

# VIDEO

## INVADERS

STEVE BLOOM



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**STEVE BLOOM**

The invasion started with a dot of light bouncing back and forth on a small gray screen. Today, nobody knows how far it will go. Nowadays, almost anywhere you go you can hear the beeps, bangs, and whistles of alien hordes being eradicated. In 1981, the hordes nearly overran us.

Last year, video games brought in 6 billion dollars — that's 24 billion quarters to you obsessive gamers — and that's a lot of monstrous mutants blasted in anybody's book. It's also a lot of records, T-shirts, funny hats, and other assorted trinkets. The question is, where did all these aliens come from and who's behind the invasion?

Steve Bloom unravels the whole complicated story in *Video Invaders*. He introduces you to the men who invented the first video games and the people who are designing the newest, most diabolical machines that are eating your quarters. He takes you behind the scenes at Atari, the Earth Mother of the games industry. Here, you'll learn how these coin-gulping monsters work and how they get from the drawing board to your local arcade. And, you'll get a unique look at the evolution of video games from the very first crude space battles all the way to what may be coming up in future years.

*(continued on back flap)*

**ARCO PUBLISHING, INC.**  
**NEW YORK**

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**STEVE BLOOM**

**ARCO PUBLISHING, INC.  
NEW YORK**

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# Dedication

To Gramps

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# Introduction

## Babes in Playland

I guess I was 9. Yeah, that sounds right. That means my brother was 12, and my father was 36. The year was 1963.

Lots of important things happened in 1963. John Kennedy was shot. Sandy Koufax struck out 15 Yankees in a World Series game. I was in the fifth grade, learning how to get into trouble.

I can remember a typical rainy Saturday afternoon, with nothing in particular to do. We probably could have gone bowling or seen a matinee — but nooooooooooo, we'd much rather make Spaghetti-O's out of Dad's nerves. Mom works on Saturdays so it's just the three of us in the house: the boys.

Dad enters the “war zone” (our room). “So, what's it gonna be, guys?”

“Playland, oh please Dad, take us to Playland. Pleeeeease!” Barry cries. He knows the whine gets Dad every time.

“But we just went last week,” Dad protests.

“Pleeeeease!” we squeal in our best falsettos.

Nodding his head and plugging his ears, he staggers from the room. We bet a dime on who can tie his sneakers



the fastest. Whoever loses has one less dime to blow in Playland. That's a serious bet in '63.

On the drive there, we chatter about our favorite games and end up arguing over which ones are better. Barry likes pinball while I go for the crane game that gives you the chance to scoop up great prizes like shrunken skulls. We both, however, agree on one game — baseball. That's the one with three kinds of pitches and a wooden bat. If you time the pitch just right you can blast the steel ball into the grandstand for a homer.

When we arrive, Dad immediately does the only thing you can do when you walk into a Playland — he gets enough change to keep us out of his hair for awhile. He deposits a few dozen dimes into our itchy little outstretched palms and instructs us to get lost — which, of course, is exactly what we've come here to do: get lost in Playland.

## Sportland: What a Concept!

Playlands as we now know them — those cacophonous caverns of coin-operated combat — date back to the anything-but-boring '20s. Bagatelle, the 19th-century French billiards-like game that eventually became pinball, was the first of America's many love affairs with the world of mechanical amusements. A certain Montague Redgrave is credited with patenting the first bagatelle machine (in 1871), but it was actually David Gottlieb's Baffle Ball (1930) and Ray Maloney's Ballyhoo (1932) that spirited, as **Business Week** observed in the spring of 1933, an "astonishing revival" in the "ancient" bagatelle. Both games replaced the cue with steel balls, the billiard stick with a plunger, inserted pins or nails in the playfield which



primarily blocked entrance to the point-scoring holes, and radically reduced the game's size and price. "It [the revival] is primarily responsible," **Business Week** went on, "for an entirely new form of indoor amusement shop. An example is the 'Sportlands' in and around New York City. There are 52 of these Sportlands in New York and the surrounding territory. They inhabit temporarily vacant stores in populous districts. One claims a weekly profit of \$1200.

"There is no admission charge to these places. Persons wandering to get out of the rain or to satisfy their curiosity are intrigued by the groups about games, become victims of suggestion, ultimately part with nickels.... Proof that these Sportlands are popular with the jobless is the record of one on Sixth Avenue in the heart of the employment bureau district. Though patronized almost entirely by men looking for work, its net is said to be around \$800 weekly."

The Chester-Pollard Amusement Company, which originally owned the Sportland name, entered the coin games business in 1927 with automated renditions of football and golf. At \$175, the latter sold over 7,000 units, setting off a stampede into the indoor amusements market. Three years later, with the Depression in full gear, over 250 companies combined to produce more than 400 different novelties and manufacture approximately 250,000 machines. Every possible penny- and nickel-pinching concept — from the Braying Jackass to the Singing Bird Gum Vendor — made its way into Sportlands, drugstores, tobacco shops, railroad depots, and hotel lobbies across the land. By 1935, the industry had a payroll numbering several hundred thousand.

"People don't mean any harm by it," another pioneer, William Rabkin (whose Electric Traveling Crane — my early favorite — was possibly the most ubiquitous arcade item in

the '30s), once waxed philosophically. "There's just something about a coin machine that makes them act up." Rabkin had initially earned his keep by pushing out "penny peepers" during the 'teens and '20s before he decided to try his hand at designing games. After Shootoscope and Grandmother's Predictions had moderate success, Rabkin released the Traveling Crane (or Digger, its street moniker) in 1928. You might remember it: Inside a glass box hung a metal crane that customers set in motion with a crank. The object was simply to lower the claw and manipulate it in such a way that you were able to nab one of the better prizes (such as wallets and lighters) that sat betwixt a collection of lesser junk (such as plastic rings). Like other great arcade devices of the day, Rabkin's Digger had one foot cleverly planted in Sportland and the other on the carnival midway. Detached and mechanical, it nonetheless seemed to have a life of its own. "Step right up, young man," you might even have heard it bark. "How wouldja like to win a brand-new cigarette lighter for your little lady?" You would "dig" for an hour, spend a couple of dollars, and finally snatch that lighter or whatever it was you were reaching for. Now, wasn't that more fun than going out and buying it? With the Digger, you still won prizes the old-fashioned way — **you earned it.**

So here I am in a Playland in Yonkers some 30 years later, and there **it** is: Rabkin's dream machine, aging restfully, like an old lady on a park bench, in a seldom-visited corner. The Digger wags an arthritic finger in my direction and I walk over warily. Seconds after pressing my greasy nose against the glass, my eyes suddenly bug out as I catch a glimpse at all the goodies inside. Key chains and charms and combs — oh boy! Without a second thought, I begin excavating. I can't remember just how many dimes it cost me,

but I'll never forget racing over to my brother and father with my freshly-dug charm in hand. Suffice it to say that I was ecstatic. Little did I know I was also hooked.

For the past 18 years, I have been among the most ardent supporters of the Playlands of America. I simply love to be "amused" for a quarter. I have led myself to believe that this is not totally abnormal behavior. And even if it is, I can always find comfort in the knowledge that, indeed, I have plenty of company.

Many stories come to mind, but I will only tell a few — like the time three other pranksters and myself were booted out of a Fascination joint in Denver for cheating. As we all know, there comes a point when you must win at a game or give it up, and I had finally arrived at that critical juncture with Fascination. I'd been a regular at the Times Square franchise (the best!) for awhile already, and felt I knew every trick of the trade **except** how to win.

Well, we just happen to be in Denver one summer's night with nothing but time and dimes to kill. Now, if you remember anything about Fascination, you sit side-by-side at tables and roll a rubber ball — one ball — into holes at the other end of the table until somebody scores Bingo. As this particular game in question begins, I ask Eddie if he wouldn't mind letting me use his ball in addition to mine. Wendy thinks that's a great idea and likewise passes hers to me. I start shuttling three balls down the lane and nobody's even noticed! Milt can't resist the temptation and bounces his over, too. Four balls all going at once in Fascination! Suddenly, the bell rings, signaling that I'm the winner. Quickly, I pass all the extra balls back and try to act cool. Not only have I achieved Bingo, I've completed every hole on the board. The joint knows something is jumping, so they send over a guard to watch my next game. Back to one

ball, I return to form, losing miserably. At this point, I'm not-so-politely told to find the exit and never to return.

Another caper occurred back on my home turf — Times Square. For any New Yorker with the slightest sense of adventure, the Square (or the Deuce, as the hustlers call Forty-second Street, the district's hub) is the exact center of the universe. One of the world's busiest and most bizarre crossroads, it is best known for being the spot where red, neon, and Broadway lights meet — the place where your choice of diversion (whatever it is) can almost always be found. Among Times Square's many attractions is Arcade Alley — the finest strip of Playlands on either side of the Mississippi — which extends for ten blocks north of Forty-second Street along Broadway. This is where I matriculated in arcade life. And at the Fifty-second Street Broadway Arcade I graduated cum laude in Skee-Ball.

At a dime for nine balls per game, Skee-Ball proved to be one of the more economical recreational pursuits of my youth. This archaic bowling exercise, which originated in 1909 and only recently has faded from the arcade scene, consumed many Saturdays and summer months. For us, pitching up to 500 balls an hour was not uncommon (each game lasted only a minute), nor was a perfect 450 score. The one drawback, though, was the prizes. For every game that you tallied 150 or more you were awarded tickets, redeemable only for those prizes. After you got past pea-shooters and calliopes, there just wasn't a whole lot to go for.

Well, one day as we are contributing to the arcade's usual mayhem, I notice an elderly man peering over my shoulder. Since this is Times Square, you never know just what to expect. Is he enamored of young boys or honestly enjoying my uncanny Skee-Ball skills? I soon find out, for he takes me by the arm and makes the following proposition.

“You boys are pretty good players, huh?” he says, lifting one eyebrow higher than the other. “How would you like to win me that clock-radio behind the counter? The dimes are on me.”

Wow! We'd finally found our Broadway benefactor! I hadn't ever paid much attention to the radio, but now I notice that it's not just any clock-radio — it's in the shape of a locomotive. We quickly conclude that this old guy is slightly batty, but we can't turn him down. He starts spreading dimes around at a tremendous clip. It takes us hours to accumulate the 2,000 or so tickets needed to spring the clock from the cabinet. And when we do, and the old man walks away — the prize wrapped in brown paper and neatly tucked under his arm — we are left with a strange feeling of accomplishment and goodwill, something I've never since experienced during a visit to Playland. (By the next morning, incidentally, my arm had stiffened up — I had Skee-Ball elbow, what else?)

## Welcome to Spaceland

It is now 1976. I'm out of college and back in New York. I'm a little out of touch with the arcade scene. Like everyone, I've had my fling with Pong (TV tennis) but found her too one-dimensional (y'know, all looks and no personality). Foosball and Air Hockey, on the other hand, have been very, very good to me. But, for some odd reason, pinball and I have never really hit it off. I attribute this partially to the fact that pinball was outlawed in New York for so long (until 1981), which explains why we never really crossed paths during my formative years. And then, I've always been more of a sucker for carnie-type games — let me shoot

something, pitch a dime or roll a ball down a lane as in Fascination and Skee-Ball, and you'll hear no complaints from me.

I decided it was time to take some continuing education courses in arcade life that fall, so I began attending classes at Broadway Arcade U once again. I was quick to discover one interesting development: a video game called Breakout, which called for cracking through a multicolored brick wall with a ball and paddle. It had quite a following. As Breakout begat Super Breakout (double balls and paddles and the wall moves at you), I noticed that lunch hours brought an eclectic (but fevered) group of white-collar workers crowding around the machines. Notes were compared, high scores scrawled in ledgers. If one player was doing particularly well, the crowd pushed him on with their cheers and applause. A clubby element was beginning to characterize this little patch of the arcade. And to me, it seemed most significant that these same players — few of whom knew each other — came back day after day for more.

Meanwhile, part of my studies involved participating. Like those members of the club, I too found myself captivated by Breakout — especially its reward. For breaking through, the ball would lodge on the “other side,” where it would chip the bricks away at a dizzying pace, then ricochet back towards your paddle; at first it was practically impossible to return. Lulled by its optical wizardry, you were then punished for enjoying the game too much. You lost that ball, maybe the game. Soon enough, however, you learned this basic tenet of video-gaming: Never break concentration, not even for a second.

Although Breakout served as my introduction, nothing did — or could — prepare me (or anyone else) for Space Invaders. Introduced at a private showing on Japan's South



Main Island on June 5, 1978, Space Invaders soon touched off a fervor in that country bordering on zealotry. While unprecedented numbers of upright cabinets packed the arcades, cocktail (sit-down) models were infiltrating the coffee shops. Pachinko parlors, Japan's traditional amusement hang-outs, were meanwhile growing emptier by the day. So complete was Space Invader's impact on Japan that at one point the government reported a coin shortage. Where were they all? Locked away in Space Invaders machines, of course.

Back at the Broadway Arcade, Space Invader's debut was hardly so auspicious. Like most new arcade pieces, it minded its own business that first week. Occasionally, a member of the Breakout gang would stroll over and examine the merchandise. It stood six-by-two feet (standard cabinet size), had three control buttons (left, right, fire) and, with hulking, hairy, silk-screened ghouls climbing up the side of the box, exuded a distinctly menacing aura. A closer look revealed what is known as the "shill mode" (a 10-second peek at a game from the machine's memory) with actual invaders, lined up in neat columns, marching down the screen towards their goal — your base. The "shill" battle was followed by a score table and then the game's logo and byline. The machine was a consummate advertisement for itself.

For the uninitiated, Space Invaders was brutal. The idea was to knock off 55 aliens before they either shot you or overran your base. After several dollars and little progress, you realized there had to be a method behind all this; as it turned out, there was.

Within weeks of Space Invaders' arrival in the States, **somebody** had figured out "the system." Since the game was controlled by a microprocessor, this meant there had to be a logical way of solving the program. The three most

startling discoveries were: (1) Picking off the outside columns first not only slowed the alien army, it opened up a clearing through which you could directly fire at the mystery UFOs that cruised overhead. (2) By counting the number of shots taken, you could dramatically increase your score (on the first 23rd shot and then every 15th afterwards, the UFO could be had for 300 points instead of 50, 100, or 150). (3) When the invaders reached the very last row before your base, they could no longer shoot. None of these instructions came with the package; players had to figure them out themselves and then spread the gospel by word of mouth.

By early '79, anyone who played Space Invaders even casually already knew the system. Unfortunately, that didn't guarantee you very much. You still needed terrific hand-eye coordination, ice in the veins, and an uncommon reserve of concentration to top 5,000.

## I Was a Space Invaders Zombie

I saw them in my sleep. I heard that dull firing sound (something like a broken whistle) wherever I walked. When steam rattled through the pipes in my house, I could've sworn it was **them**.

Space Invaders **were** everywhere — not just at the arcades, but in the backs of pizzerias, grocery stores, even that embodiment of suburban America, the 7-11. And wherever the game was, I invariably found it. Unfortunately, I wasn't the only one suffering from this strange disorder; translated that meant lines — waiting in lines to play this

ridiculous game! As a matter of fact, so acute was the illness that people became impatient and rude. For instance, imagine walking 10 blocks out of your way to the nearest game, only to find when you arrive that the thoughtless idiot at the controls has loaded it up with 12 additional quarters! That's when you ask him to step outside. Fighting over Space Invaders? Don't think it didn't happen.

When Asteroids — the next blockbuster — came along, I came upon what I felt was an adequate excuse for my relatively poor scores: I didn't like the game. As it turned out, I was in the minority. The country went just as crazy over Asteroids as they had over Space Invaders. It required dodging and shooting different-sized rocks and several enemy UFOs; Asteroids was **the** game of 1980.

Once again, with Asteroids, a system (called **lurking**) spread like brushfire along the arcade circuit: By allowing one or two asteroids to remain on the screen, you could go after the UFOs for bonuses — that is, if you were fast enough — all day. Some people decided to do just that. While the high score for Space Invaders (regardless of all the strategic revelations) never exceeded 400,000, Asteroids addicts really began to pour it on. As of this writing, a teen named Lonnie Cancienne from New Orleans is the only gamer to ever surpass 30 million points in Asteroids. It took him over two days to accomplish this extraordinary feat. How did he eat? Friends fed him. And go to the bathroom? He had so many bonus ships that he could afford to run to the john and just let a few ships go down the drain. Sleep? Not a wink.

Speaking of zombies: One day I walked into a local grocery store and was instantly besieged by a conglomeration of sounds that only could be described as those you might someday hear in a jungle in space. Two video games

were capturing the complete attention of what appeared to be the entire fifth grade of the local public school. Even I was taken aback. Placing my items on the counter, I couldn't help asking the clerk how he got through the day with all this racket. "Oh, man," he replied, staring back at me queerly, "I love it. It keeps me going. When the machines are off and everything is quiet I get nervous. You don't know, man. These games keep me going."

## Beyond the Valley of Space Invaders

William Rabkin had a point: There is something about a coin machine that makes people act up.

In 1981, \$5.7 billion was spent on coin-operated video games in America alone. That's a 49-percent hike from the year before. That's also twice the gross earnings of all of Nevada's casinos, three times the total TV revenues and gate receipts for professional baseball, football, and basketball combined. Want more? Video games ran neck-and-neck with the recording and film industries — again combined. At home, consumers paid more than \$1 billion for TV games units (8 percent of American homes now have them), not including sales on cartridges, which range from \$20 to \$50. Atari, the industry's Goliath, doubled its revenues for the second consecutive year. They sold one million copies of their Space Invaders cartridge, which in the record business would have entitled them to a gold citation. And while we're on the subject of Space Invaders, it was reported that as of mid-'81 more than four billion

quarters had been deposited into its nearly 400,000 coin buckets worldwide — which roughly adds up to one game per earthling.

Video games are obviously more than just the modern head on the coin-games beast. They are the dynamic result of a marriage between two of the 20th century's most revolutionary inventions: the computer and the television. They are a new form of entertainment, and they appear to have had a profound effect on many of their players.

This book will attempt to answer the following questions about video games: How are video games created and who creates them? Why have certain trends developed and who are the people responsible for them? What leads have we taken from Japan and vice versa? What games do women prefer and why? How do TV games vary from their coin-operated counterparts and why? What is the story behind Atari? Why are certain municipalities up in arms about video games and what do they think they have to fear? How can you overcome an especially difficult level in your favorite game and also increase your score? And, of course, what might the future bring?

# 1

## Who Really Invented Video Games?

### The Sixties

Computers and television, considered the dominant media for America's technological and cultural future, began really asserting themselves in the 1960s. By the end of the '70s the two had formed a remarkable union and millions of people were playing video games, their first significant offspring. Where and when did this synergy begin? Some say in a research lab in Nashua, New Hampshire, in 1966. Others contend the marriage occurred in Silicon Valley five years later. And who were the persons responsible? A German-born TV engineer who was forced to leave his homeland just prior to World War II, or a former Mormon who went on to found the most successful games company in this country's history? (There are some, in fact, who would shout neither.)

The fundamental question is, when and where were the first dots moved around on a CRT (cathode ray tube) screen

— and by whom? Would you believe Cambridge, Massachusetts, in 1962?

At the time, computers were the size of a comfortable living room, or even larger; they clanked, clattered, and crunched (numbers, that is), spit reams of strange-looking paper and oddly-punched cards, and ran ribbons of information reel-to-reel. Hulking and mysterious, the IBM 704 (for instance) appeared indomitable. But like thieves who will go to any length to crack open a safe, the students and assistants in Harvard's Littauer Statistical Laboratory schemed day and night to find a way under this monstrosity's skin.

This group of highly intelligent sleuths returned each day to the Hingham Institute on Hingham Street, where they passed the evening fantasizing about the wonderful programs they could write if only this computer were simpler, faster, more flexible. Space was the usual topic. The novels of Edward E. Smith, whose epic spatial voyages (especially "Skylark of Space") predated those in "Star Trek" and "Star Wars" by at least a decade, had been floating around the Institute all year. The researchers also were particularly aroused by Japanese sci-fi escapades on the order of "Rodan" and "The Mysterians." Imagining all of the novel displays they could generate with vectors on the CRT (if only the IBM had one), they bided their time. Meanwhile, the Institute's Study Group on Space Warfare published its Theory of Computer Toys, which stated, in short, that programs should (1) demonstrate as many of the computer's resources as possible; (2) be interesting and different while remaining consistent; and (3) involve the player in a pleasurable, active way — in other words, perform like a game.

In the fall of '61, a PDP-1 mainframe computer was installed just down the hall from the IBM 704. Unlike its

# PONG





predecessor, the PDP-1 was a compact (smaller than a living room, but only just), faster machine that you could turn off and on like a light. It had a terrific CRT and didn't require a team of electrical engineers to operate it. With this new toy, Hingham's "hackers" (the euphemistic term for obsessive programmers) went wild and began executing their most exotic computer dreams. A game of Spacewar, they decided, would be their first undertaking.

By January '62, Steve Russell had generated a dot that skipped around the screen; he soon converted it to a spaceship. The additional dots he had powered remained as stars. By February, two spacecrafts were dancing around the screen, controlled from separate boxes that had two levers (left-right, up-down) and one "torpedo" button each. When the torpedo was pressed, it emitted blasts of light from the ship's nose to destroy the enemy.

Peter Samson, who reportedly was "offended" by Russell's slipshod star configurations, rearranged the dots into constellations based on data culled from the **American Ephemeris and Nautical Almanac**. Dan Edwards calculated the gravity of the so-called "heavy star," which drew you into its radius unless you steered clear, and plugged it into the program. This element in particular transformed Spacewar from a mere cosmic shootout requiring only reflex speed and reasonable hand-eye coordination into a skill game. The final, vital ingredient written into Spacewar was created by J.M. Graetz: the panic button, better known as "hyperspace." Russell defined it as "something you could use, but not something you wanted to use."

Spacewar was the hit of M.I.T.'s annual Science Open House in May 1962. Projected on a large-screen CRT hooked up to the computer, it was a dazzling display. Over the summer, Steve Russell relocated to Stanford. In no time at all, he had that Northern California campus abuzz.

“Did large computers build a games industry? The hell they did! Spacewar was very expensive, didn’t have rasterscan, and therefore was unattainable — except for somebody who had \$50,000 to spend on a display. What did it have to do with consumer products? I developed the raster consumer game industry we have now.”

So says Ralph Baer, who emigrated to New York with his parents from Nazi Germany in 1938. Baer also claims to be the first person ever to earn a degree in TV engineering, which he accomplished at the American School of Technology in Chicago in 1949. He owns about 75 patents, the most controversial being “the black box that moves spots around on the standard TV set for the standard TV monitor [raster] and allows you to play games. That patent is worth millions and millions of dollars.”

As an engineer at Sanders Associates, a defense-oriented electronics firm located in Nashua, Baer projected playing sports, maze, and chase games with a TV set as early as 1966. “I have an official entry in my notebook dated September ’66,” he says. “I had started thinking about what one might do with a home TV set other than turn it on and off. It’s a ubiquitous device — at the time, 62 million families owned at least one. My whole thrust was towards doing something with the TV set that people could afford. That’s when the thought of playing games came along. The emphasis was on simplicity. The basic question I asked myself was, ‘What can we do for \$19.95?’

“From September to December of ’66 I set to work on some elementary circuitry. I did it by myself after-hours. By December, I had some spots chasing each other around on the screen. That’s when I decided this thing was too important to handle on an after-hours, casual basis. So I went to the corporate R&D director, Herb Campman, who understood the scope of the whole thing immediately. We

put a few bucks aside in corporate research and established an official project. We set up a room on the sixth floor of our Canal Street building and brought in two engineers — Bill Harrison and Bill Rusch — to work under my direction. Through all of '67 that room was off-limits to everyone but the three of us, who each had a key. As you might imagine, there were some pretty convoluted rumors going around.

“Early in '67, we had the most basic ball-and-paddle games working. By September, we were playing hockey games that were rather fancy, meaning the ball motion was complicated. Velocity depended on how hard you hit the puck. It had all the dynamics of a real puck — the kind of thing that didn't reappear in games for years and years afterwards. So now we had all this stuff, but there was one question we couldn't answer: What the hell do we do with it?”

## The Seventies

Nolan Bushnell was a child of the 1960s who came roaring into the new decade full steam ahead. An electrical engineering student, he graduated from the University of Utah in 1968. Bushnell had spent the previous four summers managing the games department of a Salt Lake City amusement park, which included everything from electro-mechanicals to pinball to carnival games on the midway. This was an initiation into the world of quick-buck amusements that Bushnell would later immerse himself in.

Like so many other '60s computer students, he was weaned on Spacewar. But Bushnell then went further. He thought to himself, “Gee, if you could make this cheap enough the public would love it.” Then, when the cost of integrated circuits started its precipitous drop in 1969, he

decided that the time was right to give it a try. Bushnell, by now, had moved to California and taken a job in Ampex's advanced technology division. He began adapting Spacewar to raster hardware in his spare time. After some scouting around he found Nutting Associates, a relatively unknown arcade games manufacturer, who agreed to build it.

Bill Nutting had entered the coin games business two years earlier with an electromechanical number named Computer Quiz. Looking to boost sales and possibly gain recognition, he purchased the world's first commercial video game and released it in 1970. Dubbed Computer Space, it was not received altogether warmly. "We blew the whole coin-op industry's mind," he recalls. "Back then, it was all electromechanical — rifle games, periscopes, airplane shoot'em-ups, pinball. No one had ever heard of video. During that first year, I guess you could say we had the whole business to ourselves."

At best, one could say that Computer Space was a crude version of Spacewar. Since there was no computer (integrated circuits made the game move), the game's name was first and foremost a misnomer. Second, gameplay was restricted to one person at a time and only versus the machine — no fearsome hand-to-hand combats here. Finally, the black-and-white raster images were literally light-years behind the splendor of the PDP-1's sparkling display. To Bushnell's credit, he did effect similar controls — buttons for directions, shooting, and hyperspace — but the stars were just dots of light and gravity was nonexistent. Computer Space was a man-machine space duel of the simplest kind.

Nevertheless, Bushnell has repeatedly stated over the years that Computer Space was "ahead of its time." Larry Rosenthal, whose duplication of Spacewar — called Space

Wars — was cited as the industry's most popular game in 1978, believes this was hardly the case. "It didn't do well because it wasn't fun to play," snipes Rosenthal, to which Bushnell answers, "I thought it was a pretty fun game" (though he concedes that it didn't do "real well").

Explains Nutting: "Marketing Computer Space was tough. We built 1,500 and had to sell some by force. The more progressive-minded distributors took it, others didn't. At the '71 A.M.O.A. (Amusement and Music Operators Association) show, there were a few attempts to copy us. Then the next year Nolan started Atari and came out with Pong, which was an instant success. Soon there were 30 or 40 ball-and-paddle games on the market. The business simply exploded."

Here's where things begin to get sort of sticky. If we accept Ralph Baer's premise that mainframe computers had about as much to do with raster games engineering as NASA does with providing our daily bread, then who really invented Pong? Though Baer had been bouncing a ball on a screen (according to his records) for at least two years before Bushnell ever gave the idea much thought, that does not negate the achievement, however flawed, of Computer Space.

Two key developments occurred in 1972. First, Magnavox, licensing Baer's "black box" through Sanders, manufactured the first at-home video game. The Odyssey 100 allowed consumers to play hockey, tennis, and mazes right on their TV sets. Introduced in March, it was delivered to Magnavox's distributors that fall. Second, Pong was meanwhile shipped to the arcades at about the same time. Could this have just been one of those excruciating coincidences?

“Pong was no coincidence,” Baer says firmly. “Later on in the mid-’70s, when we negotiated with Atari to get them under license, it came out that somebody over there had actually seen Odyssey sometime during the course of 1972. I don’t know how they did it, but they saw it. So, Pong was a derivative of Odyssey — not the other way around, by any means. The coin-op games are derivative of what we did here back in the ’60s!”

Surprisingly, Bushnell barely counters Baer’s assertions. “It’s really hard to say,” he replies. “I think he can say **that** even though I had not seen an Odyssey game at that time. But if you do look at the time frame, Pong was actually on the market before Odyssey. I remember being quite surprised to see Odyssey.” After thinking a moment, Bushnell does, however, go on to stress that Baer’s games “were based on a completely different technology. He did some really good pioneering work in the analog field while we were strictly digital. A lot of the work he was doing back then came before the integrated circuits that made my life very easy. I think he’s a very bright man.”

Baer is actually less bitter than one might think. Indeed, he’d genuinely like to know why his name doesn’t “pop up” more often in articles that discuss the genealogy of TV games, but otherwise has nothing but kind words for Bushnell, the man who usually overshadows him. “He did one helluva lot for this industry. If he hadn’t come along with Pong I think the whole thing would have gone down the drain. Bushnell was the catalyst — there’s no question in my mind about that. I’d just like to see myself identified more often as the real inventor.”

Then it’s agreed: Ralph Baer was the first to engineer games on a raster, and Nolan Bushnell, converting technologies, capitalized on it. Yet one question remains: Who really invented Pong?

Al Alcorn met Nolan Bushnell while on a work-study project at Ampex in 1970. He left Ampex soon after to resume full-time studies at the University of California at Berkeley. Back at Berkeley, Alcorn later heard that Bushnell had “gone crazy” (Bushnell had actually resigned from his engineering position at Ampex and joined Nutting’s outfit — which to some may have appeared an act of lunacy). The next news regarding Bushnell Alcorn learned firsthand. “He called to say he was starting a company and offered me a job,” he remembers, adding wryly, “Nolan knew I was cheap.” Alcorn, who had by then graduated from college and happened to be looking for work, gladly accepted. His first project was Pong.

Since Alcorn had had no real experience in this area, Bushnell assigned “the simplest game I could think of” as a training exercise for his new employee. “The game I was striving for was a driving game,” says Bushnell, “but I felt he wasn’t ready for that yet. I described Pong to Alcorn. Basically I felt it was a throwaway. However, he engineered it and the game turned out to be a helluva lot of fun, so we decided to market it on the way to the driving game. I guess you could say Pong was a mistake.”

In other words, Bushnell didn’t entirely invent Pong? “It depends on what you mean by invent,” Alcorn explains. “Nolan defined a ping-pong game that could be played on a TV screen. He defined it and I built it, though there were little things like the sound that I did add.” Says Bushnell, “It’s a thing where I sat down and said that the ball should act this way and the sound should be such and such and Al executed it. Al steadfastly maintains he designed it and I maintain that I did. I always joke with him that I get the credit because I have more access to the press than he does.”

A final word on the controversy over Odyssey and Pong: Alcorn claims to have seen a brochure detailing the

100 system, but never the actual game prior to its release. Even so, he feels the point is moot. "Look at our games [Atari's] and Baer's," Alcorn says. "Obviously, our success has not been based on one stolen game."

## Epilogue

Where have all these proud pioneers gone? Nolan Bushnell, for one, went straight to the winner's circle and has stayed there ever since. After auctioning Atari off for \$32 million in 1976, he formed a fast-food pizza chain that also has an extensive menu of video games. Bushnell, an entrepreneur par excellence, was recently featured in a **Time** cover story titled "Striking It Rich — America's Risk Takers." It has been estimated that, at the age of 39, he's worth more than \$70 million.

Ralph Baer's portion of the "millions and millions of dollars" his patents have brought to Sanders Associates could probably only be estimated in terms of salary and bonuses; surely, it is nowhere near \$70 million, probably closer to one half of one percent of that. "I haven't done too badly," says Baer, now in his 23rd year at Sanders. "I'm not complaining." Selected by the New York Patent Law Association as "Inventor of the Year" in 1980, he is presently Sanders' manager of consumer product development. Baer's most recent patents involve his work in the areas of interactive video training and military simulations.

Al Alcorn has remained at Atari under the new regime, though he's been on a mutually-agreed-upon leave of absence for the past fifteen months. "They're paying me well not to be there," he says, "which suits me fine." After Pong,



Alcorn conceived Space Race, which did poorly but, like Computer Space, has since spurred numerous more profitable imitations. Characterizing himself as "conservative when it comes to games," he recalls an argument he had with Bushnell over whether the ball in Pong should be round or square. "What's the difference? Who needs the window dressing?" Alcorn had protested. Even today, he comments, "To me, the best instruction on any game was the one we had on Pong: 'Avoid missing ball for high score.'"

At first glance, Bill Nutting might appear the loser in this whole gruesome affair. Bushnell did offer him Pong and he did turn it down. "I didn't like his deal," Nutting says. "The kind of royalties he was asking for didn't seem fair to me. But, as they say, hindsight is 20-20." By 1974, Nutting's company had gone bankrupt. He ended up peddling it to a Reno slot-machine manufacturer. "After Pong's success I saw what was happening in the industry and decided I didn't want to have any part of it," he insists. "I didn't need the hassle. So I retired and became a pilot."

Few of the video pioneers have strayed as far from the nest as Nutting has. Just recently he left for Nairobi, Kenya, where he will be managing the East African operation of the Mission Aviation Fellowship for the next two years. Essentially, it's a mini-airline for missionaries. "I'll be flying anything from a Cessna 210 to a Beach 99," he said exuberantly one day before his departure. "It'll be a real ball." And he has no regrets? "Well, Nolan walked away with \$20 million and I didn't. I just wouldn't do the kinds of things that had to be done to get successful. In my mind I'll always believe I did the smart thing by getting out."

## 2

# The Games: A Chronology

## King Pong

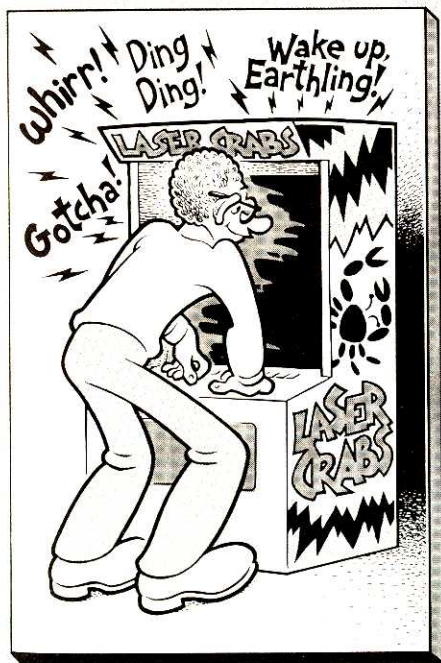
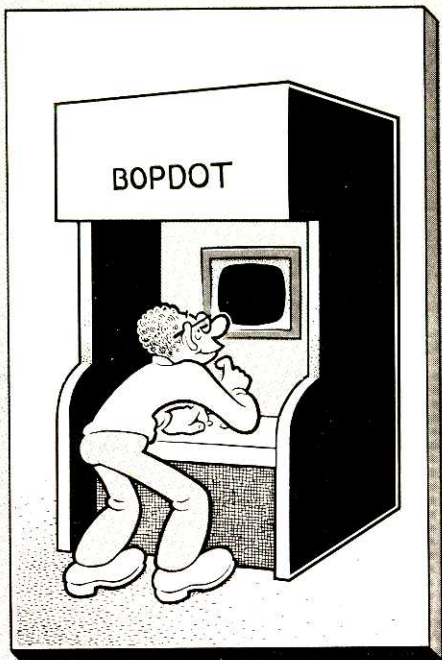
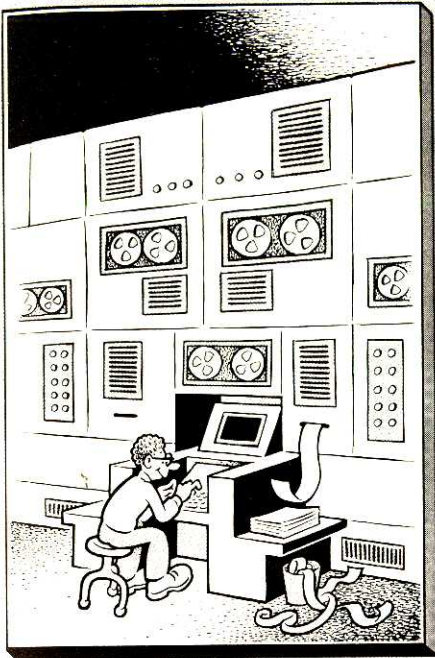
King Pong, as it has been so aptly dubbed, was the electronic answer to the hula hoop. You bought it, toyed with it for maybe a month, then buried it away in a closet — the inevitable final resting place for all trendy playthings. Pong was a different sort of cheap thrill, but its lack of sophistication (and, ultimately, challenge) contributed most to its demise. Pong, however, did set in motion the entire video games business — that much credit it surely deserves.

Atari, the first company to parlay Pong earnings (\$3 million in 1973 alone), immediately set up shop in California's Silicon Gulch once it was clear that people would drop coins into video machines. Nolan Bushnell, arguably the game's inventor and president of Atari, began by hiring a staff of electrical engineers like himself. His instructions to them were simple: Develop new, titillating game concepts

along the lines of Pong. The lab's first efforts were dubious at best — Super Pong, QuadraPong, Pong Doubles. Enough! But, then, Atari came out with three prototypical — almost archetypal — games. Track 10 (and 20) were the racing games that preceded by several years Atari's own Bug Car and Sprint series, Night Driver, and Sega's more recent state-of-the-art roadster shows, Monaco GP and Turbo. Got'cha, a maze game, was followed by Gremlin's Head On and Exidy's Targ, and indirectly had a hand in the maze craze of '81, though Pac-Man's incredible success was the heart of the craze. Space Race, the third of their initial entries, introduced asteroids to the video screen. It was also the first game where players crossed from one side of the playfield to the other while maneuvering around an obstacle-type course. Sega's Frogger is the latest example of this popular idea.

Still, these were lean times for video games. Or as Atari's present vice-president of engineering, Lyle Rains, candidly admits, "There were some pretty bad games between Pong and Tank." Tank, Rains' first baby, was delivered at the annual Amusement and Music Operators Association convention in November of 1974. It was your basic kill-or-be-killed game, with miniature tanks stalking each other on a barrier-loaded (but otherwise esthetically barren) field. "It got the old ho-hum," Rains recalls, "but Tank did support Atari for the better part of '75."

By this time, several other companies had entered the competition. Admittedly, Ramtek and Meadows Games were not involved for long. However, Midway — a manufacturer of electromechanical arcade games which had been purchased by Bally in 1969 — proved to be a formidable opponent for Atari. One of Midway's first video efforts, Gunfight, was significant for two reasons: First, recognizing the



need to convert traditional arcade concepts to video, they chose to replicate the cowboy shoot-'em-up theme that had been a Playland staple for (it seemed) forever. Second, Midway **did not** create the Gunfight game; Japan's Taito Corporation, which later designed Space Invaders, did. This was Japan's first taste of the American market, a preview of their invasion of America's video games market later in the decade.

As 1976 rolled along, Midway scored another success with a periscope game called Sea Wolf. At the time, a solid success for any arcade piece was 5,000 units made and sold. Sea Wolf did twice that number. The game certainly had unique qualities, but Sea Wolf probably benefited most from the media's scathing rhetoric directed at another game made by another company: Death Race.

Exidy, a Silicon Valley neighbor of Atari's, was founded in 1974 by a former partner at Ramtek, Pete Kaufman. For its first two years the company floundered, receiving few notices in the press or on the arcade circuit — that is, until Death Race hit the streets. The game's idea was crude and simple. It was a driving game. You started off behind the wheel and had to follow a simulated road. In Death Race, however, your objective was not just to stay on the road, but to mow down the "gremlins" that ever-so-quickly darted across your path. For each grounded gremlin, a tombstone ingenuously took its place. As the mock-stones began to clutter up the road, it then became your job to avoid hitting them. Each miss resulted in an abnormally loud crash. "Good, clean fun," Kaufman called it. "Sick, morbid and insidious," the National Safety Council rebutted.

Death Race touched off a spate of newspaper articles. A "60 Minutes" feature even examined the psychosociological significance of it all. For better or worse, it was

the publicity the video games industry needed at that particular juncture. Everybody's machines started moving more quickly.

## The Micro Revelation

Very quietly, meanwhile, technicians at California's semiconductor companies had discovered a way to drastically reduce the cost of integrating the numerous circuits and components required to operate the games. The microprocessor, or computer-on-a-silicon chip, was the technological innovation many industries (not just video games) were waiting for. This tiny computer suddenly allowed all of the machine's complex functions, such as data storage, memory, arithmetic and logic, to be completed by a central component. In effect, what was always possible on mainframe computers was finally filtering its way down to the masses. For the games player — both video and pinball — the fun was just beginning.

By 1978, a new company, the San Diego-based Cinematronics, appeared on the scene. After several unsuccessful game ventures, the firm unveiled Space Wars at the fall A.M.O.A. Except for Computer Space and Space Race — two early, spectacular failures — no one had ever seen anything like it. An enormous cabinet (enormous especially by today's standards) housed numerous innovations, such as multiple controls (buttons for fire, forward, left and right, and the world's first hyperspace), game levels (two each for beginners, intermediates, and experts), modifications (get this: bounce back, expanded universe, black hole, negative gravity, and no gravity), and an X-Y video monitor (which

made possible for the first time on a coin machine the display of vector-generated graphics [lines] instead of the standard raster images [dots]). Space Wars became the uncontested hit of 1978. That year alone, Cinematronics built more than 10,000 Space Wars, earning six million dollars in the process.

The game's evolution was a long one, though. Larry Rosenthal, an MIT student who first played Spacewar on the engineering department's massive computer back in 1968, began shopping the idea around after graduating with a Master's from the University of California at Berkeley in 1973. "It was the era of Tank and racing games," Rosenthal remembers. "Images would distort because of the horizontal lines on the raster. I decided it was time somebody worked on a different monitor." He had seen the X-Y in action before, but only when hooked up to a big computer system. By developing a simplified algorithm, Rosenthal was able to adapt the X-Y to a much smaller game unit such as the hardware he was designing for Space Wars. The key was to bring the price on the X-Y down.

When the project was completed, white space ships danced around effortlessly against a black backdrop, challenging whatever foe happened to materialize. Compared with Bushnell's relatively primitive Computer Space, in which ships were represented by approximately 10 dots on a raster screen and had no play options, the computerized Space Wars was a quantum leap in video gaming, both technologically and conceptually.

Rosenthal, who received several patents for his invention, was originally wooed by Midway. "They liked the vector, but not the game," he says, recalling his 1976 visit to Chicago. "They didn't believe people could adjust to buttons instead of a joystick. Also, they offered me a ridiculous

royalty.” Rosenthal packed up his presentation and returned to his apartment in the Bay Area with the nagging feeling that he would end up having to build the game himself. That meant spending capital, which he didn’t have anyway. Then, one day, Cinematronics called. After months of negotiation (they didn’t go for the buttons either), Rosenthal agreed to license the game to them. By 1979, he had parted with the company **and** his patents, which Cinematronics in turn trademarked as Vectorbeam; this label has been used on nearly all of their games since.

And whatever became of Larry Rosenthal, video game pioneer? He’s laboring over another new game system — a raster that can quintuple the number of moving objects on the screen. “I’m shooting for 100,” he says. “Why not?”

The distinction between vector and raster monitors might be helpful at this point. **Raster** is the standard video display device found in all television sets. It scans back and forth across the screen, painting large areas of solid color. The raster’s greatest limitation is that it can move just so many independent objects at one time. For example, in *Space Invaders* fewer than 10 objects move simultaneously, since the invaders move in rows and each row is considered a single object. More recently, *Defender* — with much more memory than its peers — upped that number to about 20.

With **vector** displays, on the other hand, as many moving objects can be drawn as there is time to compute (40 is a good approximation). The vector doesn’t scan, it actually draws lines from one point to another. While every games company has made use of the raster, as of this writing only Cinematronics (*Rip Off*, *Star Castle*), Atari (*Lunar Lander*, *Asteroids*, *Tempest*), Sega (*Space Fury*, *Eliminator*), and Midway (*Omega Race*) have invested in vector technology. Atari’s *Tempest* and Sega *Space Fury* are the first of this type.



Atari entered the vector race in 1979 with Lunar Lander, but not before they once again shook the industry with two raster games: Breakout, which essentially is the ultimate Pong game; and Football, probably the most dynamic sports arcade piece to come along since Foosball. By the end of '78, Atari (which had been sold two years previously to Warner Communications for approximately \$30 million) had cornered nearly 70 percent of the coin-operated market; only Midway and Cinematronics (a mere one-shot company at that point) stood between them and virtual monopoly. Something had to be done to preserve justice, free enterprise, and the American Way. Midway knew the answer: to send out an SOS to their ever-industrious associates in Japan. Taito certainly did respond to the call. They handed over Space Invaders.

## The Invaders Arrive

Taito (which simply means East Pacific) started off as an import-export company run by an imaginative White Russian émigré named Michael Kogan. During the '50s, Kogan observed that with shorter workweeks and more yen to spend, the Japanese were going to be looking for something beyond Pachinko — the island's cross between pinball and slot machines. His first experiment was imported jukeboxes and arcade machines, which his company put wherever the government would allow them.

By 1960, Taito had started manufacturing games as well as distributing and operating them. Quickly, Kogan became Japan's arcade king and soon after was ready to take on the world. In rapid succession, Taito invaded

Australia, South America, Europe, and, finally, America. And *Space Invaders* is only the tip of this arcade iceberg. Taito is the world's largest designer, manufacturer, distributor, and operator of coin-op games. Only Sega, another Japanese giant, can compare. Alongside these two, Atari's coin-op division — which only designs and manufactures — is a dwarf.

When Midway called on Taito in the spring of '78, they had only one thing in mind — licensing a game. Unlike the competition, Midway did not put much time into research and development (until recently, anyway); for them, it was easier to purchase the rights to a game and then manufacture it themselves. Since Japan was the only other reliable source of video products outside of the States, Midway turned to the Far East, as they had done so successfully in the past with *Gunfight*. Taito's *Space Invaders*, however, was above and beyond what the doctor ordered.

Explaining the game's mysterious origins, Taito's import manager, S. Ikawa, then commented, "We were studying what game is good for the Space Age. At Tokyo, there had been a Space Expo and we rode the crest of that boom." Ikawa went on to list what he felt were the primary reasons for *Space Invaders*' incredible ascent to world-wide recognition:

- 1—Never-before-existing game features.
- 2—Player-versus-machine competition.
- 3—Fantastic sound effects appropriate to the game's features. **This sound particularly affects girls.**
- 4.—*Space Invaders* gives you a feeling of tension. **A little neglect may breed great mischief."**

Taito certainly had its corporate hand fixed firmly on the player's pulse. Just as *Space Wars* and *Breakout* attracted a generation of Foos- and pinball junkies with "never-before-existing game features," *Space Invaders* of-

ferred an entirely new challenge. Speed, aggressiveness, strategy, and concentration — correctly combined — became the recipe for offsetting wave after wave of aquamarine aliens. Luck — a key ingredient in pinball — was not a factor here. You could rattle the machine until closing time, but to no avail. Space Invaders was indeed “player-versus-machine competition.” And because of this, players hated that much more to lose. If you were defeated badly, you’d simply try again. If you fell one invader short from completing your first wave — well, why not give it another shot? In very little time, you found that you were hooked. On a good day, you might walk away smiling, having conquered the third battalion or surpassed your previous point high. But on a bad day, the blue meanies had you cursing out loud, thrashing at the controls. You walked home muttering to yourself. That night, you sat up dreaming of space invaders. (Dream or nightmare?)

Space Invaders became a madness, inspiring songs and even a new affliction, according to one medical journal — Space Invaders wrist. The 60,000 units that rolled out of Midway’s Franklin Park plant in suburban Illinois broke all existing arcade records as well as getting into hundreds of locations that operators had never before sought. But Midway was happiest knowing that, with one magical phone call, they had pulled into a dead heat with Atari (who openly conceded to reporters that 1979 had not been a very good year at all for their coin-operated division). Not that Atari had lost any money in ’79 — they were just beaten to the punch by a superior game.

Still, it would have been extremely uncharacteristic had Atari not launched a counteroffensive to recapture whatever edge they might have ceded to Midway. Atari’s response was swift and certain: Seemingly at once, they

negotiated the rights to package Space Invaders for their at-home Vjdeo Computer System and unleashed Asteroids for street consumption.

## Something Old, Something New ...

Asteroids, unlike Space Invaders, was not an entirely new concept. Visually (spaceships and asteroids rotating against a black background) and technically (the vector monitor and multiple controls), it owed a lot to Rosenthal's Space Wars. (Rosenthal distinctly recalls that when Asteroids came out at the '79 A.M.O.A., an Atari engineer walked over to him and joked, "Recognize the spaceship?") But Lyle Rains maintains, "Asteroids came to me as a result of other ideas I had been thinking about, other projects I'd been working on."

A game called Cosmos was actually Atari's prototype for Asteroids. As in Space Wars, two ships flitted around on the screen, attempting to annihilate one another. Stationary planets and asteroids littered the picture but were nothing more than cosmetic. As is the case with so many games that don't initially make it out of the lab, Cosmos was shelved, but not forgotten. A year passed and Space Invaders had already begun to infect the nation. All that while Cosmos continued to gnaw at Rains. An essential ingredient was missing, but what? One day, he decided to check into the feasibility of having the rocks move about. The shooter would have to outsmart the asteroids by either dodging them or blowing them away. And, at intervals, saucers

would appear and duel with the spacecraft. Cosmos begat Asteroids and, well, a star was born. Asteroids would exceed Space Invaders by 10,000 units in the States (100,000 overall) and catapult Atari back into the lead in what had become a full-scale games war.

Midway answered Atari with another Japanese bombshell, Namco's Galaxian, in early 1980. It went on to sell some 50,000 units. By that November at the A.M.O.A. gathering, every exhibitor was brazenly boasting about some new space game that was a variation of Space Invaders or Galaxian (which featured dive-bombing aliens instead of the goosestepping kind). Almost all were imported from the Far East. Gremlin, another San Diego-based manufacturer that was purchased by Sega (owned by Gulf & Western) in 1978, showed Nichibutsu's Moon Cresta. Taito America introduced the industry's first "talkie," Stratovox — a creation of its parent company. Centuri (formerly Allied Leisure of Hialeah, Florida) released Amstar's Phoenix (and also Eagle, which was remarkably similar to Moon Cresta). Just about every Japanese games firm from Data East to Sun Electronics vigorously tried to auction off their space wares to American buyers. But, because of the glut, few U.S. companies were buying. As a result, some 25 Space Invaders and Galaxian spinoffs returned to Japan, never again to be seen on American soil.

There was a general feeling of disappointment at the '80 A.M.O.A. Operators and distributors alike grumbled about the flurry of lookalike space games — so much so that they almost overlooked the two most impressive machines on the floor. Midway, once again raiding Namco's vault, offered a silly-looking maze game named Pac-Man, which featured a yellow chip that swallowed up dots and pieces of fruit while steering clear of four heady little ghosts:

Inky, Blinky, Pinky, and Clyde. (Incidentally, most of the noise at Midway's booth was for yet another Namco maze concoction, Rally-X — not Pac-Man!) The other nearly neglected video game at the show was Williams' debut, a fantastic game called Defender.

## An Arcade Original

With Defender, Williams Electronics, formerly Williams Manufacturing (now a subsidiary of XCOR International), became the second member of Chicago's "Big Three" pinball gang to toss their hat into the video arena. Bally had done so with their purchase of Midway a decade before, and Gottlieb Amusements (now a Columbia Pictures company) would follow suit early in 1981 to complete the triumvirate. By the time Stern-Seeburg and Rock-Ola, two more old-line Chicago outfits that are best known for jukebox sales, enlisted in this movement, the decline of all other forms of coin-operated entertainment was no longer merely suspected but an undeniable fact. While pinball profits dipped in 1980, video games registered a cash-jarring increase of over 70 percent. For even the most farsighted businessman, the economic picture was quite clear: Video games, not pinball, was where the serious money was.

"By the '79 A.M.O.A., we saw what was happening," explains a Williams spokesperson. "There was no question what we had to do." Williams, unlike most companies in a hurry to plunge into the video market, selected the more difficult of the two proven methods for producing a video game — they decided to research, design, and build it themselves.

When Eugene Jarvis, one of Williams' in-house pinball designers (Laserball and Firepower, **Play Meter's** top pin-game of 1980, were his creations), was assigned to Project Defender in February 1980, he gladly got to work. "Pinball was dying out," Jarvis reflects. "The handwriting was on the wall. I didn't want to be in a dying industry. You could see video's horizons opening up before you. Suddenly you could do everything you ever wanted to do."

Jarvis went wild with Defender. Tired of laser bases that could only shuffle from side to side, he created a monster that flew just about anywhere you wanted to go (as in Asteroids, but with greater control). Bored with the vertical movement that had become standard in all space games, he designed a planet that you circled on a horizontal screen. "And why not have a friend to protect?" Jarvis wondered. So, he programmed in little men, known as "humanoids," who had to be saved from treacherous "landers" that kid-napped the men. If and when the landers got away with this devilish scheme, the lander and humanoid would mutate into the dreaded "mutants." Once "mutants," they became doubly powerful and that much harder to hunt down. "I got that idea from 'Star Trek,'" Jarvis reveals, "the real destructive merging of personalities." The mutant is only one of the game's cast of characters. And, in case the evil electro-villains get to be too much for you, Jarvis provided two last-ditch options: Either you hyperspace into the unknown or detonate one of your three all-purpose "smart bombs." These destroy everything on the screen instantly. (A recent game simply calls this option, "Nuke.")

Defender has been hailed by some as the classic "macho" video game. With its joystick and five control buttons, it's about as close to a cockpit as amateur video pilots

will ever get. Though Atari's *Missile Command* and Centuri's *Vanguard* might be more dramatically explosive, *Defender* is tough to beat when it comes to hardcore video warfare. "I'm into violence," Jarvis freely admits. "*Defender* is a very intense, violent game."

Most games may be less violent or "macho" than *Defender*, but this intensity is the key to all the best games. Various degrees of aggression and anxiety seem to have become essential elements in any game's success. Remove the so-called "power capsules" that allow you to devour the ghosts in *Pac-Man*; eliminate the falling objects that prevent you from easily scaling the building in Nichibutsu's *Crazy Climber*; banish Evil Otto, the fiendish red ball that bounces after you in Stern's *Berzerk*, and you will have a dull exercise rather than an on-the-edge-of-your-seat video game. Macho or not, all employ this same principle in one form or another. The games take many forms to get this across, but there are some basic characteristics that can help you recognize a game's ancestry or even a designer's fine hand.

**\*Space Invaders-type games** move vertically except for the shooter, which can only shift from side to side. Every possible alien (birds, insects, bombs, and what have you) can boogie on down from the top of the screen toward your base at the bottom. You dodge and shoot until you bust. The controls are usually simple — left, right, and fire buttons. Some of the best examples are *Phoenix*, *Pleiades*, *Centipede*, and *Moon Cresta*. The most notable exception to this rule so far has been *Missile Command* — a war of the worlds of sorts — where the three bases sit still while Atari's imaginative, multidirectional *Trak Ball* (first used with *Football*) moves the aiming point all over the board.



\***Defender-type games** move horizontally, except for the shooter, which can usually go in any direction. The controls are extensive and must be quickly mastered in order to make the game playable. Because of Defender's uniqueness, there have been few imitations thus far. One is Stern's Scramble and subsequent Super Cobra (both by Konami), which travel from left to right only. Fuel gathering, in addition to shooting, is central to these games.

\***Space Wars-type games** use vector graphics, have unusually clean displays, and now are being produced in color. Movement is confined only by the size of the monitor; in most cases, the player can even maneuver his craft off the screen and return directly across from the point of last departure. Once again, the controls can be exhausting. But once they are mastered, you are granted a freedom few other games afford.

\***First-person games** are the latest novelty. All games thus far described are third-person, in that you can view the action from either the back, top or side. First-person graphics are practically three-dimensional; you are inside the vehicle looking straight out. You navigate the terrain or travel anywhere you wish in the game's particular universe. Only a scanner helps you keep track of where you are. The object of these games, however, does not differ much from that of its predecessors — you must recognize the enemy and obliterate it before it does the same to you. But it **feels** different, which is important. Atari has almost singlehandedly pioneered this new game direction with Night Driver, Battle Zone, and, most recently, Star Raiders. Cinematronics has had one entry with Tailgunner.

\***Pac-Man-type games** are the latest entry in the evolution of maze games. Also called cartoon or “cutesy” games, they originated in Japan when the Space Invaders infatuation there finally grew thin. In most instances, comic strip-like characters with infantile names chase each other through a labyrinth. Cats and dogs, cops and robbers, even fish and a paint roller have gotten into the act. Probably the most ridiculous game so far is Nichibutsu’s Frisky Tom, in which mice thwart Tom the Plumber’s efforts to keep a bathtub’s water level up by swiping the pipes. “Why is Tom so concerned with keeping the tank full?” the company’s promotional flyer asks. “Find out when Tom fills up the tank!!” (That’s when the “lively” blonde materializes. The rest is up to you.) The controls are as simple as you can get: one four-way joystick.

\***Climbing games** are yet another Japanese innovation. Again, here we have characters and a story line of sorts, but a different objective. Basically, you must climb from the bottom of the screen to the top while avoiding and/or destroying the obstacles and foes you invariably meet along the way. Universal introduced this theme with their ambiguously titled Space Panic in 1980. The idea was to scramble up a maze of five flights using ladders, to bury the pursuing monsters wherever you could, and do it all before you ran out of oxygen. Poor marketing, however, was the ruin of Space Panic. This was graphically demonstrated in the middle of 1981, when Nintendo (with Donkey Kong) and Sega (Frogger) started taking this clever concept to the bank.

\***Adventure games**, unlike all the other groups already mentioned, have their roots in the home computer under-

world. The games manufacturers, aware of their popularity and also that of the cult board game Dungeons'n'Dragons, have replied with Wizard of Wor (Midway) and Venture (Exidy) which are less complicated but, well, adventuresome nonetheless. Slay monsters, capture your treasure, then dash out of the chamber with the prize. Some believe adventures don't convert well to arcade games. Time and elaborateness are the major considerations here. They may be right, but a lot of people are playing them.

And then there are those games that boldly defy classification. Very often these are the trendsetters — games that will define future categories as did Space Invaders, Defender, and Pac-Man. As of this writing, there are two such games on the streets: Taito America's Qix and Atari's Tempest, the hands-down hits of the 1981 A.M.O.A. show. Both are unusual in design, entirely American-made (which is unusual), and proving very profitable. Qix, which has already been labeled an "area-capture" game, is something between Etch-A-Sketch (remember that one?) and a video version of Rubik's Cube. Actually, it's hard to say what it is. The Qix (pronounced kicks) is a helix that whirls around on the playfield. Your task is to trap it by filling up at least 75 percent of the screen with rectangular shapes that you trace with a marker. The trick is to avoid the Qix and also several so-called "sparks" that zip along the lines you've already drawn. Every box you complete either turns blue (for fast tracing) or tan (for slow), making for a rather interesting display. What's most boggling about Qix, though, is its mathematics: One finds a googplex (or let's just say trillions upon trillions), of possible configurations in the machine. Hence, to play, you must develop your **own** strategy. According to Taito's president, Jack Mittel, "The day of easy game solutions is over. For instance, Space In-

vaders had a definite method and approach to attack. Qix doesn't. Every game is different." Taito, he adds, was determined to design "something unique, entirely different." Qix easily fills that prescription.

Much the same can be said about *Tempest*, Atari's latest contribution. Lyle Rains details the game's 1981 evolution: "*Tempest* started out as a first-person, *Space Invaders*-type game. It literally had all these invaders out in front of you rather than marching down from the top. You sat behind your cannon, rolling back and forth as invaders moved toward you. But we decided that that wasn't really a whole lot better than regular *Space Invaders*, so why bother? Then somebody came up with an idea for tubes that you could zip around. We mocked it up and decided it was quite a bit more interesting, both visually and gameplay-wise." *Tempest* is a *QuadraScan* shooting game and Atari's first experiment with color vector graphics. (Only Sega's *Space Fury* preceded *Tempest* in this area.) To amplify Rains' statement, the visuals and gameplay are no less than sensational. There are 16 three-dimensional, tubelike playfields that change color gradually as you progress through the 99 possible skill levels. Enemies — such as spikers, fuseballs, and flippers — form out of specks of light, then suddenly land on the far end of a tube and race toward your blaster (a yellow, clawlike shooter) that patrols the outer rim of the field. You zap and "superzap" (the equivalent of *Defender's* smart bomb) from one battlefield to the next; with each conquest you are awarded a momentary flight through simulated space. *Tempest* is a little bit of every space game and **more**. It reflects the daily advances being made in new technology — advances that will continue in 1982 to alter the way we look at and play video games.

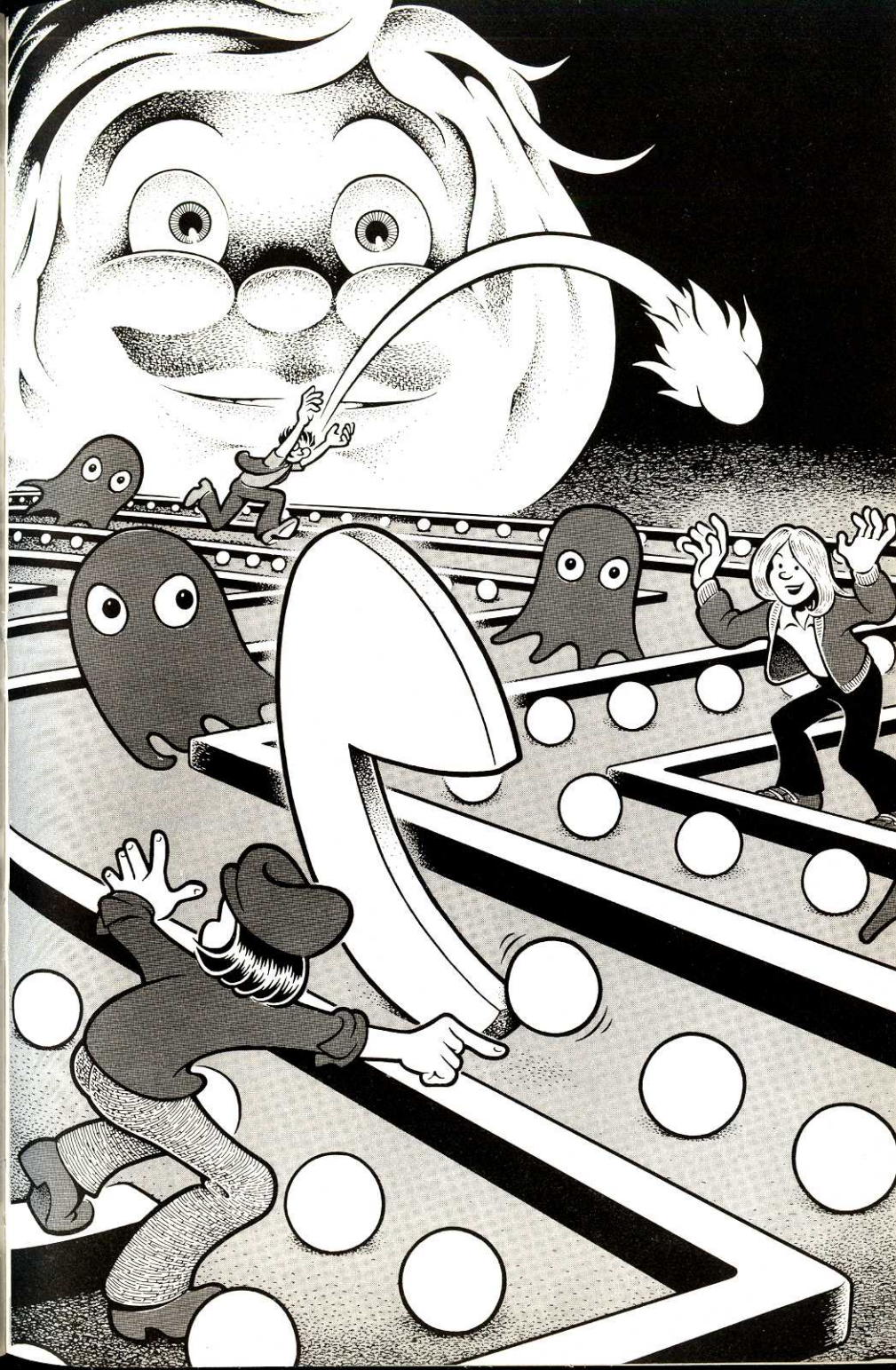
# 3

## Pac-Man and the Maze Monsters

I've got a pocket full of quarters and I'm headin' to the  
arcade,  
I don't have a lot of money, but I'm bringin' everything I  
made,  
I've got a callous on my finger and my shoulder's hurtin'  
too,  
I'm gonna eat 'em all up just as soon as they turn blue.  
Now I've got 'em on the run and I'm lookin' for the high  
score,  
So it's once around the block and I slide back out the side  
door,  
I'm really cookin' now, eatin' everything in sight,  
All my money's gone, so I'll be back tomorrow night.

—“Pac-Man Fever” by Buckner & Garcia,  
copyright © BGO Music, Inc.

The scene: a Brooklyn shopping district, outside a delicatessen. The time: after school. A Pac-Man machine is chained to the store's security gate and two teenaged girls



on roller skates have the game all to themselves. They are sharing a can of Pepsi, a bag of Pretzel Nuggets and, best of all, Pac-Man.

Lisa is by far the better player of the two. While Lisa claims to have scored over 100,000 points yesterday, Maureen is struggling in the low 20s. Lisa doesn't kid around. Ever so nonchalantly, she completes maze after maze and talks to me at the same time.

"I play all the time," Lisa explains as she shakes two ghosts and swallows a power dot. "This, Space Invaders, Galaxian, and Phoenix are my favorites. The trick to Pac-Man is the pattern. Just watch. That's how I learned. Everyone cheats off of everyone else."

Maureen, meanwhile, stands by impassively, waiting her turn. She has nothing to say.

"Oh, I hope I get to the bells," Lisa says greedily. The bell is one of the many bonus targets only star players like Lisa get to go for in later rounds. Finally, she is cornered by the so-called "ghost monsters" and her turn is over. With one Pac-Man remaining and a reading of 65,000, Lisa just may break her record.

As Maureen takes over the joystick (four-way lever control), I pepper Lisa with more questions. She acknowledges spending her allowance on the games; when I ask her if her parents mind at all, Lisa whines like the 14-year-old she is.

"It's **my** allowance," she insists, adding for good measure, "I bought these skates with **my** allowance, too." So there.

"Do they care?" I press on.

"Nah, they don't care."

Maureen is having problems. When her last Pac-Man gets bitten she bangs the glass, screaming that the game is messed up.

“How come it’s OK for me?” Lisa sneers. But she’s about to get hers, too. A minute later Lisa’s skates nearly slip out from under her and the final Pac-Man is eliminated. So much for her record-breaking attempt. Next quarter.

## Anatomy of a Phenomenon

Pac-Man is like a good old-fashioned B movie. It starts out with titles, credits, and a musical theme that sounds vaguely similar to the old standard “A Night in Tunisia.” Instead of anonymous aliens dropping from the sky, though, we meet Inky, Blinky, Pinky, and Clyde, the four dauntless “ghost monsters” whose shifty eyes you must constantly watch. Needless to say, they are the bad guys. Pac-Man, the hero of our story, is a frisky yellow disk with a pie-cut for a mouth, who aims to run these pesky varmints out of town. And run is exactly what these five vid kids do — all around a blue maze.

Pac-Man, like one of the gunslingers of old outnumbered by merciless outlaws, is saddled with an enormous task: He must avoid this colorful gang of four while swallowing up the 240 white dots that cover the paths of the maze. Each dot gobbled is worth ten points and is accompanied by a rapid succession of chortling noises. As long as the Pac-Man can keep his distance from the bug-eyed boys, he seems to be having a helluva time. But one false move and he’s gone — literally — the Pac-Man folds up and disappears. If he manages to eat all 240, he gets a fresh supply and a new start.

There is more, of course. The power capsules stationed in each corner are the gateways to higher scores; use them wisely and you can add 3,000 extra points with a few well-



timed gulps. When Pac-Man gobbles a capsule, the gang suddenly turns blue and dashes away. They can be feasted upon now, but Pac-Man's advantage only lasts a moment. The ghosts soon return to their menacing form and the chase resumes. The third and final source of points is the bonus target, which switches identity (from cherries to keys) and increases in value the farther you get along.

Each time you clean out a maze you get an identical new one, but the ghosts pick up the pace. The prize for completing the mazes, aside from extreme gratification and an ever-increasing point total, are some brief intermissions, during which the cast puts on a little show. In the first, a giant Pac-Man terrorizes one of his rivals in a madcap romp about the mazeless stage; in the later breaks, he visits further humiliations on the villain. Though there's no time for popcorn, these respites come in handy — in fact, you'll need them. Like every great video game, Pac-Man grows more difficult with each screen, challenging you not only to outwit it, but to physically keep up with it. With its simple joystick, though, how could anyone resist?

Pac-Man fever, it's driving me crazy,  
Pac-Man fever, I'm going out of my mind.

— Buckner & Garcia

It starts with the wait, with the quarters lined up on the ledge of the machine. Before long, it's T-shirts, pop singles, news of the latest ailment resulting from compulsive play of a particular game, reports of profits that would feed all of West Africa. And if the story line isn't "I Was a Space Invaders Zombie," then it's "I Was a Teenage Pac-Maniac." But

where Space Invaders was a global phenomenon, Pac-Man has become America's game. With 100,000 units on the streets, it has surpassed Space Invaders and Asteroids, the previous Crown Princes of Video, to become the acknowledged King of the Arcades (and inspiration of countless imitations).

That Pac-Man is a Japanese creation may seem ironic, but, in reality, it is the least unusual part of this story. While breaking ground in both maze design and its novel use of cartoon-type characters, it is probably best recognized as the game that dragged women out of the video closet and into the arcades. Traditionally, men have had the arcades largely to themselves. But Namco's Pac-Man changed all that. Though it clearly was not intended that way (as we will see), Pac-Man is even now being hailed by some as the first "women's" video game.

Atari's Donna Taylor is one of the very few non-male game designers in the field. Asked for her opinion of Pac-Man, she says, "I admire it a lot. I think it's proved that you don't have to be lost in space to have a good time."

To Taylor, easy controls are the real key to Pac-Man's success. "I won't play buttons. I just don't think it's worth the trouble. I know plenty of other women who feel that way, too." She cites Defender, with its five buttons and joystick, as the "worst" offender and credits much of the acceptance of her own game, Centipede (which utilizes the Trak Ball and a fire button) to its "minimum of controls."

"Another problem," insists Frank Ballouz, Atari's Vice-President of Marketing, "has always been where the games are located. You won't see a lady hanging around most arcades or 7-11s to play. But now that you find the games in lounges, airports, and restaurants, women are being exposed to the product more often." And now that manufac-

turers have woken up to the fact that women **will** play, they aren't going to ignore them again.

The stories of some women's compulsive attachment to Pac-Man have already made the rounds. Take the case of a Florida beauty salon owner who installed the \$2,500 machine on the premises, or the more farcical tale of a wife who threatened to leave her husband unless he could prove to her that Atari had not already released its Pac-Man cartridge (which it hadn't at the time). According to an Atari spokesperson, one phone call from the company to this slightly hysterical woman was enough to patch up the matter — and the marriage.

Don't think the industry isn't ready to capitalize on their new-found friends. But where Centipede and Frogger were arguably designed with women in mind, Midway's stunning follow-up to Pac-Man — titled *Ms. Pac-Man* — left no room for argument.

Made up with a bow and ruby-coated lips, the Pac-Man has swung the other way, so to speak. Plus, the maze has been redecorated. Just take a look: *Ms. Pac-Man* has painted the maze pink, moved the fruits and other bonuses around at random, and opened up two more escape tunnels — it was getting pretty stuffy in there, wouldn't you agree? But this is all lukewarm-to-medium camp compared to the intermissions. Act One (following the second screen) flashes back to that eventful day when Pac-Man and Woman met; Act Two follows their courtship and subsequent nuptials; in Act Three, a stork appears, delivering none other than Pac-Baby (*Pac-ette*). No joke!

## Pac Roots

Pac-Man wasn't designed for women. Over in Japan, where the game was invented, women had always played all the games — from space battles to car chases — as fanatically and skillfully as the men. By 1980, the question facing Japan's games community was not how to attract women, but how to rekindle flagging player interest in general. Space games, which had won Japan its honorable reputation in the business, had suddenly bottomed out. To Atari's surprise, Asteroids — the hit of the year here — bombed miserably over there. "I could never understand why it was a good game," contends Yoko Yama, a representative for Data East. "I think as a people, we did not understand it. It was very difficult for us to play." Again, the controls were causing complications. "We found the buttons hard to operate," he says. "The U.S. likes buttons. We are much happier with levers. I don't know why that is. Maybe it has something to do with typewriters." (They're not nearly as common in Japan as they are here.) In any case, space was out. And what was in? Comedy.

According to Yama, the Japanese have a "comical sense," and are great fans of comic books, sitcoms, and cartoons. Taito-America's president, Jack Mittel, tries to explain: "They [the Japanese] want more of a story line, more of a Walter Mitty experience that's like a whole movie. They are very cutesy." (Whatever that means.) Yama believes that the Pac-Man characters are a composite of those that appear and have appeared in Japanese comic strips and books, but can't pinpoint which ones. He is positive, however, that several of Pac-Man's successors (such as his company's Lock'n'Chase and Treasure Island) are direct representations of Japan's most popular cartoons and strips.

No company had less experience than Namco Limited for developing a comical game. Though Galaxian — which was essentially a new, improved Space Invaders — had established Namco as a force in the video arena, simulated batting and skeet-shooting devices were really their forte. Namco's Hideyuki Nokajima describes Pac-Man's genesis.

"People were fed up with space games. So we started to dream up games that would make them laugh. For instance, in Japan, **puck** is the sound you make when you eat something good — like **munch**. We decided to build a game around that idea instead of shooting. **Puck, puck, puck** instead of **blam, blam, blam**. Everyone was skeptical about Pac-Man because it was the first video game with so much strategy but no fighting, but the more people in the company tried the game, the more they became addicted. We discovered that the energy dot touched people's inferiority complexes. People like to feel like Superman. This all swayed the negative votes. Nevertheless, there were many who felt Pac-Man would never gain acceptance abroad. They thought it was too typically Japanese. Obviously, that was unfounded."

Namco contacted Midway, who had licensed Galaxian from them, in early 1980. They had a game called "Puck-Man" that they thought Midway might be interested in. The story goes that Bally's president Robert Mullane was so unimpressed by what he saw that he advised Midway against buying it. "It's silly," Mullane jeered. "Anyway, who plays a maze game?" Fortunately for Bally, shrewder minds prevailed and Midway went ahead with the agreement. But first, there was this little matter concerning the word "puck" which had to be cleared up. "They didn't like how it rhymed with your very popular expletive," Nokajima smiles, "so we changed it to **Pac**."

Pac or puck, the annual gathering at the Amusements and Music Operators Association in November didn't quite get the joke. For them, space was still very much "in" and "anyway, who plays a maze game?" Since only two (Targ and Duel) of the year's Top Twenty videos (as determined by **Play Meter** magazine) were mazes, you could say they had a point.

"People thought that the cute-factor was going to nail us," recalls Midway's marketing director, Stan Jarocki. "But, we had been through this kind of thing before. If you remember, Space Invaders also got the old ho-hum at the 1978 A.M.O.A. From then on we just decided, 'Don't tell me it's bad until the players see the game.'"

Can you honestly say you know someone who has **not** played Pac-Man? Pinstriped execs steal precious hours from their business lunches to get at a machine. Housewives have been spotted jockeying Pac-Man with one hand and rocking babies with the other. Needless to say, kids have been more than zealous with their support. One bunch I recently ran into doesn't even bother with arcades anymore. Each has his own Apple computer, on which he is learning to program; but, come Saturday, the bedroom converts into a gameroom. The afternoon I joined them, Gobbler and Snoggle, two floppy-disk replicas of Pac-Man, were without question the most requested games of the day. Can't afford an Apple? Don't despair. There are always the TV systems and their corresponding cartridges: for instance, with Atari's Video Computer System you can play the real Pac-Man (again, licensed through Namco) at home. Magnavox has K.C. Munchkin available for their Odyssey 2, while Munchie can be plugged into Astrovision's Bally Arcade. Wait, there's more! For really cheap thrills, both Coleco and Tomy have battery-operated, miniaturized Pacsimiles (couldn't

resist) and under yet another assumed name is VTech's Crazy Pucker by way of Hong Kong.

It should be no surprise to anyone that maze games have begun to inundate the lucrative coin-games business. Just about every major manufacturer has gotten into the act. At the '81 A.M.O.A., we saw Exidy's Mouse Trap (mice, cats, and dogs), Williams' Make Trax (goldfish, birds, and a paintbrush), Stern's Turtles (giant turtles and turtles), Taito-America's Lock'n'Chase (cops'n'robbers), Centuri's Round Up (so-called "gly-boys" and cowboys), and Nichibutsu's Frisky Tom (mice, a blonde, and a plumber named Tom). As it was, the show's two most exciting variations on the maze theme, Nintendo's Donkey Kong (a damsel, an ape, and a carpenter named Mario) and Sega's Frogger (frogs and logs), both dare players to scale from the bottom of the screen to the top; this really makes the games more like obstacle courses than mazes, since you always know where you're going — up.

Only Atari seemed to make it policy not to take part in this spectacle. Explains their chief coin-op engineer, Lyle Rains: "We had the first maze game with Got'cha (1974) and we've looked at other maze games, but essentially our policy is to produce games that are different from everyone else's. Unfortunately, everything at the A.M.O.A., except for Tempest and Qix, looked like something else. That's very typical in our industry."

"There's a trickle-down effect that happens," says Tim Skelly, an independent game designer. "Everyone begins to realize what works and what doesn't. That's why you have so many imitations." Skelly, who is responsible for Cinematronics' Star Castle and Rip-Off, among others, rips the Japanese for being "horrible copiers," but adds, "Most

of their games don't cut it here anyway. I foresee them losing a lot of business in the States."

While many of the American companies continue to look toward Japan for licensing deals, there does seem to be a slight turn away from that trend. Even Midway, who owes their fortune (approximately \$200 million on Pac-Man sales alone) to Japanese ingenuity, is beginning to bank on its own research and development staff for promising new game ideas. Then there is Taito-America, whose parent company, Taito Corporation, invented Space Invaders: With Qix they have not only one of the strongest games of the '82 season, but an entirely American-made product as well. Says Mittel proudly: "The Japanese had nothing to do with it. For us, that's quite an accomplishment."

But is it a case of America asserting itself or of Japan rethinking its own priorities? It seems to be a little of both. In Japan, the latest trend is toward versions of less action-oriented, board-type games such as Go, Othello, Mah Jong, and Golf. Shooting and chasing, still popular as ever here, have been replaced by quiet deliberation. None of these games has yet caught on in the States; they probably never will. Take Golf, for example: Unlike in the United States, golf is a very expensive and relatively elitist pastime in Japan. Despite this, the Japanese are fervent followers of the sport. "Golf is on television every night," says Yoko Yama. "People are constantly reading magazines about it. They want to play but they can't afford to. Basically, the reason for this is our limited land space. With the video game, they can now play anytime they wish.

"We like intricate games like golf," Yama further explains. It helps us to get rid of psychological frustrations. Anglo-Saxons also seek to rid themselves of frustrations, but with more activity. For us, these games are a kind of clean-up."



I don't really understand Yama's distinction, so I asked Nokajima to possibly clarify for me. "It's hard to explain the difference between Japanese and American people," he says. "I think we go more hot and cold very quickly, like aluminum. Americans — you get hot and stay hot for awhile."

I've got Pac-Man fever, I'm going out of my mind.

— Buckner & Garcia

The scene is the Broadway Arcade (where else?). If you weren't familiar with all the sights and sounds you'd think a police raid was going on. Pac-Man has been on the streets for over a year (four months would be an ample lifetime for any other machine, thank-you), and still there are people standing in line for the two machines. One unit is in the hands of a Pac-master; at 300,000, he shows no signs of weariness and can talk fluently without disturbing his concentration. Watching him, I learn that this machine's program has been tampered with (which is usually the case after a game has been "maxed" by too many); it's taken him several quarters to discover that the first pattern differs from the second, the second through the fifth are the same, and the rest . . . well, he's working on that.

As I busily jot down all of this Pac-talk, there seems to be trouble brewing at the other machine. Two girls have been waiting behind this businessman-type for, they claim, the last 15 minutes. The man won't give it up. After each game (since he's a novice, they're short), he quickly dips into his pocket and deposits another coin in the slot. The girls are starting to get piqued.

"Hey, mister, how 'bout letting somebody else have a chance?" one asks.

"Yeah, c'mon, man," the other cries. "Enough is enough already."

Mr. Wing-tip Shoes turns around and waves his finger in the girls' faces. "I waited for this machine and so can you."

"But it's been 15 minutes, man," one replies.

"We only want to play one game, anyway," the other says.

"And how am I supposed to know how good you are? How do I know you're not as good as **him**? No way."

His face plum red, he turns and pumps another quarter into Pac-Man. Such problems. Puck, puck, puck.

## 4

# The Inventors

Real people think up these games. They dream up these electronic addictions — and they're the one natural resource the industry has that nobody knows about. Stored like precious gems in a vault, the inventors go about their daily routine of creating video games, unbeknownst to the world beyond their laboratory walls. Can you imagine a record company not crediting a performer for his or her latest song? Or an author, playwright, or film director being denied a rightfully-entitled by-line? Think of the fuss, the confusion, the unmitigated gall of it all. Not to mention the lawsuits. I hereby submit to you the case of the unknown inventors.

"Do you know me?" jokes Dave Crane, the designer of such Activision cartridges as Laser Blast, Dragster, and the much-ballyhooed Freeway. "I design video games. I'm the one who made the chicken cross the road. So when you're crossing the road, carry an American Express Card. I do."

Crane shouldn't jest. If Activision is as big a hit as it looks like it's going to be, he may be doing an American Express commercial sooner than he expects. Activision, which



makes software for the Atari Video Computer System (VCS), is the first games company to say whodunit. On each instruction pamphlet accompanying the game cartridge there are "tips" from the designer of that game, a photo, brief bio, and — yes, right there in bold type for all to read, copy down, and memorize — that person's name. "It's on the box, cartridge, and manual about 14 times," Crane comments wryly.

In contrast to the code of secrecy that generally prevails in this business, Activision decided it was time to expose the inventors. "It's something we requested," explains Al Miller, another unmasked designer. "It's also something that Jim Levy, the president of Activision, thought would be a good way to promote the product — by personalizing it. We agree with that philosophy. It's nice when you get recognized for your accomplishments, but you also have to take the heat for those that aren't so good."

Unfortunately, this break with tradition hasn't yet inspired a mass confession in the industry. In general, questions about designers' identities and new projects remain off-limits or, at best, off-the-record. An Atari spokesperson admits that this is "too bad, because we have so many great stories to tell," but adds, "Management doesn't want to make rock stars out of them [the designers]. I don't think we'll ever open up on this." The last time Lyle Rains, Atari's engineering vice-president in the coin-op division, opened up to a reporter about a game that was in production, "we got burned," he says. "The information on *Asteroids Deluxe* that appeared in *Esquire* two months before we began building it hurt us in a lot of ways. Since the writer didn't particularly like the game, that gave us a bad start. So we're sensitive." Rains seems to be forgetting that players vote with quarters. That the response to *Asteroids Deluxe* was

lukewarm at best said more about the game's shortcomings than the writer could ever have.

In researching this chapter, I set out to interview as many inventors as possible. I had far fewer problems contacting them than anticipated. Two interviews were conducted at the A.M.O.A. show in Chicago; four others were set up by the companies themselves; and the rest I arranged on my own. Logistics prevented me from actually meeting a majority of those I interviewed; in one case I was even on the company's premises yet was only able to communicate with the designers by phone. (My suggestion that we all wear brown bags over our heads was inexplicably denied.) Atari, I might add, asked that I protect the innocent by not using their last names. Lately, they have lost many employees and have concluded that when designers are known, they may become more marketable and maybe even move on. I have therefore substituted fictional last names in the case of the three Atari interviewees at the company's request.

There is no doubt that these ten inventors, whose comments will follow, were the most approachable, articulate, and appreciative persons I had the opportunity to speak with during all of the research for this book. Once we started talking, it was often I who had to bring the conversation — some lasted for hours — to a close. Several people were good enough to pass along names and numbers of colleagues, information which proved invaluable to me; others simply dictated their lives into my recorder. All brought with them a passion for their work that is unsurpassed in this business.

Seldom are these individuals free to comment on matters pertaining to them and to the industry at large. Needless to say, video games could not exist without them.

## DAVID CRANE and ALAN MILLER

Crane and Miller are half of the original design team that left Atari in October 1979 to help start Activision, the industry's first software-only company. They had met two years earlier at an apartment complex in Sunnyvale, California, where they both live. Miller, 32, who was working in Atari's Consumer Electronics division, hired Crane, 28, after they had played a lot of tennis together and exchanged games ideas. Along with Larry Kaplan and Bob Whitehead, they decided to start a new venture — for reasons that their lawyer, who was present during the interview at Activision's Santa Clara headquarters, said they ought not to discuss. Atari and Activision were embroiled in a lawsuit over that very issue at the time of the interview; they have since settled.

**MILLER:** I went to high school in North Carolina and to college at the University of California at Berkeley, where I studied electrical engineering. I specialized in analysis of large-scale computer systems. After graduating in 1973, I went into traditional engineering occupations — putting a computer control system in a lumber mill, working for a company doing computer contracts for NASA, and also for one of the semiconductor firms. I enjoyed doing control systems. I can get some satisfaction out of any job as long as I can see the actual result of my work.

A lot of technical work is pretty repetitive; you can't really put your hands on what you're doing. You're just a

small part of a very large design project, as opposed to here, where you are the sole creator of a game. For four months you do all the work and each day you can see it evolve a little further on the screen. It's a great satisfaction to watch your creation emerge.

Actually, I had never really considered getting into video games. I played pinball during college, was involved in competitive sports throughout high school. I remember Space Race, Pong, and a variety of driving games, but I never really anticipated going into this business until I saw an Atari advertisement.

CRANE: My development from the beginning was always toward consumer electronics. I've been dabbling in electronics since I was 12. I started playing pinball before I was 10. After high school in Nappanee, Indiana, I went to a technical school in Phoenix called the De Vry School of Technology. My first job after graduating was with National Semiconductor, doing linear circuitry design — which is the other end of the electronics field...amps and voltage regulators, strange things that I didn't have any experience with. But I wanted to round out my education, so I stayed at National for two years until AI recruited me to join the programming department at Atari. I did a few cartridges and worked on their personal computers (400 and 800) for a year before I went to Activision.

MILLER: I went to work for Atari in February of 1977. They wanted some people to come in and do games before the VCS (Video Computer System) was released that June. I did several of their first cartridges — Hangman, Basketball, and Surround, for example. For most of '78 and '79, I worked on the 400. At some point we decided to go off on our own.

CRANE: We'd been working closely together for over a year before we left. We found out our product was better



when we (including Kaplan and Whitehead) badgered one another to get it as close to perfect as possible. One person can decide that it's done, but with us nothing's done until all four say so. We found that that worked out very well — it's a good design strategy as far as we're concerned.

There are lots of ways to design games. There are the video versions of old standards like Tic-Tac-Toe or Checkers. There are video adaptations of sports games. Then there are those that you've never seen before, have no gaming reference for. We tend to think of life as a game as we're going along. In the case of Freeway, we were on the wrong side of Lake Shore Drive in Chicago and were having trouble getting across, and somebody just said, "Hey, this is a great game idea." Most of the time we're joking. Only one out of 50 crazy ideas will ever become anything. A tree falls down, try to get out from under it — obviously nothing will come of that. But that's how we come up with the original game ideas.

I've put more games on the shelf than I've released — at least twice as many. I'll start a game, put two weeks into it, then take a look at it and decide: Will it ever be an Activision game? Will it ever be playable enough, graphically intensive enough? If the answer's no, it goes back on the shelf. Sometimes I resurrect it a year later to see if I can think of something else, and end up shelving it again.

MILLER: We look at all the video games on the market. Mattel's Hockey, for instance, doesn't let you score. I knew I could do a better version, which is why we did our own Hockey cartridge. Another example is Tennis. Dave and I have been playing in U.S.T.A. amateur tournaments for the last four years. We both enjoy tennis a lot, so I decided I could do a pretty good tennis on the VCS. Most of the previous attempts were just rectangular balls and paddles. I figured out that I could put little-men graphics and

rounded balls in there and also do a pretty good job of having the ball actually bounce. It worked out very well.

CRANE: You asked, "Why tennis?" Any kind of question like that can be answered this way: We come in one day, having just finished a cartridge; we've gone through all the ideas that we have and then you say, "Hey, I want to do a tennis game" or "Hey, I want to do this" — that's basically the reason we do games. I did the Fishing Derby game, which started as a video aquarium — all it had was two players up there with fishing lines. I got the idea after seeing some cartoon that had an underwater scene. My first objective was to duplicate that in video. At first, I came up with a display that looked more like the surface of water than a cross-sectional view of it. It looked like rippling water going off into the horizon. Then I added some goldfish that swam around. People would walk into the lab, which happened to be the kitchen in our first building, and they'd start staring at the screen, mesmerized by these little fishies. It was like an aquarium. The whole reason for an aquarium is that it's pleasing to look at and relaxing. The problem was, it was a little *too* pleasing to be a video game. I went ahead and put in a couple of men with fishing lines to play as a game, but it didn't work. Well, everybody kept saying, "Put a shark in it, put a shark in it." I was reluctant mostly because it was difficult to do that. But Bob Whitehead worked with me to make the shark, which turned it into a game. Suddenly, there was something to avoid.

MILLER: We're designing products for the Atari VCS, which was finalized in 1976 and hasn't been updated since. [Atari's "Advanced System" had not been announced at the time of this interview.] It's very limited. The current coin-op designers have the most recent technology; they can spend \$1,000 on hardware and do whatever they want. They get

fantastic video display capability. Meanwhile, we're stuck with a five-year-old piece of technology.

CRANE: We have to compete with both the coin-ops and other consumer [home game and computer] products with later technology, so we have to go to great lengths to make our games graphically comparable. It's our job to make sure the consumer doesn't realize we're under hardware constraints. We do games that are graphically as good as any consumer game out there, and we have more hardware constraints and nobody knows that. They don't have to. In the beginning there were coin-op games, so home games had to play catch-up. I think if we haven't gone beyond coin-op, we've at least branched along beside it.

MILLER: You have to realize that we have different objectives. A lot of themes open up to us that you can't do in coin-op because they require too much strategy or too much practice to get good at. So certain games are good for consumer use but aren't feasible for the arcades.

CRANE: For example, in *Dragster*, if you do well the game takes six seconds. Nobody's going to pay a quarter for six seconds.

MILLER: Not even you? Dave, by the way, is the best player among us.

CRANE: I play just about every coin-op game that comes out. I've spent up to \$300 a month on them. I'm a professional, so it doesn't take long for me to get pretty good. When somebody asks how I got so good I say, "\$40 worth of quarters." There is a lot of concentration. The best players you can talk to while they're playing to your heart's content, but they're just not listening. We used to play *Double Breakout* to perfection — there's a perfect score for having two balls in play for the whole game. If you lose one you'd better drop the other before it hits another brick,

because you only have five chances to keep two balls in play during the entire game. The closest I came was within six points of a perfect game.

MILLER: Satin Doll's still my favorite coin-op game. That's pinball. It was before Dave's time.

CRANE: Unfortunately it wasn't. ... I guarantee you that a person who is good at Asteroids will be good at Defender. In coin-op, once people get good at all of the controller functions the designers add four more. It's almost a matter of experience — how long you have been playing all the other games — because each game is easier if you've played before.

MILLER: Eye-hand is important, too — being quick.

CRANE: Lots of quarters.

MILLER: A strong bladder.

## MORGAN HENRY

Henry is an engineer in Atari's coin-op division. I met him at the 1980 A.M.O.A. show. At the time, *Battle Zone*, his personal pride and joy, was collecting industry-wide kudos. As it turned out, *Battle Zone* was the 21st most popular video game (according to **Play Meter**) of 1981. We chatted in the lobby of Chicago's Hilton Hotel.

I think I'm 29. I'm from California, the Peninsula (Bay Area). Basically, I kind of slipped into video games. It was the first really solid job offer I got. I have a B.S. in biochemistry and a Master's in scientific instrumentation — that's how I learned electronics. When I went out looking for a job, Atari was the first firm offer I got, so I took it. I started in 1976 as a hardware engineer and worked my way up to project leader. Instead of designing electronics, now I mostly schedule projects and try to keep the various people working on them.

In the case of *Battle Zone*, I got together with a few other people and we wrote up a game description. At some point, the game description is approved — or not approved — as a game project. I happened to be the person designated as the project leader for *Battle Zone*; I also designed some of the hardware for it. Ed Rotberg was the programmer.

I didn't have much interest in video games before coming to Atari. I didn't play them very much — thought they

were frightfully expensive. Still do. No, I wouldn't call myself an arcade person. There are some engineering people who are very interested in video games — it's part of their normal form of entertainment. And then there are also some very good people who don't even play the games at Atari. They're interested in the project they're working on and only work with that game. Then, there's a mid-ground that's probably bigger than any other group — those are the people who play Atari games in engineering, but don't go to the arcades. Actually, you get kind of jaded working at and playing with video games at Atari because there isn't a lot of good stuff on the outside. If it's a good game, it's probably an Atari game. If it's a new technology, it's probably an Atari game. That's because Atari has a lot of long-term employees who've really seen the games industry and have a good feel for it. There are a lot of creative, innovative people working in Atari engineering. The people at Atari take a lot of pride in being novel and creative. There's a strong drive not to copy games.

Most games take from six months to a year and a half to be completed. One like *Battle Zone* takes longer because of new techniques. The idea for the game came in a one-line statement for a "first-person tank game" [inside looking out]. That got converted into what you see now after some artist's renderings and a lot of thinking about what kinds of games people enjoy. The idea for the game was something that started out very small and just grew. People found things they liked and didn't like; we listen to what people say and watch people play.

*Battle Zone* is really the first game that has a three-dimensional effect to it. The game keeps track of where you are in a 3-D setting, like a simulator. Doing something like that accurately and consistently was one of the objectives I

had when I started the project. I didn't want to compromise the accuracy.

What do I think of the competition? There are maybe two non-Atari games at this show that are going to earn some people some money: Spectar and Rally-X. Star Castle looks good; I haven't played it enough to see if I can retain interest in it. I figure if I can't retain interest, then most other players can't either.

Defender is very flashy, but it's a one-activity game. You do the same thing over and over again, and while I've heard there are a variety of activities you can do — like picking up people and moving them around — I don't think it's going to be at all clear to the player. I played Defender two or three times but didn't want to play it after that. I don't think many other people will want to, either.

## EUGENE JARVIS

Jarvis is Defender. He and several colleagues at Williams are totally responsible for putting that pinball company on the video map. Jarvis and Larry DeMar subsequently quit Williams to start their own company, Vid Kid 2. Their first project was Stargate (also known as Defender II) for Williams. They are at the forefront of a designer's revolution — it's called going independent.

I'm an independent. I still work fairly closely with Williams, though. The only way to get royalties is to be independent, but you have to pay for your own research and development, capitalize it yourself. Williams brought in \$115 million on Defender, but I'm not bitter. Sure, designers haven't been rewarded for their contributions like other creative people, but it'll come. Right now, I'd at least like to be able to see our names on the screen. That would be nice. I'd like to be where Activision is at. Things will continue to evolve; the field is so new.

I graduated from Berkeley with a computer science/electrical engineering degree in 1977. My first job was at Hewitt-Packard. I quit after three days. Couldn't take it. Right after that I was hired by Atari. I worked on all their pinball games — Atarians, Time 2000, Airborne Adventure, Superman, Space Riders. But they ran into manufacturing problems and couldn't make money on any of them, so



their pinball department went down the tubes. That was the break I actually needed.

I went down to South America for a few months, then worked for my dad for awhile. But soon I came to a realization: Once you do games it's hard to do anything else. Coincidentally, I got a call from a friend at Williams telling me I had a job if I wanted it. I decided, "What the hell?" Firepower turned out to be my big game there. Pins were really strong then. But from '77 to '79, the first microprocessor-controlled games arrived and they were incredible, especially the sounds. With Space Invaders, someone had finally discovered how to apply the microprocessor to video. I was an old pins player, but suddenly I was only playing video. I felt they were the best games out at the time. That's when I decided I wanted to do one.

I started Defender in February 1980. By August, with only three months to go before the show, things were getting pretty tense. For instance, everyone really hated the humanoids — the president of the company included. I was stubborn and kept them in there anyway. It gave me a feeling of power to do that, but I was behind schedule and in deep trouble.

The truth is that we finished the game the morning of the show. We worked on it for another two weeks afterward refining things. For example, we added the planet explosion for when you lose your last man. Sam Dicker (who did all the sound effects) and I wanted an awesome penalty. We also added the part where you get your men back after every fifth wave. It recycles your life, like the tenth wave of Space Invaders. That way it's not so endless.

I don't know if you can outdo Defender. For its time and place, it's about as good as you can do. It's a game for punks, for guys into games, for life-and-death gamers. It's

not for people who aren't as dedicated, who just want to have a good time. It's for games nuts like myself. Some younger girls play it, but older women find it too intense or threatening, even though the whole concept is pretty maternal — the idea of protecting your brood. That's the dichotomy. When you're good, it's a great high, but when you're bad, it's really bad. The explosions and the speed give you power, a feeling of omnipotence. You're the King. When you've paid your dues, it's a higher high — almost an elitist thing. That's what I'm after: the higher high, the spacier space, the rush.

With the success of Pac-Man, I see a watering-down effect happening. The market is breaking up into professional players and a mainstream that can be defined as more casual players — less intimate, less skillful, and less macho. This polarization represents a new challenge for me. It's disillusioning, but now I must try to appeal to both players. I have to be like the Beatles — a pop group with substance.

Still, nobody cares about Eugene Jarvis. Nobody cares about Atari. It's the substance that matters. The game is the performer. I'm selling myself in electronic form. Is anybody going to play a game just because Eugene Jarvis designed it? The best question is, why do people play?

People are bored with TV. They're not participating, just constantly watching someone else do something. Games let you take part, allow you to not just escape into another reality, but be the star. You can be a hero for a quarter. That's what it's all about.

## DAVE NUTTING

Nutting was the industry's first independent. Like Jarvis, however, he has only sold his wares to one company — Midway. His brother Bill built the first coin-operated video, Nolan Bushnell's Computer Space, back in 1970. Dave's involvement in the business had begun just prior to that date.

I really believe we're in the movie business. Real-time graphics are making people participants in video games, like becoming a character in a movie. This is a far cry from the electromechanical film projection games [mostly shooting games like Skeet Shoot] I started out manufacturing in Milwaukee in the late '60s.

Actually, I'm an industrial designer by profession. I was designing cars and outboard motors while Bill and Bushnell were first doing Computer Quiz and IQ Quiz (which came before the space game) together. As a sidelight, I began manufacturing quiz games. Before I knew it I was in the business full-time.

Back in 1973 I got involved with Midway. They were a \$12-million subsidiary of Bally at the time; now they're a \$300-million subsidiary of Bally. We've put Midway where they are. They asked me to develop a hardware system. With my new system, we had the first interactive two-player games after Pong — about 18 or 19 games, all based on the same hardware. Since then my biggest games have been Sea Wolf, Gorf, and Wizard of Wor.

We're working on only one space game now. I think non-violent games will be the next trend. In fact, in Germany they wouldn't take Wizard of Wor because it was a shooting game. We're going big into adventure games [computerized spinoffs from the Dungeons'n'Dragons craze]. We have four in the works right now. One is called Roto, who's a character that rotates and digs its own mazes. There are monsters, hostages, keys, and all different types of mazes. Unfortunately, we can't do a full-blown adventure like Zork [an adventure game played on micro-, mini-, and main-frame computers that can literally take weeks to play], because playing time in coin-op, as you know, is a major factor. Instead, we have to make it so that every time you play, the game will be somehow different.

## DONNA TAYLOR and ED LODGE

Taylor and Lodge are two of 150 employees on Atari's coin-op research and development team. Lodge's major professional distinction is that he programmed *Asteroids*; Taylor's is simply that she's a woman — the only one in the department, one of two or three in the whole industry. What they have in common, among other things, is a game called *Centipede*. He directed it, she programmed it. *Centipede* and *Asteroids* were Atari's top quarter-eaters of 1981.

**TAYLOR:** I have a B.A. in psychology, 18 months of graduate work in statistics, and 3 years of research. General Motors hired me in 1978 to work on their '81 Cadillac Seville. They taught me how to program assembly language. I worked on the microprocessor that regulated the car's cruise control, idle speed, spark advance, and the digital displays. I learned a lot.

I was actually lucky to get a position like that, but — and this is a big but — the work was boring. Ultimately, I guess, I wasn't thrilled by making a car work. At about that time I started playing video games. I decided to send out a resume to Atari early in 1980. They hired me in June.

**LODGE:** My computer experience goes all the way back to high school when I first toyed around with a Bendix G15. In junior college I began writing programs on the IBM 1400. I studied math, physics, and computer science at Berkeley, did my Master's at Stanford, and then went right to Control Data for five years. I worked on one data manage-

ment system for a year and a half. At Control, you could conceivably work on one [program] loader project for 10 to 15 years; all you'd have to do is make improvements. By 1977 I had had enough. My next stop was Atari.

Back in college I had done a lot of game-playing on the computer that was in the basement of the physics department. Games were a hobby; I always played them to break up the work. The first coin-ops I remember playing are Pong and Tank. My first project at Atari was Dirt Bike, then Super Breakout, Video Pinball, and two-player Football. Then I did Asteroids. I think of myself as a choreographer rather than a programmer.

Centipede was one of those ideas we had on Atari's master list of games. It was listed as a "multi-segmented snake that splits up and moves down the screen." From the start till we finished in May '81, Centipede took nine months, which is a comparatively short time for any game in coin-op. We wrote all the details, like the scorpion that poisons the mushrooms and the centipede diving toward the shooter when it touches one. At first there were no mushrooms, just blocks. Lyle [Rains] suggested that we change the blocks to mushrooms. We also modified the hardware several times.

TAYLOR: As a programmer, my main focus is graphics. I want games to look good. For instance, I really like pastels, which is why there are so many pinks and greens and violets in Centipede. I really wanted it to look different, to be visually arresting. I think that's a new emphasis in games. For me, it's so much more exciting to think of something and then see it on the screen than what I was doing before.

LODGE: Centipede was definitely aimed at a women's market. I'm not so sure that without Donna's viewpoint it ever would have made it there.

TAYLOR: Being the only female programmer insures one thing — that I'll be listened to. It's funny working in a department with only men — I'm like the only sister with a thousand brothers. Somedays I hate it; I end up going home really annoyed. I guess I think they're listening, but no one really is. But, I'm lucky to be at Atari. It's fun being the Queen of Taste.

## EDWARD ROTBERG

Rotberg is another Atari "ex." When I first spoke with him at the '80 A.M.O.A., he was riding high as Battle Zone's programmer. The company was his life; Atari could do no wrong. A year later, he and Atari had parted ways. What went wrong?

I was making Warner (Atari's parent company) very rich. I figured it was about time I made myself rich. Atari's not the same company that it was when I joined in January 1979. The coin-op R&D group has doubled in size since last year, but has hardly increased output. There was still a small-company atmosphere, but somehow it was becoming less friendly.

You've probably heard about the Army version of Battle Zone. When Atari agreed to build a modified Battle Zone for the Army [using U.S. and U.S.S.R. tanks and helicopters to create a realistic battlefield], I was assigned to the project simply because I was the only one who could do it. Let me say that that was not my favorite project. I was against it from the very beginning. I personally was opposed to Atari getting involved with the U.S. Government and the Army; at a planning meeting back in January ('81) we had a major debate over this. They said that it was important to seek out alternative markets. In my opinion, good technology can be used for bad purposes, such as weapons research. The automobile's a wonderful thing, but you can turn around



and use the same assembly line to make tanks. I prefer to make the kinds of tanks I did in *Battle Zone*, ones that can blow something away but still nobody gets hurt. I just didn't think the project was in Atari's best interest. Obviously, we disagreed.

I lost two months of my life working on *Army Battle Zone*. I resented that. I knew there was tremendous opportunity in the [Silicon] Valley. Well, it's always been a dream of mine to work for myself. Howard Belman, a hardware engineer in coin-op, Roger Hector, the manager of R&D, and I all shared this dream. We left Atari on October 15, 1981, to form Avid, Inc. We're an engineering group selling ourselves to the highest bidder. It doesn't have to be games; in fact, our first project is not a game. But we have been in contact with several games manufacturers who have expressed interest in us. We're very excited to be out on our own — as I said, it's time we started making ourselves rich.

I came to Atari after responding to an ad in **Computer World** that somebody showed me. It was for a micro-computer programmer. I didn't know much about it, but it looked like it would be fun. Originally I was a chemistry major at Northwestern. My science project for my senior year in high school was a bacteriology experiment. I guess you could say I was the "science-club type," but I was into music and athletics, too. A lot of the people I've worked with over the years are the guys you'd see walking around the campus with their pants on backwards and a slide rule hanging from their belt — just a little bit weird, you know.

Organic chemistry totally turned me off to chemistry. I had taken a computer course and done very well in it, so I decided to switch to computer engineering. I transferred to the University of Michigan and began studying computers. I found computers not at all challenging, while other people

in the classes were having a lot of trouble with it. I thought it was fun and I felt good about doing it.

My first job was with Texas Instruments (TI) down in Austin. I worked on the operating systems group of the advanced scientific computer — this was one of the supercomputers, an extremely fast and expensive number-crusher. TI was a very good experience for me coming straight out of school, but we didn't see eye to eye. There was a lack of understanding of just what is involved in doing software. Also, the only way to advance at TI is to move from technological to management and that wasn't what I wanted to do. After two years, I went to Rockwell International — a group of theirs called MGD Graphics. I worked in their operating systems group for a short while until an opportunity arose to work at G.D. Searle Pharmaceuticals — Dramamine, the whole thing. There I had my first job that I really liked: interfacing microcomputers to laboratory equipment. I stayed there for just over a year. My next stop was Atari.

My first game project was Baseball. What I essentially did was look at the organization of the company's football program and decide how I could start from there and go to Baseball, which is really not a good way to do any project. It's a fairly sophisticated game in that it takes a long time to play well. My next project was Battle Zone. This was the start of a new generation of games. We had used the X-Y [vector] display before for Asteroids and Lunar Lander, so the technology was there. Asteroids was a digital vector generator, but wasn't as fast as the generator we used for Battle Zone. The new vector generator gave us smoother lines and better-looking, more complex figures. But the real reason I say it was a new generation is that Battle Zone was the first truly first-person game. Atari did Night Driver, but

that wasn't much except for a bunch of pillars; and Tailgunner, by Cinematronics, was a good game, but you were locked in — you couldn't move and turn. It had one less level of freedom than Battle Zone offers you. In Battle Zone, the view is what you'd see if you were actually in a tank looking out. It's a simulator, like driving and flight simulators.

I wish I could take the credit for Battle Zone, but it wasn't my idea. Actually, game ideas come from almost anywhere. Quite often they come from brainstorming sessions, where people get together and talk about what made this or that game good. Technology is also a major consideration.

There's enough sophisticated hardware in the world to go out and put together a simulator like the ones astronauts or airline pilots train in — which are absolutely phenomenal, but they cost millions. We have to do it cheap. To me, that's the real challenge of designing these games. We're trying to do as much as we can as cheaply as we can, and as a result we're coming up with very innovative ways of doing these things. That in itself is one of the more impressive aspects of the job; cost is definitely a part of the challenge.

Someday you'll see games as realistic as any of today's simulators. Someday we'll be able to do that.

## GARY SHANNON

Shannon is one designer who's already seen his name in print. Before joining Gremlin, he wrote several programs (such as Othello and Chess) for the Apple and other computers. As a hobbyist he received credit for his work (disks and cassettes are by-lined), but as a professional he must remain anonymous. He was recently promoted to software manager at Gremlin.

Let's see — I was born in Michigan, raised in California. I started programming in high school. We had a neighbor who worked for IBM who taught me a lot. I was in the computer science department at California State, but never graduated; that didn't seem to hurt me, though. I spent 12 years as a programmer on large-scale systems. I did contract work for IBM 370 installations. I worked for Capitol Records for two years on their system — that was fun. Actually, I got into computers because I thought **they** were fun. When personal computing started to happen, I got into it. I wanted to demonstrate that computers can be fun. My contribution is writing an accessible program. I still want to tell the rest of the world how great computers can be.

I couldn't go back to large-scale work again. It requires a lot of technical expertise, which I have, but isn't artistic enough. Writing video games has definitely brought out the artist in me. I really got a kick out of publishing games for

Apple, especially seeing my name on them. I don't need fame, but I wouldn't mind it.

I started at Gremlin two years ago. They hired me on a short-term contract to do sound-effects boards. After three weeks I decided I liked it there, and soon enough they offered me a full-time position. My first major accomplishment was Astro Blaster. Upper management said they wanted another variation on the space theme. From there I took the idea where I wanted it to go.

I don't think anybody really knows why a game hits. For instance, everyone thought Eliminator, not Frogger, would be our next big game. Frogger violates every unwritten gameplay rule — but then, so did Pac-Man. Both prove you don't have to shoot to have fun for a quarter. But, does anyone remember that we had a so-called cutesy game called Frogs out three years ago, which fell flat on its face? The feeling then was that cartoon games wouldn't make it. Clearly that's been proven untrue.

Video games transport people out of this world into a complete fantasy world. The games must rivet your attention — lapses won't do. Another game of ours that flopped was Digger — it had too much dead time. The player has to remain active, must be required to do something all the time. The more you can accomplish this, the more interesting the game will be.

Personally, I think rhythm is a major factor. We have two games in development that will make players respond rhythmically to the sound pattern. If you can figure it out, then you'll be able to go for more targets, for instance. You'll almost have to be a musician to play the game well.

To me, games are just another way to make computers fun. The less people are intimidated by computers, the more they'll understand them. This, of course, is my ra-

tionalization. I just want to make people happier. If I can do that in three minutes and succeed at it, then that's my reward.

## TIM SKELLY

Skelly's background is the oddest of the bunch: He's an artist. A student of communications and graphic arts. Skelly was shocked to discover that "most programmers can't draw"; he calls himself "more of a designer who programs." His work at Cinematronics — Star Castle, Star Hawk, and Rip-Off — has been hailed throughout the industry for years. He recently went independent and is currently contracted to Gottlieb.

I can't tell you the difference between a capacitor and a resistor — I'm an artist. I worked as a freelance illustrator before I ever got involved in this business. I did everything at Northwestern — TV, radio, film, video, design. Everything but computers. I had an electronic video art show at a Chicago museum as early as '72. But I decided to get out of art, mostly for financial reasons.

One day I ran into a guy who was planning to open an arcade. He wanted to have some computer games, so I decided to take a few courses in computers. I started programming games for him, although we soon split up. I decided to send my resume out to the games companies. Larry Rosenthal, who did Space Wars and was working for Cinematronics at the time, hired me.

My personal output during the three years I was there matched all of Atari coin-op. For every 50 engineers Atari hired, I put out one game. Apparently they hired the wrong people.

I've done more X-Y games than anyone else. I've done more arcade games than anyone else; at Cinematronics, I programmed five and worked on six.

There were specific things we were going for. X-Y, for instance, has a great game appeal because of the black background — your eyes are drawn to it. Sound was another thing we concentrated on. We wanted really noisy knock-your-socks-off effects. I listened to nothing but Ted Nugent when I was working on Star Hawk. If there was one central feeling we went for, it was visceral impact. When you got destroyed, we wanted you to feel it.

I have worked out in my head something I call the "Zen theory of arcade games." First of all, we grab your attention with lights, which are a great source of fascination. Light helps you focus directly on the endeavor at hand. You concentrate on trying to reach a goal, which in itself is a form of aggression. Basically, you shut down your conscious brain. You are in a light hypnotic state. Your mind is clear, you have forgotten about your problems for a few minutes. You get to pick up things, to shoot, to score. You must not die — that's the anxiety element. Even if you get blown away, like in Defender, you still feel good because of all the sensory things that have been going on.

Anxiety and aggression are the two keys to designing games. My one major turkey, Sundance, totally lacked anxiety. It had grids in space years before Tempest — that was my accomplishment. It was great to look at — in fact, I used to stare at it for hours — but wasn't so great to play. I asked the company not to release it, but they went ahead anyway.

I left Cinematronics basically because I never made a cent, except for salary, off the six games I did for them. I was going to ask for co-ownership of the copyright for my next game, but I knew they wouldn't give it to me. I also fully in-



tend to put my name on the screen of my next game.

You always see notices in the trade papers about which salesmen have moved on and done well, but never anything about us. Things are starting to change, though — we are finally starting to see royalty plans. Things **have** to change because there's such a shortage of talent.

I'd say there are only 10 or 20 good video games designers in the whole country. There aren't even enough of us at this point to define what it takes to be a good games designer.

# 5

## Atari!

### Birth of a [Corporate] Nation

The rugged landscape that leads up to the distant, low-lying mountains immediately reminds you that you are west of the Mississippi and south of the Rockies. A sprawl of chrome-and-glass corporate two-stories and their corresponding parking lots stretches into the distance in all directions. You're about an hour south of San Francisco, in the heart of California's renowned Silicon Valley. This is the center of the microprocessor revolution. This is where the microcomputer revolution started, where robotics evolved, and the home of the video games industry. Atari, the Earth Mother of video games, owns a large chunk of this prime real estate.

Contrary to what you might think, Atari is not a Japanese company. This misconception could easily have been prevented had Nolan Bushnell, Atari's founding father, been able to procure the name Syzygy, which he had originally selected. Bushnell chose the word for its spatial

significance: syz-y-gy signifies the nearly straight-line configuration of three celestial bodies (as the sun, moon, and earth during a total eclipse) in a gravitational system. (Thank-you, **Webster's.**) However, Bushnell was not the only entrepreneur fascinated by this celestial image; it was already someone else's corporate handle. Bushnell, an avid devotee of the Japanese board game Go, then decided on "Atari," which in Go is a polite warning to your competition that he's about to be engulfed. It's more or less the equivalent of "check" in chess.

What's in a name? In this case, plenty. If Syzygy foretold Atari's present three-tier corporate alignment of coin-operated games, consumer electronics, and personal computers, Atari was an even brasher prognostication. With the \$500 or so that Bushnell had earned in royalties off his first video effort (Computer Space) and an idea for a simpler game in his head, he started Atari. He had always played for all the marbles. Take, for example, Bushnell's version of his final dispute with Nutting Associates, the company that built Computer Space:

NUTTING: OK, Nolan, you're head of engineering now. How about designing us another game?

BUSHNELL: OK, but let's first figure out how much of Nutting I get.

NUTTING: Nolan, you're a good engineer. Let's just keep things that way. We know what we're doing.

BUSHNELL: What I need is an option on one third of the company and more say in the marketing strategy.

NUTTING: We'll give you five percent, but you stay in engineering and we'll take care of marketing.

BUSHNELL: Nyet!



Two days after this conversation, Atari was born. And the rest (**cliché time**) is history. Pong was that simpler game Bushnell had been devising, and once Atari released it, the video games boom was on. A decade later Goldman Sachs, the investment firm, said of Warner Communications' hottest property: "Atari's record in its first ten years may make it the fastest-growing company in U.S. history." Based on earning estimates and the 1980 Fortune 500 ranking, Goldman predicted that Atari "would be about the 195th largest company in 1981 and 150th in 1982." Goldman Sachs was probably too conservative.

When Bushnell sold Atari to Warner in '76 it was worth \$32 million to them; he took almost half that sum directly to his bank. By '81, half of Warner's entire operating income came from Atari as the games company's earnings rose more than 100% for the second successive year. In 1982, Atari will become a billion-and-a-half dollar entity, Goldman projects.

According to most accounts, Bushnell had lost financial control of Atari in 1975. Politely warned of impending disaster, he was bailed out (then bought out) by Warner, who deposed him two years later. Bushnell, in turn, purchased back from Warner a company that had been developed while he was in command at Atari: the Chuck E. Cheese's Pizza Time Theatre. This is essentially a restaurant that combines fast-food service and video games. There are now 75 locations in 17 states, in addition to Canada and Australia. By 1985, Pizza Time figures that number will rocket to 1,000.

Bushnell describes himself as "a person who's driven to convert fantasies into realities. The minute I start believing in something I take steps to put it into action." Atari was his first fantasy, followed by Pizza Time and now the Catalyst

Group, an umbrella organization for computer-related start-ups, dedicated to aiding fellow entrepreneurs.

Though he may be the most visibly flourishing Atari alumni, Bushnell is by no means the only successful one. Steve Jobs (the Apple Computer pioneer whose face recently adorned **Time** magazine's cover) started his career in coin-op engineering, as did Noah Anglin (now the president of Exidy, one of Atari's crosstown rivals), and Defender's creator Eugene Jarvis. Both Activision and Imagic, two software companies, would never have existed without Atari. Imagic's president, Bill Grubb, last served at Atari as vice-president of consumer marketing; at least eight designers sharpened their talents at Atari before deciding to move on.

Why have there been so many defections? While some simply chose to chase after their own entrepreneurial dreams, others had become dissatisfied with Atari's nonstop growth and increasingly corporate atmosphere. Anglin — who began his professional life at IBM — resigned from Atari in 1980 after six gainful years of employment. "Atari was a whole new world for me," says the former engineering executive. "Unlike IBM, it was fun to work there. But when Warner took over, I felt like I was back at IBM. The real reason I went to Exidy was because it reminded me of my early days at Atari."

Bushnell's reign, especially during the early years, was something less than orthodox. He helped define the casual, laid-back work style that once was so pervasive in Silicon Valley's high-tech corridors of commerce. Actually, many of the best times occurred not in Sunnyvale, but at Atari's think tank in Grass Valley (between Sacramento and Reno in the Sierra foothills), where Bushnell sent his brightest employees to consider the company's future. Hot tubs, pot, and private shuttle flights between the two valleys were the *modus operandi* there — or so legend has it.

Joe DeCure, a chip designer who spent a great deal of time at Grass Valley before he too moved on, remembers his job interview well. "I was warned, 'Don't wear a suit and tie,' so I went in a lumberjack shirt and jeans and was hired on the spot." Grass Valley, he says, was "a place to dream up new ideas in a very unstructured work environment. It's very imaginative. Most of Atari's best ideas came from there, including Chuck E. Cheese."

Says Bushnell about his many Grass Valley accomplishments: "The basic architecture for everything from the VCS (Video Computer System) to the Atari 800 to the X-Y monitor to the high-speed microprocessor game drive all came from there. Oddly enough, the engineering department at Atari was constantly sniping at the Grass Valley operation, and vice versa. They basically detested each other. According to the Sunnyvale crew, Grass Valley was full of prima donnas who couldn't make anything work — which was true in part, but they happened to be good technologists. Excuse me — great technologists!

"Pizza Time has a think tank too. I believe that's how a company should work. If you don't do the seedwork, you'll end up with a very lackluster, short-sighted, and uninteresting company, so I think it's very necessary to take people — even if it's just three people — and get them away, as far away from the factory as possible. Don't even give the factory the phone number. Just let these people look two or three years down the road and their work will form the base of what tomorrow's technology will be.

"I believe," Bushnell continues, "that there is no real correlation between hard work and good results. I think good work is an effective blend of leisure and work. You need leisure for perspective and work for execution, but all execution and no perspective will give you a bad product. I want all my engineers to have that perspective, even more

than I want them to work hard — which may be a funny thing to say.”

Back when the company was still Syzygy, Bushnell hired a young engineer out of Berkeley named Al Alcorn. Alcorn, who quickly emerged as one of Bushnell's most trusted colleagues, remembers how Bushnell's work style evolved.

“All of the top management were good friends,” Alcorn recalls. “We'd sit around drinking beer in our jeans and tennis shoes, but the work always got done. People used to call us the Smith Brothers because we all had beards.” To Alcorn, Atari's relationship with Sears (who marketed their original consumer products such as Pong and the VCS) best illustrated the chasm that existed between those who toiled in the Silicon Gulch and the rest of the business world.

“Some of the techs who did our early chip layouts were a little spacey. When the Sears guys showed up, we'd hide them in the back room. Well, Dr. Bob Brown, another of our slightly eccentric engineers, had designed Video Music, our weirdest cartridge ever. Hook it up to your stereo and the sound triggered some pretty psychedelic visuals. The Sears guys took one look and asked what we'd been smoking when we did that. Naturally, one of the techs lit up and showed them what he'd been smoking.

“Another time, Sears' national buyer then, Carl Lynn, brought out about ten guys to see our new plant in Los Gatos. We were in our everyday work garb and, of course, they were all dressed in three-piecers. Everybody was getting a little uptight so Nolan and a few of us jumped into some empty boxes and took a ride around the building on the conveyor belt. The Sears reps were flabbergasted. That night, the whole group had dinner together in a ritzy restaurant. We had gone home, cleaned up, and changed into three-piece suits, hoping to make peace. Meanwhile,



they'd put on their jeans. What a mix-up! Fortunately, we had rented out a private room. The whole thing was pretty funny, we thought."

## The Dream Dies

Yet by 1977, Bushnell's fantasy-turned-reality turned sour. Not only was he forced to sell the company to a corporation, but the competition was also playing hardball. Bushnell's demeanor had reportedly changed drastically. "[Bushnell] had started at Atari," wrote **Esquire**, then, "with a we're-all-brothers attitude, greeting each new employee with a power handshake and a smile. Then competitors began rushing out imitations of Atari's games, some of them very likely gleaned from spies in Bushnell's own plant. Now Atari owns paper shredders and a secret lab in the mountains and it's tough to get any kind of handshake out of Bushnell."

This description was "partially true," Bushnell concedes. "We still had a laid-back attitude, but things did tighten up. We still had as many beer busts and what-have-you as we did before, though." Anglin, who was there at the time, sides with Bushnell. "After all was said and done, Nolan was the same person. He never changed. He still knew how to make it fun."

Fun, however, was not in Warner's plans for balancing the books. Ray Kassar, a no-nonsense executive at Burlington Industries, was brought in and Bushnell, the partying idealist, was pushed out. "Credit Warner," Alcorn says reluctantly. "They did a fabulous marketing job. They had the

nerve to put mucho, mucho dollars into a company that was losing lots of money. Atari never could have made it without them.”

## Entering Atariland

When I hit the front door I really expect to see a lineup of Atari's best coin-eaters in the reception area, with employees deliriously battling alien hordes. Surprise — there are no machines, no terminal video cases to write home about. When my appointed guide through this labyrinth appears and introduces herself, I register a formal complaint. “You want games?” she replies. “You'll get games — don't worry.”

My first interview is with Ron Stringari, the vice-president of marketing in the consumer electronics division. He recently joined Atari after 16 years at Sears, where he climbed from retail to corporate marketing and merchandising. Stringari worked with Atari on marketing the VCS, which Sears has sold under their name since it came out in 1977.

He is a marketing man with a corp-speak vocabulary and a vision: “I see a revival of traditional American values in the success and return of country and western music. Believe me, the '80s will be the 'we decade,' where families reunite as they sit home together and entertain themselves.” If you've seen any of Atari's television ads for the VCS, you've seen a good part of Stringari's vision of the future — whole families all the way from Mom and Pop down to the family dog sitting in front of the tube battling a joystick.

And whose joystick will that be? "We're in a leadership role here at Atari," says Mr. Stringari. "We want to bring the best Space Invaders game to the consumer. If they want maze games, we're going to bring them the best of that, too. Atari wants to be the biggest consumer electronics company there is — and I'm not talking toasters. Hey, we take fun seriously. We don't sit around and play games all day."

Downstairs is the office of one Jewel Savadelis, software product manager for the VCS. She's playing Pac-Man on a TV set in her office. (So we don't sit around and play games all day, do we?) Savadelis oversees the development of all new cartridges, but ironically has no background in video games or consumer electronics whatsoever. She's a Harvard M.B.A. grad and previously worked as an energy consultant in Washington.

We become so engrossed with Pac-Man and an assortment of other soon-to-be-released games that I never do find out what brought Savadelis to Atari. I do, however, discover that Haunted House is a chiller thriller of a game with ghosts, bats, swords, and the theme to "Twilight Zone" jingling at the end of every level completed; Yar's Revenge reminds me of the coin-op game Star Castle. Super Breakout covers the original perfectly and a rather hypnotic soundtrack has been added. But Pac-Man, I'm sorry to report, is a great letdown. The ghosts are the problem — their fitful flickering is enough to make you dizzy.

Savadelis is good enough to assure me that I'm not the only one having problems with this Pac-Man. Blaming the five-year-old VCS hardware, which can really move no more than two independent objects on the screen, she concedes that five (as in the case of Pac-Man) is pushing things a bit.

Hence the flickering. "Nevertheless, we have come a long way," she maintains.

Opening a drawer just below the TV, Savadelis pulls out cartridges from three to five years ago — which is the Stone Age in the world of video games. "We've had some real dogs," she laughs, pointing to *Indy 500*, *Surround*, *Outlaw*, and a few others. "Some of those were probably done in a matter of weeks. Today we spend about seven months on each game. We do very extensive research. In fact, a team of my designers just returned from Japan, where they met with Namco, the company that created *Pac-Man*. We're watching Japan very closely for more license deals. Better sports games, more adventure, less violence, skill-type games like *Breakout* and licenses — those are the directions we're heading in right now."

Before leaving the building, I duck into a private gameroom and am startled by what I see: a whole gang of people playing *Berzerk*, *Pac-Man*, *Galaxian*, *Rally-X*, and *Defender*. These aren't Atari games — what's going on here? These are Atari-licensed games and the players are the engineers who will dutifully transfer them to the VCS. Clone doctors! *Berzerk* is open and though the machine still comically chortles, "Coin detected in pocket," I know this one's on the house.

Have you ever played arcade games for free? It's like staying twice for the movie. For free, you can afford to develop your own strategy, not swipe the next guy's. For free, you can waste a game if it's not going your way and start again. For free, you don't know when to stop. Fortunately, my guide tracks me down and steers me out of this mad scientist's video den. The tour must go on.

At the coin-op plant, foreman Mike Hinkin greets us warmly. Hundreds of *Tempest* cabinets are propped on a

long roller belt that snakes past ten pit-stops. I learn many interesting things from Hinkin, such as the fact that Missile Command had two speakers (as opposed to one, which is standard); Tempest, Battle Zone, and Red Baron were Atari's first games to require two printed circuit boards (as opposed to one, which **was** standard); and that Tempest has ten memory chips where Asteroids only had six.

Atari, Hinkin explains, operates a wood mill and state-of-the-art silkscreen shop in nearby Milpitas. Once the fully-constructed and decorated cabinets are delivered here, the interior assembly process takes about half a day. Today, Hinkin's 140 workers will turn out approximately 300 Tempests, all of which have received safety certification from the Underwriter's Laboratory, an 85-year-old nonprofit group that attempts to enforce product safety standards. (Atari was the first games manufacturer to gain UL approval.)

Next stop is the coin-op chip building, where Lyn Nieberg is awaiting our arrival. Here, the first procedure we see is 240 components — resistors, capacitors, diodes, etcetera — being stapled to PCBs by an Auto Inserter machine. About 450 boards are stamped with parts during the two shifts. After a brief inspection, they are passed down to tables where workers (wearing grounding strips on their wrists "so they don't get zapped") connect from 40 to 100 integrated circuits to each board. Once that is done, they are set on a conveyor belt for soldering; this machine, called a Wavesolder, is like a car wash — every board rides through an actual wave of a 490°F solder, which adheres the components to the board. The board is then washed with solvents, rinsed, and dried. The entire process takes about four minutes.

Finally, we get to the chips. Tiny black boxes that look like something you might find inside a Crackerjacks

package, these sensational devices warrant no more attention than any other part, Nieberg says, despite the fact that they're what made the games revolution possible. Workers simply attach them by hand. After a short-circuit check is made, those boards that pass the test (75%) are readied for a 12-hour "burn-in" at 75°C in the ovens. As he walks us out, Nieberg explains that there would probably be twice as many workers on the floor (75 now, 150 total) if not for the Wavesolder and short-detector machines. Despite this, he wonders whether I know anyone who needs a job.

Harold Johnson, our next tour director, picks up where Nieberg has left off. We slowly wind our way through the next building, where very much the same sort of activity is going on (except that the boards here are for the VCS and computers). Johnson, the manufacturing engineering supervisor, describes the employment situation for plant work at Atari and generally throughout the Valley in general.

"The labor market is terrible. There's simply more industry here than people. The turnover in the whole Valley is also very high. If you don't believe me, take a look at the **San Jose Mercury** — it has the largest classified section in the country. The work is skilled to a degree. You have to be able to recognize components, know how to solder and desolder, and should be able to check for whatever's wrong. So we try to look for experienced workers.

Johnson points at two women, both Hispanic. "They've been with the company for seven years, but they're the exception. People don't seem to realize that this industry's a great place to grow. Most managers, including myself, started right here on an assembly line. On the line we have Vietnamese, Cambodians, Haitians, both types of Indians, Pakistanis, Mexicans — you name it. It's a regular United Nations."

To add to Atari's international flavor, Johnson informs me, they also have plants in El Paso, Texas, Taiwan, Puerto Rico, and Ireland.

I feel as though I've seen enough assembly lines for the day and ask if I can play some of the games I've been hearing about and staring at. "You guys are all the same," the flack needles. "All you really come here for is the free games, I know." Even though I offer to take in another plant, she deposits me at the company arcade. I enter and am quick to establish that this is not your ordinary gameroom — it's the Atari coin-op Hall of Fame! Pong, Tank, Space Race, Sprint, Fire Truck, Bug, Got'cha — the classics all sit along one wall, conspicuously inactive, while employees fire away (free of charge, of course — now that's what I call a perk!) at this year's models. I observe each of the old machines as if it were a museum piece. They are truly ancient. My nostalgia, however, soon subsides and I go wait in line for Tempest.

Less than twelve hours later, the dawn and I greet Frank Ballouz, the marketing vice-president on the coin-op side, who is generally Atari's corporate mouthpiece. In the lobby of his building there are Tempest and Centipede machines that office early birds are already hunched over in hopes of raising their morning averages. Ballouz, however, goes one better: He has his very own Tempest right in his office. "I like to play when I'm on the phone," he says happily. About the lobby games, Ballouz explains, they had to be removed once because the chairman decided that paper-pushing was taking a back seat to meteor maneuvers and the destruction of enemy spacecraft. Now he simply regulates the machines. From 12:00 to 2:00 is OK; if you have a note from your superior, then anything goes.

Ballouz came to Atari five years ago as national sales manager after a regional sales stint at A.B. Dick, the printing equipment company. A native of New Jersey, he graduated from Seton Hall College with a B.S. in marketing in 1970. "Before I was hired," he recalls, "Atari just threw games out onto the street, saw how much they earned, and if they did OK, fine — if they didn't, oh well, throw it away or work on it a little bit more. It wasn't, as you can probably tell, very scientific. Gene Lipkin [Ballouz's superior at the time and a former president of Atari], Lenore Sayers [who is still with Atari in another capacity] and I started talking to players — asking them what they liked or didn't like about a game. That was in '76. Right now, a product takes from 9 to 18 months to develop — through the various focus groups, market testing, research, engineering reviews, and right on down."

Focus groups? "OK, let me explain. When a game is in prototype but not yet ready for test-marketing, we bring in two groups of players: 16-to-18, and 19-to-35 year-olds. We select them from anywhere in the Bay Area. Usually we find these people in arcades; a good portion of them are skilled, regular players. We pay them \$20 for 2 hours' work — if you want to call it that! We'll contact them and have them go to a certain conference room here, where we start off with a general discussion about what they play, which games are their favorites, and so on. Then we'll have them play one or two games in an area that has two-way mirrors and videotaping facilities — we get a lot of information by just watching the players, seeing how they are reacting to the games, and hearing their comments firsthand rather than having to read a report afterward. So we have the whole thing taped. After they play, we sit them back down to discuss what they liked and disliked about the game, how



they'd compare it to their favorite game, the graphics, sound, controls, the theme. We pick their brains.

"We then decipher all of this information and take it back to engineering. Whatever we and they feel is good input will result in the appropriate changes. A game goes through two focus sessions — normally that's enough. Then we'll make more changes and put it out on location for the first field-testing. After it's on location for several days we go out and talk to the players there. We don't solicit them to play the game, but when they do we grab them, ask them to spend a few minutes with us, and ask them the same questions we gave the focus groups. Again, we'll decipher all that information, feed it back to engineering, and eventually the game evolves into a product."

Does this mean that a few Bay Area players are deciding what games we get out here in the hinterlands? "By the time we get to prototype stage, we'll rarely shoot a game, as we call it," Ballouz says. "Although there are games that our engineers love and the players don't want to hear about. But even when we shoot a game on that account it may not stay dead. There have been games that we shot that the engineers kept working on behind our backs. For example, we shot Drag Race, but 10 months later the engineer showed it to us again and we ended up building several thousand machines, which was a lot in those days. Nowadays, though, we want a run of 10,000. Excellent is anything over 25,000."

And if you're testing these things in public, what's to keep the competition from coming over and taking a peek? "Well, many times we're aware of what and where our competitors are testing, and vice versa. I know a case where we had a game on test and one of our competitors actually flew in to see it. I've done that myself. It's just to make sure that if

we have anything similar we'll be prepared to bring it out. But downright espionage — that's not happening."

Speaking of espionage, maybe Ballouz can save me the trouble and disclose exactly what games are on test right now. "Not really," he smirks. "However, I can tell you that we have five or six products on the burner ready to come out, but we don't know when. We have various games in development, some of which are similar to Asteroids on the X-Y monitor. We're looking at cooperative two-player games and competitive two-player games where you play against each other. We're not looking at sports games since we've probably hit all of them — we fell on our face with soccer, did an excellent job with football, fair jobs with basketball and baseball. We don't know what new sports themes will open up. We've always been a driving-games company but haven't had one of those for several years, so we're definitely looking at that. We're wide open. I think that the only thing we're limited by is our imagination. And possibly money."

Lyle Rains, the notoriously tight-lipped coin-op engineering chief, is my final interview. Maybe he'll even show off some new product the way Jewel Savadelis did yesterday. Can't hurt to ask — or can it?

Rains was the brains behind Asteroids, the video game that reestablished Atari's lead in the coin-op derby. His background is electrical engineering, a degree from Berkeley in the early '70s. One of Bushnell's first hires in 1974, Rains has seen the R&D department leap to 50 about the time of Breakout ('76) and bound to 150, which is its size today. He's a veteran of eight A.M.O.A. gatherings, so I solicit his opinion of the most recent ('81) conclave.

"Nothing really surprising," he says. "What I liked is that there seems to be a consolidation underway. A lot of

the little companies who were at the A.M.O.A. before seemed to have cleared out a bit. The solid companies were there and the products they had were fairly solid. There were probably six or seven significant products introduced there: Tempest; Qix; Eliminator, which is a very improved Star Castle; Donkey Kong, which Nintendo blew by not licensing. Unfortunately, there were a large number of Pac-Man-styled games. A lot of the product was solid, just not surprising. Cinematronics and Midway were disappointments. And Stargate seemed indistinguishable from Defender."

Will Atari respond to the maze craze with a Pacsimile of their own? "We have a couple that we're looking at in the lab right now, but whether or not they'll be any good I wouldn't know just yet. We monitor trends and make judgments about what we believe is significant and what's not. If we feel something significant has happened, we'll try to respond to it as soon as possible. Usually this is in terms of features. Most often, we like to sit back and see how people respond first. For example, for about a year there was a really hard push to put voices in games. Now, this year you saw few new voice-equipped machines, which proves there is not enough evidence that the voice chip would increase profits significantly. That's something we never really jumped into, though we talked about it a lot. Until we have a good application for voice we've decided not to jump into that. Another trend is color X-Y, which we've known for awhile we'd have to do. But first we wanted a good monitor to do it with.

"We have to make sure," Rains continues, "that we provide a technology that makes sense for the industry. We spend a lot of time being innovative with gameplay. We feel that's the key to making a machine that makes money. Philosophically, we believe that technology is not the end-

product — it's only a tool to provide the end-product, which is, of course, the game."

I asked about the next game on his agenda. "I would feel very uncomfortable talking about anything beyond Tempest," Rains states decisively. "Right now I know the next product after Tempest, but I don't know anything past that for sure. Anyway, there's a good probability that nothing new will be out by the time your book is released."

(Not true. I found out several months later that not only is Space Duel [a one- or two-player Asteroids-type game with color X-Y graphics] ready for production, but that Rains' division had broken a ten-year-long policy by licensing a game from Namco, the makers of Pac-Man and Galaxian.)

If Rains would rather be vague, general, and uncooperative, I guess that's my problem. But, pest that I am, I have to give it one more try: Will it be a space game?

"I'll only say that space will continue at least for awhile," he says, shifting nervously in his chair. "I think it's a viable thematic vehicle because it allows you to do things that aren't real world, that you don't have to worry about. Does this match somebody's idea of reality? Well, it doesn't have to. I think there's going to be a better collection of different types of games available. For awhile, everything was space — there wasn't an option. If cowboy movies make a resurgence you'll probably start seeing more cowboy games. I really can't figure it out one way or the other."

Two frantic days at the IBM of the games world has left me physically and psychologically drained, but I must finish my work here. If Atari was Nolan Bushnell's utopia, where play shook hands with work "we're-all-brothers" style, then what could Pizza Time possibly represent? I have

to see. Driving north, I cruise along a suburban strip of malls and fast-fooderies and grow increasingly nauseous as I consider the nutritional wasteland before me. Pizza Time is tucked away safely from the traffic and smartly offers space for over 100 vehicles. The lot is half-full at dinner time, which is a fair sign that business is going well. Inside, it's Pizza Time, boys and girls! (Moms and dads, too.) There are two rooms with tables (one a great deal more active than the other), a main self-service area, and an arcade stocked with the latest video games (no pinball) and an assortment of kiddie rides and amusements. The larger dining area, where a peculiar troupe of Muppet-like characters provides entertainment, is the romper room. Trays of pizza with every possible, inconceivable, inexcusable topping and pitchers of beer and soda are the only foodstuffs I see. Every eight minutes the show must go on: Pneumatically-operated computerized robots such as Jasper J. Jowls, Harmony Howlette, Pasquale the Pizzaman, and the Big Cheese himself, Chuck, do a song-and-dance schtick that's straight out of vaudeville. It's a neat side-order that the kids gobble right up. And for dessert, there are games galore.

Only one rule is steadfast here: No one under 18 without parent or guardian is allowed on the premises. At a time when communities are seeking ways to keep unaccompanied teens out of the arcades, Bushnell is already five giant steps ahead of everyone else. Pizza Time is clear-cut evidence that the innovative, entrepreneurial spirit that has always been the hallmark of this unique swatch of America remains as vital as ever.

# 6

## Video-to-Go

Back in the spring of '72, Pong hadn't even been invented yet. Computer games were just something bleary-eyed student programmers played to stay awake until their program ran. Except for Bushnell's Computer Space (a loser), there was hardly a sign of what would be a \$10 billion industry less than ten years later.

The invitation, a tasteful blend of vellum and brown embossed lettering, went out to members of the media and the company's New York-area distributors early in February 1972. In announcing the release of its newest consumer product — the Odyssey 100 — Magnavox mentioned little else but the official launching date (sometime in March) and the location (Central Park's ever-so-classy Tavern-on-the-Green). Oddly, the invite didn't even mention television — for years Magnavox's *raison d'être*.

Only in Fort Wayne, Indiana (where Magnavox's corporate offices were then situated), and in the even more remote locale of Nashua, New Hampshire, did anyone really know the complex story behind this new venture. Four years earlier, Ralph Baer of Sanders Associates had begun

searching for a buyer of his ball-and-paddle TV games concept. Teleprompter, the cable TV company, was the first to show serious interest. Their chairman, Irving Kahn, went so far as to visit Sanders' Canal Street building, where Baer had rigged up an interactive cable games system.

"He got pretty turned on by it," Baer remembers. "But, back then, cable was in trouble so we ended up getting nowhere. At this point we decided to start concentrating on licensing the whole concept to a strong consumer electronics company, preferably a TV manufacturer.

"It took us until early 1969 to convince the RCAs, the Zeniths, the GEs, the Sylvania's, the Magnavoxes — you name it — to send representatives up to Nashua for demonstrations. In a period of nine months, we held one demo after another and aroused a helluva lot of interest. Everyone who came left enthusiastic. We negotiated with RCA for six months, but they wanted to own us as part of the deal and we finally said no to that idea.

"One of the members of RCA's negotiating team was a fellow named Bill Enders. Just about that time — this was early in '70 — he left RCA and went to Magnavox as a senior product vice president. Shortly thereafter, we received an invitation from him to come to Fort Wayne with our presentation. The day we came, Jerry Martin, their vice-president of marketing, had filled up a conference room with 30 or so people. The reaction to the demo was lukewarm to good, except for Jerry, who was very enthusiastic. The room was crowded with engineers who thought it would be next to impossible to create a TV games system at a reasonable price. But Martin was in charge and said, 'We're going with it.' That was the beginning of a relationship that developed into a cooperative effort between us and them which has lasted until this very day.





“After all the paperwork was completed, we put together about twelve prototypes, which they put into their demonstration vans. This was now the summer of '71. In those days, Magnavox would take their new products out on road shows to their distributors twice a year. They did a pretty damn good job of demonstrating the Odyssey without ever blowing their cover. The game was the company's 'mystery product.' It was such a well-kept secret that when they had that blowout at Tavern-on-the-Green, it was the first time anyone — including myself — saw what the Odyssey 100 actually looked like.”

On that chilly March afternoon at the Tavern, Magnavox's invited guests warmed their bodies with alcoholic refreshment as they anxiously awaited the disclosure of that “mystery product.” When the Odyssey was unveiled, they saw essentially a plastic box with knobs for controls and switches for game selection (cartridges would come much later), which connected to the rear of a TV set. Once hooked up, hockey, tennis, and maze games could be played.

Remember the Victrola? This was the video equivalent. A dash on the screen indicated either the racquet or stick, a rectangular spot the ball or puck. For added realism, a vertical line represented a net or center ice, but keeping score . . . well, that was up to you. Maze and chase-type games, however, were only a bit more complicated. Since the circuitry (and cost) for any display other than a few straight lines was prohibitive, Magnavox gave you a handful of plastic overlays printed with various scenes that you could **tape** to your TV screen. Some of the more ambitious players even constructed playfields of their own.

In retrospect, the Odyssey 100 seems ridiculously primitive, but remember that it sold 100,000 units at \$100

each in 1972. Magnavox's coup was worth \$22 million that year alone. Unfortunately, however, Odyssey would not be the pride of Fort Wayne for long.

By 1975, the company's consumer electronics division had lost more than \$60 million, mostly on video games. Explains Baer, "They made two very basic mistakes: restricting the sale of Odyssey to their distributors — which didn't include toys stores — and creating the very distinct impression that the machine would only work on a Magnavox television. That, of course, was manifest nonsense, but that's the idea you certainly got from their early ads." Competition from Atari, whose home version of Pong hit the scene in 1973 and reached some 100,000 households, certainly didn't help matters for Magnavox either.

Whatever their shortcomings, Magnavox should be credited for anticipating the video games merry-go-round by three years as well as taking their lumps like a champion. Even faced with massive losses, Magnavox didn't give up — they just went back to the drawing board. In 1975, they earned the distinction of being the first TV games company to make the quantum leap from the Odyssey's discrete transistors over and beyond Pong's integrated circuits to large-scale integration (LSI) semiconductor chips. The Odyssey 4000's nine chips performed the functions of over 300 discrete parts, such as circuitry, ball generation, and horizontal and vertical sync. In addition, the chips kept score, generated characters, and supplied logic. Early in 1976, Magnavox continued to reduce the number of components needed to operate a video game. The single-chip LSI design did all of the above, albeit a little less reliably than its multi-chip predecessor. A semiconductor manufacturer named General Instrument, however, would soon change all of that.

## The Chip Witch

**AY38500.** It's not a foreign license plate number, nor is it a code for a jazzy new sports car. AY38500 was simply the numeric nom de plume for the discovery that turned this uncertain industry around. On one silicon chip was practically all of the circuitry required for at least six games as well as various modifications like fast ball, curve or slow, wide or narrow angles, and short or long paddle. This \$10 chip guaranteed a retail price of under \$75 for any so-called dedicated (nonprogrammable or without cartridge flexibility) TV video game. Some small companies who had invested heavily in expensive machines immediately bit the dust.

The chip had originally been developed in General Instrument's Scotland plant sometime in 1975 and was already being incorporated into European television manufacture, but it wasn't until GI's Long Island lab converted the design to the American 525-line (instead of Europe's 625) raster monitor (or television screen, to be non-technical) that the chip hit the fan.

Coleco Industries, a Hartford-based toy company, just happened to be waiting on General Instrument's doorstep when word of the AY38500 escaped from the building. First to place an order, Coleco charged ahead with production of its own TV game console.

According to Ralph Baer, Coleco's Telstar Ranger system had been completed and was only waiting to pass the Federal Communications Commission's standard radiation test, when he received a call from company president Arnold Greenberg one day early in 1976. "We're in

trouble," Greenberg exclaimed. "The FCC just flunked our machine. Can you help us out?"

Baer, head of consumer electronics R&D for Sanders Associates, was all too aware that Coleco and his company had been negotiating a license agreement for several months but were then at an impasse. Recognizing that he had a desperate man on the line, he shrewdly took full advantage of the situation. "Sign the goddamned contract with us," Baer said, "and maybe we can do something for you."

The next morning, Greenberg and company arrived in Nashua with pen and machine in hand. Once the contract was signed, Baer went to work. It took awhile but he finally devised a method for suppressing the Telstar's excess radiation.

"They passed the FCC test the next morning and everyone was happy as hell," Baer recalls. "They had a game and we had ourselves another licensee. They billed something like \$30 million (more like \$110 million, according to **Electronic Engineering Times**) worth of video games that year. That same little black box put Coleco on the map as an electronic games producer just as it had for Magnavox."

And just like Magnavox, Coleco fell from its perch one year later. Again, Baer explains: "In 1977, they promptly proceeded to overestimate the demand for their product. We engineered ten different games for them simply because Coleco didn't have any engineering capability. They did \$30 million in electronic games and didn't have anyone on board. They decided on a lot of mid-level products in the \$40 to \$60 range and laid a big egg. They had a \$20-to-\$30 million inventory overload. It took them two or three years to undo all of that."

## The Gold Rush

Meanwhile, some 70 companies — RCA and National Semiconductor included — were suddenly bucking for a piece of the video games action. Few would remain on the scene, including RCA and National Semiconductor. Another short-lived venture, Channel F, was created by Fairchild Camera and Instrument of Palo Alto. Channel F too would disappear, but not before making its mark.

Channel F was to the video games industry what stereo has been to modern recording. With one nifty invention, it delivered TV games from the dark ages of “dedicated” obsolescence to the new frontier of “programmable” awareness. For \$170, the consumer could now purchase a rather stylish console that looked and played remarkably like a tape deck; indeed, game cartridges (trademarked “Videocarts”), which sold for \$20 each, popped in and out just like the audio varieties. If you didn’t like a particular cartridge or got bored with it, you could toss that one cartridge in the trash — you didn’t have to shelve the entire unit. Channel F, or at least the concept, was here to stay — not throw away!

Back at the ranch in Silicon Gulch, Atari was taking notice. While coin-operated games (the company’s initial investment) were moving along sluggishly and hand-held minicomputers had begun to replace their dedicated archetype, programmables looked like they just might be the answer to the four-year-old question: Is there life after Pong? Bally (Professional Arcade) and RCA (Studio 2) had apparently arrived at that same conclusion as they began chasing Fairchild down the industry’s latest fast lane. Atari, as always, proved game for the challenge as well. In November 1977, their Video Computer System (VCS) was

shipped to toy departments and electronics dealers around the country.

Atari's VCS, which has since sold more than six million units, received a commercial cold shoulder at first. Despite its multiple controls, growing games catalog, three chips worth of intelligence, and mildly handsome design, the VCS created little commotion at its Christmas debut. Throughout 1978, the public persisted in ignoring this new and improved video product. "It was an education problem," contends Al Miller, who wrote several of Atari's first cartridges. "People didn't know whether to spend \$30 to \$50 on the numerous dedicated games that were still on the shelves or slap down \$180, a more considerable expense. But as the library of games began to diversify, the public came around. It was an evolutionary process."

The VCS, code-named "Stella" by the Grass Valley gang, was the brainchild of three of Atari's finest minds. According to Joe DeCure, who designed the chip sets for both the VCS and the Atari 800 computer, Harold Lee "convinced Nolan (Bushnell) to start adapting coin-op games for home use back in '74." He adds, however, that Steve Meyer, now a vice-president of research and development, "deserves the real credit for initially conceptualizing how to go about cutting the cost of home games."

DeCure devised the prototype for the VCS while working at the company's Grass Valley think tank. "I was the only one who really understood the design, which is why they brought me down to Santa Clara to describe it to them," DeCure explains, adding somewhat cryptically, "Most inventions never survived the trip from Grass Valley to Santa Clara."

The VCS not only survived Atari's bureaucracy but the public's initial resistance as well. Suddenly, in 1979, with

Fairchild, Bally, and RCA temporarily out of the programmables race and with only Magnavox's revised Odyssey 2 (a keyboard made the only difference) to contend with, Atari had little trouble establishing itself as the TV games industry's unqualified leader. At this point, they set out to convince the consumer that TV games could be a year-round pleasure, not just a Christmas Day joy. Atari's \$6 million advertising blitzkrieg toward the end of '78 was the first of many campaigns that would collectively stamp the company name ("Mommy, I want an Atari") into America's consciousness. By the end of '81, 9 percent of American homes were equipped with a programmable system, and 80 percent of those had an Atari.

But the VCS was not without its faults. As technology roared forward, it could only lag behind. Where the VCS barely had brains enough to control moving objects (inside each cartridge was an additional small memory with game instructions and backgrounds), its coin-operated cousins were moving continents. It may be grossly unfair to compare a \$3000 machine like Defender — with its 12,000 bytes\* of memory and extensive hardware — to the VCS or any other at-home system, but that hasn't prevented people from doing just that.

To be fair, though, the "black box" that Ralph Baer invented and Joe DeCure improved upon was never intended to rival the complexities of an arcade model. Quite the opposite, in fact. The idea was to simplify without compromising the essential game elements that any player ought to demand. Vector displays (which require another monitor

\*A byte is equal to eight bits or one character. Thus, a 12K (12,000-byte) memory contains approximately 2,500-3,000 words.

altogether) are, of course, out of the question. Sophisticated controls such as the Trak Ball and extravagant hardware like periscope-type viewers are also not within the TV players' grasp. But with the home games you don't have to stand in line with strangers and you don't have to keep spending your quarters. The real differences, though, are clearly functions of technology and depend on what is affordable and practical at the given moment.

## The Next Step

As you might expect, the VCS became the de facto industry standard, but not for very long. At the Consumer Electronics Show in Las Vegas during the second week of 1980, Mattel grabbed the lion's share of trade headlines with the release of Intelligent Television, also known as Intellivision. Raising the stakes to \$300, this latest system seemed worth the wager.

Since Mattel had scored well with its series of battery-operated, hand-held sports games, Intellivision's initial emphasis was primarily in the various athletic arenas. Its Football, Baseball, and Hockey cartridges, for example, were so comprehensive that even **Newsweek** quipped, "But can this thing walk the dog?" Football came complete with a selection of 180 plays. Baseball allowed for stolen bases, hit-and-run, and slickly-turned infield double plays. In Hockey, a referee could blow his whistle on a number of infractions, in which case the player charged skated over to the appropriate penalty box. The dull roar of a crowd further enhanced the games' intended realism.

Intellivision's graphics were a great leap forward in the state of the art — no TV system had ever taken the limits of



computer animation this far. Figures, previously robotlike and formless, began to take shape: trees (in Skiing) looked like trees, a tennis racquet — round instead of square — almost looked like one. With Intellivision the illusion of playing a game was truer than ever. Aside from its high price tag, the system's only major flaw was that some games were **too** difficult to play. Scoring one goal in Hockey, for instance, might take an entire afternoon. Concedes Bill Gillis, the vice-president of marketing in Mattel's electronic division, "We're well aware that some of the games you can't just sit down and master in five minutes. But we don't want that. We want them to have enduring interest over time."

As if Intellivision wasn't startling enough news, Mattel had more. Later in the year the so-called Keyboard Component — which, when attached to the games console (or Master Component), would serve as an all-purpose personal computer — was to be made available. The total package ran \$800, which seemed hardly competitive with the more economical Atari 400 (\$399), TRS-80 (also \$399), and Commodore's VIC-20 (\$295), all of which performed similar computing and game-playing functions. Whereas the Master Component (with its 21 chips compared to the VCS' 3) was applauded unanimously by TV games critics, many questioned the wisdom of the Keyboard plunge and further speculated whether Mattel would ever deliver either of the components.

The Los Angeles-based toy manufacturer, whose Barbie dolls have entertained generations of pre-adolescents, had had trouble getting its wares to market before. So when Mattel ran out of its original inventory of 200,000 Intellivisions at the end of 1980 and began cautioning distributors that there would be a shortage during the first two quarters of '81, skeptics figured there was another disaster in the offing. (A lack of chips on the part of General Instrument, their

supplier, contributed enormously to this slowdown.) Mattel, however, was not about to accommodate their doomsayers' dim prognoses; in the second half of '81, they tripled their output from the year before and, as of this writing, have probably sold more than a million units.

Intellivision's moderate success has yet to alter one industry analyst's TV games scorecard, which continues to read, "Atari and the other guys." According to Ed Atorino of Smith Barney, Harris Upham & Company, "Mattel had a terrific situation in 1980, but when they couldn't produce they had to play catch-up all over again. Mattel let Atari sail off into the sunset while they were fumbling the ball. They definitely blew it." The Keyboard, which Mattel only recently began to test-market, Atorino insists is a "dead issue," stating: "They totally missed the home computer package."

As would be expected, Mattel's Gillis hardly agrees. Citing RCA's Videodisc project, which he worked on, Gillis maintains that "it's not at all unusual to have some delays in a start-up operation. As an example, RCA announced that machine in 1973, but it didn't get to the marketplace until seven years later." If one is to believe Gillis, the Keyboard Component will be ready for distribution sometime this year.

## Activision's Soft Sell

Following Mattel's frontal attack on Atari, which more recently has escalated into a full-scale war of advertising on prime-time television, the most significant incursion on the TV games battlefield has been in the area of software development. With blessings from both Atari and Mattel, two more California companies — Activision and Imagic —

have begun creating cartridges for both the VCS and Intellivision. The logic is unmistakable — the better the software, regardless of who makes it, the more systems will be sold. In practice, this theory worked in 1981. The number of American households reported playing video games doubled, as did Activision's revenues. In 1982-83 they expect sales and earnings to increase tenfold.

Activision's ascent into the video games stratosphere was the upshot of a discussion between an entrepreneur named Jim Levy and four games designers who had grown disenchanted at Atari back in 1979. "I left the music business earlier in the year," says Levy, who had been with GRT Corporation, "and was resting by my swimming pool when I got a call from an attorney friend. He told me that he had just met with these four guys who were planning to leave Atari and form a company. None of them had any business experience so he said they should contact me.

"Prior to GRT, I had spent some time in and around a startup venture in personal computer software — stuff for Apple and TRS-80. I didn't know anything about video games. However, when I was involved with computers I came to the opinion that the whole home software revolution would develop in the 80's and '90s much the same way the record industry did in the '50s, '60s, and '70s. There would be similar patterns developing, such as the existence of large hardware manufacturers like stereo companies and some highly creative, very energetic software companies very much like the creative end of the music business. Like record labels, we would be dedicated to finding new talent, developing those talents, and making available their work. And that's the whole idea behind Activision."

Stretching the music and games analogy even further, Levy says that "Activision is a record company. The only difference is that we're putting out video games. The way pro-

motion, publicity, marketing, advertising, and distribution are done is very similar to the record business. The whole rhythm is similar, too — we're continually putting out products, focusing attention on new releases."

Activision's 16 titles, which can only plug in to the VCS, arguably form the most eclectic array of software on the TV games market today. Conventional cartridges like Tennis, Hockey, and Checkers have not eclipsed more unusual concepts such as a chicken darting across a heavily-trafficked road (Freeway), catching explosives dropped by a mad bomber (Kaboom), negotiating obstacles while at the helm of a biplane (Barnstorming), and lassoing l'il dogies rodeo-style (Stampede). The collective imagination at Activision has enervated this sometimes lethargic industry and also confirmed that, with some effort, the VCS' perceived weaknesses can be overcome.

"I think we electrified the industry," Levy boasts. "We came out of nowhere and took a generational step forward in terms of game design — I think even ahead of a lot of the Mattel work. People point to Intellivision because of the pretty pictures it puts up, but I would stack up most of our cartridges against any of theirs for realism. Their Tennis, for example, is graphically a lot more elaborate, but I think ours plays a better game.

"And as a result of all of this having happened, well, we started to see the savage beast (Atari) begin to wake up a little bit. Atari began to get a little more creative with their own system. I'm sure with Imagic coming into the picture they're going to push the state of the art forward again. That's got to put a little creative spur into Activision and Atari. Mattel's [George] Plimpton ads were just what we needed — it's that sort of competitive instinct that goads people to go beyond what's acceptable to what is unexpected."

At this point, Levy can afford to view the competition optimistically, although one wonders how wise it was to disturb the somnolent "beast." Once awakened, Atari rose to the occasion in 1981, peddling nearly 20 million cartridges (mostly conversions of arcade favorites like Space Invaders, Asteroids, and Missile Command). Management also decided to commence designing a new hardware unit, which was displayed in prototype form at the Consumer Electronics spectacle this past January. Sometime in 1982, consumers will virtually be able to own the Atari 400 computer, sans keyboard, for \$349. "The new game system," a press release informs, "has far more power and memory potential (16K) than the VCS. With this power the system exhibits unmatched visual quality. For example, the unearthly attackers of Space Invaders do more than flap their wing shields as they descend to embattled earth — they rotate in 24-stage animation." This new "advanced" system, which has yet to be named, will be delivered in the fall — just in time for another Christmas games rush.

Mattel isn't content to rest on its laurels either. Among other developments at the Consumer Electronics Show were Mattel's 12 new cartridges, increasing their catalog to 36, and the introduction of Intellivoice, a voice synthesis module that can be attached to the Master Component. Astrovision, the Columbus, Ohio-based company which bought Bally's Professional Arcade in 1980, showcased the \$299 system, plus a Zgrass-32 keyboard attachment for another \$600 that converts the unit into a usable home computer. Imagic, which is being headed up by a coterie of former Atari and Mattel employees, launched their first three cartridges. The Odyssey 2, which is now owned by North American Philips Corporation, expanded its game library to 35 with the Pac-Man-like K.C. Munchkin and the

innovative Quest for the Rings (a Dungeons'n'Dragons-type adventure that combines gameboard play with TV visuals). Coleco re-entered the games sweepstakes with licensed cartridges of arcade games (Phoenix, Mouse Trap, Venture, Donkey Kong, Vanguard, and Round-Up) for both the VCS and Intellivision; the company also promised that its own programmable system would be on the market later in the year. And not to be left out of the software competition, Atari exhibited licensed versions of Defender, Pac-Man, and Berzerk, plus three more homegrown games, widening their collection to 45. For owners of the Atari computers, uncanny replicas of Pac-Man and Centipede on cassettes created quite a stir.

Nowhere to be found at the big show (or anywhere in the market, for that matter) were people patiently taping overlays onto their television screens. Ten years since that luncheon at Tavern-on-the-Green, the Odyssey 100 seemed more of a myth than ever — like a great relative you've always heard about but never knew.

# 7

## The Great Debate

### You Got Trouble Here...

New York's mayor for most of the 1930s and '40s was an explosive, charismatic man named Fiorello La Guardia. Loved by millions for saying whatever he felt like whenever he felt like it, La Guardia was not on the friendliest terms with the coin-operated amusements business. Somewhere along the way he had decided that coin games — particularly pinball — were in no way beneficial to his constituency. Pinball, he concluded, was a bad influence on children, would lead them into lives of vice and other immoralities. One of the more famous photographs from the era is that of La Guardia leveling a pinball machine with a sledgehammer. Clearly, people who played pinball in New York did so at their own risk. By 1942, La Guardia had accomplished his long-stated goal: Pinball, the so-called "perverter of innocent children," was banned in New York City.

I never really understood all of this fuss until I started reading up on pinball's less-than-pure past. Back in La Guar-



ELECTRO COURT



dia's day, the reward for a high score was not simply a free ball or game (many states, incidentally, still outlaw bonuses of any kind) — pinball actually paid off! A meter recorded your winnings, which were then tendered to you in cash by the operator. When the authorities discovered that gambling was, indeed, going on and figures such as La Guardia began taking the offensive, pinball manufacturers continued to do whatever they could to keep their customers satisfied. At first, they switched from meters to dispensing tokens or color-coded hard candy. After registering your scores you would head to another location, where these items were redeemed for cash. Soon enough, however, law officials realized the ruse and cracked down once more, at which time the industry stepped forth with a compromise — the free game. But there was another hitch: Manufacturers, still looking for a way to circumvent the law, invented the “knock-off button.” This way, when you racked up a bunch of free games the arcade owner could just buy them back from you (payoff time!); then he could reach under the machine and reset it to zero. It looked better, but the payoffs could still happen.

By the late '40s, local legislators had forbidden pinball in the nation's three largest cities: New York, Chicago, and Los Angeles. Clearly, it was time the industry cleaned up its act. Gambling had to go. With the introduction of flippers in 1947 and the prohibition of pay-outs, pinball finally began to achieve the aims of the industry's anti-gambling, “For Amusement Only” faction. No longer would the game be a refuge for two-bit gamblers, nor could it be accurately labeled a “game of chance”; flippers made it a game of skill. Aside from the bingo pinball games that remained legal in a number of states, pinball was clean — or so the industry thought. Instead, criticism persisted. The tough-talking National Association of Citizens Crime Commission was

steadfastly against the industry, calling it a "racket that fleeces children of their carfare, their lunch money, their allowances, and even drives them to crime to obtain funds for their craze." Gambling or not, pinball and all the other arcade amusements have always had the knack of raising the national blood pressure. Now, some 50 years later, equally strong language is being directed at the play and proliferation of America's latest "craze," the video game.

## The Bans

Cities as large as Oakland, California, and as small as Midland Park, New Jersey, have acted recently to restrict the use of video games. Again, parents are worried about their children's schoolwork habits and whether lunch money is feeding them or forever hungry Pac-Men instead. Town councils are reviewing zoning regulations and have denied many an arcade application on the basis that games are of no value to the community and only cause problems. Law officials are claiming a rise in juvenile criminal behavior — particularly at arcades, where rowdy, drunken crowds supposedly congregate. Psychologists have determined that video games can be addictive. No doubt, there is a genuine apprehension over these games and the effects they may be having on our children. However, it seems that few can truly express what it is they are afraid of.

Unfortunately, many of these arguments have spilled over into the courts of late. The most celebrated case, "City of Mesquite, Texas, versus Alladin's Castle, Inc." (an arcade chain owned by Bally), went straight to the top — the Supreme Court. Mesquite had banned minors not accompanied by an adult from playing coin-operated machines

back in 1973, but then exempted Alladin's from their Ordinance 1353 in 1975. However, two days after commencing business in the city's Town East mall, Alladin's license was suddenly rescinded. The case was mired in technicalities that did not directly pertain to the issues at hand (Mesquite, for instance, determined that Alladin's had "connections with criminal elements," which may have been true at one time but no longer seems the case). Nevertheless, "Mesquite v. Alladin's" did raise questions relevant to both the First and Fourteenth Amendments.

In their Supreme Court brief, Alladin's maintained that preventing children from playing arcade games without parental supervision was tantamount to book-banning and fundamentally tampered with both the players' and the game designers' "right of expression." That video games had recently been granted copyright status further indicated to Alladin's that the games should receive free-speech guarantees provided under the Constitution. In addition, a friend-of-the-court brief (filed by the Amusement Device Manufacturers Association) equated video games with movies. Citing a particular game (Scramble) and its functions ("to navigate a mountainous airspace, destroy enemy fuel depots, evade deadly ground fire, and prevail in an aerial dogfight while at the same time watching carefully over a diminishing fuel supply"), the ADMA concluded: "In essence, the work is a movie in which the viewer participates in the action as the fearless pilot controlling the spaceship."

Interesting premises all — though none addressed the more critical Fourteenth Amendment questions, which were: What prompted Mesquite to originally enact the ban and how did they go about justifying it? To understand that, we must travel back 60 years to another Supreme Court case, "Murphy versus California." At that time, billiard-

playing and pool halls were the perceived evils of the day. In advocating the state's power to either regulate and/or prohibit "non-useful commercial enterprises" such as billiards, the Court wrote: "That the keeping of a billiard hall has a harmful tendency is a fact requiring no proof, and incapable of being controverted by the testimony of the plaintiff that his business was lawfully conducted, free from gaming or anything that could affect the morality of the community or of his patrons. The fact that there had been no disorder or open violation of the law does not prevent the municipal authorities from taking legislative notice from the idleness and other evils which result from the maintenance of a resort where it is a business of one to stimulate others to play beyond what is proper for legitimate entertainment." After entering this into the record, Mesquite's attorney, Elland Archer, promptly inquired, "How 'irrational' was it for the City of Mesquite to protect its health and welfare through legislating as it did to protect children against those perceived evils?"

What is so "evil" about video and pinball games, you might be asking? And what right does anybody have to determine standards for "idleness"? Archer attempted to explain: "The playing of a pinball machine or a game of billiards, when viewed in the abstract, is not harmful. Unfortunately, these games are not played in the abstract. . . . Idleness is likewise good in the abstract. Without some idle time to refresh our minds and bodies, we would wear out. But, as with food, not all idleness is helpful. Children that are taught to act in a responsible manner by being assigned duties at home, required to attend school at designated times and use their money for useful purposes, all other things being equal, grow into more responsible citizens than those that are encouraged to forego responsibility for idleness." In other words, children who play amusement

games will become irresponsible adults and, looking at the broader picture, these irresponsible adults will ultimately undermine the system under which we live. Is that what Archer was trying to say?

As further evidence (or lack of it), Archer cited "Ginsburg versus New York" (1968), a decision prohibiting minors from purchasing pornographic materials. Archer equated the harmfulness of such acts to the harm in playing pinball games. He did, however, concede that "neither prohibition of 'girlie magazines' nor pinball games will, standing alone, develop good citizens," but added: "At the very worst, such laws can cause little harm to minors, for throughout recorded history children were not able to play pinball machines except during the last century because they were previously unavailable. No severe trauma appears to have been inflicted by such lack prior to the inventions of such games."

In rebuttal, Alladin's attorneys wrote: "Mesquite's final justification for the age restriction that it contributes generally to the health, welfare and morals of its citizens, represents nothing more than a value judgement about the relative benefit of coin-operated amusement games in Mesquite. The provision clearly has nothing to do with health, and we are not aware of any case in which the Court has upheld a classification on the sole ground that it somehow contributes to general welfare and morals in some subjective, unarticulated way."

Plus, the fact remains that Mesquite was never able to actually prove any juvenile wrongdoing in the Alladin's Castle or any other local gameroom under their jurisdiction; they eventually admitted as much. The charges of truancy, drunkenness and drug-peddling were nothing more than mere supposition. In defense of the "city fathers," who could not provide adequate evidence of criminal behavior

in Alladin's, Archer argued, "The fact that they were unable to articulate these values in a precise manner in no wise detracts from their existence. Most people could not give a precise definition of 'liberty' but believe it is important."

With all of the moralistic balderdash now said and done, we finally arrive at probably the most fundamental poser before the Court: Who is to determine what is right for children — their parents or the State? When is it necessary for the two to cooperate in regulating minors' activities outside the home? In an interview, Archer conceded that "it's the parents' primary responsibility, but I also believe that government has an obligation to assist parents on certain difficult matters, such as age limits for the purchase of liquor." About the Alladin's case he said, "We're not aware of any harm caused by the games per se. It's the operators who don't care — they'll cater to anyone with a quarter. I'd say 100 parents protested to the Council that their kids were going without lunch and whatever else. Then, we also started hearing of dope traffic, vice, runaways — you name it — all going on inside these places." When asked why evidence of this behavior was never presented to the Court, Archer simply replied: "That wasn't our responsibility."

Alladin's counsel noted that "none of the city's witnesses at the trial suggested that youths were harmed by the act of playing coin-operated games," and concluded succinctly: "If a parent has no objection to the child visiting the centers and playing the games, the State has no right to overrule that decision."

What is the solution to this complex problem? Is there one? Atari's marketing vice-president, Frank Ballouz, is one of the few veterans in the coin-games business I spoke with who openly admits that there is indeed a serious problem here. (Most others don't seem to want to hear about it.) "Oh, yes, we definitely have a problem," Ballouz says. "Players

are just out playing too long. I'm very sympathetic to anyone who's upset about kids skateboarding down the block at midnight to the 7-11 to play a video game. Maybe the game should be shut off at 11 P.M., maybe earlier. I believe there is a need for regulation. There definitely should be some control. I don't think you need to have a game on every street corner. As an industry, it's time we began talking about drawing up a model ordinance. The onus is squarely on us."

Oakland, Dallas, and other municipalities, meanwhile, aren't waiting for the manufacturers. Last December, Oakland's City Council, in response to numerous complaints from parents, educators, and neighborhood groups, voted to ban minors from arcades during school hours and after 10 P.M. on weekdays and after midnight on weekends. In addition, adults cannot bring their children in with them during the off-hours. Dallas also restricts video gaming to after-school hours, but (oddly) forbids pinball altogether.

More startling news, however, was this recent development in two Milwaukee schools: Wauwatosa and Nicolet High Schools each reported earnings of over \$400 a month during the 1980-81 school year after installing video and pinball machines in the schools' commons. Those profits went toward the part-time salaries of students who maintained the areas and into general activities funds. Not surprisingly, this revelation created a controversy as educators, parents, and school board members traded opinions at meetings and in the local newspaper. While the **Milwaukee Sentinel** editorialized that "there's such a thing as making school too much fun," one principal contended that the in-house arcade contributed to a decline in student vandalism and loitering at nearby stores, noting: "As educators, we're providing for the total student and part of his life is socializing and recreating. I don't know any concrete educational

value in the games, but I do believe they are a good supplement to a well-rounded education." The school board president, also in favor of the program, said he had yet to receive protests from parents about it.

## Proof Positive

What occurred in Milwaukee is certainly a departure from the norm, but not unique. Video games are being experimented with in several other innovative programs in the fields of rehabilitation, military training, and children's education. Dr. William J. Lynch, Director of the Brain Injury Rehabilitation Unit at the V.A. Medical Center in Palo Alto, California, is among the first clinicians to employ video games in cognitive rehabilitation. In a paper titled "TV as Therapeutic Interventions," he has concluded that brain-damaged patients "express a preference for working with a video game over working with a paper and pencil." This, he says, is because those with head injuries generally do not relate well to people and are less threatened by TV displays. For example, Pong and Breakout, both ball-and-paddle games, have proved to increase electrical activity in the right side of the brain as well as aiding in visual searching and tracking.

Lynch tells about one patient who was being treated for a vision blockage in his right side. He tended to bump into things. "We had him play lots of Pong," the doctor explains, "which taught him to compensate with his vision. He became so good that he began to beat everyone on the staff — plus he didn't bump into things anymore." Other less graphic games like Hangman, Codebreaker, and Concentration are used to improve spelling, memory, and math



skills. In another rehabilitative field, a colleague of Lynch's has even found an application for Space Invaders. It seems his patients — those with neck injuries — now prefer to strengthen their shoulders by shooting down aliens instead of lifting weights.

According to Lynch, hundreds of clinicians are “dabbling” with video games for rehabilitative purposes, but little so far has been published in medical journals. “I feel that the use of electronic devices such as video games and microcomputers will continue to evidence dramatic expansion in rehabilitation in the '80s,” he asserts.

Very much the same conclusion has been reached by both Army and Navy researchers regarding training applications for video games. A 1980 study conducted by the Naval Aerospace Medical Research Lab found Atari's Combat cartridge an “excellent prospect for use in performance testing” and, in general, “microcomputer-based video games to have a high utility for performance assessment.” Combat, a fairly standard tank program that simulates gunnery on a very basic level, actually drew high praise. “The task . . . is promising and its technical properties are outstanding,” the researchers wrote in their report (published in the **American Journal of Psychology**). “In addition, [it] requires little equipment and what little it does require is light; it is also portable, almost universally operable, and occupies little space. Best of all, the task is self-motivating. . . . The subjects, far from becoming bored with their work, become involved with it.”

Shortly thereafter, it was the Army's turn to announce its plans to call video games into active duty. A company named Exemco had been retained by the Army for the purpose of examining the latest coin-operated games and reporting on their possible applications. When Atari released Battle Zone (a first-person, vector monitor tank game

that drew rave notices at the 1980 A.M.O.A. show), Exemco made sure the Army noticed. Like the Navy, the Army was especially pleased with two aspects of video game technology: first, the simulations can be of extremely high quality; and second, compared with the real thing, it doesn't cost much. With Battle Zone, the Army realized you could train for hours for next to nothing and actually have a good time doing it. The brass decided that this was all reason enough to hire Atari to modify Battle Zone to their specifications. The \$15,000 MK-60, as it is known in Army circles, is a far cry from its \$3,000 arcade predecessor. Instead of generic tanks, there are line drawings of Soviet and American heavy metal. The controls, almost identical to those of an actual tank, stress magnification and new, improved steering. Three kinds of ammo can be fired, not one; 30 programs have been stored, not one. The MK-60 is an ultimate video game. It is presently under the Army's evaluation.

## The Classroom Arcade

Video games of another kind are also just beginning to make an impact in the progressive realms of children's education. Children suffer few of the fears and anxieties that adults have about computers. They tend to see computers as essential and ordinary a part of their existence as are television, Sony Walkmans, and talking clocks. Educators, though slower than the kids, have recently started to make the connection between computer technology and the burgeoning video games phenomenon. The result is a growing number of computer programs that carefully blend learning skills and game challenges, sound effects and

realistic graphics. Taking the lead in this area is none other than the Children's Television Workshop, which is best known for creating **Sesame Street**. CTW first began toying with computer games in the Computer Gallery at Sesame Place, the unique "play park" that's located just outside Philadelphia. In operation since 1980, the Gallery, which already boasts an inventory of more than 60 games, has quickly become the largest collection of electronic educational programs in the country. Ranging from simple word- and image-identification puzzles to hard-core sports games (whose major educational contribution is the sharpening of one's hand-eye coordination), CTW's educational arcade has convinced hundreds of kids that learning can be a lot of fun.

"CTW's software," according to Paul Firstenberg, the Workshop's executive vice-president, "transforms the TV viewer into an active participant, programming what is seen on the screen and talking back to the set at your own time and pace." Buoyed by their obvious success, the Workshop has reached an agreement with Apple computers to publish many of these games for use on Apple's home units. "This is our first step into electronic publishing," says CTW president Joan Ganz Cooney. "This deal has the potential for one day having as much impact on the informal education of children as CTW's TV series is having on broadcast instruction."

Researcher Tom Malone concurs. In a study titled "What Makes Computer Games Fun? Guidelines for Designing Educational Computer Programs," he resolved that "new educational applications will use . . . computers to make learning more efficient, interesting, and enjoyable." For his data, Malone interviewed students in computer classes, asking them to rate their favorite games. He then set out to determine why one was more popular

than the other. Whether or not the game had a goal proved to be the key factor in the ratings. (Breakout, for instance, ranked high among the 25 tested. However, when Malone reprogrammed the game and stripped it of its primary challenge — that of breaking through the wall — students totally lost interest.) Goals were followed by audio effects, point totals, randomness, and graphics. In a checklist for designing such programs, Malone posed these provocative questions: "Does the activity have a clear goal? Are the goals personally meaningful? Does the program include hidden information selectively revealed? Does it include an emotionally appealing fantasy? Does it provide a useful metaphor? Does the program include constructive feedback? Surprises?" He also raised the rarely-discussed topic of self-esteem in terms of how games affect the players' psyche, which is as much an educational concern as recreational.

"Success in a computer game," Malone writes, "like success in any challenging activity, can make people feel better about themselves. The opposite side of this principle is, of course, that failure in a challenging activity can lower a person's self-esteem and, if it is severe enough, decrease the person's desire to do the activity again."

Has Malone stumbled upon the one thing that can reduce America's video games fever — negative feedback? Maybe all we have to do is have designers program games so intricate, so fiendishly impossible to get better at, that our collective self-esteem will drop like an asteroid in the California desert.

But, seriously, banning games is no solution. Bans usually inspire greater interest. What has occurred in Mesquite is a travesty; what has happened in Oakland and Milwaukee is more reasonable. And if we look at the

Children's Television Workshop for an example, we see that the games can be a positive, even exciting, educational experience. That's a whole lot more like it should be, don't you think?

**NEWS FLASH:** On February 23, the Supreme Court decided **not** to decide whether Mesquite, Texas could ban Alladin's Castle and the playing of arcade-type games. The Court remanded the question back to the Fifth Circuit Court of Appeals, saying:

Because learned members of the Texas bar sit on the Court of Appeals for the Fifth Circuit, and because that court confronts questions of Texas law in the regular course of its judicial business, that court is in a better position than are we to recognize any special nuances of state law....

Speaking on behalf of the Amusement & Device Manufacturers Association, counsel David Maher notes that the decision to remand was caused by ambiguity in the appeal court's judgment. Maher added skeptically, "I think the Supreme Court likes to duck difficult decisions. I shouldn't be surprised, but I am."

The matter returns to the Court of Appeals, where they will attempt to clarify their position. That could take at least a year.

# 8

## Future Flights

Ten years have passed since the first commercial video game was introduced. In the trip from Pong, which simply instructed the player to “avoid missing ball for high score,” to Tempest, with its 99 skill levels, exotic enemies, and incredible geometric landscapes, we have witnessed an evolution so rapid and fantastic that it would seem that things just have to stop — it must be impossible to keep on like this.

Well, it's not only possible, it's probably going to get faster. What people fail to realize is that just as they're warming up to the latest video trend, labs full of researchers, designers, and engineers are already drawing up the plans for the next one.

## What's Next?

Graphics, video experts agree, is where the next great strides will be made . . . and soon. Apparently, what we shall see will have little relation to what we've looked at so far. To the experts, simulations are the look of the future.

Since the mid '60s, when computers became capable of digitally generating three-dimensional objects and this 3-D effect began being applied to flight training, the art of computer simulation has advanced dramatically.

Singer's Link Flight Simulation Division, for instance, has developed some extraordinary visual systems so that pilots can practice takeoffs and landings (without wasting gas) and emergencies (without cracking up expensive airplanes). When you're sitting in one of these simulators, you look out cockpit windows (CRTs) at an uncannily realistic landscape; your instruments register all your flight indications; you hear your engines; you feel the tilt, lift, and drop caused by your control outputs. In other words, you're flying. The experience can run all the way from takeoff to engine shutdown.

Ed Rotberg, whose *Battle Zone* was the game industry's first true three-dimensional program, has been closely following Singer-Link and the other simulator builders' efforts. "I would hope that someday in the near future," he says, "we'll be able to do even better simulators than *Battle Zone*. But before we can match the military and industrial simulators in the arcades the price has to come down. Either that or people will have to be willing to pay more for certain games. Today, the state of the art includes video-imaging and three-dimensional displays; these will be happening in the games very soon.

## Enter Tron

Full-scale computer animation for entertainment purposes — while not yet affordable on the games level — has recently hit Hollywood hard. Computer animation, in fact,





takes the tedium out of this medium. In the past, to animate something, artists had to draw, color, and photograph 24 frames for each second of an animated feature — whether it was **Snow White** or a Popeye cartoon. Today an artist can sketch a scene, sketch a character, tell the computer the details of the scene and where the character should go, and the computer takes it from there. The result is mind-boggling — shadings, shadows, elaborate scenery — the artists can be as realistic or fantastic as they desire.

Disney has become the first major studio to take full advantage of this new technology with **Tron**, a futuristic film set primarily in the electronic fantasy realm of a video game. Scheduled for a July release, **Tron** is the first of several upcoming video games movies. **Starblasters**, a CBS Theatrical Production, is another computer-animated game movie; it should arrive in your neighborhood theater by Christmas 1982.

**Tron**, though, is every game player's secret fantasy. It begins in the real world and concentrates on a communications conglomerate akin to Atari; there's a demonic executive who rules the company (David Warner) and Flynn (Jeff Bridges), a possessed programmer who demands the return of his stolen software. Flynn's attempt to retrieve his games from the company computer results in his being zapped into an electronic world **within** the computer.

Three of the country's top computer graphics houses — Information International Inc., Magi Inc., and Digital Effects Inc. — created the incredible landscape that is the heart of **Tron**. Turmoil reigns within the computer's electronic civilization. Its inhabitants are in a constant state of war as they seek to liberate themselves from Tron, a security program that controls their lives. Where Bridges fits into this scenario is a bit unclear, although he is there leaping from holographic grid to grid, from one titanic battle to the

next. One sequence, dubbed the Chase of the Life Cycles, is an awesome geometric display — something like playing Qix for keeps. Whether Bridges ultimately recovers his games or the electronic slaves do break free of their chains are points you might better enjoy learning for yourself when you see the film.

Richard Taylor heads up Information International's Entertainment Technology Group and also oversaw the design and programming of *Tron's* computer graphics. He explains, "We've been inside the brain, taken fantastic voyages, and been to space and back. It's time for a new fantasy. Steve Lisberger (the screenwriter and director) came to us two years ago with an idea about sports in the future. This evolved into an investigation of video games and as Steve learned the nuances of the new technology, the concept went from an electronic-games world to a computer-simulated world, which is where the technology is really at."

Looking at the future of the games, Taylor speculates that the "graphics will be amazing. Instead of line drawings (vectors), raster images will be shaded so that objects, for example, will look real and can blow up into realistic pieces. Bigger memory chips are the key to all of this." In addition, Taylor foresees an entirely new type of arcade. "A central processing computer that is capable of doing very complex computations will run the whole center. The games will become more environmental. You'll literally get *into* the game and drive through the desert — rolling over sagebrush, passing cactus. Or you'll fly over it, like in an Air Force F 104 simulator. There might be four screens lined up side by side, surrounding you. And the booths will shake, rattle, and roll, not to mention talk to you. Again, it's all in the chips — the denser they become, the more memory they have, the more exciting the games will be."

Games manufacturers have already begun to employ bigger chips than ever before, and there's nothing to prevent them from moving ahead. "Smarter" chips with four times the memory cost only a fraction of what they did a year ago. Since 1970, when the first 1000-byte chip was introduced, the semiconductor industry has managed to double the amount of information a chip can handle, increase its speed, and cut the price nearly every year. Lately, there's even been talk of a chip that will be able to cram more than one million memory cells onto a single chip the size of a fingernail. What does all this mean to games players? The greater the memory, the greater the number of computations, decisions, and moves can be made at the press of a control button. Better action, more sophisticated visuals, the ability to move more objects independently — all the things players love — are happening right now.

Incidentally, Midway plans to release an arcade game based on **Tron** this spring. Though Midway's marketing vice-president, Stan Jarocki, would say little about the project, he has boasted that Disney contacted them. Dave Nutting, who designs games independently for Midway, has conceded that Tron will be a color X-Y-type game that duplicates one of the movie's landscapes. Mattel is also in on Tron. Two cartridges — Deadly Disks, which features Flynn in grid warfare, and Mazatron, an adventure — should be available by summer. Nobody's ready, however, to say when we'll be able to fully duplicate Jeff Bridge's trip inside the computer.

## Hardware Wars

It shouldn't come as a surprise that Ralph Baer, the video games pioneer, has also taken an enterprising interest in inexpensive simulations. His experiments, however, have been of a different variety than the sort of spectacular computer animation Taylor extols. Three years ago, Baer constructed what he describes as an "Interactive Video Games System" by interfacing a game machine that he built "from scratch" to a videotape recorder. After first producing an actual color videotape of a pinball game field as a background, he then generated the balls, flippers, a few extra bumpers, and the score with microprocessors. Buried on the tape were the necessary digital data to position the synthetic objects against the pictorials. Though he has patented this system, it has never been sold for commercial use. However, Sanders Associates, Baer's employer, has gone ahead and dealt it to the Army.

"During the course of demonstrating it in-house," Baer explains, "some of the military people walked by and asked, 'Can you make it shoot at Russian tanks?' I said, 'Sure.' Three months later we converted the system so you could stand five feet away from a seven-foot Kloss projection unit, have Russian tanks zip by on a papier mâché landscape that looked just like Vietnam, and zap them by pointing a rocket launcher at the screen. When you combine video — which is very cheap to make — with small, personal computers, you can do all kinds of great things."

Some California tinkerers are taking Baer's idea and running with it. By interfacing small computers with videodiscs (which can respond faster, contain more information in a much smaller space than a videotape, and won't wear out if played again and again), they hope to create a

whole new genre of first-person adventure games. The idea fits right into Baer's credo: "I'd rather look at realistic graphics than stylized, computer-generated symbology anytime. Wouldn't you rather play a fantastic space game against backgrounds that look like a Lucas movie than what we have out there now?" You may get to do just that — and maybe Baer will get the credit he deserves if this new technique creates as much of a stir as his first venture into video gaming.

## Home Machine Magic

The arcades aren't going to get **all** the action in years to come; people are going to be looking for more sophisticated, more challenging home video games. Although unit sales figures have yet to overwhelm Wall Street, at least one financial analyst whose task it is to observe the entire home games market believes that people will shortly "realize they should buy a computer, not a games system." Says Harold Vogel of Merrill Lynch, Pierce, Fenner & Smith, "Home games will evolve with home computers."

Vogel's ideas about the future of home gaming are more skeptical than most. While some are wildly predicting that one third of American households (27 million) will be equipped with games units by 1985, he casts a somewhat dimmer light on the living-room arcade scene. "The unrestrained growth will come to an end," Vogel projects. "The growth rates will have to come down — they're unsustainable. All the software talk is very nice, but people forget it takes a lot to produce hits. And even though Activision has proved to be a good second supplier of games, you can't assume they'll all (Imagic, Coleco, Parker Brothers, Milton

Bradley) do well. There will be casualties as the business levels off, which should be fairly soon. The early entrants and only the companies with real know-how will survive.”

Vogel may sound like a real pessimist, but you have to remember that he's talking about the growth of home **gaming units**, not home computers. Electronic games are serving an important purpose today. They're habituating people to a computer in the home — a crude one, but a computer. After a while, people may get tired of having an electronic wonder that's so simple (or so lobotomized) that it can **only** play games. When these owners figure out that real, full-bore computers can play games even better than the game machines, plus do anything else they dream up, the boom will really be on.

For example, few consumers realize that Atari's low-budget computer, the 400, is a superior game player. “The 400,” says Joe DeCure, formerly one of Atari's designers, “is a great games computer disguised as a personal computer system.” If you compare the 400 to the Atari VCS you'll never go back. Playing Pac-Man on the 400 is a revelation — the graphics, the sounds, the control qualities are so good that you'll probably never even go to an arcade again. And this is just the tip of the home computer iceberg.

Once you have one of these little electronic brains in a box and get to the point where you can run your family budget, a little bit of your business, a mailing list, French lessons for Mom, or calculus for the kids, there's a whole new world of games out there that you'll never find in the arcades. With a real working computer you can try adventure games that are akin to Dungeons'n'Dragons and take hours, days, or even weeks. You can hook yourself up to a computer network and get new games, or just go shopping for a worthy opponent. You can even join the Pentagon

brass and work out your own wars — any conflict from the Norman Conquest to the Battle for Beta-5. And it can all be done in the comfort of your own living room.

But back to the arcades, where — at least for now — the action is. The same pattern that Vogel is forecasting for TV games will, in all probability, surface in coin-op as well. Although no analyst has been bold enough to predict it, the astronomical profits of the last three years should shortly shuttle back to earth. The industry's \$6 billion take in 1981, however, inspired such a media blitz that it has forced realistic reflections about the state of the industry behind closed doors. Nevertheless, the business need only look back to three years ago, when pinball was suddenly again the rage. "It's hard not to notice," wrote the **Wall Street Journal**, "that the pinball machine is making a comeback." It's easy to perceive how quickly that comeback faded.

## A Peek at Pinball

For those of us who aren't absolutely obsessed with video games, there's one necessary question — Is pinball dead or is it only sleeping? Although pinball's earnings per machine have stayed steady over the last four years, operators are buying fewer and fewer machines. In '81, six pinballs were bought for every 50 videos, which was twice the average 1980 purchase rate. According to Roger Sharpe, author of "Pinball," the manufacturers have let the players down. "Let's face it," he says. "Pinball has stagnated while video continues to refine itself. Playfield design has become almost completely predictable, and the challenges are the same. Pinball didn't keep up its end of the bargain

and players turned away to try the new TV challenges. There's a lot of gloom and doom right now, but I think all that's needed are a few strong, exciting pieces to bring back some of the enthusiasm and interest to pinball."

Over in Chicago, where pinball has taken a backseat to video, they haven't exactly been twiddling their pinkies. Williams, for instance, would like nothing more than to salvage whatever is left of the pinball spirit with their newest creation, Hyperball. While it's not quite pinball, neither is it video. Maybe we should let them explain:

"We decided to manufacture something with a pinball cabinet and a video concept," says spokesman Ron Krause. "The result was a kind of electromechanical Space Invaders." The object of Hyperball is to protect your "energy center" from an advancing army of lights by shooting actual balls (as many as 250 per minute) out of a cannon. Triggers are where the flippers would ordinarily be. When certain targets are hit they reveal additional clues on how to avoid and, of course, destroy these luminous aliens. Says Sharpe, who was allowed a sneak preview, "It borrows more from video programming than pinball. If anything, Hyperball's an old rifle game enhanced by solid state electronics."

## Digital Warriors

So what does all this technobabble mean for those of us who want to drop our quarters in a machine and get away from it all for a while? Let's take a quick look at some possible futures.

. . . Bob rolled his tiny jet fighter out of the loop at 12,000 meters, hit the glowing mutant ship that appeared in his



sights, and dove hard for the ground. Riding just a few feet in the air at mach 3 stretched his skills and the terrain-following radar to the limit, but he'd be off the enemy's detection screens just long enough to set up another hit-and-run kill. Before he could congratulate himself for being so smart, however, he caught a glimpse of the missile site that the mountain hid. Damn, shot down again. Warily, Bob undid his harness and popped the Takasita Tie Fighter canopy to return to the noise and flashing lights of the arcade. This was the highest score he'd ever gotten, but he thought he could do a little better if he could perfect his pop-up move. As he climbed out of the cockpit he started looking for someone to make change for him.

. . . Lisa sighed when the computer finally signaled that all the bills were paid. If only the box could get a job to pay all these bills, things would be so much easier. With business out of the way, though, she was impatient to get back to the Cave of the Winds. She logged onto the GameNet and was pleasantly surprised to find everyone already waiting for her — Snooze the Wizard greeted her in her usual drowsy fashion, while Mary the Monk and the tiny thief Janet just nodded. This is a good group, Lisa thought. We'll surely win through to the treasure. She reached back to check that her bow was strung and ready. A Warrior must be prepared.

You can always spot a dueller — he'll have a pair of custom sensor gloves tucked into his belt. Bill had already pulled his on when he stepped into the flashy Sternwarner Duelling Booth. He quickly told the machine his name and which account to bill the game to. Reaching out to touch the screen, he whispered "duelling grounds"; immediately the familiar sandy plain with its ring of glowing doors appeared on the booth's wraparound screens. While he waited for his

opponent, Mad Em, Bill checked out the doors, touching each one and whispering a place and time to make sure that he could jump through any of them and not end up stuck behind a Dead End Door or in a Limbo Lobby — the two surest deaths a gamer could face. As he peeked through the last door at the pre-Cambrian jungle clearing he had called up, he saw Mad Em entering the other end of the ring. The chase was on. Today he was sure he'd beat her and put his name up in lights.

Now, all of these are admittedly not going to show up in the arcades in the next month or so, but Bill's Duelling Booth and Bob's Tie Fighter may not be as far down the road as you might think. The Duelling Booth is a natural outgrowth of Baer's work with videotape and the work going on right now with videodiscs. The Tie Fighter is just an arcade version of the simulators that you'll find in any flight training school gone berserk. Lisa's GameNet already exists, as does the computerized version of Dungeons'n'Dragons that she was playing — though the present versions are not quite so interactive.

With these kinds of amusements in the not-so-distant future, can anyone still believe that video and computer games are just a fad? If you find someone who thinks so, ask him if he'll bet his last quarter.

# BEATING THE GAMES



# Raiding the Arcades

## CENTIPEDE

Centipede is an all-organic version of Space Invaders. Instead of pursuit by aliens, mutants, and robots, the player is attacked by bugs, spiders, and fleas. And instead of a background with computerized versions of outer space, we are given a neat, almost pastoral setting. Same difference. You shoot, you score, you gallantly defend your space (excuse me — pasture), and you suffer from the same anxiety when you lose. Is there really a difference?

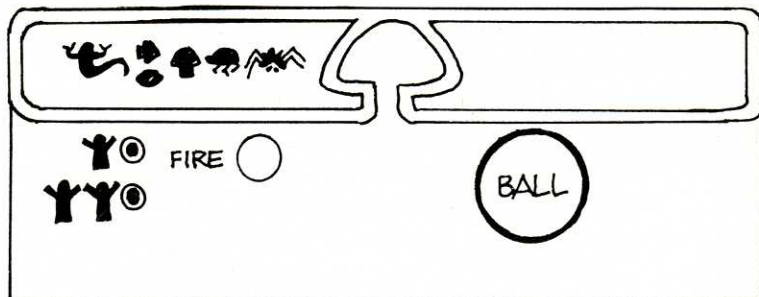
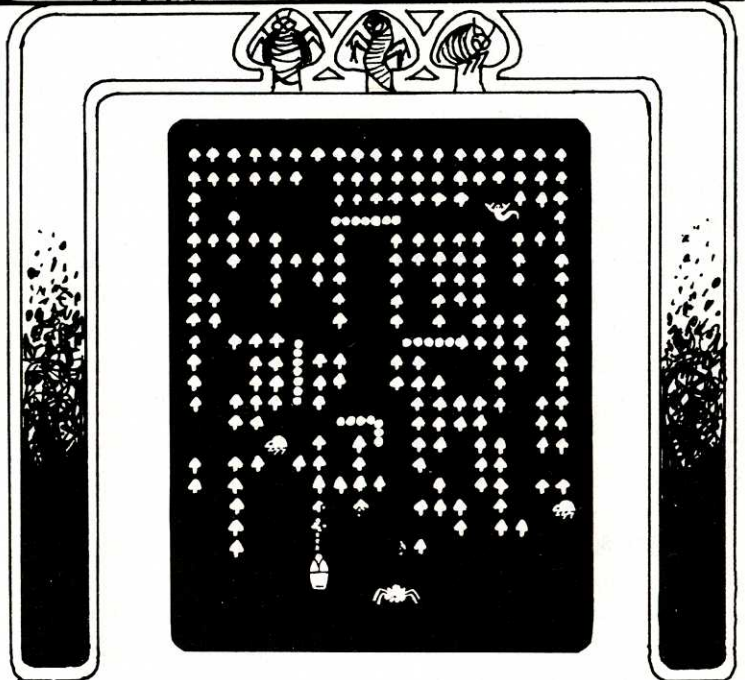
Atari's Donna Taylor, who programmed the game (which is currently Atari's second-best seller at 50,000 — and still climbing), insists that space does not have to be the place. "I've never been into science fiction," she says. "That's probably interested me less than almost anything I can think of." Interestingly, her boss, Lyle Rains, when asked about Centipede's success replies, "You're probably talking to the wrong person about this. I never really cared for it." Pressed to explain the game's appeal to women, Rains contends, "We didn't do anything in particular to achieve that. The major portion of the marketplace is still

male, so we're not looking to do anything that would alienate them. I can't start putting an emphasis on just attracting a female population. We will, however, try to maintain a graphics level that doesn't offend female tastes, if possible."

Like it or not, Centipede **has** attracted women — and mostly for its graphics, especially the lively selection of primary colors. What you initially see is a green field of mushrooms, a pink centipede, and a purple spider. What you get is a gun that can be maneuvered about the bottom fifth of the screen, a miniature Trak Ball (actually a cue ball), which allows for tremendous mobility and shooting accuracy, and a rapid-fire button. If the button is pressed continually, the gun emits a barrage of ammo; however, as in all shooting games, the first shot must connect with either a foe or the top of the screen before the second can follow. Nevertheless, it is quick and also less work for those weary digits.

Centipede is simple. The segmented worm starts at the top and snakes back and forth at progressive speeds until it is either shot or reaches the bottom. At this point, it begins to climb back up, though it will never leave your territory again. Mushrooms impede its course, forcing it to turn back, hop rows, and zigzag a bit. The bug does not shoot; its objective is to stomp all over you. You prevent this by shooting away the mushrooms (for one point each) so that you can aim clearly at the centipede, which begins in twelve segments and can be split into pieces. Splitting the bug up is not generally advisable; in doing so, you then must follow two or more bugs, which just complicates matters. But this is sometimes unavoidable.

There are three other nemeses to watch out for. First and foremost is the spider — it inhabits the player's zone



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and, bouncing diagonally and vertically, is truly a pest. Worth from 300 to 900 points (depending on how close you are to it when you shoot it), the spider is confined to an even smaller area after 60,000 points. Like the flea that is introduced in the second round, it can kill you if you can't slip out of its path. Fleas are less problematic. They divebomb straight from the top of the screen whenever there are five or fewer than five mushrooms remaining in your zone. It takes two shots to kill a flea (it takes four to destroy a mushroom). A dead flea leaves a trail of mushrooms in its wake; replenishing the field seems to be its main purpose. Lastly, we have the scorpion. Its purpose is to poison every fungus it touches as it crosses the field (about two thirds of the way up the screen) from the fourth round on. When the centipede bumps into one of these poisoned mushrooms, it dizzily drops to the bottom. If you're quick enough, you can use this to your advantage by waiting for the bug's vertical descent and picking off the segments one by one with rapid-fire.

Here's more of what you need to know:

- Each centipede has one head, with eyes, that is worth 100 points. Each time you knock off a head a new one appears.
- After the first round, an 11-piece bug will emerge along with one separate head. In each of the next ten rounds, the bug will reduce in size by one segment but will be augmented by another independent head. Hence, by round six the bug will have decreased to seven pieces while the head count climbs to five. Get it? By the 13th round, the initial cycle begins again, but the centipede is moving much faster.
- Partial and poisoned mushrooms on screen at the end of a round count for five points each. They are

- added to your total before the next round begins.
- You know a mushroom's been poisoned because it changes color.
  - Whenever a bug section is shot, a mushroom is left in its stead.
  - Spiders erase all mushrooms they touch. No points.
  - The longer you take to clear out the bug from your zone, the more heads are released — also into the zone. Almost all lives are lost this way.

**Tips:**

- Don't overuse rapid-fire. At times it is better to use just one shot for extra accuracy and control.
- Shoot for the head of the centipede. The more heads, the more points.
- Take advantage of certain mushroom formations. When bugs are forced to drop steadily instead of shifting to the left and right, this is your chance to wait for them; this is also the case with the poisoned bug. Here's where rapid-fire is of greatest value.
- Unless you're going for points rather than playing time, leave the spider be. Just avoid it by moving to wherever it's not. The same goes for fleas, although you should be concerned with the mushrooms it plants. However, the best method to prevent fleas altogether is to leave more than five mushrooms in your zone and just work around them.
- When in trouble in your zone, don't panic. Remember Space Invaders — especially that last sprinting alien? Stay put in one spot and hit whatever's after you. Trying to following any of the game's high-speed threats will only get you in more trouble.



## SPACE INVADERS/SPACE INVADERS DELUXE

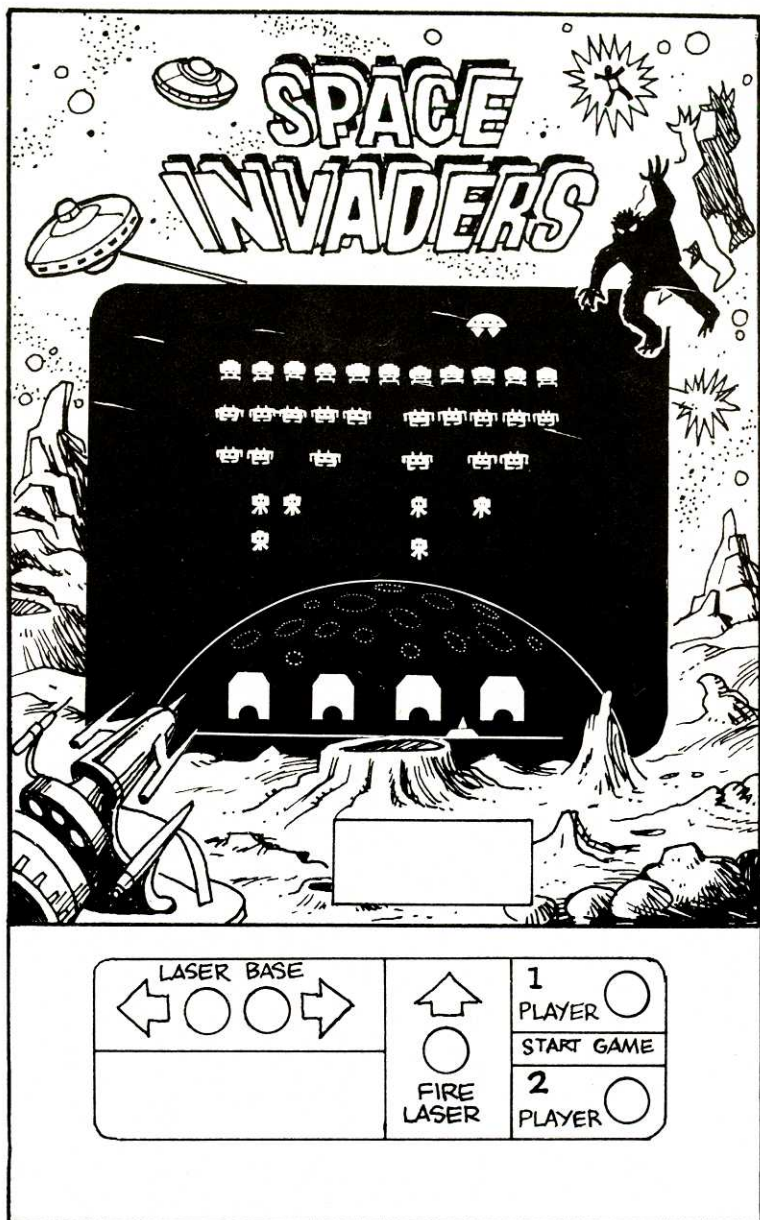
“When I retire,” Walter Cronkite once said, “I’m going to fill one room with nothing but pinball machines and electronic games and just sit there in the dark — playing Space Invaders.” Could this Japanese confection have hastened the grand anchorman’s retirement? And does he really play in the dark? Hmmm . . . .

Space Invaders is the original laser-base game, although conceptually Progressive Breakout did precede it. The idea is to defend your base by moving a shooter side to side at the bottom of the screen and destroying the alien force that charges down after you. You begin with three shooters (or lives) and can only achieve one bonus, but these are all for naught if you can’t repel the invaders. Anyone who’s ever played knows the feeling of losing your remaining lives because your defense was so awful. Space Invaders is an almost hopeless task that builds tremendous self-control while decreasing your bank account.

### Space Invaders

If there is still a machine standing in your local arcade, this is what you need to know:

- There are 55 invaders per screen, totaling 990 points.



Space Invaders is a trademark of Midway Manufacturing Company.

- The only other source of points is the UFO that crosses the top of the screen every 25 seconds. Its value varies from 50 to 300.
- Count your shots. The 23rd shot, and every 15th afterwards — if used to explode the UFO — is worth 300. Also, the 5th shot and 11th afterward count for 150. Otherwise the UFO only goes for a paltry 50 or 100 points.
- To shoot at UFOs you must clear a path vertically through the wall of invaders. Start at the left and continue to the right; do this for at least three rows. Now, you have a safety zone to shoot through and hide in; you have also slowed up the invaders.
- Your only other defense consists of four blockers that look like rhinoceros rumps. Both you and the invaders can shoot your way through them.
- The first screen is the easiest, so go for as many 300-point UFOs as possible. Claiming 8 is great; it affords you a maximum first screen score of 3,390.
- The second screen starts one row lower and closer to your base. This continues until the tenth screen, when the invaders return to their initial attack point.
- By the fourth screen, forget about the UFOs and totally concentrate on the invaders. Use this method to ward them off: Once again clear the left-hand rows, but remember to leave one invader intact at the very top of the far-left row. Carve the invaders into a four-by-six rectangular box and then allow them to descend as far as the second-to-bottom row. This, in player's parlance, is known as "death row"; it is where the invaders are suddenly stripped of their guns. Cruise underneath them to the far right and, shifting back to your left, pick the bottom aliens off

one at a time. Return to your safety zone and wait for the next battalion to drop into “death row.” Repeat this technique until all that’s remaining is the lone invader. It has served its purpose, which was to prevent the block from moving to the far left. Now it, too, must die — blow it away!

- This last invader, and all previous lone invaders, are marathoners with a terrific kick. For whatever reason, they move quicker from left to right; therefore, sit tight and aim for them when they’re chug-a-lugging in the opposite direction.
- In the later rounds, accuracy is key. Aim for the outside of the invader, since he fires from the middle. This will prevent ammo collisions from occurring in midair and enable you to disable the army faster.

## Space Invaders Deluxe

This game is more of the same, but with a few neat tricks.

- Counting only matters on the first screen. Afterward, the UFO flashes on and off. Whenever a UFO is hit, 200 points are added to your total.
- On the second screen, the invaders show an uncanny ability to stay alive — when shot, they often split in two like ghouls. They then pulse with the beat of the machine, expanding and contracting in a way which requires not only swift but well-timed shooting.
- During screen three, the UFO attempts to bolster the troops as new invaders skip out of the ship’s belly. Hitting the UFO will stop this maneuver; tagging

a new alien in flight can also drop it to the bottom of the screen on its side. (Unfortunately, it doesn't bleed — not that you can detect, anyway.)

- The last stupendous effect is the rainbow explosion that no one ever sees. Only marksmen get to experience this. If you can somehow clear the rows, **except** for one invader in each of the first two rows — they go last — you receive a 1,000-point bonus and the visual treat of a rainbow display. There may be greater rewards in this life, but not many.

## GALAXIAN/GALAGA

Galaxian was the breakthrough laser-base game, not Space Invaders. Galaxian's aliens were suddenly freed to move in constantly changing patterns from the top to bottom of the screen; they were no longer confined to lock-step rows. Galaxians don't just march — they divebomb . . . and look good doing it. Sega's Astro Fighter came along next and kind of jitterbugged; Nichibutsu's Moon Cresta was more of a ballet; while Taito's Stratovox performed a crasser two-step. Rogers and Astaire they'd never be, but a whole soft-shoe trend had emerged and Galaxian was solely responsible for it.

### Galaxian

Galaxian begins with a force of 46. Green (30), purple (40), red (50), and flagship or Boss (60) aliens waver back and forth before the onslaught commences. By waiting for them to peel off and zigzag toward your base, you can claim them for double the booty. The flagship, however, is your main point source. Shoot it during a solo descent for 150; when it's being protected by one escort, for 200; with two escorts, for 300; and, if you can rattle all three at once, 800 points is your reward.

There's not a whole lot to Galaxian — no counting, barely any strategy, just quick eye-hand coordination. It's

particularly mindless as video games go, more of an exercise than anything else. But Midway must have known what they were doing — they built over 50,000 of them.

The little you need to know is as follows:

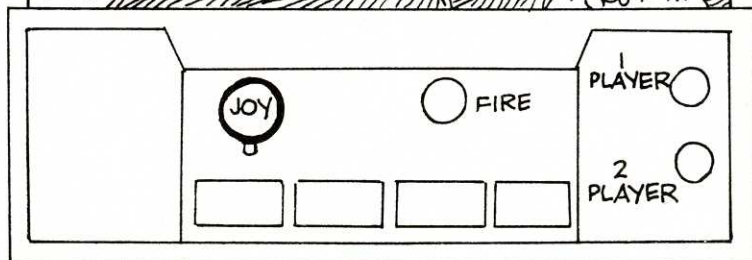
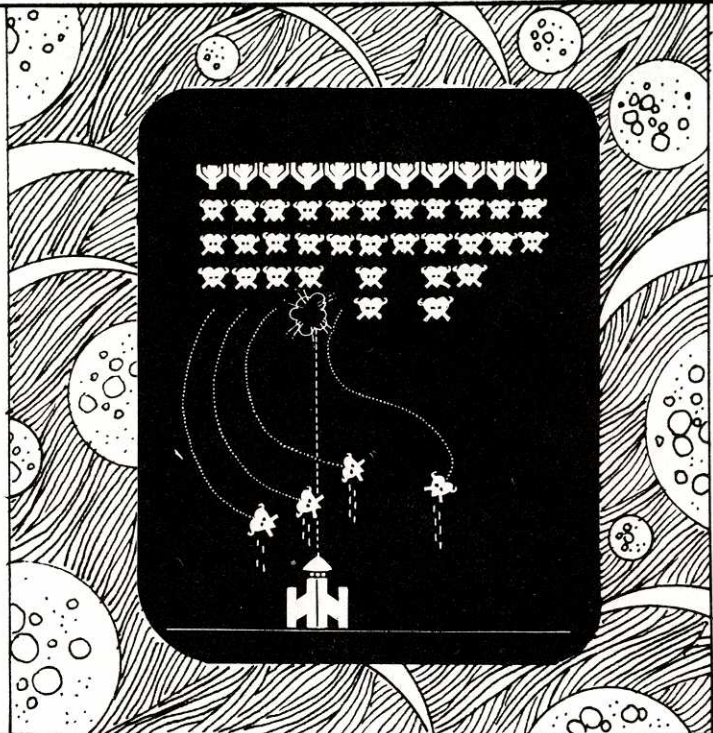
- No more than five galaxian warriors will swoop down at once.
- As the game progresses, they will make wider descents. Aside from gunning, you might want to stay far to the right or left, which can be somewhat safer than sitting out in the middle.
- The purple galaxians are particularly dumb when they switch direction. They suddenly slow down and don't shoot. Take full advantage of this weakness; it may be the game's only one.
- Try never to shoot the Boss while it's in formation. The 800 points may come in handy.

## Galaga

Nearly two years after Galaxian's success, Midway (by way of Namco) decided to release a deluxe model. Galaga may be the last variation on the diving space theme. This game is the arcade version of the Radio City Rockettes; its formations are fun to watch and it does have nice looks, but not a whole lot of substance.

Galaga begins spectacularly as the Galagans enter like baton twirls from either side. Without shooting, they position themselves in rows. You should immediately open fire. They soon start swooping and the game is on. Be careful in stage two, as they call it — sneaking onto the screen fairly close to your shooter, the Galagans blast away. The third (or “challenging”) stage once again has the Galagans dipsy-

# Galaxian



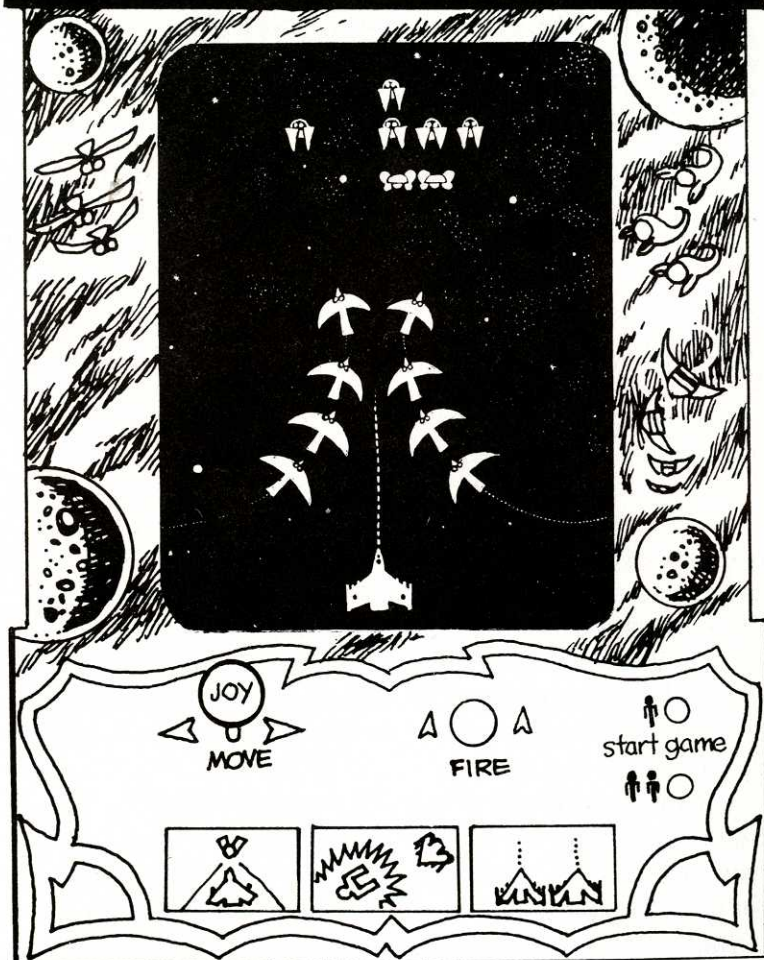
Galaxian is a trademark of Midway Manufacturing Company.



doodling around the screen, but not firing. What challenge? You just shoot till your finger hurts.

Galaga's big innovation is the Boss's ability to project a "tractor beam" which can capture your fighter. Whenever this happens, you are sucked up to the top of the screen. There you lose a life, but you are then deposited back on the bottom with double fire-power. You've lost a life but gained a partner, all in one elegant move. In tandem, you can tame the swarming Galagans a great deal easier. You might even want to swap lives for this extra might — that is, if you have the lives to spare. But remember: If the beam appropriates your last shooter, you're gone. Probably less risky is this tack: Go for the Boss before it releases the beam. If you hit it, you immediately convert to a double without having to give up one of your game lives.

# Galaga



Galaga is a trademark of Midway Manufacturing Company.

## ASTEROIDS/ASTEROIDS DELUXE/SPACE DUEL

Does everyone agree that without Asteroids there could never have been a Defender? Asteroids introduced button-play to the majority of Americans — and to the world, for that matter. Except for Space Wars (which was perhaps ahead of its time), controls were no more than three buttons, joysticks, or knobs before Asteroids. Asteroids sports five: left, right, thrust, fire, and hyperspace. To play, you must master the buttons first; without that basic skill you are literally up the creek sans paddles.

Like most superior games, Asteroids begat a deluxe; unlike most, its deluxe begat another: Space Duel. But let's go back a bit: Asteroids had a major flaw that allowed players to sit at a machine for thousands of minutes at a time. "Lurking" and "hunting" — two separate techniques — virtually killed the game. Players padded scores and stockpiled bonus ships, leaving a couple of rocks floating around the screen and then simply gunning for the smaller of the game's two UFOs.

Atari responded a year later with a machine that experts could barely score 50,000 on. Admits Rains, "When it came down to it, Asteroids Deluxe was a little too difficult for the average player. We tried to answer some of those complaints about people playing forever. We went a little too far." So far that, within weeks of delivery, operators were

insisting that Atari change the program by making it easier. Now that's a switch — the original Asteroids was reprogrammed to prevent lurking and hunting, which of course made the game more difficult. Deluxe followed that lead and added a few more tricks, which really gave even the hard-core crowd fits. Enter Space Duel.

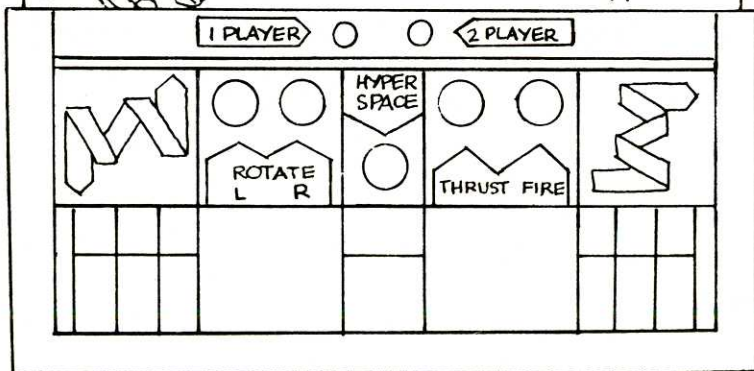
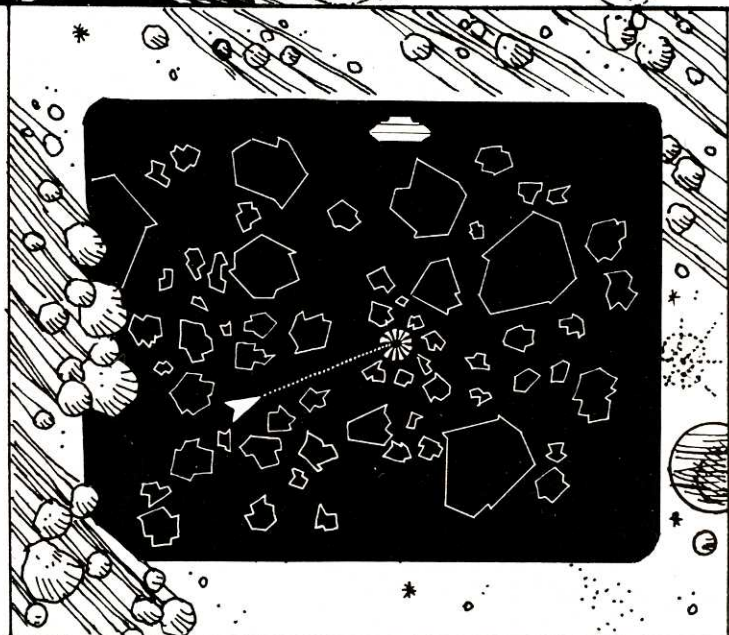
“Space Duel is the Asteroids Deluxe that never was,” says Atari's Frank Ballouz. “It's a player's game.” It is Asteroids, Tempest, Omega Race, and Eliminator all rolled into one. Seven geometric objects that split into smaller, similar objects when hit by a free-wheeling ship and menacing saucers remind one of Asteroids; its full-color vector graphics were pioneered by Tempest and Eliminator; a bounce-back effect, instead of wraparound ship departure and re-entry, had first been unveiled in Omega Race and Eliminator; and finally, its cooperative two-player format is also a feature of Eliminator and Rip-Off.

## Space Duel

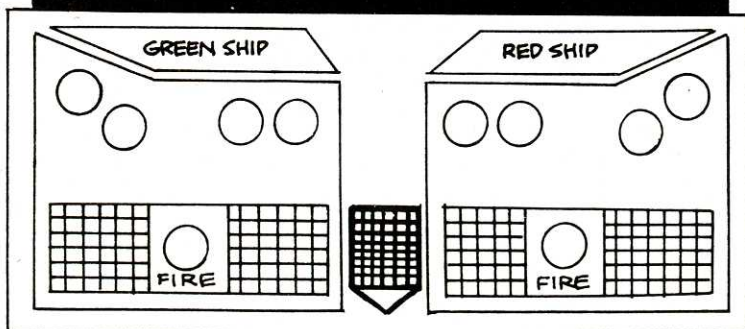
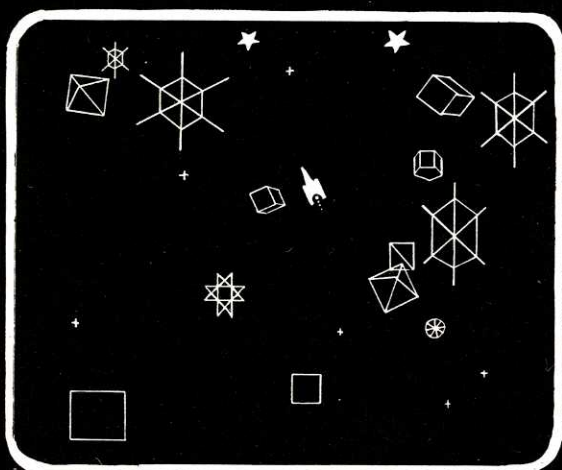
Space Duel offers four games: (1) one player, one ship; (2) two players competing; (3) one player with two ships linked together as a “space-station”; and (4) a two-player space-station. There are five buttons: left, right, thrust, fire, and shields (replacing hyperspace, as was the case in Deluxe).

- All splitting objects — from spinning cubes to octahedrons — are worth 20, 50, and 100 points, depending on size.
- Mines, which are represented by tiny plus marks, must be shot seven times before they are destroyed. With each blow they change color and are repelled

# ASTEROIDS

The title "ASTEROIDS" is written in a large, bold, stylized font with a 3D effect. To the right of the text is a spaceship flying towards the right. The background is a dark space with stars and a bright sun or star in the upper right.

Asteroids is a trademark of Atari, Inc.



Space Duel is a trademark of Atari, Inc.

backward. Mines are white by the sixth shot and are worth 100 points.

- There are two other stars that go for 200 and another octagon-shape for 300. A hardly-visible spinning saucer races about the screen, firing gunshots; it can also be had for 300 points.
- After all objects are destroyed, the “onslaught wave” begins. First you hear a humming sound, then a boundary line marks off a rectangular area inside the screen; this is meant to prevent wraparound shots. For approximately seven seconds you can gun for stars and fuzzballs and earn bonuses. Then the humming reaches a high pitch and the onslaught is over until the next wave.
- You can have as many as four shots on the screen at once.
- Your shield diminishes with use. It protects your ship from collisions and saucer fire, but when it fades, watch out.
- If you lose your life during the onslaught wave, you go directly to the next regular wave.
- Your ship reappears in the vicinity where you were last destroyed. You have an automatic shield for two seconds, which prevents immediate destruction (a liability in Asteroids).

The two-player competitive game allows the following:

- You can accumulate your highest points by shooting your opponent for 500 each time. This can be especially lucrative during the bonus level.
- You don't lose a life when you're shot by the other player.

- You **can** shoot the opposing ship and force it to “blink out” for five seconds while your ship continues to amass points. This a purely competitive maneuver.
- You return after “blinking out” with full shield power.
- A damaged ship can still function as long as the other player is still alive. In other words, if a player is out of lives he still can play — but with lessened mobility and fire-power — until the game is entirely over.

A space station is two ships strung together by a fuse, or “astral umbilical cord,” as Atari has suggested it be called. In the one-player version, the two ships fire in the same direction. Be careful not to thrust and rotate too quickly or you’ll spin uncontrollably. Due to this limited mobility, the space station has four times the shield allotment than in the solo flight games. In the cooperative version:

- Both players must work together to score. Individual and combined totals are registered at the top of the screen.
- Use of the thrust is a spatial tug-of-war. Since you won’t be able to move easily, don’t hesitate to use the shield.
- The first hit on a ship damages it. At this point, it rotates slower and only can fire one shell at a time. The second hit causes the fuse to burn. In a moment, **both** ships will explode. Hence, a damaged ship has to be protected at all costs by the functioning one. This may seem unfair; it’s even worse when you have a lousy player for a partner. The only way around this



is to make sure when you deposit two quarters in the slot that both of you are equally good . . . or bad. Otherwise, you probably won't be friends much longer.

The space station is the real twist on the Asteroids theme. Otherwise, Space Duel is a hunt-and-chase spectacle just like its predecessors. The tremendous number of objects floating around the screen in higher rounds is certainly Space Duel's greatest challenge.

## Asteroids

In Asteroids, you simply must:

- Split rocks and eventually destroy all but one so that you can either hunt or lurk.
- Be careful not to let yourself get within an inch (or less) of a large or medium rock, which, when hit, may explode in your ship's direction.
- Aim for the center of the rock. This slows it up and causes it to slither away.
- Stay away from the edges of the screen when it's crowded. You don't want to be kissed by a rock that has just wrapped around from the opposite side.
- Watch for UFOs appearing from the sides, usually high on the screen. They do not enter from the top or bottom.
- Take advantage of your ability to wrap shots around the screen. UFOs can't do this. (They can in Deluxe Asteroids.)
- Shoot UFOs as quickly as possible. The larger ones (200 points) only fire randomly. The small ones

(1,000 points) seek out your ship with smart bullets. Never stay still when one is on the screen or it'll get you. After 35,000 points, their aim becomes even more accurate.

- Be very selective about hyperspace. Three out of the four times you press the panic button, you'll wish you hadn't.

There are two ways to beat Asteroids. In both cases, the key is leaving less than three medium or small rocks on the screen; this forces the tiny UFO to reappear continuously. "Hunting" is the ultimate thrust method — aim your ship north and hit the gas. As you circle around the screen, watch for the few rocks left (when they are gone, the next round with big rocks starts and hunting is over — at least for the time being), but look mostly for the UFO. Since you're moving so rapidly it's nearly impossible for the UFO to get a fix on you. When you see it, release the thrust, turn in its direction, and fire. Your momentum will carry you off the screen, so don't worry about it tracking you down. The object of leaving more than one rock on the screen is to prevent the hunt from ending if you (or the UFO) accidentally hit one.

"Lurking" is less frenetic. Patiently sit one to two inches from either upper corner. Wait for the UFO to appear. When it does, since it's momentarily defenseless, open fire immediately. If the UFO appears in the opposite corner from where you're lurking, turn and fire off the screen. By wrapping around, you just may tag the UFO. Soon, you should be a pretty successful hitman. Perfecting either technique can result in bonuses of over 100 ships. **That's** how you get to go to the john when you're pulling a marathon.

## Asteroids Deluxe

Forget about marathons with Asteroids Deluxe. Masters who can easily score 200,000 on Asteroids barely push 50,000 on this somewhat vengeful game. Like the re-programmed Asteroids, which prohibited lurking and hunting by allowing the UFO to snipe at the remaining rocks, Deluxe is a video bully. UFOs can shoot wraparounds, only 10 bonus ships can be stored, and a new collection of foes join in pursuit of your ship. Hexagonal clusters, when split, become three diamonds; when these are split, they become two tiny wedges that home in on you. At 200 points apiece, you might be better off hunting for the wedges than taking on the new and improved UFOs — they're killers. For your additional information:

- Shields are useless when you're sandwiched between two objects. They can, however, be used to ram into a UFO for points. As in Space Duel, shields diminish with use.
- This time, the larger UFO shoots at the ship occasionally.
- When the last rock is wiped out, all of the other objects magically disappear and the next round begins.
- You can shoot rapid-fire.

## DEFENDER/STARGATE

Just when you thought it was safe to go back to the arcades, along came Defender. More buttons, more space, more smarts — who can cope? Well, I confess that I have yet to fathom this overgrown Asteroids, so I asked the game's creator, Eugene Jarvis: What is a poor, pitiful novice like me to do?

### Defender

Before I reveal the Grand Master's own words, let's first go over the basics:

- Defender has five buttons: fire, thrust, reverse, smart bomb, and hyperspace. It also has a joystick for moving up and down.
- Defender is a two-dimensional world. You circle it, moving sideways across seven landscapes. The mountains on the surface of the planet are not an obstruction, as in Lunar Lander or Scramble; they are the least of your problems.
- A scanner at the top of the screen tells you what's happening everywhere else in the world. It does not record fire or mines set down by bombers. Learn to watch the scanner as carefully as the scene you are in.

- The main objective in Defender is to prevent landers from abducting your humanoids located on the planet's surface. When all ten are gone, the planet blows up in the most incredible explosion you'll find in the arcades. You are catapulted into a space battle at this point. Wave five, if you can reach it, returns all your men. (The same applies to 10, 15, and so on.)
- As enemies go, the landers (15 appear in the first wave, 20 thereafter) are pretty lame. They don't do much attacking, but they'll steal your men pretty quick if you let them. When a lander (150 points) gets away with this, the man becomes a mutant (150) and comes back to haunt you. Mutants track you, firing incessantly. In the space battle, all landers are instantly transformed into mutants. For most players, the end is suddenly nigh.
- Green saucers named baiters (200 points) are your most treacherous foe. They not only track and shoot, but are faster than you. Baiters appear only when you have taken too much time clearing out the landers. They can be beaten, though.
- Bombers (250) are slower and box-shaped. Their essential purpose is to leave X-shaped mines in their path. Don't touch these mines whatever you do; they'll disappear shortly.
- Pods (1,000) contain a bellyful of swarmers (150 each), your tiniest rivals on the screen. When a pod is shot it releases the swarmers — which do just that. As many as eight can start coming after you at once.
- The smart bomb blows up everything directly on the screen. You begin with three and receive one as a bonus for every 10,000 points earned. (The same goes for lives.) Use them wisely, especially against pods and swarmers.



Defender is a trademark of Williams Electronics.

- Aside from the pods, the greatest way to accumulate points is by saving your men. If you find a lander stealing one, shoot the lander and then rush over to catch the man before it falls back to the planet. A safe fall is anything less than an inch; it scores with 250 points. You will, however, receive 1,000 for nabbing your man and depositing him back on the planet.
- After every wave you get a bonus. This is determined by the number of men left multiplied by the number of the wave just completed, times 100.

According to Jarvis, “First you must learn to fly. You have to go beyond sideways Space Invaders. By mastering the four flight controls you’ll attain freedom. At the start, however, I don’t recommend playing around with reverse. Just move to the right. Reverse causes problems — it makes you momentarily blind, requires you to redirect your vision, makes you weak. Start flying around the planet. Go right through the mountains. I decided that they shouldn’t blow you up because, believe it or not, I wanted Defender to be a friendlier sort of game.

“Fly low, just slightly above the surface. Stay in that groove and begin blowing a path through the landers. Don’t worry initially about saving men. That’s acrobatic, more advanced, one of the real rushes. It’s amazing, but don’t worry about it. Just drive and kill. Don’t fly too fast — slow down, take a few shots, and then continue on. Try not to let a lander go by you, but if it does, leave it alone. Save your smart bombs for the pods and swarms. Only use the smart bomb if you’re in bad shape. And hyperspace is the last resort.”

This advice should get you through the first wave, though it may not sound like much fun. As you move on to wave two, you'll need to know the following:

- The best way to kill baiters is to reverse twice, which dazes them; then adjust to their height and shoot.
- The best way to kill mutants and bombers is to steer ahead of them, suddenly reverse, adjust height, and shoot. Sometimes you can also nail mutants at the top of the screen, where they tend to congregate.
- In wave two you are confronted by your first pod. Shoot it from a healthy distance and smart-bomb the swarms. In wave three, there are three pods. Wait until they are all on the screen and drop another bomb.
- Oftentimes swarms escape the bomb (you know what they say about roaches and nuclear fallout). Swarms are small and hard to shoot at. Do a lot of reversing; nobody can reverse as quickly as you. Then line them up and shoot. (This sounds a lot easier than it is.)

Some interesting things you can do with your little men:

- Drop them off at the lowest point on the planet. (Give the landers as much work as possible.) Also, bunch them together so you know where they are and can watch them more easily.
- Let a lander steal a man, then blow it away (the lander, not your man); catch the little guy and return him to the surface. This is a quick source of 1,000 points. Repeat the procedure if you're good enough.



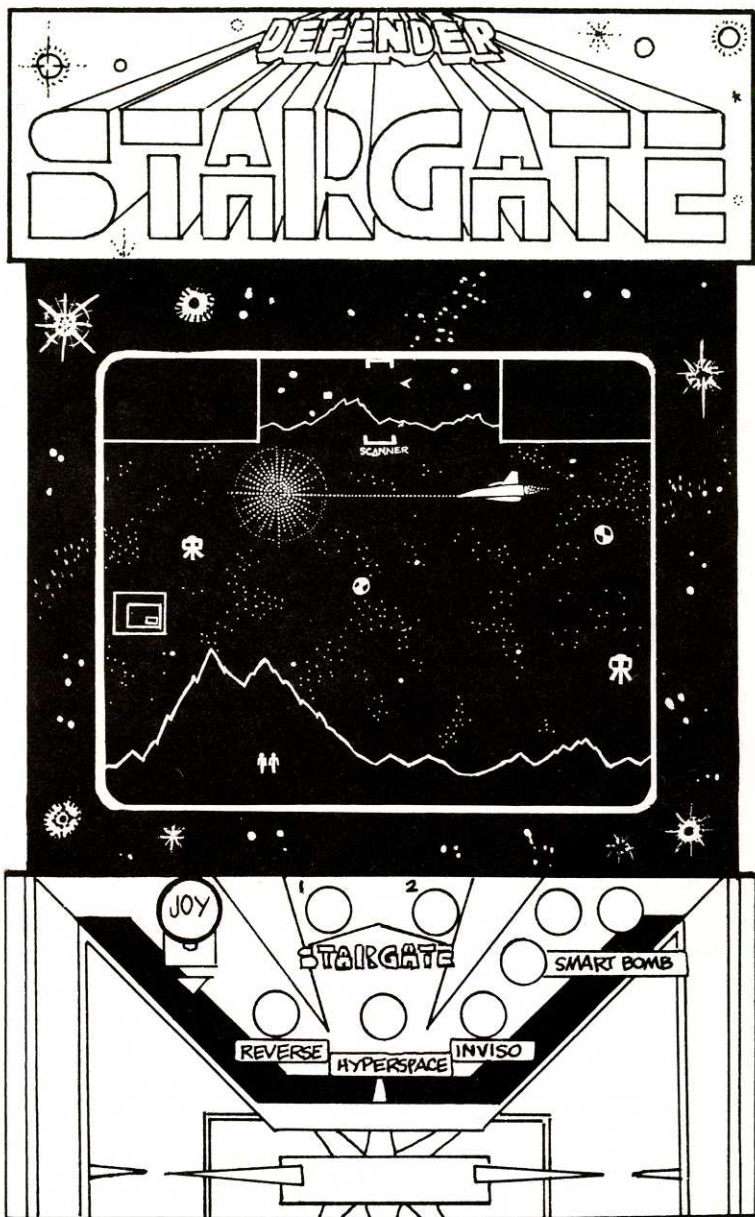
- If you only have one man left, let a lander steal it; then rescue the man and carry him around with you. The risk is that the wave will end and you'll not have received the 500 points for returning him to the ground. You will have saved your planet, though.

Defender's apocalyptic space battle is confusing at first. All your men are gone, the screen explodes, and suddenly you are situated in space, surrounded by the cast of horrific characters. Beginners seldom know what's going on. And before they realize it, the game is indeed over. Once in space, however, you do have a slim chance to survive. Since the fifth wave restores the planet and men, the game will continue on if only you can hold out till then. Here's where the smart bombs you have conserved will really count. Also, plan on doing some hyperspacing. I don't think Jarvis would mind.

## Stargate

Stargate is the deluxe Defender and, like all deluxes, packs a wallop. Although the first wave is easier than in Defender, the rest of the way is quite a bit more challenging. Added to the controls is one more button: the Inviso Anti-matter Cloaking device, which makes the ship invisible and invulnerable. This lets you destroy everything you touch, for a short while. Also, the scanner becomes a message board. For example, when there is only one man remaining, it reads, "Planet surface unstable."

Along with the Defender cast, in Stargate you now must tackle space guppies and Hums, Phreds, Big Freds, and Munchies. The accepted method of play is as follows:



Stargate is a trademark of Williams Electronics.

- Instead of wasting time and energy on the first wave, slip into the Stargate — a box-shaped time-tunnel that gravitates in the atmosphere. You will be “warped” to an area where landers are busily pilfering your men. Shoot them down, collect four men, and escape back into the Stargate. Next stop: fourth wave. For your work you’ll have received 2,000 points per man. Repeat this tactic and again duck into the Stargate.
- The fifth wave is similar to the space battle in Defender. The planet is gone and so are the landers and men. You are now faced with the Yllabian dogfight. With waves of new foes coming your way it is best to start using the Inviso. Since you’re invisible, scoot around the screen, hoping to bump into and knock off all of the attackers. After the dogfight, you return to the planet with a fresh supply of men.

## PAC-MAN/MS. PAC-MAN

The game-playing story behind Pac-Man is similar to what happened with Asteroids. The game became so popular that players have figured out systems to beat it every time . . . and for hours. You have to remember that winning in video games is subjective; although it may seem (regardless of how high you scored) that you **lost** because the game just finally ended, operators don't think that way. They look in the cashbox — and if you've played a long time for very few quarters, they figure you've won. At first, Pac-Man earned as much or more than any other video game ever has. But, then came the “pattern” people, who spoiled everything. Well, not exactly; for every machine that has been taken over by an irresponsible Pac-Master, the next one is coolly gobbling quarters spent by the uninitiated. Still, this trend is enough to send the manufacturers — in this case, Namco's designers — back to the boards. This is the real war in video games — between the players and the designers. And those designers are vicious. When they tinker, the game can speed up, slow down, and the ghosts can wander far from their old patterns.

Atari first responded with patterns, then a deluxe game. Midway has done just the same. For the longest while, Pac-persons have had to distinguish between slow (the original) and fast versions of their favorite pastime. One way of telling is by testing out your own proven pattern — if

it doesn't jibe, then you know it's the new game. Another method is simpler: Look for how many ghosts initially emerge from the "pen"; if it's two it's slow, three fast. But trouble yourself no more. Instead, play Ms. Pac-Man.

### **Ms. Pac-Man**

The essential modifications in this game are:

- There are four different maze formations, none of which seem to have patterns. Three of the four mazes have four exits, not two.
- The fruit bonus is no longer below the pen. It hops onto the maze through an entrance and bounces around until it's either eaten or skips back out. The points are the same as in the original, with two trifling exceptions: The strawberry is worth 200 instead of 300 and there is no 3,000 point bonus. Also, the floating fruit can be something of a distraction.
- The colors are brighter and more soothing to the eye.

Actually, there's not a great deal of difference — except for Ms. Pac-Man's lack of patterns, which to most players is all that matters.

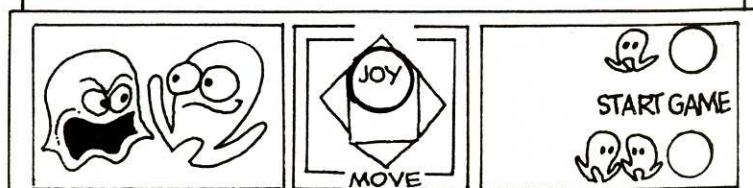
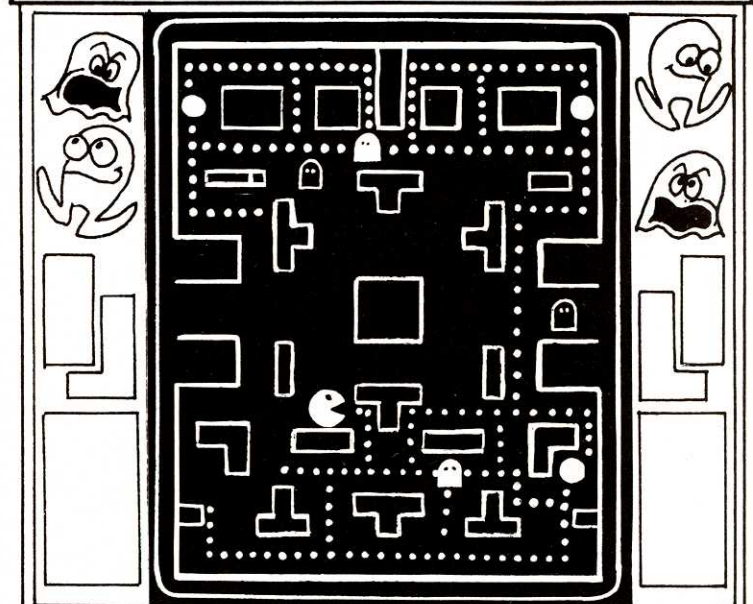
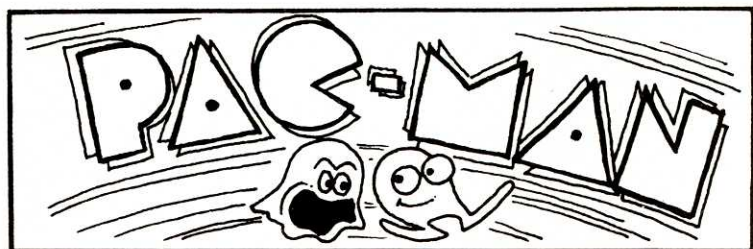
### **Pac-Man**

If you are still playing the original, fast or slow, here are a few tips:

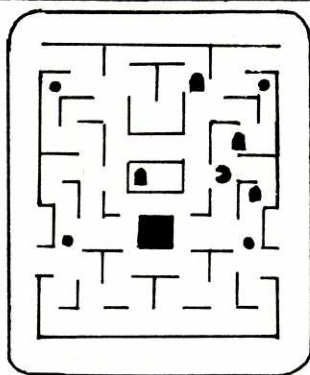
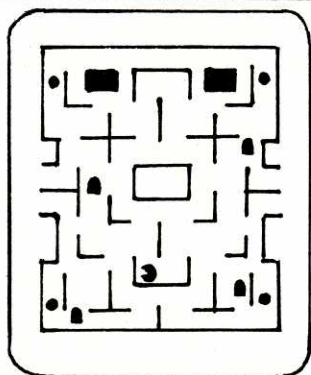
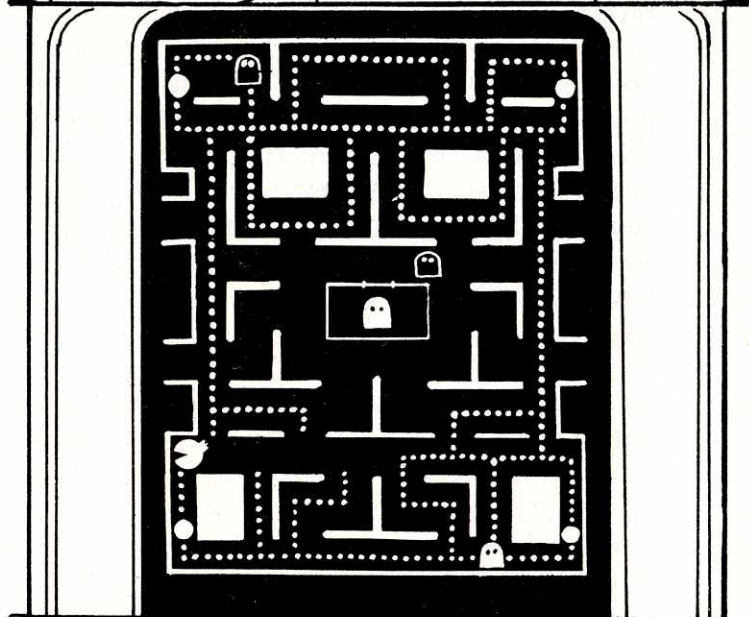
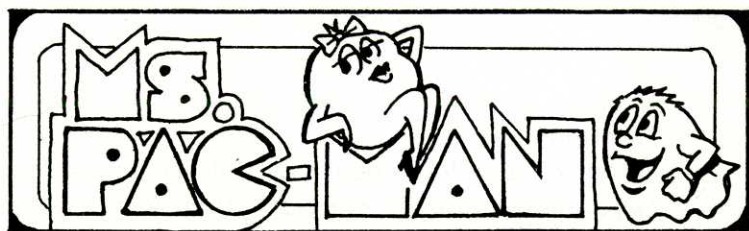
- Shaking your stick generally confuses the ghosts. Inky (blue) is particularly susceptible to this tactic.

- Inky may be easily threatened, but he is fast and has a tendency to trap Pac-Man in the tunnels.
- Pinky is the speediest of the four. He'll outsprint you on a straightaway. It's best to cut corners around him.
- Blinky (red) is slow but persistent. Never underestimate him.
- Clyde (orange) you need not worry about. He's the one who reads comic books all day.
- Pac-Man is most vulnerable on the lower width-long run. Try to complete that strip as soon as possible. The same goes for the two vertical corridors, but worry less about them; on each of the vertical corridors there are five possible turns, while the bottom one has only three.
- The tunnels allow you to exit and momentarily re-enter directly across the screen. Don't do this if there's a ghost loitering on the other side! This is the place where you can get ahead of the pesky ghosts; they slow down in the tunnels.
- Besides the tunnels, there are two other safe spots in the maze. Take a breather under the T-square just above the pen. The ghosts never enter that spot from below, but they will drop down from the top. Make that rest snappy. If you want to take a longer rest — say, for coffee or one of the inevitable biological functions — wait till none of the ghosts has its eye on you; then slide right up into the right-hand side of the tee directly **below** the pen. Make sure that your Pac-Man stays perfectly still, and you can stay here forever. Twitch once and you can kiss the little fellow good-bye.
- If sandwiched between two ghosts, don't give up. Look to see in which direction their eyes are fixed —

# PAC-MAN



Pac-Man is a trademark of Midway Manufacturing Company.



Ms. Pac-Man is a trademark of Midway Manufacturing Company.



if one is looking the other way, you can go right through him.

- When you swallow a power capsule, the ghosts turn blue and run away in every direction. As the rounds progress, the length of time that they're blue varies — in fact, by the 19th round they don't even turn color at all. During the first four rounds they stay blue for at least 5 seconds. This is also the case in the 6th, 10th, and 14th rounds. The 5th and 7th rounds last 3 seconds, the 9th less than 1. After the 11th round, and except for the 14th, don't expect to see much blue again. For playing the game that long, you don't rightly deserve it.

## DONKEY KONG

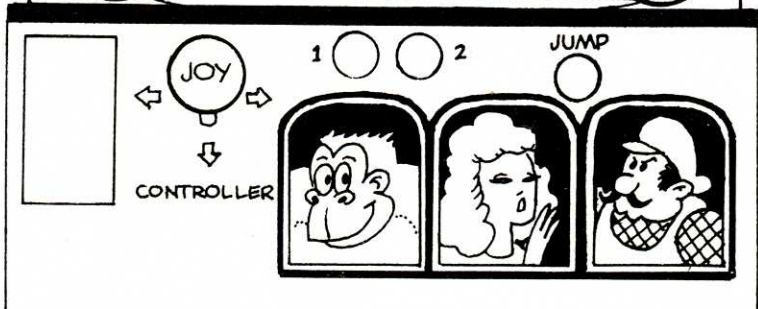
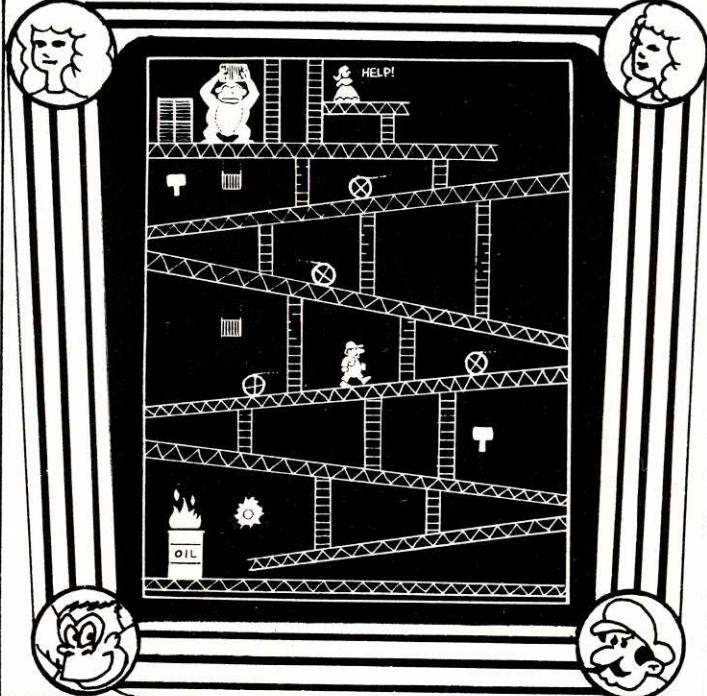
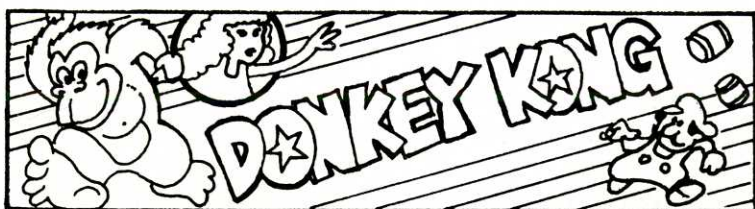
Donkey Kong is another bizarre cartoon game, courtesy of Japan. While we in America continue to invent new and improved methods of exploring outer space and obliterating all we find there, our Eastern rivals' seemingly frivolous comic mentality keeps spilling over into their design of video games. It appears to have all started with Space Panic and Crazy Climber. The former introduced the idea of scooting up ladders, but that was hardly weird; the latter, however, was pretty insane. In Crazy Climber, a man desperately seeks to scale the side of an endless skyscraper, fumbling at window ledges and dodging falling objects at the same time — a pitiful sight. What sort of mind created this sideshow? Nichibutsu's Masao Kijima explains: "One day I got a dream. In my dream, Marvel Comics' Spiderman is there."

Whoever dreamt up Donkey Kong obviously had the 1933 classic version of **King Kong** in mind, but why the construction set? This latter-day Kong drags a blonde (who in no way resembles the film's heroine, Ms. Wray) up a series of girders and forces a little dope named Mario, who happens to be a carpenter, to rescue her. Kong does his best to prevent this by tossing down barrels and fireballs and occasionally beating his breast. You can make Mario climb by manipulating a four-way joystick and jump over the obstacles (the machine's only button is labeled "jump") or thrash them with a hammer. That's about the size of it.

The first screen begins with a 15-second skit. Kong grabs the girl, scales six stories, and then bounds so hard that the girders crack. Enter Mario, bottom left. He's confronted with barrels rolling along the framework, and some barrels that just seem to drop anywhere they please. See Mario jump. Each time he hops over a barrel it's worth 100 points. The other scoring chance is provided by the hammers, which look more like cherry suckers and just hang in midair for Mario to find. For each barrel he squashes, Mario gets anywhere from 300 to 800 points. But, he really must climb — his failure to reach the girl before the bonus clock runs down (it starts with 5,000 points and decreases steadily by 100s) will result in the loss of that life. The trick is to time his ascent just right. Bolt up a ladder, wait for a few barrels to pass, scoot to the left, up another ladder, and so on until he gets the girl.

The second screen will made the kiddies squeal. Loosen the bolts (eight) in the structure, jump over fireballs as well as barrels, and watch Kong fall headfirst to the ground. The third screen is a souped-up version of the first (as also are the 6th, 10th, and 12th), but it's the fourth screen you may have some trouble dealing with. Two lifts are running up and down three flights. Mario has to leap from the girder to the lift — again, just perfectly. He does this by waiting until the lift is one inch below the girder he's on, then leaping to the right. This continues until he reaches the main girder three flights up. If Mario misses, he loses a life.

After the 5th screen (which is another bolt-stealing exercise) and the 6th, we come to the last set. This consists of three conveyor belts with buckets of sand moving on them, and a large oil drum ablaze in the middle of the screen. Mario must negotiate all of this, plus avoid the constant bar-



Donkey Kong is a trademark of Nintendo of America, Inc.

rage of fireballs and barrels. Donkey Kong may be cute compared to Defender, but it sure ain't pretty.

Take this advice if you want to better your game:

- Use partial ladders to duck barrels or fireballs. Don't go too far, though, or Mario will fall.
- Remember that when Mario has hammers he can't do anything but move side to side — no jumping. This, however, is the best way to accumulate points.
- The faster you climb, the more bonus points you'll receive.
- Collect the blonde's belongings, such as her umbrella, purse, and hat (sorry, this is GP-rated), and score from 300 to 800 points.
- When two barrels or balls are rolling in succession, take one giant step by pressing the joystick to the far left or right and double-dutch over both of them. As Eugene Jarvis would say, it's a rush!

## BERZERK/FRENZY

### Berzerk

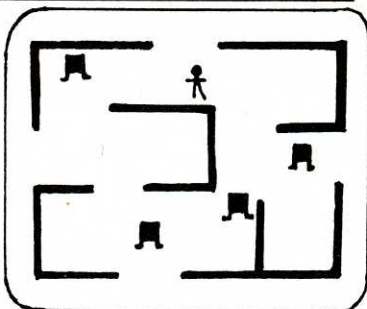
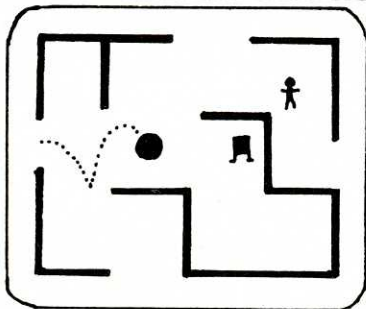
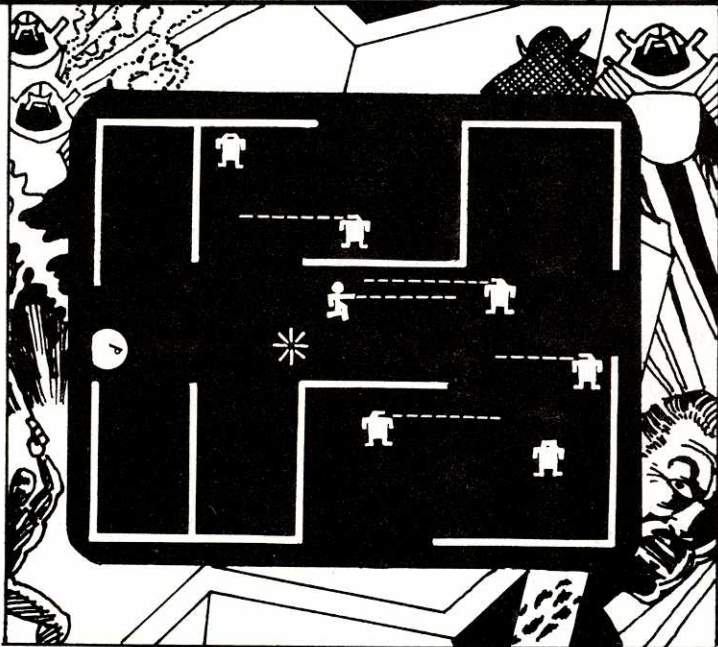
Berzerk is a shoot-out of another kind. It's not a space game and it's not really a maze game. Each screen resembles an apartment layout. There are thousands of possible pattern variations, so it's like moving through a high-rise housing complex where every dwelling is a little different and every room contains a couple of killer robots. With a four-way joystick, you control the "humanoid" who is **constantly** under attack by anything from 4 to 12 robots. A synthesized voice within the machine howls "Chicken!" whenever you back away from the robots' fusillade by slipping out an exit. And while you try to catch your breath, it will issue the ultimate challenge: "Fight like a robot!"

Berzerk requires a lot of gun-slinging and a modicum of strategy. The object is to clear the screen of all robot traffic and flee before the most villainous of all video game rogues, Evil Otto, makes an appearance. He's an indestructible red ball that can pass through or bounce right over anything — and that includes you or the robots — in his way. Don't bother shooting at him, just scam. Each robot is worth 50 points, whether you or Otto kill it. At the end of each round you will receive a bonus — 10 times the number of robots initially on the screen — if you've disposed of all of them.

You should also know:

- The first screen is a “gimme,” as Lyle Rains calls it. The yellow robots shuffle about, but do not fire. In the second, they are red and fire once. This continues until the robots are purple and can shoot up to five bullets at a time.
- It is best to exit on the left or right, not top or bottom. When the next screen appears, the humanoid will be exactly opposite from where you just left. To reappear on the top or bottom, most players agree, is disorienting.
- You can move and shoot in eight directions. However, you can't do both at the same time. You can fire in several directions from one firing position, though; just hold down the fire button and move the joystick in the direction you want to shoot. This is good if you're surrounded.
- Instead of shooting all the robots, let them knock each other off. For instance, when two are close together it's a good bet they'll collide, particularly if you move around a bit. Robots also have a tendency to walk blindly into the walls, which will destroy them. Another technique is to duck quickly out of the path of two robots that are flanking you. They'll shoot each other.
- You can have only two shots on the screen at a time. Try to aim for the robots so that your fire won't meet theirs in midair. This wastes time — especially in later battles.
- Otto always appears through the same entry where you started the round. He is slow until all the robots are gone, then the chase is on. Try to position yourself so that Otto will steamroll robots in his pursuit of you. For example, line the humanoid up with the robot that you can't reach. Whether or not Otto tags

# BERZERK



Berzerk is a trademark of Stern Electronics, Inc.



it could make the difference between getting a bonus or not.

- After 5,000 points, which takes about 10 minutes to accumulate (high scoring is not Berzerk's trademark), Otto is twice as fast. Be near an exit or be squared by Otto.

## Frenzy

During 1981, video gamers across the land became obsessed with ghosts, mutants, bugs, and Otto. The first three could be had, but Otto was different. Immune to attack, he became the game world's most inscrutable foe. All year Otto reigned supreme as players accepted the fact that they would never be able to pay him back. Late in the year, however, Stern (Berzerk's manufacturer) decided that his jig was up. Frenzy, released in March of '82, is where Evil Otto gets his . . . well, almost.

This Berzerk deluxe does allow you to shoot Otto (it takes three hits), but he reincarnates and comes back, faster than ever, for more . . . and more. In addition, Frenzy features numerous other improvements over its parent. A great deluxe game is one that is so effective you never return to the original. Super Breakout was the only example I could ever think of before Frenzy; Frenzy may very well be the second.

The differences between Berzerk and Frenzy are:

- There are two types of robots: fat ones, which look like stagecoaches, and skeletons. The skeletons are smarter.
- As many as 25 robots may appear on the screen at once. Bonus time!

- There are two types of walls on each screen. One is solid white and bounces shots rapidly back in the direction from which they came; the other is formed by quarter-inch segments that can be shot away for one point each. Hence, if a robot is sitting behind a picket-fence-like wall, the good news is that you can blast right through it; the bad news is that the robot can, too. Also, you can make your own exits.
- Ricochet shots are a major factor in Frenzy. Be especially careful not to fire twice when a robot is up against a white wall. The first shot will kill it, but the second will immediately fly back at you. You're going to have to learn to play the angles, as you do in Eliminator.
- You can advance to higher levels simply by exiting. Unlike Berzerk, you don't have to complete a screen by killing all the robots to move on up to the next phase.
- Speaking of phases, Frenzy has four very unique ones, dubbed the "special rooms." When the fourth level flashes on the screen, all is basically the same except for a white box which appears just to the right of center and up a bit. Inside the box is a two-inch, moon-shaped yellow face with eyes and a straight line for its mouth. This, my friends, is Mama Otto. Once you finish off all the robots, she smiles, and from her mouth escapes four little Ottos. If you're too far from an exit, don't bother — they're worse than a pack of wolves.

The next three special rooms appear in the 8th, 12th, and 16th levels, respectively. The power station, computer room, and robot factory all function virtually in the same way. By zapping the special part of the room with one hit, everything on the screen — except for your humanoid — is

paralyzed. Surprisingly, this is easy to do. But Otto soon comes to his frozen mates' rescue, and yet another duel between you two is on.

Gunning for Otto is the real fun in Frenzy. Since the game is fairly new, I have only seen him killed thrice during any one screen. First of all, make sure you're right near an exit; after a brief demise, Otto charges out of his original doorway — only faster. This will repeat, getting faster every time, until either he gets you, or you decide to duck out the exit. Three times seems nearly impossible, but it can be done. Would you believe seven?

A technician at Stern, who's known to his colleagues as Dragan, claims to have gotten Otto seven times running. Eight, however, he concedes is impossible. "Otto took one flying step and was right on top of me," Dragan explains. "Stay by an exit and concentrate on your shots. You can't waste any. Every one has to hit Otto or you're finished."

## QIX

Qix is one of these newfangled games that defies instant solutions. In fact, I doubt if Qix will ever need to be sped up or reprogrammed. It's an oddball, what else can you say?

"I love it," one games designer exulted after the '81 A.M.O.A., "but it'll never make it. It's too subtle. Head games never do well." Fortunately for Taito America, he was wrong. As of mid-February of this year, Qix was the fifth top-earning video game behind Donkey Kong, Stargate, Galaga, and Tempest, which is pretty hefty company. Says Taito's Jack Mittel: "I think Qix surprised a few people."

So how do you play this subtle "head game" that has surprised some people, including one anonymous games designer? "Start with five bucks," explains a Taito spokesperson. "After ten bucks you should be up to 60,000 points." Maybe we should go back to zero.

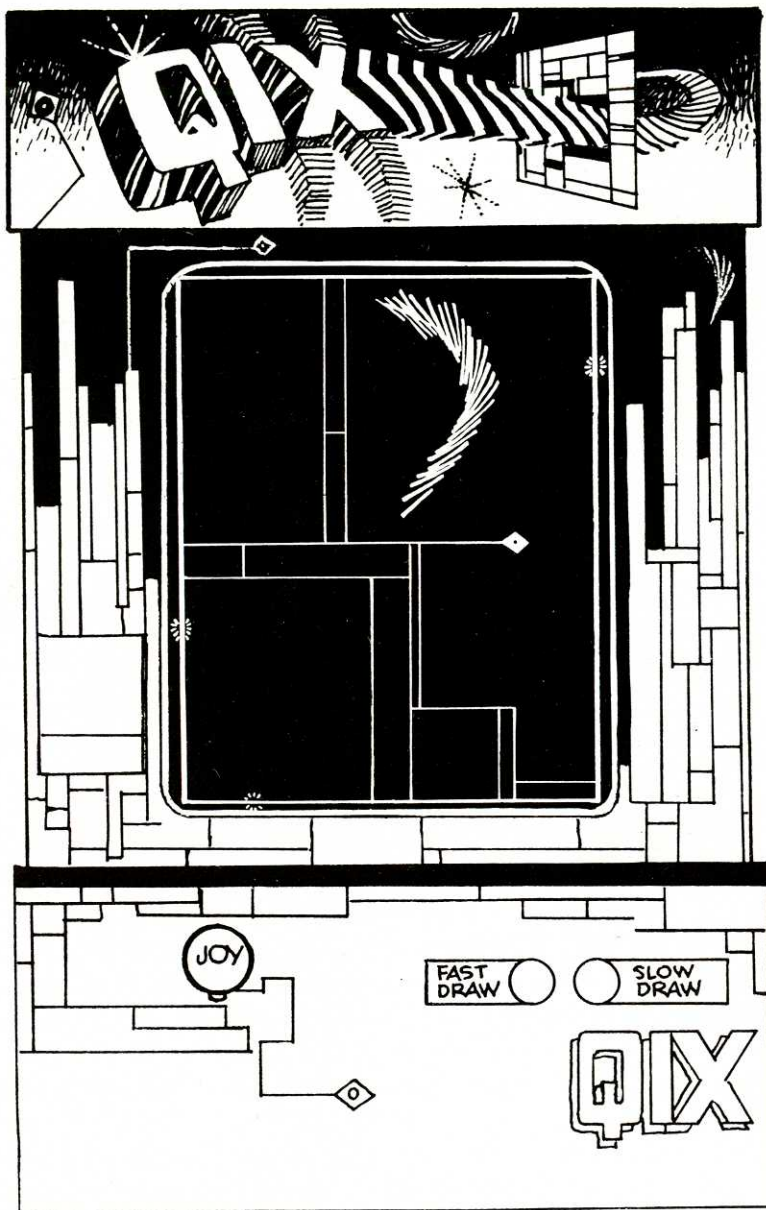
Qix has a four-way joystick and two buttons labeled "fast draw" and "slow draw." The object is to fill in at least 75 percent of the screen with boxes of any shape and size. Your adversaries are the Qix, a whirling dervish made up of colored lines; Sparx, which follow the lines you draw; and fuses, which take advantage when you get careless. Trap the Qix, outsmart the Sparx, and defuse the fuse and you'll have conquered Qix.

Since you never want to run into the Qix as it sweeps around the screen, the faster you draw might appear the

better method. But use the slow-draw button and you earn twice as many points. And for every percentage point over 75 you get an additional 1,000 points. The idea is to have 74 and then outline a box that will push you to 80, for instance. This, however, is easier said than done.

I suggest you do the following:

- Take advantage of the first screen, which is the easiest of all. Draw slowly and aim for a bonus.
- Watch for the two sparks that start in the uppermost corners. Try to form a box while one's directly pursuing you. When you close the box, the spark wastes time covering the lines you've just drawn. It's like fooling Blinky in Pac-Man.
- Super Sparx, which appear later, are like Baiters in Defender; they don't pussyfoot around. Perform the same treatment described above, but faster. Releasing the draw button sometimes helps.
- Fuses are caused by not finishing a box, which happens when you release the button or simply lose concentration. Don't.
- Avoid the so-called Spiral Death Trap. This is self-inflicted treachery which occurs when you stupidly box yourself in. Since you can't complete a box, the fuse has a field day with you.
- There are several techniques for trapping the Qix. Start at the bottom of the screen and build a T-shape. Capture it in one of the two L-shaped areas. Another is to build two pier-like shapes that protrude from the upper-right-hand corner — one from the side, the other from the top, with enough room for the Qix to slip in. When it does, quickly draw it closed.



Qix is a trademark of Taito America Corporation.

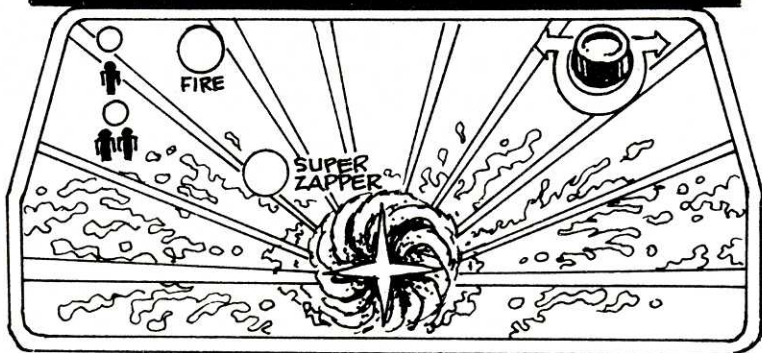
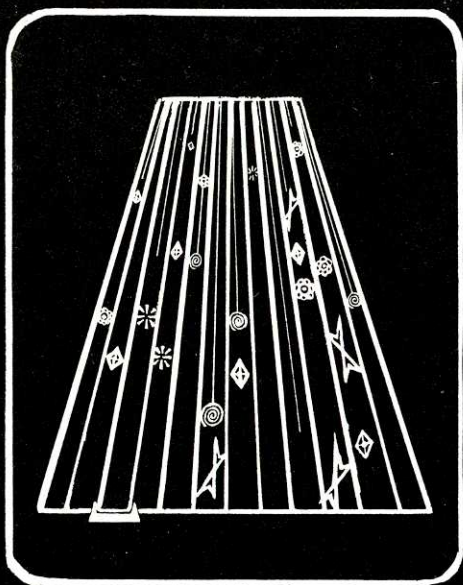
## TEMPEST

Tempest is beauty, as they say in the Canadian Northwest. It looks, plays, and feels like a Mercedes; drive it through 99 levels of computer-animated space . . . if you dare.

Tempest is easy to learn. A paddle-type rotating knob and two buttons are all the controls you need to conquer. Spin and rapid-fire — that's all there is to it. In fact, the first four levels are "gimmies," says Atari's Lyle Rains. "Simply spin the knob and hold the fire button down and do nothing else. They're definite gimmies. Once you've established that, it's no fun playing the lower levels. People rapidly advance from that point."

Tempest, in addition to its other qualities (which we'll get to momentarily), is the world's first "skill-step" video game. Remember how annoying Space Invaders became because you couldn't skip right to the fourth or eighth wave? No more. Tempest allows you to start at the ninth level if you wish — quell that attack and 59,000 bonus points are all yours. In succeeding games, you can begin as high as you wish as long as you've attained that level in a preceding game. The machine remembers little facts like that.

Tempest is colorful, two-dimensional, extremely clean vector graphics. At times, the artwork is so spectacular you forget you're looking at and playing a 25-cent video game.



Tempest is a trademark of Atari, Inc.



It's not exactly Laserium, but just you wait. Tempest is testimony that the games' graphics designers have been doing their homework. Yes, just you wait.

For play instructions, let's skill-step to level four. By now, you should be familiar with the basics: You control a yellow gunner with the knob; fire steadily with one button; and super-zap, which devastates everything on the playfield when pressed, with the other. Though similar to Defender's smart bomb, you can use the zap twice in every level (the second hit randomly takes out **one** enemy on the field). The Superzap recharges whenever you move on to the next challenge round. The playfields are geometric (usually circular) constructions made up of 16 rails and 15 tubes. Your shooter, or "claw," perches on the outermost edge of the field and fires down or out into the nebulous vacuum of computer space. Thus far, these foes have emerged from that vacuum:

- Flippers (150 points) — These look like cosmic boomerangs, and shoot as they flip up the tube. If you don't kill them while they're tumbling around in the tubes, flippers will land on your edge and somersault towards you. At this point you are limited to two defenses — either zap, or patiently await their arrival. Just as a flipper is about to flop on top of your claw, tap the fire button. This should do the trick, but it does take some timing.
- Tankers (100) — These are diamond-shaped and they also fire. When shot, tankers unload two more flippers. In later (higher) levels, they also carry fuseballs and pulsars.
- Spikes (1-3) and spikers (50) — Spikers are vicious spirals that ride up between the rails, building spikes. Spikers shoot, but aren't too dangerous.

When all attackers have been vanquished and you hurtle down the tube to be catapulted through space, spikes become a major peril. If the spikers have been at work, you may have real troubles avoiding the spikes that are invariably cluttering the tubes. If you can't find an empty one or quickly whittle a spike down, your claw will be mercilessly gored to death. Even worse is the fact that you immediately return with a new life to that same spot. Act quickly or it'll all happen again. Many novices end games this way. So always keep at least one tube clear or you'll suffer the consequences.

Try your best not to be dazzled by all that's going on. In these early levels, get used to spinning the knob rapidly and firing continuously. There can be as many as eight shots on the screen at one time. Take full advantage of your super-zap — it need not be conserved as cautiously as a smart bomb. Still, wait for the right moment to use it, such as when three flippers are chasing your tail around the top. Also, practice knocking them off and running.

Tempest's graphics can be terminally distracting. When you use your super-zap or the machine awards you a new shooter (at 10- to 50,000 points, depending on how avaricious your arcade owner is), the fireworks are so nifty that you may end up watching your shooter get swallowed by one of the flippers and dragged away to some hideous fate at the bottom of the tube. Keep tabs on your score and you won't be surprised by the rainbow effects that come along with your bonuses; and when you super-zap, don't get carried away watching all the little electronic monsters disappear. You'll live longer.

Now, let's skill-step once again up to level 11, where we meet our newest adversary — the fuseball. A sort of stick-

figure with a crooked line for its head, the fuseball is a wicked opponent. That's why shooting it is worth anywhere from 250 to 750 points. It dodges up and down the tunnel, but the big problem is what to do when it climbs up onto the edge with you and you're already zapped out. You can't knock off a fuseball the way you can a flipper. If you wait for it to sidle up next to you, then fire off a few rounds, it just keeps sidling right over you; you get to watch your disintegrator disappear in a cloud of electronic dust . . . literally. There are only two possibilities — and both of them faint: (1) Move to the farthest possible point away from the fuseball and hope that before it gets over to you, you can knock off all the denizens of this level; or, they can all get to the top, whereupon you'll shoot down the tube and on to the next level. (2) Just close your eyes and spin the knob with all your might. Sometimes you can pass right through (under? around?) the fuseball. This little lesson will, of course, teach you to save your super-zap until you're **really** in trouble.

Finally, there is the pulsar (200 points) which appears at level 17. When expanded, it's just another line; when contracted, it spells out the initials "VW." It shoots, flips, and pulses. There are two things that tell you when a pulsar's got your number: First, if there's no top on the tube that your claw is straddling, there's a pulsar down there somewhere — so shoot and run. The second clue is a fatal one: when the rails of a tube light up, that means one of the monster mites is down there pulsing. The result is a shattered shooter. This is a nice graphic but it may also be the end of your game. You should handle pulsars even more carefully than fuseballs, because they can get you as soon as they hit the tube.

Good hunting.

## The Rules of the Video Jungle

The first time you walk into an arcade, you may think that wherever there's such chaos, anarchy must rule. Well, you're **wrong**. Emily Post might not understand the rules of the road in here, but if you break them too often — or too loudly — you're gonna look bad, play bad, and possibly get your features rearranged.

- 1. If a beggar walks up to you and asks for a quarter, don't give it to him — he'll only put it in the game **you** want most to play.
- 2. Never come to an arcade with less than \$5 if you plan to do some serious gaming.
- 3. Never bring more than \$10.
- 4. Unless you're an expert (not self-proclaimed), be prepared to do a lot of watching. It's the best way to learn.
- 5. Cheat. Use **everything** you've learned.
- 6. Talk about the games with anybody. Unraveling a good video puzzle takes as many heads as you can get.
- 7. Have a few favorite games and waste all your money on them. This way you'll at least become proficient on a few, instead of very mediocre on many.
- 8. At home's a different story. Play as much of as many games as you want for as long as you want. Of course, sooner or later you may have to go to work or to school.
- 9. Memorizing the Atari jingle reduces your score on Atari games by half.

- 10. Concentrate.
- 11. Limber up your fingers before playing a button game. Cracking the knuckles seems to loosen them right up. Just don't take too long or the game will start without you.
- 12. Regardless of what the industry likes to believe, video games can be a lot like gambling and even addictive. For the sake of yourself, your family, and that person who's been waiting for the one game in the bar that you've been hogging for the last 45 minutes, know when to stop.
- 13. When **do** you stop? Answer: If you've already played for 30 minutes and you haven't topped your high score for the last 15.
- 14. Don't smoke while you play. Cigarettes leave burn marks on the control board.
- 15. Get buddy-buddy with video mavens. They'll tell you everything they know. Don't believe me? Just ask.
- 16. Never bother anyone who's deeply involved in a game. Don't ask questions. Don't put your quarter on the screen. Give the player room. He may flail at any moment.
- 17. Concentrate.
- 18. Be very picky about joysticks. If you don't like one because it's too war-weary — even if it's the only Pac-Man in the house — move on to something else. Walking away from a game will also make you look like a real pro.
- 19. Subscribe to **Electronics Games** magazine.
- 20. Take a video game to lunch.
- 21. Better yet, have a video game for lunch.

# Home Again, Naturally

There are now four programmable home games systems on the market. Three were developed in the late '70s and are fairly similar. These are the Atari Video Computer System (VCS), Magnavox's Odyssey 2, and Astrovision's Bally Professional Arcade. Mattel's Intellivision, released in 1980, is in a league by itself for the moment, but Atari is sure to catch up when their Advanced Computer System comes out later this year.

There have been a number of software companies established to supply programs, games, and amusements for all this nifty hardware, but of all of these only Activision has a significant library of software available to the public. That, of course, will change. Imagic, Coleco, and others promise to have scads of the stuff on the market by Christmas '82.

Here, though, we're just going to take a look at the systems and the software available right now.

## Video Computer System (VCS)

VCS has taken on a whole new (and better) personality since Atari began licensing games (Space Invaders was the first) and using an outside software company, Activision. The machine may not have the most sophisticated electronics, but it's still worth having — if only because it gives

such good value for the money (it's been sold for as little as \$108). The cartridges, though, are another story entirely.

Pac-Man and Defender have the dubious distinction of being the most expensive pieces of software ever to sit behind the toy counter; but since they cost only 120 quarters or so and you can play them any time and as often as you want, you'll probably pay the toll no matter how heavy.

## SPACE INVADERS

Sorry kids, no secret bonuses in this spinoff of the immortal game. Save your counting for the arcades. Here we have 36 invaders inching down the screen — clear them off for a total of 630 points. A UFO, renamed the “Command Alien Ship,” is worth 200, as in the deluxe coin-op model. However, it doesn’t blink.

Incredibly, Atari programmed 112 possible variations into this 3-by-4-inch cartridge (standard VCS size). You can select from a menu of moving shields, zigzagging or fast bombs, and invisible invaders. Also, two players can compete simultaneously, either as partners or opponents. In the partnership game, one player controls the base while the other one fires. They can also alternate these tasks.



## ASTEROIDS

Once again, Atari decided to mix things up. Basically, this is the Asteroids we all know and love (in color, no less), with some very interesting modifications. For example, you have to play with a joystick and only one button. Thrust is up, hyperspace is down; east and west move you counter-clockwise or clockwise. Besides hyperspace, you can also choose shields or flip (your ship can turn 180 degrees). You also get to set rock speed and bonus levels at 5,000, 10,000, or 20,000 (or none at all). Generally, all of Asteroids' rules and point totals are the same. And, guess what? You can hunt and lurk with this program.

## MISSILE COMMAND

This is one of the better arcade adaptations. It just looks and feels more like the original. Again, however, you have to adjust to a joystick and one fire button instead of three. Nothing can replace a Trak Ball, which the coin-op version has, but the stick comes pretty close. One nice change here is that there are no bombers cruising along and dropping a whole slew of bombs just as you get around to blowing them out of the sky. Plus, you get to decide whether you want dumb or smart missiles and fast or slow cursor control. Also, this Missile Command has skill-steps — you can start your game at the 1st, 7th, 11th, or 15th level.

## PAC-MAN

As already mentioned elsewhere, this conversion is a mild disappointment. The ghosts flash too much, there are no fruits (just a box called a vitamin), and the joystick doesn't really give you optimum control. There are eight variations, only two of which are worth playing: fast Pac-Man with medium speed, or fast ghosts chasing after him. The only really bright spot is that you begin with four lives.

## DEFENDER

All of your favorite aliens can now invade your living room. Landers, baiters, pods, and bombers can all wreak their particular kinds of havoc on you and your humanoids (only 5 instead of the arcade's 10), but here you do have the advantage of being able to adjust the speed of the aliens' attacks and decide exactly whom you want to fight. If you're particularly masochistic, you can fight your battles against mutants only.

This is a terrific program but there are some shortcomings. Since the Atari joystick doesn't come with the six separate controls that the arcade machine has, the manufacturers had to throw in a couple of screwballs. Sadly, the screwballs mess up your two last-ditch weapons — hyperspace and smart bombs. You can't drop a smart bomb unless you're sitting behind the city on the screen (it replaces the familiar tall mountains on the arcade screen). And you can't pop into hyperspace unless you fly all the way off the screen behind the scanner. This is almost no help at all. The game, though, is still the fastest, meanest little program you can find, and it's still very easy to work up a sweat as you watch a lander float away with your last humanoid. The same hit-and-run tactics you used on the arcade machine will work here.

## SUPER BREAKOUT

Probably my favorite video game of all time finally comes home. And it works. **Sounds** great, too. The most unique of all options so far is this cartridge's choice of six keyboard soundtracks to go along with the ball-and-paddle action. Press the game reset lever until the right tone hits you — then call for your first ball.

Play original Breakout, double, cavity, or progressive Breakout. Since I admire the musical accompaniment so much, I mostly play double (two paddles, two balls). There is a trick to lodging one of the balls above the wall seconds after you've just completed the previous one. It's more or less luck, but if this does happen, you get to sit back for at least 90 seconds as the ball caroms between the uppermost boundary and the wall just below it. Listen to the music; it's soothing (as long as you didn't pick the one that sounds like a whip cracking) — even hypnotic. Highly recommended multi-media entertainment.

The next three games are by Activision:

## KABOOM

This is a clever reissue of an Atari coin-op game called *Avalanche*, in which objects were dropped from the top or middle of the screen and you had to catch them or lose a life. In this case, we have a mad bomber who is tossing round, black explosives from top to bottom. You are given three water buckets sitting on top of each other to snare the bombs with. If you miss three bombs, you lose all your buckets.

My advice is to be incredibly quick and determined and to follow this one strategy: Whenever you are approaching a thousand mark (bonus time) and have more than one bucket left, purposely miss a bomb. You will now return to the previous level, which is easier, and you should be able to hang on long enough to collect the bonus. Since *Kaboom* is a rather straining exercise, you'll undoubtedly need all the slack you can get. Incidentally, you can't accumulate bonuses.

While 3,000 points is near mastery, a cute surprise awaits you if and when you top 10,000. The bomber, who has been smiling all along (bet you never noticed), suddenly frowns. He remains in this pitiful state until he finally does you in.

## TENNIS

This rendition of Pong is the best yet. Would you believe rackets and balls and little, flat-headed men deftly scooting around on videograss? Of the four possible games, only two — full speed versus another person, or full speed versus the computer — are worth playing. The others are slow and terribly boring. Use the joystick for movement and the button to serve — the computer does the rest. Especially effective are the shadows that follow not only the players but also the trajectory of the ball.

Battling the computer is the greatest challenge. The only way to beat it is with perfectly timed cross-court volleys and by rushing the net when the other player is in. With some luck and a little English, you can loft a shot over your opponent's head. According to Steven J. Rubinsky, who has defeated the computer in 44 straight matches for an Activision record, "The computer is Borg. It's precise and conservative. To beat it you have to do the unexpected. You have to be McEnroe."

## LASER BLAST

Although Laser Blast combines characteristics from Missile Command and Defender, much is left to be desired. This is a tedious endurance test of the worst kind. I scored 60,000 in 20 minutes and felt I hadn't accomplished anything at all. You can select four play levels: cadet, lieutenant, captain, and commander. The commander level is at least twice as difficult as any of the others.

The object here is to blast the three "enemy forces," which sit anonymously on a hilly surface near the bottom of the screen, with your spacecraft's lasers before the enemy zaps you out of the sky. For every thousand points you get a bonus ship, but you can't accrue more than six at once. Dance around to confuse the forces, then shoot. That's it; nothing else happens. This game you can play until your finger falls off.



## Odyssey 2

Magnavox, like Atari, has made significant strides with their programmable system over the last 18 months. No longer is Odyssey being viewed as a mediocre unit that simply happens to have a keyboard on its console. With the recent release of some better-than-average cartridges, the oft-maligned Odyssey will soon see the end of its "I get no respect" days.

Odyssey, however, did deserve its poor past reputation. Until recently, if there were any imaginative people working in the labs, you wouldn't have known it. Basketball, Hockey, and Speedway are among Odyssey's catalogful of lemons; UFO, Quest for the Rings, and War of Nerves are few of the new products that are helping to turn things around.

At a list price of \$199, Odyssey is a fair bargain. But since it lacks the advertising push of the VCS or Intellivision, it may be a while before outside companies (like Activision) will consider developing software for it. In my opinion, this decreases Odyssey's value greatly because it will inevitably limit your game choices.

## UFO

UFO is a neat little space game. You control a so-called Earth Federation battle cruiser and find yourself in a death-defying struggle with three types of UFOs: drones (1 point), which look like H's and X's and are littered all over the screen; hunter-killer satellites (3), a menacing way of describing two drones that have joined forces; and the light-speed starship (10), the savagest of all. Your defense is a force field (indicated by a ring of blue dots around your ship) and a laser cannon. There are two reasons why you should use the latter sparingly: (1) Whenever you shoot, the field temporarily disappears. (2) Anyway, the cannon isn't all that accurate. A better technique is to leave your shield up and literally bump off the UFOs; as long as the field is there, anything you touch will be destroyed.

It's easiest to go for the killers and accumulate points. One way of protecting yourself against the speedy starships is to hide behind bunches of drones. Another is always to stay on a parallel with them; since drones can only shoot diagonally, whenever you're positioned like this you should be safe.

## QUEST FOR THE RINGS

• Quest is Odyssey's master stroke. It is truly a first — the synthesis of board and video games. Loosely based on Dungeons'n'Dragons, Quest is about an adventuresome duo who are assigned to recover 10 magical rings which the Ringmaster (who can either be computer- or player-controlled) has hidden under 23 possible castles. These two Don Quixotes can have any one of four identities: wizard, warrior, phantom, or chameleon. The game starts on the board, but once a dungeon is reached, it becomes televised. Battles with monsters and dragons ensue. Quest is the first game of this type and a real winner. If this designer were to be turned loose, maybe Odyssey could be a serious contender in the home game invasion.

## Bally Professional Arcade

This is the system that is still trying to come in from the cold. When Astrovision bought the Arcade in 1980, they had a wreck to repair; Bally had bungled matters so badly that it would take a year to begin getting the system back in order. By Christmas '81, Astrovision claimed to be selling more than 20,000 units — compared to 250 the previous May.

They plan to unite the Arcade with a Zgrass-32 personal computer and sell the entire package for just under \$1,000. As it is now, the game machine retails for \$299. In either case, Astrovision will be competing directly with Mattel. Graphically, the Arcade is on a par with Intellivision; however, the game designs are somewhat behind the present trends. Galactic Invasion 2011, for instance, is a popular arcade game spinoff. So are Quest for the Orb and Munchie (sound familiar, Pac-Maniacs?). Probably more impressive at this point is the machine's basic programming capability.

## **BALLY BASIC 6004**

This unique cartridge comes complete with a built-in audio tape interface, which essentially converts the unit into a personal computer that you can program yourself. The interface lets you save and load programs with a standard cassette recorder. An extensive 116-page manual teaches you the art of programming. In Lesson 7 you are informed how to build your own video game, while Lesson 4 is a primer in electronic music; the machine's own music system (three separate sound synthesizers) transforms the keypad into a three-octave musical keyboard, including sharps and flats. And Lesson 8 gives instructions for designing video art. All in all, it sounds like a lot more fun than playing another Galaxian.

## Intellivision

The titanic advertising war between Mattel and Atari has basically proved what everyone knew already — each of the two systems has its own strengths and weaknesses. Though Mattel has made up ground by releasing Astrosmash and Space Armada during the first quarter of '82, they are still recognized primarily for their superior sports cartridges. And they know it. If not, then why do they always showcase Baseball, Football, Soccer, and Golf?

Intellivision shepherded in a new era of TV games. Not only would realism be stressed graphically, but rules, especially in sports, could be adhered to. This is the machine's trademark; it is also, in another sense, its inexcusable flaw. At times, Intellivision is just too difficult to play. All things considered, however, it is still a terrific machine — albeit an expensive one (\$299).

## NHL HOCKEY

Is it entirely my fault that I have all kinds of problems trying to score goals in this thoroughly original cartridge? The key is to shoot on net when the goalie is in a sprawl, having either made a save or been knocked down. But these chances are few and far between, and when they do occur the puck always seems to end up somewhere in the vicinity of the penalty box. Yes, you heard right — the penalty box. The computer referee will blow the whistle on you if things start getting a little rough. When a player gets tripped or cross-checked, he goes down with a resounding thud. But back to scoring — or the lack of it. Scoring hardly seems possible with this machine; it knows the rules so well that every time you push hard enough to make a goal, you break one — there goes your shot, straight to the penalty box. It will never cease to amaze me that a game could be designed where scoring becomes the least likely event.

## SPACE BATTLE

This is Mattel's one really impressive space cartridge. It is first-person — just press the "Go to Battle" button on the overlay card that slips onto the controls (in your hand is a mini-keyboard, a 16-way dial for movement, and side buttons for shooting). Shortly, you'll be peering out of a cockpit. But before you do this, you are first introduced to the Mothership, which you are sworn to protect. In this scene you have three squadrons — blue, white, and gold — with three fighters in each. By pressing another button, the "alien key," you will be able to locate the alien squadron. Dispatch one of your squadrons after it and "go to battle."

What you will now see is blue alien fighter crafts. Use your green oval-shaped cursor to line them up. When you shoot, blasts from the bottom corners of the screen will angle out and meet at the cursor. Shoot continuously, **aim**, and keep moving. If the alien fire hits the cursor, you lose a fighter. The point is to engage the alien force in constant battle so that it stays away from the Mothership. If she's in bad trouble you'll hear a siren; at that point you have only moments to save her. If you can't, the screen will flash red twice, signaling that you can't go home again and the game is over.



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