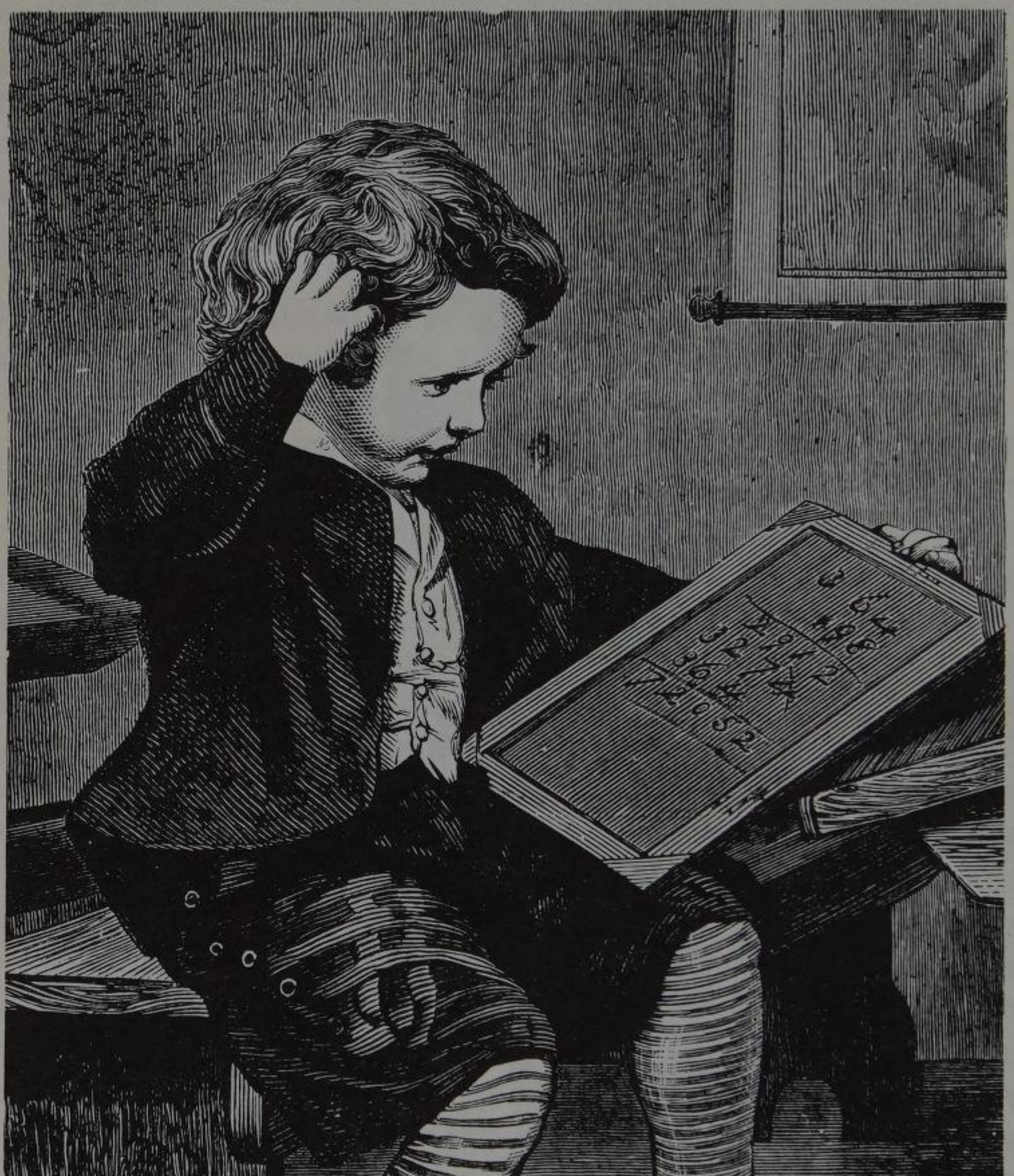
Different word processing programs offer different features. One of my favorites, available on almost all programs, is known as **word wrap**. When the end of a line is reached while typing, word wrap automatically puts the next word on the next line. No more hitting the carriage return button, except at the end of paragraphs, while writing poetry, or making lists.

Word processing programs that turn personal computers into word processors cost from $50 to $500. If you write two letters a month and send out Christmas cards once a year, you'll find the investment in a less-expensive word processing program worthwhile. If you are a writer — as a profession or an avocation — a more sophisticated word processing program is more than a worthwhile investment — it will change your life.

Computers are becoming more familiar and easier to use. Businesses are no longer necessarily dependnt on large cneral sysms; individutteals wihin organizations no longer necessionels to interpret their needs in language which the computer can understand.

—*London Times.*





Chapter Eight

Personal Computers in Education

Because personal computers are infinitely patient, they make excellent tutors.

Because almost everyone under thirty living in this country was raised with — and perhaps on — television, most young people feel more comfortable looking at a video screen than being with another human.

Because personal computers are interactive, a student may get more individual attention per day from a computer than per month in a classroom.

These reasons, and many more, make personal computers an inevitable part of education's future. For the present, however, the average schoolteacher need not fear being replaced.

Personal computers do not teach, *programs* teach, and programs — like textbooks or film strips or video tapes — must be written, created, and compiled by people. There will be effective programs and there will be ineffective programs, but for the moment there are not enough of either to make a major impact on education as we know it.

Not that there's not plenty of things to learn today from personal computer programs — everything from multiplication tables to spelling to grammar to touch typing. The point is that the vast potential personal computers offer in the area of education has not even been approached, much less tapped.

The first problem is one of time. Personal computers have been around but seven years, and personal computers as we know them less than four. If you can imagine how much time it has taken to develop the variety of teaching materials available today, you'll see why four years could not begin to duplicate, much less surpass, the non-computerized educational aids.

The second problem is one of disk storage space. Even a large-capacity floppy disk with 340K of memory will hold only 170 pages of double-spaced typewritten

material. I use the word "only" because — although 170 pages would be generous for, say, word processing — in education, 170 pages might not even hold a complete outline, much less all the information detailed by that outline.

The storage problem should be solved in the next few years as video disks (the kind that have so dramatically failed to capture the imagination of the home video market) are adapted for personal computer use.

One video disk could hold the entire *Encyclopedia Britannica*, including color photographs. One could theoretically store, in the same space currently occupied by an average teenager's record collection, all the information necessary for a four-year college education. Not only would that information be there, like books in a library, but the information could be cross-referenced in an elaborate system of indexes and files.

To give an example of how this might work, let's look at a program available today called SuperFile. After information is entered into the computer, one "files" that information on disks under a series of key words. Each bit of information — anything from an address to a thousand-page book — can be filed under as many as 250 key words. What one can do, in essence, is file one piece of information simultaneously in 250 different files.

A letter need not be filed under either "Sales" or "Product Information," it can be filed under both — plus 248 other classifications. The names in an address book need not be filed under last name alone — first name, birth date, city, state, favorite color, astrological sign, and 243 other vital bits of information could be entered as key words.

Not only can you call up a given file from any of the key words, you can also combine key words. Only those files having all of the required key words would be displayed. Using the address book as an example, one could ask for all Capricorns from Wisconsin whose favorite color is pink.

Applying this program that already exists to the larger data bases available to personal computers in the future, we can see the value this would have in education.

The works of Aristotle need not be filed just under "Aristotle." Each sentence could be filed under dozens of different classifications, from "Ancient Greece" to "Philosophers" to the subject matter of the sentence.

"Neither a borrower nor a lender be" might be filed under Shakespeare, *Hamlet*, Polonius, Elizabethan England, England, Drama, Plays, Literature, Thrift, Borrowing, Lending, and Fatherly Advice — just for openers.

If a student were to type in "LENDING and PLAYS," all references to lending in all plays would be presented. "LENDING, PLAYS, and SHAKESPEARE" would give all references to lending in the plays of Shakespeare. "LENDING and HAMLET" would give all references to lending within the play *Hamlet*. And so on. The variations are as infinite as the imagination and curiosity of the student.



The third problem (I bet you thought there were only two) is that the market for educational software has not been as great as for, say, business programs or games. In this supply and demand economy, the supply meets the demand, and the demand for educational software has not been overwhelming. Interest in educational software has been steadily increasing, but it's not a Demand quite yet. It is now at the level of Second Request.

There are still too few computers in classrooms to spend the money necessary to develop elaborate educational software. There is a plan to give tax breaks to computer companies who donate computers to schools. The plan limits the donation to one computer per school. One computer per school is about as useful as one Selectric per typing class. But it's a start.

Most educators who want good software must write their own. Most software houses who want to sell educational programs must rely on concerned parents for sales rather than progressive school boards.



Although educational programs do not begin to approach — either in quality or quantity — what they will be ten years from now, a personal computer's other abilities could benefit almost any student today. Word processing for homework and reports; data banks for research and current events; programming for science projects; games for mind-body coordination (and fun); the list goes on.

The most valuable computer-assisted education a parent can offer a child today is how to be comfortable with computers. These television-typewriters will be around for some time. Their numbers will be increasing yearly. By the beginning of the next century (less than twenty years away), the computer will be almost as common as the television in the home or the typewriter in the office.

Familiarity with computers is generally known as computer literacy. Computer literacy doesn't require speaking a computer language, nor does it require programming skills, nor does it even require extensive knowledge of already-written programs. All it requires is a sense of ease around computers, and the knowledge that personal computers are powerful tools, not menacing characters out of science fiction.



Chapter Nine

Games People Play

Computer games. Is there a living, breathing human in this country who has not heard of Pac-Man? Only Johnny Carson has a higher recognition factor than this hungry circle with a pie-shaped mouth. (Pac-Man, by the way, is a Japanese invention. It comes from the Japanese word *paku-paku*, meaning to open your mouth and shove food in.)

Not since the smile button (a distant cousin of the Pac-Man), have a few simple lines, drawable by any first-grader, grossed so much money.

The young do not need a chapter detailing the endless fascination computer games offer. Do you think the younger generation is unmotivated? Do you think they have no interests, no direction, no passions in life? Drop by the local video arcade sometime. You will see riveted attention, focused concentration, and rock-steady reflexes that would spark the envy of a concert violinist.

And, if you want an education in video games, bring along a roll of quarters. The Masters will be happy to teach you, as long as your quarters hold out.

Like Ping-Pong or tennis, video games look easier from the sidelines. Before you sigh that these kids are wasting their time, try a few sets. You'll see that the co-ordination and split-second timing required to play — and acquired *by* playing — these games, is nothing short of spectacular.

The Army, realizing this, have made the aiming mechanisms on their newest multi-million dollar tanks the same as the ones found on the most popular computer games. The generation that grew up with Missile Command can go to war with . . . Missile Command.

No, the young don't need to know about the wonders of video games. It's us old folks who read *books* about computers and wonder what all the fuss is about who need chapters on computerized game playing. (The young figure that, for the price of this book, they could play Donkey Kong—or Konkey Dong, or whatever that game is—forty times.)

So, I will turn the balance of this chapter over to Mr. Michael Evans, who will describe what video games are like for us non-enthusiastic — but nonetheless open-minded — non-teenagers.

Me and My Computer

A Classic Love/Hate Relationship

by Michael Evans

Recently I bought an Apple II — a friendly, attractive little home computer. Along with it, I purchased a series of programs that some humorist chose to call "games." If you detect a hint of bitterness in my remark, you're close: in short, I was not ready for the "fun and challenge" of computer games.

It all began one fine Saturday when I sat down to while away some time in computerized amusement. The game disk was labeled Penny Arcade. It contained various pinball, tennis, Ping-Pong, and lemonade-stand games, all of which looked harmless enough to the untrained observer, so I loaded it and selected a game called Little Brick Out.

Little Brick Out consists of a paddle, a ball, and several rows of multicolored bricks. On command, the computer will toss you the ball, and you must keep it from getting past the paddle. If you hit it, it will bounce off, strike a brick, and make that particular brick disappear. Each brick that vanishes adds a few points to your score, and the object is to get rid of all the bricks. Sounds easy, right? Try it sometime.

The first thing you will notice is that the screen is very bright, which makes it hard to distinguish between the multicolored bricks and the brightly colored spots that don't go away when you close your eyes. In addition, every time the ball hits an object it makes a little "bip" that sounds like a malfunctioning smoke alarm. While you are distracted, the computer lobs the remainder of the balls past your paddle, leaving you with something resembling a baseball score.

Perhaps the most disconcerting aspect of Little Brick Out is the sound it makes when it sneaks a ball past you. The buzzer makes you feel not unlike a hockey goalie who has lost the rest of his team and must face the enemy alone.

Abandoning Little Brick Out, I moved on to Star Trek, a game that evokes both excitement and a sense of personal failure.

You play the part of Captain Kirk and are responsible for the utter elimination of all Klingons from the universe. All of them. By yourself. I don't mean to complain, but somehow the odds just don't seem fair. There are 40 of them and one of you. You have a time limit: they have all day. You try to behave like a gentleman: they shoot at you while you're trying to open communications. You have to refuel and get more weapons every so often: they are somehow able to wander through space without expending any energy whatsoever. As if all this weren't enough, you can chase a slippery little Klingon clear across the Galaxy only to discover that he has borrowed a "cloaking device" from the Romulans (arch-enemies for years) and while he can still shoot at you and break vital parts of your life-support systems, you can't even see him! Why couldn't the Romulans give *us* the cloaking device? Why do the Klingons get all the breaks?

I decided to "beam out" of Star Trek and try my hand at something a little closer to home — Blackjack. First of all, the computer said that *we* cut the cards and I lost. Wait a minute. At no time did I even *see* a deck of cards, electronic or otherwise.

Before long, a message appeared on the screen saying "I'm shuffling now!" Again I had nothing to go on but the computer's word, which may or may not have had any basis in truth. Finally, it dealt the cards. It dealt both of mine face up and one of its face up and one face down. At this point, I was convinced I was being taken for a ride. Here it was, displaying my cards for all the world (and itself) to see, while I was denied the same access. And if that wasn't enough, it wanted me to bet money on the game! I tried to bet a nickel, but it came back with a message informing me that the house minimum was $5. I wondered why it felt entitled to set the house minimum in my house, but since I had gone this far, I figured it was worth $5 to continue. I typed in "5" and hit the Return key.

I had a Queen and a Six. Sixteen points. The borderline. The computer had a King showing, but no amount of persuasion would get it to let me peek at the other card. I figured it had probably "dealt" itself 21 points, so I asked

for another card. It gave me a 10. Needless to say, I busted. And my opponent had 13 points, but it won anyway. (I never paid, though. I don't think it would have paid me if I won.)

I decided to try another selection. Then another. And another.

At this point, I began to wonder about the effects of computer games on my overall health. Aside from the fact that every minute spent playing games is a minute not spent playing tennis or otherwise toning my body, I began trying to guess exactly how much radiation the human body absorbs when it spends five hours a day in front of a television screen trying to destroy little space creatures with a laser turret. And why would I continue to play with a machine that obviously had the utter degradation of my sense of well-being as its primary goal?

I have a theory. I call it the Cycle of Unrequited Punishment. It goes like this. Suppose I *do* shut the thing off and turn to some other wholesome activity. How does the computer respond? Does it feel rejected and unwanted, or drop into a funk? Does it promise never to be unsportsmanlike if only I'll turn it on again?

No. It sits there, smug in the knowledge that I'm not playing with it because I know I can't win. *The machine simply refuses to recognize that it's being punished.*

Smashing it won't do any good. Its brains are etched onto silicon and encased in plastic. They, and every other part, are replaceable. And the repaired unit won't acknowledge that it's been properly rebuked. *So who's punishing whom?*

Now we've reached the critical stage in the cycle. Faced with all of this unrequited punishment, the weary computer owner tends to grasp at one last hope: the way to put that machine in its place is to beat it at its own game.

That's when the cycle starts all over. . . .

Don't get the idea that you can't win. Of course you can. The computer knows that even laboratory rats need occasional positive reinforcement. Let me describe my first victory.

I decided to select a game that left nothing to chance — no dice, no cards — something based on sheer mental manipulation. Knowing better than to play chess with a machine that understands Bobby Fischer's psyche better

than his own mother, I chose to play Othello, a checker-like game that requires some crafty thinking.

It began well. One of the first things the program did was ask me if I would give it an advantage. I resisted the temptation to become snide: "What's the matter, afraid you'll lose?" Instead, I just laughed and said "NO."

It set up the board and the game began. We both played well, but before long it fell for one of my traps and let me capture one of the coveted corner squares. I pushed mercilessly, taking men and replacing them with my own. I felt an almost inhuman glee. When the last chip was played, the machine beeped once to signal the end of the game, and printed.

ME: 25 YOU: 39

WANT TO PLAY AGAIN?

That was it. No fanfare, no congratulations. I beat the computer, fair and square, and all I got was a printout of the score and a question whose tone implied that my victory was of no consequence. I bitterly typed in "NO," and unplugged the machine.

In retrospect, perhaps the computer was just being game — a willing combatant. Or maybe it'll take a whole string of defeats for the computer to begin showing signs of desperation. I might even have to bring home another game disk — and win those, too — just to drive the point home.

But right now, my computer sits on the bottom of my closet. I've got to have time to think.



Thank you, Michael.

While Michael's thinking, let's take a look at a few new video games from INTELATARIVISION — "Games as Original as their Name."

Here we have ten from INTELATARIVISION'S new series, "Life is a Video Game."



THE TROJAN WOMEN

You are a male in a culture in which 98% of all top governmental and military positions are held by women. Your goal: Get an amendment giving equal rights to men added to the Constitution while raising two children.



SHOOT THE SHEEP

You are a farmer who tries to protect his sheep from a deranged stranger. Little do you know that the stranger is playing a video game in which he is trying to shoot as many sheep as he can before being stopped by a deranged farmer. F'un for all.



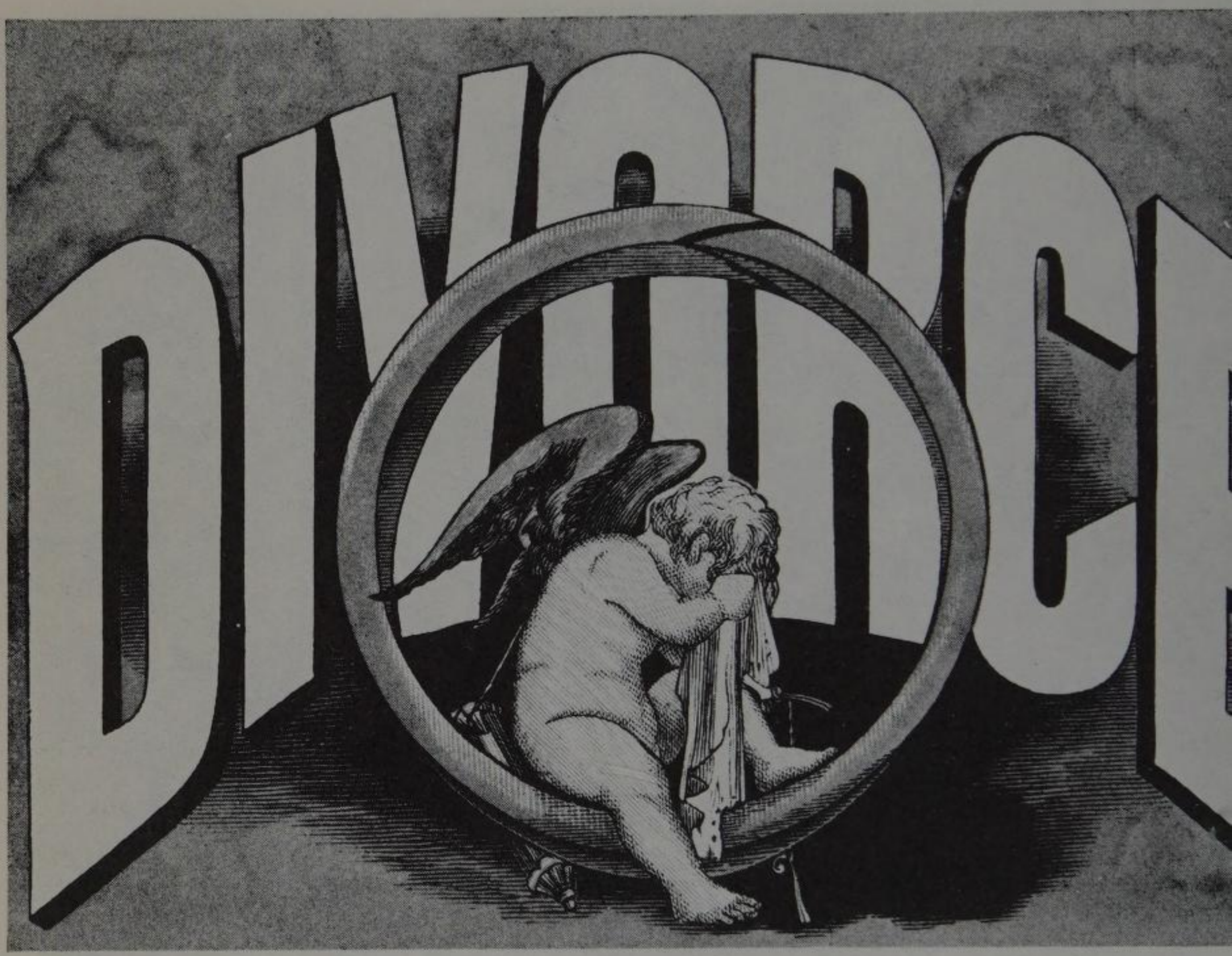
SCHOOL DAYS

You are a schoolteacher in the days before computerized education. Good luck!



THE YOUNG AND THE REST OF US

You play one-half of a young couple who have an uncontrollable passion for each other in Victorian England. Many surprises.



DIVORCE

You are pitted against Elizabeth Taylor in a race through the divorce courts. The first person to divorce and remarry the same spouse three times wins.



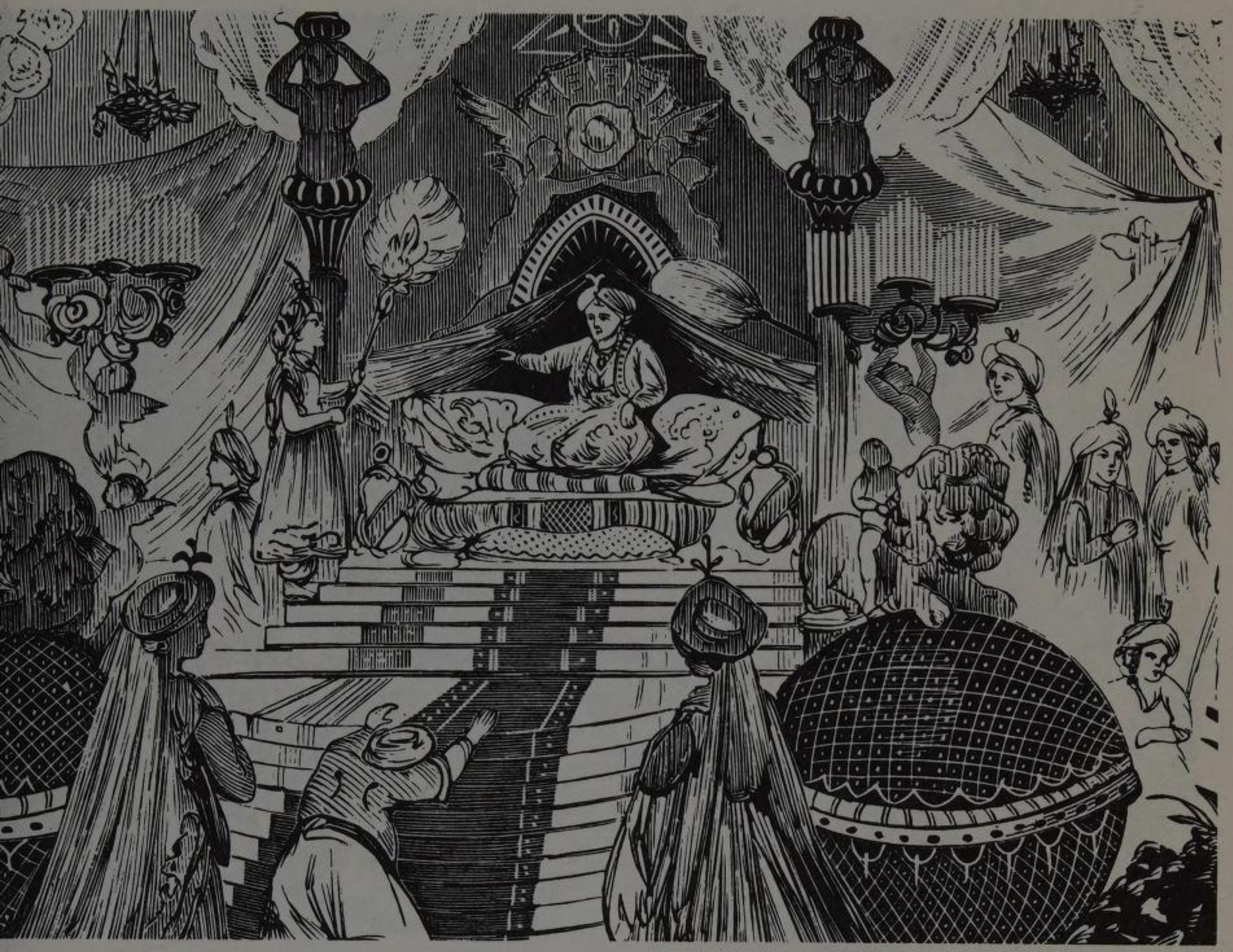
RIDERS OF THE LOST ARK

You are Indiana Smith, a mild-mannered professor nine months of the year, but your summer vacation is spent rounding up stolen art treasures on your flying horse, Pegasus.



I'LL SHOW YOU MINE IF YOU'LL SHOW ME YOURS

An introduction to anatomy, presented in a way that's sure to hold the interest of the 13-year-old in all of us.



GURU YOU

You are a midget in the circus who must impersonate a 12-year-old Perfect Master when the 12-year-old Perfect Master is stepped on by an elephant. Your life is always in danger, but there's lots of good food and sex.



CURIOSITY

You are one of several curious monkeys, and you are put into a series of interesting situations. Educational as well as fun.



WHAT THE HELL'S GOING ON HERE?

You are shown a picture on the video screen. You have thirty seconds to offer a plausible explanation.

(The Grand National Playoffs of this game are held every year in Washington, D.C. Winners are frequently offered high-level positions in the White House Press Corps, the State Department, and the CIA.)



Chapter Ten

What Personal Computers Do Not Do Well

There are some things computers do better than people and some things people do better than computers. I know admitting that humans can do some things better than computers in a book about computers borders on heresy, not unlike praising Liberal Humanists at a Moral Majority rally. Alas, it is true: Human beings are not yet obsolete.

Some predict that the office of the future will have no need for the printed word, just one large desktop-size video screen, simultaneously displaying dozens of "sheets." This 2001 concept is known, in fact, as The Paperless Office. Some are saying this is inevitable.

I'm not so sure. Let's look at an essential element of anyone's business or social life, the engagement calendar, and see if the time-tested datebook and pencil has been superceded yet by magnetic media and computer.

To make this important comparison, I purchased a "Schedule Program" ($19.95) for my computer and *The New Yorker Diary* ($15.00) for my pencil. I will not name the manufacturer of the Schedule Program as almost all inexpensive databook programs operate in roughly the same way. We will not be looking so much at an individual program as we will be investigating the entire range of not-too-expensive electronic appointment calendars available today.

The New Yorker Diary is an 8 x 10 hard-covered volume, available in brown or blue artificial imitation leatherette. When opened, each double-page spread covers seven days of appointments. There are 23 lines for appointments (or, as *The New Yorker* prefers, "engagements") each week day, ten lines for Saturday and twelve for Sunday. (I suppose Sundays in New York are more active than Saturdays.) At the top of each page is the month and year. At the top of each column is the day and date. The lines in each column have no specific time allotted to them, except a line toward the middle of each day that is labeled LUNCH.

The New Yorker is, of course, famous for its cartoons. So respected are the creators of these often hilarious drawings that the magazine refers to them as Artists and lists them in the table of contents of each *New Yorker* along with its Authors.

These cartoons are generously spread throughout *The New Yorker Diary*, and often refer to particular holidays during the year: The wife of a Colonially dressed couple saying to her husband, "Good Heavens! Tomorrow is George Washington's birthday and we don't have a thing for him!" or a middle-aged man, kneeling by his bed as Father's Day approaches, reminding God, "I don't ask for much, but what I get should be of very good quality."

The Schedule Program comes on a brown circle of plastic, enclosed in a black square of cardboard. It also comes with eight pages of Operating Instructions. There are no cartoons on either the disk or the instructions. There is, in fact, no humor in this program at all. It could safely be used by an undertaker to schedule funerals without offending anyone.

The Schedule Program limits the number of appointments to ten per day, good enough for most Saturdays in New York, but this limitation immediately renders the program useless for doctors, lawyers, and other professional people who generally see more than ten people per working day. Further, the Schedule Program does not remind you to have lunch.

When you want to make an appointment with *The New Yorker Diary* you flip to the appropriate week, find the correct day, jot down the time and information — from one word to 23 lines' worth — and the appointment is set.

When you want to make an appointment with the Schedule Program, the first question it will ask is the year. Now I know what year it is, and *The New Yorker Diary* knows what year it is, but your computer doesn't know the year any more than your toaster does. (Your computer may have a clock/calendar, in which case it would know what year it is. If this is the case, please apologize to your computer for me.)

The next question the Schedule Program asks is the date. That seems simple and straightforward enough, but I could not tell you the date "a week from Thursday" for the life of me. I'm not entirely sure what *today's* date is. To find "a week from Thursday" in *The New Yorker Diary*, all I'd need do is turn the page. I would locate Thursday, and the date would be conveniently attached.

Unfortunately, there is no "flipping through pages" on a computer. "A week from Thursday" means nothing to the Schedule Program (for reasons we'll discuss later). It wants a date, and the date must be written in a very specific way. First the month, as a number, then the date, with a zero preceding the date if it is less than 10.

This requires knowing what month it is in numbers. I'm lucky if I know what month it is in *words*. What number is April? July? It's a good thing I know November is 11 and December is 12, because I run out of fingers the end of October. Adding zeros before dates is equally confusing: I was born on the 5th, not 05. August 5th would be entered "805." September 28th, "928." November 26th, "1126." Christmas would fall on 1225, and New Year's Day 101.

The Schedule Program then asks for an "Event Name," a phrase light years removed from the sophisticated "Engagements" one makes in *The New Yorker Diary*. The Operating Instructions tell us that an Event Name, like an engraved charm bracelet ordered by mail, can be "up to thirty characters in length." "Dinner with Joe" is acceptable. "Dinner with Joe at The Ravenswood" is not. Complicated addresses or simple directions are out. There is no writing-small-so-it-will-fit on a computer.

Then we are asked by the Schedule Program the time of the event. The time is to be added in hours and minutes, but without colons. 115 is 1:15, 1045 is 10:45, and 1225 is not Christmas Day but 12:25. After entering this, it will ask AM OR PM? Unless you mark "P" for PM, the program assumes AM.

Here the Operating Instructions for the Schedule Program state, "At this point you have completed one entry." Whew.

To delete an engagement in *The New Yorker Diary*, one simply turns to the page on which the engagement was written, finds the engagement, and erases it. To delete an event in the Schedule Program, one must enter the year, the date, and then the number of the event to be deleted. (The events are numbered by Schedule Program automatically from 1 through 10 according to criteria having nothing to do with Bo Derek.)

To find an available engagement time in *The New Yorker Diary*, one need only open the page, scan the week and, if full, turn the page to review the week that follows. When an agreeable hour is found, one writes the information down.

To find an open event space in the Schedule Program, one must first ask the computer to display information between two dates. This means entering the current date, an arbitrary date at some point in the future, and then scanning the scheduled events between those two dates two days at a time. (To have a full week displayed all at once would require a printout.) When a suitable event slot is found, however, one cannot simply enter the information. One must exit the scan mode and enter the enter mode, starting with year, date, event name, etc. etc.

To use a computer as a datebook, based upon the above description, seems cumbersome — and it is. Keep in mind, though, that in the descriptions given thus far we have assumed that the computer was up and running and the Schedule Program already loaded. If the computer were turned off, or busy doing something else or — heaven forbid — broken, you can see how much more inconvenient iron oxide might be than processed wood pulp.

The fact is, simple list making and information retrieval is much more efficiently performed with pen, paper, and human interaction. As lists become longer, computers become useful for manipulating information on those lists, especially in terms of selecting specific items or rearranging items in complex patterns. The longer the lists and the more complex the rearrangements, the more helpful computers become.

What Personal Computers Do Not Do Well

Let's create an imaginary situation in which computerized scheduling might be helpful. Suppose that there were six people who needed to meet with each other on frequent but irregular intervals. When they were not meeting with each other, they have numerous meetings and activities away from this inner circle. As any secretary knows, scheduling a time in which six busy people can mutually gather is not easy. One (usually the Boss) sets a time and the others, as best they can, rearrange their schedules.

If all six, however, were to schedule all their activities on computers, and each schedule were programmed to interact with each other's schedule, any one of the six could ask the computer for blocks of time in which all six had nothing else scheduled. With a push of a few buttons, a meeting between the six could be added to everyone's schedule, and no one would have to rearrange anything. Granted, a program like this would cost much more than $19.95 but, to the participants, it would be worth it.

Airline reservation computers work in this way, but on a much larger scale. An airline agent can sell a specific seat for a specific flight, and instantaneously all connected reservation terminals the world over would indicate that that seat was sold.

Given this kind of convenience, it would be worth the inconvenience of learning to translate human expressions into "computer talk." As pointed out earlier, "A week from Thursday at four" means absolutely nothing to a computer, and programming a computer to take that simple sentence, and other similar sentences, and translate them into year-date-time would be difficult and require large amounts of memory. Is "four" a time or a place? If it's a time, is it 4:00 AM or 4:00 PM?

The sentence: "Meet June for Brunch at Fridays on Thursday around 2nd or 3rd between ten and eleven." is understandable to most people living in New York. June is the person we're meeting, Fridays is a place, Thursday is the day, "around 2nd or 3rd" is the general location, "between ten and eleven" is the time, and because brunch was mentioned we assume it to be in the morning.

Words change their meanings based upon their use within a sentence, and computers have no way of knowing which definition of what word to use when. This is why the high hopes scientists had for using computers to translate foreign languages have been substantially lowered in recent years. When a computer tried to translate "The spirit is willing, but the flesh is weak" into Russian, it came out "The vodka is good, but the meat is rotten."

The computer wouldn't know what to make of the brunch sentence. You would no doubt get an appointment on June 2nd or 3rd between ten and eleven, if you were lucky to get anything at all. And is that ten or eleven AM or PM? Is it for Thursday or several Fridays in a row? And who is this Brunch fellow?

For most of us, I think, although we may love our personal computers dearly and use them for everything from writing love letters to alphabetizing our record collection, there will still be $15.00 set aside toward the end of December for the following year's *New Yorker Diary.*



"If God had meant man to have a computer, he wouldn't have given him a brain. That's what I say."

Another example of pencil and paper being better suited than computer and program is checkbook balancing. To enter a check in a checkbook you write in the check number, the date, who the check was written to, the amount of the check, and subtract that amount from the bank balance. Most people don't even do the last bit of subtraction. Some people don't do it for years. Some people never do.

Can you imagine these people turning on a computer, putting a disk in the computer, entering the date (Month/Day/Year), entering the check number, entering the payee, deciding what the check was for, is it tax deductible? is it a household expense? a business expense? medical? legal? social? and answering all the other questions a prying program might ask.

Sure, for the first few weeks such a program is fun. You might even look forward to writing checks and watching the computer magically tell you how much money you have in the bank — something you could have done with a $5 pocket calculator. After a while, though, the thrill wears off, and if you aren't organized about your finances now, you will not be organized about your finances six months after The Electronic Solution arrives.

Computers will accurately record, add, and subtract a row of checking deposits and debits, but doing it "the old-fashioned way" is faster, easier, and cheaper.

Keeping an electronic checkbook is valuable for large businesses who need to know exactly how much was spent in which of several dozen departments. This uses the sorting feature of computers, and sorting is a thing computers do very well.

But humans are not bad at sorting, either. If you really need to know how much you spent last month for food or auto or medical expenses, sorting the checks into little piles when the monthly statement comes from the bank wouldn't take more than fifteen minutes.

Naturally, at tax time, it might be good to know how much was spent on deductible items and how much on non-deductible items. Again, sorting the year's checks into three piles, "deductible," "not deductible," and "hopefully

deductible," would take no more than an hour. Besides, most people fill out the short form and take standard deductions anyway.

Speaking of taxes, many people seem to think that a personal computer will somehow file their taxes for them. Well . . .

Tax laws change from year to year. During Reaganomics, they change from month to month and, when Congress is in session, sometimes from day to day. Given the lag time in marketing computer software (six months at least), even if you were to buy an up-to-date tax return program, it might not be as up-to-date as you might hope.

Most of the tax return programs I have seen are in the $100 range. Most of the come-as-you-are-and-bring-your-shoebox-full-of-receipts-and-cancelled-checks-and-W2-forms-and-we'll-turn-them-into-a-tax-return-guaranteed-to-give-you-a-refund-and-keep-you-out-of-jail-or-my-name-isn't-Henry-Block tax services seem to cost less than that. Further, I would think that these tax services would be more current on tax laws, and more experienced in personal tax returns than even your personal computer.

Another area people talk about the personal computer revolutionizing the world is in the kitchen. Trade in your file box full of recipes for a computer programmed with recipes. Well . . .

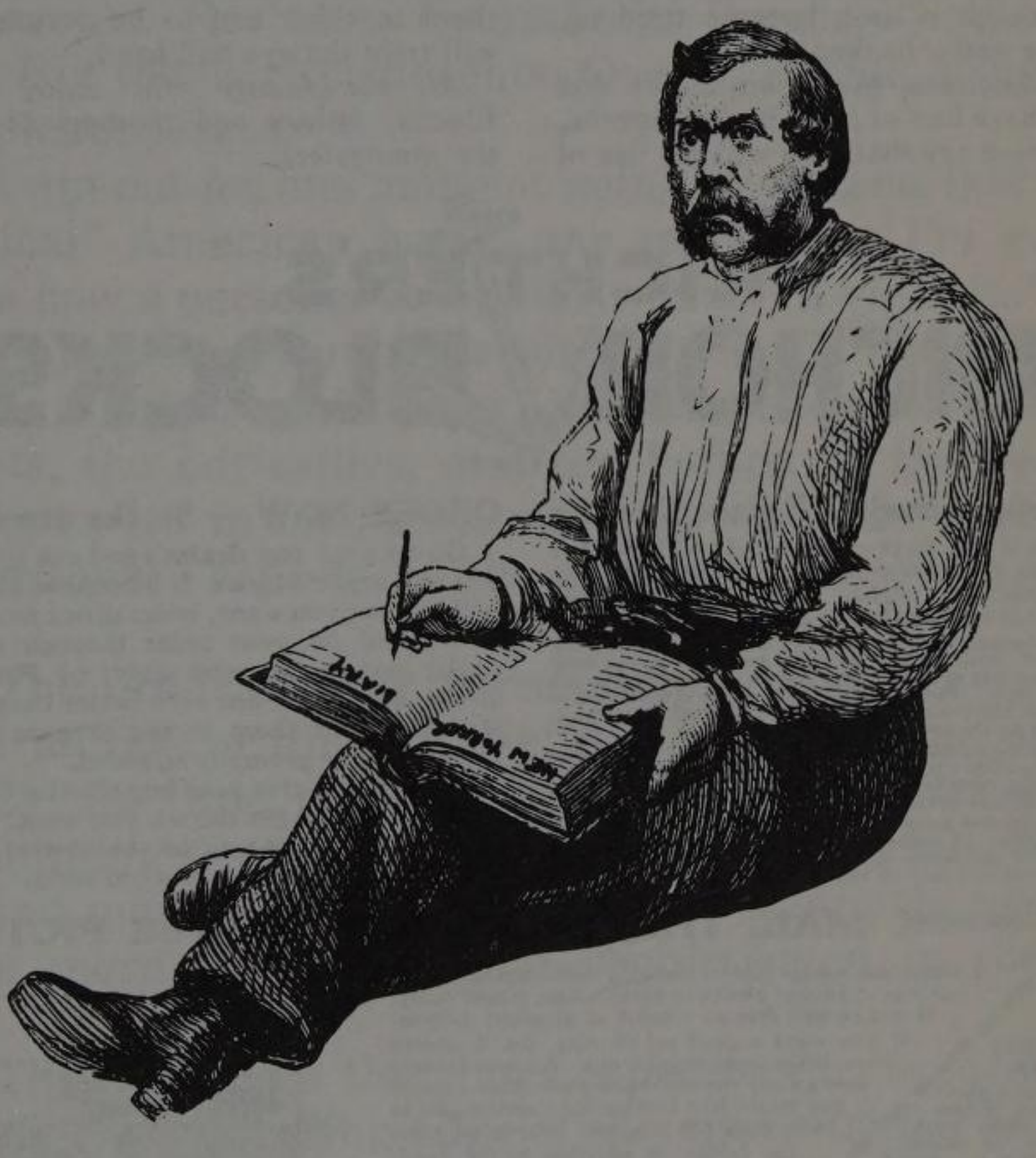
In terms of filing recipes and displaying recipes, the file box with 3 x 5 cards will do just as well as a computer and cost, oh, $2,000 less.

The place a computer might come in handy in the kitchen is reducing or increasing recipes. Enter a recipe for four and have the computer increase it to six, or reduce it to one. If someone does *a lot* of that, a computer might be a handy tool.

For everyday use, however, if two cups of flour are required to make turnovers for eight, one cup will be required to make turnovers for four, and performing such difficult calculations in your head will save you not only some dough, but also dough on your keyboard, your video screen, and your disk drives.

I do not mean with this chapter to throw excessive amounts of hot water on your delicate crystallization process. I am, obviously, all for personal computers. I think, however, that being "for" something includes being honest about the limitations inherent in that something. I am all for compact cars, but not when moving furniture.

It's better, I think, to have your expectations lowered to a more realistic level now, than be disappointed later. If you try something that personal computers do not do well, and discover that personal computers do not do that well, you may never try some of the things that personal computers *do* do well, thinking that that, too, was nothing more than zealous hype. And that would be a loss.





How many parents weary of buying toys that the children soon become tired of, or that are easily broken?

This Christmas, give them a gift that they will have lots of fun with for months, *and years*—a toy that they will not tire of and that will not break—that will teach them to think and to be accurate; that will train the eye and hand.

All the family will enjoy Anchor Blocks, fathers and mothers as well as the youngsters.

RICHTER'S ANCHOR BLOCKS

REG. U.S. PAT. OFF.

Build Forts, Armories, Bridges, Churches

All kinds of buildings can be built with Anchor Blocks, from the very simple ones for beginners to large and elaborate designs. These buildings are like *the real things* in miniature—not mere skeletons.

Complete instructions and books of designs are furnished with every set, which make building very simple and easy enough for any boy or girl. The play is not confined to set designs, however. Famous buildings can be reproduced in miniature, just like the real buildings—or original designs can be worked out by the youthful architect.

And in less than a minute the finished structure can be dismantled and another started. Just push it over. No tiresome delay; no tedious labor to take the model apart. This advantage the Anchor Blocks possess over all other construction toys.

Many blocks and metal pieces are included in the various sets, in different shapes and sizes, and in three colors—red, buff and blue. Anchor Blocks are made of *stone* and will not chip or break, but will last "forever."

ORDER NOW — Stocks are Limited

Go to your toy dealer's and ask to see these sets of Anchor Blocks. If he cannot supply you with the set you want, order direct from us.

We will fill your order through a reliable dealer near you or send direct by Parcel Post. If the Blocks are not even better than we have stated, return them at our expense and your money will be *promptly refunded.*

You cannot give your boy a better Christmas gift. Be sure to get the set you want, by ordering now. *Do not wait* as stocks this year are limited and may be exhausted early.

MAIL THIS COUPON FOR FREE PICTURES

COUPON

F. Ad Richter & Co.,
Department 101
74 Washington St.,
New York City.

Gentlemen: Without placing me under any obligations, send me free, your descriptive folder in colors, giving full particulars about Richter's Anchor Blocks.

Name.....

Address.....

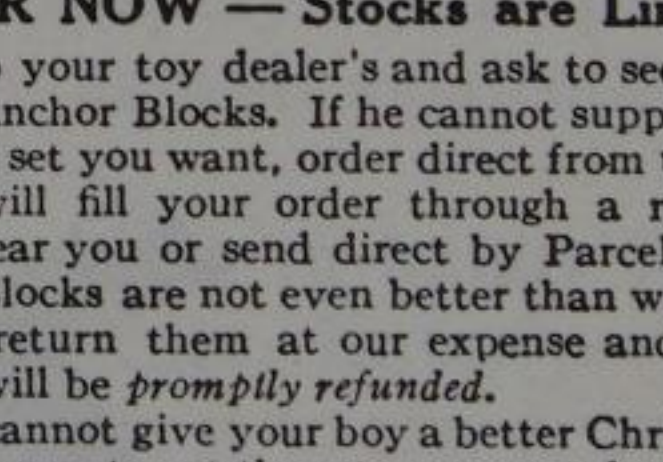
NOTE .....
If No. 7 set is desired at once, send money-order.

A handsome 4-page folder, showing buildings and various sets of Anchor Blocks in three colors, is now ready. It will be sent *free* on receipt of attached coupon.

If you want a good set at once, No. 7, shown here, is the most popular one. You can order it now on our *money-back guarantee.* But if you would like further information, fill in and mail the attached coupon at once.

The folder, in addition to its handsome pictures, tells all about Anchor Blocks. *Mail the coupon now.*

F. Ad Richter & Co.
Department 101
74 Washington Street
New York City



Outfit No. 7
$5.00
Parcel Post Prepaid in Continental United States

Chapter Eleven

Personal Computers in the Home

The American home is such a wonderfully varied place.

There are the mama-papa-kiddie households of the Norman Rockwell paintings. There are bachelor pads. There are eight stewardesses sharing two-bedroom apartments in four different cities with timetables and work schedules more intricately planned than a space shuttle launch. There are crash pads. There are senior citizens "living together" because, if they got married, one or the other might lose his or her Social Security. Teenagers in their first apartment. Widows and widowers living alone, or with their children, or with their parents. Divorced singles. Unmarried parents. Recluses. Communes. Farms. Cities. Small towns. Big towns. Apartments. Co-ops. Frame houses with white picket fences.

I am not for one moment going to pretend that there's a "typical" American home, any more than I'm going to explore how a personal computer would "fit right in."

A personal computer either will fit right in, or it won't fit right in, and that will depend upon the needs, the interests, the curiosities, and the budget of the people in each home. It's in the home, more than anywhere else, that the "personal" aspects of the personal computers can be seen.

The programs for personal computers in the home are not as vast or directly useful as, say, the programs for business. As time goes on, this will change. Just as TV programming expanded and improved as television reached more and more households, so too will computer programs become more interesting and sophisticated in the years ahead.

The household that buys a personal computer today is still on the pioneering edge of this much-touted computer age. Estimates are that from one-to-two percent of all American homes have a personal computer. That's not a high percentage. There are more Cuisinarts out there than computers.



While some find it fun being a pioneer, others find it unsettling being even a settler. They will wait until there are towns and Holiday Inns and indoor plumbing. And, sooner or later, computerdom will have all that. Sooner or later is not yet here.

Most households, I think, buy a personal computer for the games, just as most businesses once bought personal computers for VisiCalc. Once in the home, however, they experiment with a few of the other things personal computers can do — maybe a little word processing, maybe a little data bank dating — and expand, in that household, the horizons of personal computing.

A disk drive added here, a modem there, a printer, more programs — and soon one could almost run a small business. Add a few business programs and you can remove the "almost" from that last sentence. Osmond Family and Smith Brothers: watch out!

Personal computers encourage not just children, but the child in all of us — that bubbling mass of curiosity and

love of adventure — to explore not only the outer world, but also the inner world of our own potential.

Think you have a story worth telling? A poem worth writing? An idea worth expressing? Get a word processing program and tell it, write it, express it. With some computer programs you can even set it to music.

Think you could write a better program than the one you just paid $29.95 for? Give it a try. Fortunes have been made sitting up late at night, peering into a flickering screen.

Feeling artistically inclined? You might try your hand at computer graphics.

Want to know what's going on in Philadelphia tonight? Find out who's "on line" at The Source or CompuServe from that city and "chat" with them. There are no strangers in the world of personal computers — a lot of strange people, but no genuine strangers. There are certain advantages to frontier life, and the friendliness of fellow pioneers is one of them.

Or you could have your biorhythms charted, your I-Ching thrown, or your astrology read.

And don't forget the games. Games have been a central part of hearth and home for centuries. Getting together over a game of Snafu or Adventure or Star Trek can be as rewarding as gathering together to play Monopoly or Parcheesi or Mahjong.

To discuss the typical uses of a computer in the home is as hopeless as trying to define the typical home. But for those of us who take on the hopeless tasks of the world, and take them on in our homes no less, let's hope they continue to write programs to help us on our way.




NAUGHTY CHILDREN
ODD CHILDREN
REQUESTS FOR COMPUTERS
OTHER REQUESTS

Chapter Twelve

Computers and Kids

Kids *love* computers. Not only do computers embody something kids are completely familiar with, the television screen, but computers *respond*. *The Smurfs* don't respond. *Captain Kangaroo* doesn't respond. Even *The Electric Company* doesn't respond.

Computers respond.

It's funny: To an entire generation, computers represented the very personification of distance, aloofness, unfeeling, and uncaring. To the current generation (no pun intended), computers are friendly, cuddly, personal, and fun. How quickly things change.

Kids don't seem to mind learning a new language, if that's what it takes to talk with their new friend. To children, a keyboard is a new avenue of communication, not the appendage of some lowly office machine.

Not only can computers respond, but they can be *programmed* to respond in certain ways. Kids thus take to programming — not because they have a business to run or a deadline to meet or a letter to write — but for the best reason of all: it's fun.

Computers hold an additional fascination to young people for an almost irresistible reason: Grown-ups, for the most part, don't know what the hell is going on. To adults, computers are the things that remind them that payments are past due. Computers are neither interesting nor fun. They are, in fact, intimidating.

Like a boy showing his mother a snake, or a girl turning a cartwheel in front of her father who can barely cart it into the house, kids delight in feeling affection for things their parents find impossible.

In the past, music has been the battleground of this war of tastes. The John Philip Sousa generation couldn't understand the younger generation's fascination for George Gershwin. The Gershwin generation couldn't comprehend the young Frank Sinatra. The Sinatra generation didn't know what to make of rock and roll. The rock generation

thinks punk is going a bit too far.

But, somehow, it's the parents who bought the phonographs and who bought the records, even if they couldn't "understand a word of it." And so it is with computers.

In the delightful piece that follows, Carolyn Benson Cohen details not only the enthusiasm of youth, but also the befuddlement of parents, when it comes time for a family to confront one of the burning questions of the eighties: "Should we get our kid a computer?"

The Kid, the Computer, and Me

by Carolyn Benson Cohen

Computers represented the wave of the future,
and who wants their kid to be late for the future?

Let me begin with a parent's true confession: all my kid knows about computers was learned in the gutter. We didn't discuss such things at home. When my boy began to get curious, he had to go to the streets for answers to his questions. It wasn't that we didn't care; we just didn't know a darn thing!

The first indication I had that his tastes were maturing was when he asked for a $20 subscription to a computer magazine. It was a big jump from the five bucks we'd doled out from time to time for the cheery periodicals of childhood.

"You're only 12 years old—what do you want that magazine for?"

"I like to read it, Mom."

"Read it? Are you crazy? It's all full of numbers and symbols...." Then I remembered the little notebooks he'd been leaving around the apartment lately, little notebooks filled with—you guessed it—numbers and symbols. I turned the pages of the magazine, one eye on my blue-jeaned, T-shirted, dirty-sneakered son, one eye on the fat, glossy publication. It boasted a lot of words, as well as those mysterious numbers and symbols, and a few of the words made sense to me. I was very much in favor of his reading words. And his birthday was coming up. "O.K., but you're going to have to explain this one to your father."

The very next day the boy started asking if the magazine had come yet. When it finally arrived, they both disappeared

until dinner. The evening was spent on the phone mumbling unintelligible numbers and words to unnamed friends.

We had further indication that his interests were expanding when he began to drop hints about his computer savvy. This was a child who usually kept us starved for information about his life, so, while trying to ignore his egotism, we perked up our ears. In fact, as parents sometimes do, we tried to take advantage of his conversational mood to serve our own needs:

"That's good. How are you doing in history?"

With great aplomb he vaulted over more sensitive areas and kept to his topic: "You should have seen the program Kenny and I made up after school today!"

"Kenny who?" When he was younger we knew all his friends.

"Oh, I don't know. He's one of the kids."

Computer Science, with the aid of three PETS (small computers, not dogs and cats) and a terminal hooked up to the computer of a nearby university, was taught in the seventh and eighth grades of our son's private school. He was a sixth grader but, I gathered, he spent his leisure time hanging over the shoulders of those more qualified to use the equipment. Such was the beginning of his computer experience: "Over against the wall, kid. I'm an authorized user!"

Soon he was disappearing after school to the homes of several of those boys, particularly to that of one known only as "Adams." Phoning the assorted numbers he left on the kitchen table, I discovered a network of adolescent computer junkies all over the city. My kid was hanging around with some of the local high-tech addicts.



One of the boys had a mother who taught at the school and after a P.T.A. meeting I cornered her with some questions. She bragged that she had just bought an Apple II Plus for her family. I was astounded—we had reached a whole new plateau in keeping up with the Joneses! She told me about the clever and unusual programs her darlings were writing and offered advice about what to buy when the time was right. "Your son should have at least 16 K," she warned, and for the first time I learned that my child had needs that could be measured in Ks. Ks of what, I had no idea.



For several months my husband and I mulled and mused. Could we justify such an expense? And yet, from all we had been told by the school and by our son himself, he clearly had ability. Computers represented the wave of the future. Who wants their kid to be late for the future?

Meanwhile, somebody's mother was teaching my child FORTRAN. He had gotten wind of the faint possibility that we might buy a computer and had jumped into the fray with

no subtlety whatsoever. He talked about it all day. Every night before he went to sleep he lay in bed like an angel, whispering another reason why we should have a home computer. We kissed him good night and tiptoed away as he quoted memory capacities and lists of available software.

To make a long story short, we reviewed the bank account, reappraised the budget, rethought the issue, and relented.

Now, imagine that you have $1,000 or more and are going to spend it on your child. You talk to all the experts, confer, make a decision, and inform the boy of your beneficence, right? Wrong. In our case, what we knew about buying a computer could fit into a salt shaker. My husband's business associates were either blank when it came to home computers or suggested something simple "so the kid can play games." So where did we go for advice on how to spend this large sum of money? To our son. His largest purchase to date had been a $40 electronic kit on which he spent an entire summer's earnings and with which he got a much-needed "A" on a science project.

The responsibility didn't faze him. For several weeks he phoned and visited the pubescent underground of computer junkies, debated the respective qualities of the Commodore PET, the TRS-80 Model III, the Apple II Plus, and other machines with curious names and numbers, and stopped in to see his buddies at Radio Shack (where he had become well known by programming their demo). Finally the Apple emerged triumphant, and we ordered it from a company in California.

One day, not long afterward, the kid was home with a cold. He lay limply across the sofa, the huskiness of his unpredictable voice exaggerated and thickened with congestion. With a television set propped at his feet he was a docile patient, although I found his lethargy disconcerting.

When the doorbell rang I rushed to answer, thinking my son was fast asleep. There was the United Parcel Service delivery man holding a big box labeled Apple. I wondered why my parents were sending apples instead of oranges from Florida and then the truth dawned. "Mom," I said to myself, "you're going to see a real show."

I called softly to the boy, who drew himself up from some inane rerun. "Come here a minute."

When he saw the box his lassitude fell away like the afghan he had been clutching about his neck. He began to leap about

like someone on a pogo stick. "It's the Apple! It's the Apple!" his poor voice cracked and bellowed. The UPS man stood with his mouth open looking at the two of us. When the pogo stick settled down to earth, he helped us tear open the box.

"Save the instructions!" I shouted as the boy triumphantly lifted out the carefully packed pieces. But he knew what everything was. I was the dangerous one, almost discarding an extra 32 K bytes of uninstalled memory we had ordered. Spotting something that looked like a row of staples, I thought it was part of the packing. "Mom! Don't!" the kid screamed, just in time.

We quickly moved some furniture and I set up a card table for the Apple, leaving the boy to figure it all out. Frankly, I was on the retreat to a room where I knew how everything worked. When school was out, he placed an emergency call to Kenny.

"Who's Kenny?"

"He's a kid who has an Apple. He knows how to install extra memory."

Across town faster than a speeding bullet, Kenny banged on the door. "Mom, this is Kenny Adams," my boy said. A swarthy child with a Kellogg smile stood poised on the threshold.

"You mean, this is Kenny *and* Adams? I thought they were two separate persons!"

Kenny walked in with an air of authority befitting his superior knowledge. He grabbed the Apple from its perch on the card table and trotted with it under his arm to the kitchen. "Gotta have a room with no rugs," he explained, as I rushed to move things out of the way. With a flick of Kenny's wrist, the top sprang off the Apple and we all peered inside. It was practically empty! On the bottom I saw a shallow layer of what looked like black Lego blocks. Kenny stuck his head, hands, and the extra Ks inside the computer, and soon declared that all was well.

The day the Apple arrived, the parade of boys began. Soon I had met all the unknown kids whose computers my son had visited. Most had first and last names by now. Some came bearing extra disk drives, some with games programs, some just to test, play, and program the latest Apple. They were nice children, of various ages and even more various sizes. They didn't ask for food, but if it was offered, they cleaned me out. They were clever and funny and polite, and thoroughly wrapped up in the world of computers. I've felt much better about the gutter and my guttersnipe ever since!

As for me, I sat down at the computer with the manual one day when the kid was in school. "Push the switch into an upward position," I read. "You will be rewarded by the 'POWER' light at the bottom of the keyboard coming on." I pushed the switch. The 'POWER' light came on. A smile spread over my face.



FATHER CHRISTMAS—"UP-TO-DATE."

Illustration by John Tenniel. From *Punch*, Dec 26, 1896.

(Slightly updated by our artist.)

Do you love your children?

A few years ago, the *National Lampoon* had a cover photo of a dog with a gun to its head. The headline read, "Buy This Magazine or We Will Kill This Dog." The dog looked worried. It was the largest newsstand sale in *National Lampoon* history.

That cover struck a familiar two-note chord within us, fear and guilt. Fear and guilt. Guilt and fear. Those primary manipulators have been used to sell us everything from religion to war to soap for generations.

Which brings us to the point of this story.

Do you love your children? *Really* love them? How much do you love them? $100 worth? $300? $1,995? Remember, we're talking about love, not money. You say your love for your children is unlimited. Is it? Is it really? When put to the test, do you find your love has certain, uh, limitations?

We're talking about your children's future here. Their education. Their careers. What can you give your little ones that's more important than the ability to compete in the technological age of tomorrow? We're talking about jobs. We're talking about your babies' ability to put food on the table. We're talking about their survival.

Buy this computer or you'll kill your kids' future.

It was easier back in the old days. Kids wanted roller skates and bicycles. Eventually, they got them. Today, kids can quote statistics from the President's Council on Physical Fitness on the importance of physical exercise to little bodies. Loving parents must now supply their offsprings with bicycles, roller skates, running shoes (not inexpensive tennis shoes, mind you: they don't provide sufficient arch support!), and whatever else Vic Tanny might have provided for the Little Tannys.

All this is only fair, of course; almost karmic. Parents have been raising kids with guilt and fear for years. Thoughts such as, "Wait until your father gets home," or "Eat your vegetables, there are children starving in China," were never designed to appeal to a child's sense of reason. That kids are now using the age-old child-raising techniques on their parents is a justice that seems, well, poetic.

Computers and Kids

Child psychology has convinced us that if kids go wrong, *it's the parents' fault.* Naturally, parents don't want to be responsible for creating partial human beings, so kids now couch their requests in terms of growth and development, not fun and games.

Disneyland is not amusement, it's education—especially now that there's EPCOT. Television must be watched for school (*Three's Company* will be discussed in sociology on Thursday). Science projects are no longer hobbies, but preparations for Tomorrowland.

Which brings us to personal computers.

Aren't personal computers the most *wonderful tools* for creating whole human beings? They're educational and recreational and technological at the same time, and as we all know, technology *is* the future. That's the only thing Ronald Reagan and Tip O'Neill have agreed upon since the invention of the automobile.

How could you *not* buy one for your kid? Don't you love your children?

If personal computers had come out when I was growing up, they would have been lumped in the general category of Erector Sets, chemistry kits, and microscopes. Educational? Sure. Invaluable? Nah. I don't think my life would be significantly diminished if I had never built a model of the Brooklyn Bridge or burned sulphur or watched brine shrimp hatch.

Although I'm grateful to Mom and Dad for these memories, my parents did not go out and buy me all these educational goodies on one day, or even one year—although I'm sure I devoutly wished they would have back when I was eight or so. I did my best to make them feel guilty, but I don't think they read enough child psychology. No matter how hard I tried, I could not convince them that if I didn't win a Nobel Prize, it would be their fault.

The only people better than kids at stirring the cauldron of guilt and fear in parents' hearts are advertisers. Heavens, they're ruthless. First, they convince the kids that "If you don't have a computer, you will not grow up to be a human being." Then they have compassionate celebrities sell the virtues of various computers to parents, as though buying

a computer for a child was a given, like buying shoes or a smallpox vaccination.

Yes, computers are the wave of the future. Computers are marvelous tools. They are also marvelous toys. At some point in a child's childhood, a computer would be a fun way to learn about, well, computers.

But relax, parents. It need not be this year. It need not even be next year. There. You have a self-proclaimed computer expert (God doth not make experts; experts make experts) telling you it's OK to wait. You can buy a computer for your child on the same schedule as you would any other exciting but expensive toy. Relax. No need to feel guilt, fear, or to keep up with the Jones' kids, or their computers.

Buying a computer, for a child or an adult, should not be an impulsive act. Imagine buying an automobile without knowing the difference between an engine and a transmission. It will take research, study and work. (Buying a computer is one of the most intricate and educational computer games around.)

What, for example, could a kid use a computer for?

Computers are excellent educators. They do not judge and they never get angry. A computer will respond, "That is incorrect, try again" ten thousand times without once getting upset or calling the child a hopeless idiot. Of how many saints could you say the same?

While the computer does not judge a slow-moving student, it will also take a fast-moving student as fast as he or she can go. If there are 100 steps in a lesson, a computer will take you through them in five minutes or five years. The computer does not care.

Do not expect, however, a personal computer to turn your child into Plato. My above comments refer to the *potential* of the computer in education, not its current standing. The selection of educational programs available today, while vast, have a limited scope.

Computers are good today at teaching things by rote—multiplication tables, spelling, alphabets—but are not very good at conceptual instruction. In time, as mass storage devices and better programming are used, the computer will

play an increasingly important role in education. But that's a few years down the road.

We all know computers play games exceptionally well. This activity is not as easy to discount as it seems. Adventure games do develop quick thinking and rational response; action games increase hand-eye coordination. While not measurable on later SAT scores, the cumulative effect of computer games tends to be more positive than negative.

But the best reason, I think, for having a computer in the home is to simply get kids used to computers. The keyboard and screen will be a part of their future, at work, at school, and in their homes. The earlier a computer is part of their daily environment—like cars, electric lights, telephones, or any of the other newfangled gadgets we have come to depend upon—the more comfortably they will integrate computers into their daily lives.

As the kids of today grow into tomorrow's adults, the computer will become just another tool, nothing special, a machine, taken for granted. The sooner we reach that point, the better off we will be.

So, eventually, you will probably buy your kid a computer. (If you can, do it before they're fifteen. At fifteen, if you'll recall, they start shopping for cars.)

Selecting the right computer takes time, and pressure to buy *now* is strong. You have Madison Avenue, sales people, educators, newspapers, magazines, books, television, and your very own guerilla warriors doing their best to convince you that time is running out.

Finding the time and resisting the pressure is important. It's not easy, but loving children seldom is.



"No more of my sweet favors until the computer you promised me arrives."

PART III

Selecting and Purchasing a Personal Computer



Chapter Thirteen

Personal Computer Backlash

I was seated in the cavernous Radio City Music Hall listening to Bette Midler's opening monologue. ("I must look like an angel dancing on the head of a pin," she told the balcony.) The subject of personal computers arose.

This surprised me. I had been to essentially the same concert not three months before in Los Angeles (I am happily addicted to Ms. Midler), and personal computers were not mentioned. (The San Fernando Valley, home of Valley Girls, was: "Ah, The Valley, The Valley. One million people. One hundred stories.")

Bette asked the New York audience, "How many of you have one of those computer things at home?" The applause, while not as great as that following "Boogie Woogie Bugle Boy," was nonetheless strong. Bette seemed chagrined. She could not understand why people, especially *her* people, would want to sit in front of a video screen and tap data onto disks.

"I got into show business so I wouldn't *have* to do data processing," she explained.

And so it's been at other stops along my tour. ("My tour" is a 20-city promotional junket designed (a) to educate the public, through the various media, on the wonders of small computers; and (b) to sell as many copies of *The Personal Computer Book* and *The Word Processing Book* as possible—not necessarily in that order. Ms. Midler has labeled her roadshow extravaganza "de tour." I know just what she means.)

The personal computer backlash, it seems, has begun.

In a few short months, for example, the people who schedule interviews on trendy radio and television shows have traveled from, "No one knows or cares what those things are," to "We've done computers to death." From passed over to passe in four months. Even pet rocks had a longer life span than that

I can't say that I blame either Bette or the bookers. Too much has been written about computers too soon. Most

has been written by people who either know something about computers but nothing about writing, or by people who know something about writing but nothing about computers. Some, like myself, know nothing about anything, but have always relied upon the kindness of strangers.

Far from giving up, however, most have not yet begun to write.

We are on the verge of a media blitz (or "intensive coverage," as they say in the media) that will rival Watergate, "Who Shot JR?" and the Burton-Taylor-Cleopatra affair. Combined.

If you thought *Star Wars* was fun, wait until you see the video violence ahead as CBS vs NBC vs ABC vs PBS vs cable vs tape vs laser disks join in a galactic battle over who gets to teach us all about computers. (I nominate Mr. Wizard.)

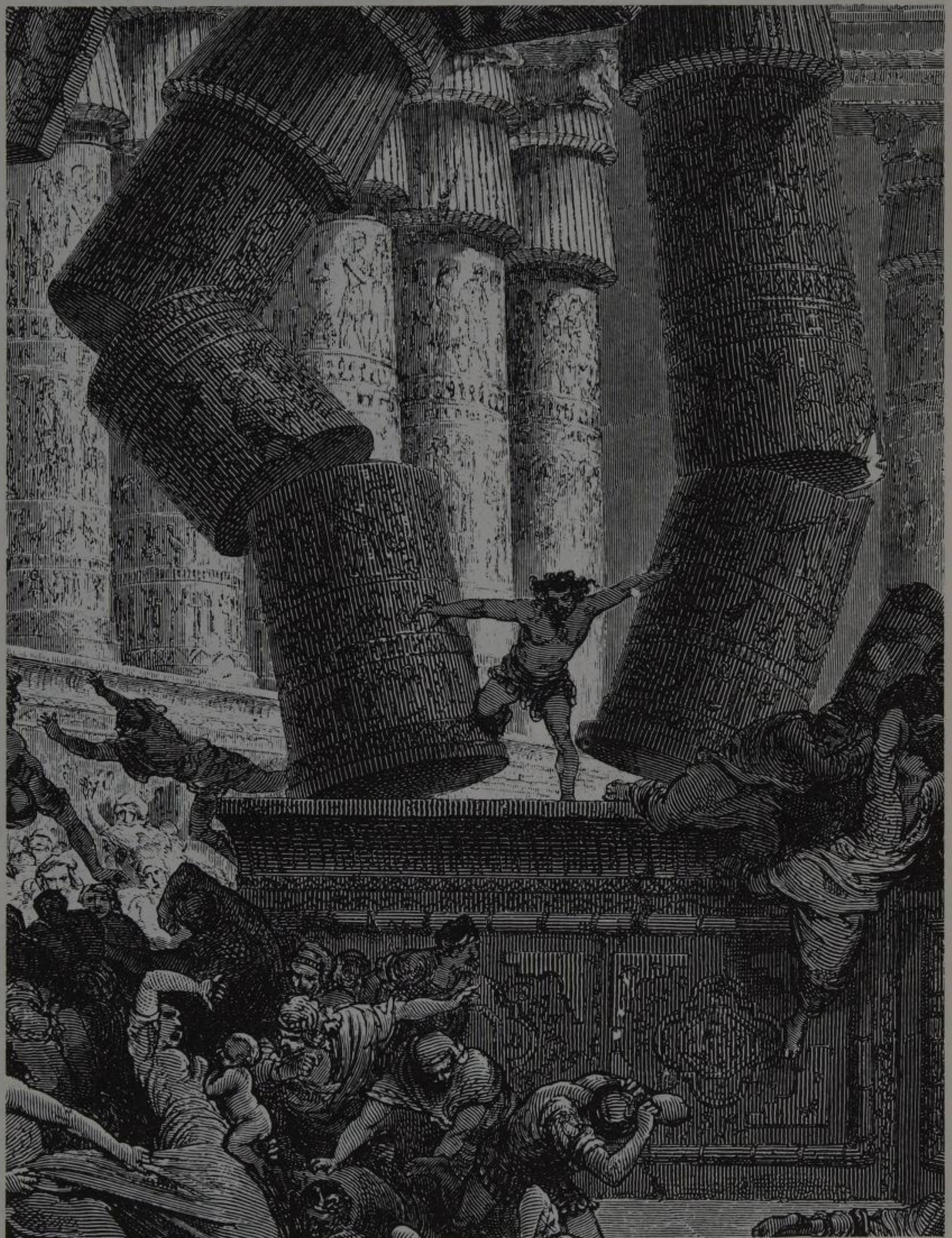
I, mild-mannered reporter, have been approached by six—count 'em six—"computer oriented" television shows. These proposed spectaculars want me to be anything from on-camera host to "Andy Rooney-like commentator." If six shows (thus far) have dug me out of the computer woodwork, you can imagine how many other "home computer" shows are being planned. (I would conservatively estimate sixty in the oven, with several hundred gleams in independent producers' eyes all over Freedonia.)

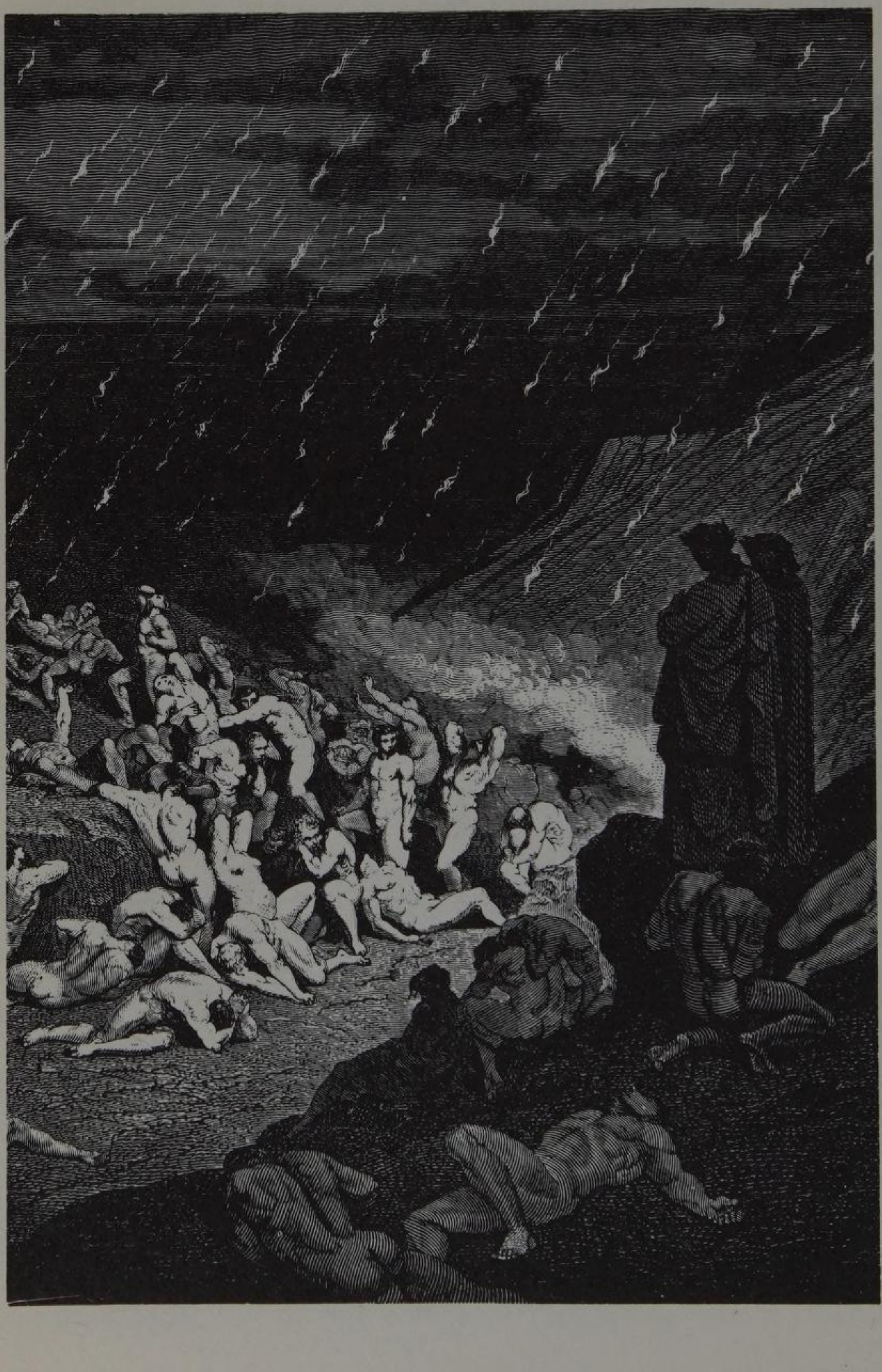
And then there are the books. (I must plead guilty to at least six of those.) And the phonograph records. (All seriousness aside, there's one out by Steve Allen and Jane Meadows.) And the night school classes. (Introductory computer courses might just save a number of junior colleges from receivership.) And the specialty magazines. (*Commodore Accountant, PC and the Jaycees, The Radio Shack Law Review.*)

And the magazine articles. (*Popular Mechanics*: "How to Build Your Own Solar-Powered Workshop Computer Using a Transistor Radio and Spare Chevy Parts." *Cosmopolitan*: "Programming Your Computer for Love—If Eve can do it with an apple, why can't you?" *National Enquirer*: "Man Hacks Computer into a Thousand Pieces and Flushes it Down His Toilet as Carol Burnett and Seven Other Celebrities Look On.") Why, I hear somebody even had the audacity to start a nationally syndicated newspaper column! Too much is quite enough.

So, if it's true that for every action there is an equal and opposite reaction, I have but one word of advice for my fellow personal computer enthusiasts.

Duck.





Chapter Fourteen

The Drawbacks of Personal Computers

Yes, there are drawbacks to personal computers, and I'll tell you what they are. You won't have to hear it first from Geraldo Rivera on a *20/20* expose.

There are drawbacks to everything, of course, and drawbacks must be weighed in proportion to benefits. Further, most drawbacks can be reduced or eliminated if approached creatively. So, in this chapter, we will be looking not only at problems, but also at solutions.

Here they are then, the several drawbacks (and suggested remedies) to personal computers I have encountered.

1. Computers are expensive. Personal computers cost a lot in terms of both time and money. Some people I know have enough money, but they don't have much time. Some people I know have enough time, but don't have much money. Most people I know have neither enough time nor enough money. Personal computers require a sizeable investment of both.

Will this investment pay off? Will it be worth it? Like installing a swimming pool, it's hard to know until you take the plunge. Health clubs could not exist without the remarkably high drop-out rate of its members. Fully 80% of the people who join, signing up for several years at several hundred dollars, never go near the place after the first month. If everyone who joined made use of the facilities, health clubs would be five times more crowded than they are now, a burden they would be unable to bear.

A personal computer is something that you will buy, use a few times, and then abandon, a monument to your impulsiveness and lack of determination — like a Cuisinart. Or, you will buy a personal computer, wonder how you ever got along without it, and use it daily for a variety of tasks you would never dream of doing again by hand, a living example of your good taste and practical nature — like a Cuisinart.

Recommending that you "start small" doesn't help

much. As those who bought a discounted version of a Cuisinart will tell you, most of the knock-offs were no bargain — they butchered meat rather than sliced it, and mangled vegetables rather than chopped them. The very people who might have been happy with a *genuine* Cuisinart, found the imitator unacceptable, assumed the praise heaped upon food processors was grossly overstated, and returned to the processing of food by more traditional methods.

If you want, for example, to do word processing, and attempt it on a $300 machine, you might find it unsatisfactory; whereas, if you were to attempt it on an $1,800 machine, you might be thrilled; and if you were to try word processing on a $5,000 machine, you might find yourself unable to write even a shopping list without it.

If you don't process words (or do bookkeeping, or have a passion for electronic games, or one of the other things that personal computers do remarkably well), it's hard to know if the many things that personal computers do marginally well will appeal to you enough to cause a change in habit.

If you are in the habit of calling your broker or waiting for the daily newspaper to see how the stock market is going, you might not find the allure of an updated-only-fifteen-minutes-ago stock price worth turning on your computer. In some areas, personal computers might offer more power than you'll ever need — and in other areas, they may offer much less.

I wish I could give the rather pat advice, "Try before you buy." Unfortunately, personal computing is rather like flying a plane or visiting Europe or sailing a boat — you'll never know if *you* will like it unless you try it, and trying it is expensive.

If you're uncertain, continue your investigation. If any of the "drawbacks" in this chapter seem like sound, logical, clear-headed arguments for not buying a personal computer, then you probably shouldn't get one — yet. If these drawbacks seem like intolerable nit-picking that no reasonable person would consider for more than a few moments at most, then you're ready.

How long that readiness will last is anybody's guess, and if you guess wrong, it could be a costly error.

You can minimize the chances of disappointment by lowering your expectations. Personal computers do many things well, many things not-so-well, and a broad spectrum of things somewhere between "well" and "not-so-well."

Don't expect a personal computer to change your life, unless you are a professional writer who already knows how to use a typewriter; a small businessperson who has fairly standard small business needs (word processing, accounts receivable, accounts payable, etc.); or someone who devotes a large portion of their time doing something personal computers do well (electronic spreadsheeting, stock marketing, cross-index filing, and the like).

If you don't fall into one of those three categories, it might be best if you lower your expectations to a workable minimum. By "workable minimum" I mean, don't lower them so much that you don't get the computer, but lower them enough so that disappointment will not be one of your peripherals.



Be realistic. Don't expect too much from your computer.

Another way to help insure that you'll use your personal computer more often than your Norman Rockwell Thanksgiving Turkey Platter is to choose carefully. As much as possible, select the computer and programs that meet your current needs and fit comfortably into your lifestyle.

If you want to play computer games, buy the best game-playing computer you can afford — and make sure you like the games that are available for it.

If you are running a small business, there is no need to buy a computer and software designed for a ten-million dollar corporation. (Yes, the salesperson might say, you can grow into it. When you're grossing ten million, however, you can *buy* into it.) If you get more program than you need, you'll have to learn about the complexities of a program that you might use only 25% of, and those complexities besides being expensive — might one day cause the computer to be turned off for good.

If you're just curious about computers and want to get your feet wet, a fish pond will do — there's no need to install an Olympic-sized pool.

As pointed out before, however, if you need word processing, plan on spending enough for a decent personal computer, a letter quality printer, and the best word processing program you can find. The same is true of business: buying too much computer can be a bother; buying too little, disastrous.

There's a quote about suiting the action to the word and the word to the action, but we've already quoted once from *Hamlet* in this book, and one profound Shakespearean reference per computer book is sufficient, I think.

2. Computers are powerful and, therefore, capable of powerful mistakes. It is hard to duplicate, using ordinary methods, the efficiency and effectiveness of a computer. It is equally hard to duplicate, using ordinary methods, the degree of devastation and disaster possible on a computer — unless you consider fire, flood, and nuclear fission "ordinary methods."

Let's assume, for example, that you run a company and have all of your accounting information on a single

hard disk. A hard disk is a platter of metal, usually aluminum, spinning at something like 1,800 revolutions per minute, which is equal to 30 revolutions per second. Pretty fast. Let's say that one day, the hard disk decided it was tired of being a hard disk and wanted to become a frisbee.

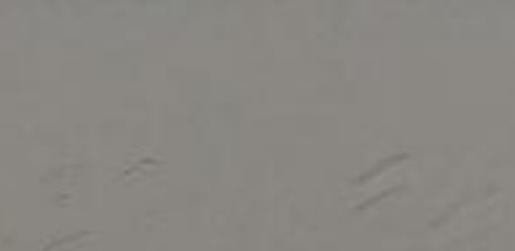
The disk exercises a remarkable amount of free will for a disk, releases itself from its normally secure housing, and flies out the window, landing in the *Guinness Book of World Records* for The Greatest Distance Traveled by a Personal Computer Hard Disk.

Television news crews are dispatched to interview your disk, while Tom Brokaw and Roger Mudd argue over which one of them will handle the story. (Neither one wants to, but they hear that Dan Rather is opening his broadcast with it, so they feel *somebody* has to interview the damn thing, Tom Snyder and Rona Barrett having both refused.) Roone Arledge can't decide if the story should be on *The ABC Evening News* or *ABC Wide World of Sports.* He decides both.

The MacNeil Lehrer Report cancels its planned satellite interview with Fidel Castro and devotes a special, expanded 90-minute version of the show to your disk.

Also at PBS, both William F. Buckley, Jr. and Dick Cavett are trying to get the disk on their respective shows. "The disk is a celebrity, not a politician," says Cavett. "It belongs on my show."

"The disk is a projectile, and therefore belongs on *Firing Line,*" counters Buckley.



In a ceremony on the White House Lawn, your former hard disk is made an honorary frisbee. "This is one small step for disk," the hard disk says as you flip off your TV and mutter something about ungrateful hardware. You try to figure out a way to recover months of priceless financial data, and decide there is no way.

A company once, in a less colorful way, lost all of its accounts receivable information. The company sent out polite form letters asking how much money, if any, each customer owed. Not surprisingly, the company was soon out of business.



Businessman, upon being informed that his hard disk had been turned into a frisbee.

Even a single floppy disk, holding 170 pages of information, can be a tragic loss. The entire text of this book fits comfortably on three 5¼-inch floppy disks. If I were to lose one of these prior to the publication of the book, and I had failed to make back-up copies (which I

almost always fail to do), it would surely go beyond tragedy and deep into soap opera. O, the gnashing of teeth and the pulling of hair. Cecil B. DeMille never directed *angst* on a grander scale than I would emote.

There are two possible causes for such unthinkable, but possible, occurrences: computer error and operator error. As much as I hate to admit it, the latter far exceeds the former. By "computer error," I mean both hardware and software. Once again, the latter is the cause of far more difficulty than the former.

The causes of costly mistakes, in order, are:

A. Operator error.
B. Software error.
C. Computer error.

Using software that's been around for a while and a computer that's a relative newcomer, the last two categories might trade places. Almost without a doubt, though, operator error will be responsible for more "computer errors" than anything else.

Suggestions for minimizing this drawback are:

First, make sure you know what you're doing. It's fine to experiment with a computer — there is almost nothing you can do from the keyboard of a personal computer that will cause any permanent damage to the machine — but don't experiment while you're working on something important or irreplaceable.

Before trying anything new, try a test first, or *at least* save whatever is in memory on a diskette. If, for any reason, the computer "crashes," (shuts down, freezes up, or turns off), whatever was in the memory is lost. If it is put on a disk (a simple, swift procedure), then the chance of retrieving the information is greatly enhanced.

Second, buy quality, time-tested software. This may not always be possible. You may need a program that is one-of-a-kind and newly introduced. In that case, watch for bugs and be very careful. If you are using the program to process information that is important to you, call the software manufacturer periodically and ask if any bugs have been reported that you should be aware of.

On the whole, however, most of the major categories

of software — word processing, spell-checking, accounting, electronic spreadsheeting, filing — have products in each category that have been around at least a year, have sold thousands of copies, and have had most of the bugs removed.

Third, take good care of your machine. It doesn't require much. It is estimated that the majority of electronic parts that do not fail within the first twelve months will last for 500 years. How they make such calculations — the transistor being less than thirty years old and the silicon chip less than twenty — I shall never know.

It's a comfort, though, to think that, unless Life Extension Science takes the same dramatic leaps as Computer Science, and soon, our personal computers will be giving pleasure to generations yet unborn. Well, maybe it won't last *that* long, but a computer should hold up until you buy your next computer.

The only parts of the computer that need periodic servicing and attention are the moving parts, and then only the disk drive and the printer. (A good keyboard seems to go on forever, and a joystick, well, use it for twenty years and buy a new one.)

Disk drives should be cleaned periodically. It takes about two minutes: all you do is put a special head-cleaning disk in the drive and turn on the computer. Most "read/write" (disk) errors are caused by dirty heads, which two minutes of cleaning would have prevented.

Even if the computer misbehaves totally and eats a disk, the failure of the operator to make a back-up disk — again, about a two-minute procedure — can cause the problem to be much larger than necessary.

Power failures, too, cause the computer to lose its memory. Power failures happen with varying degrees of frequency in various locales. While living in Detroit, I don't recall any, except during electrical storms. In New York there were only two, although they lasted several days each. In Los Angeles, the power company named in honor of Mr. Edison seems to fail, on the average, once every other month.

Murphy's Law #253A states, "The power will fail

only when you are about to find out 'whodunit' in a television mystery, have a souffle in the electric oven, or put something irreplaceable into the memory of your computer and have been too lazy to save it on a disk." Law #253B reads, "This will only happen when you are dangerously behind schedule, exhausted, and in a bad mood."

A good slogan to adopt while working with a computer is that of the compulsive bargain shopper: "Save, save, save." I am very bad at this sort of thing, but I do make it a habit to save whatever I am working on whenever I get up. Given that I get up at least every fifteen minutes, it's a rather good plan. Other people less antsy than I might want to save at the end of every page, or every ten minutes (set a timer), or at some predetermined interval or place in their work.

3. Eyestrain. Some people find that peering into a video screen causes eyestrain, and some do not. For those who do, here are some suggestions.

First, try using a monochrome video display rather than color. The images on color screens are not as sharp as images on monochrome screens. The fuzziness might be causing the problem.

Second, a monitor (a video display that plugs directly into the computer, rather than a recycled TV set) gives a sharper image.

Again, fuzziness may be the problem. (When a screen display is fuzzy, the eyes strain to sharpen the focus. This constant straining can cause headaches.)

Third, green phosphor is supposed to be easier on the eyes than white. Try a green phosphor screen for a while.

Fourth, the glare of room lights off the glass of the video screen can cause eyestrain. Get a filter (Polaroid makes a good one) that reduces the reflected light. (The Polaroid filter also improves the contrast of the characters on the video screen, making them easier to read and further reducing eyestrain.)

Fifth, try a "slow phosphor" video display. The image on a video screen changes thirty times per second. This rapid changing is what gives the illusion of motion when

Laverne hits Shirley in the face with a pie or a pizza or something. Ordinary video screens are designed to display the one-thirtieth-of-a-second-image, and then to fade quickly to make way for the next flash.

Slow phosphor holds the image for a longer period of time. Before the last image fades, another has already taken its place, and before that one fades, another has taken its place, and so on. This delivers a video display that is rock-steady.

The disadvantage of slow phosphor is that, because it holds onto a light image so long, when you change something on the screen, "ghosts" of what were formerly there will momentarily remain. These poltergeists remain for less than a second, but for someone used to quick-fade phosphor, it can be annoying. It is, however, far less annoying than eyestrain.

Sixth, read the solutions to disadvantages 4 and 5 below.

Eyestrain does not affect the vast majority of people who use video screens. These suggestions were offered for those who do have trouble.

4. Neck and back strain. Most back and neck strain experienced in front of a personal computer comes from maintaining the same posture, hour after hour.

If the keyboard and video display are all in one piece, your options for shifting positions are limited. You must reach the keys which, attached as they are to the screen, are not easily moved. This makes varying your position difficult. Not surprisingly, this sameness of position is a pain in the neck, a pain in the back, and a pain in any other portion of your anatomy you care to name.

The solution is a simple one: a detachable keyboard. A detachable keyboard allows you to place the video screen where it's most comfortable for viewing, and the keyboard where it's most comfortable for typing.

We have grown accustomed to looking *down* at a page when we type. This is because those of us who learned typing on a typewriter found that, invariably, that's where the paper was. The paper was where the typing was, and that's what we wanted to see.

Video screens can be placed a bit higher — closer to eye-level — and not having to look down for hours at a time can, in terms of neck and back strain, make quite a difference.

Also, the video screen need not be as close as the keyboard. As I write this, the video screen is at least four feet away. To read the entire screen, I only have to move my *eyes*, not my head. (The closer I get to the screen, the more my head would have to move — some law of physics at work there, no doubt.) This causes less strain on my neck and back. Further, the field of my vision encompassed by the video screen is small compared to the amount that would be involved if I were up close. I don't know if it's true or not, but my mother always told me it was bad for my eyes to sit too near the TV screen.

I will, mom's advice notwithstanding, move closer to the video screen when I edit this piece. I will be looking at the text in a critical character-by-character way. Now I'm just looking at words, sentences, and ideas. For those, four feet is close enough.

But even when I move up close, I will never be as close as I would have to be if the keyboard were permanently glued to some spot directly under the video screen.

A detachable keyboard also allows for an infinite variety of positions. Some of this chapter I have written with the keyboard on my desk, some of it with the keyboard on my lap. Were I so inclined, I could have stood up, lain down, or assumed any of a dozen other positions.

Maybe it's true that the straight-backed rigid posture is the best for long-term typing, but I never learned to sit like that, and I doubt if I ever will. There is too much else to learn before and after getting a computer. Who wants to have to worry about learning a new way to *sit?*

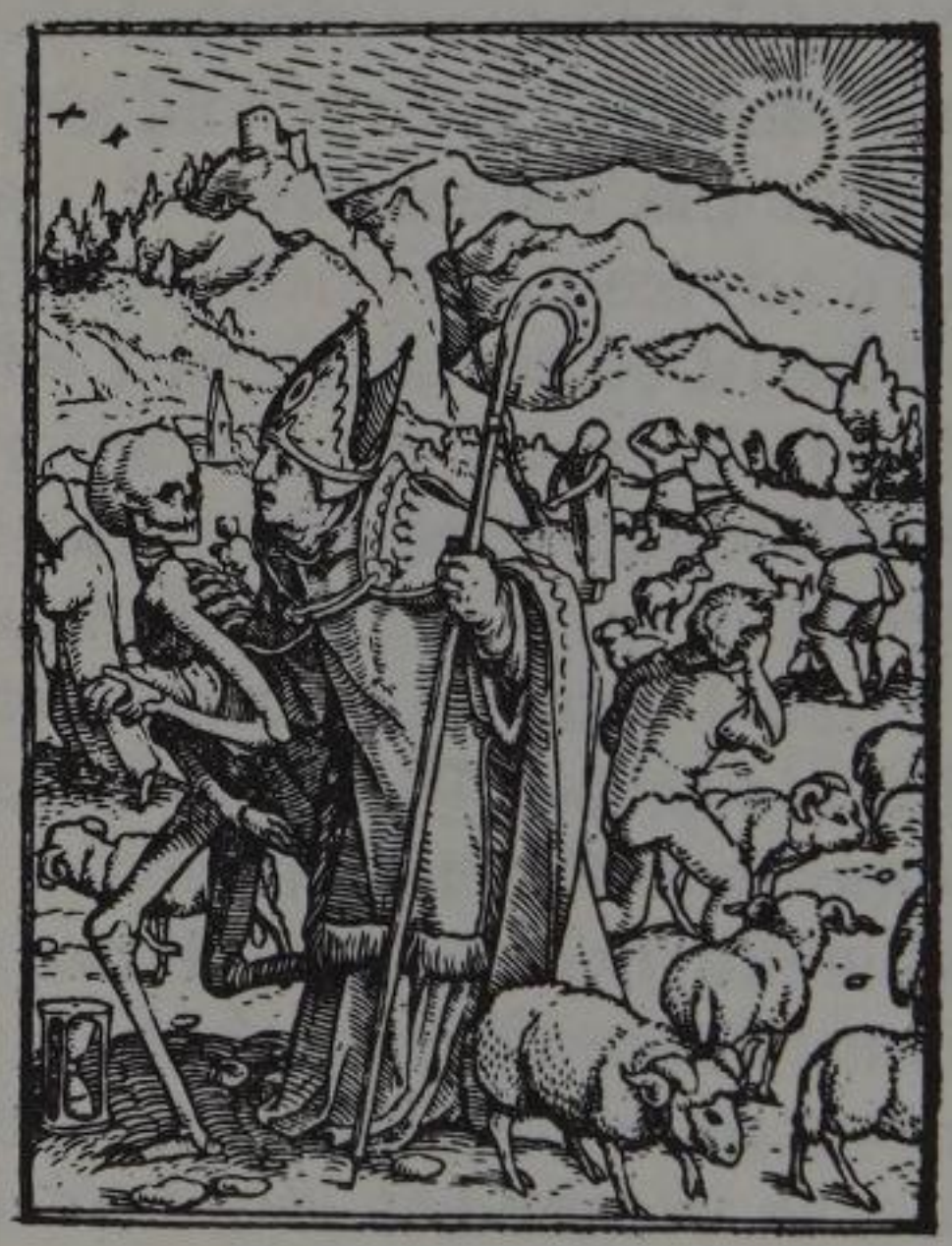
I would rather have a computer that adapts its shape to my posture, not one that demands I adapt my posture to its shape, especially when that shape is dictated by an 1874 invention. Personal computers with attached keyboards were modeled after computer terminals, and computer terminals were modeled after typewriters. This was because computer terminals were designed for secre-

taries who were already familiar with typewriters.

Besides, if there's any validity to the next point, the further away the video screen, the better I feel.

5. Radiation. *All* TV screens, including the one in your bedroom and the one in your living room, give off radiation. The electron gun shoots electrons, "radiating" the phosphor until it glows. Some of this radiation leaks out.

How much leaks out is not known. How much is safe to be exposed to is not known. What the effects of this are over time are not known.



"But how can you be sure there's no danger from radiation?"

A few things are known:

A. The farther you are from the video screen the less radiation you are exposed to. Radiation levels drop quickly with distance. A few inches from a video screen, a measurable amount of radiation is given off; several feet away, the amount is no longer measurable.

B. Color monitors give off more radiation — as much as five times more — than monochrome.

C. Radiation is not good for you.

I remember looking at a sign in front of a building on my first trip to Los Angeles in the early 1970s. It said,

"UCLA CENTER FOR UNCLEAR MEDICINE."

I thought, only in Southern California would a medical center admit that there were any areas of medicine that were unclear; and to put it on a sign, and to devote a whole center to it — well, I was impressed.

A friend had to point out to me that the sign read UCLA CENTER FOR NUCLEAR MEDICINE. Since that time, I have been unable to look at the word NUCLEAR without seeing the word UNCLEAR.

The reports that have surfaced over the past ten years have only made it more unclear. Atomic bombs, meltdowns, nuclear energy, annihilation — did this perplexing subject have to pop out of Pandora's Box *on television*, too? Do we have to face major moral, social, and medical issues every time we turn on the TV or switch on the computer? I mean, can't they leave us *SCTV* and Space Invaders? Is nothing sacred?

A polling of the scientific community only heightens the dilemma. Some say radiation from video screens causes cataracts, miscarriages, leukemia, and arthritis, especially in the fingers because, on computers without detachable keyboards, the fingers are closest to the video screen for the longest periods of time.



"But I can't see any radiation."

Other scientists say that the chance a radioactive electron has of passing through the glass of a video screen is about the chance you or I would have of driving through Nevada with four feet of beachballs on the ground and a gallon of gas in the car. (I did not make that up. A nuclear scientist made that up. A man with credentials.) They say that even the sun gives off radioactivity, and that there is as much danger being exposed to daylight as there is to video light.

The more intricate the arguments, the more persuasive each side became. The only advice I could offer concerned computer users: use a monochrome video screen, and put it as far away from you as possible. (Yet another argument for the detachable keyboard.)

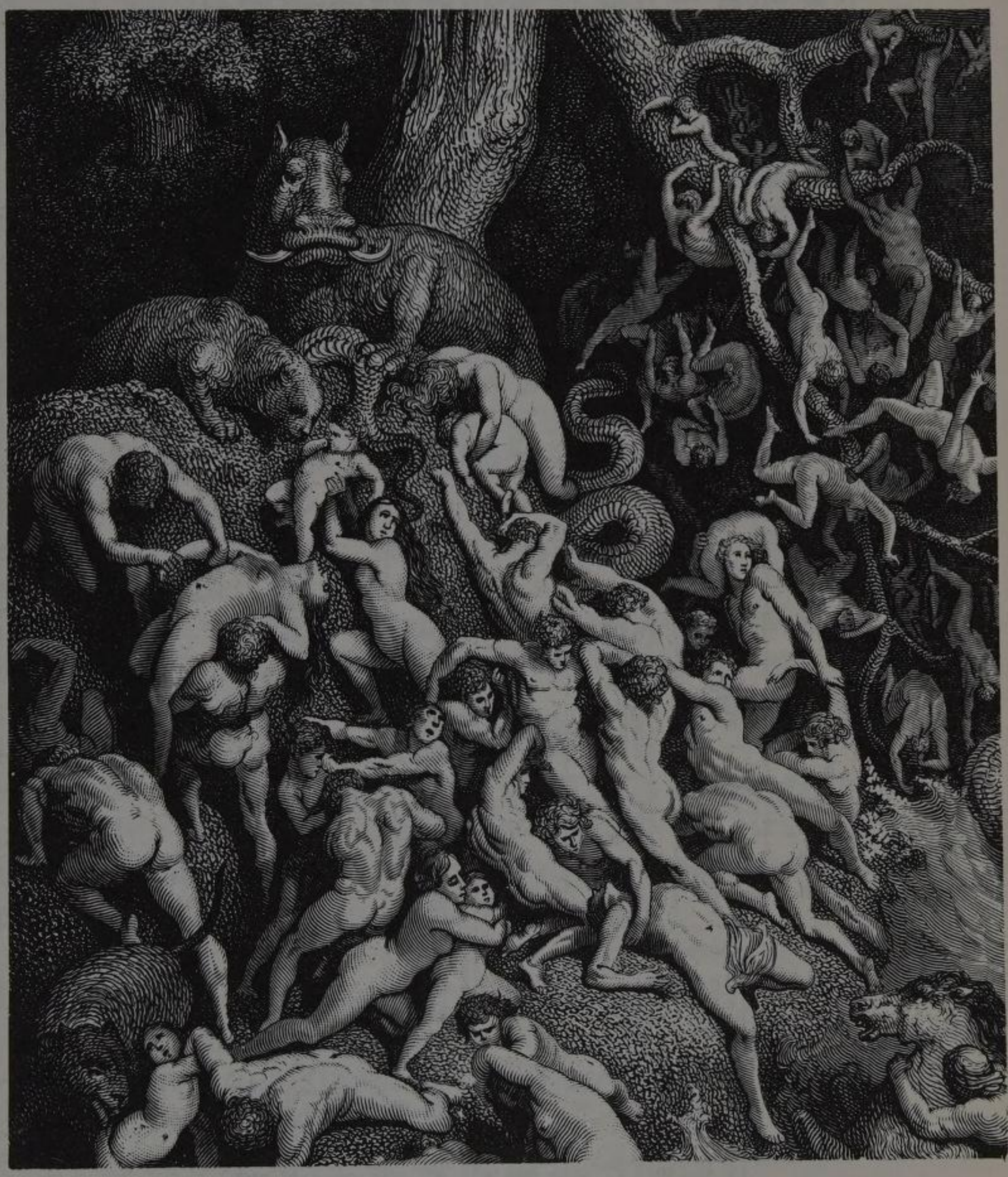
But then I wondered: should I be giving this advice at all? Maybe there's no danger to begin with. What's the point in scaring people? *The China Syndrome* was bad enough. No point in starting *The Computa Syndrome.* I was in the midst of deepening confusion when, suddenly, a solution appeared.

The Langley-St. Clair Company began marketing lead-impregnated acrylic screens that fit over regular video screens and block, according to Langley-St.Clair, 100% of all x-rays and most ultraviolet radiation. The acrylic, it turns out, was originally designed for windows in nuclear power plants.

I ordered one. It arrived, a sturdy piece of plastic, about a quarter of an inch thick; transparent, with a slight tint. It attached easily to my video screen with velcro tape. I felt safe from radiation, like Lex Luthor felt safe from Superman when wearing his Kryptonite-impregnated leisure suit. It was the magic shield of Gardol from my youth.

The only problem is that the acrylic screen reflects light almost like a mirror. Who wants to trade safety for annoying glare? (It's trade-off time again.) The Langley-St. Clair people have solved this by laminating anti-glare mesh onto their screen. The whole package costs around $120. Not a bad price for no glare, improved video screen contrast, and peace of mind.

Well, those are all the drawbacks I've discovered about personal computers, except for unknowledgeable salespeople, lack of product support, and manufacturers' arrogance and incompetence. But I'll discuss those in the chapters ahead. Besides, I never let those things stop me from having something I want. If I did, I wouldn't have a telephone.



A Periodic Table

																4 R RAIN	3 Tu TUBAS
																12 F FISH	11 E ELBOWS
36 Cr CROUTONS	35 Pa PASTE	34 I INK	33 Fe FEAR	32 An ANIMALS	31 Ri RICE	30 Da DACRON	29 Y YELLOW	28 Me ME	27 Yo YOU	26 Jo JOE	25 Rc PHOTOS	24 Rt RITA	23 Ck CRACKERS	22 Ju JUSTICE	21 Pd PUDDLES	20 Mu MUD	19 W WINKS
54 Ca CARS	53 Fb FLUG BUGS	52 St STOP SIGNS	51 Tv TVS	50 Mt MEAT	49 Ic ICONS	48 Ru RUGS	47 N NATO	46 Mr MARS	45 Dg DOGS	44 Cy CRAYONS	43 U UNDERWEAR	42 Po POOLS	41 Li LIPS	40 Cn CARTONS	39 Ev EVIL	38 Wh WEALTH	37 Bg PLUMS
86 Sl STEALTH	85 Ha HAWAII	84 Ar ART	83 Sc SCORPIO	82 Tr TAR	81 Lf LIFE	80 Go GOODIES	79 Co CONCRETE	78 Eg EGG NOG	77 Tk TALK	76 Ta TAPE	75 Lv LOVE	74 Le LEMONS	73 So SOAP	72 To TOGAS	57--71 NEAT STUFF	56 Gu GNUS	55 Ld LADLES
71 De DEATH	70 Mk MONKEYS	69 Id IDEAS	68 Sh SHOES	67 Lc THE DOG	66 Se SEX	65 Cu CRUD	64 Tu TRUST	63 Ct CATS	62 Bc BIG CATS	61 V VACUUM	60 Er ERROR	59 Im IMPS	58 Cc COCO	57 Lt LUTES	89--103 DUMB STUFF	88 Th THEM	87 Us US
103 Fr FROST	102 Su SUN	101 Mn MOON	100 Gm GUM	99 Cw COW	98 Ff FOO-FOO	97 Lg LUGNUTS	96 Cg CIGARS	95 Fd FIDO	94 Hi HICCUPS	93 Sy STANLEY	92 Ly LUCY	91 Wb WATER BALLOONS	90 Fg FIRST GRADE	89 Cd CANADA			

You can use T.K. Atherton's handy Periodic Table in selecting your personal computer.

Chapter Fifteen

Selecting a Personal Computer

Whenever I hear the words "selecting" or "choosing," I am reminded of a piece I read in *Daily Variety*. "Johnny Mathis 'coptered to his Irvine Meadows concert, but when the chopper refused to start-up after the show, Mathis chose to be driven home by car to L.A."

He *chose* to be driven home by car to L.A.? What, do you suppose, were his other choices? Riding a bicycle? Hitchhiking? Moving to Irvine Meadows?

If you are in the market for a personal computer and you only have $100 to spend, your choices are about as narrow as Mr. Mathis's. If you have $300-$400 to spend, your choices broaden. If you have several thousand to spend—or, rather, invest—the selection, and selecting, can be almost staggering.

My first piece of advice is, don't take it all that seriously. If you buy a personal computer now, and you like it, chances are* you'll be buying another one within the next few years. Most gourmet cooks are on their second or third Cuisinart. You may not like hearing this, just as car buyers in the early 1900s on the verge of buying their first car would not like to have been told that they would own ten or fifteen more cars during their lifetimes...but most of them did.

Still, you should choose your first personal computer carefully. Your first experiences with your first computer will invariably color your views of personal computers and computing for some time.

There are three factors to be considered when buying a personal computer:

1. What you want to use the computer for.
2. How quickly you want to do that on a computer.
3. Your budget.

Let's look at each of these points individually.

1. What you want to use the computer for. Before you go looking at computers, have a good idea of what you want to use the computer for. If you want to do word

*One of my favorite songs, Johnny. Honest.

processing, for example, your need for graphics will be small. Some people go into a computer store, are dazzled by the graphics display of a given computer, buy the machine, and are disappointed when they try to use it for word processing. It still does those great graphics, but you can't *draw* the Great American Novel.

The reverse is true as well. Some machines display and process text and numbers very well, and many of these machines are good values, but the graphics they display are primitive. If you need a computer primarily for pie charts and architectural renderings, you'll wind up using a T-square and compass more often than you'd like.

Computers are sometimes demonstrated like those Ronco commercials on television: they show everything the gadget does remarkably well. It does whatever it does so well, in fact, that most people don't stop to think, "Do I really need to get this done?" I don't care *how* well the Popeil Pocket Fisherman catches fish, I catch my fish at the supermarket. I don't care if the VegaMatic makes mounds of sliced radishes in just seconds; I wouldn't go through a mound of sliced radishes in a year. And then there's the Popeil Pocket Radishman, which I have no need for whatsoever.

If someone shows you a computer that does something amazingly well, admire the technology, but make sure the computer also does what you really need it to do.

Computers tend to be better at either games and graphics or at letters and numbers. This is becoming less true all the time, and many computers today do both well, but if you look closely, you can often tell if a given computer really has a heart of text or a heart of graphics.

The graphics group of computers can trace their ancestry back to the crude video games of the early 1970s. (Remember PONG?) They grew into computers aimed at the average American consumer, and this usually meant careful attention to color graphics. Even when characters were later added, the characters had to be in color. (Most people had just gotten a color TV. *Nobody* wanted to go back to black and white.)

The other group of companies manufacturing

computers once made the monoliths of the 1950s and early 1960s. It was a major breakthrough when a business no longer needed a climatically controlled computer room. By the time a big computer was small enough to fit into an ordinary *closet*, well, that was something. To a business, the mere fact that data could be displayed on a *screen*—any screen—and not require a teletypewriter printout, was more than enough. Color? Who needs color? When the color green came to office video screens, that was plenty.

So the home/game computer continued to grow, and the mainframe/business computer continued to shrink, and today they're both getting close to the same size, and that size is recognizable as the personal computer.

It's an eventful time, like the driving of the golden spike that connected the railroads of the East and West. As with the Transcontinental Railroad, one group of computer manufacturers (the home/game group) began in the West and another group of computer manufacturers (the mainframe/business group) began in the East, and they're coming together in size and philosophy somewhere out there in the Midwest, each hoping to capture the heartland of America.

There's no *reason* it started on both coasts and moved in. It could have, like broadcasting, started in the middle and moved out. (Network radio started in Chicago, and eventually moved to New York and L.A.) But moving in it is, and has, and if you're going to be selecting a personal computer in the next, say, year or so—prior to the Japanese invasion (known affectionately among American computer manufacturers as "Pearl Harbor II")—it's good to keep these origins, and their differences, in mind.

So, if you want to use your personal computer to play graphic games, balance your checkbook in full color, and teach a young child the alphabet, you are in luck—there are several fine computers that do all of these well.

Or, if you want a computer for word processing, accounting, and displaying up-to-the-fifteen-minutes-ago stock market prices, you, too, are in luck—there are many fine computers that do these things as well.

If, however, you want to play full-color graphic

games *and* process words, or do full-scale accounting *and* teach a young child the alphabet, you will have to select your computer more carefully and either (a) make compromises, or (b) spend more money.

2. How quickly do you want to do that on a computer? The world of personal computing is changing so rapidly that, every day you wait, the personal computer you eventually buy will do more and/or cost less.

This has always been true of technology. Light bulbs, when they were first introduced, cost a dollar. That was back when people were making about ten cents an hour. Although light bulbs are a dollar again, people make more than ten cents an hour.

It's how badly you want the new technology, and how much it will do for you, that determines if you should buy now or save later.

In 1975, I bought one of the first video recorders offered for the home market, a Betamax. Each tape recorded for an hour. The timer turned the machine on and off, once, in any 24-hour period. It cost about $1,000.

In 1976, I bought a Betamax II. This recorded for two hours, allowing me to record entire movies while away from home. The timer, still, turned on and off once during any 24-hour cycle. It cost about $1,000.

In 1980, I bought a Betamax III. It recorded for up to five hours. I could set the timer to record four different programs on four different channels over a fourteen-day period. It had a remote control switch that allowed for fast forward (no more commercials), rewind (instant replays), slow motion, and freeze frame. It cost about $1,000.

In 1984, I bought a Beta Hi-Fi. It has all of the above features, plus wireless remote control, the ability to record an unlimited number of programs over a two week period, and the finest sound this side of digital disks. The cost? Oh, about $1,000.

And so it has been and will continue to be with personal computers. If someone were to ask me about my early purchase of a video recorder, "Now don't you wish you waited?" I would reply with an unconditional "No." I feel I got a thousand dollars' worth of use out of the first

Betamax, and certainly more than a thousand dollars' worth of use out of the second, third and fourth.

But that's me. I use it a lot and enjoy it a lot, and I do not feel that $4,000 for the past ten years' worth of use is unreasonable. But some people watch just one program a week. It would be hard to justify the expenditure of even $200 for a video machine—unless that one program was very important.

I cannot, just because I happen to love and adore my personal computer, recommend that you run out and buy one of your own. I use mine every day. You might not.

I gave my mother my first two Betamaxes and, in the past seven years, I doubt if she's used them twenty times. I gave her a phone answering machine. It seems to make a nice telephone stand, but it seldom gets turned on. If I were to give my mother a personal computer, it might be used as a nightlight, but that's about all. My mother has no real need for personal computers. Pizza, yes. Personal computers, no.

My brother, on the other hand, is, like me, a writer. He spent three years writing stories on the computer at the newspaper where he worked. Now that he's moved to the Big Apple, he uses a computer to process his words. It's invaluable to him.

If you have a specific need for a computer, but are waiting for prices to drop, buy the computer now. What you get from the computer as it fills your need will more than balance whatever saving you may gain by waiting. If you don't have a need for a computer, you can get it sooner or later, and it won't make much difference.

3. Your budget. Personal computers range from $100 to $5,000. That's quite a range; and there's quite a range of features within that range. Which computer to get—or to get a computer at all—will depend to a certain degree on what you have to spend.

Personal computers, like cars, offer everything from transportation specials to limousines.

Before purchasing a personal computer, many people try to figure out which computer manufacturer will be in business five or ten years from now. These might be

the same people who bought a DuMont television back in the early fifties.

I wouldn't spend a great deal of time wondering about that. Nobody knows. Here, for example, are some of the cars that were on the market in 1927: Ajax, Auburn, Buick, Cadillac, Chandler, Chevrolet, Chrysler, Cleveland, Dodge, Durant, Erskine, Essex, Flint, Ford, Gardner, Gray, Hudson, Hupmobile, Jewett, Jordan, La Salle, Locomobile Jr. 8, Maxwell, Moon, Nash, Oakland, Oldsmobile, Overland, Packard, Paige, Peerless, Pontiac, Reo, Rickenbacker, Star, Studebaker, Velie, Willys-Knight, and the ever-popular Whippet-Overland.

Do you think you could have selected one of the eight cars from this list that would still be manufactured 55 years later? And, if you could have, would it have made any difference?

The gold rush is on, and California is again its focal point; only this time it's not Sutter's Mill but Silicon Valley that draws the prospectors. "Computers or Bust!" More than one company has staked its corporate stick on some aspect or other of the microprocessing world.

There will be an alarming increase of computers and computer companies, followed by a leveling off, followed by a winnowing out. There will be bankruptcies, buy-outs, and mergers.

So, don't pick a computer based upon how long you think the company might last. The list of computers changes monthly— certainly yearly—and ten years from now we will all laugh at the funny-sounding computer names, and the old timers among us will tell tales of how they once knew somebody who actually owned one.

And expect the Japanese to be here soon, in great numbers, offering the same quality at low prices that they have already brought to automobiles, electronics, cameras, and even steel.

Let's look at the basic component parts of the personal computer from a buyer's point of view.

Microprocessors

Microprocessors come in 8-bit, 16-bit, 32-bit and, sooner or later, in 64-bit, 128-bit and 256-bit. In general, and I repeat, *in general*, the more bits, the more powerful the computer.

A 16-bit microprocessor has more power than an 8-bit microprocessor, but the implementation of the processor might make the computer using an 8-bit processor more powerful than the computer using a 16-bit processor. But you must ask yourself: Do you really *need* more power.

People often brag about how much *faster* one processor is than another. This may be true, but all things are relative. Say processor A is four times faster than processor B. A function that would take a quarter-second on processor A would take a whole second on processor B.

Let's suppose you perform this function twice a day. At the end of the day, using processor A over processor B would save you one-and-one-half seconds. If, however, you perform this function ten times a minute, processor A would save you not just time, but also your sanity.

All things being equal, why not get processor A? Well, all things are seldom equal, and for processor A you'll probably have to pay a bit more, or give up a feature, or something. You'll have to decide.

What I'm saying is that faster is not necessarily better. Does it matter if the top speed of your family car is 120 or 240 mph? How well it handles at 40 is far more important than its ultimate speed.

Salespeople will say, in hushed tones, "It has a *sixteen bit* processor," as though sixteen were intrinsically better than eight, or thirty-two were always better than sixteen. It's not. The right price/performance ratio for you might well be an 8-bit machine, just as a four-cylinder car might be all you need, or a nineteen-inch television more than sufficient.

Look at the machine and how it does the sort of things you need it to do. Some automobile manufacturers

do more with four cylinders than others do with six. How a computer *drives* is important, not what the manufacturer uses to drive it with.

Operating Systems

"Operating system" is a shortened version of **Disk Operating System**, also known as **DOS**.

A disk operating system simply tells the computer how to store information on the disk, and how to retrieve stored information from the disk. For the most part, the operating system is transparent to the user. The user is involved with running a specific program, and the computer runs the DOS to let the computer know how to interact with the disk drives.

If you take the computer-is-like-the-phonograph-and-the-program-is-like-the-record analogy from an earlier chapter, you can look at the operating system as the *kind* of record being played (78, 45, 33), and the specific program (word processing, accounting, spreadsheeting) as the *contents* of the record (Beethoven, Bowie, Draper).

It is only important to know about record formats when you buy a phonograph and when you buy recordings. To purchase a phonograph that only plays 78s might have been a good investment forty years ago, but it wouldn't make much sense today. Almost all records are either 33s or 45s, and you purchase a phonograph accordingly. When you're actually playing a song, it's impossible to tell if it's coming from a 45 or a 33.

The disk operating system on a computer is very much the same. Once you are running a program, you would be hard-pressed to tell which operating system you were using.

The choice, however, of operating system for personal computers is far more complicated than the choice of which phonograph to buy. In terms of operating systems for 8-bit machines, there's CP/M, and then there's everything else.

Apple has its own operating system, Radio Shack has its own operating system, Commodore has its own operating system, and so on. Selecting an operating system

is not like choosing between 78s and 33s; it's like choosing between records, cassettes, 8-tracks, video disks, video tapes, microcassettes, laser disks and all the other possible methods of playing back recordings.

For some, the choice is made because of the programs available in a specific format. If you like the software offered for Apple, you must get the Apple operating system. The programs in TRSDOS (Tandy Radio Shack Disk Operating System) will not run on anything but a machine operating under TRSDOS.

For others, the choice will be based upon the machine. If you really *like* Commodore, then you use the Commodore operating system and choose your programs from the library of Commodore software.

Then there are the 16-bit machines. The hands-down standard there is MS-DOS, which is the same as IBM-DOS. Because IBM chose MS/IBM-DOS as the operating system for its 16-bit personal computer, it became the standard.

Disk Drives

Disks come in two sizes: 5¼-inch and 8-inch. (Although Sony is marketing a 3½-inch disk. Stay tuned. Film at eleven.)

5¼-inch drives are the most popular in the world of personal computing. A 5¼-inch disk can hold from 72K to 3,400K of information, depending on the computer. (K stands for kilobyte, or 1,024 characters. A double-spaced, typewritten page holds about 2K. To roughly figure disk capacity in pages, divide the number of K by two. 72K equals approximately 36 pages, 3,400K equals about 1,700 pages, and so on.)

The amount of disk capacity you'll need will depend upon the kind of programs you'll be running. Some programs, such as accounting, require large disk capacity, and may necessitate a hard disk. For most other business applications, 150K per drive should be considered a minimum.

The question then arises: Should I get one disk drive or two? For almost any business application, two is

necessary. The need to make back-up copies of disks is crucial and, although copies of disks can be made on one-drive machines, it's much easier and faster with two drives.

For home use—storing BASIC programs and playing games—one drive of about 100K should suffice. Drives cost upwards of $300, and most homes could find better places to spend the cost of a second drive. One disk drive is recommended, however. Cassette tapes, as a medium for storing computer information, are slow, limited, and prone to error. Disks, by comparison, are fast, sure, and reliable. (All things, once again, being relative.)

Now, are you ready for some more confusion? Almost every manufacturer of personal computers has its own *format* for storing information on disks. This is not the same as the disk operating system, which tells the computer how to get at that information. The disk format is the way the information is stored physically on the disk by the disk drive. (I warned you it got more confusing.)

Returning to our phonograph analogy (talk about wearing out a record), let's say that the disk operating systems were 78s, 33s, and 45s. One record manufacturer may, for example, start the groove near the spindle, so that records play from the inside out. Another manufacturer may start the groove in the middle, play to the end, pick up the arm, go to the beginning, and play to the middle.

And so it is with disk formats: everybody's got a different one. So, even if a program were written onto a disk using the CP/M disk operating system, it would probably not be compatible with any other computer, even if that computer were designed to run CP/M. A disk made on a NorthStar could not run on a TeleVideo or a Morrow—even though all three machines use 5¼-inch disks and can run CP/M.

Why this floppy disk Tower of Babel I will never know. There has been some talk about finding a standard for 5¼-inch disks, although it's still just talk. There is a standard for 8-inch disks, however—the IBM standard. (IBM invented floppy disks, but were, at the time, primarily interested in the 8-inch format. The 5¼-inch

format fell into the hands of several microcomputer manufacturers simultaneously, and they each developed incompatible systems. Maybe it's all continuing today out of some sense of *tradition*.)

There are ways of transferring disks from one machine's format to another, provided they are written in the same operating system. This can be done by some computer stores and costs about $20 per disk. There are also programs (such as UNIFORM), that allow the second drive of a computer to read and write information in a variety of formats.

Keyboards

Membrane keyboards should be eliminated unless (a) money is tight or (b) you almost never plan to use the keyboard or (c) it will be used by a small child eating an ice cream cone near a swimming pool.

If, however, you want to do programming, typing, budgeting, or any other tasks requiring more than a flirting pass at the keyboard, avoid membrane keyboards.

When we examine keyboards that have movable keys, we find two different kinds: the cheaper-feeling keyboards and the more expensive-feeling keyboards. Cheaper keyboards feel, well, cheap. You get the sense that the keyboard design was not of primary concern to the designers of the computer, and it's clear that no one walked around saying, "Money is no object!" when it came time to manufacture.

Other computer keyboards have a firm, solid feel to them. They were obviously designed for people who would spend a great deal of time working at a keyboard—writers, secretaries, accountants.

If you do little with your keyboard—use it to communicate with a data bank or record personal bank balances—the keyboard is not a major concern. If you plan to do some work at your keyboard—writing, accounting, even programming—select your keyboard as you would a spouse: you'll be spending a lot of intimate time together.

If you plan to do accounting on a personal computer, a numeric keypad is a must. This is a square of keys to the

right of the regular keyboard that allows one to enter numbers quickly and easily.

For a variety of reasons given in the last chapter and next chapter, a detachable keyboard is important if you plan to spend much time in front of your computer.

Mice

For the life of me, I don't know if the plural of the mouse used in computing is "mouses" or "mice." I'll use mice, but I'm taking a chance.

The mouse is a little box with a button (or two buttons or three buttons) on it. The mouse is connected to the computer with a thin cord, vaguely resembling a mouse's tail; hence, I suppose, the name mouse.

When you move the mouse around on a desktop, an arrow on the video screen moves, too. The button (or buttons) does (or do) a variety of things, depending upon where the arrow is pointing.

Some people think mice are the greatest thing since canned bananas. I'm not so sure. Personally, I prefer cursor movement keys. With a cursor, the screen is divided into a finite number of squares—a grid, made up of the number of lines on the screen, and the number of characters on each line. There's a comfort in knowing that the cursor is either in the right square or it's not.

On a mouse-driven screen, the arrow has an almost infinite number of places to point. Infinity is very nice, but mostly in the study of Eastern religions.

I also like cursor movement keys. Hit a key once, and the cursor moves into the next square (either up, down, left or right.) Hold a key down, and the cursor zips along, but always landing on a square. That square is fillable with precisely one letter, number, or punctuation mark. Ah, security.

A mouse requires about a square foot of empty desk space somewhere near the computer. Do *you* have an empty square foot of space on *your* desk. I don't. Flat surfaces tend to gather paper, books, or dirty dishes. At least *my* flat surfaces do.

Mice make sense for graphics (it's hard to draw a

circle with cursor movement keys), although I suppose a well-implemented light pen would work even better. With a light pen, you touch the area you're drawing on. With a mouse, you must manipulate on a horizontal surface what then appears on a vertical surface.

But, the mouse might prove to be very popular, and a number of good programs will then be written that will require the use of a rodent, and so be it. I am resigned to using one if I must, but if not, I'll remain a traditionalist.

Video Display

Personal computers use two kinds of video display: **monitors** and **TV sets**.

Some computers use a device known as an RF generator to broadcast a signal to your TV. This little generator costs about $5. When you consider the millions spent on equipment by TV stations to get a sharp, clear picture into your home, you can imagine the quality of the picture produced for $5. It's OK, but not great.

Monitors, on the other hand, plug directly into the computer. They produce sharper images than do RF-generated TV pictures.

Be careful when you look at computers that use your TV set for the picture display. Often these computers are demonstrated using color monitors, not ordinary TV sets with RF generators. Many people have been disappointed by the images on their TV set once they got the computer home.

Another thing to be aware of is the penny-wise-pound-foolish possibility in using your home TV. It seems logical to assume that, since one already has a TV, one might as well use it for a display. This is true—if you live alone.

What some people fail to consider is that the TV cannot be used for anything else during Computertime and, contrary to the Atari ads, the entire family will not want to gather around the TV *every night* and play video games. Occasionally, someone's going to want to watch *Happy Days*, and the battle for the control of the set is on.

The typically American four-TV-four-person house-

hold need not worry about this. They might, however, worry about the sharpness of the images, and that is another matter.

To play games, images do not have to be sharp. If a spaceship is a little fuzzy or the line of a maze is a little out of focus, people don't seem to notice. It's the action and the color and the movement and the sound effects one is concerned with.

When working with words and numbers, however, the fuzziness on the screen can be annoying.

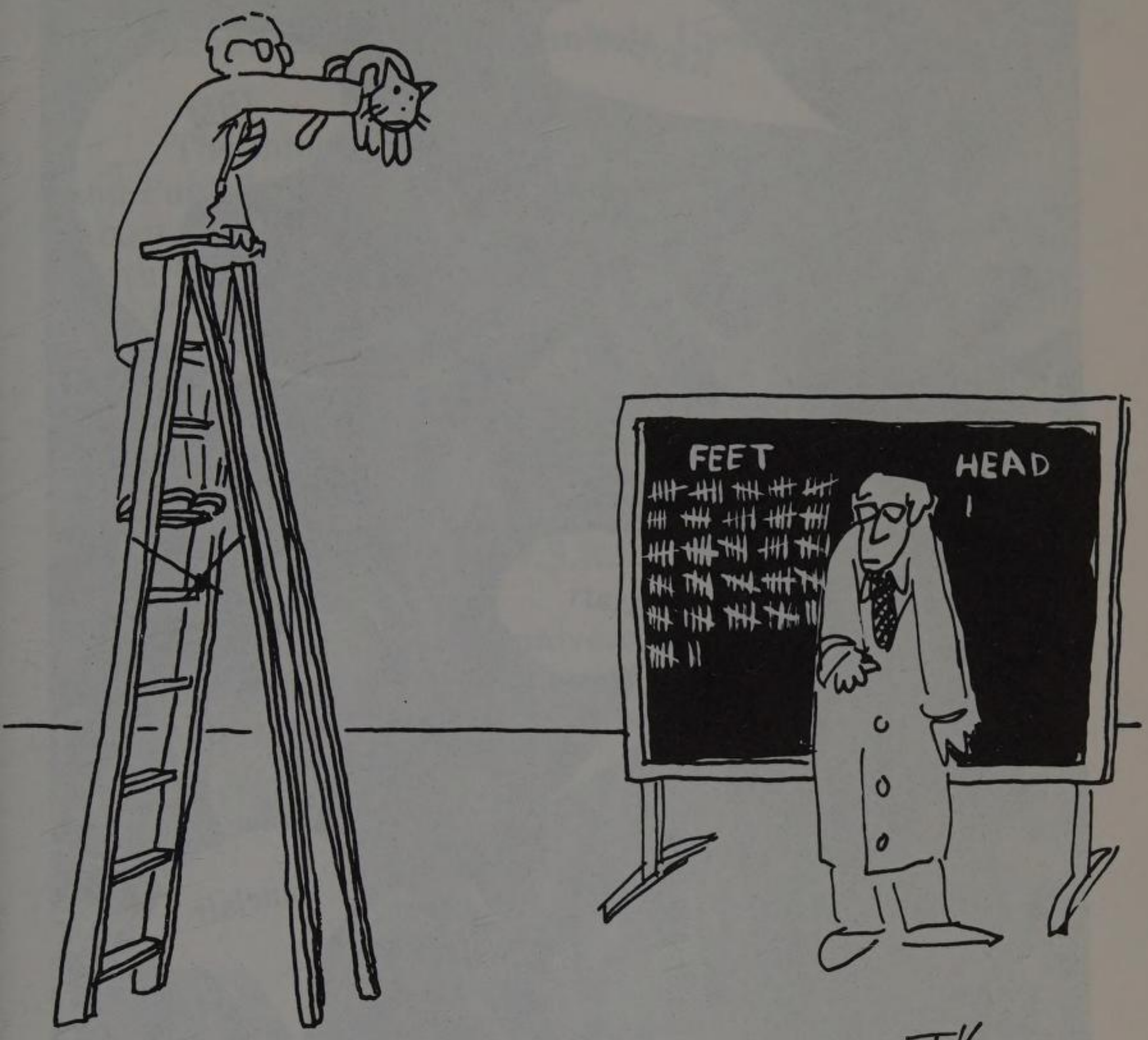
One may wind up investing in that $300 monochrome or $850 color monitor after all—only to discover that the computer they bought so that they could save money by hooking it up to the TV doesn't produce the greatest letters and numbers anyway.

Some computers display only 40 characters across the screen. This is known as a **40-column screen**. Some produce 65 characters per line (a 65-column screen), while others produce 80 (an 80-column screen). Forty-column screens are OK for, say, reading classified ads on The Source or programming in BASIC, but for any serious letter-writing or accounting, 65 columns should be considered a minimum, and 80 columns are highly recommended.

Some computers, too, do not display uppercase and lowercase characters, just uppercase. Unless one were doing nothing but sending telegrams, any sort of writing on the computer would require both.

As touched on in the previous chapter, monochrome displays are sharper than color displays. It is said that green phosphor is easier on the eyes than black and white.

In the next chapter we'll look at a few computers currently available; then we'll talk about making that great trek into the computer store and, finally, purchasing a personal computer.



As T.K. Atherton's drawing illustrates, a personal computer may or may not speed up scientific research.


Kaypro
IBM
Atari
Sinclair

Chapter Sixteen

A Brand Name Buying Guide

An Introduction to the Symbols Used in This Chapter

The International Association of Computer Reviewers and Publishers of Books and Magazines and Other Materials About Both Computer Hardware and Software Being Manufactured All Over the World at Such a Rapid Rate (I.A.C.R.P.B.M.O.M.A.B.C.H.S.B.M.A.O.W.S.R.R.), in their eternal search for brevity, have created a set of Universal Symbols for Computer Reviewers and Publishers of Books and Magazines and Other Materials About Both Computer Hardware and Software Being Manufactured All Over the World at Such a Rapid Rate (U.S.C.R.P.B.M.O.M.A.B.C.H.S.B.M.A.O.W.S.R.R.).

Computers speak a universal language, and it is only fair that those who must write about computers should have a library of Universal Symbols at their disposal.

Peter A McWilliams

Peter A McWilliams
De Facto President

I.A.C.R.P.B.M.O.M.A.B.C.H.S.B.M.A.O.W.S.R.R.



Double-sided disk drive



Computer will perform marriage ceremonies



Computer plays synthesized dance music



Suitable for a family



Suitable for a rather strange family



Suitable for a large family



Suitable for a hungry family



Large file capacity



Word processing capabilities



Sold door to doŏr by former encyclopedia salespersons



Sophisticated



Suitable for a couple



Suitable for a rather strange couple



Suitable for a couple who mess around



Suitable for a divorced couple



Suitable for a male chauvinist



Large memory



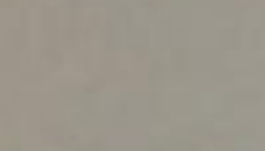
Small memory



Conforms to industry standards



Does not conform to industry standards



Apple



Pair (Two disk drives)



Palm (Made in California)



Peanut (Word processing program approved by Jimmy Carter)



Lemon



Turkey



Fishy



Multiplies fast



Stinks



May drive you to drink



For the birds



Portable



Semi-portable



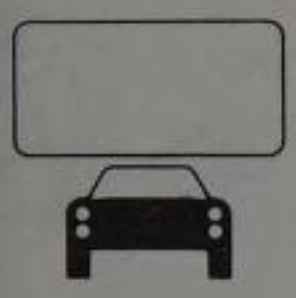
Normal size video screen



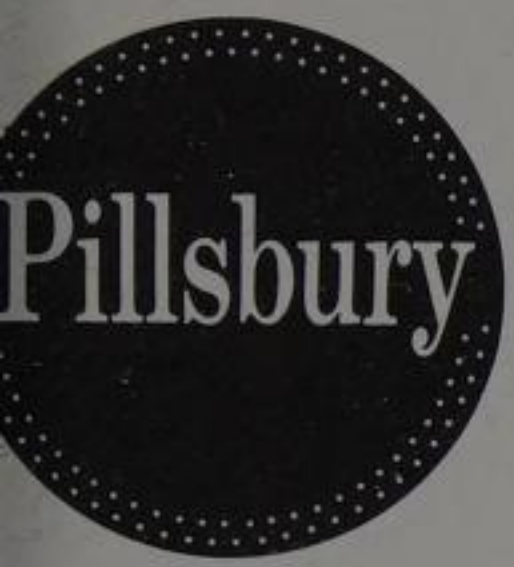
Small video screen



Large video screen



Very large video screen



Costs a lot of dough, boy



If you need to ask, you can't afford it



Build it yourself



Not designed for human beings



Electronic mail



Do whatever is necessary to get this computer



Confusing



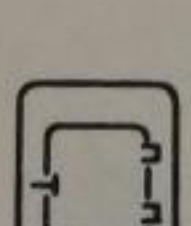
Gives off a lot of neat



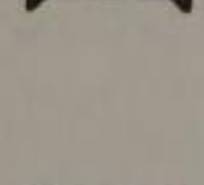
Save your money



Hot



Not so hot



Not hot at all



Video games available



Realistic video games



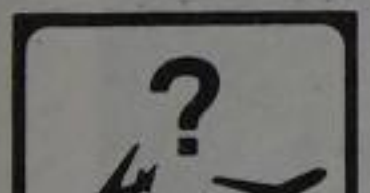
Trashy



May put you to sleep



May make you sick



Has no idea what times the planes arrive



Six out of seven people want this computer but can't afford it.



This chapter is incomplete and obsolete. Even as I write, computers are being introduced, and improvements are being made on personal computers already on the market.

When all makes and models are accounted for, there are something like 200 personal computers on the market. This does not include software, printers, or other peripherals.

To spend just one day with each of these computers would take me the better part of a year, and to devote but one page to each of them would take the better part of this book.

I am reminded of a *Ripley's Believe It or Not* item from my childhood. It said that if the population of China were to line up and march four abreast past a point, the line would never end. The rate of reproduction was faster than the number of people moving past the point. (I wondered, precocious youngster that I was, how they could reproduce that fast while standing in line.)

Reviewing computers, I fear, would have the same effect. By the time the 200 days were done, there would be another hundred computers to look at, and by the time I got through those, it would be time to start all over with revisions and improvements.

During all the days spent with these machines, of course, this book would not be in your hands. I postponed the publication of **The Word Processing Book** twelve times. Every week I heard about something new, and every week I thought, "I'd better investigate this—it's worth waiting a week if I can include it."

Three months later I had to draw the line. "What I know about word processing **today** will encompass the first edition of the book, and that's that."

And so it is with this Buying Guide. What I know about personal computers now is what's in this guide.

To make life easier, I've at last standardized, to some degree, the buying guides in all my books. The computer and printer sections are the same in **The Personal Computer Book, The Word Processing Book, The Personal Computer in Business Book,** and **Personal Computers and the Disabled.** The software and peripheral sections are individualized, fit to the needs of each book. That is, you'll find word processing software in **The Word Processing Book,** and software of a universal interest in this book, etc.

Please don't let me, or anyone, select a computer for you. Personal computers are, above all, personal. What one person likes, another person dislikes; what one person finds annoying, another person might not notice. Like buying a car, you'll have to "test drive" a number of computers before you can comfortably decide, "Yes, this is the one for me."

At best, I will place before you a computer or two that you may not have considered before.

One warning: these "reviews" are subjective and heavily biased. This chapter is nothing but my opinions and, just because they happen to be bound in a book, gives them no more credibility than anyone else's.

I have divided this section into several groups, arranged by types and needs. First, there are the home computers—computers that are under $1000 and are suited particularly for games, introductory programming, and home accounting needs. Next come lap-sized personal computers. These are machines that weigh under 10 pounds and are meant for business or word processing use on the road.

Then come the larger, slightly more expensive computers. Most of these are geared for people who have a more active need for computing—in business or word processing. I have divided these computers into three

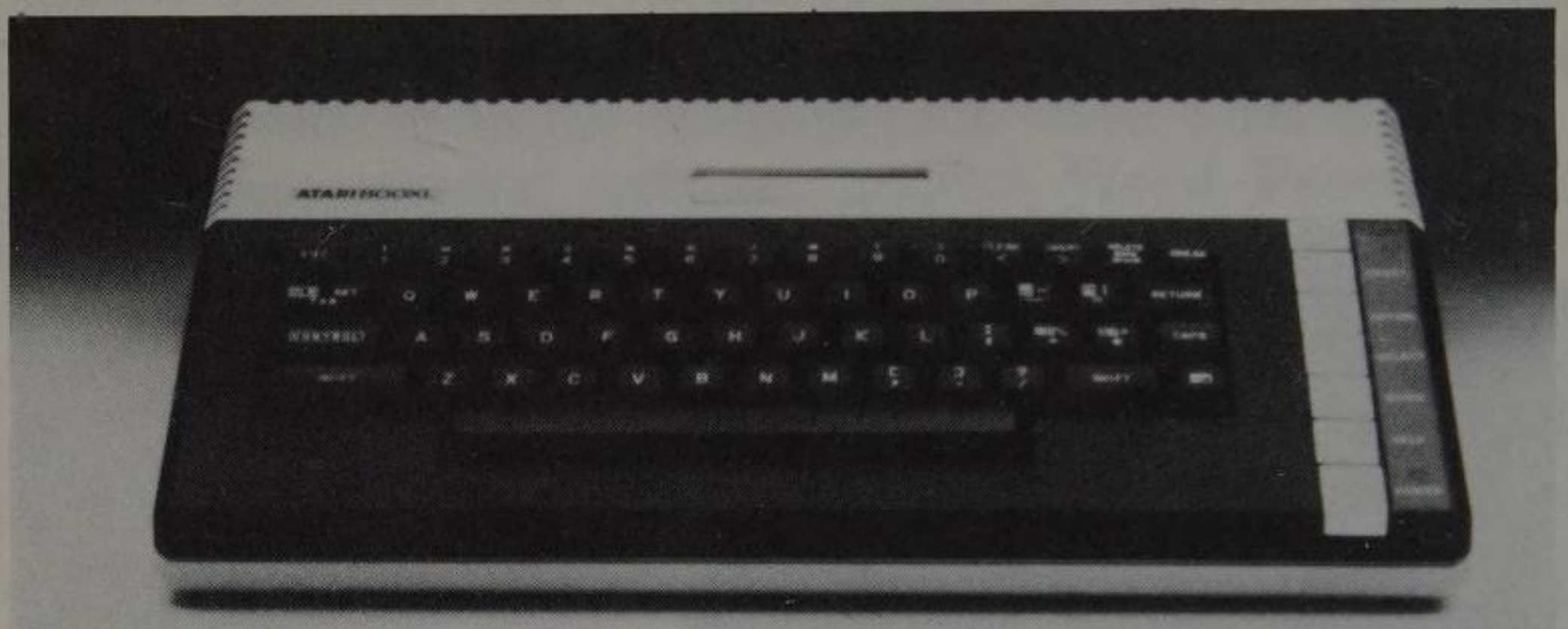
sections: IBM and IBM-compatible computers; Apple and Apple-compatible computers; and CP/M and other computers.

All the computers listed have two disk drives, 80-column screens with at least 24 lines on the screen, a numeric keypad on the keyboard, and separate cursor keys, unless otherwise noted.



Home Computers

Atari 800XL



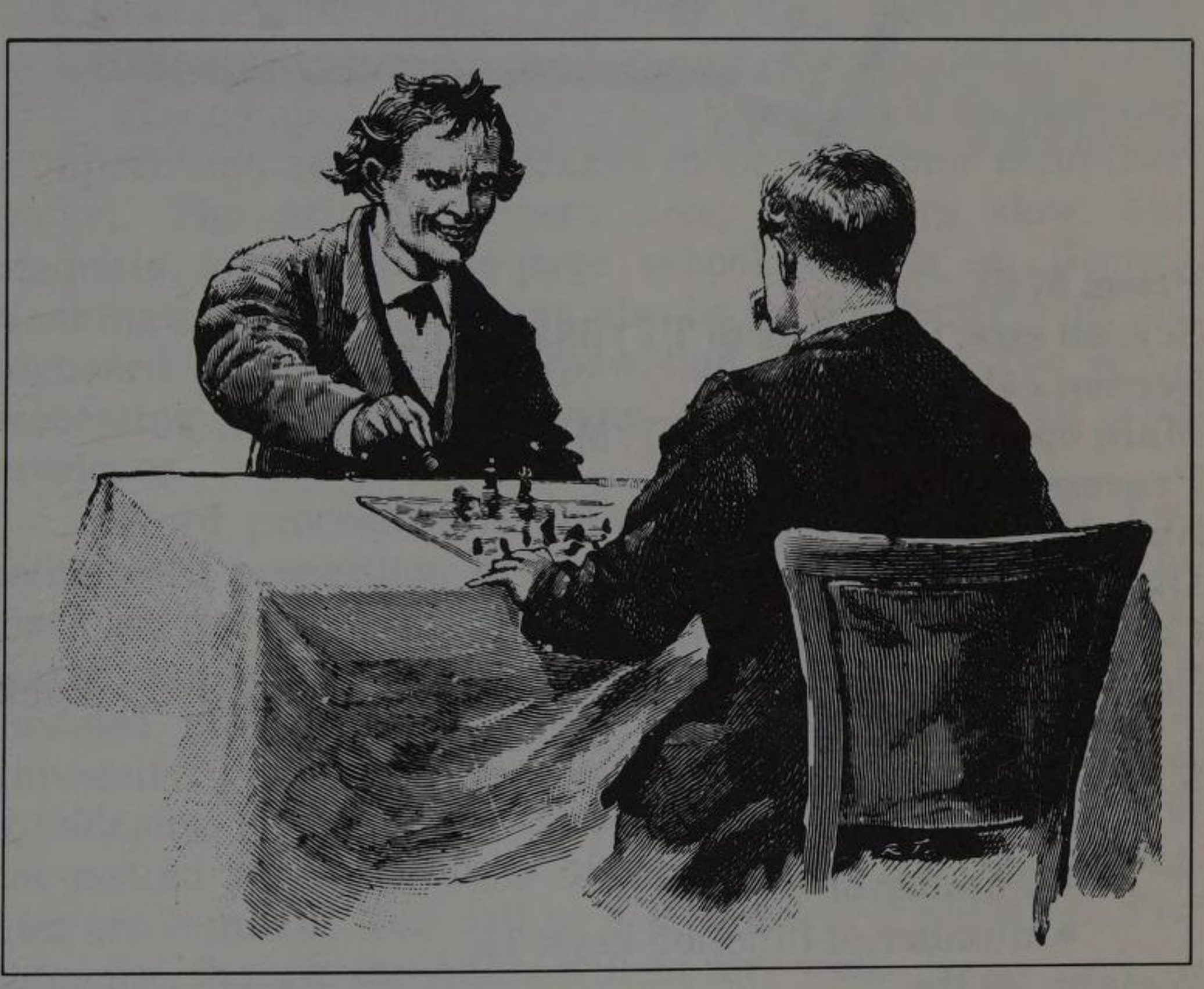
Price: $399 (no drives, no monitor)
Screen size: 40 characters x 24 lines
Screen color: color
Main operating system: Atari OS
Processor: 8-bit 6502C
Standard memory: 64K
Disk drive type: 5¼" (available for $450 each)
Capacity of formatted disks: 127K
Software included: BASIC, operating system
Keyboard:

- detachable? yes
- number of keys: 62
- number of function keys: 4

Weight: n/a

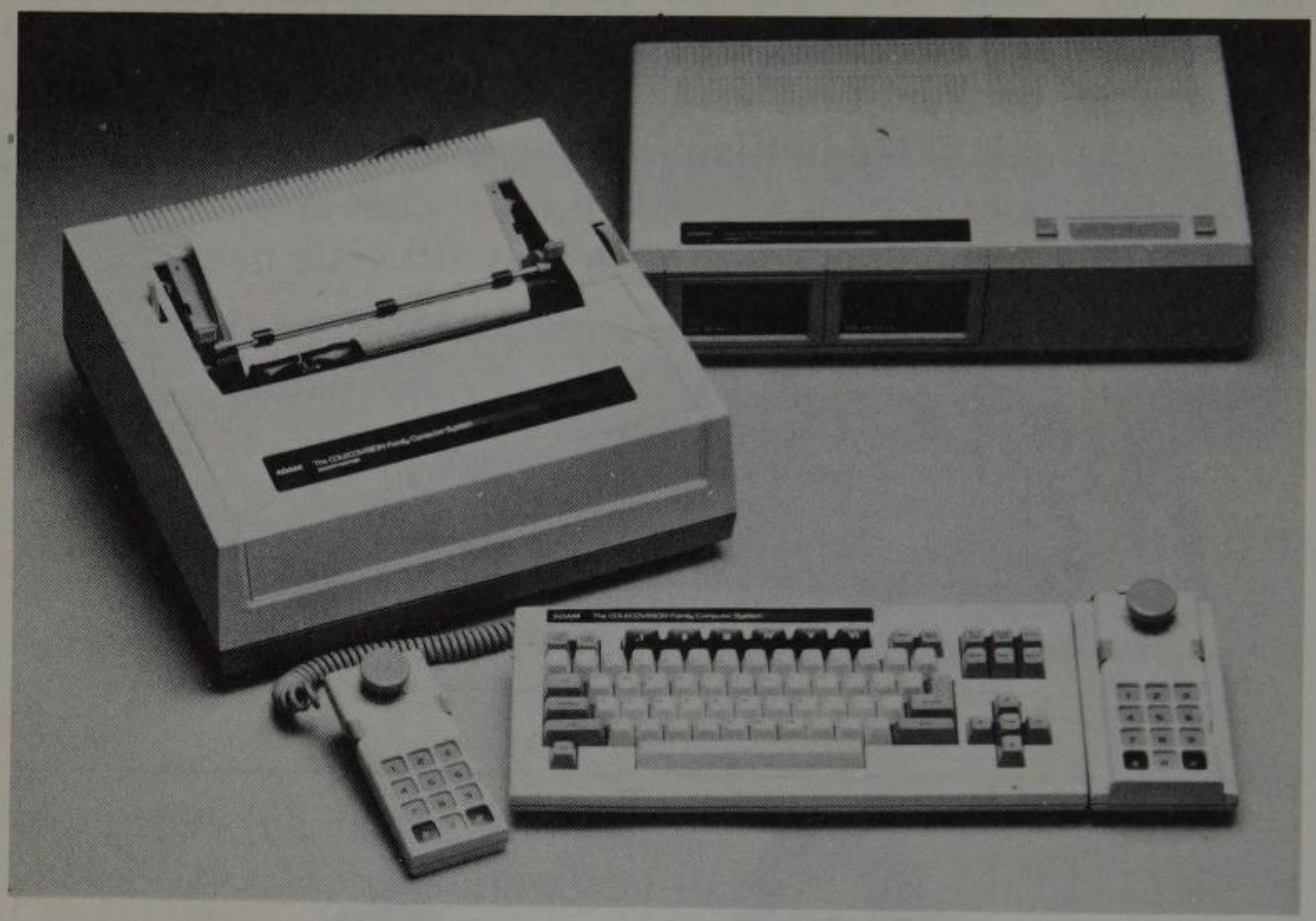
Comments: Atari dropped half its line of computers and now only sells the 600XL and the 800XL (until the 1450XLD is released). Neither are good for word processing or for business. They are home computers, geared as an introduction to computing. Atari's game cartridges are ever popular, and if games are your main interest in computing, the Ataris may fill your needs.

> And a smooth-faced Atari executive, in charge of the Home Consumer Division, tears his gaze away from his in-office video screen and game master control to grin, "I play about 20 to 30 hours a day. If I had my druthers, I'd probably play all day long."—*San Francisco Examiner & Chronicle.*



"Atari!"

Coleco Adam



Price: $749
Screen size: (connects to TV) 68 chars x 36 lines
Screen color: color
Main operating system: CP/M
Processor: 8-bit Z80A
Standard memory: 80K
Disk drive type: cassette
Capacity of formatted disks: 256K
Software included: SmartWriter, SmartBASIC, Buck Rodgers' Planet of Zoom
Keyboard:

- detachable? yes
- number of keys: 75
- number of function keys: 15

Weight: 39 lbs.
Other: A 2 cps letter-quality printer is included.

Comments: *In the beginning, Coleco made video games, with superior graphics, and an adapter to run Atari games, and Coleco saw what it had done, and it was good.*

And then Coleco said, "Let us make a home computer system in our own image, and let it run Coleco games as well as contain all the features that will compete with Commodore and Atari." And then Coleco saw what it had done, and called it Adam.

The Adam will easily fill the needs of a "family computer." It is very easy to get acquainted with, and your kids will be using it in no time at all—if they can pry it away from you.

It comes with a full-size keyboard with six function keys, ten command keys, and two ways of moving the cursor: using the cursor arrow keys, or using one of two Coleco game controllers (included). The controllers have joysticks for games and a built-in numeric keypad.

The inclusion of a letter quality daisy wheel printer is unprecedented in the package price of a home computer system. The printer is *very* noisy and *very* slow, but adequate for those five-page school reports on George Washington. The printer can also be used directly with the keyboard as an electric typewriter (bypassing the word processing program), allowing you to type labels and envelopes.

Word processing is built right into the system. For home word processing, it can do a lot: store files, highlight text, set variable margins, number pages automatically, search and replace—even do superscript and subscript. It's modeled after dedicated word processors. Recently at a university, I overheard graduate students in a writing class considering an Adam for their dissertations. The Adam is not geared for heavy duty or professional use where long files are common. You will be disappointed if you try it. For home use, though, the Adam will do very well.

The Adam plugs into your color television set. It provides only 68 columns. As with all computers using TVs as screens, the characters are never sharp (especially when they're rainbow colored). As a consolation, Adam lets you adjust the background to colors that might please you.

Like other "family" home computers, the audience for the Adam may eventually outgrow it; as youngsters become more sophisticated in their acquaintance with computers, the Adam may not be able to expand enough to meet their needs. But that's tomorrow. Today, this is a good buy.

These comments are based on the unit I used. It worked fine. The *Consumer Report* people, however, had problems with the ones they bought and according to *Time* magazine, quality defects have chilled sales and caused customers to return up to 30% of the computers. If this continues, I can't see the Adam being around much longer.





A Brand Name Buying Guide

Commodore VIC 20



Price: $99 (no drives, no monitor)
Screen size: (connects to TV set) 23 chars x 22 lines
Screen color: color
Main operating system: Commodore OS
Processor: 8-bit 6502
Standard memory: 5K
Disk drive type: 5¼" can be added
Capacity of formatted disks: 170K
Software included: operating system
Keyboard:

- detachable? yes
- number of keys: 66
- number of function keys: 4

Weight: 10 lbs.

Comments: Commodore markets two good small personal computers, the VIC 20 and the Commodore 64. The VIC 20 is my choice in the under $200 range.

Commodore 64



Price: $199 (no drives, no monitor)
Screen size: (connects to TV set) 40 chars x 25 lines
Screen color: color
Main operating system: Commodore OS
Processor: 8-bit 6510
Standard memory: 64K
Disk drive type: 5¼" (available at extra charge)
Capacity of formatted disks: 170K
Software included: operating system
Keyboard:

- detachable? yes
- number of keys: 66
- number of function keys: 4

Weight: 10 lbs.
Other: An all-in-one unit, called the Executive 64, has similar specifications, but comes with a 5" color monitor and one 170K disk drive, and weighs 28 lbs. Cost: $950.

Comments: The Commodore 64 is a very good hardware value (it seems to have almost every hardware feature of the Apple IIe at less than half the price). The Commodore 64 problem is one of software, a problem which extends, to a lesser extent, to the VIC 20. Neither computer should be considered for word processing or serious business computing. Time will tell how well-supported these Commodores will become. They are popular.



Main assembly room for the Commodore 64.

IBM PCjr



Price: $999 (one drive, no monitor)
Screen size: —
Screen color: —
Main operating system: MS-DOS
Processor: 16-bit 8088
Standard memory: 128K
Disk drive type: 5¼"
Capacity of formatted disks: 360K
Software included: none
Keyboard:

- detachable? yes
- number of keys: 61
- number of function keys: 0

Weight: 10 lbs.

Comments: Because IBM is IBM, all the software and peripheral manufacturers are figuring this is THE home computer, and they are going off and writing programs and making plug-in boards and, lo, with all that support, the PCjr *will* become THE home computer. It's a form of self-fulfilling prophecy. It will work. And no one other than IBM could pull it off.

The "Entry Model" comes with 64K of memory, two cartridge slots (for games programs, and whatever else the world dreams up), and a detachable keyboard.

The "Expanded Model," which the chart shows, has 128K of memory and a 360K disk drive. The idea behind the expanded memory and only one drive is this: The program is loaded into the memory and acts like an "A" drive. This disk drive stores the data people usually put in the "B" drive of a two-drive system. A bit more memory is cheaper than a second drive. For the home, it makes sense.

Offered accessories for the PCjr include a built-in modem ($199); a wonderful joystick ($40); a carrying case ($60—watch out Kaypro?); a cheap but terrible printer ($175); and an OK but expensive color printer ($1,999).

Both the Entry and Expanded Juniors are designed to use ordinary televisions for screen display (connector for TV: $30), although any number of houses will invest in the Ultimate PC Junior option: an IBM Color Monitor ("If you have to ask...")

The keyboard is something new. It looks like five rows of chicklets. No self-respecting middle-manager would want one on her desk. No secretary would want one on his desk. It has no numeric keypad. Obviously it's not made for business.

That aside, it's not bad to work with. I wouldn't want to write a novel on it, but a review or two would be no problem. In other words, for the kid's homework and the parent's letter to Abby, it'll do just fine. Also: unlike the PC Senior, the shift key is in the right place.

And the keyboard is THE most detachable around. There's not even a wire connecting it to the computer. It's all done by infra-red rays, just like science fiction movies (and remote control units for television). Like the ads for cordless phones, mom can take her computing by the pool without any wires getting in the way.

For a home computer—not a full-time business or word processing computer—the PCjr is definitely one to look at.

Sinclair QL



Price: $499 (announced price, without monitor)
Screen size: —
Screen color: —
Main operating system: Sinclair OS
Processor: 16/32-bit MC68000
Standard memory: 128K
Disk drive type: Sinclair wafer tapes
Capacity of formatted disks: 100K
Software included: word processing, spreadsheet, data base manager, and graphics
Keyboard:

- detachable? yes
- number of keys: 65
- number of function keys: 5

Weight: 3 lbs. (without monitor)

Comments: A short while ago, you may have heard of the Timex/Sinclair computers. You could get them just about everywhere: drug stores, department stores, hardware stores—almost every popular place where people congregated except computer stores. The price was right: $49. They became as popular as watches, and over 3 million were sold. And yet Timex/Sinclair exists no longer. The Timex people found Clive Sinclair's computers had an insufficient profit margin, so they dropped the line. Sinclair, an entrepreneur and Englander from the same cloth as Sir Freddie Laker, still ticks. He is offering his new computer by direct mail.

My mail box has not brought me one yet—at publication time, the Sinclair QLs had not yet reached these shores.

I like the idea of a powerful, portable computer using the same processor as the Apple Macintosh for under $700 (including a monitor). Today, however, success requires top-notch marketing, and with Timex out, that leaves a large dent in Sinclair's schemes. Even if the Sinclair QL becomes a wholloping success in Europe, without a distributor here, it means nothing. I seriously doubt many people would consider buying a computer by mail. Most folks fear computers as is, and buying one by mail would never be considered. To be popular, the computer must be in stores. Perhaps Sears or J.C. Penney will put their imprint on it. (I can see the ads now: A woman with a bouffant hairdo lovingly holds "The new Lady Kenmore Computer....")

Lap-Sized Computers

Epson Geneva/PX-8



Price: $995
Screen size: 80 characters x 8 lines
Screen color: LCD
Main operating system: CP/M
Processor: 8-bit
Standard memory: 64K
Disk drive type: microcassette
Capacity of formatted disks: 128K per microcassette
Software included: WordStar, spreadsheet program, electronic appointment book
Keyboard:

- detachable? —
- number of keys: 68
- number of function keys: 5

Weight: 4 lbs.

Comments: The name of this little wonder is, technically, the PX-8 and, generically, the Geneva. (There are any number of Japanese-Swiss jokes that come to mind, all of which I will spare you.)

The point that needs to be stressed in portable computers, I feel, is the weight. I once lugged a nine-pound portable around with me on a 20-city tour and sent it packing after the first five cities. Nine pounds is a lot of pounds. Four pounds is five pounds less than nine pounds, and four pounds is not bad. Maybe the Geneva will make it to city ten on the next tour.

The batteries last 50 hours on a charge. The programs are contained in interchangable memory units (the machine can hold two at a time), allowing all 64K to be used for data files.

Those familiar with WordStar will love this machine. It's a writer's portable paradise, or, as Hemingway might say, a moveable feast. Some of the WordStar features are missing from this condensed version—most notably the display of available documents in the no-file menu—but most of WordStar survives. The spreadsheet is more than adequate, and the scheduling program beeps to remind you of impending appointments.

There is no built-in modem. I'll take the microcassettes over a built-in modem, but that's my preference. An external modem is available, as is an external 3½ inch disk drive, and a light-weight dot matrix printer.

The Geneva is a CP/M-based computer. Data files can be transferred to an MS-DOS computer, but the Geneva will not run MS-DOS programs. Epson seems to be the last of the CP/M innovators.

The price/weight/performance combination of the Epson Geneva PX-8 make it my current choice in the battle of the portables, but the battle rages on.

Hewlett-Packard HP-110



Price: $2,995
Screen size: 80 characters x 16 lines
Screen color: LCD
Main operating system: MS-DOS
Processor:16-bit 8086
Standard memory: 272K
Disk drive type: external 5¼" drive optional ($800)
Capacity of formatted disks: 360K
Software included: MS-DOS, Lotus 123, MemoMaker
Keyboard:

- detachable? —
- number of keys: 76
- number of function keys: 8

Weight: 8.5 lbs.

Comments: The HP-110 is designed to be an exceptionally portable full-function computer, and in that regard, it does remarkably well. You type your work into the memory, and when the machine is off, the memory remains on (using very little battery power), retaining the software and your material. When you return to the office, you can connect the HP-110 to an HP-150, an IBM computer or IBM-compatible, and download or swap information. You can even use the other machine's disk drives.

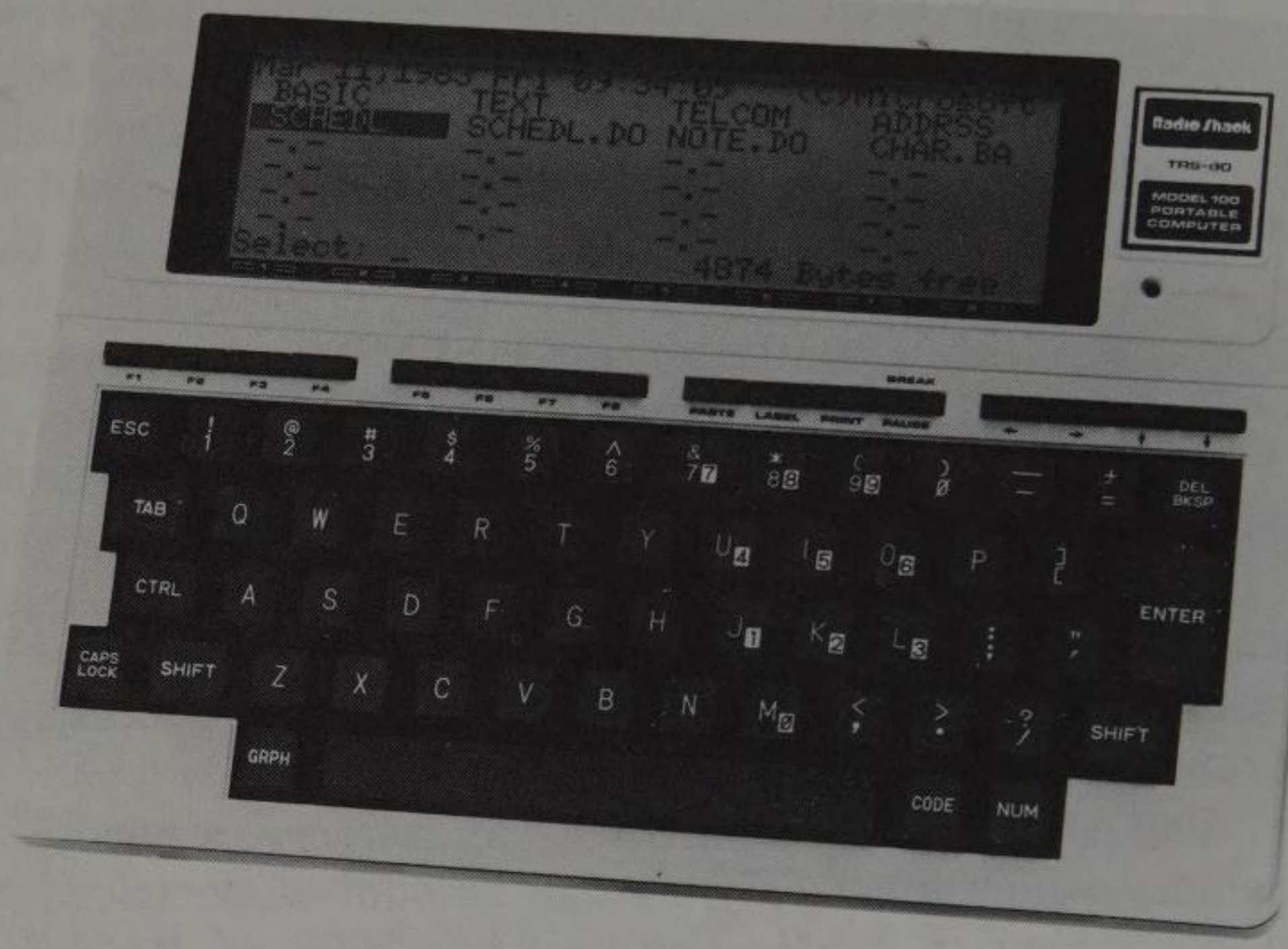
Because the HP-110 uses standard MS-DOS programs, you can run anything you could on a desk-top computer. I used WordStar, and WordStar had all the same capabilities it does in a large machine.

The HP-110 has a 80 character by 16 line liquid crystal display screen. While this is still eight lines short of the standard 24 lines, it is large enough for word processing or spreadsheets.

The computer uses CMOS RAM memory, a new type of memory which takes only a small amount of electricity to keep everything in RAM. The unit has 272K of RAM for ones work. The HP-110 comes with Lotus 123 and a simple word processor called MemoMaker. These programs are in ROM, so they take none of the RAM memory storage space.

The HP-110 comes with a built-in modem, allowing you to dump its memory into the office computer while you're on the road. The price is a bit high for a portable, but so is the technology.

Radio Shack Model 100



Price: $799
Screen size: 40 characters x 8 lines
Screen color: LCD
Main operating system: MS-BASIC
Processor: 8-bit 80C85 CMOS
Standard memory: 8K
Disk drive type: microcassette
Capacity of formatted disks: n/a
Software included: Text, Schedule, Addressbook, Telecommunications, and BASIC
Keyboard:

- detachable? —
- number of keys: 56
- number of function keys: 0

Weight: 4 lbs.
Other: Built-in auto-dial modem. A version with 24K of memory costs $999; 32K, $1,119. Also available is a disk-video interface for $799. It comes with one disk drive and a connection for a monitor or TV.

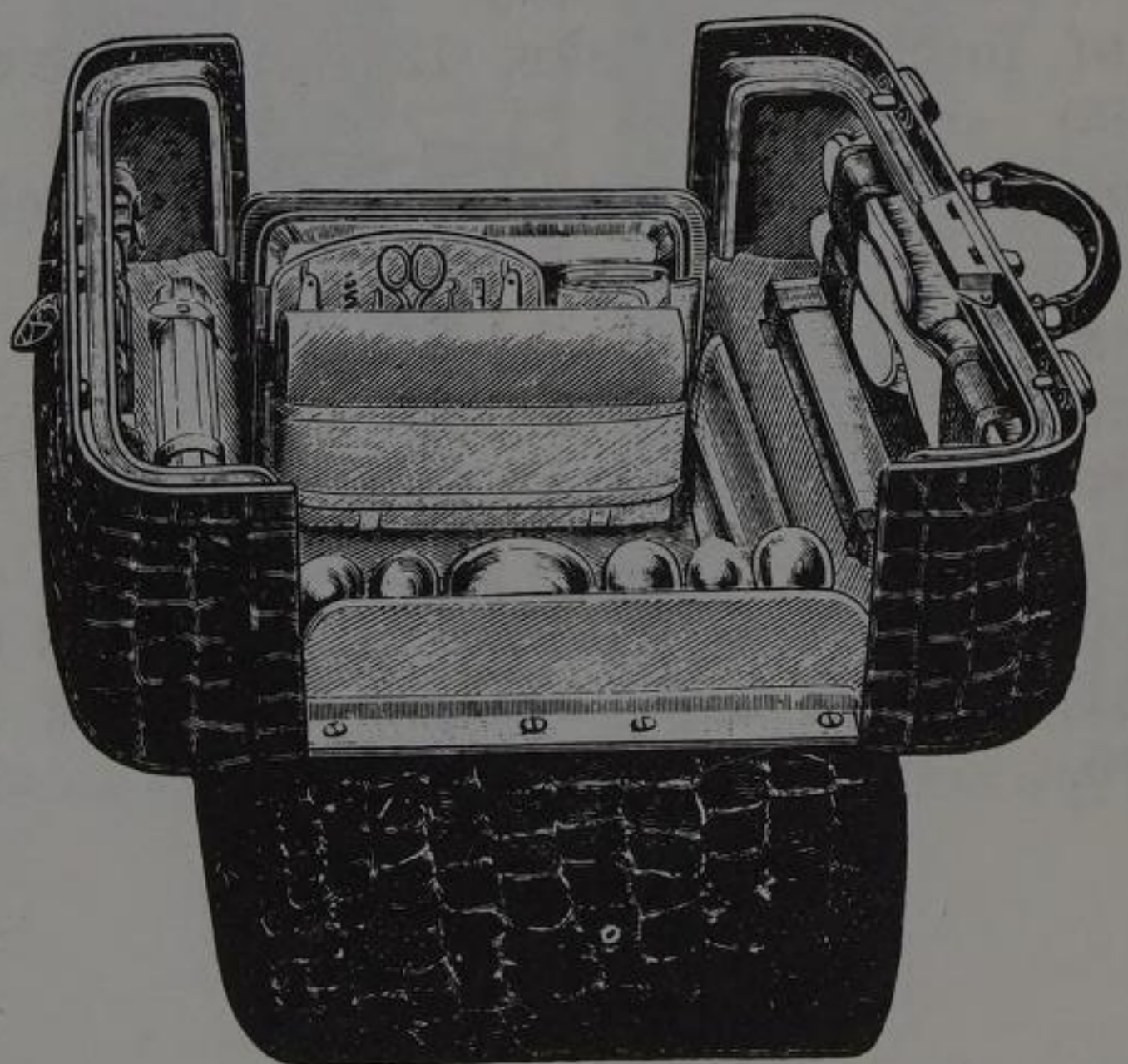
Comments: You wouldn't want to run your office with a Model 100, but you might want to throw one in your briefcase.

The 100 is light, compact, and highly portable. It's smaller than a three-ring binder. The full-sized keyboard has a great feel. The screen is liquid crystal (like a pocket calculator) and displays eight 40-character lines.

It's not what you'd call a word processor—more a word recorder. Whatever you store in the 100 can be transferred to another computer for later editing and revision. Documents are stored in a kind of RAM that never forgets. After files are transferred to another medium, or printed, the memory can be erased for future computing.

One of the most interesting features is a built-in modem. By plugging in a modular telephone cord, one can contact data banks or the computer in the office.

It operates on batteries that can be plugged in. The hardware design (Japanese) is first-rate, and the software (from Microsoft) is as easy to learn and use as one can ask.



And there's still room for the Radio Shack Model 100.

THE PERSONAL COMPUTER BOOK

Teleram T-3000



Price: $1,795
Screen size: 80 characters x 4 lines
Screen color: LCD
Main operating system: CP/M
Processor: 8-bit Z80L
Standard memory: 64K
Disk drive type: Bubble memory
Capacity of formatted disks: 128K (256K version for $2,095)
Software included: CP/M, utilities, TeleText, TeleTalk
Keyboard:

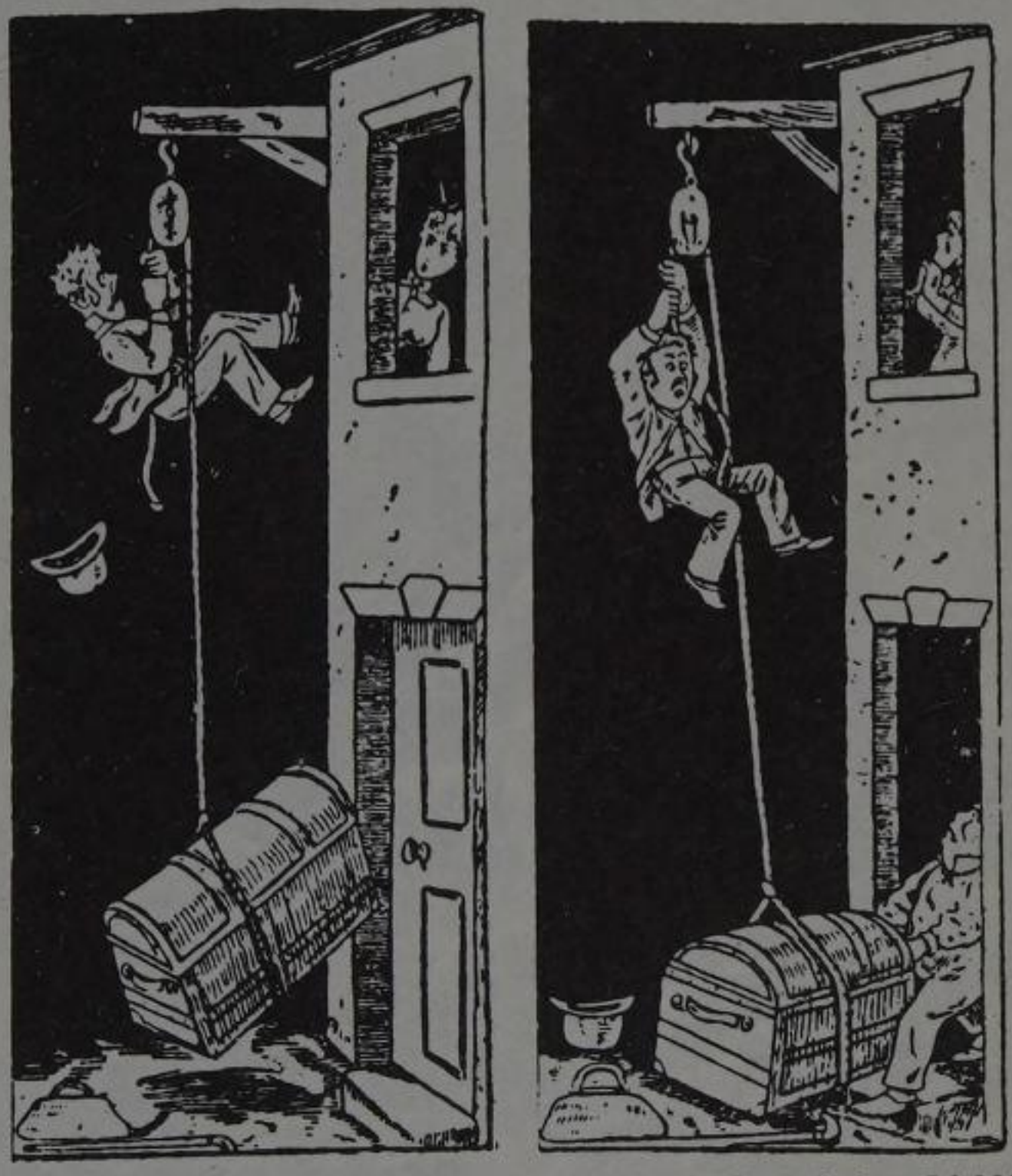
- detachable? —
- number of keys: 83
- number of function keys: 28

Weight: 9 lbs.
Other: There's a T-4000, with an 8 line screen and 128K for $1,995; and a T-5000, 16 lines and 128K, for $2,495.

Comments: The Teleram portables are the most portable full-function computers available. They come with 128K of bubble memory, and another 128K can be added. Bubble memory is user-changeable, like RAM, but it keeps the information indefinitely, even when the power is turned off, like ROM. It's a great combination of the two.

The Teleram is rugged, and full 80-character lines are displayed. Many reporters for newspapers use this computer in the field.

While one would not want to write a magnum opus on a four (or sixteen) line screen, it's possible.



Giving her a Teleram wouldn't be this difficult.



A Brand Name Buying Guide

IBM and IBM-Compatible Computers

The Battle Is Over

The battle is won. It's all over but the fighting. IBM is the new standard for personal computers, and is likely to remain so for years to come.

The great Punic Wars over a standard have been raging for some time. Early battles pitted the Commodore PET against Radio Shack against Apple. Radio Shack and Apple won. Then CP/M came along and slugged it out in a tag-team match with the two winners. No clear winners in that battle. It smoldered on for years.

Someone put CP/M on the Apple, which formed an unlikely alliance, and indicated that both had won. But Radio Shack said, "We have 6,000 stores. We already won. Why don't you both go away?" The battle continued.

Noting that the real losers of this battle were really consumers, the UN (computer writers) joined in, and declared a sort-of truce: CP/M was the winner for business and word processing; Apple was the winner for games and overall expandability; Radio Shack won for being everywhere at once (there was hardly a small town anywhere that didn't have a Radio Shack store).

The treaty was never ratified by The Big Three, but at least consumers knew where to shop for what.

Then came IBM. It offered *a whole new standard*. Just what the computer world needed (he said, with no small degree of irony). But, in little more than a year, IBM won, and imposed this fourth standard as THE standard for personal computers.

The signs of an IBM victory are everywhere. Not only is almost every significant new piece of software being introduced first on the IBM, but almost every piece of software that's ever been written is being rewritten for the IBM.

Plug-in board, peripheral, and printer manufacturers are outdoing themselves in not only quantity, but also quality of product.

And, most telling of all, other computer manufacturers are turning out computers that are advertised proudly as "IBM Compatible."

In the meantime, it's not certain what IBM will do about all this. Will they follow the Apple route and sue everyone in sight? Or will IBM take a smarter tack, and license its ROM to interested parties? This would lead to true compatibility, choice in the marketplace, and the final seal on the fact that the IBM Standard is the new standard for personal computers.

Does this mean you should only buy an IBM if you want to do word processing? No, not at all.

If the *only* thing you want to do with your computer is word processing, then get the screen and keyboard you like best. The fact that thousands of educational, business, and recreational programs are available for the IBM will not matter. You'll be busily writing, oblivious to the hubbub, in love with whatever computer you've bought.

I do not use an IBM. I do not plan to use an IBM in the near future. I hate the clicky sound of the keyboard. The replacement keyboard from Keytronics is quieter, but not much better. I'm more than happy writing on the first computer I bought almost three years ago. Sitting unused a few feet away is a PC IBM sent me for evaluation (along with a half-dozen other expensive "state of the art" computers from other manufacturers). I like what I've got. I'm used to it. We're comfortable together.

If, however, you plan to do things *other* than word processing on your computer, then the IBM deserves a serious look. A *very* serious look.

Also, a new generation of word processing programs is being written for the IBM. We found *scores* of them while researching *Word Processing on the IBM.* (A special edition of *The Word Processing Book* for potential IBMers.) If you think you'll want to upgrade programs, and will want to have each state-of-the-art word processing program as it comes along, then the IBM would be the best bet.

If money is an issue (and when is money not an issue?), a Morrow or a Kaypro make excellent word processing computers for about half the cost of an IBM. Don't feel you have to mortgage the ranch just to get an IBM. There's lots of word processing power to be had for lots less.

I don't want you to feel locked into an IBM. This essay is not my endorsement of IBM as *the* personal computer, it is simply my best guess as to what the future standards of personal computing will be.



The Myth of IBM Compatibility

Now that IBM has become the standard in personal computers, a lot of manufacturers are claiming their machines are "IBM Compatible."

Last year, the key selling phrase around computerdom was "User Friendly." One software manufacturer confessed, "Creating User Friendly software generally meant pulling out last year's brochures and stamping 'User Friendly' on them."

This year's selling phrase is "IBM Compatible." Whatever the minimum a manufacturer can do to call its computer IBM Compatible, it'll do.

Generally, the minimum is getting the computer to "read IBM disks." This means that if you put an IBM disk into the drive of Computer X, Computer X will be able to read information from the disk. This does not mean Computer X will be able to write information onto that disk, or that it will run a program on that disk, or that it will even be able to display the information on its video screen.

In other words, if all a computer will do is "read IBM disks," what the manufacturer is really saying is, "Please buy our computer. We're desperate."

The next level of IBM Compatibility is adding MS-DOS, which is the same disk operating system as IBM-DOS. This makes the two machines "DOS Compatible," or, as Brand Y likes to say, "IBM and us share the same operating system." This means, theoretically, that Brand Y can read IBM files and write IBM files, but not necessarily run a program written for the IBM.

Running programs written for the IBM requires that a computer, Brand Z, say, copy a good deal of the internal architecture of the IBM. Most of this is public domain, or available for license from other manufacturers. (IBM purchases a good deal of its internal workings from other manufacturers, and so could Brand Z.) If Brand Z set out to clone the IBM, it could do a pretty good job—until it got to ROM.

A Brand Name Buying Guide

IBM holds a copyright on the information inside its ROM chip, and any computer manufacturer that copies an IBM copyright does so at its own peril. So IBM cloners copy a little here and a little there, but thus far no one has been courageous or dumb enough (choose your own adjective) to copy the whole thing.

Without *all* the information in IBM's ROM, a computer cannot be considered fully IBM Compatible. This is because you never know when a programmer will use some of that information in a program. If a program, written for the IBM, says, "Go into ROM and get this information," on an IBM the information will be there. On a clone, it might or it might not. If not, the program will not run.

Therefore, there is no true IBM Compatibility. Some of the programs, written for the IBM, will not run on the clones. How many? Well, the clone manufacturers usually try the top 100 IBM programs and see how many will run. They then announce "most" will run (if it's more than 51), or they say 90%, or 95%, or whatever number ran.

These high percentages are nice, but what if the program you want to run is in that incompatible 5%? And what if the program you want to run was never tried? And what if the program you want to run hasn't been written yet, but when it's written it runs just fine on the IBM, but not on Brand Z?

I report this not because I like it, only because it's true. There are too many people who paid thousands of dollars on an "IBM Compatible" computer, only to find that it's not really. As of now, if you want 100% IBM Compatible, you'll have to buy an IBM.

This is unfortunate, because many of the Compatibles are better computers than the IBM, especially when it comes to keyboards. Some of the clones have discreet cursor movement keys, and properly placed shift keys, and a quiet keyboard. Others have better color graphics, or cost less, or are portable. For your needs, maybe 90% compatibility is enough—but make that choice with your eyes open.

How did IBM do it? How did it come in with a new standard and wipe out the three competing standards (Apple, Radio Shack and CP/M)?

Well, first, there are those initials, I. B. and M. No small amount of mystical power is contained in those three letters. IBM is so closely linked to computers that some are predicting "IBM" will lose its Trade Mark status and, like escalator or aspirin, become a generic term for all computers. When IBM introduced a personal computer, people LISTENED.

But IBM didn't rely on its name alone to launch the product. They came up with a brilliant ad campaign featuring Charlie Chaplin. (IBM even got permission from the Chaplin estate.) These ads were not only well done, they were everywhere—still are, in fact. Now, every time someone sees Charlie Chaplin, they think of IBM.

Then there was the computer itself. Apple was good at processing games and graphics, but poor at processing letters and numbers. Radio Shack and CP/M machines were good at processing letters and numbers, but poor at graphics and games. The IBM could do both, and do both well. Finally, somebody could do word processing AND play flashy full-color graphic games on the same computer.

Beyond that, it used a 16-bit processor, which could access more memory than Apple, Radio Shack or CP/M. This extra memory opened the door to powerful new programs. Just as people bought Apples just to run VisiCalc back in 1978, people were buying IBMs just to run 123 or Context MBA in 1983.

And, in what was probably the most brilliant (and noncharacteristic) move of all, IBM *invited* other manufacturers to make peripherals to plug into and add onto an IBM. In the past, the quickest way to void an IBM warranty was to use non-IBM products on an IBM machine. (Years ago, an IBM repairman said I shouldn't be using any ribbons but IBM ribbons on my Selectric. "Is it OK if I use non-IBM paper?" I asked.)

But with the PC, IBM made usually-secret schematics available to all, and announced to the world, "We've got five expansion slots, boys. Come on and plug on in!" And they did.

And they still are. There hasn't been this much action since the Chicken Ranch closed.

Meanwhile, Apple is talking about letting the Lisa run programs written for the IBM, and Radio Shack now offers an IBM-compatible computer. Does it sound like there's a winner to you?



IBM PC



Price: $2,945
Screen size: 12”
Screen color: green (color available)
Main operating system: MS-DOS
Processor: 16-bit 8088
Standard memory: 256K
Disk drive type: 5¼”
Capacity of formatted disks: 340K
Software included: “Exploring the IBM Personal Computer”
Keyboard:

- detachable? yes
- number of keys: 83
- number of function keys: 10

Weight: 51 lbs.
Other: A hard-disk version of the PC is known as the IBM XT. The XT replaces one of the disk drives with a 10-megabyte hard disk. The price is $4,820.

Comments: IBM has built, quite simply, a great personal computer.

Rather than patch together a small computer using a little from this IBM machine and a little from that IBM machine (which they could easily have done), IBM assembled a group of engineers, designers, programmers and, yes, a few personal computer lovers, sent them all to Boca Raton, Florida, of all places, and gave them a mission: Design and build the IBM Personal Computer.

They researched everything available in the field of small computers, investigated what was new, came up with a few things of their own, massaged the information together, made a few hard decisions, and created the IBM Personal Computer.

There was fear in the land of small computers that IBM would swallow up the personal computer market. Instead, IBM has created a whole new industry. The industry is called "Supporting the IBM Computer, Inc." Everyone's getting a franchise: peripheral manufacturers, software vendors, mail-order houses, retailers—it's the IBM Personal Computer Bandwagon and everybody's welcome to climb on board.

The basic Personal Computer is rather bare. You get the CPU with two disk drives and a keyboard. The monitor and a board to run the monitor are extra (which I figured into the price on the chart to the left). Also extra is any software—including the operating system MS-DOS—and any internal memory beyond 64K.

IBM's monochrome screen is sharp, rock steady, and nice to look at. A color monitor can be added for full-color graphics, although the color screen is not as sharp as the monochrome one. If your primary interest is word processing, go with monochrome.

The keyboard has a firm and sure touch. It's detachable, although heavier than most detachable keyboards. As good as it is, the keyboard has a few drawbacks. First, the shift key is the size of a regular key, which is far smaller than shift keys usually are. This is compounded by the fact that just below the shift key is a larger key labelled ALT (for Alternate). It's very easy to

hit the ALT, or any other key surrounding the shift key, because of the shift key's smaller size. Further, the shift key is not located directly next to the Z key, as is the standard, so one often hits the backslash key (which is located next to the Z) rather than the shift key. (Why the inventors of the industry standard "Selectric Keyboard" didn't follow their own standard is beyond me.)

Second, the cursor movement keys are located on the numeric keypad. This means that you can either use the cursor keys *or* you can use the numeric keypad. A special shift key must be depressed to change from one mode to the other. This could prove inconvenient in typing financial statements or documents containing many numbers.

There is an audible and tactile "click" each time a key is depressed on the keyboard. It is subtle, rather like turning a small electrical switch on and off (which is, in fact, exactly what you're doing). This is not the same as the electronic beep or boop one finds as an option on some computers. This click is built into the keys. There's no way to switch it off or get rid of it. Some people are delighted with this verification of a keystroke that can be heard and felt. Others, like myself, find it irritating. You'll have to decide if you fall into the "some" camp or "others" camp.

If there are any standards within the personal computer industry, the IBM PC comes the closest. I was sorry to see Apple develop an entirely new operating system for the Macintosh instead of working with MS-DOS. Imagine every electrical appliance you bought having a different size plug. Having standards brings down prices—and can only benefit consumers.

A Brand Name Buying Guide

IBM Portable Personal Computer



Price: $3,020 ($2,595 with one disk drive)
Screen size: 9”
Screen color: green
Main operating system: MS-DOS 2.1 (same as the PCjr)
Processor: 16-bit 8088
Standard memory: 256K
Disk drive type: 5¼”
Capacity of formatted disks: 360K
Software included: none
Keyboard:

- detachable? yes
- number of keys: 83
- number of function keys: 10

Weight: 30 lbs. (one drive)
Other: Watch out other portables!

Columbia MPC



Price: $3,620
Screen size: 12”
Screen color: green
Main operating system: MS-DOS or CP/M-86
Processor: 16-bit 8088
Standard memory: 128K
Disk drive type: 5¼”
Capacity of formatted disks: 320K
Software included: Perfect Writer, Perfect Calc, Perfect Speller, Perfect Filer, Fast Graphs, Home Accountant Plus, MS-DOS, CP/M-86, communications, tutoring software, and games.
Keyboard:

- detachable? yes
- number of keys: 82
- number of function keys: 10

Weight: 46 lbs.

Comments: Columbia promotes its computers as running the 350 most popular IBM programs. The magazine *Future Computing* has similar findings and rates the machine as "quite IBM compatible," along with the Seequa Chameleon and the Compaq. I find the machine well-built, as sturdy as an IBM, employing similar expansion slots. It also has the same keyboard design flaws: the print key hangs below the vertical return key, and the alternate key lies under the shift key. At least Columbia took the clicky noises out of the keys.

Columbia's price reflects a recent increase, at the same time in which the IBM PC price went down. An IBM PC is cheaper than a Columbia, although you get a load of software with the Columbia and nothing with the IBM PC. Also, Columbia has 64K more standard memory than the IBM PC.

Columbia also has a portable computer, the VP, with similar specs as the MPC, the same software, and a nine-inch screen. Like the Seequa Chameleon, the VP runs both CP/M-80 and MS-DOS programs. Its price is $2,995.

Compaq



Price: $3,090
Screen size: 9”
Screen color: green
Main operating system: MS-DOS
Processor: 16-bit 8088
Standard memory: 128K
Disk drive type: 5¼”
Capacity of formatted disks: 320K
Software included: MS-DOS, M-BASIC
Keyboard:

- detachable? yes
- number of keys: 83
- number of function keys: 10

Weight: 31 lbs.
Other: A 10 MB hard-disk version, the Compaq Plus, costs $4,995.

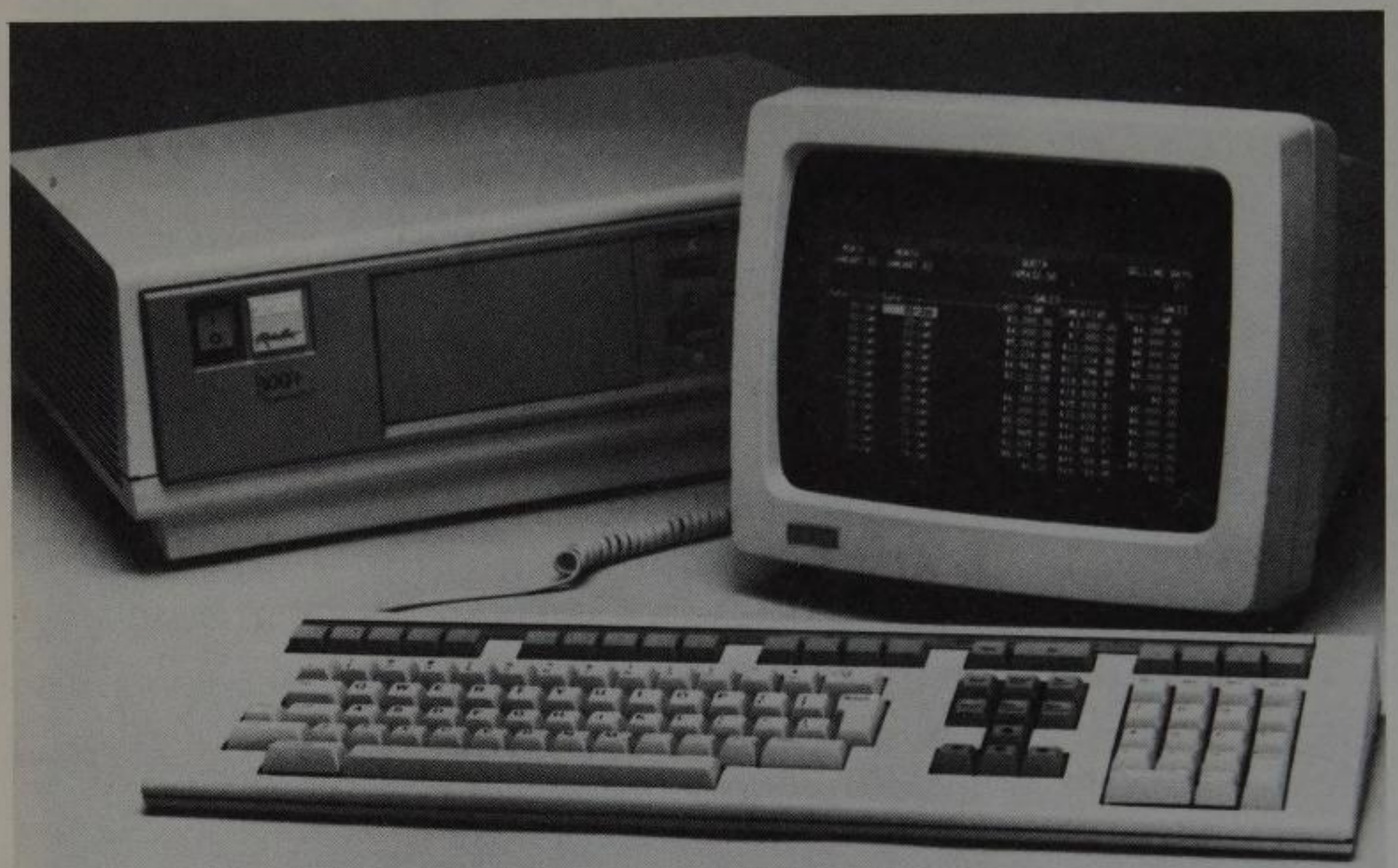
Comments: The Compaq computer runs everything we've tried on it. A nearby computer store said they have not found an IBM program which does not work on it. Like the Columbia, Compaq has a keyboard patterned after IBM's, but has taken out the click. The keyboard has a good, solid feel. The nine-inch screen is quite sharp, though a little less so when running graphics. It is a dependable machine.

The price is just under IBM's portable, so why buy a Compaq? Well, Compaq has a few small advantages over IBM. First, Compaq's monitor is dual mode, meaning it can do both graphics and text (without needing to buy an extra graphics board). Then there's expandability—Compaq has three full-size expansion slots to IBM's one (though IBM has an additional four half-size slots.) The Compaq also comes with a parallel port for a printer. For what it's worth, Compaq has been in the portable computer market a few years more than IBM.

The Compaq Plus is a portable hard-disk model, and sells for nearly the same price as an IBM-XT (desk model).



DEC Rainbow 100B



Price: $3,495
Screen size: 12”
Screen color: amber, green or white
Main Operating System: CP/M-86/80 and MS-DOS
Processor: 8-bit Z80A and 16-bit 8088
Standard memory: 128K
Disk drive type: 5¼”
Capacity of formatted disks: 400K
Software included: CP/M-86/80 and MS-DOS
Keyboard:

- detachable? yes
- number of keys: 103
- number of function keys: 36

Weight: 48 lbs.
Other: Also available is the Rainbow 100 Plus, a 10 MB hard-disk machine with two floppy drives. It costs $6,295.

Comments: In 1960, Digital Equipment Corporation (DEC) set the computing world on its ear by introducing a small computer at an outrageously low cost. Computing power had come within the reach of thousands more. The cost? A mere $120,000.

Today Digital's Rainbow computer puts computing within the reach of many thousands—perhaps millions—more.

First of all, the Rainbow keyboard is one of my favorites—the other two being the Epson and TeleVideo keyboards. (The *my* in "my favorite" is important—you'll no doubt have your favorites, too.) It has a numeric keypad with add, subtract, multiply and divide symbols, separate cursor movement keys, and more special function keys than one is ever likely to need.

The shift key, like the IBM's, is not directly next to the "Z." It is, however, larger than any other keys around it, and adjusting to the new placement is not a major hardship.

The Rainbow is an 8 *and* 16-bit machine. It will run CP/M, CP/M-86, and MS-DOS software. The memory is expandable to 896K.

A plug-in card permits high resolution graphics, and the addition of a color monitor with the card permits graphics in full color.



Eagle PC PLUS-2



Price: $3,119
Screen size: 12”
Screen color: green (color available)
Main operating system: MS-DOS, CP/M-86
Processor: 16-bit 8088
Standard memory: 128K
Disk drive type: 5¼”
Capacity of formatted disks: 360K
Software included: MS-DOS, BASICA
Keyboard:

- detachable? yes
- number of keys: 84
- number of function keys: 10

Weight: 32 lbs.
Other: Eagle also offers the Eagle PC Turbo XL for $5,619. “Turbo” comes from its ability to operate at a speed of 8 megahertz, which would be apparent in complicated

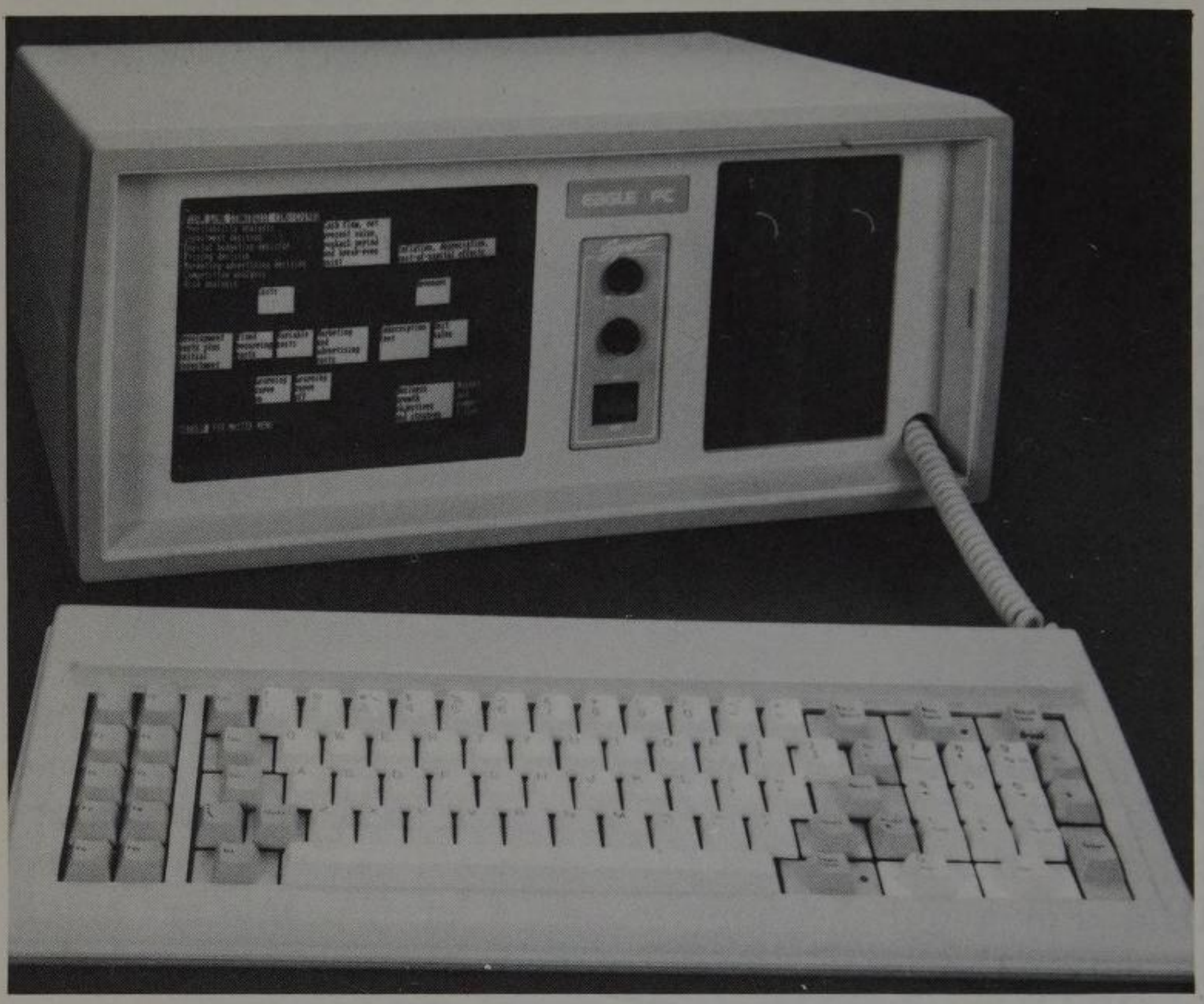
math and business processing. 256K of memory comes standard on the Turbo, as does a 10 MB hard disk, one floppy 360K drive, a 16-bit 8086 processor, and MS-DOS and BASICA.

Comments: The Eagle PC PLUS is Eagle Computer's challenge to the IBM PC. It is virtually the same size as the IBM, and it looks a lot like the IBM. With the Eagle PC PLUS, you get a very sharp 12-inch monitor (a color monitor is also available), a 16-bit processor, and a 128K of memory. The keyboard is detachable and fits neatly inside a built-in compartment underneath the disk drives (a nice feature when desktop space is limited). And those disk drives are so *quiet!* I hate the drone of IBM's fan. Eagle took the fan out.

The Eagle PC PLUS has, in other words, all that you'd expect from a personal computer that must compete with IBM. This is one of the best IBM clones. Unfortunately, the Eagle's list price makes it as expensive as the IBM. For about the same money, a lot of people are going to choose the "real" IBM. Too bad, because the Eagle PC PLUS is in many ways a better computer.



Eagle PC Spirit 2



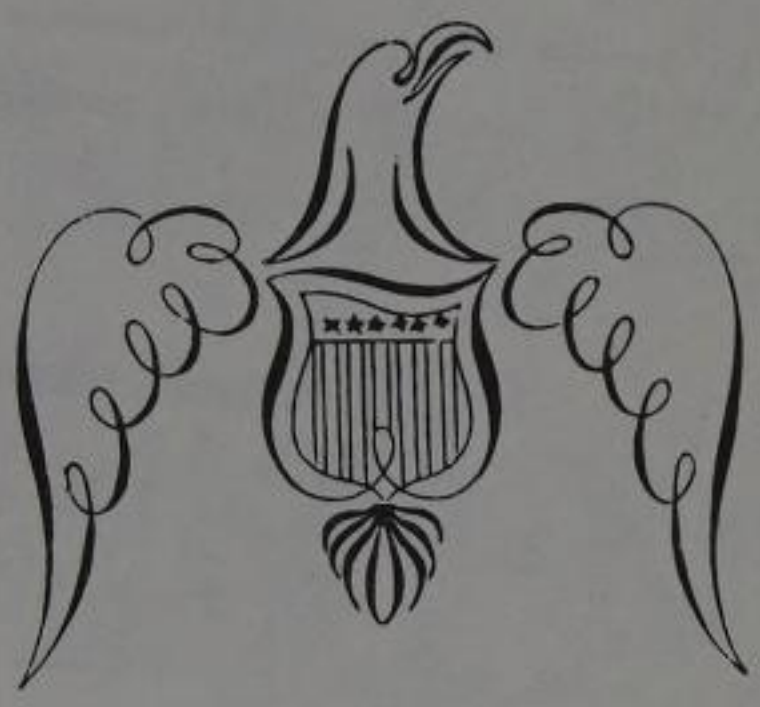
Price: $2,995
Screen size: 9”
Screen color: green
Main operating system: MS-DOS
Processor: 16-bit 8088
Standard memory: 128K
Disk drive type: 5¼”
Capacity of formatted disks: 360K
Software included: MS-DOS, BASICA
Keyboard:

- detachable? yes
- number of keys: 84
- number of function keys: 10

Weight: 28 lbs.

Comments: By discontinuing its CP/M-based IIE model, Eagle now sells only MS-DOS machines. In early 1984, Eagle had a run-in with IBM over the Basic Input Output System (BIOS). IBM charged that Eagle's BIOS infringed on IBM's copyright. Eagle had to stop shipping their computers for a short while until they could replace the BIOS chips. The new chips do not infringe on IBM's copyright, and still Eagle's computers remain highly compatible.

The Spirit is a portable computer and looks and operates quite similarly to other MS-DOS portables. One small but worthy difference becomes apparent quickly, however. Eagle placed the on/off switch on the front. No more groping at the back pushing knobs and sockets until you find the switch. This is so logical, why haven't switches been on the front before? Maybe Eagle will start a trend.



Hewlett-Packard HP-150



Price: $3,995
Screen size: 9”
Screen color: green
Main operating system: MS-DOS
Processor: 16-bit 8088
Standard memory: 256K
Disk drive type: 3½”
Capacity of formatted disks: 264K
Software included: MS-DOS
Keyboard:

- detachable? yes
- number of keys: 94
- number of function keys: 8

Weight: 27 lbs.

Other: It has a touch-screen, meaning you can put your finger on the screen to implement some commands. I have never found touching the keyboard difficult, but for the keyboard-phobic, this may be a good invention.



Roman Centurion waiting for the invention of the touch screen.

NEC APC



Price: $3,448
Screen size: 12”
Screen color: green
Main operating system: MS-DOS
Processor: 16-bit 8086
Standard memory: 128K
Disk drive type: 8”
Capacity of formatted disks: 1,000K
Software included: MS-DOS, WordStar, Multiplan, dBase II
Keyboard:

- detachable? yes
- number of keys: 108
- number of function keys: 22

Weight: 40 lbs.

Comments: NEC, the people who make the finest letter quality printer around, make several small computers marketed by at least two different divisions.

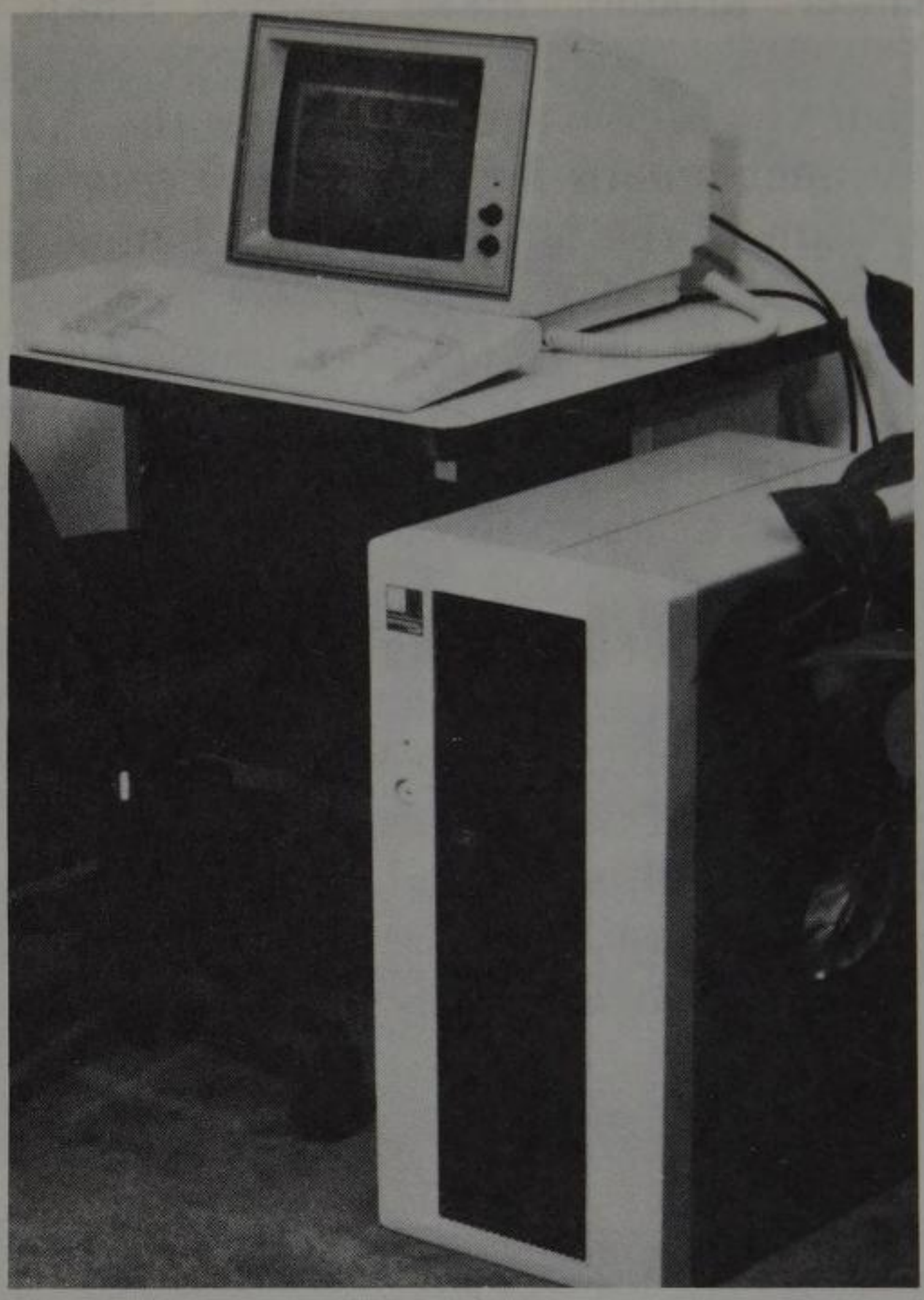
The one that seems to be getting the most attention is the APC, which stands for Advanced Personal Computer. As fond as I am of the NEC printers, I must admit I am not very fond of the APC.

The keyboard is solid, and the screen display is clear—but then so is the keyboard and screen display of computers costing half as much. The drives are 8-inch, and only 8-inch. They are also the noisiest drives I have heard on a small computer.

The strength of this machine seems to be when a color monitor is added. If sharp, full-color graphics are required by your business, you should certainly have a look at the APC. (And if you're someone who *must* do word processing in color, this, as well as the Texas Instruments Professional Computer, are the machines to investigate. The color monitor on the APC adds about $1,000 to the price.)



NorthStar Dimension



Price: $7,000 per module, $1,500 per station
Screen size: 12”
Screen color: green
Main operating system: MS-DOS
Processor: 16-bit 8088
Standard memory: 256K
Disk drive type: one 5¼” floppy drive and one 15-megabyte hard disk
Capacity of formatted disks: 360K/13 megabytes
Software included: none
Keyboard:

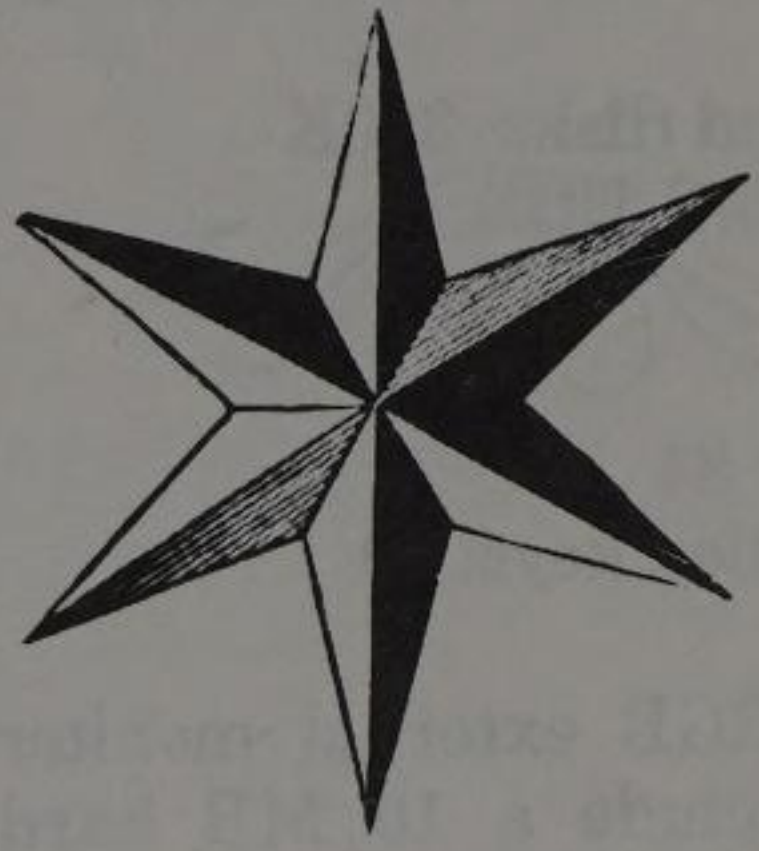
- detachable? yes
- number of keys: 83
- number of function keys: 10

Weight: n/a
Other: A 30 megabyte hard disk is available.

Comments: The Dimension is a multi-user-oriented system. You don't run out and buy just one Dimension as you might any other computer. You buy a module, and a module contains one CPU, two work stations, and appropriate cable and hardware to tie it all together. Additional work stations are extra for a fraction of what additional full computers might be. Up to 12 work stations can be connected to each CPU.

NorthStar felt that coming out with a basic IBM-compatible computer was asking for a great deal of competition. Competition, indeed, is brisk. NorthStar, therefore, asked itself what could it offer that no one else has offered? A multi-user network, the company decided, and so it developed the best, most economical system it could.

The system is not the same as networking individual computers together. With the Dimension system, each user has a dumb terminal—that is, a keyboard and monitor (no disk drives or CPU), just as on the Big Machines of The Corporations. This system uses easily available MS-DOS programs. Dimension, therefore, is suited for small-to-medium-sized companies.



Otrona 2001



Price: $2,995
Screen size: 7”
Screen color: amber
Main operating system: MS-DOS
Processor: 16-bit 8088
Standard memory: 256K
Disk drive type: 5¼”
Capacity of formatted disks: 360K
Software included: MS-DOS
Keyboard:

- detachable? yes
- number of keys: 84
- number of function keys: 10

Weight: 19 lbs.
Other: a composite/RGB external monitor interface comes standard. Options include a 10 MB hard disk, additional memory up to 640K, Z80B processor and CP/M operating system, 8087 math coprocessor; and an internal modem.

Comments: Otrona has abandoned ship with its CP/M-based Attache computer. In Attache's place is the 2001, an advanced, well-designed MS-DOS system. While the Attache was always a bit overpriced, the 2001 enters the market with a price dead-on with its competitors. Not a carbon-copy design of many other portable computers, the 2001 has a screen which tilts up while the disk drive remains flat. I can see no practical advantage to this, but it does give it a unique appearance.

Also newly designed is the keyboard. Though it closely resembles IBM's keyboard, a few modifications make it superior: the return key is full size and moved closer to the quotation-mark key; the foreign-accent key has been moved up to a better position on the third row; and the left-hand shift key sits properly next to the Z key.

The screen-size, as you may have noted, is only seven inches. The characters produced are extremely sharp, but seven inches is too small for long-periods of use—at least for my eyes. If you truly need to carry your computer around, though, the small screen may be more than compensated by the machine's lightness. It's a full ten pounds lighter than most other full- function portable MS-DOS machines. Otrona offers a twelve-inch monitor, which attaches in seconds, to make the 2001 a desktop computer. This, naturally, adds to the price.

Radio Shack Model 2000



Price: $2,999
Screen size: 12”
Screen color: green (color available)
Main operating system: MS-DOS
Processor: 16-bit 80186
Standard memory: 128K
Disk drive type: 5¼”
Capacity of formatted disks: 720K
Software included: MS-DOS
Keyboard:

- detachable? yes
- number of keys: 90
- number of function keys: 12

Weight: n/a

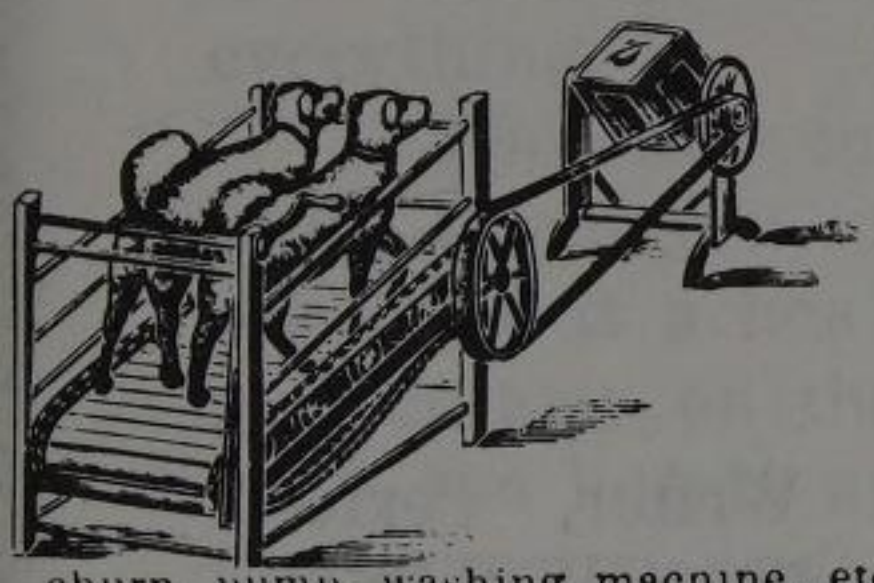
Comments: Take note Apple: Big, behemoth Radio Shack has accepted the market trends—they came out with an MS-DOS machine. And at a reasonable price.

There are some great features here: a standard 128K of memory, a wholloping 720K of formatted disk space in each drive, and a keyboard not wedded to the IBM concept. Radio Shack's keyboard, detachable, has a full-size return key and shift keys. The cursor keys, in a diamond pattern, are separate—not part of the numeric keypad. The keys click, however, and if you're the type who doesn't like the click verification, you cannot turn it off. A mouse is optional for those who like the creatures.

The screen resolution, in both monochrome or color, is extremely sharp. The unit comes in a pleasing white styling, and inside, there are four expansion slots.

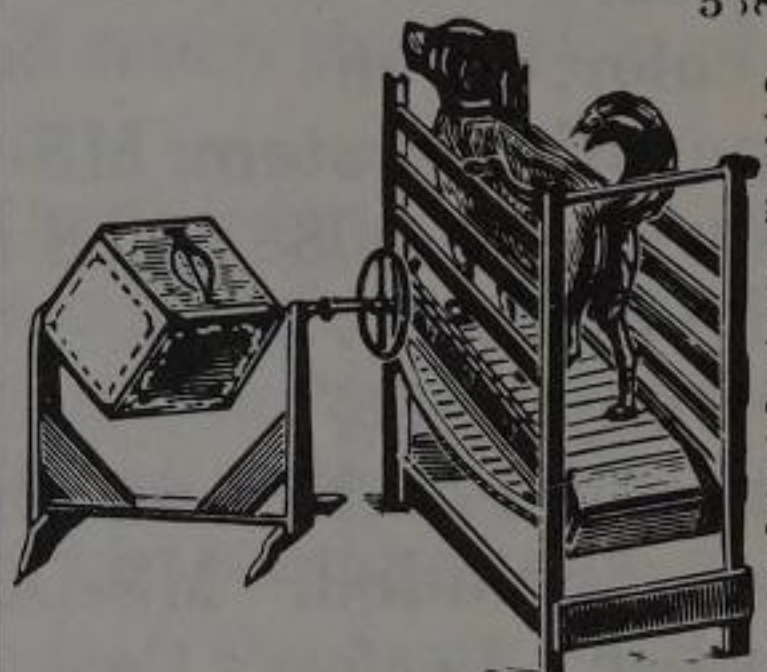
Who would have ever guessed....

Lamb's Adjustable Animal Powers.



56830 This power is built to be operated by two dogs, sheep or goats, and will furnish sufficient power to run a "Safety" separator, corn sheller, fan mill, sawing machine, churn, pump, washing macnine, etc. Balance wheel is banded for 2½ and 3 inch belt; weight, crated, 180 pounds. Price.....$23.00

First Prize Dog Power.



53831 This power can be operated by a dog, goat or sheep; yields 25 per cent. more power from a given weight of animal than any other, and with adjustable bridge to regulate the required power and motion, a 30 pound animal will do the churning; if you keep a dog make him "work his passage." The power can be connected to any churn sold by us. Price.....$15.00

Seequa Chameleon Plus



Price: $2,695
Screen size: 9”
Screen color: green
Main operating system: MS-DOS
Processor: 16-bit 8088 and 8-bit Z80A
Standard memory: 256K
Disk drive type: 5¼”
Capacity of formatted disks: 320K
Software Included: MS-DOS, Perfect Writer, Perfect Speller, Perfect Calc, M-BASIC 86, GW-BASIC, Condor-1, C-TERM, WordStar, SuperCalc 3
Keyboard:

- detachable? yes
- number of keys: 83
- number of function keys: 10

Weight: 28 lbs.
Other: CP/M software optional

Comments: The Seequa Chameleon is an MS-DOS computer touted as one of the more IBM-compatible machines on the market. With the IBM Portable Personal Computer

heading to market, all portable computers will have heavy competition. The basic Chameleon, with 128K and two 160K drives for $1,995 may fare well simply because of price. The Chameleon Plus, however, is priced only slightly less than the IBM, so people may forgo it, despite the fact that the Chameleon has two drives to IBM's one, and much software to IBM's no software.

The Chameleon's designers did a fine job on the outside. It is stylish looking with white metal casing. A standard 256K memory lends this machine to using the more powerful MS-DOS programs, such as Lotus 123 and Samna Word. Overall, it is a good value.

There are, however, a few flaws to be aware of. On the particular unit we tested, the outside was so prone to static shock that any unfortunate static contact with the Chameleon would make the screen and the program disappear and the keyboard LED's light up. I called Seequa with that information, and they said I must have an early model, one that did not have the static module. Whatever the module is, make sure the one you look at has it, and make sure the module works. I would only have to take two steps on carpeting and touch the keyboard to lose everything.

The other thing is that the 9-inch screen is not fully used. When you turn up the monitor brightness, you can see there is a healthy margin on all edges of the screen, particularly on the right-hand side. Because less area is used, the letters are smaller. This would not be so bad if the letters weren't squished and on the fuzzy side. It's like watching the credits of a Cinemascope movie on a TV set. This isn't to say letters and numbers aren't readable, but it does take more effort than on other screens.

The Seequa keyboard is the same as IBM's—though the keyclick is gone.

On the positive side, the Seequa not only runs MS-DOS but 8-bit CP/M. If you want to use both types of software, this is the machine to look at. If you just need MS-DOS, its price still can't be beat.

TeleVideo Tele-PC



Price: $2,995
Screen size: 14”
Screen color: green
Main operating system: MS-DOS, TeleDOS
Processor: 16-bit 8088
Standard memory: 128K
Disk drive type: 5¼”
Capacity of formatted disks: 360K
Software included: TeleDOS, MS-BASIC
Keyboard:

- detachable? yes
- number of keys: 83
- number of function keys: 10

Weight: 52 lbs.
Other: A hard-disk version is called the Tele-XT, comes with 256K RAM, and sells for $4,495. A portable model with a 9” screen is named the TPC-2, comes with 256K RAM, and retails for $2,695.

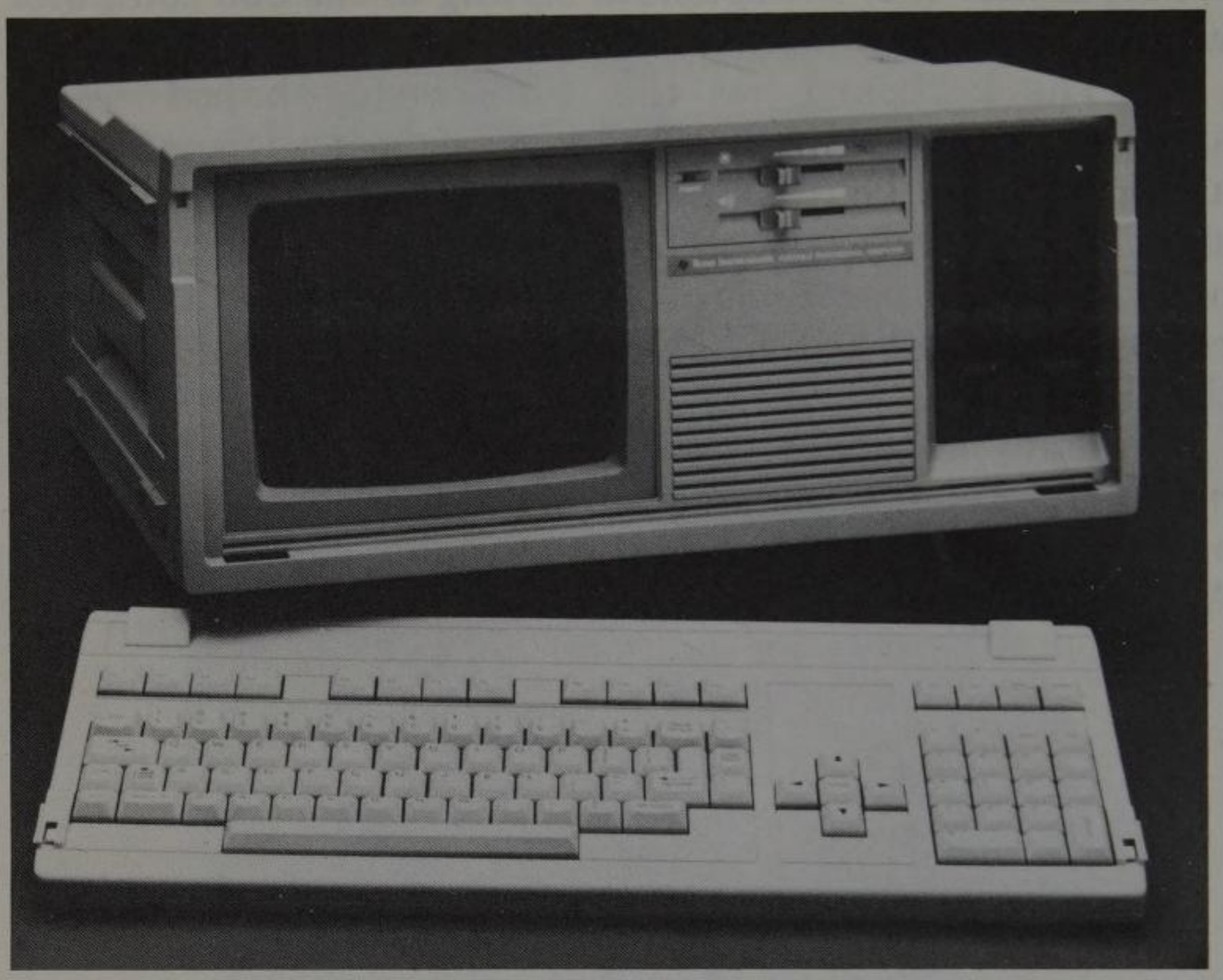
Comments: The TeleVideo people have merged two good concepts into one: the splendid styling of the 803 computer with IBM compatibility. Viola! The Tele-PC.

The keyboard has the same wedge-shaped design and palm rest as the 803, but the keyboard is configured as on the IBM. That is, there are 10 function keys, and the slash key is between the shift and Z key, etc. The Tele-PC has, however, corrected a few of IBM's mistakes—the return key and shift keys are slightly larger than on the IBM.

Many items that are optional with IBM are standard here. The Tele-PC comes complete with two drives, 128K of memory, both a serial and a parallel port, and MS-DOS. As on the 803, there is no fan, just blessed silence.



Texas Instruments Portable Professional Computer



Price: $2,695
Screen size: 9”
Screen color: green (color available)
Main operating system: MS-DOS
Processor: 16-bit 8088
Standard memory: 128K
Disk drive type: 51/4”
Capacity of formatted disks: 360K
Software included: none
Keyboard:

- detachable? yes
- number of keys: 107
- number of function keys: 16

Weight: 37 lbs. (44 lbs. with color monitor)
Other: optional voice-recognition system

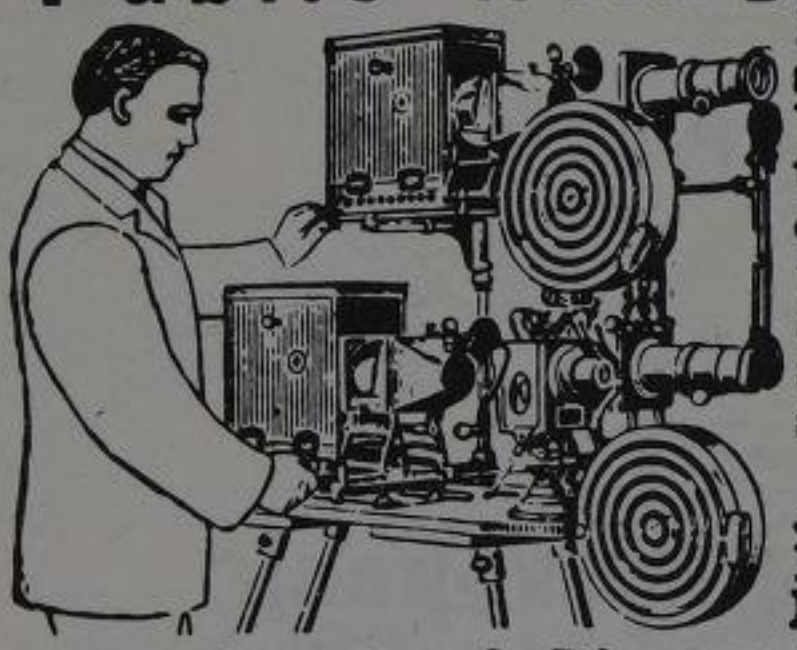
Comments: The machine I tested came with a color screen—and I was taken with its sharpness. If it were a monochrome screen, this would be very good quality. As a color screen, it's great. Texas Instruments pushes Easy Writer II as its word processing software. Easy Writer II, on this machine, turns all the letters on the screen green, as in a green phosphorous screen. I like that.

The keyboard has a good feel, the disk drives are quiet, and, in a clever design move, the machine cannot be operated without the fan door open.

Thirty-seven pounds is a bit heavy to be considered "portable."

As you may know, Texas Instruments dropped out of the *home* computer market, despite cuddly Bill Cosby as the spokesperson. I am not sure if Texas Instruments can do much better in the personal computer market, but they have a solid machine to work with.

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AMUSEMENT SUPPLY CO., 818 Illinois Bank Bldg., Chicago, Ill.

[1910]

Victor 9000



Price: $3,545
Screen size: 12”
Screen color: green
Main operating system: MS-DOS, CP/M-86
Processor: 16-bit 8088
Standard memory: 128K
Disk drive type: 5¼”
Capacity of formatted disks: 620K
Software included: MS-DOS, CP/M-86, MS-BASIC
Keyboard:

- detachable? yes
- number of keys: 100
- number of function keys: 10

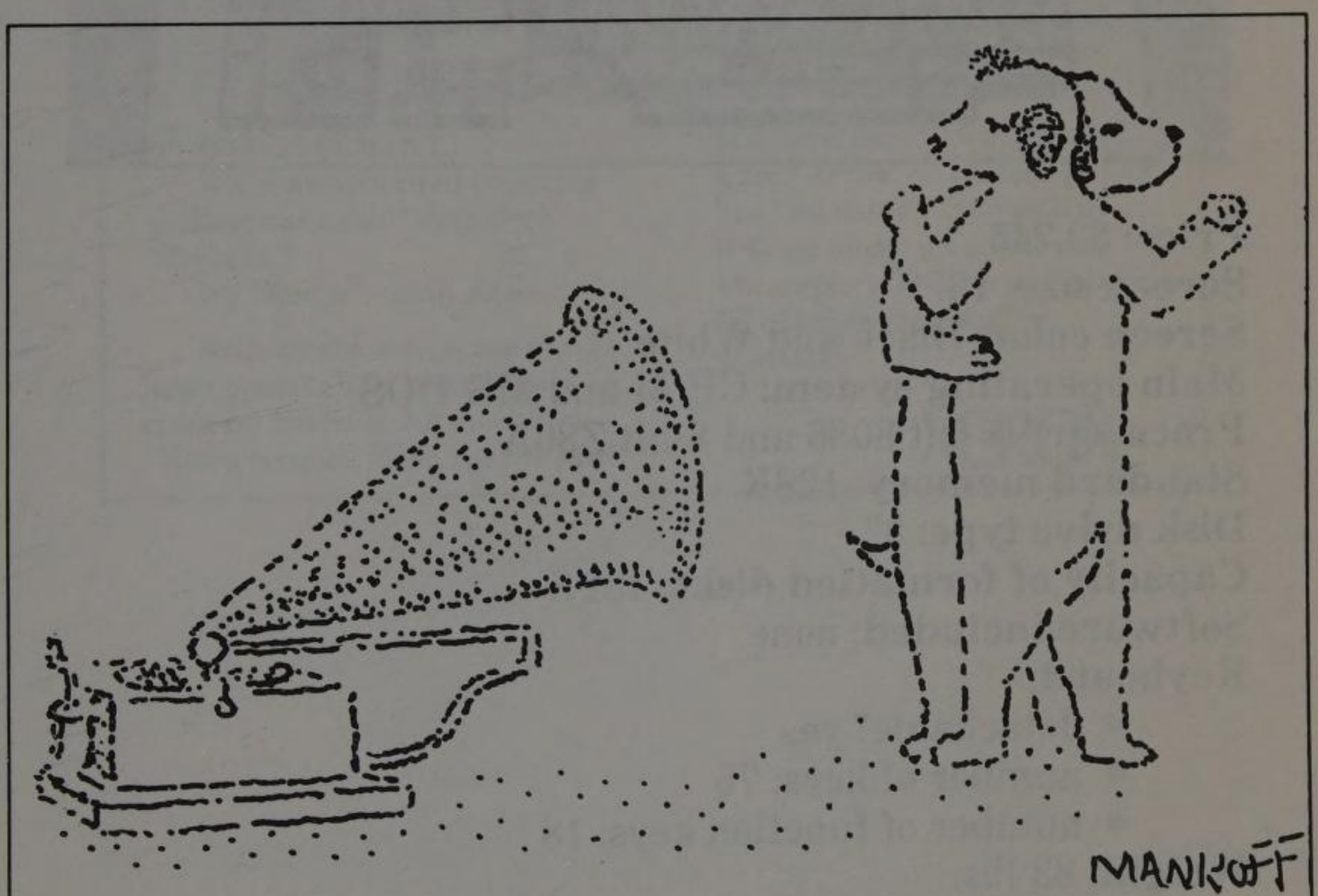
Weight: 49 lbs.
Other: A double-sided disk version available. Each disk will then hold 1,240K.

Comments: The Victor 9000 is a superb computer—one of the better ones around.

The screen display is the best I've seen on a computer. Like the IBM, the characters on the Victor are made up of serifs—thicks and thins in the design of each letter. It looks more like printing than a computer display. Like the IBM, it has a green, slow-phosphor screen that's sharp and rock steady. The screen tilts up-and-down and left-to-right, and the keyboard has a palm rest, for maximum operator comfort.

The keyboard "solves" all the problems found on the IBM keyboard: The shift keys are large and the left-hand key is located next to the Z key; the return key is massive; the cursor keys are separate from the numeric keypad. Also, the keyboard is silent in operation. This will be good news or bad news, depending on your feeling about the IBM "audio tactile feedback." The keyboard is, of course, detachable.

The Victor 9000 will do color graphics with the addition of a PC PLUS board. The board will also make the machine IBM compatible. Without it, you need to get software specifically formatted for the Victor.



Drawing by Mankoff: © 1983
The New Yorker Magazine, Inc.

Xerox 16/8



Price: $3,745
Screen size: 13”
Screen color: Black and White
Main operating system: CP/M and MS-DOS
Processor: 16-bit 8086 and 8-bit Z80A
Standard memory: 128K
Disk drive type: 8”
Capacity of formatted disks: 482K
Software included: none
Keyboard:

- detachable? yes
- number of keys: 75
- number of function keys: 18

Weight: 83 lbs.

Comments: Xerox no longer sells its 820-II computer. Instead, it is directing its marketing efforts to its other machine, the 16/8, a co-processing computer that permits use of 8-bit CP/M or 16-bit MS-DOS.

The 16/8 is a large but sturdy machine that works well. The eight-inch disks make it an odd format for an MS-DOS machine, but Xerox now offers a model with 51/4-inch drives, retailing for $3,295. A hard-disk model sells for $5,295.

If Xerox does not improve its marketing efforts, it may not be in the computer business long.

There are two X's in Xerox.

One on each end.

We're awfully tired of people spelling our name "Zerox" or "Zerocks."

It's "Xerox"—as in Xeres.

And, by the way, some of you insist upon calling photocopies made on Savin or 3m machines "Xerox" copies. Well, they're not!

Just cut it out. You think we want "Xerox" to become generic like "escalator"? So watch it. If we go under it's goodbye Masterpiece Theater and a whole lot of other good stuff on television.

XEROX

Zenith Z-150



Price: $3,099
Screen size: 12”
Screen color: green
Main operating system: MS-DOS
Processor: 16-bit 8088
Standard memory: 128K
Disk drive type: 5¼”
Capacity of formatted disks: 320K
Software included: MS-DOS
Keyboard:

- detachable? yes
- number of keys: 83
- number of function keys: 10

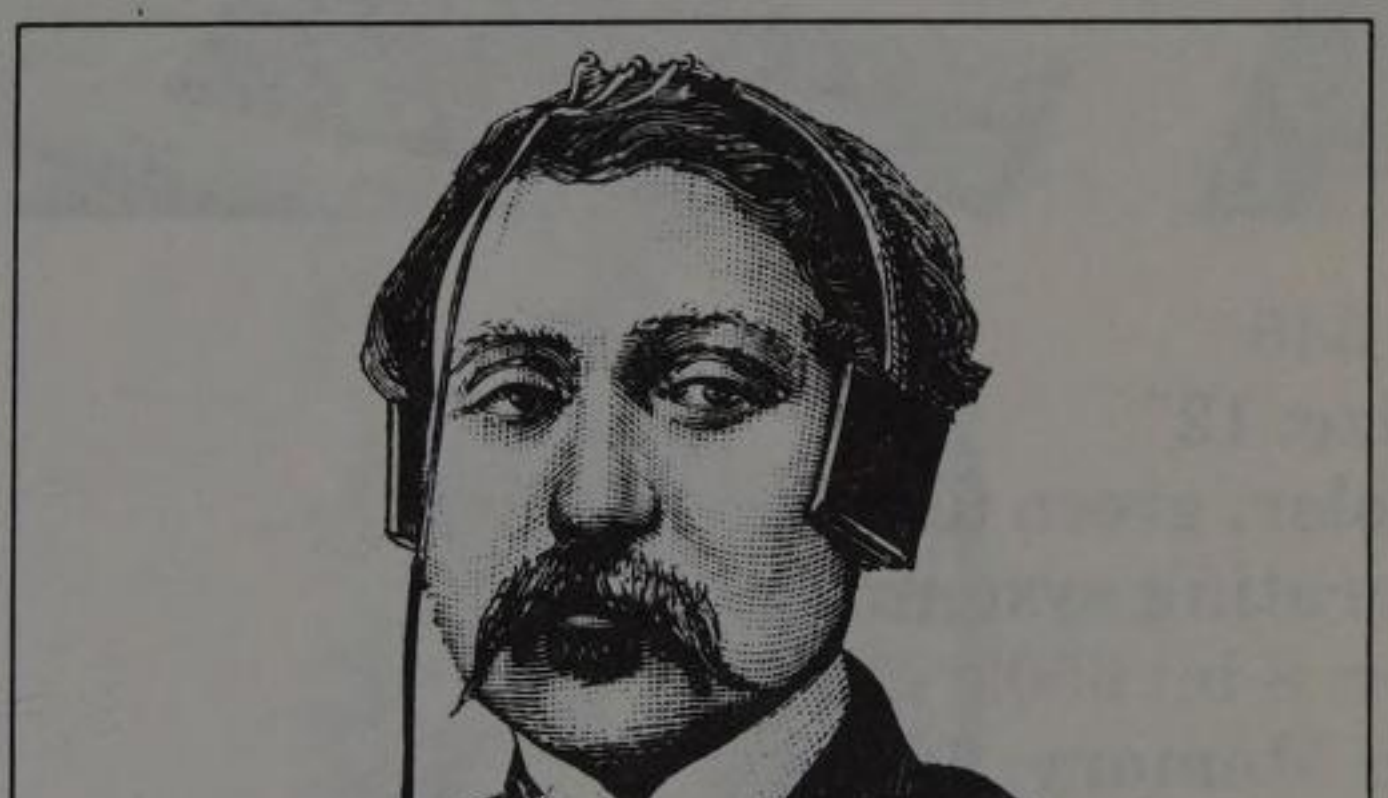
Weight: n/a
Other: A 10.6 megabyte hard-disk version available for $4,799

Comments: Zenith is scrambling to keep up with the marketplace, and recently introduced the Z-150, and a portable model called the Z-160. The Z-89 computer has been phased out.

Though I haven't seen it yet, the Z-150 represents some better thinking on Zenith's part. The keyboard is detachable, and it does the IBM keyboard one better: Zenith has made the return key and shift keys large.

The computer is made to be IBM compatible, thus it uses MS-DOS instead of the Z-100's Z-DOS (whatever that is). Zenith tells me they have tried the 150 top-selling IBM programs, and they all run on the Z-150 and Z-160. (Hence the 150 in Z-150? Does the Z-160 run the top 160 programs? Film at eleven.)

The price for the Z-150 is slightly cheaper than the IBM, and more expensive than the Compaq or Columbia. I'm not sure what market Zenith's going for. (Why get a Zenith when you can get the real IBM?) Maybe it's for the people who bought the Zenith Space Phone, which allowed one to answer the phone through the television set.



Apple and Apple-Compatible Computers

Apple hasn't taken the same approach as IBM in licensing of its designs, so there are not as many compatibles. But there are a few, Franklin being the best known.

Apple IIe



Price: $1,545
Screen size: 12"
Screen color: green (color available)
Main operating system: ProDOS
Processor: 8-bit 6502
Standard Memory: 64K
Disk drive type: 5¼"
Capacity of formatted disks: 140K
Software included: ProDOS, DOS System Master, Applesoft BASIC
Keyboard:

- detachable? no
- number of keys: 63 (no numeric keypad)
- number of function keys: 2

Weight: 31 lbs.

Comments: It's no secret that I've been dissatisfied with Apple's products in the past. Most of my criticism has been focused on their pricing. Theories of the marketplace aside, I've felt Apple tends to gouge consumers. Just a short time ago, IIes, with two disk drives and 80-column card and all, cost over $3,000. It was IBM that brought Apple to its feet.

Prices have dropped dramatically at Apple. The Lisa, which used to go for $10,000, can now be bought for $4,500, and the IIes have no list price at all—whatever the dealer wants to sell it for is fine by Apple. I've called several stores near me, and a two-drive system ranges from $1,545 to $1,699. The 80-column card is standard, as is the green monitor, and upper- and lowercase letters.

$1,545 is not a bad price. Other machines (Morrow, Kaypro, etc.) have much better prices. The machine still does not have a numeric keypad or detachable keyboard, but for a basic computer that has been around for a while and has support, the Apple IIe is, at last, a reasonable buy.



Apple IIc



Price: $1,823
Screen size: 9”
Screen color: green
Main operating system: ProDOS
Processor: 8-bit 6502
Standard memory: 128K
Disk drive type: 5¼”
Capacity of formatted disks: 140K
Software included: ProDOS, DOS System Master, Applesoft BASIC
Keyboard:

- detachable? —
- number of keys: 63
- number of function keys: 2

Weight: 11 lbs. (with power unit, but without monitor)
Other: A mouse port and an 80/40 column switch included.

Comments: At first glance, a portable from Apple seems worth celebrating, particularly one which is advertised at $1,295. The brohaha obscures some limitations, however.

First, while 128K RAM is an ample size for memory, the IIc has no room for expansion boards, so 128K is all you can ever get. What made the desk-top Apple IIe a phenomenon originally was its expandability. Companies everywhere came up with items to plug into or onto the IIe. For this very same reason, the IBM PC blew—and continues to blow—up a storm. People are able to make their computer something more than what the factory offered them. The IIc, however, does not have this ability, so what you buy is forever what you get.

For $1,295 you get one drive and no monitor. $1,823 gives you a complete model, with two drives and the monitor. A comparably-equipped Apple IIe, at $1,545, is less expensive and offers adaptability. Other than for its semi-portability, I am not sure why anyone would want a IIc.



Apple Lisa 2/5



Price: $4,495
Screen size: 12”
Screen color: Black & White
Main operating system: Lisa OS, Mac OS
Processor: 32/16-bit MC68000
Standard memory: 512K
Disk drive type: One 3½” floppy and one 5 MB hard disk
Capacity of formatted disks: 400K/4.4MB
Software included: None
Keyboard:

- detachable? yes
- number of keys: 76
- number of function keys: 3

Weight: 50 lbs.

Comment: The Lisa, uh, was copied from Xerox. In December of 1979, Apple founder and chairman Steven Jobs attended a demonstration of Xerox's Smalltalk system. The demonstration was given by Xerox researcher Bruce Daniels. Six months later, Daniels (along with 20-or-so other Xerox Smalltalk researchers) was working for the Lisa team at Apple. (Apple later decided it would be best to avoid an extended legal battle and now pays Xerox a licensing fee.)

Originally, the Lisa was designed for managers and corporate gentry. Apple figured there were 30 million who could afford the $10,000 price. Perhaps their research was correct, but many of that group chose an IBM for their office. (Actually, they could buy three IBMs for the cost of one Lisa.) Besides, no one was ever fired by buying an IBM.

I think it is a fantastic machine for architectural designers and engineers—people who have use for ultra-sophisticated graphics. For others, the power will never be used, or can't be. The best business programs are written for the IBM, and the IBM is cheaper. If that weren't enough, the catalog of software available for the IBM is inches thick, while the offerings for the Lisa fit on a few pages. This means if you have an unusual need, you are more likely to find a program for an IBM than a Lisa.



Apple Macintosh



Price: $2,980 ($2,495 for one drive)
Screen size: 9”
Screen color: black and white
Main Operating System: Mac OS
Processor: 32/16-bit 68000
Standard memory: 192K
Disk drive type: Sony 3½”
Capacity of formatted disks: 400K
Software included: built-in Mac OS
Keyboard:

- detachable? yes
- number of keys: 58
  (no numeric keypad or cursor movement keys)
- number of function keys: none

Weight: 22 lbs.
Other: mouse included

Comments: Apple has blitzed the airwaves and print with how the cute, cuddly Macintosh is the computer of today. The advertising is visual and clever, and Apple promotes itself as being the concerned David in a Goliath industry. This obscures some basic facts about the Macintosh—most of which parallel my comments on the Lisa.

First, let me start with the positive. MacPaint is a terrific graphics program. This will sell lots of machines to people who will never use it, and it will also sell lots of machines to people who will. It's great fun, and is an excellent example of hardware-software integration. If the Macintosh is a success, much of the credit is due to Bill Atkinson, the author of that program. Architects, designers, and those who make black-and-white drawings regularly are encouraged to look at this program and seriously consider the Macintosh.

From there, the software goes downhill. The word processing program, MacWrite, is mediocre. Okay for memos and homework, but not powerful enough for business or professional writing. Better word processing will be available, but the Macintosh will not accept a letter-quality printer(!). One must use dot matrix, which is still not acceptable for most business correspondence.

The Macintosh is incompatible with every other computer in the known world. Even the Apple II, IIe, III and Lisa software won't run on the Macintosh. Most importantly, software written for the IBM won't run on it. IBM is now the standard, certainly for business and professional computing.

The Macintosh screen is not in color, and is not likely to ever be in color. I'm not a great fan of color myself, but if you are, know that there is more color on a Macintosh T-shirt than on a Macintosh screen.

The Macintosh keyboard has no numeric keypad (though you can buy a separate, optional keypad). For work with numbers, I recommend a computer that offers a numeric keypad.

The disk drives are non-standard. Sony is selling Apple 3½" drives AT COST, hoping that the smaller standard will catch on. After turning out some of the most

resoundingly unsuccessful computers in recent memory, maybe Sony, like Apple, is desperate for market share.

Given that a comparably-equipped Macintosh is only a few hundred dollars less than an IBM, and given the reputation, support and software of the IBM PC, which would you choose?

In short, though the Macintosh does exceptionally well with a few things—namely graphics—it is severely deficient in other areas, particularly with business and word processing applications. Especially for the price.

Will there be a new standard, the Macintosh standard? Time will tell, and here's how to tell: if Apple sells 500,000 Macintoshes in 1984 and one million in 1985, then it has successfully established a new standard. There will still be a few million less Macintoshes than IBMs and IBM compatibles, but a standard will be created.

If Apple doesn't meet these sales figures, I wouldn't suggest buying one.



Franklin Ace 1200



Price: $2,154
Screen size: 12”
Screen color: green
Main operating system: Apple DOS and CP/M
Processor: 8-bit 6502 and 8-bit Z80B
Standard memory: 128K
Disk drive type: 5¼”
Capacity of formatted disks: 143K
Software included: CP/M, Ace DOS, WordStar, MailMerge, Ace Calc, C-BASIC, tutorial program
Keyboard:

- detachable? no
- number of keys: 72
- number of function keys: 0

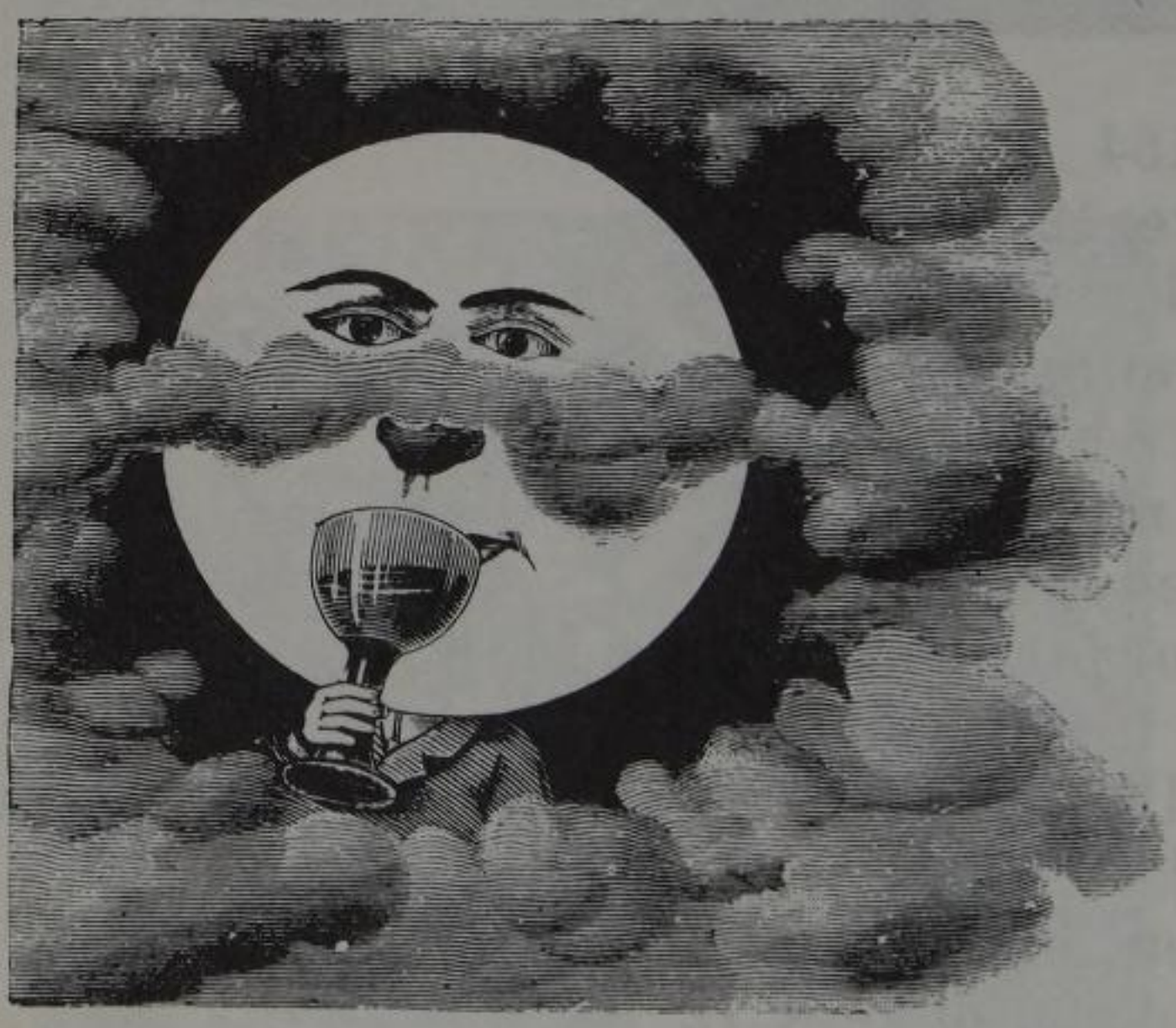
Weight: 35 lbs.

Comments: If you need to use one or more Apple programs, and still want to do some serious word processing or business applications, you might look at the Ace 1200. It has better keyboard than the Apple IIe, including a numeric keypad. A less expensive model, without CP/M, is the Franklin Ace 1000.

CP/M and Other Computers

This is the last section, but certainly not the least. Apart from all the hoopla of IBMs and Apples are some fine, solid computers, those using CP/M operating systems and those from Radio Shack. There is a tremendous amount of software written in CP/M and a barrelful for the TRS-80 machines.

If your main interest in computing is business, and you don't need the powerful and complex graphing programs made for the IBM, consider a CP/M machine. If your primary interest is word processing, there is no reason you have to spend hundreds more for a machine that does the same tasks as those in this section. Some of my best friends are CP/Mish.



Cromemco C-10



Price: $2,380
Screen size: 12”
Screen color: green
Main operating system: CP/M
Processor: 8-bit Z80A
Standard memory: 64K
Disk drive type: 5¼”
Capacity of formatted disks: 390K
Software included: WriteMaster, PlanMaster, CalcMaster MoneyMaster, Screen Editor, Chess, BASIC
Keyboard:

- detachable? yes
- number of keys: 97
- number of function keys: 20

Weight: 40 lbs.
Other: WordStar/MailMerge/InfoStar/CalcStar package available

Comments: When this computer first came out, it did not have a numeric keypad on the keyboard. Now the keyboard has one, making this a good, full-featured machine, albeit on the expensive side.

DECmate II



Price: $3,745
Screen size: 12”
Screen color: black and white
Software included: COS-310, WPS-8
Processor: 12-bit 6120
Standard memory: 96K
Disk drive type: 5¼”
Capacity of formatted disks: 800K
Software included: COS-310
Keyboard:

- detachable? yes
- number of keys: 105
- number of function keys: 20

Weight: n/a

Comments: This is designed solely for word processing, although it will run other programs. The DECmate II is very much like the Rainbow, except the processor is the Digital 6120, which is made to run Digital's existing word processing program. It is (get this) a *twelve*-bit processor (just when I was getting used to eight and sixteen). But don't worry. For a few hundred dollars extra you can have a CP/M auxiliary processor installed and run 8-bit CP/M. The CP/M plug-in card also adds an additional 64K of RAM.

The price of the DECmate II is a fraction of the traditional Wang-Lanier-IBM Displaywriter (etc.) stand-alone machine prices. It directly rivals the $8,000 to $15,000 stand-alone word processors sold by the Other Guys.



Computer stand

Epson QX-10



Price: $2,995
Screen size: 12”
Screen color: green
Main operating system: CP/M
Processor: 8-bit Z80A
Standard memory: 256K
Disk drive type: 5¼”
Capacity of formatted disks: 376K
Software included: Valdocs, CP/M, Time-management program, and games
Keyboard:

- detachable? yes
- number of keys: 104
- number of function keys: 20

Weight: 38 lbs.

Comments: With the Epson comes a green, exceptionally sharp 12-inch screen which is capable of high-resolution graphics. The keyboard is a pleasure to work with. It is, of course, detachable. The overall design (that is, the way the QX-10 looks) is delightful.

The Valdocs word processing software has all the features one might expect from a state-of-the-art word processing program including sub- and superscripting, and mail-merging. The one problem with Valdocs, until now, has been its speed. Because of its ease of use and user friendliness, Valdocs has tended to be slow in executing commands. Not slow enough that a novice would notice, but slow for experienced computer users. The new Series Two generation (Valdocs 2.0) promises to be much swifter. It also allows for spelling checkers to be used, including the Word Plus.

The Valdocs software does some things that few word processing programs do. In addition to its ease of learning, it will display bold words in bold on the screen. Also, italicized words in italics. It will even display words in bold italics. If that weren't enough, character pitch (that is, the size of the letters) can be altered and mixed on screen.

The computer has a clock that remembers day, date, and time—even if the machine is unplugged for shipping. The day and date is automatically added to the index. The index is made up of whatever name you wish to assign your files. No longer are you limited to one-word descriptions. You can rhapsodize about the contents of a file using, if you like, about twenty words. To find a file, for later editing or telecommunication, all you need remember is any *one* of the words. The computer will display all files with that word in the index.

The computer has some considerate features. For example, if you are working on something you don't want someone else to see, all you have to do is push the CONTROL and STOP buttons. This blanks out the screen display until the person has gone. Hitting any key on the keyboard brings back the screen display. When you depress the "Calc" button, a full spreadsheet is displayed.

Unlike when the QX-10 first came out, it now supports many, many printers, including Comrex, Diablo, NEC, and of course, Epson. It runs almost all CP/M software.

The whole package to me represents a good value.

Jonos C2150



Price: $3,395
Screen size: 9”
Screen color: green
Main operating system: CP/M
Processor: 8-bit Z80B
Standard memory: 128K
Disk drive type: Sony 3½”
Capacity of formatted disks: 322K
Software included: CP/M 3.0
Keyboard:

- detachable? yes
- number of keys: 92
- number of function keys: 10

Weight: 28 lbs.
Other: STD-bus based—room for 4 extra cards



Mother Earth News *is marketing a personal computer in the shape of a tree. Here a young couple use a light pen to check the price of soybeans on the organic commodities market.*

Kaypro II



Price: $1,295
Screen size: 9”
Screen color: green
Main operating system: CP/M
Processor: 8-bit Z80A
Standard memory: 64K
Disk drive type: 5¼”
Capacity of formatted disks: 192K
Software included: CP/M, WordStar, The Word Plus, DataStar, SuperSort, MailMerge, CalcStar, Profit Plan, M-BASIC
Keyboard:

- detachable? yes
- number of keys: 76
- number of function keys: 0

Weight: 26 lbs.
Other: high-resolution screen, as on the Kaypro 10

Comments: The Kaypro computer is the Volkswagen Beetle of computers. It's not an elegant-looking machine, but it gets the job done. Though Osborne (now defunct) may have been the first to bring affordability into the world of computing, Kaypro was the first to add quality to price.

In the past, Kaypro has been quite responsive to the comments of the marketplace. They've been constantly adding and refining their list of free software. They've developed and offered machines with more power (Kaypro 4, 10, etc). They are also becoming a bigger company, and I am concerned with their quality control. In their eagerness to get new machines out, a shipment of bad disk drives found their way into Kaypro 4s. Quality control missed them. For a while, there were problems with the hard-disks in the 10. These problems have since been corrected. I just hope the Kaypro management doesn't lose sight of the quality they were built on. The Kaypro II, which has been around longer than many personal computers on the market, is a solid machine.

Kaypro's competition in affordability and dependability are the Morrow computers. Especially if your main interest in computing is word processing, please examine both Kaypro and Morrow. Also know that Kaypro offers the Kaypro II-X, which is a Kaypro II with two double-sided drives (as on the 4 or 10). It does not have the internal modem or all the software of the 4 or 10, but only costs $1,595.

Kaypro 4

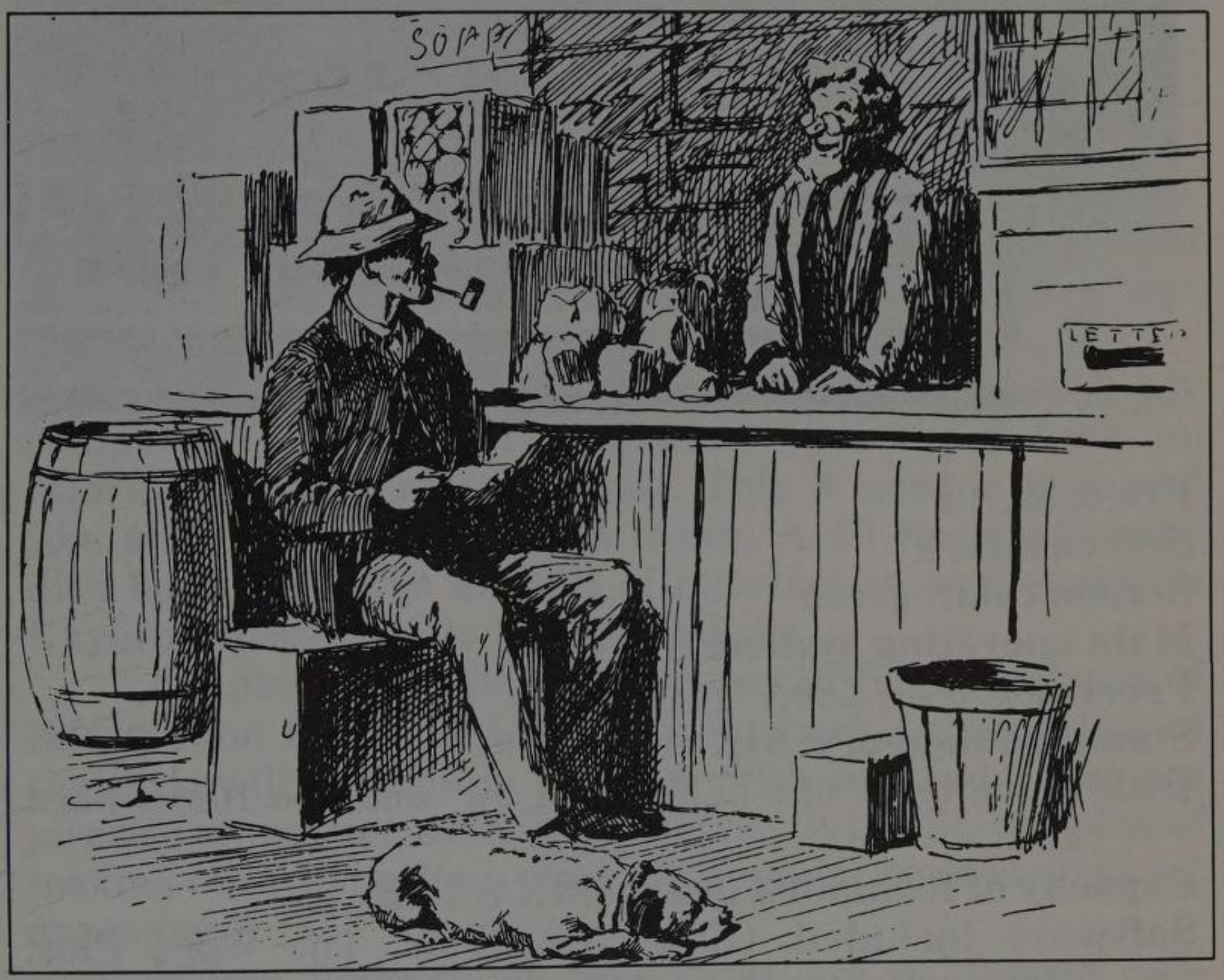


Price: $1,995
Screen size: 9”
Screen color: green
Main operating system: CP/M
Processor: 8-bit Z80A
Standard memory: 64K
Disk drive type: half-height 5¼”
Capacity of formatted disks: 384K
Software included: CP/M, WordStar, The Word Plus, dBase II (with tutorial), InfoStar (integrates DataStar and ReportStar), MailMerge, CalcStar, Microplan, M-BASIC, S-BASIC, C-BASIC, Suprterm
Keyboard:

- detachable? yes
- number of keys: 76
- number of function keys: 0

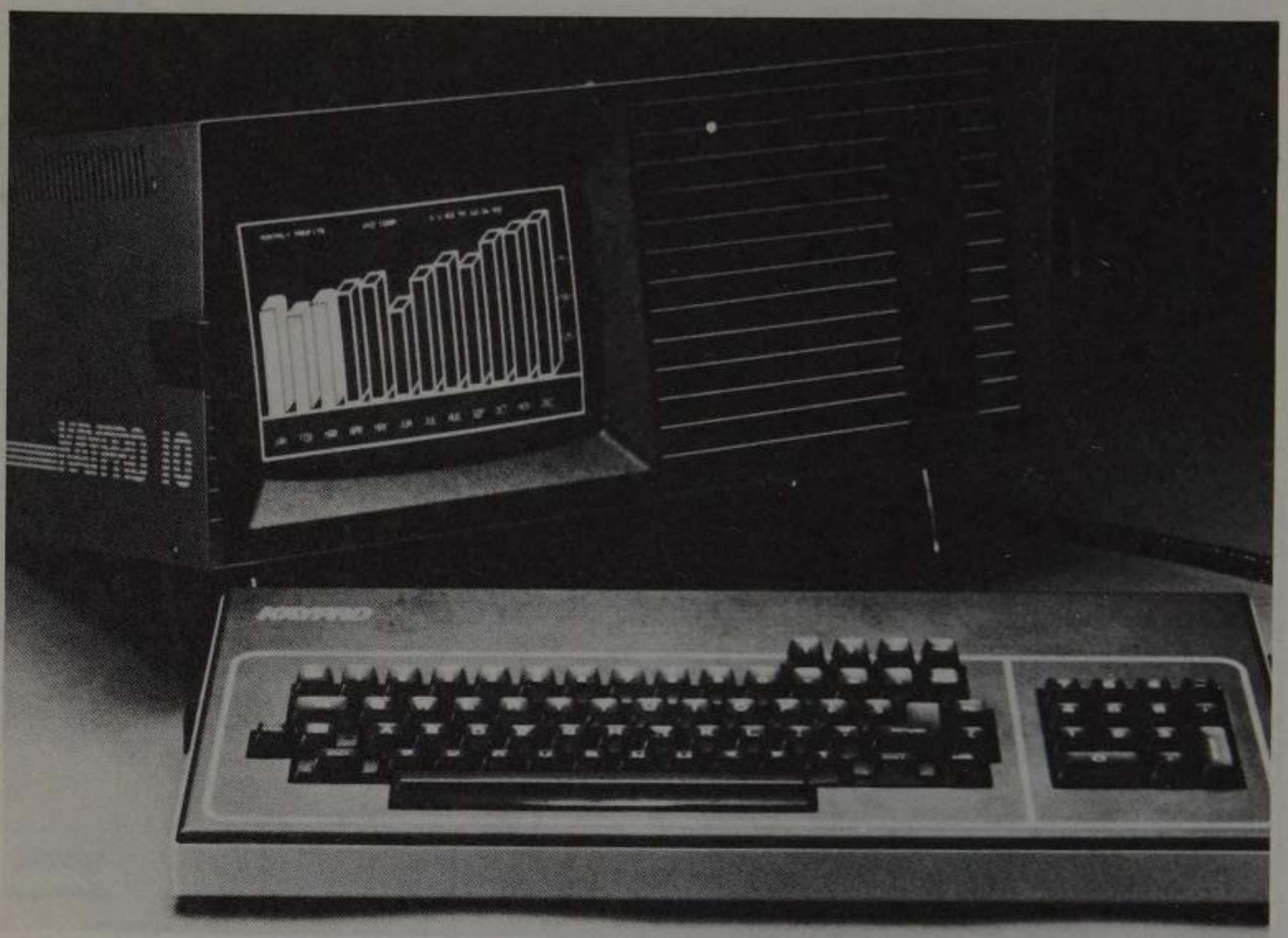
Weight: 27 lbs.
Other: Also included: a built-in auto dial/auto answer modem and a real-time clock

Comments: The Kaypro 4 is similar to the Kaypro II. Instead of single-sided disk drives, the 4's drives are double-sided, giving more disk storage space. It also has an extra serial port, a built-in 300 baud modem, and a real-time clock (which shows the time on the screen). The software package is slightly different, adding a few pieces such as dBase II and InfoStar. All the software is name brand and powerful—making for one of the most impressive free-with-purchase offerings around.



"Got a special today on a 64K, double-density, 8-bit sweetheart of a computer."

Kaypro 10



Price: $2,795
Screen size: 9″
Screen color: green
Main operating system: CP/M
Processor: 8-bit Z80A
Standard memory: 64K
Disk drive type: one half-height 5¼” and one 10MB hard disk
Capacity of formatted disks: 384K/8.3MB
Software included: CP/M, WordStar, The Word Plus, dBase II (with tutorial), InfoStar (integrates DataStar and ReportStar), MailMerge, CalcStar, Microplan, M-BASIC, S-BASIC, C-BASIC, Suprterm
Keyboard:

- detachable? yes
- number of keys: 76
- number of function keys: 0

Weight: 32 lbs.
Other: Also included: a built-in modem, and a real-time clock

Comments: The Kaypro 10 is very much like the Kaypro 4, except the Kaypro 10 has one floppy disk drive and a built-in 10 megabyte hard disk.

The machine is wonderful, a superb value, and all that, but I have one major concern: the hard disk. In the world of personal computers, hard disks are considered delicate beasties, who must be treated gently, and with the respect that's due anything that can destroy on whim 5,000 typewritten pages of information.

When a hard disk is put in a *portable* computer, considering the knocks and bangs portable anythings are subjected to, I become worried. I'm told the disk drive is of a new design and double-shock mounted and on and on. Still, in the testing stages, my Kaypro 10 went out twice. Two friends of mine have had problems with the 10. Kaypro tells me we're in a quite small minority, that problems the public has had with the machines have been quite few. I hope so.

This leads me to an important concept: as with any computer, hard-disk or otherwise, one should back up information on a regular basis. This is good advice, and like all good advice, seldom taken. A 10 megabyte hard disk holds the same amount of information as twenty-five Kaypro 4 disks, or *fifty* Kaypro II disks.

Granted, one will seldom have 10 full megabytes of information that will need frequent backing up. Much of the disk will be empty, or filled with programs that are already on master disks somewhere. But, still, the idea of making even 10 back-up disks on a regular basis is, well, not appealing.

Please understand that these are subjective, primordial, emotional reactions, like the fear of flying. (99.9999% of all airline flights are completed safely. 50,000 more people die in traffic accidents every year than in plane crashes. Then why am I afraid of going on an airplane and not afraid when I get behind the wheel of my car? It's not logical, especially the way I drive, but there it is.)

You see, as long as it works, the Kaypro 10 is a great computer. It has a sharp screen display, has an

attractive blue-grey bushed metal case, has all the software of the Kaypro 4.

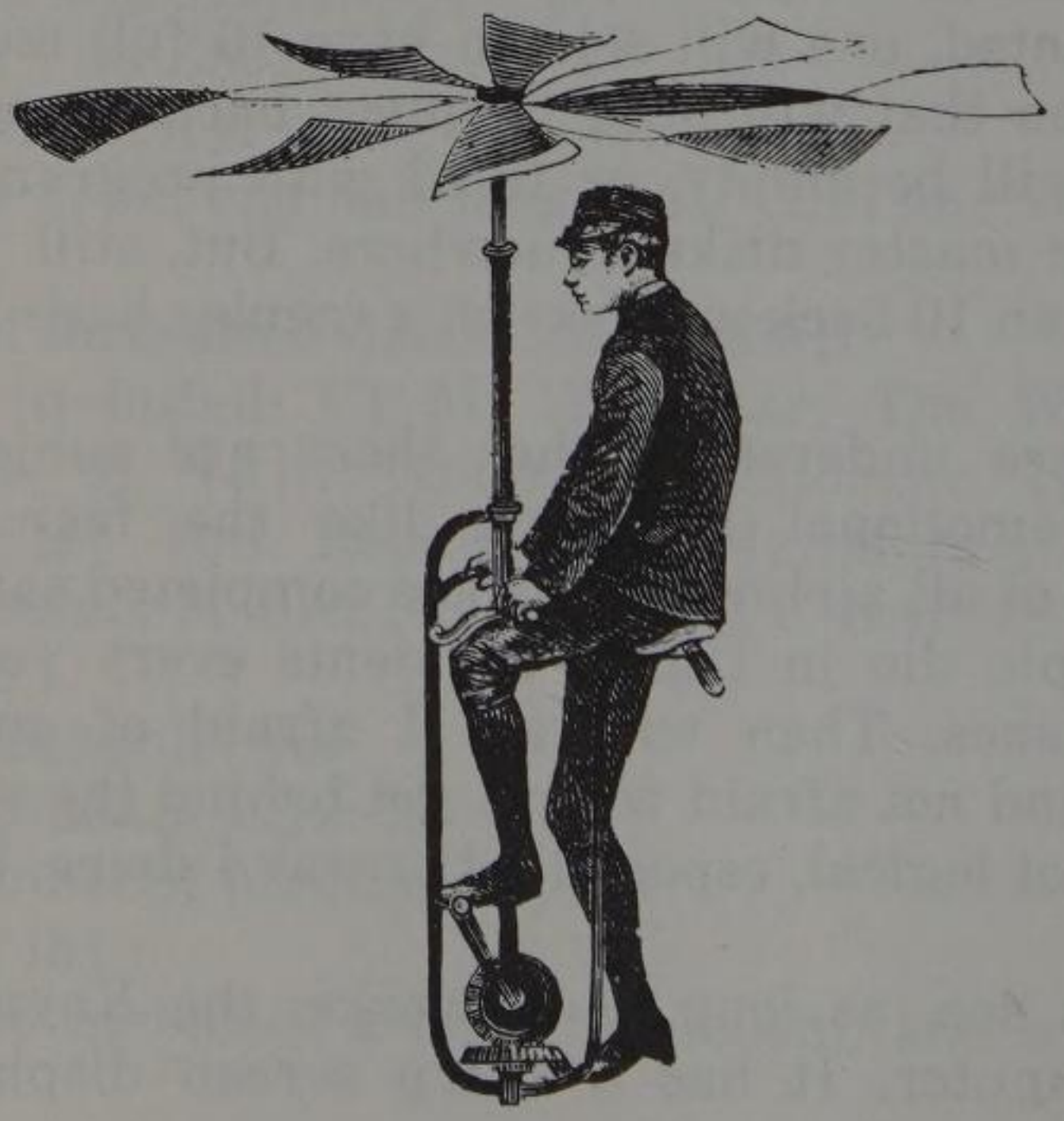
This computer is heaven-sent for people with tens of thousands of things to file. The titles of whole *libraries* or bookstores or auto parts companies or baseball card collections can be put on this computer.

Ten megabytes could handle the accounting, inventory, and word processing needs of a good-sized company, and still leave room for the boss's computer games.

Then why am I afraid? Why do I fear the letter that says: "I took your advice and I bought this thing and after five months of putting everything I know on it, it broke and I hate you forever"?

Ten megabytes is a lot. It's very powerful, but very dangerous. *Please*, with this or any computer, *back up your irreplaceable information regularly.* Back-up information is like wearing a seat belt: If it's only used once in ten years, it was worth the effort.

Maybe the Kaypro 10 and I should get away somewhere, take a long trip or something, and maybe we can work on my anxiety together.



Lanier TypeMaster



Price: $3,495
Screen size: 9”
Screen color: green
Main operating system: AES
Processor: 8-bit Z80
Standard memory: 64K
Disk drive type: 5¼”
Capacity of formatted disks: 70K
Software included: word processing
Keyboard:

- detachable? no
- number of keys: 83
- number of function keys: 30

Weight: 60 lbs.
Other: The printer’s included, right in the top, and paper spurts out like toast. All-in-one has never been—and pray Heaven never again will be—taken this far. Note that the 70K disk capacity is quite small.

Morrow MD-2/MD-3



Price: $1,699/$1,999
Screen size: 12”
Screen color: green
Main operating system: CP/M
Processor: 8-bit Z80A
Standard memory: 64K
Disk drive type: 5¼”
Capacity of formatted disks: 186K/384K
Software included: CP/M, NewWord, List Manager, Correct It, SuperCalc, M-BASIC 80, Pilot, SmartKey (Also included with MD-3: Personal Pearl, Quest)
Keyboard:

- detachable? yes
- number of keys: 92
- number of function keys: 0

Weight: 48 lbs./44 lbs.
Other: A portable version of the MD-3, called the MD-3P, has the same specifications as the MD-3, except it is a single unit with a 9” green screen, weighs 26 lbs, and costs $1,899. The MD-3E has all of the MD-3 except the software only includes CP/M, NewWord and Correct It. The price for the MD-3E is $1,499.

Comments: These are fine computers and excellent values. They're in the same league as Kaypro, price and quality, yet, having larger and highly legible screens, make great desk models.

Everything about the Morrows I like: the keyboard has a good, solid feel; the software is name-brand and abundant. (NewWord, a word processing program, was developed by a group of people who split off from MicroPro; the command structure is virtually identical to WordStar, and has more help files. Beginners may find it easier to use.)

For companies considering multiple purchases or networking, look into the Morrows. The per-unit cost is far below an IBM or IBM-clone system, and with a hard-disk MD-11 in there, you will have plenty of storage space.

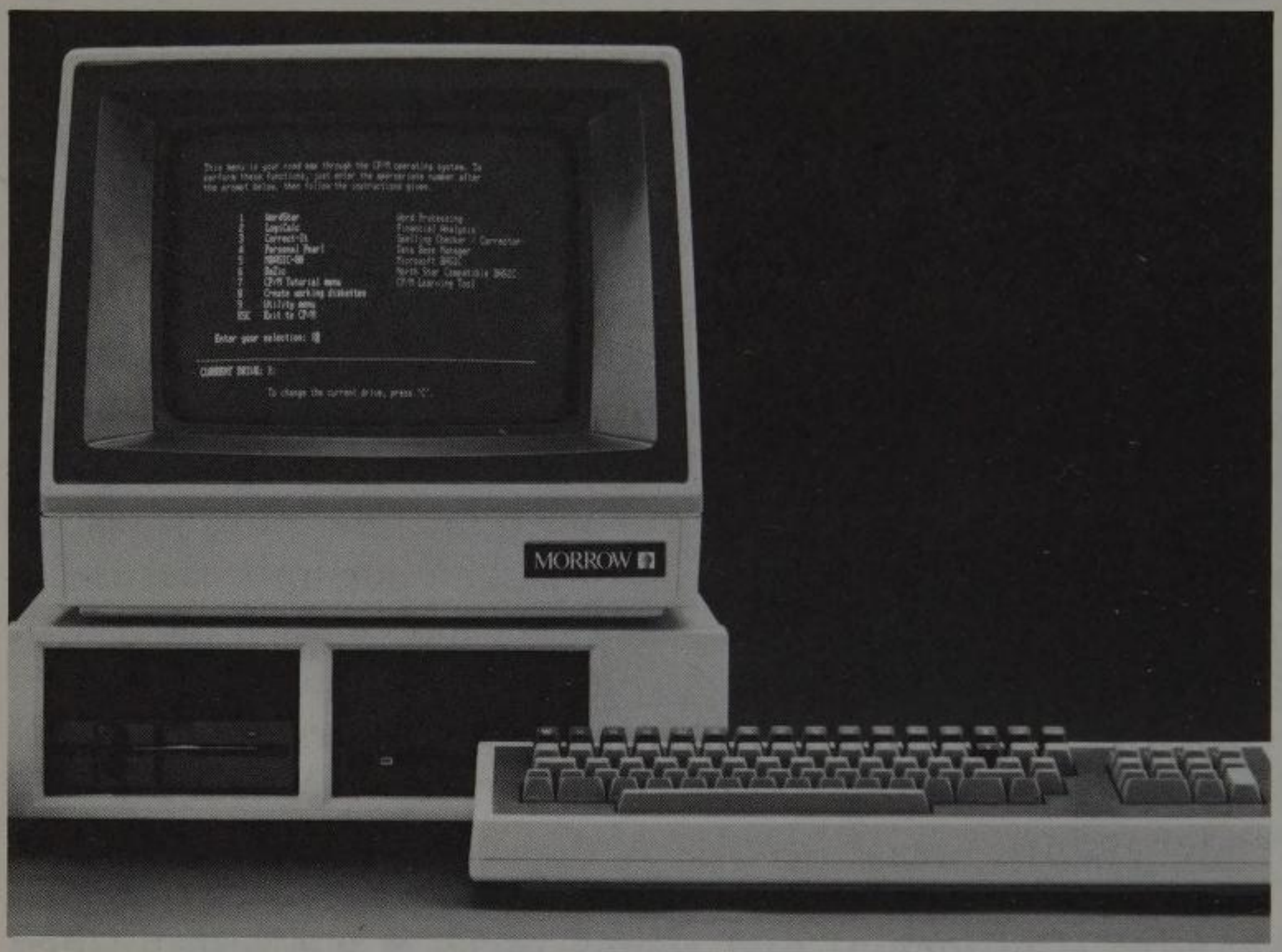
I first heard about Morrow a few years ago the way I heard about most things: a letter from a reader. The reader wrote:

"The company is MORROW DESIGNS out of San Leandro (California) and seems to be a well-established producer of hard disks and S-100 type board components. DUN'S Directory tells me they have thirty-five employees and the listed officers are all named Morrow. I have traced their ads back to 1979."

Now, of course, the company is much bigger than that. I don't know how many employees it has, but I do know the chairman is named George Morrow, an affable, pleasant man. The company has a good reputation and has been around the computer world longer than I have. It is a solid organization and will no doubt stand behind its products.

The Morrow computers are well worth your consideration.

Morrow MD-11



Price: $2,995
Screen size: 12”
Screen color: green
Main operating system: CP/M 3.0
Processor: 8-bit Z80A
Standard memory: 128K
Disk drive type: one 5¼” and one 11MB hard disk
Capacity of formatted disks: 384K and 10.1MB
Software included: CP/M Plus, New Word, SuperCalc, Personal Pearl, Quest, M-BASIC 80, and tutorial disk
Keyboard:

- detachable? yes
- number of keys: 91
- number of function keys: 9

Weight: 52 lbs.

Comments: The MD-11 is a tank—large, solid, reliable. It has a few features other CP/M-based machines don't have. First of all, it uses the new, more powerful CP/M 3.O. This allows for faster execution time, erase protection on individual files, and permits the machine to work with 128K of memory. After formatting is done, there is over 10 megabytes of useable storage area, which is almost 2 megabytes more than the space on the Kaypro 10.

The MD-11 comes with a utility program called Pilot. When you turn the machine on, Pilot gives a menu of all the bundled software. Next to each software program is a number. If you then want to use New Word, for instance, you press the number "1," and soon you are within the New Word program. It's handy, especially for those new to computers.

You won't see this machine on the cover of computer magazines as the Macintosh has been, but with the MD-11, you'll find power and reliability.



NorthStar Advantage



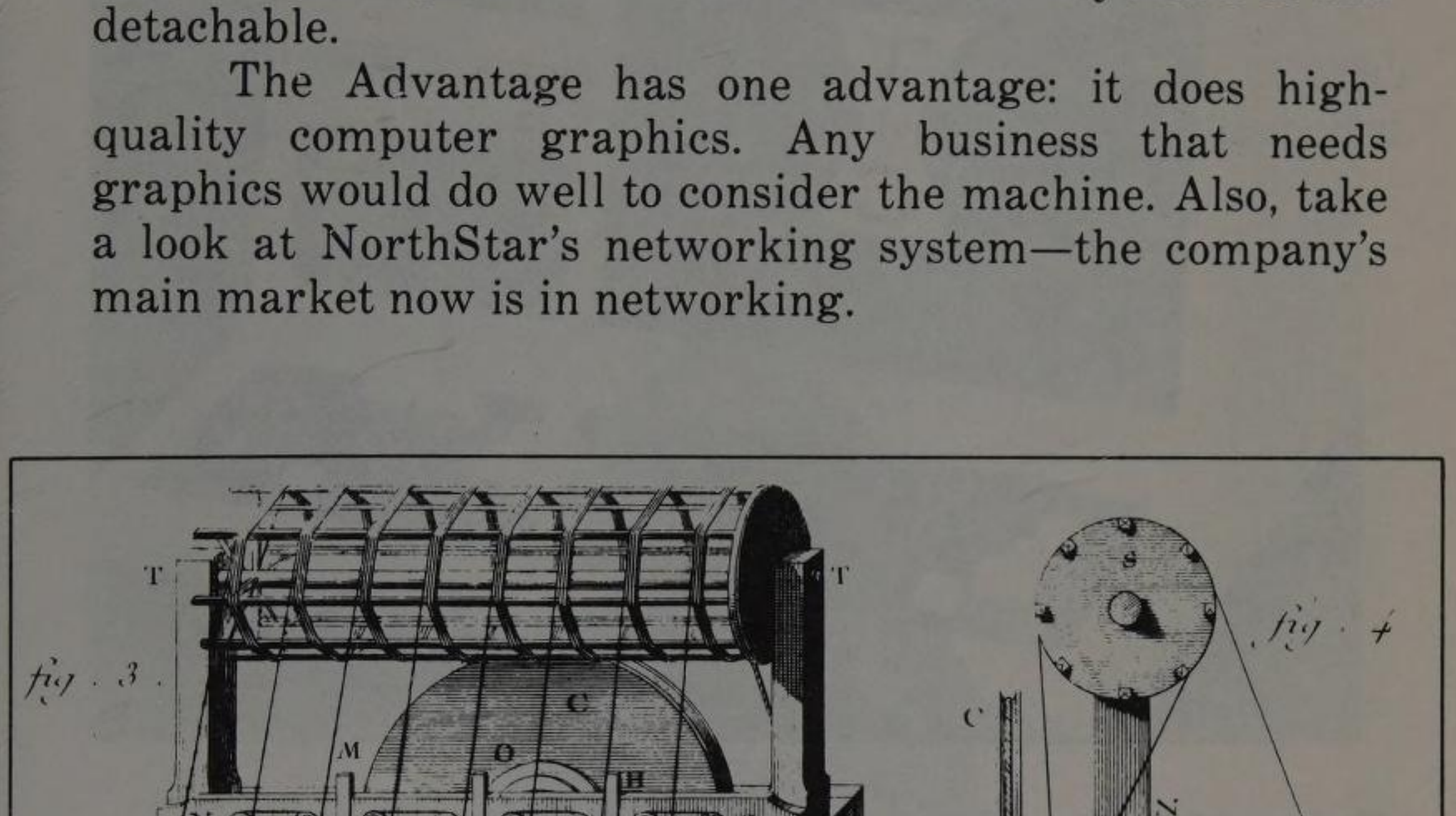
Price: $2,600
Screen size: 12”
Screen color: green
Main operating system: CP/M
Processor: 8-bit Z80A
Standard memory: 64K
Disk drive type: 5¼”
Capacity of formatted disks: 360K
Software included: CP/M, Graphics
Keyboard:

- detachable? no
- number of keys: 87
- number of function keys: 15

Weight: 43 lbs.

Comments: NorthStar has been making computers for a number of years, its Horizon being one of the most respected and dependable ever made. (I still use one.) The Advantage is NorthStar's first "all-in-one" computer—a fine machine, reasonably priced. Unfortunately, NorthStar took the concept of all-in-one too far: the keyboard is not detachable.

The Advantage has one advantage: it does high-quality computer graphics. Any business that needs graphics would do well to consider the machine. Also, take a look at NorthStar's networking system—the company's main market now is in networking.



A hand-powered floppy disk.

Radio Shack TRS-80 Model 4



Price: $1,999
Screen size: 12”
Screen color: black and white
Main operating system: TRS-DOS
Processor: 8-bit Z80A
Standard memory: 64K
Disk drive type: 5¼”
Capacity of formatted disks: 184K
Software included: BASIC, TRS-DOS 6.
Keyboard:

- detachable? no
- number of keys: 70
- number of function keys: 3

Weight: n/a
Other: A portable version, the Model 4P, has a 9” black-and-white screen, two 184K disk drives, a detachable keyboard, and weighs 26 pounds. It retails for $1,799 and is a better computer.

Comments: The one great thing about Radio Shack is that, like Earl Scheib Auto Paint, they are just about everywhere. I even saw a Radio Shack off the beaten path in Lake Tahoe. For small towns without a variety of computer stores, Radio Shack isn't so bad. And if you move a lot, you'll always know where to get your machine repaired.

The Model 4 is the least expensive of Radio Shack's full-line computers. Two disk drives, attached keyboard. Nothing great, but it's OK.



Radio Shack TRS-80 Model 12



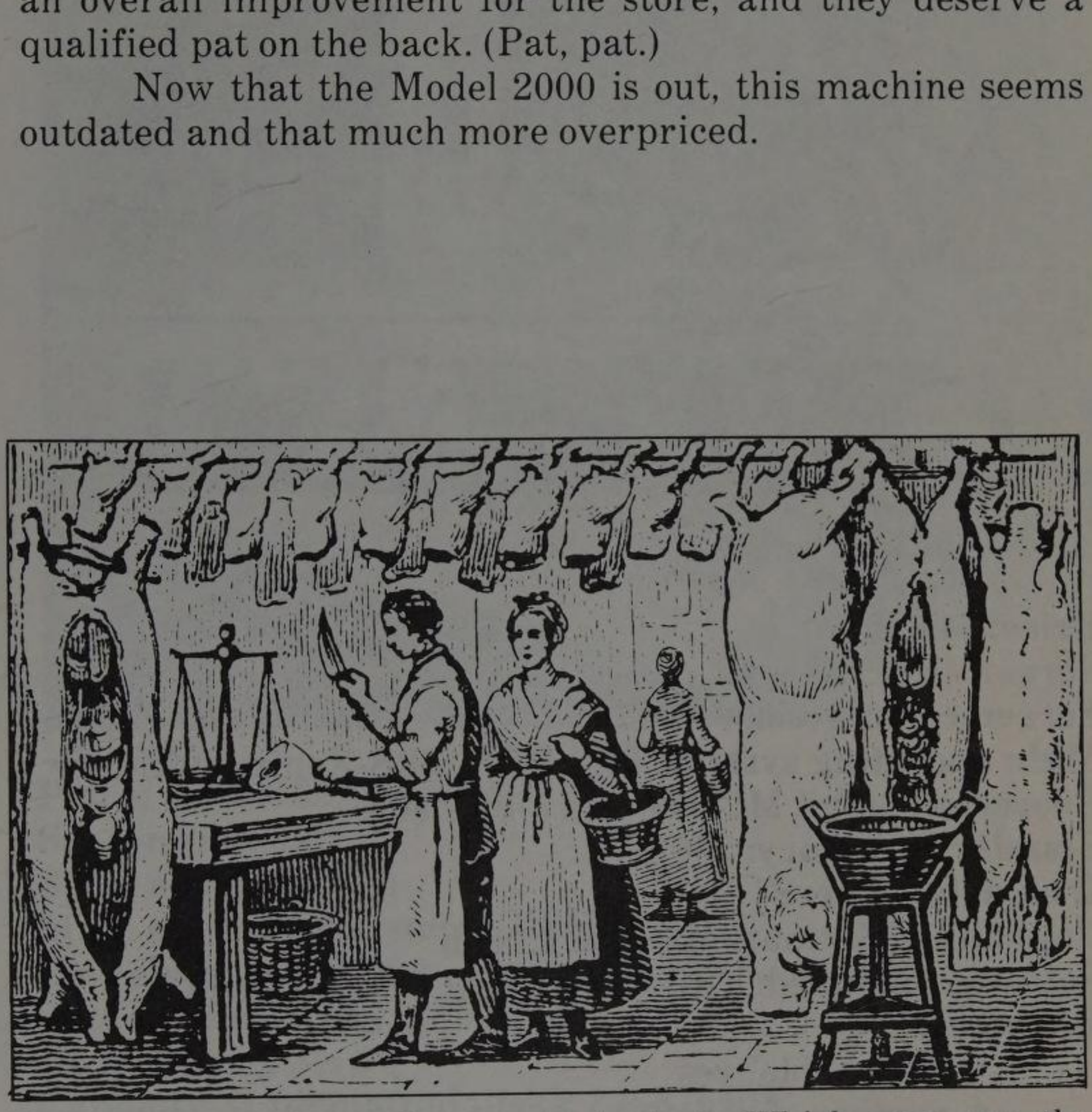
Price: $3,499
Screen size: 12”
Screen color: green
Main operating system: TRS-DOS
Processor: 8-bit Z80A
Standard memory: 80K
Disk drive type: 8”
Capacity of formatted disks: 1,250K
Software included: TRS-DOS and BASIC
Keyboard:

- detachable? yes
- number of keys: 82
- number of function keys: 8

Weight: n/a

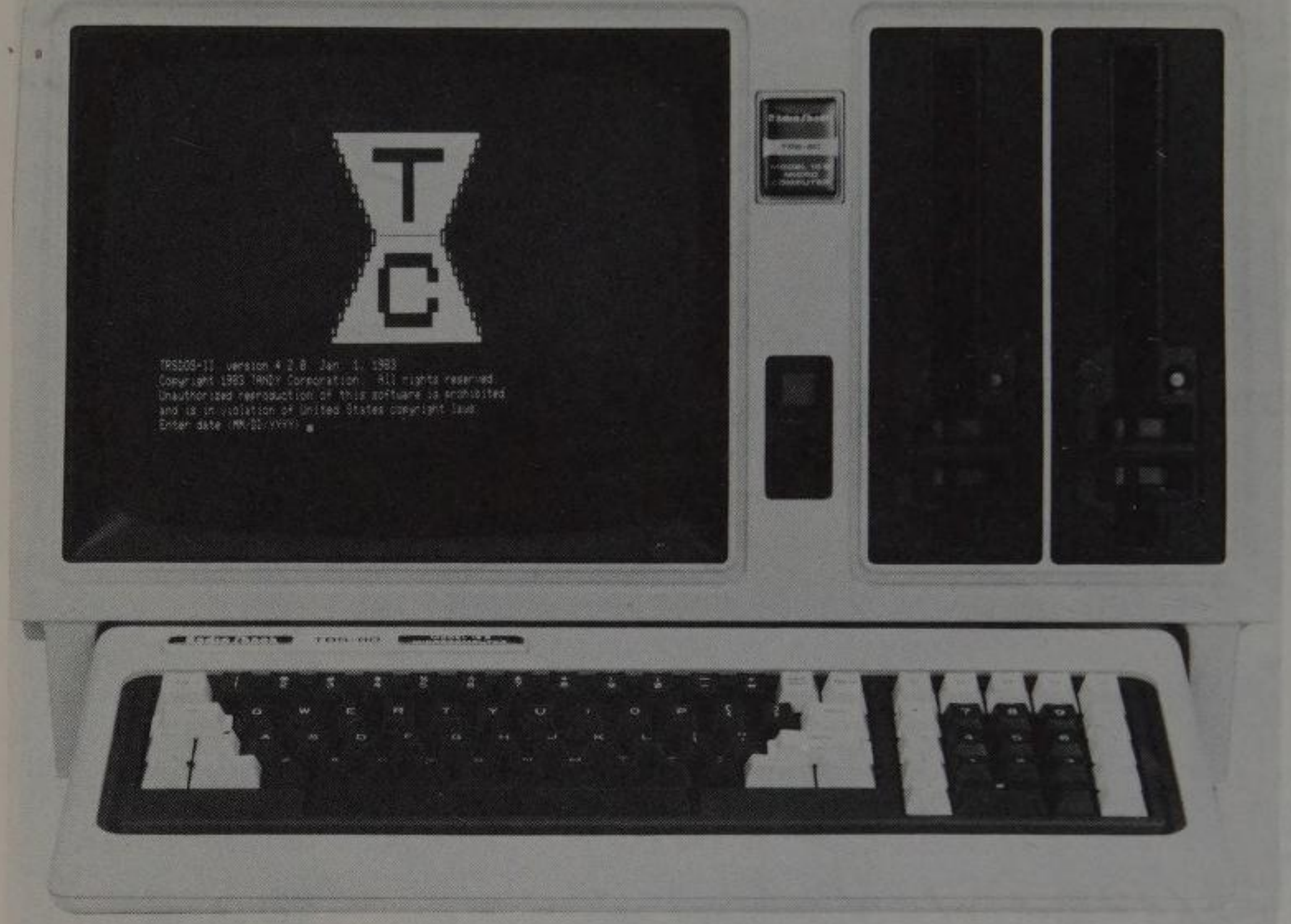
Comments: This is one model I'd recommend for word processing. The whole unit seems a bit bland, a bit big, and a bit overpriced (Radio Shack is the Chevrolet of computers), but if Radio Shack is the only computer store in town, you could do worse for word processing or general office computing than the Model 12. (You could do worse without leaving Radio Shack.) The Model 12 does represent an overall improvement for the store, and they deserve a qualified pat on the back. (Pat, pat.)

Now that the Model 2000 is out, this machine seems outdated and that much more overpriced.



"Excuse me, please. I seem to be lost. Which way are the printers?"

Radio Shack TRS-80 Model 16B



Price: $4,699
Screen size: 12”
Screen color: green
Main operating system: TRS-DOS, TRS-Xenix multi-user
Processor: 16-bit MC6800 and 8-bit Z80A
Standard memory: 256K
Disk drive type: 8”
Capacity of formatted disks: 1,250K
Software included: TRS-DOS, BASIC, TRS-XENIX
Keyboard:

- detachable? yes
- number of keys: 82
- number of function keys: 8

Weight: n/a
Other: A powerful machine, but overpriced.

Sanyo MBC-1150/MBC-1250



Price: $2,099/$2,599
Screen size: 12”
Screen color: green
Main operating system: CP/M
Processor: 8-bit Z80A
Standard memory: 64K
Disk drive type: 5¼”
Capacity of formatted disks: 326K/640K
Software included: CP/M, S-BASIC II, WordStar, CalcStar, MailMerge, SpellStar, InfoStar
Keyboard:

- detachable? yes
- number of keys: 100
- number of function keys: 15

Weight: 35 lbs./38 lbs.

TeleVideo 802



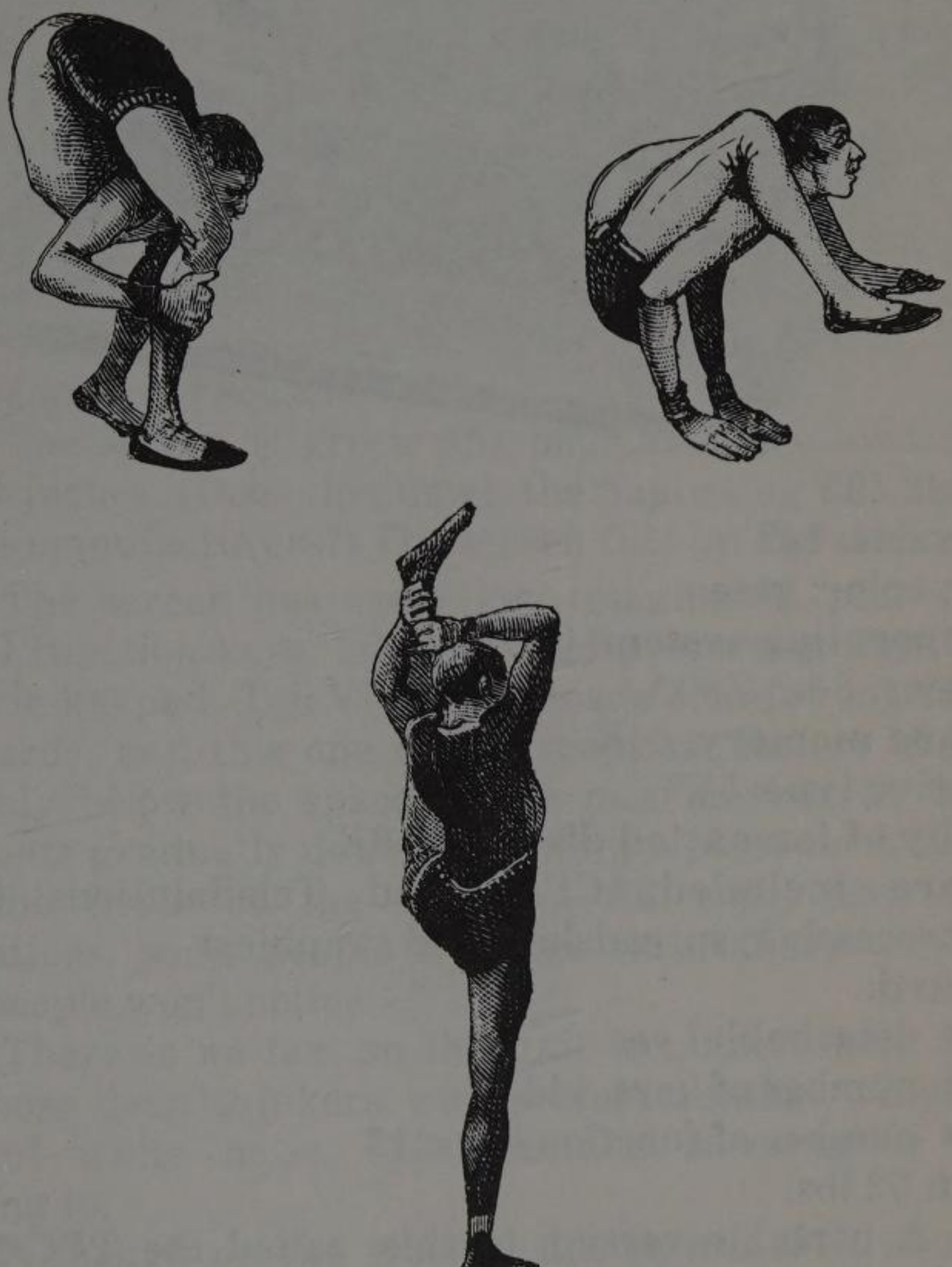
Price: $3,495
Screen size: 12”
Screen color: green
Main operating system: CP/M
Processor: 8-bit Z80A
Standard memory: 64K
Disk drive type: 5¼”
Capacity of formatted disks: 340K
Software included: CP/M
Keyboard:

- detachable? yes
- number of keys: 101
- number of function keys: 22

Weight: 44 lbs.
Other: Hard-disk version available for $5,995.

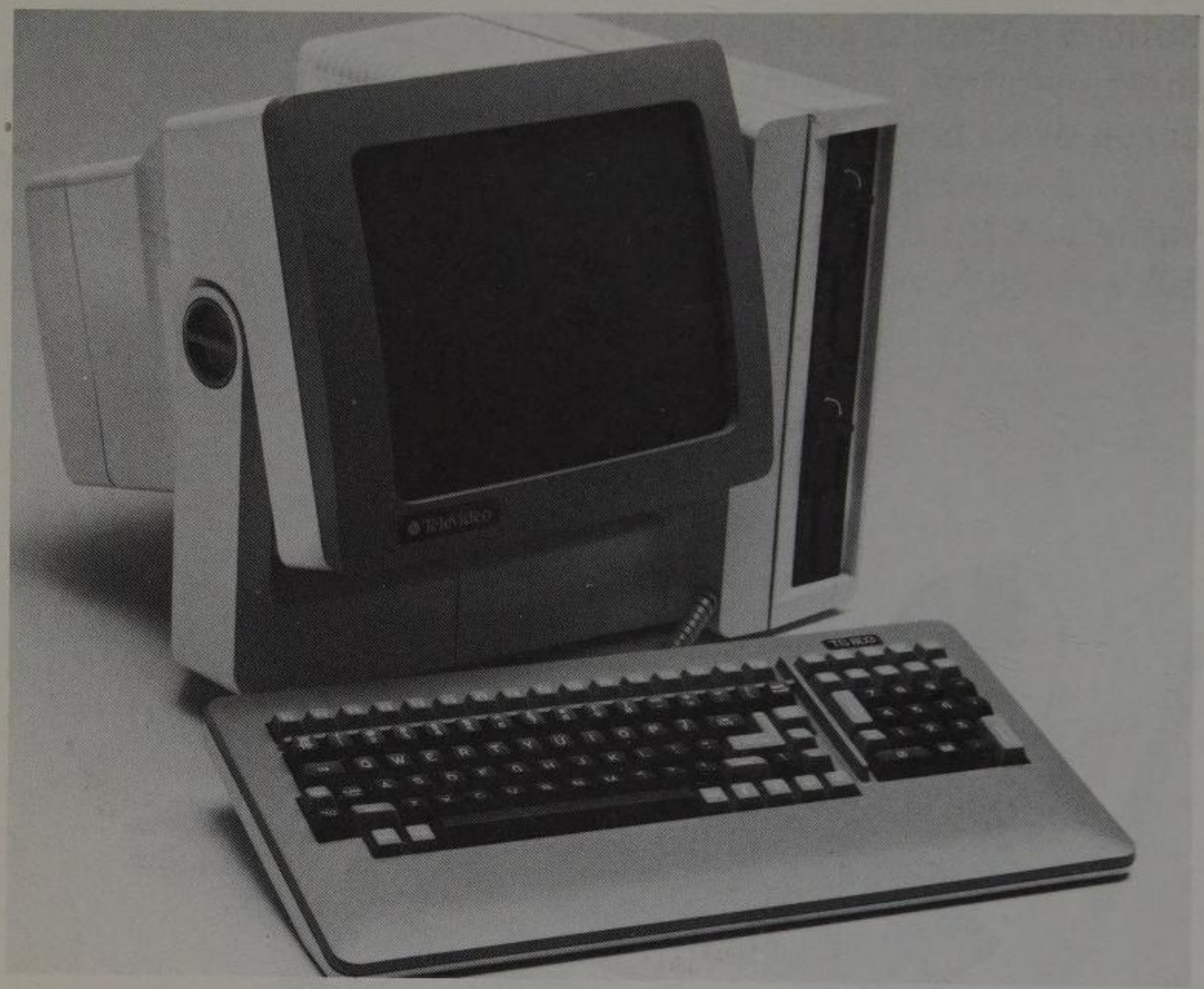
Comments: TeleVideo built high-quality, low-cost terminals for years before they manufactured full computers. To build a personal computer, TeleVideo began with the best: their own 950 terminal. The 950 is the top of the line of a dozen-or-so models.

I used to recommend the TeleVideo 802 as a good value, until an even better value came along: the 803. The 802's price now is high.



Exercises to combat keyboard fatigue.

TeleVideo TS-803



Price: $2,495
Screen size: 14”
Screen color: green
Main operating system: CP/M
Processor: 8-bit Z80A
Standard memory: 64K
Disk drive type: 5¼”
Capacity of formatted disks: 368.6K
Software included: CP/M and TeleSolutions (word processing, spreadsheet and graphics)
Keyboard:

- detachable? yes
- number of keys: 111
- number of function keys: 16

Weight: 52 lbs.
Other: A portable version of this, called the TPC-1, has the same specifications as the 803, but comes in a 32 pound all-in-one unit. It costs $1,999.

Comments: The "TS" in "TS-803" stands for, I think, Tres Sexy. This latest computer for TeleVideo is the sexiest thing this side of Euphoria.

The design is, how you say, ohh-lah-lah. If this computer does not win some design award somewhere, there is no justice. Aesthetics aside, the 803 is a powerful full-featured computer at a great price.

TeleVideo, more than any other company I know, has no fear of making the computer they introduced only a few months before nearly obsolete by the introduction of a totally new computer.

The company began with the 801, which basically added a processor, memory and two disk drives to their already popular 950 terminal. In its day, it was a good value. Then came the 802, which housed all the personal computer elements in one sleek package. Suddenly the 801 seemed a bit clunky.

Now, with the 803, which looks as though it was designed by Maserati, with more features, and far less expensive than the 802, well, is there any doubt which consumers will choose?

The screen is green phosphor and measures not 12, but 14 inches. (Does this mark the beginning of a size war among manufacturers?) The screen tilts up and down.

The screen has every key imaginable, plus sixteen special function keys, labeled word processing keys, and a numeric keypad. TeleVideo has made some of my favorite keyboards, and this one is no exception. Rather than end suddenly below the spacebar, as most keyboards do, this one slants gradually down, providing a place for a typist to rest the heels of the hands. As with most design innovations, some people will like this, others won't, and most people won't notice.

There is no fan, so the unit is quiet, silent in fact. For those deep thinkers who prefer creation without the whir of white noise, this machine is certainly worth listening to.

Although on the whole I am enthusiastic about the TeleVideo 803, I have a few reservations. Although the silence of no fan is nice, the disk drives, when they

operate, sound a bit like muffled coffee grinders, and not the sort that Bessie Smith sang about. This is a minor distraction, as the disks seldom turn when any "serious" computer input is going on.

Also, the 803 has a slight electronic click each time a key is hit. Some people, especially touch typists, like this. The 802 has a switch in the back to turn the keyclick off, but I could find no such switch on the back of the 803. I'm sure that some technical type somewhere knows how to turn it off.

While I find the larger letters on the 14-inch screen easier to work with, they aren't as sharp as on the 802. A check of the specifications shows why. The 802 has a character resolution of 10x14 with a 7x10 dot matrix, while the 803 has a 8x10 resolution with a 7x9 dot matrix.

The decreases are not significant, but, when combined with the larger character size on the screen, the degeneration of character quality is noticeable. I should point out that the screen display is perfectly readable, and anyone who did not have the 802 display to compare it with would probably never know a dot here and a dot there were missing.

These few cavils should be considered minor complaints, especially when the price of the unit is taken into account.



Toshiba T-300

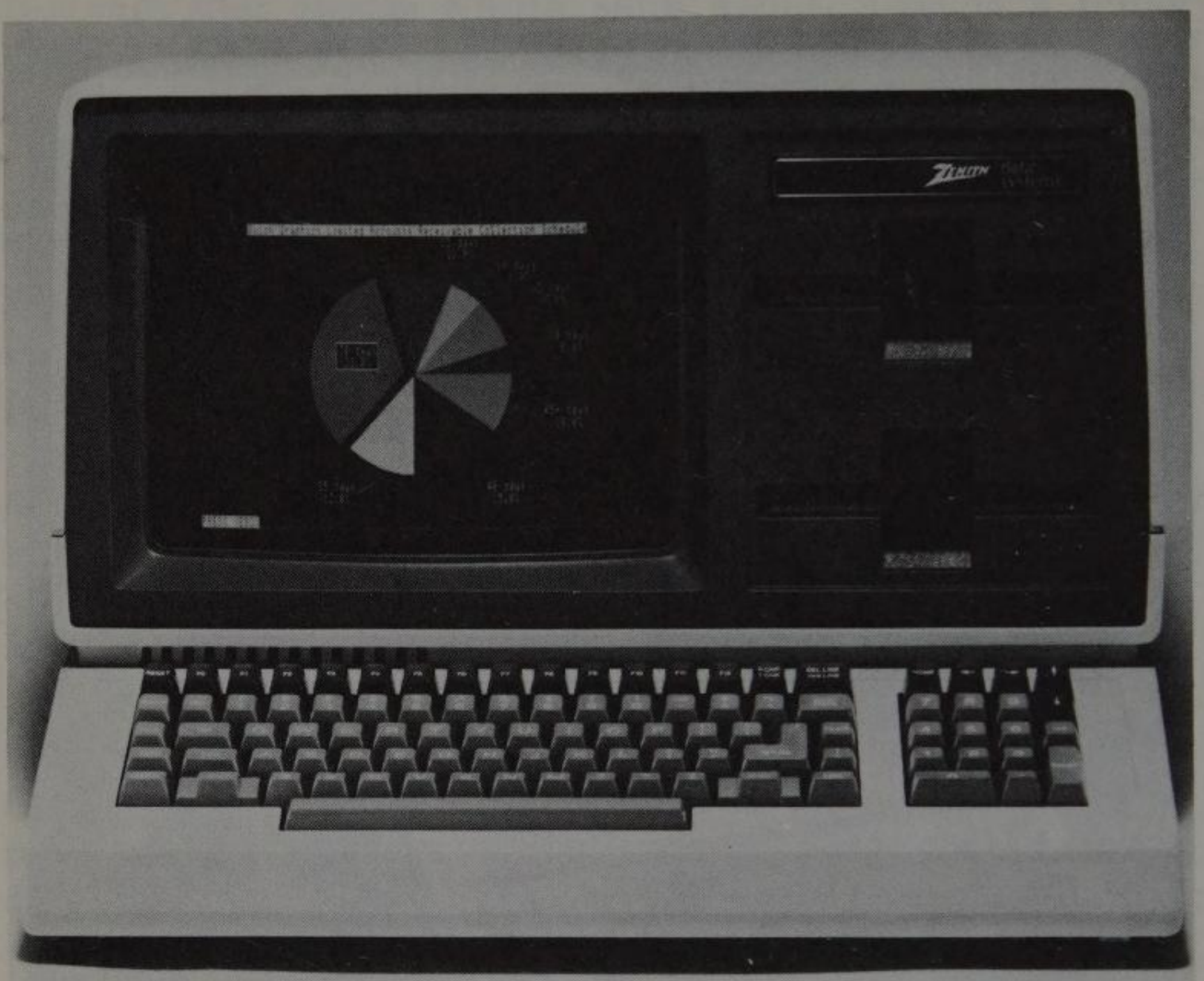


Price: $3,090
Screen size: 12”
Screen color: green (color available)
Main operating system: MS-DOS
Processor: 16-bit 8088
Standard memory: 192K
Disk drive type: 5¼”
Capacity of formatted disks: 640K
Software included: T-BASIC 16
Keyboard:

- detachable? yes
- number of keys: 103
- number of function keys: 10

Weight: n/a
Other: Toshiba has phased out its T-100 computer, an 8-bit model, and this replaces it.

Zenith Z-100 (Heath HZ-100)



Price: $3,729
Screen size: 13”
Screen color: green
Main operating system: Z-DOS
Processor: 8-bit 8085, 16-bit 8088
Standard memory: 192K
Disk drive type: 5¼”
Capacity of formatted disks: 320K
Software included: Z-DOS
Keyboard:

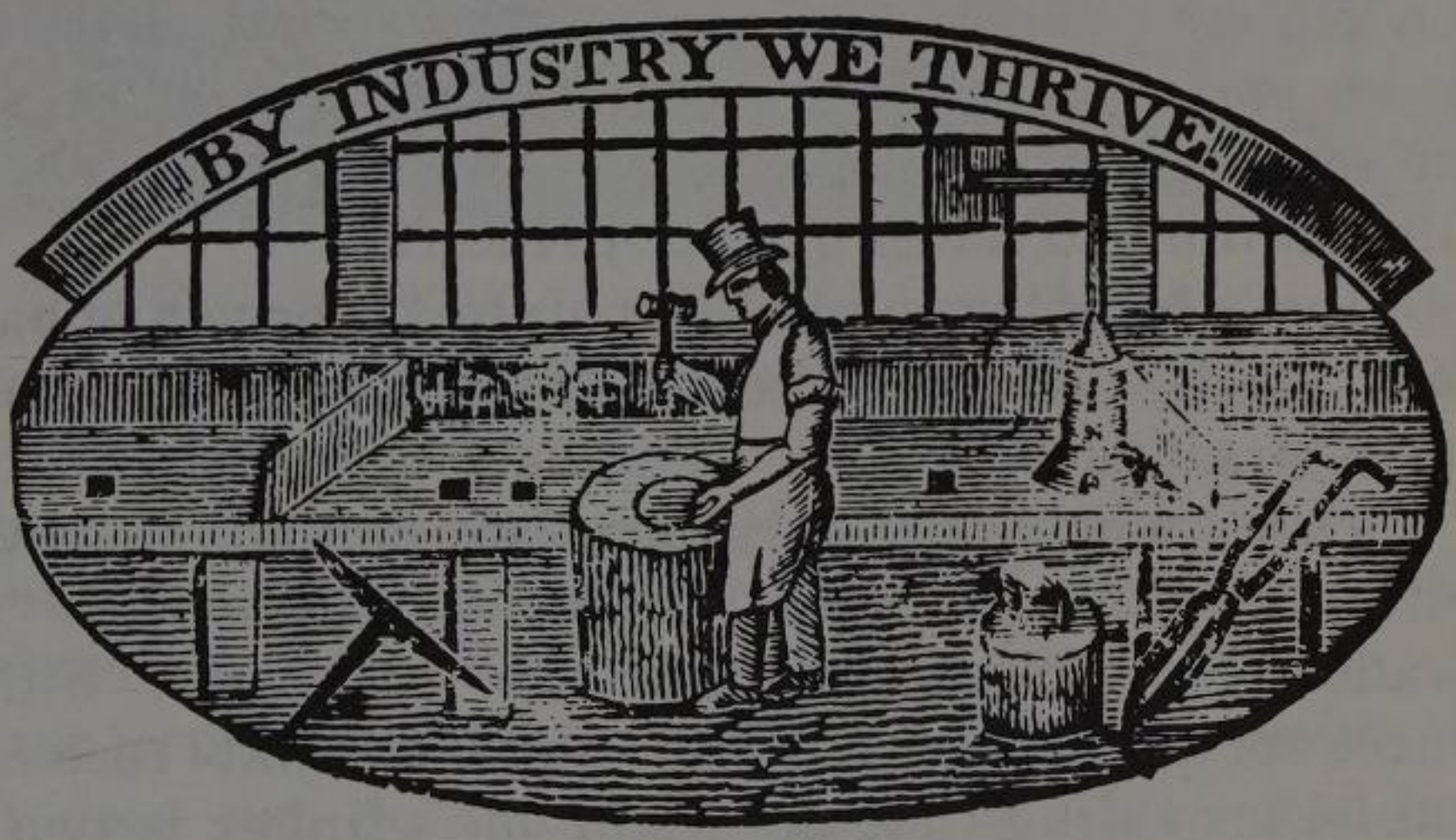
- detachable? no
- number of keys: 108
- number of function keys: 13

Weight:n/a
Other: The Heath HZ-100 is in kit form

Comments: For a "state-of-the-art machine," and one that Zenith and Heath hope to conquer the vistas of computerdom, the Z-100 is surprisingly primitive. The screen display is not very good. The keyboard is non-detachable. It is an 8- and 16-bit machine, but the amount of software that will run on it seems limited.

It has some good points. It uses an S-100 bus, for example. The S-100 bus is a standard for which hundreds of plug-in expansion boards are available. This provides great flexibility, but I'm afraid it requires a tinkerer's mentality. This machine, then, is right up a Heathkit lover's avenue. I'm not sure how well it will fare in business or word processing, where non-tinkerers abound. It's not exactly inexpensive, either.

If you own a Z-100, or are considering one, Hugh Kenner has written a great users' guide for the machine. It is published by the R. J. Brady Company.



PRINTERS

The next consideration is that of a printer. There are two kinds to consider, dot matrix and letter quality. Dot matrix printers cost less to buy and print faster, yet the quality of their finished pages leaves much to be desired. Letter quality printers cost more to buy and print more slowly, but the quality of their finished pages rivals that of the best electric typewriters.

Which is best for word processing? Clearly, letter quality. Correspondence, manuscripts, term papers—almost anything but in-house financial statements and invoices—look unbearably chintzy when printed on most dot matrix printers.

One of the bigger trends is that dot matrix printer manufacturers are advertising "correspondence quality." I must say, the print is getting better, but it's not as sharp as true letter quality printers. At best, the characters on dot matrix machines look like a typewriter with a thick nylon ribbon—which is saying a great deal. This quality may be enough for many people, and just below par for those sending important letters or manuscripts. Therefore, I still recommend letter quality printers.

But which letter quality printer? There are basically three kinds: daisy wheel, thimble, and converted typewriters.

Daisy wheel printers are so named because the printing element is a metal or plastic circle with "petals" Salvador Dali might mistake for a flower. Similarly, thimble printers use a print element that resembles a thimble, providing that the tip of one's finger is two inches wide. (Who names these things anyway?)

Metal daisy wheels give better print quality than do plastic daisy wheels, but plastic daisy wheels print faster than metal ones. Thimble printers combine maximum speed (55 characters per second, or about 450 words per minute) with maximum print quality. Thimble printers tend to be slightly more expensive than their daisy wheel cousins.

If money is a major factor in your decision, you can save quite a bit of it by buying a daisy wheel or thimble printer that prints at 35 cps or less rather than at 55 cps. Everything will take longer to print, but you'll initially save $1,000 or more.

Epson FX-80



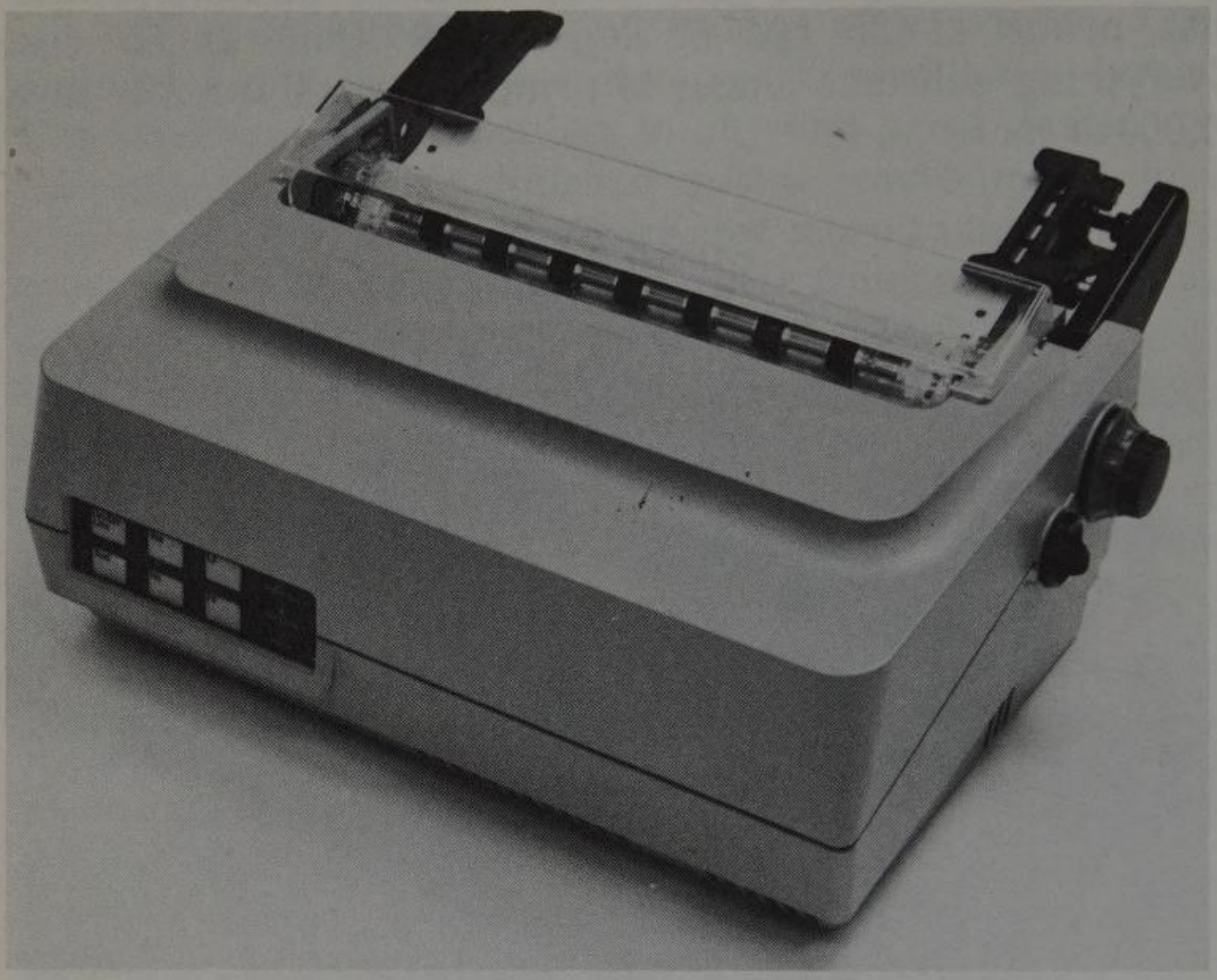
The Epson FX-80 is generally considered the leader in dot matrix printing for its price range ($500 — $1,000). Of all the inexpensive dot matrix printers available, IBM chose the Epson as the printer for the IBM Personal Computer.

A dot matrix printer, for reasons I gave above, should be considered for word processing only if the final appearance of printed copy need not look impressive. (The FX-80 does not do the "near letter quality" that newer printers are doing. Epson's LQ-1500 does this nicer printing, but it also costs $1,395.)

The Epson FX-80 is extremely rugged. I've carried it all over as a travelling printer (with my portable computer) and it withstands all the bumps I give it. It weighs only 15 pounds.

The printing speed of the FX-80 is 160 cps. The list price is $599.

Mannesmann Tally 160L



One of the new generation of dot matrix printers entering the market, the Mannesmann Tally 160L gives you a choice of 160 characters per second in the regular dot matrix "draft" mode, or near letter quality at 40 characters per second.

The letter quality is accomplished by two passes of the print head. The quality of the print is excellent, and only someone scrutinizing the type would notice how it was done.

```
This is a sample of the Letter
Quality mode of the Mannesmann Tally
This is a sample of the Draft
Quality mode of the  Mannesmann Tally
```

The Mannesmann has another new feature which should become standard on other printers. With most printers you have to face a myriad of little switches and search through a manual to set up the printer for your

computer. The Mannesmann simply asks you questions in plain English on plain paper. You answer "yes" or "no." It's that simple.

Another advantage is the size of the printer. It measures just 14 inches wide and 9 inches deep. That even fits on *my* desk.

The printer comes with parallel and serial interfaces, and form feed tractor. All seems complete. There are a few drawbacks to consider, however. Single sheet paper can be next to impossible to load. Don't consider printing on your own letterhead unless it's tipped for form feed. If you use textured paper, the type can become smeared. Ribbons are expensive, around $15, don't last long and are hard to find. (They can be ordered from the manufacturer.)

The price is around $800. When you can spend more than $2,000 for both a dot matrix and letter quality printer combined, this could be one alternative.



Okidata



The Okidata Microline 92 is a rose among the new printers on the market. Small and offering the speed and print quality of an Epson FX, the Okidata also includes a "correspondence" grade print capability.

How does this correspondence grade look? Though it is still dot matrix, it's quite good. I think the type quality exceeds that of the Mannesmann Tally printer, but this machine, listed at $599, costs far less. The Okidata typeface is a partial "serif" style, which means the letters are similar to daisy wheel fonts using a pica typeface.

The correspondence quality prints at 40 characters per second, while the normal draft mode zips away at 160.

It is fairly simple to make the printer do very large type which would be good either for headings in reports, or for correspondence to someone with poor eyesight

This Okidata does excellent graphics, and can use Reportmaker. It also takes simple, old-fashioned, typewriter-like reel to reel ribbons. They are cheaper than most printer ribbons, but they are a mess to change.

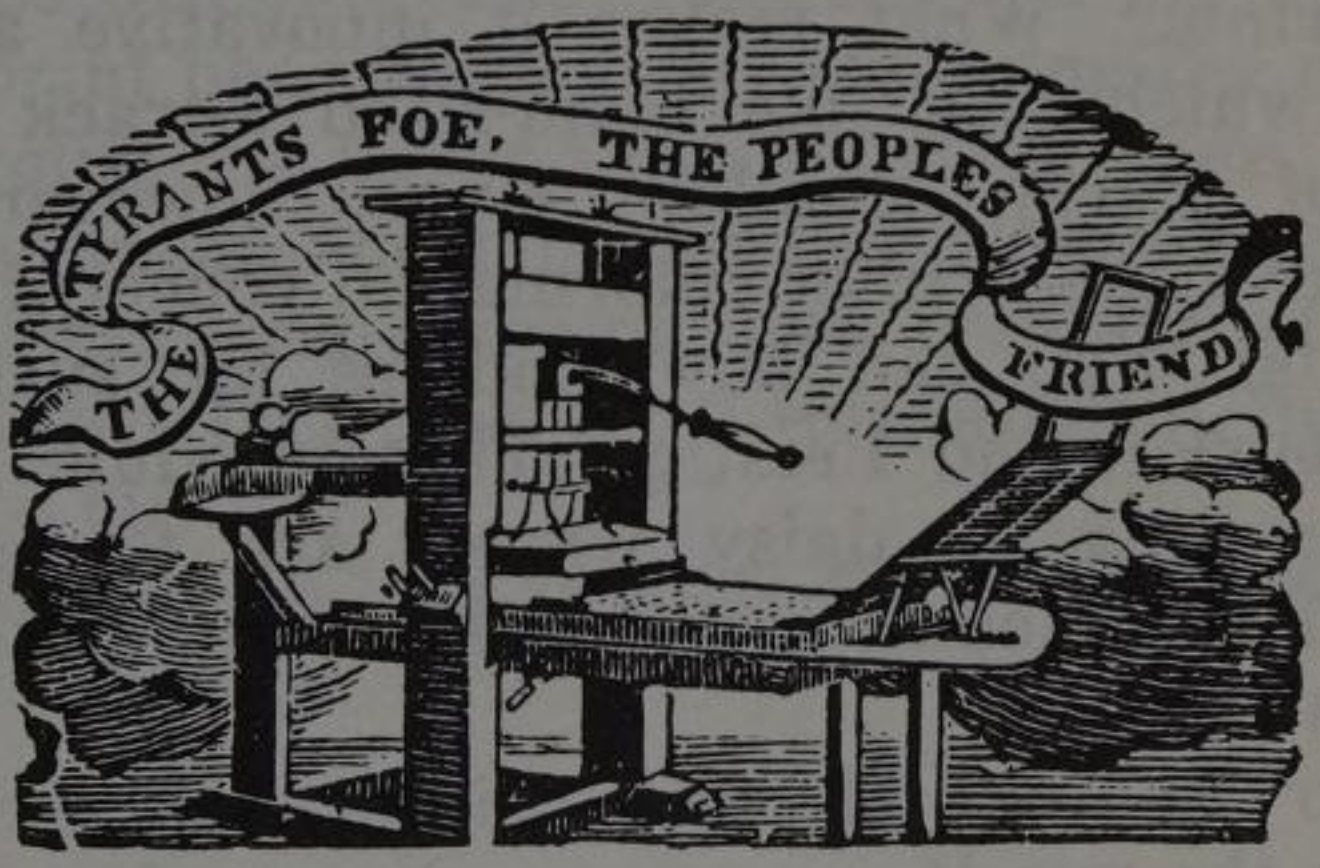
Since the printer has a built-in pin-feed, you don't need a tractor for 8½ x 11" paper. It handles single sheets nicely, but envelopes can be a problem since they get caught in the pins.

My one complaint is that there isn't just a button on the front of the printer allowing you to switch to correspondence quality. Once you've set it up it's great, but you do have to know how to set it up. Okidata now offers step-by-step instructions for many word-processing programs.

Here is an economical printer which can give you both speed and quality. Unless you're absolutely set on a daisy wheel printer, I'd check this one out.

```
Here we have a sample of the OKIDATA
"Draft Quality."

Here we have a sample of the OKIDATA
"Correspondence Quality."
```



Texas Instruments Model 855



This is an innovative—and more expensive—dot matrix printer. What makes it innovative are its font modules, which look like palm-sized 8-track cartridges Instead of Barry Manilow songs, however, the font modules give the printer information concerning the type style (fonts). You can buy modules for such styles as Gothic, Courier, and Prestige. These modules are to dot-matrix printing as daisy wheels are to letter-quality printing. Three module sockets allow you to intermix three type styles at once.

Also handy with this printer are the command buttons on the top. If you want to change from 10 pitch to 12 pitch, or switch from draft quality to letter, you press a button. There is no need to imbed commands within your text. Of course, this kind of convenience is what helps make it more expensive.

The printing quality on the 855 impresses—the finest I've seen yet from a dot matrix. The print head uses 9 pins, and passes over each line twice. Upon close scrutiny, the larger letters still have a somewhat boxy look

to them, but most people won't notice. The speed is 35 characters per second, or, using the draft quality mode (which is horrible in comparison—not even good enough for notes) 150 characters per second.

Texas Instruments' draft quality
using the 12-pitch Courier Italic font.

Texas Instruments' letter quality
using the 12-pitch Courier Italic font.

Texas Instruments' draft quality
using the 10-pitch Gothic font.

Texas Instruments' letter quality
using the 10-pitch Gothic font.

There are (at press time) ten modules available, as well as a tractor feed.

I've had one problem with this machine. Inserting paper can be difficult. The front edge of my paper can't get by the print head without my loosening the platen and sort of tangoing the paper through. Each page, therefore, requires alignment, and I'm spending almost as much time loading paper as the machine does printing on it. Texas Instruments says they have fixed this problem, but check it out before you buy it.

The Model 855 lists at $935; $995 with a tractor feed. Modules are $40 each.

Hewlett Packard Think Jet Printer



Ink jet printers are getting cheaper and better. They are not the panacea in the war between dot matrix and letter quality printers, but they're working on it.

The Think Jet Printer is a step in the right direction. Instead of hammering a character onto paper as does a daisy wheel or thimble printer, or instead of pushing pinfuls of ink at the page as does a dot matrix printer, the Think Jet Printer silently sprays micro-spots of ink. The finished product looks like high quality dot matrix printing.

The first few times I used the printer, I had to open the cover and stare at it in awe. It doesn't make any of the noises I'm used to hearing. There's only a small whir of the print head going back and forth and the ticks when the paper advances.

Near letter-quality can be had by double printing. While you can still see that the characters are made up of dots, the print is very clear, and certainly sharper than most dot-matrix printers. This high-quality whispers out at 75 characters per second. Draft quality comes at 150 cps.

Graphics are printed with an exceptional 192 x 96 dots per inch resolution.

All this is accomplished by a tiny replaceable ink cartridge about the size of a thumb. The cartridge lasts for about 500 pages and sells for around $7. Hewlett Packard has simplified the electronics and mechanics of this system so it should be extremely reliable. There are fewer moving parts compared to other printers.

Not all is perfect, however. It prints in a 12 pitch (elite), while standard business and manuscript work is in 10 pitch (pica). If you use this for your own drafts, it shouldn't matter.

```
Hewlett Packard Think-Jet Printer
This is a sample of draft quality 12 pitch
This is double-strike 12 pitch
This is the Compressed-expanded
This  is  Expanded Expanded

SSEEEEAABHLVFCSSDDDDDNSECESEFGRU !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
HXXTQKYSTFTFROIL1234KYBNMBCSSSS
```

Special paper comes with the printer, but "normal" paper can be used. Be careful, however: our letterhead, which is textured paper, did not work well, and inexpensive, thin form-feed paper tended to soak up the ink and look blotchy.

The printer's size impresses. At six pounds, it's only a little larger than a standard college dictionary, and could easily fit into a briefcase. This makes the best travelling printer I've seen.

The last but certainly not least amazing fact—the printer sells for $495. The sleeping giant named Hewlett Packard just woke up.

Comrex CR-II/Brother HR-15/Dynax DX-15



Though there are a variety of names, these printers are all the same—manufactured by Brother International. For a low-cost letter-quality printer (it lists at $599), it has many advanced features.

(For purposes of review, I'll call it the Comrex—the Comrex people were the most eager to help, and they sent the machine, while the Brother people were secretive and unresponsive. Brother wouldn't even give out the list price of their printer without a written request.)

The Comrex CR-II is a bi-directional printer rated at 13 characters per second. It's quiet, with a daisy wheel that is easier to remove than any I've seen. Its automatic paper feed does not scrunch paper.

Two features amaze me. First of all, there's an inexpensive cut-sheet feeder. Not only does it work well, feeding stationery sheet by sheet and depositing the printed pages on top, but also the price astounds: the feeder lists for $259 (and is usually discounted). IBM's cut sheet feeder for the Displaywriter is on sale for $1,095, and NEC's is $1,400. To pay a little over $200 is a bargain. To have one that works as well or better than its bigger brothers is a miracle.

For this price, you can avoid the expense of tipping stationery onto continuous paper, and you can avoid having the rough edges of tractor-fed bond. If you want a tractor feed, though, the Comrex has one: only $120.

The second feature that's new is a keyboard. If you want both a typewriter and a printer, then the keyboard, at $199, may be for you. It converts the CR-II into an electronic typewriter. You can even erase with it—the printer has the same erasing flypaper that the IBM Selectrics have. The advantages of a keyboard are not great unless you need a typewriter now and a printer later (after you buy a computer). You'll use your computer for most writing, but you'll still use the keyboard to type a quick envelope or to make small corrections without having to print out a new page.

The Comrex II has a 4K buffer, which works out to roughly two double-spaced pages. The "Copy" feature on the printer allows you to make multiple copies of a letter without tying up your computer.

The printer allows for 10, 12, and 15 pitch typestyles and will do proportional spacing, sub- and superscripting.

The only weakness to the machine is its speed. It's slightly faster than the Morrow MD-100 and the Smith-Corona L-1000, but slower than most higher-priced printers. With the cut-sheet feeder, though, just pack the machine with a load of paper and go do your shopping. For an inexpensive, letter quality printer that rates high in excellence, don't miss seeing the Comrex CR-II.

Brother HR-1 (also **Comrex CR-1**)

The Brother HR-1 (also sold as the Comrex CR-1) is a bit faster than the Smith-Corona L-1000 (17 vs. 12 characters per second) a bit quieter in operation, and naturally, costs a bit more. ($995, although like the Smith-Corona, tends to be discounted.)

The Brother and the Comrex will do double strike, bold, and underlining. They will not do proportional printing, sub- or superscripting.

Bytewriter



The Bytewriter is a converted Olivetti Praxis 40 electric typewriter with an interface that makes it a computer printer. It prints at about 10 characters per second. If you want a more portable version, the company offers a converted Praxis 35. Either model lists for $495. If you already own a Praxis typewriter, you can simply buy the interface for $165.

If you need a typewriter *and* a printer *and* you're on a budget, this would be the printer to get.

Diablo and Qume

While Diablo and Qume both make fine printers, if you're going to spend that much money, my suggestion is to buy an NEC. This is based upon the superior reliability of NECs over the years. The NEC is a workhorse.

If, however, you need a special feature offered by Diablo or Qume, or if you can get it for a special price, you will not be displeased with either printer.

A Brand Name Buying Guide

Daisywriter

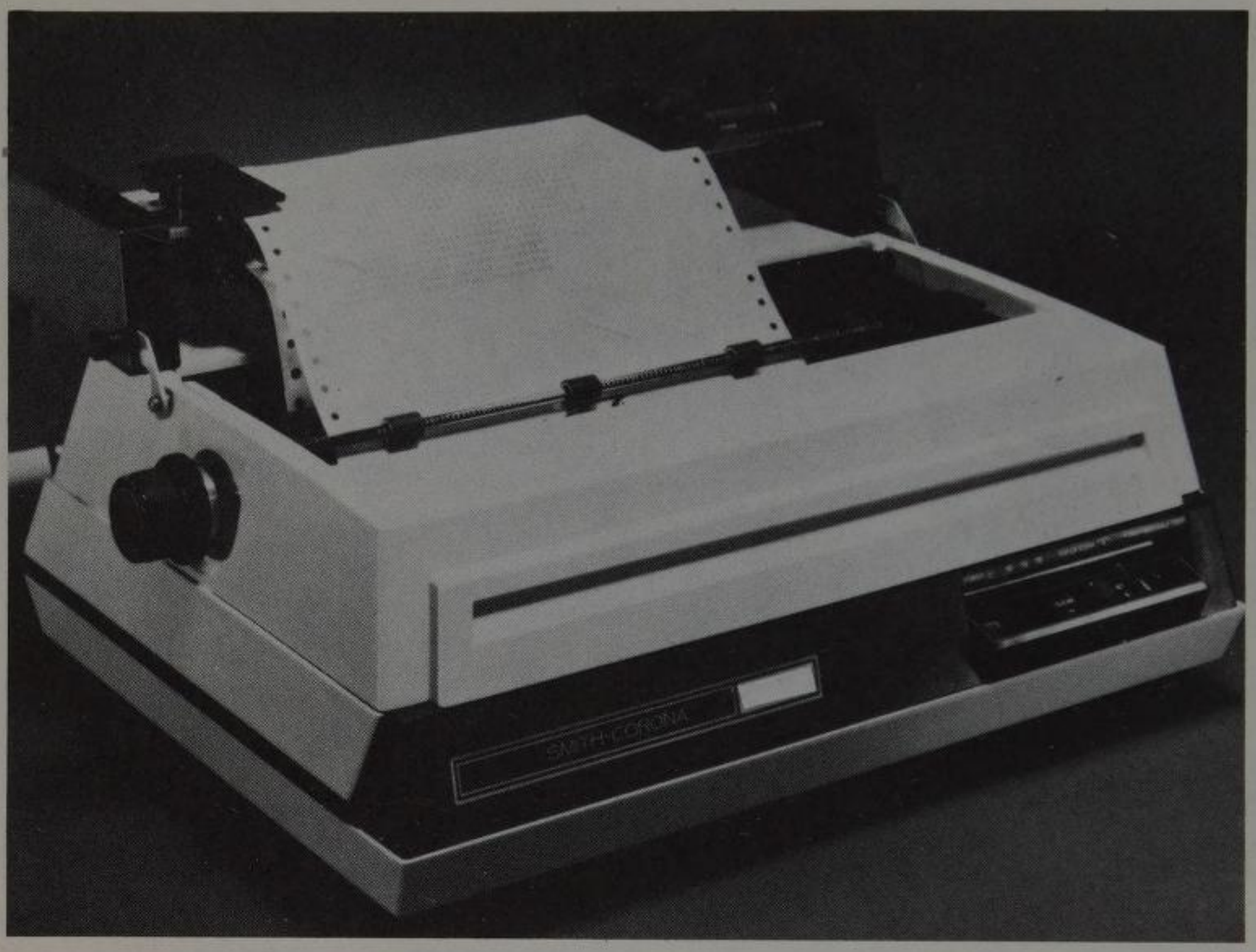


The Daisywriter, being full-featured, does true proportional-spaced printing, microspacing, sub- and superscripting. It features a 48K buffer which allows you to enter the file to be printed into the *printer's* memory. While the printer is printing from its memory, your computer is free to be used for other tasks.

The Daisywriter retails for $1,495.

DAISY

Smith-Corona L-1000



Those of you out there who are in serious need of a truly inexpensive letter quality printer should look at the new Smith-Corona L-1000. This is a solid little printer that weighs only 20 pounds. The print quality is good, with both underlining and boldface, and there is triple pitch spacing: 10, 12 and 15 characters per inch. The printing speed, unfortunately, is still a slow 12 cps using a bi-directional carriage.

The carriage and frame are very sturdy, and there's every reason to expect that this printer can stand up to a lot of form letters. The ribbon cartridges and print wheels are inexpensive and easy to replace. (It's all those years of making portable electric typewriters that's paying off.) The L-1000 also has both serial and parallel interface ports and an optional tractor feed attachment. There's also an input buffer of 570 characters.

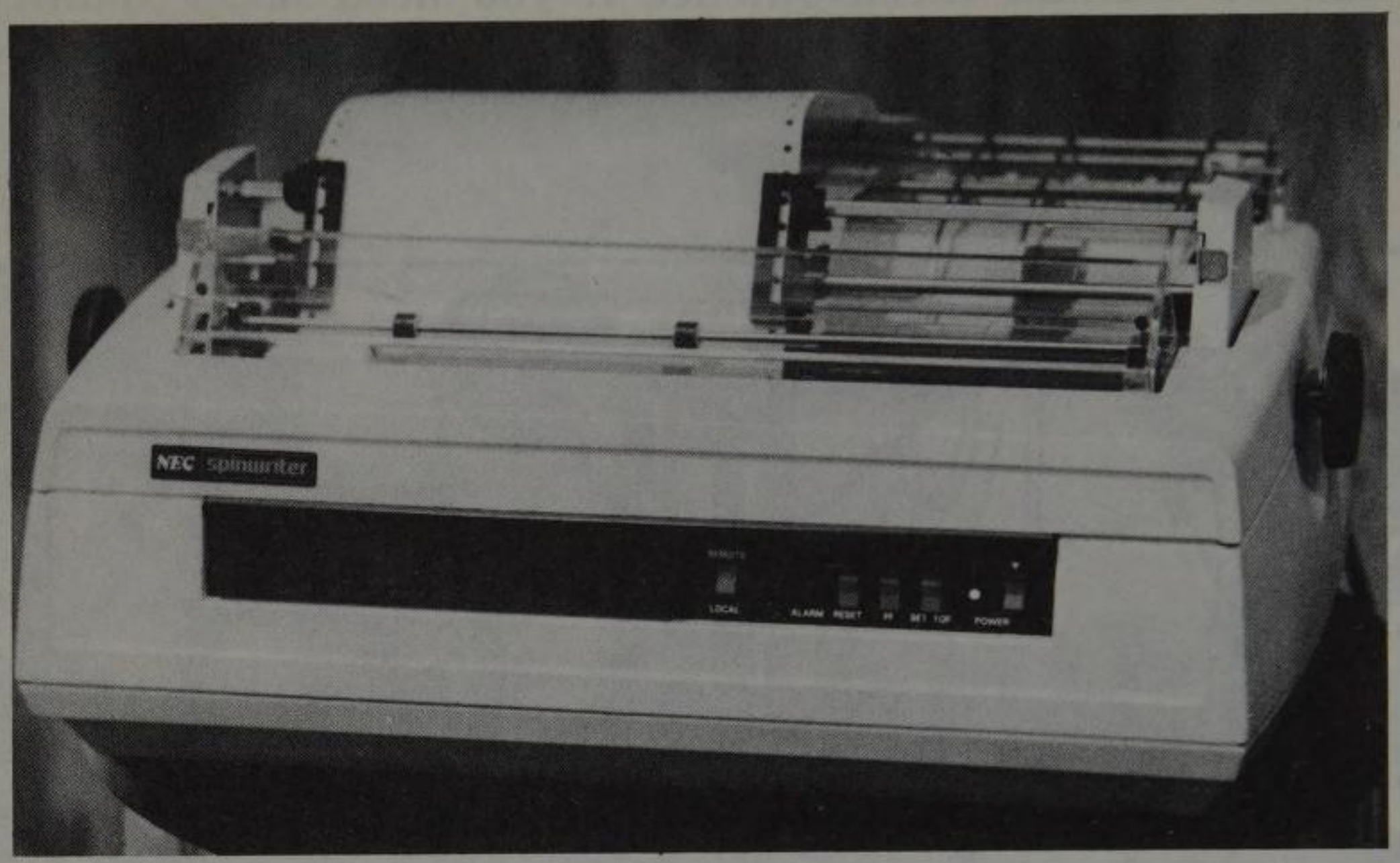
The biggest drawback of the L-1000 is noise. It's hard to believe something so small can make such a racket, and this printer will shake whatever it is resting

on without mercy—but it could be worse, and, the noise can be a small inconvenience if you need letter quality printing at a dot matrix price. The suggested list price is $545. Worth looking at.



"And then we're going to put the printer over there in that building. Would you like to see?"

NEC



The NEC Spinwriter is a letter quality printer with an excellent reputation for print quality and durability. Time and time again I have heard unsolicited praise for the Spinwriter from people who know printers and have no vested interest in NEC or any other computer printer.

The Spinwriters print at a top speed of 55 characters per second, he fastest rated speed of any letter quality printer in its price range (around $3,000). A 35 cps model is available that has all the Spinwriter features except speed, and this retails for about $1,900.

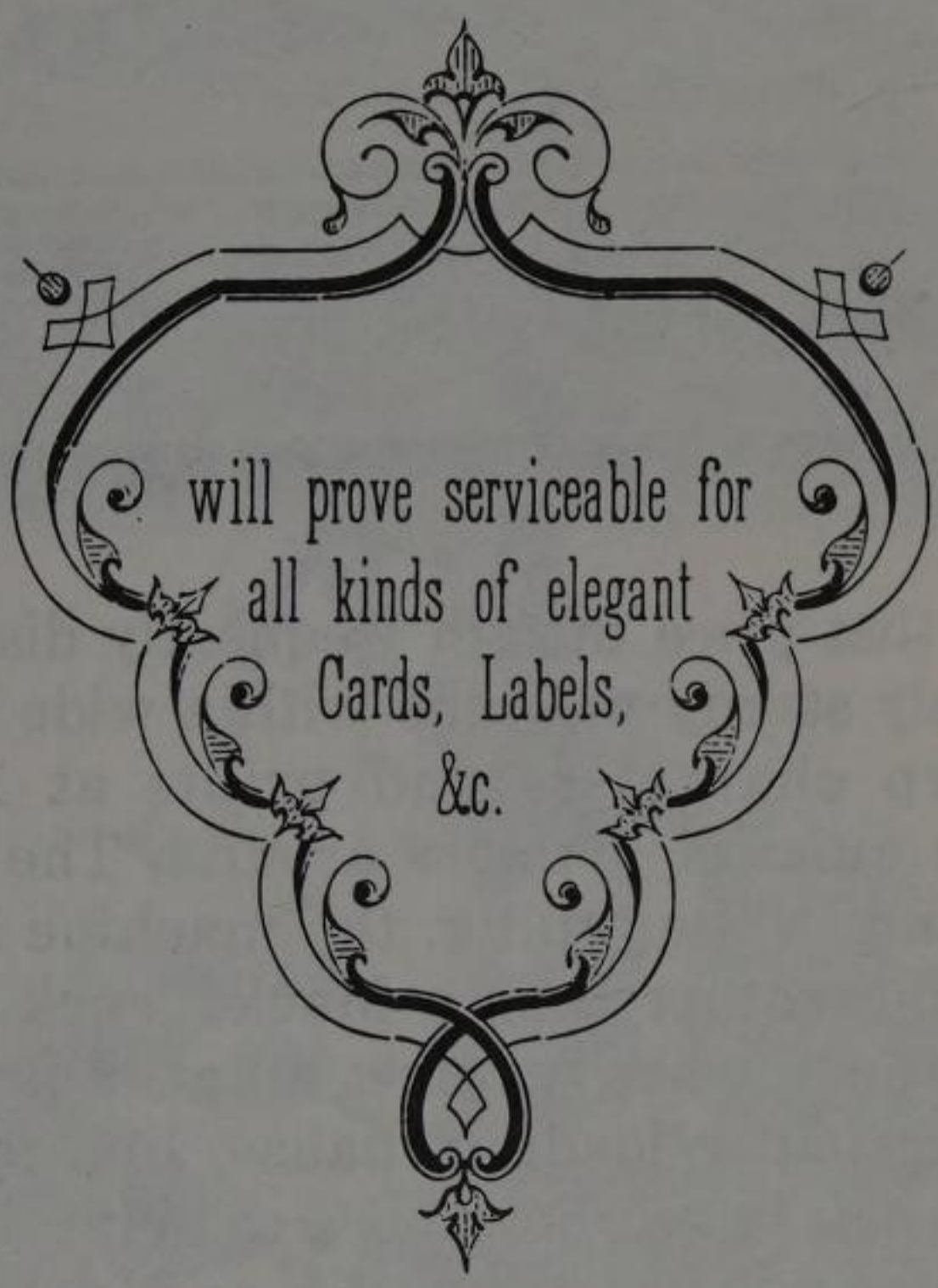
Printers and software are the most frequently discounted part of any personal computer system. Even if a dealer does not give discounts on the computer he or she will frequently take something off the printer.

All the above NEC prices include a device known as a tractor. A tractor pulls the paper through the printer by little pins on the left and right sides of the page. This special perforated paper is known as **tractor paper** or **continuous form feed paper**. It's relatively endless so that page after page can be printed without stopping. It's good for rough drafts and for printing invoices, checks, and so forth.

Tractor paper is usually not of the best quality, but high-quality stationery can be glued or tipped onto standard

tractor paper. This allows letter after letter to be printed without stopping to change paper after each sheet. This tipping process costs about $50 per thousand sheets and will work with envelopes, too. It's a good compromise between hand feeding and the expense of an automatic sheet feeder (about $1,500-$3,500).

If you don't mind feeding the sheets you print one at a time, rather like loading a standard typewriter, you can get the Spinwriter without the tractor and save about $200. If you're planning to use the printer for business applications right away, a tractor is recommended. If you might or might not use one eventually, the tractor can easily be added later.



Transtar 130



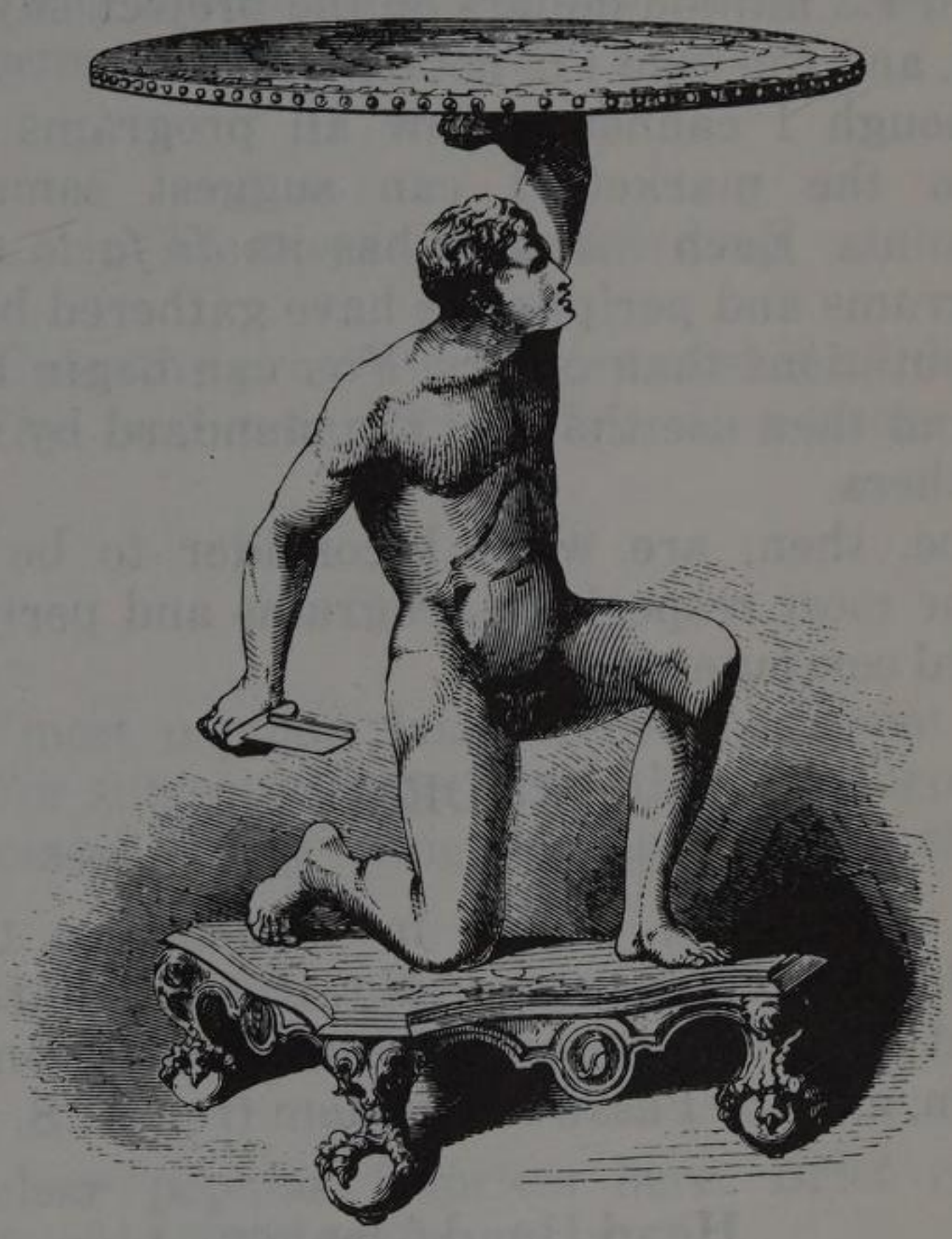
At $699 (list price though frequently discounted), you get an extremely sturdy machine with a wide carriage that will give sharp characters and prints at 18 cps. It is also one of the quietest printers around. The platen turns with silence, and, while typing, the machine sounds like a fast bird pecking rather than a Mack Truck trying to get in gear. The Transtar has features all good printers should have: automatic paper loading, pause, line feed and page eject. It does not have, however, a print buffer or bi-directional printing. A tractor feed is available for $149.

The printer supports proportional spacing, sub- and super-scripting. The platen knob turns when you turn it—no mickey mouse need for having to pull the knob out first as on the Comrex CR-1, et al.

The only problem I've had with it is that sometimes, when loading paper in with the autoload, a corner of the paper gets caught in a little horseshoe-shaped piece by the printer hammer. The autoload is adjustable, so I now have it stop before the paper reaches the horseshoe.

The Transtar printers are manufactured by Silver-Seiko of Japan, the parent company to Silver-Reed of America. Silver-Reed offers a similar printer to the Transtar 130 called the EXP-550. If you want letter quality at a medium speed and affordable price, check these out.

You should also know that Morrow Designs' MP-100 is the same printer as the Transtar 120 (and the MP-200 is really the Transtar 130).



A printer stand.

Software, Peripherals, and things that go bump in the night

The goal of this chapter has been to review computers and printers. There are, however, programs you must buy and maybe a few peripherals.

To review these is beyond the scope of this book. I hear there are more than 40,000 programs available for personal computers, and that figure is expected to double within the next few months. The first to even attempt a comprehensive software review are the folks at *The Whole Earth Software Catalog.* They're spending eighteen months and 1.3 million dollars on the project. My blessings go to them, and I'm glad I'm not doing it.

Although I cannot review all programs and peripherals on the market, I can suggest some possible starting points. Each industry has its *de facto* standards. Some programs and peripherals have gathered better sales and/or reputations than others. You can begin by looking at these, and then use them as the standard by which you evaluate others.

These, then, are what I consider to be the most popular—or most respected—programs and peripherals in the personal computer industry.

MODEMS

The recognized leader in modems is the Hayes SmartModem. A close second: Novation's SmartCat. Also quite good are the Signalman modems from Anchor Automation, and the Password modem from U.S. Robotics.

Head Head Cleaner

Head Computer Products sell head cleaning kits that are half the price of everyone else's. A normal liquid head cleaning kit costs about $30. The Head kit is $15. I can't seem to find any difference in quality so, as they say on TV, why pay more?

PROGRAMS

Word Processing

The most popular word processing program is WordStar. The best spell-check program is The WORD Plus. (For a more complete look at word processing programs, please see *The Word Processing Book.*)

Accounting

The most popular accounting packages are from Peachtree. The Accounting Partner from Star Software Systems seems to be the easiest to learn.

Electronic Spreadsheeting

VisiCalc, the program that started it all, is certainly popular. The best seller these days is a program called 123.

Data Bases

The most popular data base management system is dBase II. For subjective data bases (that is, information that must be classified by assigned key words), the best is SuperFile.

Communications programs

No clear popular favorites here. Brief reviews of Perfect Link and LYNC follow.

Quick Check

On the subject of using personal computers for checkbook balancing—I don't. But there are some decent bookkeeping programs out there ideal for small businesses, and one of them I recommend is a program from Chuck Atkinson: it's called Quick Check.

This program is easily learned. The Quick Check has simple, one-key commands to select the items you want to add, update, delete or print. Accounts payable, bills, income, checks outstanding, and all other checking account and general ledger activity is entered simply and can be summarized quickly on a weekly or monthly basis. Items can be assigned an expense code that will allow you to see what percentage of your income is being spent where. The summary will even list income vs. expenses in two categories: deductible or non-deductible.

The menu is divided into eleven categories (deposits, balance, adjustments, etc.). Formatting is preset, based on the time-honored system of ledgers, giving you a blank form for each entry so you can just fill in the spaces, with the program automatically advancing the date one day each time you enter the program (which is easily changed with a single keystroke).

When printing checks, each account payable can be assigned a two-letter code, allowing you to write checks without typing in the same information over and over again—just change the amount entered. Quick Check can print checks by check number, payee, expense code—any order that's convenient for your record or filing purposes.

Correcting mistakes is easy, as a verify function comes up after each entry, and returning to the previous entry or continuing to the next are all one-key commands. Especially helpful is when the program asks you if you want printed copies of what you are about to enter.

The summary lists all relevant entries in alphabetical order, by expense code or date.

The entire program can be learned from the help menus on the screen—I did it without the manual at all, and if I can understand it, so can you.

If you have a small business and want to find a

simple, single entry bookkeeping program that's truly easy to learn and use, then Chuck Atkinson's program is for you. The cost is surprisingly low—$49.95 in the Kaypro format; $94.95 for all other computers.

A deluxe version has everything this has plus Accounts Receivable (for those of you whose business requires billing.) If you need to computerize your inventory, check out his Retail Inventory Program, which is also wonderfully simple and complete.

Eliza

Sometimes I think it's easier to talk to my computer than to people. And now there's a program designed so you need never speak to another human again.

Eliza, as the program is nicely called, is a very simple version of what is known as "Artificial Intelligence." It simulates a psychologist asking you questions. The great thing about this program is that it actually responds to your answers. It searches out key words and reacts to them.

As you progress, it takes your own responses and throws them back at you: "But you said your mother was a tyrant?" or "You haven't mentioned sex at all."

The program was designed as an experiment, but has turned out so entertaining, and sometimes even informative, that some people have begun to use it seriously. A psychologist I know even uses it at his office for a patient's first visit. (Some people will tell a machine things they won't tell another person.)

Eliza is a great way to introduce your friends to computers, can be a very funny party game, and actually can be a good ear for problems you don't want or are afraid to tell someone else. After you've used it many times, you begin to see how to provoke it, and then it becomes more of a game of "How can I upset Eliza?" You can't. As well as being the perfect listener, Eliza never judges.

At $25 for the protected version, and $45 for the version which lets you change Eliza's responses, this program is a great game, and sometimes even more.

Communications programs

Perfect Link

It takes a new approach for a software program to stand out, especially for review, and Perfect Link is more than worthy.

To begin, Perfect Link, currently for IBM and compatibles, has everything a good communications program should offer: easy communications with other modems, dialing, error checking, file transfer, and, most of all, simplicity in its instructions.

What makes Perfect Link unique are two major additions. First, Perfect Link is designed to make connection with the major databases as frustration-free as possible. Normally when calling a database, you first dial the number; at the beeeeeeep, you or your modem makes an initial connection. The database will then ask you for an access code, a password, and perhaps a system number, all of which are supplied when you first subscribe to the database. For first time users especially, all this can be confusing. With Perfect Link, however, a few keystrokes will command all the above: the dialing, the connecting, the dispensing of code and password information.

For demonstration purposes, the Perfect Link people gave me access time on CompuServe, the Source, MCI Mail, Western Union's Easylink, the Knowledge Index, NewsNet, Dow Jones News/Retrieval, and the Official Airlines Guide. Indeed, using Perfect Link, access to all of these is simple, as with using LYNC (made by Norton-Lambert). By typing "pl mci", for instance, within 30 seconds I'm within the MCI electronic mail network. By typing "pl dow", Dow Jones News/Retrieval comes up on my screen. Easy.

Perfect Link's second unique feature is its ability to write and read a variety of CP/M formats. That is, while in MS-DOS, I could use a Kaypro disk—or one of several other computers—in my second drive. This allows me to transfer text or data files from one format to another, bypassing the need to hook up a second computer. Those people or companies with more than one brand of computer would find it easy to switch information back

and forth. The only thing this feature lacks is the ability to format blank disks in the different formats.

Some other nice features include the ability to define programmable keys, and to skip to a utilities section while in the middle of communication. (I could be receiving data, for instance, and pause while I check the directory of my second disk.)

Perfect Link retails for $149 and comes with $400 worth of coupons good for trying out many of the large databases.

LYNC

Another fine communications program is called LYNC, and it works much like Perfect Link. LYNC's advantage is that it's available for many computers, not just IBM. If your computer uses CP/M-80, CP/M-86, TurboDOS, Apple-DOS, TRS-DOS, PC-DOS or MS-DOS, LYNC may be for you.

LYNC has one of the most precise error checking routines of any communications software. This insures that what you send will be received exactly as it was sent. This may not be important for chatting (if an S becomes a C, so what?), but it's crucial for transmitting typesetting files, financial documents, programs, and any other data which must arrive letter (and number) perfect.

LYNC will remember phone numbers and dial them, providing you have an auto-dial modem. It will call MCI Mail and automatically download any and all messages you have to disk. LYNC allows you to transfer information between two "hard-wired" (directly connected by cable, not by modem) computers at the astounding rate of 19,200 baud (bits per second).

The documentation in LYNC is complete and easy to understand. People who have never used a computer before should be able to read the manual and work the program in a short time. When two computers are connected using LYNC, they are automatically in a "chat" mode. This means that whatever you type on your screen will appear on the other person's screen and vice-versa.

LYNC lists for $195.


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Chapter Seventeen

Questions and Answers

Since writing this book, I have received literally thousands of questions. (Actually, I have received thousands of *letters*. The questions tend to repeat themselves.)

This volume of queries suggests one of two scenarios: (1) I am such a knowledgeable writer that people assume I will have the answers to their questions, or (2) I am such a bad writer that people are forced to write and ask me things that should have been in the book in the first place.

I hope it's the former, but I fear it's the latter.

This chapter will attempt to answer the most frequently asked of these questions. But first, allow me to quote a passage from the funniest letter I have ever received from a stranger:

> **You live in Los Angeles? I used to live in Los Angeles. It was during World War II. My husband was there to establish a series of radar installations. We were speeding down the Pacific Coast Highway one night. My husband had to take a sighting of the North Star at a specific time. We were stopped by a policeman. "Go ahead and give me a ticket," my husband said, "but hurry—I've got to shoot Polaris." The cop looked at my husband funny, gave him back his license and said, "Go ahead and shoot Phil Harris. I don't like him either."**

And so, our lessons learned, let's retire to the local pub for an informal after-class discussion, guided, as always, by the clear, white light of Polaris.

Should I buy a computer now, or should I wait? The prices keep falling and the computers keep getting better.

No matter when you buy, the prospect of better and cheaper computers will always loom on the horizon. Yes, computers keep getting better and cheaper. The question is not whether you'll get a better deal a year from now (you will), but whether you will get more value from the computer's use during that year.

The answer to that question will depend on what you plan to use the computer for.

If you plan to use the computer in business, anything from accounting to cost projections, you'll no doubt save more in one year by owning a computer than you'd save by not owning one.

If you're a writer, secretary, or student, the value gained by word processing will more than pay for itself, over and over again.

If you want a game-playing computer, then you might as well buy now. For less than $300 you can get a fine computer and several game cartridges.

If you're curious about computers, are wondering what on earth they are, an inexpensive home computer will provide a fine introduction to computerism for less than $500. Don't expect to run your home or business with any of these. They will satisfy your curiosity, not your need for a business computer.

Over all, you'll know when the time is right to buy a computer. It's when you can't think about buying anything else.

Isn't there a danger that the computer I buy now will become obsolete?

That's one of the great myths about computers. Computers never become obsolete. A computer you buy today will do exactly what it does—be it word processing or game playing—twenty years from now.

Yes, the state-of-the-art will change, but, like a car, if it gets you from point A to point B today, it will make the same journey in the same way as long as you own it (and keep it in good repair).

If you buy a computer today, in a few years you'll probably want another, just as people moved from hi-fi to stereo and from black & white television to color. Did those people get value from their hi-fi and black & white TVs? Undoubtedly. Will you get value from one of today's computers? Almost certainly.



I want to get a computer for my son's birthday. What should I get him?

A gift certificate. Buying a computer for your son, while a loving and obviously generous thing to do, can be as dangerous as selecting for him a tie or a car or a spouse. Let him know what you'd like to spend, what you're willing to spend, and the most you'll spend. Then let him select his personal computer, personally.



Are there career opportunities in personal computers?

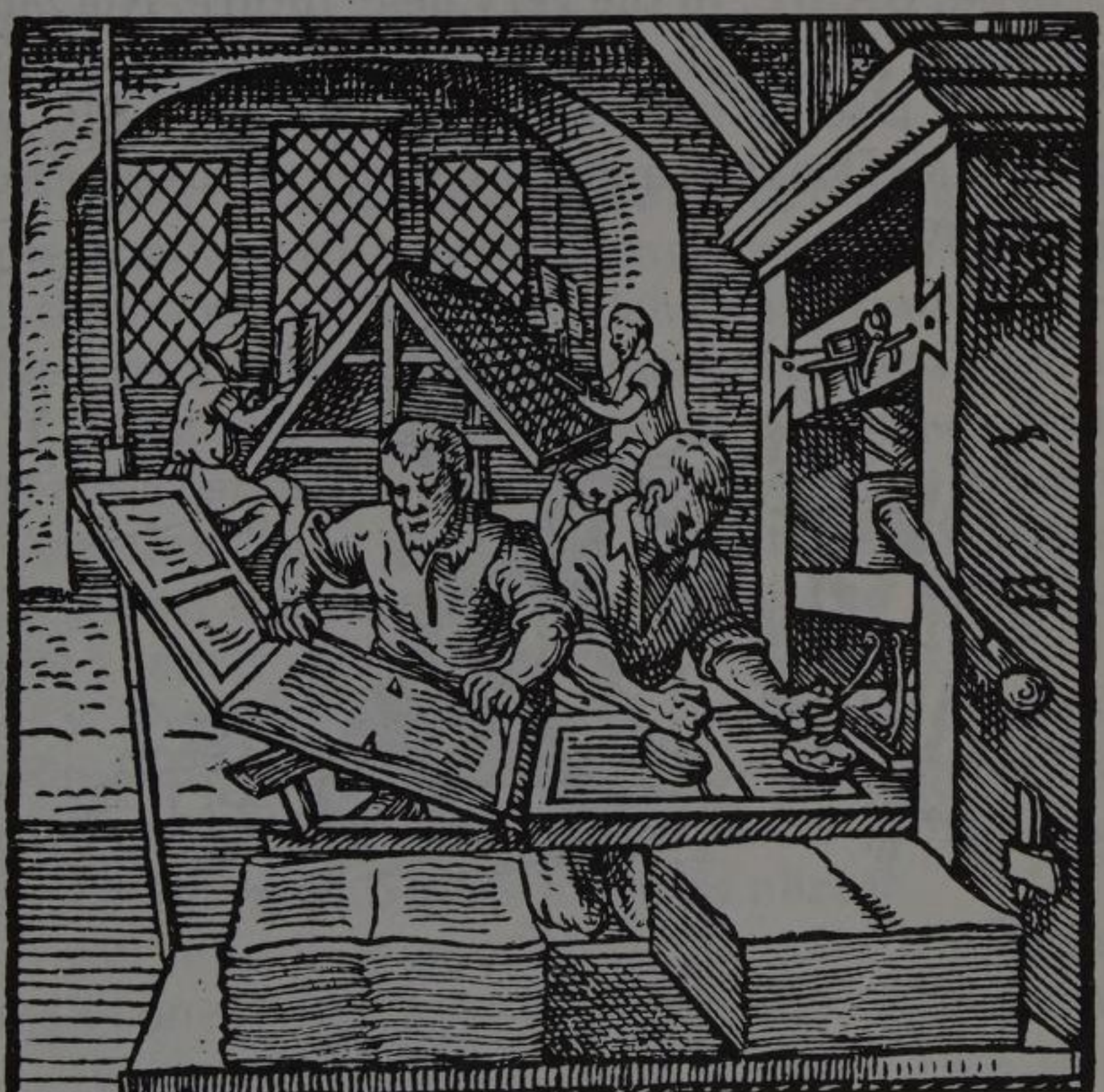
Were there career opportunities in automobiles in 1905?

Personal computing is a fast-growing industry and career opportunities abound. I think, for example, that most used car salesmen have already taken to selling computers.

Sales, marketing, writing programs, writing the documentation for programs, writing about computers, engineering, design, instruction, operation, repair—these and dozens of other jobs are waiting to be filled.

Even more exciting, there are dozens of jobs that are waiting to be created *then* filled. It's a great time for entrepreneurs. It's a great time, too, for those who find years of schooling intolerable. Personal computing is a world you can best learn about by doing.

In a decade or so, top universities will be handing out MBAs and Ph.Ds in Personal Computing. Those graduates will be hired by the people who jumped into the personal computing puddle with both feet *today*.



I've heard about some programs written in "soft basic." What is soft basic?

I have never heard of "soft basic." Although what I know about computers is far outweighed by what I don't know, my guess is that what you heard about were programs written in *Microsoft* BASIC.

BASIC (which stands for Beginner's All-purpose Symbolic Instruction Code) is one of several languages used to write computer programs. It is the most popular language for personal computer use. BASIC is, however, a generic term, like cola. Anyone can market a cola, and anyone can market a BASIC programming language.

Just as Coca Cola is the most popular cola (and am I going to get the Pepsi Challenge on *that* one), Microsoft BASIC is the most popular BASIC language. It is sometimes written as one word, MicrosoftBASIC, and often referred to as MBASIC. (Pronounced "MBASIC," not "MA-BA-SICK.")

Meanwhile, since anyone can come out with a BASIC, and since I'm an anyone, I will be introducing McWilliams BASIC, or McBASIC, in the very near future. Not only will it be the least powerful computer language since Computerese, it will also be difficult to learn. McBASIC will be marketed by McDonalds, and our celebrity spokesperson will be Mick Jagger.





After several months of investigating computers I am *so* confused. What should I do?

Take a month off. Relax. Don't look at any more computers. Don't read any more about computers. When computers come on TV, change the channel. (You may do a lot of channel changing.)

There is nothing imperative about buying a computer. Computers will be with us for a long, long time (providing, of course, that we're all here for a long, long time). There is no rush. Last year's luxury has become next year's inevitability.

If, after two weeks, you *want* to jump back into the most frenetic computer game around—buying a computer—then "Geronimo!" and good luck. If, at the end of the month, you still dread the thought of returning to Computerville, then take another month off.

If you've been instructed to investigate personal computers for your company, say you are "pausing to evaluate obtained data prior to finalization of the project," or some such important meaningless business phrase.

If you're feeling too confused to make a good decision, don't make one. After a while, personal computer overload should subside, and you'll be glad that you took the pause that refreshes. (There, that should get Pepsi off my back.)

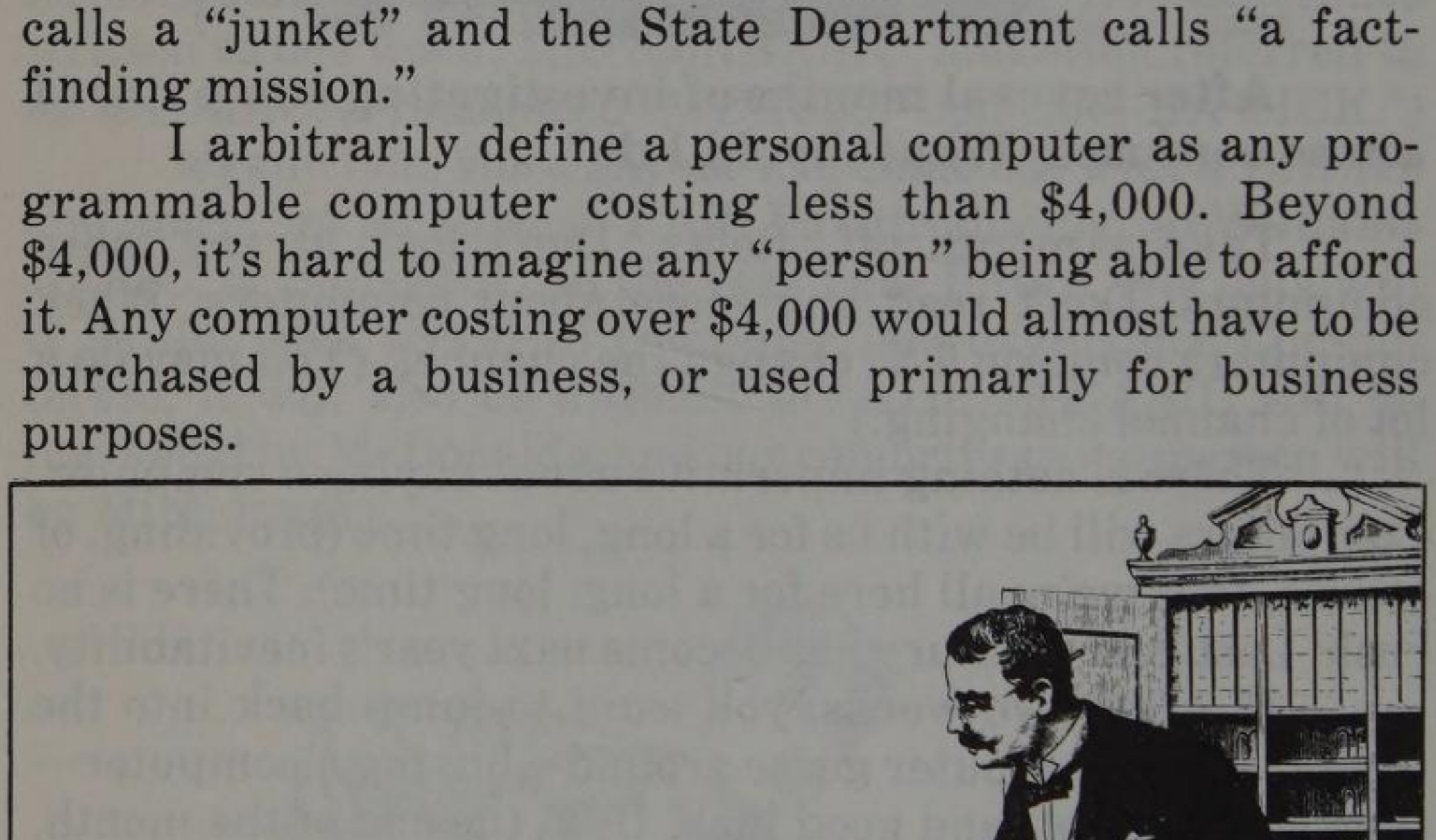
What's the difference between a personal computer and a business computer?

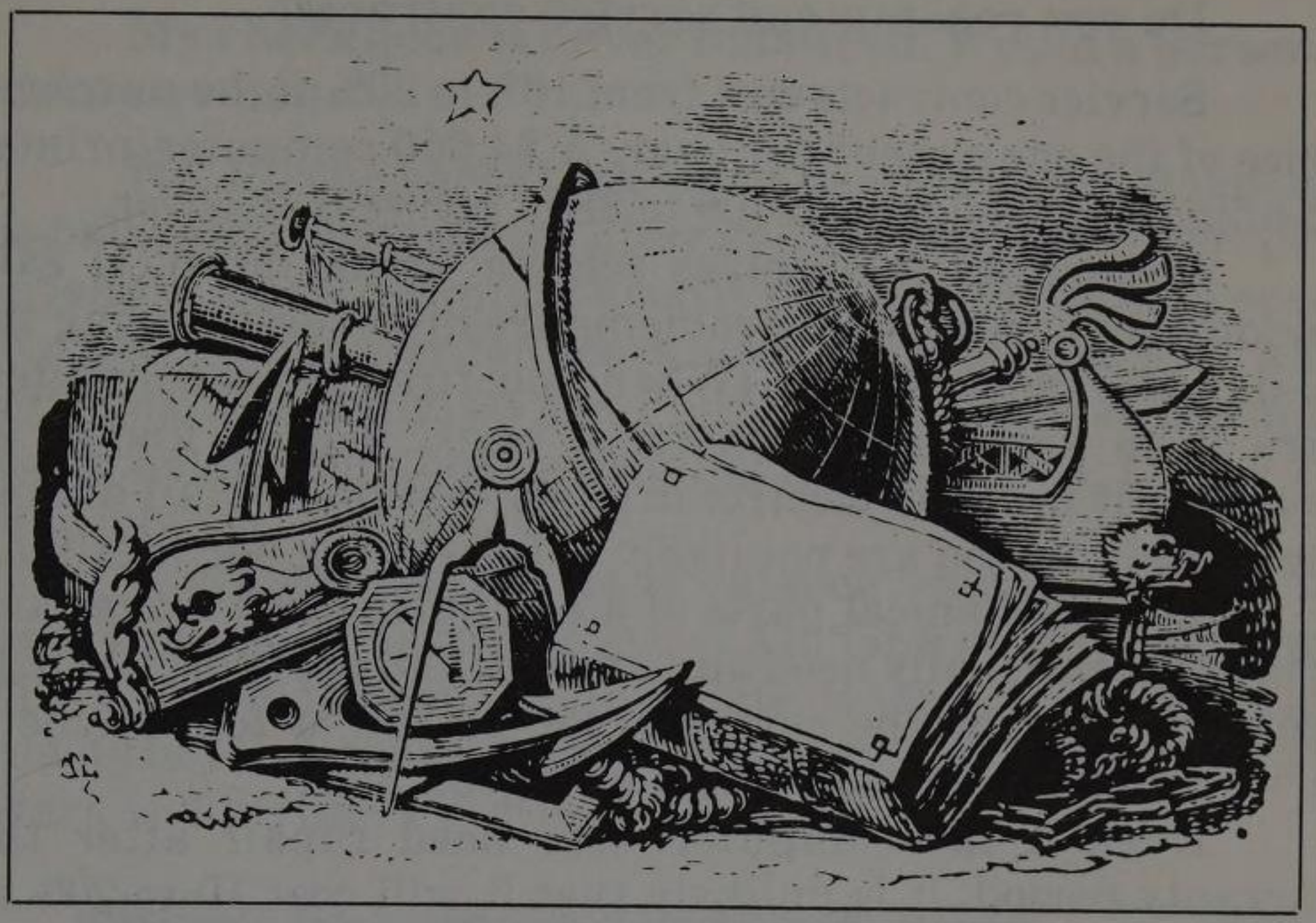
Not much, and sometimes nothing at all. A company that wants to sell computers to businesses calls its machine a business computer. A company that wants to sell to individuals calls its machine a personal computer. Some try to straddle both markets and advertise a "personal business computer."

The very same computer can be known as a personal computer, a business computer, a personal business computer, a microcomputer, a desktop computer, a small computer, an individual computer—and they'll invent a dozen more this year alone.

It's a case of the same thing described in several ways. What we might call "an all-expense-paid vacation," Congress calls a "junket" and the State Department calls "a fact-finding mission."

I arbitrarily define a personal computer as any programmable computer costing less than $4,000. Beyond $4,000, it's hard to imagine any "person" being able to afford it. Any computer costing over $4,000 would almost have to be purchased by a business, or used primarily for business purposes.





Do you recommend buying a used computer?

As a rule, no. The computer world has been changing so rapidly that used equipment is seldom a good value. The same computing power that would have cost $6,000 three years ago can be had for less than $2,000 today. This means that, for the used equipment to be a good buy, the seller would have to charge about $500. Very few people are going to feel comfortable selling their three-year-old $6,000 computer for $500.

Another problem is that there is no way to tell how much or how often a computer has been used. It might have been working 24 hours a day for the three years, or used only twice. You can tell how many miles are on a used car, but you can't tell how many hours a computer's been used.

Sometimes, however, exceptional values are to be found. (I've heard of $15,000 word processing computers selling for less than $1,000, complete with printer.) If you want to experimentally explore computing, someone else's $3,000 investment that's selling for $300 might be a good idea.

Remember to negotiate from what a comparably-equipped system would cost *today*, not from what the person paid for it two or three years ago.

Do you recommend service contracts?

Service contracts cost from 10% to 20% of the purchase price of the equipment per year. A $4,000 computer/printer combination would cost $400 to $800 per year to cover.

Computers themselves seldom break down. (I said seldom, not never.) Most problems are discovered during the 90-day warranty period. (When you first get a computer, turn it on and leave it on for a week. This is known as "burning it in." The electronic parts that do not fail during the burn-in period are not likely to fail during our lifetime.)

The mechanical parts of a computer (disk drives and printer) occasionally need adjustment, and are most likely to break. If you use the computer or printer *a lot*, maybe a service contract for that would be a good idea.

Even if the computer does need repair after the warranty period, it is unlikely that it will cost 10-to-20% of the purchase price. (I said unlikely, not impossible. I keep throwing in these disclaimers because I know I'm going to get a letter from someone who'll say, "I didn't buy a $500 service contract because you said not to and now I have a $900 repair bill!" If you might write a letter like that, please buy a service contract.)

You may require something that only a service contract company can offer, such as guaranteed three-hour on-site service, with loaner computers available at no extra charge. If you would sleep better at night knowing your computer won't be out of commission for more than three hours, and no one else can promise such service, then maybe a service contract would be a good idea.

Not buying a service contract is a gamble, but, at current service contract rates, the odds are in your favor.



My checkbook is never balanced. Would a personal computer help?

No. If your checkbook is not balanced now, it will not be balanced three months after getting your computer. (The novelty of a new toy might keep it balanced for 90 days or so.) I've had a computer for years now, and I have no idea what my bank balance is. (When I put my bank card in the automatic teller and it begins reading me my rights, I know I'm in trouble.)

If all you want to do is balance your checkbook, the most you should have to invest is $10 for a pocket calculator. This will also tell you the time, date, what day it is, and wake you up in the morning to a rousing electronic version of "The Stars and Stripes Forever."



How much time should I take in selecting a personal computer?

As much time as you need. For most people, a personal computer is a major investment and should be selected and purchased with care.

If you decided to buy a new car, you would have several weeks of test drives, reading about current models, talking with friends, asking advice, and examining your budget. The same is true of buying a computer, but, for most people, it will be more difficult as most people have never purchased a computer before. Imagine going out and buying a car, but you didn't know an engine from a transmission.

Some general study about personal computers is in order. All this will take a while. As one of those silly rules of thumb, I would allow at least two weeks of study, research, and shopping for every $1,000 you plan to spend.



"Now that we have measured the precise curvature of your fingertips, we will select a keyboard especially suited for you."

Can people become addicted to computers?

Yes.

People can also become addicted to automobiles, telephones, television, radio, food, sex, central heating, books, and all the other good things in life.



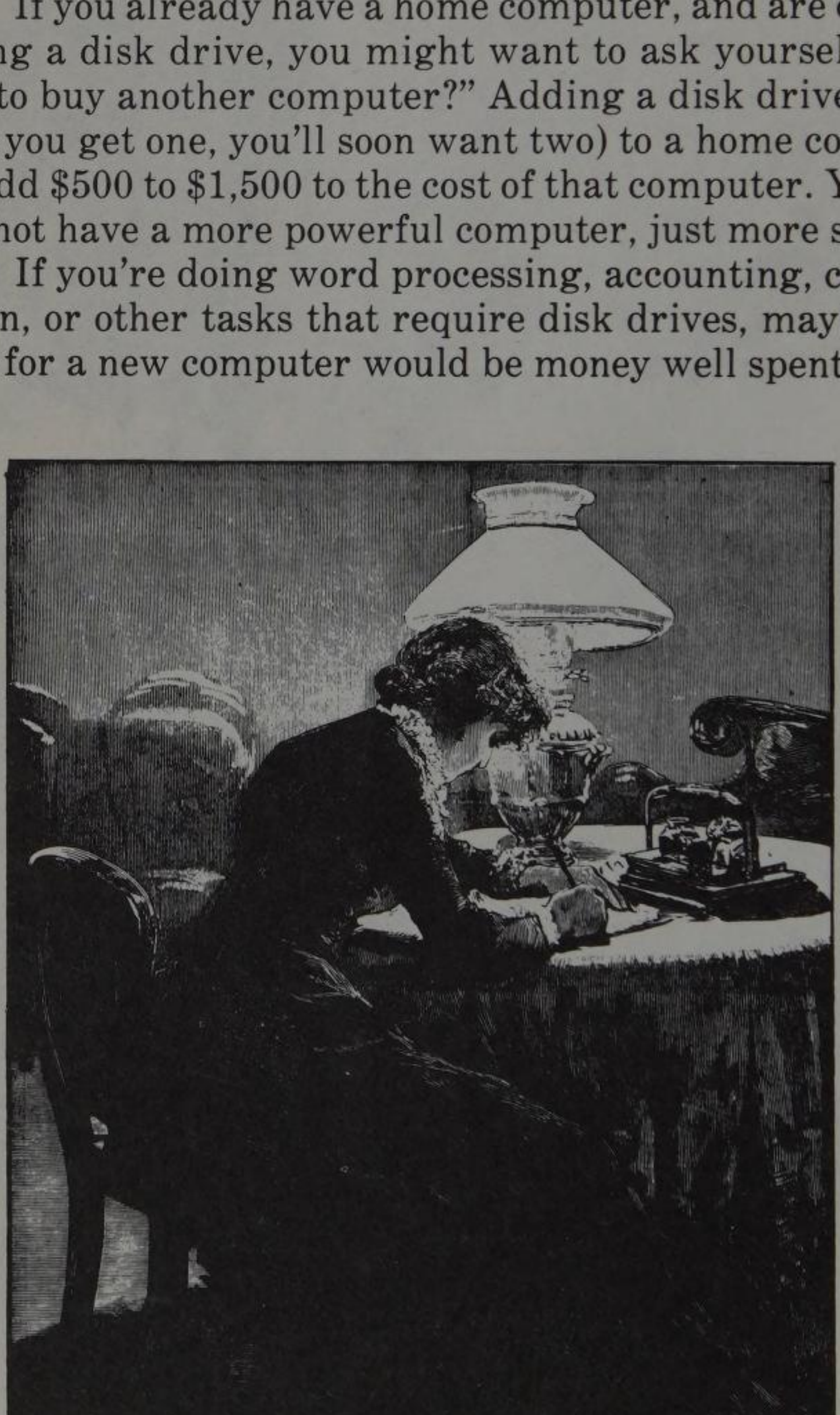
"Ohhhh. So screens come in five, seven, nine and twelve inches. Ummmm. Well, send up an assortment and I'll pick the one I like best."

Should I use a disk drive or a cassette recorder for my home computer?

For simple program entry and storage of information—and for economy—cassette recorders are certainly the medium of choice. Cassette recorders are, however, much slower and far more error-prone than disks.

If you already have a home computer, and are contemplating a disk drive, you might want to ask yourself, "Is it time to buy another computer?" Adding a disk drive or two (once you get one, you'll soon want two) to a home computer can add $500 to $1,500 to the cost of that computer. You will then not have a more powerful computer, just more storage.

If you're doing word processing, accounting, cost projection, or other tasks that require disk drives, maybe a bit more for a new computer would be money well spent.



Which computer do you own?

The only people who ask that question are either computer enthusiasts who trade brand names and equipment like stock car fans ("I have a 424 single bore hemi head Charger with four on the floor"), or they are people who have yet to buy a computer and are trying to find out what I *really* think. The logic is that I would naturally select the best personal computer for myself, and the line about "the final choice in a computer depends on your personal taste" is nothing more than diplomacy.

To answer the question directly, the main computer I use for writing is the first computer I bought almost three years ago. It is a NorthStar Horizon with a TeleVideo 950 terminal. (Back in "the old days," one bought the computer separate from the screen and keyboard. The screen and keyboard together is known as a terminal.) Although both of these products are still available, and both work just fine, the combining of them into a personal computer is no longer a good value.

When traveling, I take along a Kaypro II (it's what I'm using to write this answer). For my publishing company, Prelude Press, I have a TeleVideo 802H, the "H" standing for "hard disk." Some business files, such as accounts receivable, inventory, and mailing lists, often use more space than floppy disks can comfortably manage.

The printer I use is the first one I bought, an NEC Spinwriter. It has worked beautifully through more chapters, form letters, and mass mailings than I care to remember.

Keep in mind that these are *my* choices. There is more of my personal subjectivity than my expertise in personal computers at work here. This is not necessarily the "right" choice, only my own. (This paragraph is so diplomatic that Henry Kissinger must be jealous. I must get out of this paragraph.)

But, although I have access to dozens of new computers, my plan is to use the computer I purchased way back when to start my next book and to write columns and personal letters when at home. Although value changes, although state-of-the-art changes, computers do not become obsolete.

Are double-density disks the same as double-sided disks?

No. Double-density disks squeeze twice as much information *per side* as single-density disks. Double-sided disks use both sides of the disk.

Single-sided single-density disks hold about 90K of information. When more is wanted, the manufacturer can either double the density or use both sides of the disk. The usual practice is to double the density. This gives about 180K of information storage.

The next step is to combine double-sidedness with double-density, forming a double-sided double-density disk. These hold about 360K.

As there are no more sides left, when more information is wanted, the density must be increased. The highest capacity for a 5¼-inch disk that I've seen is about 1,200K (or 600K per side).

Naturally, the greater the density, the more expensive the disk drives are to produce. After a certain point, a five or ten megabyte removable hard disk is cheaper to produce than an ultra-high density floppy disk.

But all of this is technical talk. All you need to know is how many K of storage you'll need. Let the computer manufacturer figure out how to squeeze it onto a disk.

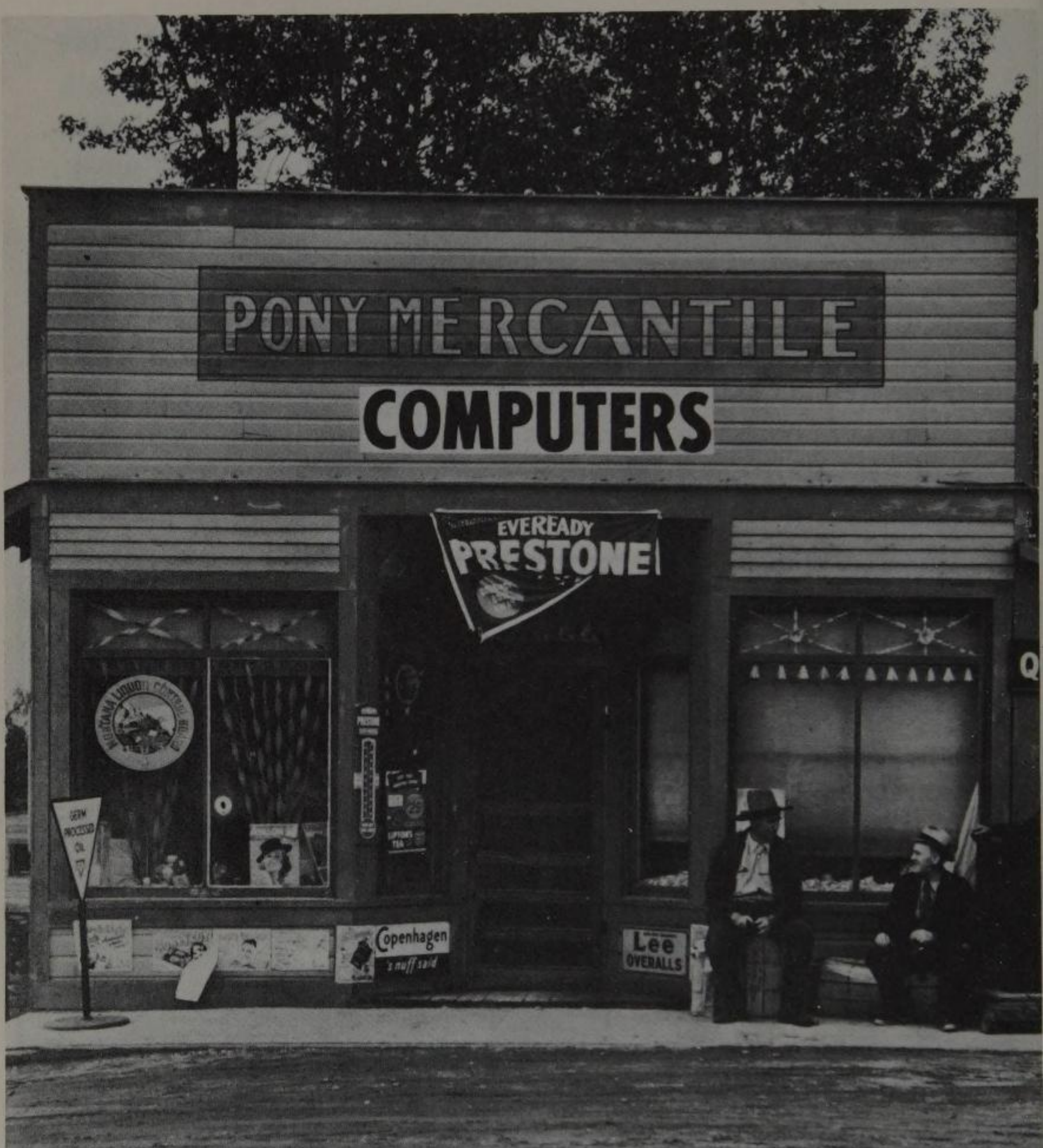


How often should I clean the heads on my disk drives?

Oh, about as often as you wash your car. For heavy use, once a week is fine. For very heavy use, twice a week. For light use, and if you're like me, once a month will have to do.

Cleaning the heads on a disk drive is a simple, two minute procedure. Head cleaning kits cost from $15 to $30. (The more expensive kits are usually not better, just more expensive.) One kit can clean heads dozens of times. Cleaning your drive heads is the easiest, least expensive, most important preventative maintenance you can do for your personal computer.





I live in a small town. We have one computer dealer. He charges full retail prices for everything he sells and knows less about computers than my 12-year-old son. I'm ready to buy my computer but don't think I should have to pay the full retail price for it. What can I do?

It seems as though you have four choices. You can wait for another computer store to open, open your own computer store (with your son as manager), learn the fine art of haggling, or buy your computer by mail.

Mail order computer buying is a reasonable alternative to buying a computer in a retail store, *providing* you (A) know precisely which computer, software, and peripherals you want, and (B) are willing to provide your own support after the sale (in the form of a consultant, research, or a 12-year-old son).

The best place to find current discount mail order computer prices and dealers is BYTE magazine. BYTE is the granddaddy of computer magazines. Most of the articles will no doubt go sailing over your head, just as they go zipping over mine, but the back pages of each issue feature a veritable *Whole Earth Catalog* of mail order computer ads.

After you've found the lowest price on the computer you want, you can use the price as a bargaining tool. If, for example, the computer of your dreams retails for $1,000, and the mail order houses sell it for $700, you may be able to use the lower price as a negotiating tool and talk your local dealer down to $850. In this way you'd get a lower price, plus whatever support the local dealer might have to offer.

Buying by mail is especially tempting if you've found a knowledgeable consultant who will work for, say, $20 an hour. If you can save $300 buying by mail, that savings will provide you with 15 hours of your consultant's time.

Will the local computer store give you 15 hours of individualized attention? Some will and some won't. If your local computer store suggests that you not buy by mail because they, the computer store, can offer home town service and support, ask them *how much* service and support? Are they willing to put it in writing?

Local computer stores are a good place to buy your computer if they seem genuinely helpful (observe how they treat customers who have already purchased a computer from them—do they take as much care in supporting as they do in selling?), offer in-house service, have classes or clubs or dances or other social activities, if you like hanging out there and hanging out is not frowned upon, or if you haven't been able to find a decent consultant.

Where can I find a computer consultant?

Good question. I wish I had a good answer. Most Yellow Pages do not yet have a heading "Personal Computer Consultants," but give Ma Bell a year, and they will. (Ma Bell will give almost anyone with money a heading, from Massage Parlors to Singing Movers.)

Until Personal Computer Consultants are as plentiful and easy to find as H&R Block, I would, while shopping for a computer, also be shopping for a computer consultant.

A salesperson who seems to know more about computers than the average reconditioned car salesman might be led astray by cold cash. Maybe the teacher of a computer class could be tempted to do a little moonlighting. Maybe a local writer about computers could be enticed from his or her word processor. Maybe a notice on a computer store bulletin board stating your needs and what you're willing to pay ($20 an hour is about average) will bring an acceptable respondent.

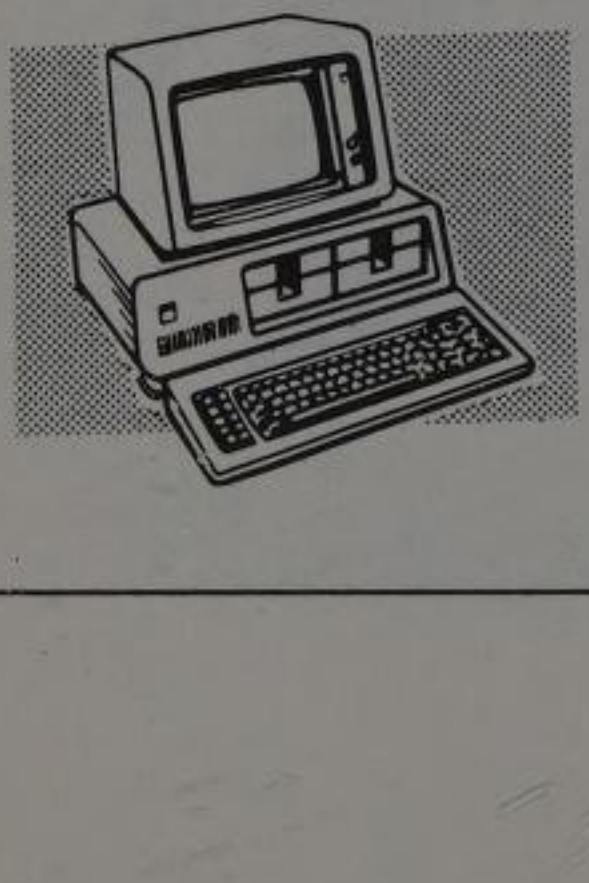
And don't forget to spread the word among your friends. They may know someone—or know someone who knows someone—who would be a likely candidate.

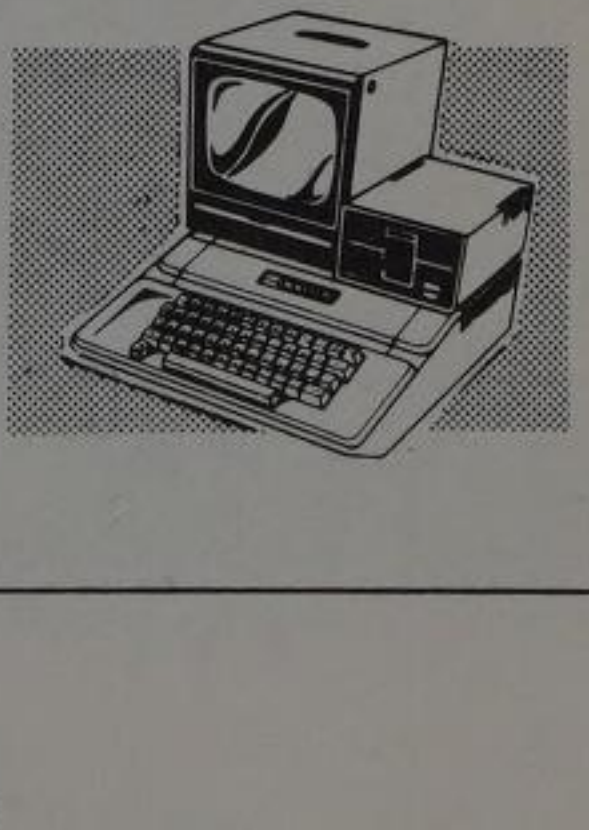
If you already have a computer, and would like to find someone to teach you a specific program, you might try one of the temporary employment agencies. (They *do* have a listing in the Yellow Pages.) Some temp agencies are now specializing in personnel familiar with personal computer programs. You *might* find someone who knows the program you're trying to learn.

When the temp arrives, rather than having him or her *use* the program, ask the person to *teach* you the program. (Most temp agencies have a half-day or a full-day minimum, so be prepared to work.)

Like all pioneering efforts out here on the computer frontier, finding a good consultant will take creativity, luck, and no small portion of gall.







We have many power failures in this area (one last week for over four hours). What would happen in this case to a computer?

Disaster. Whatever was in the memory of the computer (RAM) would be no more. There are two solutions—although "preventatives" is a better word.

First, if you live in an area of occasional power failures or severe fluctuations (it takes only a second of reduced power to erase a RAM), get into the habit of saving information onto disk regularly.

Once information is on a disk, it's safe. Power failures do not affect disks. After the power is restored you simply read the information from the disk back into the computer's memory and continue working.

If you have frequent power outages and fluctuations, or if you don't want to have the spectre of no power dangling over your work, you'll probably want to invest in a back-up power supply.

These are battery packs that plug into the wall and automatically supply about five minutes' worth of electricity whenever the power goes out. This five minutes will provide you plenty of time to save what you have in memory onto disk.

This is not an inexpensive solution: about $500. A less expensive solution would be to buy a computer that can operate on DC (battery) current. You can operate your computer from a battery all the time, using the AC (household) current to supply constant power to the battery.

When the power goes, you can light a candle and keep on computing, knowing you have an hour (or two hours, or whatever the life of the battery is) before you'll have to stop.



It gets hot here in the summer. Will I have to buy an air conditioner after I get a personal computer?

If you're asking me, get the air conditioner *before* getting a computer. I am of the opinion that central air conditioning is a far more significant contribution to civilization than personal computers. But that belief comes from my disdain for temperatures above 70 and below 68.

The idea that computers need special humidity and temperature controlled environments comes from the Old Days (say, fifteen years ago) when computers were few and could afford to be prima donnas.

Today's personal computers are a hardy breed. In terms of heat, the general rule is that if you can stand it, the computer can stand it.

Naturally, as with any piece of electronics, keep your computer out of direct sunlight (even when not in use). Keep your disks out of direct sunlight, too. Disks are, in fact, far more susceptible to damage from heat than computers.

If it gets very hot where you live, check the maximum operating temperatures of disks and computers before you buy. If you're in doubt, buy an air conditioner. Not for your computer—for yourself.



My friend and I want to "talk" to each other using our computers. What will we need to do this?

Assuming your computers are in different locations, you'll each need a telephone, a modem, and a communications program.

I will further assume you each have a telephone. (I'm making a lot of assumptions here.) That leaves only modems and communications programs.

The modem translates your computer's signals into little beeps and boops that can be sent over ordinary phone lines. A modem at the other end retranslates the beeps and boops into signals the other computer can understand. This is a process of modulation and demodulation, hence the modem's name (**MO**dulate/**DEM**odulate).

Modems for personal computers are available in two speeds, 300 and 1200 baud. One baud is roughly one bit per second, hence a 300 baud rate would send information at 300 bits per second, or roughly 30 characters per second. (In telecommunication, a blank space counts as a character.) A 1200 baud modem operates four times as fast, about 120 characters per second, and costs about four times as much.

If you're going to "talk" at long distance rates, a 1200 baud rate modem might be worth the investment. The recognized leaders in modem manufacture are Hayes and Novation.

A communications program connects the modem to your computer. It allows you to send files and programs back and forth, connect to data banks, send and receive electronic mail, and store any transmitted information on disks. Some communications programs even remember your friends' phone numbers, and will automatically dial them for you.

One fine communications program is called LYNC, manufactured by Norton-Lambert of Santa Barbara, California. LYNC is easy to install and easy to use. What more can one ask of a communications program? Well, accuracy, for one.

LYNC has one of the most precise error checking routines of any communications software. This insures that what you send will be received exactly as it was sent. This

may not be important for chatting (if an S becomes a C, so what?), but it's crucial for transmitting typesetting files, financial documents, programs, and any other data which must arrive letter (and number) perfect.

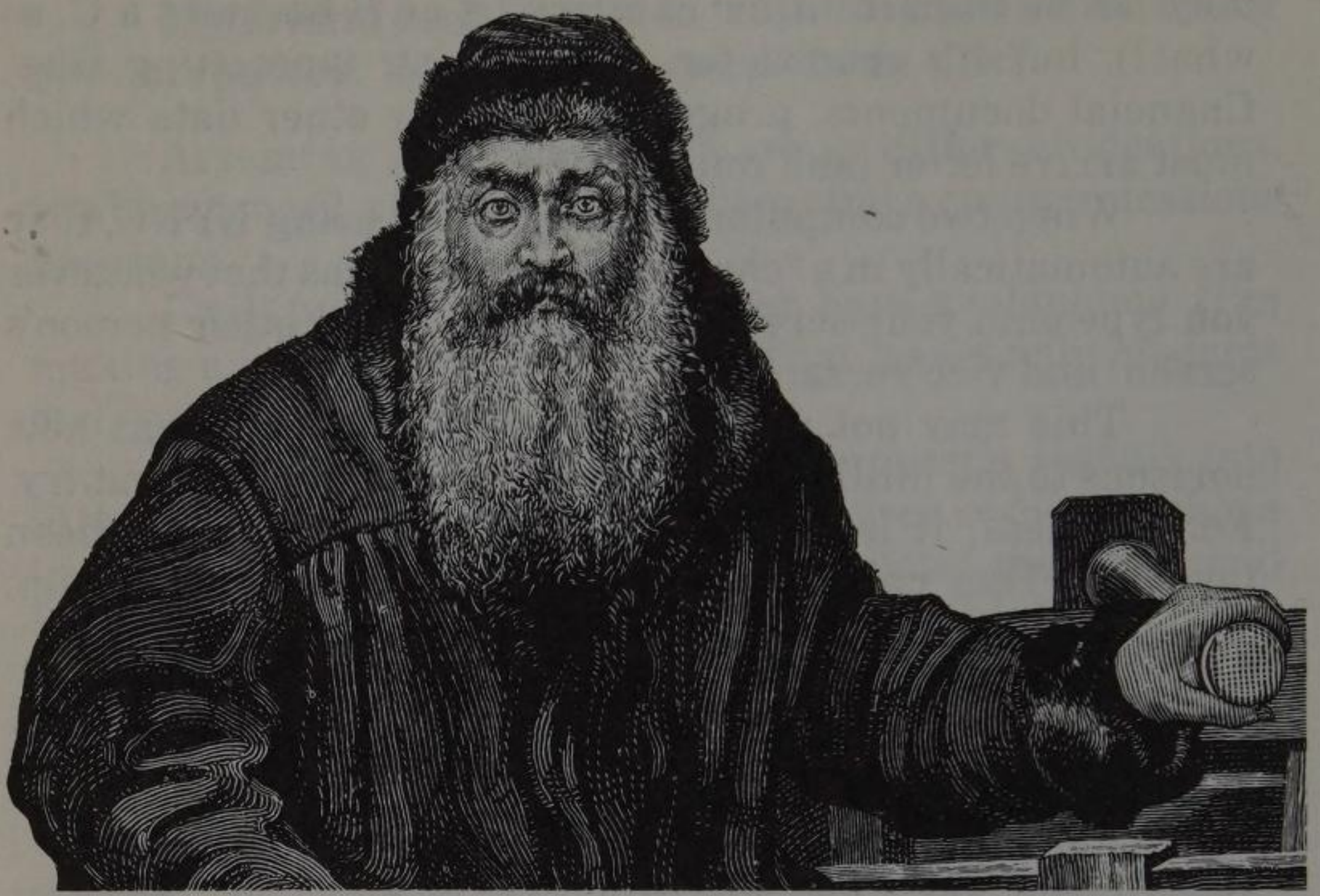
When two computers are connected using LYNC, they are automatically in a "chat" mode. This means that whatever you type onto your screen will appear on the other person's screen, and vice versa.

This may not seem very exciting, but it opens new horizons to the millions of hearing impaired in this country. For the deaf, it is as though the telephone has just been invented. They can call anyone with a computer, a modem, and a compatible communications program, and talk.

I mention "compatible" communications programs. LYNC, because of its error checking protocols, requires that both computers be operating LYNC.

For more information on telecommunication, might I recommend *The Complete Handbook of Personal Computer Communications—Everything You Need to Go Online with the World* by Alfred Glossbrenner (St. Martin's Press, New York). It is a clear, concise, amusing view of how to get computers to talk to each other, and the value humans can gain from that interaction.





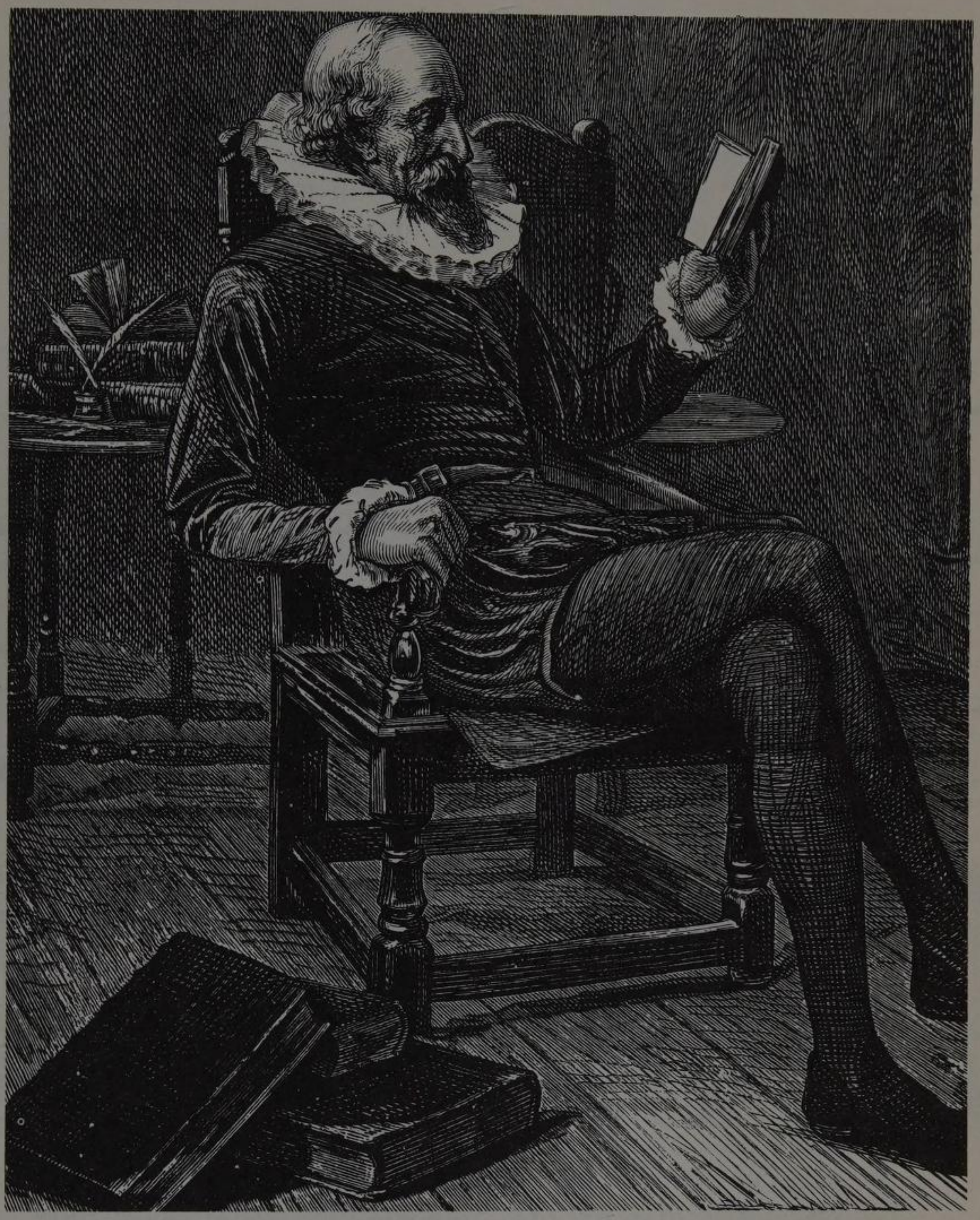
I am a grandfather and my grandchildren have a computer. How can I prepare myself to understand and use a computer?

Bless your heart for even *wanting* to understand. It seems like the old and the young are taking to computers like ducks to water. It's us middle-aged fuddy duddys who are having all the trouble.

I think you have the finest resources available for understanding computers: your grandchildren. Sit down with them and their computer and get involved. Ask questions, try things out, have fun.

When I was young, I spent weekends with my grandmother helping her in her pizzeria. I remember those weekends as some of the most wonderful moments of my childhood.

Grandchildren and grandparents have a special bond, one which is strengthened by time spent together. So forget the computer books. Go visit your grandkids and learn how to play Donkey Kong.



I am retired and took a Community College beginners' course on computers about two years ago. The only familiar and interesting word I heard during the course was a homophone which I assumed was a bawd but disappointedly learned was a baud.

I know just how you feel.


Shaving
Only
one
PENNY
JOHN BULL.
MONS ALAMODE
GENUINE
RE.A.L.
Brand
RAZOR
Set
NO
Connection
with
the other
SHOP
NOTHING
GENUINE
SOLD
NEXT
DOOR
EVERY ARTICLE
SOLD HERE AT
HALF PRICE

Chapter Eighteen

Purchasing a Personal Computer

Purchasing a personal computer will, for most people, require visiting a new kind of retail outlet: The computer store. Seven years ago there were no computer stores. Today, they're everywhere.

Please keep in mind that personal computing is in its pioneer days. You'll get along a lot better at computer stores if you treat them like trading posts on the frontier rather than as modern and sophisticated retail outlets.

When spending several thousand dollars on a consumer item, it is reasonable to expect some expert guidance, some personalized attention, and, yes, even a bit of pampering. At a computer store, feel lucky if they open on time.

A couple of years ago, there were only a few computer stores, owned and operated by knowledgeable, well-intended computer addicts who knew how to build, fix, operate, and program any computer in the store. There was only one problem with these people: they could not speak English. They had spent so long in the land of RAM that they were unable to describe life in anything but bytes.

All a prospective computer buyer had to do was take a Berlitz crash course in Conversational Computerese and he or she was set. Once you learned how to communicate with the people in the computer store, in their language, you could find out anything you wanted to know.

Then the gold rush came. Someone took a look at the sales curve of personal computers and decided there was gold in them there hills. A great many someones did. Personal computers became the domain of entrepreneurs and investment bankers and venture capitalists and Wall Street. These people were in it for the buck, not for the love of computing.

And so the marketing was turned over to the advertising agencies, store designs to architectural firms, and sales to professional salespeople. These people knew how to speak English, but they didn't know beans about computers. Selling was selling, or so the theory goes, and if these

people were good at selling widgets, they'd be good at selling computers.

Selling is a skill, just as knowing how to operate a computer is a skill, and I'm afraid there are precious few people in the world of computer retailing who know both. Computer merchandising is growing at such a rapid rate that if a person *did* know both, he or she would wind up as sales manager of the company within six months, *you'll* never see him or her on the sales floor again.

The fact that you will get neither stellar service nor sage advice from computer stores is nobody's fault, really. It would be nice to blame it on corporate greed or laziness or some recognizable evil, but I can't seem to find one.

The computer salespeople I have met are well-meaning and willing to help, they just don't have enough information *to* help.

Look at what they're up against:

1. Computers are changing all the time. If a store sells two or three different kinds of computers, one must know what's currently available, what's planned for in the near future, what peripherals are available, how each of these works, and what they do.

2. Further, one must know what the competition is doing, planning, marketing, and so on. A customer may come in and say, "I saw an ad for The Super Computer in *Time*. Why is your machine better?" A good salesperson should have a good answer.

3. Software is a jungle unto itself. Imagine being asked to know, in even a cursory way, something about every program in a given computer store, much less on the market.

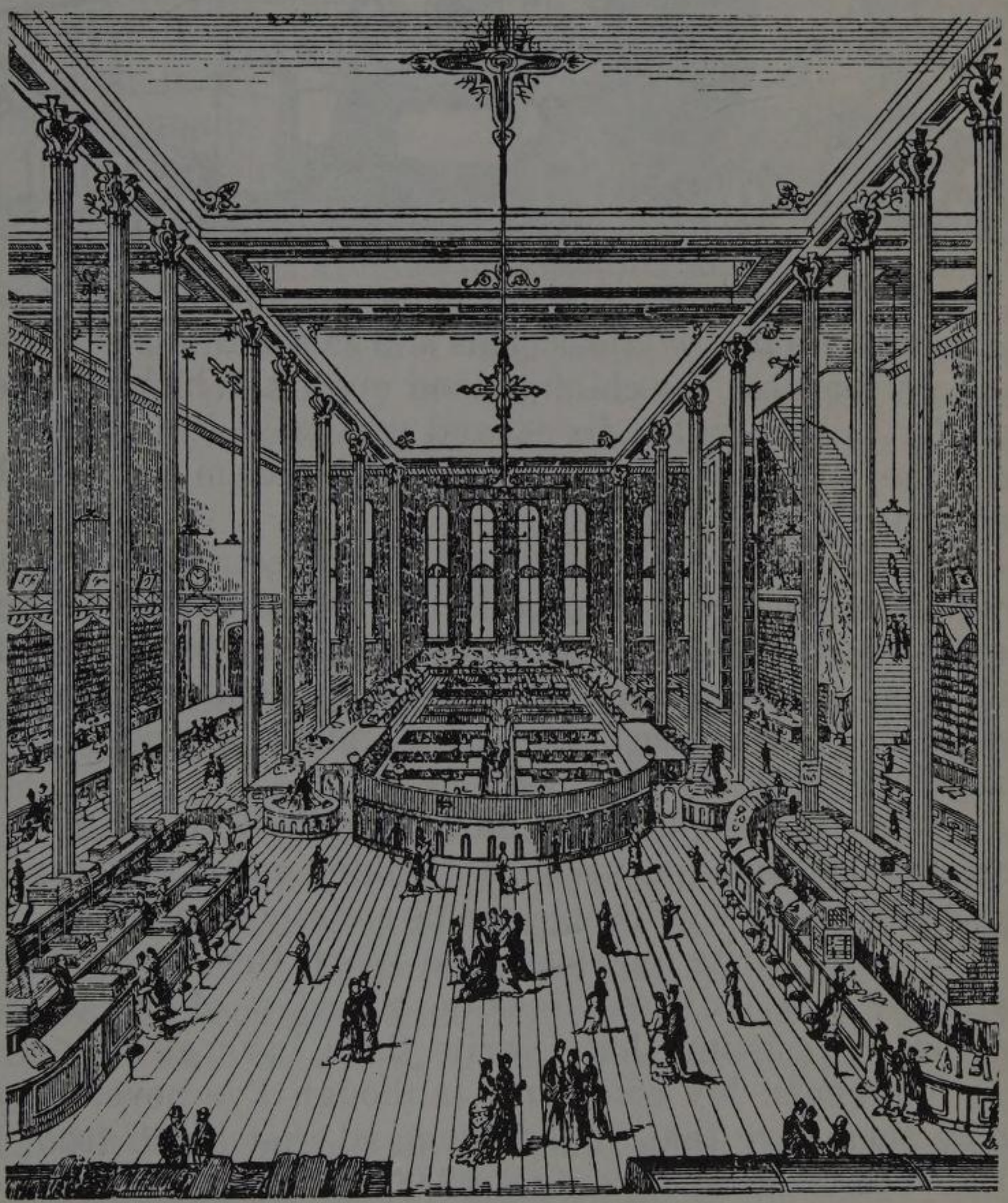
Someone shopping for games might ask, "Do you have the game that's like *Dungeons and Dragons*, except that it has the Red Baron in cell number seven and the green tiger? I played it at a friend's house last week."

Someone shopping for word processing might say, "I need to do script formats, indexing, and footnoting, but proportional spacing is not necessary."

An accountant might ask, "Will this process receivables on a year-to-date or periodic basis?"

And so it would go for every software category. Computer people are not the only ones who have jargon.

4. It would help if the salesperson were a master of psychology. (Ph.D., with a minimum of three years' clinical experience, well-grounded in crisis intervention.) People have the strangest reactions when confronted with a world as unusual and different as computers. For some, the defenses rise to battlestation proportions. Others become so defenseless that they believe anything. Terror, disorientation, hostility. Sometimes it's hard to tell the difference between the waiting room at an out-patient clinic and a computer store.





5. Most people come to computer stores looking not for computers but *solutions*. This and this and this is wrong with my business, my children, and my life. Which machine will fix it, how will it fix it, and what will it cost? For a computer salesperson, the wisdom of Solomon seems to be another prerequisite.

6. Computers appeal to a broad spectrum of people, from pre-pubescents to post-doctoral candidates. A salesperson must be able to discuss programming with ten-year-olds and video games with Nobel Laureates. If you're opening a computer store, you might check on the availability of Henry Kissinger.

7. After people spend $5,000 (or $2,000 or $3,000) on something, they expect *service*. "I didn't spend $5,000 on a machine to have it..." People can be awfully demanding.

People write me about **The Word Processing Book** *outraged* that I did not include a review of this-or-that computer, insisting that I write them back at once with my comments. My comments (although I've never dared write them) are that, if they demand that much from an $8.95 book, they'll never get $2,000 worth of satisfaction from a computer, so they might as well give up.

Naturally, the person who must carry the brunt of whatever dissatisfaction the customer might have is the salesperson. He or she must be, in other words, an expert troubleshooter, a crackerjack repair person, and a diplomat extraordinaire.

8. A salesperson also has to deal with the demands of his or her boss and the many manufacturers of software and hardware sold in the store. This takes the patience of Job and the integrity of Serpico.

One could begin to construct a picture, then, of the ideal computer salesperson. If you were to find such a person, you could easily get him or her elected President —or Pope. It is doubtful that, unless you came upon a Saint slumming it for a lifetime or two, this person would be selling computers.

The problem is that it's all so intricate and all so new, and it's getting more intricate and newer everyday. I don't know anyone who has successfully kept up with it all. I certainly don't pretend that I have. People pick an area and specialize: hardware, languages, games. I'm rather fond of word processing myself. You may have to talk to a lot of people in order to capture the gestalt of the whole thing.

There are ways of getting the most out of what computer stores have to offer. Here are some that I have found useful:

1. Make an appointment. Call the store and ask to speak to the expert in the field you are most interested in: accounting, games, word processing, electronic spreadsheeting. All you have to say is, "Which one of your salespeople knows the most about accounting?" When you reach this person, introduce yourself, and make an appointment.

Make it a specific appointment. They may try to get off the hook with, "I'm here every day from nine to five. Drop by anytime." Counter with, "Fine, how about Tuesday at three?" Call in the morning to confirm (i.e., remind them).

With an appointment, you are more likely to speak with the person who knows the most about the subject you are interested in, and you are more likely to get some

specialized attention. Not much, but some.

2. Do not be intimidated by jargon. Salespeople who use excessive jargon are either from the Old School of computer selling and know everything about computers and nothing about communications, or they are from the New School and know very little about computers but are trying to conceal that fact. When in doubt about what a word or phrase means, ask. Asking may not do you any good, but don't be afraid to give it a try.

3. Get some "hands-on" experience. Don't spend a lot of time discussing the philosophy of computing and looking at full-color brochures—sit down at a computer and *play* with the thing. There's plenty of time to talk while you're pushing buttons and watching the results of that button pushing.

See if you can spend some time alone with the computer. This usually isn't too hard to arrange. When you have enough information to attempt a solo flight, all you have to say is, "Why don't you take care of some of your other customers and come back to me later?" There are almost always other customers to be taken care of.

4. Ask a friend who knows something about computers to come along. He or she will be able to tell you (later) whether the salesperson was giving you solid information or solid, uh, disinformation. They will also be able to, once the salesperson has gone, show you some great things about the computer. (Although don't expect your friend, who runs Program A on Computer B, to know very much about running Program C on Computer B.)

5. Use the computer for what you'll be using the computer for. If you're going to use it for creative writing, write something creative. If you're going to use it for correspondence, write letters. If you'll be doing accounting, do some accounting. If you're going to use your computer as an electronic spreadsheet, bring along some numbers and project some costs. If you're going to play games, play some games.

Different computers are good at different things. One that plays games well may be awful at business, and vice versa.



"What do you mean overdressed? We're going to look at IBMs, aren't we?"

When you're done looking at your desired application, ask the salesperson to show you what else the machine can do.

6. Be on the lookout for good salespeople as well as good computers. If, while in the store, you observe a salesperson who really knows what he or she is doing, and it is clear that "your" salesperson does not, it is time for diplomacy, tact, and trickery. (Going from one salesperson to another is like changing dates after you're at the ball.) First, create some emergency that needs taking care of and leave. (You have to buy your seeds for National Potato Week or something.) The longer you stay in the store, the more the not-so-hot salesperson will feel you "belong" to him or her.

Exit soon, but first find out (a) the lunch hour and (b) the day of the week your original salesperson has off. (Make it sound as though you will rearrange your schedule so as not to miss him or her.) Return to the store next at (a) that hour, or (b) that day. The better salesperson should be on duty, and you now have a new salesperson.

7. Make notes. Write down model numbers, prices, salesperson's names, everything. After leaving the store, debrief yourself and note the pros and the cons of the machines and programs you've just evaluated. The things that are clear in your mind upon leaving a store will be hopelessly muddled a few weeks and a dozen computer stores later. Ask, too, for any printed literature the store can part with.

8. Trust your intuition. It's important that you feel good about the computer you purchase. Include your emotional reactions in your notes and in your decision. Just as cars are more than how many MPG they get, computers are more than how much RAM they have.

9. What happens if it breaks? Be sure to investigate what you'll have to do if the computer does not compute either in or out of warranty. Can you bring it back to the store or will you have to pack it up and ship it to California? How much time will repairs take? Are loaners available for free or at a reasonable cost? Will the store put all its promises in writing? Think about the unthinkable before you buy.

10. Take your time. Don't try to look at everything in a week. You might experience a Personal Systems Overload. Take it easy. If you must travel to The Big City to do your investigations, it's better to plan several shorter trips rather than one long one. Gather all the information you can, let it digest, and make your decision from a relaxed state of mind.

11. Enjoy yourself. Keep in mind that it's hard to lose. All personal computers have *something* worthwhile to recommend them. To paraphrase Father Flanagan, there are no bad computers. You might not buy the best computer that fills your every need for the best price, but such is life. Whatever you do buy will serve you faithfully, teach you several magnitudes more about computers and computing than you know now, and assure that your next computer purchase will be an almost perfect one. Knowing there's no way to lose, enjoy playing one of the most intricate and challenging computer games around: buying a computer.

In getting the best price on your personal computer, it pays to shop the back pages of the various computer magazines (*BYTE* in particular). There you will find mail-order companies that sell computers at rather remarkable discounts. Some computers will be there, and some computers will not. Different computer companies have different policies, and although "fair trading" (i.e., price fixing) was ruled illegal some years ago, some companies control their dealers such that you can be sure you will never find one of their products sold for less than full retail price.

If the computer store in your area offers absolutely nothing in the way of knowledge and support, or if you live a goodly distance from even the closest computer outlet, you might consider buying a computer by mail. Most mail-order computer companies have good reputations, but the unspoken agreement is, "We'll sell you a computer cheap, but you're on your own after the sale." That means that fixing the computer is between you and the manufacturer (most are good at mail-in warranty repairs), and that learning the computer is between you and the Almighty.

If the computer store in your neighborhood seems to know what they're doing, can communicate that with a fair degree of intelligibility, and seems to be able to offer you after-the-sale support (a repair department, software, peripherals, maybe even classes), then buy from them.

You may or may not be able to get a lower price from the local computer store by showing them the ads in the magazines. They may give you a special "systems price," or throw in some software, or offer to come over to your house and set it up. Most stores, if they are interested in your business, will make some concession somewhere.

Don't expect them, however, to "meet or beat" the price in the mail order ad. The unspoken agreement between you and a walk-in computer store is that they will be there to serve you after the sale. This costs something, quite a lot actually and, like a club, you pay your dues when you join.

You might, too, consider hiring your salesperson, or someone you met in your quest for RAM, as a consultant. This is especially true in a business environment. Offer them $25 per hour—or more—to review your computer purchase before making it, set the computer up, test it out, make sure everything is working, teach you (and your staff) how to run different programs, and be on hand to answer any questions as they arise (and believe me, they will arise).

If your consultant works, say, ten hours at this task, he or she might prove to have been the most valuable $250 peripheral you could possibly have purchased.



"Don't be afraid. There's nothing in a computer store to harm you."

This brings us to an end which is, really, just the beginning. (Be careful. I tend to wax poetic and sentimental at goodbyes.)

It's been my pleasure escorting you through a small portion of this maze known as personal computing. I hope I have been of some help.

If you would like an update on personal computers, please write. The details are at the end of the last chapter.



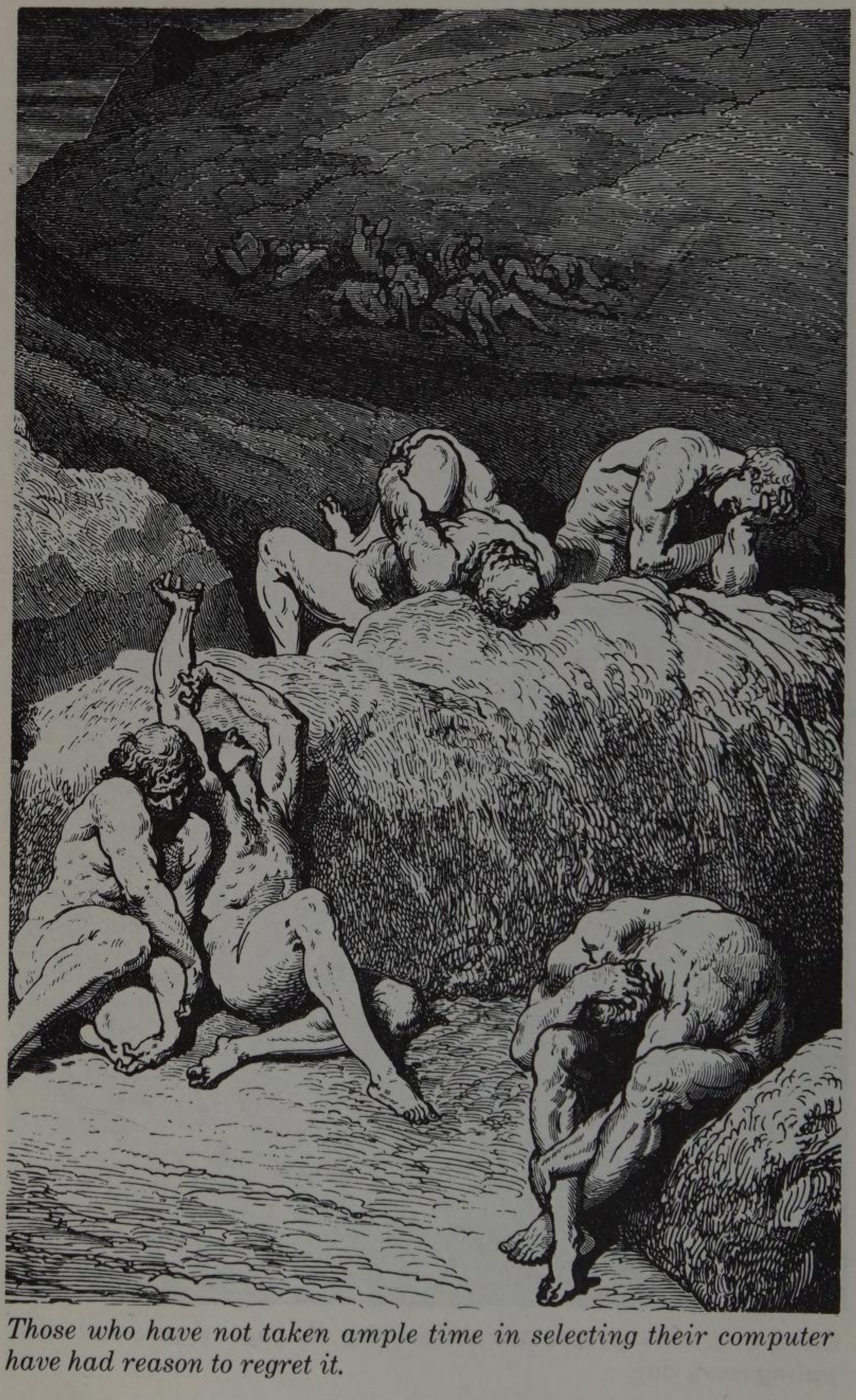
Happy computing!

Appendix A

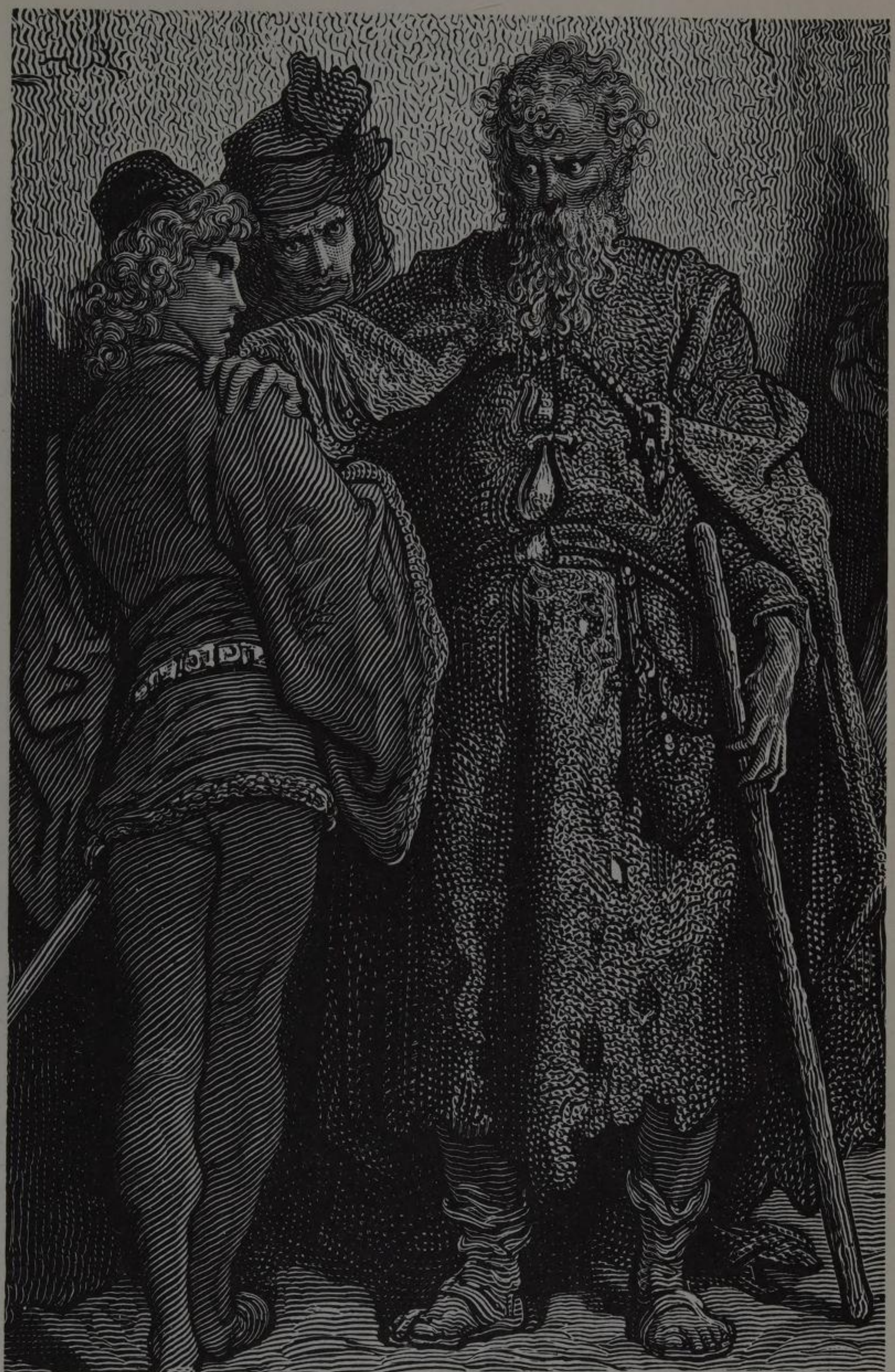
An Illustrated Guide to Selecting and Purchasing a Personal Computer



More and more people are discovering the joys of personal computing every day.



Those who have not taken ample time in selecting their computer have had reason to regret it.



Get the advice of those who have trod the path of computer ownership.



Be sure to read good books on the subject.



Weigh the advantages and disadvantages of each computer system carefully.



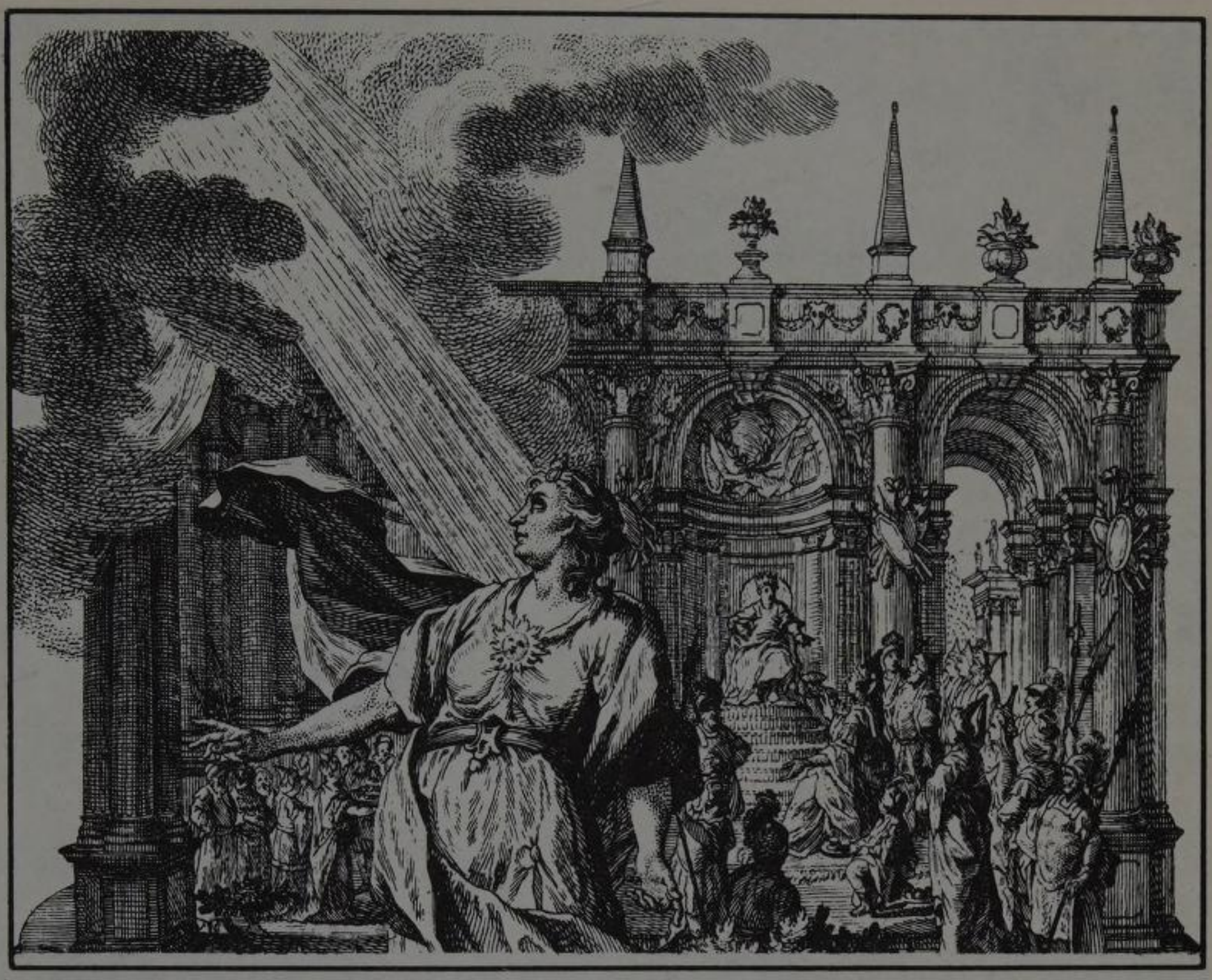
Don't overtax your system by getting one too small to meet your needs.



Be sure to read good books on the subject.



And even if you haven't read any good book on the subject, be sure to ask the advice of someone who has.



Be open to good advice from any source.



Even with expert guidance, it's easy to get in over your head.



After visiting a number of computer stores, you might want to go through the collected business cards and see which salesperson you liked best.



If you play your cards right, you'll wind up with a computer you can be proud of.

For information about **The McWilliams Letter** ("Some's News, Some's Not"), an informal ten-times-per-year update on the world of personal computers, please write to:

Prelude Press
Box 69773
Los Angeles, CA 90069

We'll send you a "descriptive brochure" (as they say in the travel industry).

Addresses

Here are the addresses of manufacturers mentioned in this book. And some others which were not mentioned.

Acorn Computer
400 Unicorn Park Drive
Woburn, MA 01801
(617) 935-1190

Advanced Software Interface
2655 Campus Drive
Suite 260
San Mateo, CA 94403
(415) 572-1347
(Keynote software for IBM)

Advent Products
965 North Main Street
Orange, CA 92667
(714) 997-0800
(Anti-glare screens)

Alfred Glossbrenner
St. Martin's Press
175 Fifth Avenue
New York, NY 10010
(Personal Computer
Communications Book)

American Training International
3770 Highland Avenue
Suite 201
Manhattan Beach, CA 90266
(213) 546-4725
(Teach Yourself Software)

Anchor Automation
6624 Valjean Avenue
Van Nuys, CA 91406
(818) 997-6493
(Signalman modems)

Apple Computer
10260 Bandley Drive
Cupertino, CA 95014
(408) 996-1010

Artificial Intelligence Research Group
921 N. La Jolla
Los Angeles, CA 90046
(213) 656-7368
(Eliza)

Ashton-Tate
9929 West Jefferson Boulevard
Culver City, CA 90230
(213) 204-5570
(dBase II)

Atari, Inc.
1265 Borregas Avenue
Sunnyvale, CA 94086
(408) 745-2000

Axel Johnson Corp.
666 Howard Street
San Francisco, CA 94105
(415) 777-3800
(Autocode software)

Brother International
20 Goodyear
Irvine, CA 92714
(714) 859-9700

BRS
1200 Route 7
Latham, NY 12110
(800) 833-4707
(BRS After Dark database)

Bruce & James Publishers
The Wharfside Building
680 Beach Street—Suite 357
San Francisco, CA 94109
(415) 775-8400
(WordVision for IBM)

Business Computer Network
P.O. Box 36
1000 College View Drive
Riverton, WY 82501
(800) 446-6255
(BCN Communications Network)

Businessoft
24 Jean Lane
Monsey, NY 10952
(201) 783-6888
(Wondertype)

BYTE
70 Main Street
Peterborough, NH 03458
(603) 924-9281
(Magazine)

Bytewriter
125 Northview Road
Ithaca, NY 14850
(607) 272-1132

Centram Systems, Inc.
P.O. Box 511
Camp Hill, PA 17011
(717) 763-1198
(Networking Kaypros)

Chuck Atkinson Programs
Rt. 5, Box 277-C
Benbrook, TX 76126
(817) 249-0166
(Pro Bookkeeper, Quick Check,
RIP programs)

Coleco Industries
999 Quaker Lane South
West Hartford, CT 06110
(203) 725-6000
(Coleco Adam)

Columbia Data Products, Inc.
8990 Route 108
Columbia, MD 21045
(301) 992-3400
(Columbia MPC)

Commodore Computer Systems
1200 Wilson Drive
West Chester, PA 19380
(215) 431-9100

Compal Computer Center
8500 Wilshire Boulevard
Suite 103
Beverly Hills, CA 90211
(213) 652-2263
(Wordpal)

Compaq Computer Corp.
12330 Perry Road
Houston, TX 77070
(713) 370-7040
(Compaq computers)

CompuServe Information Service
5000 Arlington Centre Boulevard
P.O. Box 20212
Columbus, OH 43220
(800) 848-8199
(Database)

Computers International
3540 Wilshire Boulevard
Los Angeles, CA 90010
(213) 386-3111
(Daisywriter printer)

Comrex
3701 Skypark Drive
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Torrance, CA 90505
(213) 373-0280
(Letter quality printers)

Continental Software
11223 South Hindry Avenue
Los Angeles, CA 90045
(213) 410-3977
(The Home Accountant)

Cord Ltd.
2815 Junipero Avenue
Building #102
Signal Hill, CA 90806
(213) 595-4446
(Supercord)

Corona Data Systems
313 Via Colinas
Westlake Village, CA 91362
(818) 991-8120

Creative Computing
Box 789-M
Morristown, NJ 07960
(Magazine)

Cromemco
280 Bernardo Avenue
Mountain View, CA 94043
(415) 964-7400
(C-10 computer)

Cuadra Associates, Inc.
2001 Wilshire Boulevard
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Santa Monica, CA 90403
(213) 829-9972
(Directory of Online Databases)

Cuesta Systems, Inc.
3440 Roberto Court
San Luis Obispo, CA 93401
(805) 541-4160
(DataSaver line conditioner)

Data Base Research Corp.
66 South Van Gordon, Suite 155
Lakewood, CO 80228
(303) 987-2588
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Datatran
1195 South Huron Street
Denver, CO 80223
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(Datatracker breakout box)

DIALOG Information Services, Inc.
3460 Hillview Avenue
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(415) 852-3901
(DIALOG and Knowledge Index databases)

Digisoft Computers
1501 Third Avenue
New York, NY 10028
(212) 734-3875
(Mail-Com)

Digital Equipment Corporation (DEC)
2 Mount Royal Avenue
Marlboro, MA 01752
(617) 264-1669
(DEC Rainbow and DECmate II)

Digital Marketing
2670 Cherry Lane
Walnut Creek, CA 94596
(415) 938-2880
(Micro Link II)

Dover Publications
180 Varick Street
New York, NY 10014
(Publishers of Dover
Archive Series)

Dow Jones News/Retrieval Service
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Princeton, NJ 08540
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(Database)

Dvorak International Federation
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Brandon, VT 05733
(802) 247-6020
(Dvorak Keyboard group)

DynaType
740 East Wilson Avenue
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5698 Bandini Boulevard
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983 University Avenue
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(QX-10 computer and
FX-80 printer)

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(609) 482-5900
(Franklin Ace 1000 and 1200)

FYI
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Austin, TX 78755
(512) 346-0133
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Grid Systems Corp.
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Tarzana, CA 91356
(818) 342-9600
(Head Head Cleaner)

Heathkit Electronics Corporation
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(616) 982-3285
(Heath H-89)

Heritage Software, Inc.
2130 South Vermont Avenue
Los Angeles, CA 90007
(213) 737-7252
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974 East Arques Street
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(408) 720-3367

IBM
Information Systems Division
P.O. Box 1328
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(305) 241-6007

IJG Inc.
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InfoWorld
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Menlo Park, CA 94025
(415) 328-4602
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Bala Cynwyd, PA 19004
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(Magazine)

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(206) 451-0232
(Smart Cable)

ITT Dialcom
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Silver Spring, MD 20910
(301) 588-1572
(Dialcom database)

John-Roger
Baraka Books
3500 West Adams Boulevard
Los Angeles, CA 90018
(Author of *Consciousness of Wealth*)

Jonos Ltd.
1835 Dawns Way
Fullerton, CA 92631
(714) 999-6661
(Jonos Computers)

Kaypro Corporation
533 Stevens Avenue
Solana Beach, CA 92075
(619) 481-3424
(Kaypro II, 4, 10)

Keytronics
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Spokane, WA 99214
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(Keyboard for IBM-PC)

KREPEC Software, Inc.
5460 Royalmount
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CANADA H4P 1H8
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(Reportmaker)

Langley-St. Clair
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(Eye-Guard radiation shield)

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Needham Heights, MA 02194
(617) 449-4655
(Leading Edge PC)

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Davis, CA 95617
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Lotus Development Corporation
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(617) 492-7171
(123 software)

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8301 South 180th Street
Kent, WA 98032
(206) 251-5500
(Mannesmann Tally 160L)

MCI Mail
2000 M Street, NW
Washington, DC 20036
(202) 293-4255
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Micro Solutions
125 South Fourth Street
DeKalb, IL 60115
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(UniForm Disk Formatting
Program)

MicroPro International
1229 Fourth Street
San Rafael, CA 94901
(415) 499-1200
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Morrow Designs
600 McCormick Street
San Leandro, CA 94577
(415) 430-1970
(Morrow Micro Decision)

Muse Software
347 North Charles Street
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(301) 659-7212
(Word processing for Apples)

NEC Information Systems, Inc.
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(800) 525-7550
(Otrona 2001)

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(713) 520-8221

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Suite 700
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(PeachText and other software)

Pearlsoft
25195 Southwest Parkway
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Wilsonville, OR 97070
(503) 682-3636
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manager)

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(415) 524-1926

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Riverton, NJ 08077
(Magazine)

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(CP/M 2.2E and Plu*Perfect
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(Publishers of Z-100 users guide)

Radio Shack/Tandy
1800 One Tandy Center
Fort Worth, TX 76102
(817) 390-3011

Ring King Visibles, Inc.
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Muscatine, IA 52761
(800) 553-9647
(Makers of disk storage files)

Rising Star Industries
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Torrance, CA 90505
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Rocky Mountain Software Systems
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Romar Computer Systems
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Woodland Hills, CA 91367
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(CP/M card for Victor 9000)

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San Diego, CA 92121
(619) 450-1526
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Solution Technology, Inc.
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SOS Computers
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computer stand)

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Star Micronics, Inc.
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Supersoft
P.O. Box 1628
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28631 Canwood Street
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Agoura, CA 91301
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Teleram
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TeleVideo
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Houston, TX 77001
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(Databank)

The Systems House
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(Free Flier)

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(916) 529-3000
(Thunder 'Tector Power Saver)

Toshiba America
Information Systems Division
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Tustin, CA 92680
(714) 730-5000
(T-300 computer)

Transtar
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U.S. Robotics
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Chicago, IL 60607
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Strongville, OH 44136
(216) 238-8448

VisiCorp
2895 Zanker Road
San Jose, CA 95134
(408) 946-9000
(VisiCalc and other software)

Wang Electronic Publishing
1 World Trade Center
Room 3271
New York, NY 10048
(212) 432-2131
(Random House Thesaurus and
Strunk & White)

Wang Laboratories
6059 Bristol Parkway
Culver City, CA 90230
(213) 642-7433
(Wang Personal Computer)

Western Telematic Inc.
2435 South Anne Street
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Western Union
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(312) 761-4610
(Balans Chairs)

WP News
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Suite 210
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(818) 845-7809
(A word processing newsletter)

Wyndham Group, Ltd., The
125 Mirona Road
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Xedex Corporation
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New York, NY 10105
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Xerox Corporation
Stamford, CT 06904
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(Xerox 820-II)

Zenith Data Systems
1000 Milwaukee Avenue
Glenview, IL 60025
(312) 391-8744
(Z-100 computer)

Computers $10.95

If You...

- Plan to Buy a Personal Computer
- Need to Explain the One You Already Bought
- Are Wondering What All the Fuss is About

Then This Book is for You

"Solid advice for the first-time buyer ... just what the consumer needs."

—The New York Times

"Mr. McWilliams writes about personal computers in an informed, cheerful, relaxed, unintimidating, and immensely readable fashion."

—William F. Buckley, Jr.

"If you can't afford to give a computer, give *The Personal Computer Book.* This sprightly, clear, funny primer explains everything you need to know."

—Newsweek

"The most useful and amusing computer book available today."

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—The Houston Post

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