

PILGRIM IN THE MICROWORLD

DAVID SUDNOW

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PILGRIM IN THE MICROWORLD

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For Paul, Jessica, Larry and Danny

With the fearful prayer that the only ICBMs
they ever encounter are the Atari sort.

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David Sudnow

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Memory

I first went into a video arcade to retrieve my teenager. The semester was over, I was in the Renaissance Cafe a block from campus grading final papers, and he was upstairs at the Superball Arcade. "Just a couple of quarters, Dad, please". Enough for me to have my coffee in peace. An hour later I'm ready to go. What's he doing up there? You could hear explosions muffle through the ceiling, and walking upstairs was like coming upon a contest between a rock band and a mortar battalion. How can they stand the megatonnes? How do ears adjust? Does the loudness decrease or the rest of the world just get quiet? The composer John Cage put himself in one of those research chambers devoid of all sound. He nonetheless began to hear two tones, one very low, the other high, and was told the first was his blood circulating and the second his nervous system. Now a reverse milieu, our new electric brain sets turned up to the maximum and the only quiet left to imagination.

When you first enter one of these places, not the shopping plaza sort with carpets, old fashioned lighting, a more polite volume, and parents holding little kids up to reach the controls, but inner-city versions where the heavies hang out, you know you're in a new species of public place. Strangers of all kinds pack in tight along the walls, intensely engrossed in private behavior while browsers come close up from behind to watch. Rear ends are dark and faces flicker. Something vital is being dispensed.

He was still on his first quarter at a game called *Missile*

Command, and when I put my hand on his shoulder it was like touching a statue. "Come on, Paul. Let's go". *Wang, wang, wang, wang....bang*. "Paul, I said let's go". "I got six cities in memory", he snapped between volleys as the score racked up to 120,000. "Well, you'll just have to forget them because I want to get out of here". I don't think he heard me, so I stood off and watched him play, or whatever you could say he was doing. If "doing" was the right word. Maybe the point was just to have your part in creating the noise? I couldn't make head or tail of what was happening so I took a quarter and dropped it into the next machine over. Same game. Do they consider how to divide up the room? *Missile Command* and *Defender* in the northeast corner, *Centipede* and *Frogger* in the south, *Berserk* to the West, and cartoon types near the entrance so the scene doesn't look too ominous should concerned parents peek in.

Without reading the instructions on the machine, for how could you listen in such noise, I put in my coin and all hell of one form or another broke loose. Then, with no sense I was playing a game, not knowing who "I" was among the various moving objects on screen, not even sure "I" was there - without the slightest idea whether, why, or when whatever was happening would end, it was all over. It even told me: THE END. What gall. I glanced at the instructions. Minimalist understatement. Enough to make sure you know to put in money. Some business this coin-op irony. Make the widespread confusion about what's worth paying for explicit: spend your dough in order to appreciate the absurdity of getting nothing in return. I tried another game and before I knew it, again, the thing told me GAME OVER. "Told me?"

Well, there were kids standing all around, and whenever I'd get to a machine one would soon enough show up and put

a quarter by the slot along the overhead rack of the console, house etiquette for reserving rights to the next quartered round. I was happy to be bailed out of the foolishness, not about to pay to stand there looking like an idiot. At least in casinos you can fake what little you need by following bets of someone who looks competent. The casino was the closest thing I could think of, for when you really got down to it, in both instances the prize seemed to be just holding on. Their looks looked that way.

The kid was still accumulating cities in memory, whose or which kind I couldn't say, least of all why, and by now a few others were standing over his shoulders to watch. As I headed his way I flashed on a poolroom in the Bronx. I'm in the midst of running three straight racks on my favorite table in the back corner, and a couple of kids are watching, when my father comes in. He never liked me hanging out there, but allowed it within limits. Caught between hoping he'd come close enough to see me do my thing and wishing he'd leave so I could keep it sacred, I freeze up. Now here I am, on the other side of the stage in that drama. I stood close enough to see his final score for myself, but not to where he'd see me see him. I watched and waited and waited but he kept holding on. How can you interrupt someone saving the world, let alone your own kid, but when I sensed this could go on for some time, I took the risk and browsed around, like window shopping at night with a Sony Walkman at peak volume between two very closely spaced rock stations.

Baroom, ICBMs hit MIRVs - "mirvs" as our kids say - sirens announce incoming enemy rounds much too fast for comfort, machine-gunning *rat tat tat tats* rack up the score, and then a little computerized melody, no bugle cry or Tchaikovsky overture but a piccolo-ranged bit of Schoenbergian fluff, easy and cheap to program I suppose, joyfully signals you've won

back an obliterated city.

Two adjacent machines. A kid, maybe ten at the most, stands right next to some preppy law school type at least twice his age. From my perspective they behave identically. Each body rivals the other as perfect specimens of the strangest human conduct I've witnessed in a public place. I see right hands putting epileptic seizures to shame, while the rest of them just stares and cares, standing up, watching TV.

Two adjacent machines. In one you apparently try to get a frog through four lanes of heavy traffic to reach the safety of a grassy divider, and if you don't use your legs right, you get a good simulated splat. When will they squirt at us? In the next one over on a black screen there's nothing but white Rorschach-shaped outlines moving around, and you're to hit them, so to speak, before they hit you. Once you've figured out what "you" is. The name on the machine implies you're in a field of asteroids, not that you know what a field of asteroids is, or what it'd be like to be a being in one. Here's where you learn. Now ask players at each game what's going on. One says you gotta get the frog to the the other side. The other says you gotta keep from getting hit by asteroids. But the hands don't reveal the difference, twitching on for dear life.

Two adjacent machines. Spectacular little fantasy worlds, a moving connect-up-the-dots-to-get-through-the-maze-game. How utterly more spectacular if we didn't forget so fast. Another flashback, same time ago as before, my father and I on a plane from La Guardia to New Haven and back again, so I could feel flying. I'd taken a camera and was acutely disappointed when the pictures had come back a week later. The extraordinary sensations of that day were lost in a simulated view of mere things. Those are clouds. That's the tip of the plane. So much wanting a good souvenir of the experience, I'd ended up with a piece of glossy paper.

I remembered the sadness I felt on my first cross - Atlantic flight ten years later, when I noticed that only about three or four noses or even Nikons were pressed to the windows when the icebergs went by, or we went by the icebergs, whichever it is, I've forgotten. Everybody else either snoozed his way from one meal to the next or looked at pictures and listened to imaginary voices on paper, while icebergs were there, real honest to God icebergs like you've never seen before and you could moreover take pictures of them with your own two hands. Maybe some were reading about icebergs.

Watching this spectacular fantasy world under glass, whose marvels we'd as soon forget as we forget the "real" one, wondering how our new crystal memory box could possibly help us out of this endlessly spiraling amnesia, I was most struck by the opponent. Not just the tip of your pencil to contend with for connecting up the dots to get through the maze, but the tips of others as well, four others, intent on breaking your point. And you can't push their arms out of the way as with your kid brother in the backseat of the car. You just have to watch them carefully and move carefully, and they keep time very well, their kind, at your expense. One player seems to be connecting up, and the other can barely draw. From where I stand I can't tell if it's because the one doesn't watch as well or move as well or both. But this kid knows how to deal with the armless opponent and the other doesn't. Something vital is being dispensed, and knowhow controls the dosage and cost. When they're both just as good, do they have precisely the same knowhow, since the opponent is a machine? Can't tell from where I stand, but a specter of rigorously uniform training somehow hovers overhead.

I got back in time. Paul was still holding on. And several others were now watching, maybe five in all. Dead quiet but for the war. Yet from where I stood it looked like he was having

a tough go at it, for his overall stance had tightened as though the fingers were getting through to him. And in about five minutes he missed whatever it was that finally matters, hit the machine, and said 'Damn.' I moved in, rehearsing my praise, wondering what to say.

I thought of how you lie down in the hot sun, snuggling a groove in the sand to settle back into yourself, and with a deep sigh say "Wow, isn't this wonderful". That "wow" isn't a disembodied witness standing outside of the experience. Just our talkative way of having it, as much a part of the pleasure as the snuggle itself. Yet it's a way we speak together. Were all terms for my talk with him to be defined by the box itself, or would we retain some old-fashioned ways to converse? Would the computers one day control exclusive rights on our vocabulary for referring to them, with possibilities for reflecting on our experience reduced to glass, remembrance turned to memory, fantasy to reality, micro-and macroworlds eventually indistinguishable in feeling? I moved in over his shoulder and wondered whether he'd just had some "wow" way of being that took notice of alternatives. Did he know he was somewhere special and utterly fantastic, hopeful and terrifying, a world we've never seen before? Was there some irony, amazement, awe, sadness, anything other than facts about missiles to discuss? Could we make talk of the experience and not just the conduct?

After the world blew up, the screen said "Great Score, Enter Your Initials", and he got to put his at the top of the list. I watched him swirl some knob or another until he made the machine speak an irony, not needing and thankfully not yet obliged to be memoried in the microworld as a uniformly trained P.A.S. But what he did punch in frightened me.

D.O.A.

"Why D.O.A., Paul?"

"Because I like that band."

"Band?"

"Yeah, it's a punk rock group."

"What does D.O.A. mean?"

"I don't know, death on arrival, dead on arrival, something like that."

Then what do you say?

Interface

The professor's house was one of those wraparound affairs perched on stilts high in the Berkeley Hills overlooking San Francisco Bay, and as soon as I arrived at the faculty party I spotted the grand piano in an elegant study with oriental rugs, floor-to-ceiling books, as much a look of scholarship as you'd see anywhere. That would make my evening.

In a half hour a gathering had formed around the piano. Then, in the midst of "The Man I Love," there was an explosion in the next room. "Maybe I will meet him someday, maybe ..." "What the hell was that?", my lead singer cracked. "They're playing a video game Herb bought for Christmas," said the hostess with slight irritation. "He couldn't keep it wrapped up. The kids hardly get to it. I don't know if he'll finish the talk he's supposed to give in Frankfurt next month".

Well, we weren't about to give up Gershwin for Atari, about to sit in front of a TV with little plastic joysticks in our hands. So as several people found a polite way to back off and sneak out of the study, a dedicated threesome remained committed to singing. Then someone pretty good must have gotten to the joystick as we got into "I've Got a Crush on You." "All the day and nighttime ... *wham ... varooooooooom ... bam ... crash ... bam..bam ...* Hear me cry ... *ooooooooo ... bam..bam.. bam.*" I played at fitting the "Stars and Stripes Forever" to their action but the timing wouldn't mix. We had to stop. I needed a refill anyway,

and the hostess would tell them at least to turn down the volume because they were ruining the party.

The party was in the next room, as many as thirty of them in there at times, never less than ten, and it was three in the morning when I finally left Herb to play by himself. Between drinks and nearly two straight hours one on one with him at *Missile Command* once everybody left and we didn't have to give up turns, I could barely see my way down the hill. Here's the screen frozen in the height of action:



Intercontinental ballistic missiles descend from the sky toward six cities on earth, as the player employs a two-handed joystick-push-button device to intercept their trajectories. The stick controls a half inch long cursor line, a sight that can be moved and stopped anywhere within the visibly televised sky-space. And with one hand you try to place it beneath an incoming missile, at least if you're taking the game seriously and care about the welfare of Cleveland, New York, or any other city in the world. Atari will take your dollars, francs, or rubles. You then push the button with the other hand to launch an antiballistic missile from the "silo" in the center of the landscape to the designated cursor location. And if you've properly judged distance and time, your ABM meets their ICBM head-on and

wham, the folks below are spared for the while. The overall object of the game, thank goodness, is to avoid the total destruction of all cities. Atari and Company play the bad guys, from any political standpoint you occupy, while you defend whatever counts for life, liberty, and the pursuit of happiness in a world of six towns. Which I suppose some calculate to be enough of a world.

Every so often the onslaught stops and there's a pause that defines a "round" of play. Rounds allow turn-taking competition against the enemy, with no logic except in a truly insane world, but still, a series of volleys is a reasonable enough way to run a war. You can reload ammo, attend the wounded, deal with first strike second strike problems, or run to the fridge for a beer. Between rounds the score is posted, and a siren then warns of a next incoming volley. The attack resumes. Should, heaven help you, all cities get hit, the world blows up and it's THE END. Unless of course you charmingly succeed in attaining a high enough score to win a replacement city. Points are earned for every successful shot, the destruction of more rapid, accurate "smart missiles" earning the most. These marvelous weapons make a screaming sound all their own, and gain their intelligence in being precisely guided to a city, never falling into the little countryside between towns. Were the cities near each other or far apart, and was their equidistant spacing intended literally or as an abstraction? The scale of things was obscure, and the microworld had a decidedly mathematical look about it. I guess the big one does too when you're thinking of trajectories.

For every ten thousand points a city is rebuilt, though not necessarily in the same spot, and depending on how you imagine the delay between rounds, the urban reconstruction occurs with instant Atari technology or over the course of generations. They don't say what happens to the people, even whether the

cities are populated, and presumably considerations of taste have left out burning bodies. Should the score reach the city replacement figure of ten thousand before any town has been annihilated, your silo skills don't go unrewarded. For you now have a "city in memory," which doesn't mean you remember what it was like or even where it was. And when the first one actually does blow up, this remembered achievement makes for an automatic replacement. The memorized city just pops up out of the electric brain, instantaneously appearing somewhere else to strategically fill the gap. Early rounds involve slow enemy missiles --carryovers from a prior war? - but with each new round the speed, numerical density, and relative proportion of screeching smart missiles increases, making matters more contemporary and defense more and more tricky no matter how patriotically you behave.

Few temptations can drag me from a well tuned Steinway on a Saturday night, not into a next room with lots of people anyhow, so the next day I went out and bought a color TV and a home Atari console that plugged into it. Now I'm not big on war, wasn't even allowed a cap gun as a kid, and *Missile Command* models the calculated insanity of the worst imaginable twentieth-century scenario. How powerful and eerie that the computerized arena seduces us to transcend the nightmare it presents.

A whole party full of Berkeley intellectuals blasting their way through an evening of warfare, stoned on button pushing. Sure, everybody made fun of it all. There were the perfectly expectable disclaimers and expressions of horror, enough first rate political satire to give Lenny Bruce a run for his money. Sure, the women came off with the most vociferous disdain. The world was coming to an end. It was a conspiracy to train our kids for the real thing. Not to mention the ultimate destruction of the evening. Most of them hung out in the kitchen, but

every so often a new one stuck her nose in the game room, feigning utter disinterest. I thought I spotted some female fists clenched. And beneath all the joking, this guy after that wormed his way close to the controls to say, "Hey, let me try that for a while."

None of us was a warmonger. And neither were our kids. But the pace of things. The speed. The fast twists and turns. The fireworks. The luminescence. Take a Polaroid picture on a street corner in Bombay, a ten-second kind, and inside of three there'll be fifty people hovering around, with a depth of curiosity so heavily smacking of worship you can see the reverence and fear in their faces, whether it's a picture of a dead body or their own child held up for a smiling pose. That doesn't matter. It's the thing in its fully emblematic significance, token of a new world and way of being. Watch them watch your ten-second Polaroid come up, and you can see them looking across the Atlantic. We were looking out there. Way out.

Missiles come in from the top of the screen, the outer limits of one's radar, upper horizon of the new world landscape with its little curve to make your body feel a bit more at home. Several trickle on and then down screen at the same rate, three or four lines very slowly coming from the top. So you've got plenty of time. You learn to move your cursor beneath them, one by one, and without much practice, a half hour at most, you can judge how far below you need to be in relation to their speed when you push the button. And at the time the missile gets to the cursor the enemy has arrived there too.

You go from one missile to the next, aim, hold it, and fire. And that's fine till they start coming faster. Then you need a new technology for moving. You try machine gunning, pointing all over the place while rapping the button, a give-them-all-you've-got last round of the snowball fight. But the rules don't let you. Only three explosions are allowed on the screen at

once, a seemingly absurd restriction in a kind of war where reloading ammo makes little sense. But Atari controls all microworld rules, the umpire is built right in, and the arbitrary restriction constrains and organizes the rest of play. While a three-shot limit is a slight defect in the game's authenticity, along with atonal melodies and replaced cities, its consequences for how you've got to attack are neat enough to make up for it, as with many such restrictions. Machine gunning won't work because you can't keep firing. The video air of memorized places must periodically clear, lightening the electric brain's burden, rearranging its memorized thoughts enough to give new considerations room and time to register and count off paces in the clearing. But it counts fast, thinks that way, and you've got to stay on your thumbs.

One little maneuver I came upon did seem like a move in the right direction. In a simple situation with three missiles coming slowly down together on the same horizontal plane,



I smoothly swept right beneath their paths without stopping the cursor, firing *en passant*. When my placement and rhythm were together, as my missiles got to where the cursor had been when I'd pushed the button, theirs were there too. It was a panning action with several little articulations along the way, the hands in synchrony, one wiping past, while the other inserted

punctuations. As you watch the cursor move, your look appreciates the sight with thumbs in mind, and the joystick-button box feels like a genuine implement of action. *Bam, bam, bam*, got you three right in your tracks, whatever the hell you are.

When doing well, I could pick off a few missiles with one continuously smooth gesture. Nothing to call the Pentagon about and hardly grounds for trading in the piano. Just a snazzy little skill. But as the game progresses, the sky blazes with missiles racing toward earth, keeping you awfully busy saving the world. So you'd have to have some such smooth way of improvising round the sky, continuously tracing through a sequence of places that wouldn't pile up to overload you, with quick analysis and good handicraft. Just look at the screen in advanced stages of play. All six cities can be annihilated in the first five seconds. The Department of Defense thinks they can handle that on their TVs, and Atari implies you can on yours, so what's wrong with a little advance preparation? Look at the barrage and you know it's got to involve some pretty fancy action. Touch Gershwin? That's another question.

Whether useful or not, my little movement was nice to watch and feel, and whenever Herb took a break I switched the reset control and started over again so I could practice joy sticking back and forth, gliding past those slow missiles, connecting up with the lines, each explosion right on the button, each electric roar right where it belonged. I was just as content to watch the world blow up and start all over again whenever things got heavy, playing this little three-note melody to refine the accuracy of my video stroke.

Punctuate a moving picture? I'm no painter and don't dance in mirrors. But here I could watch a mysterious transformation of my movements taking place on the other side of the room, my own participation in the animated interface unfolding in an extraordinary spectacle of lights, colors, and sounds.

Improvised painting, organized doodling, with somebody doodling against you to make sure you keep doing it.

The little silly panning shot was a trip. I thought of the arcade and the electro-umbilical hookup I'd seen. I'd stay in an arcade for more of that too, for the flashy lights of the little landscape whose warfulness I could at least pretend not to imagine, for that cursor of pure power you could swing where you wanted, for those wild changing color coordinations and even the little plastic controls that now felt like a way into a new world. If you couldn't take a microworld home with you, I could see standing in an arcade just to be able to put together anything well with the new crystal brain kit, to mount the first step of control over its affairs, its booms and bursts. And especially for action like this shot, with its touch of grace.

Most sedentary, you say, hardly an arena for vigorous action, awfully cold and calculating, the terrain for human involvement reduced from a several acre plot to the microworld of a TV tube and the calibrating motions of two or three digits. The farmer who once gazed and plowed toward an endless horizon now sits on his can in an office scanning a nine-inch video display of his inventory, seedling growth rates, soil composition, market prices and PAC MAN.

But what about finger work in a tightly voiced Bach fugue, or the little movements of writing, reading, and singing? What of Rembrandt's brush strokes? To be good for the embodied spirit certainly action needn't stimulate the pulmonary vascular system. For one thing, there's more time left for jogging when you log in hours at your "PC", and God knows tilling the soil is no great bargain. It all depends on who ends up with the dirty work they won't make robots do. No big software market for street cleaning programs these days.

Human history was cultivated through speech and the

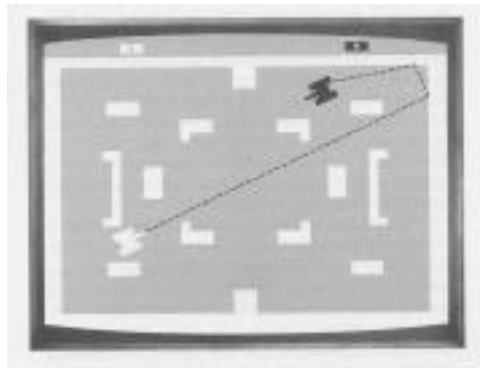
motions of fingers, one could say, the tiniest not biggest actions. After all, take away all the carved, painted, and inscribed meanings, the thoughts giving rise to its symbolic significance as a shape, and what's the Great Pyramid alongside Beethoven's Fifth, or something like this:



this:

$$E=mc^2$$

or even this:



“Just” labor.

Now the computer. Our organically perfect tool. Seated upright on behinds just made for that, our hands dangle near the lap at their most relaxed point of balance, while these fingers, capable of such marvelous interdigitation, have a territory for action whose potentials and richness are electronically enhanced beyond the wildest dream. And the eyes are freed from hand guidance work, free to witness and participate in the spectacle from above.

Before, the piano was the quintessential human instrument. Of all things exterior to the body, in its every detail it most enables our digital capacities to sequence delicate actions. Pushing the hand to its anatomical limit, it forces the development of strength and independence of movement for fourth and fifth fingers, for no other tool or task so deeply needed. This piano invites hands to fully live up to the huge amount of brain matter with which they participate, more there for them than any other body part. At this genetically predestined instrument we thoroughly encircle ourselves within the finest capabilities of the organ.

Then a typewriter, speeding the process whereby speech becomes visible, the extraordinary keyboard for sequencing and articulating perhaps awaiting a still truer sounding board, strings, and tuning, a still more suited canvas for thought.

Then TV.

Then super-fast super-tiny electric switches to rapidly translate keyboard motions into an infinite variety of sights and sounds. Computers.

The three are united. We program the arrangement of circuits to indefinitely vary the effects each stroke and sequence of strokes can generate on screen, building codes and codings of codes, so now this key stands for that, that key for this, dozens of shorthands and shorthands for shorthands. Computer languages. Typewriter strokes get heftier. Sentences gain power.

Then to complement the ensemble further, we add a rapidly expanding assortment of hand tools for tuning, depressing, sequencing, switching, fine tuning, and more. The typewriter is best for linear movement, up and down and side to side, its keys laid out in banks with spaces in between. This word piano can't fill the visible spaces between its printed-sounds, and greater fluidity of motion is wanted for more

graphic finger drawing, violinlike brushes to glide and slide over the glass canvas. So there come knobs, joysticks, track balls, "mice," light pens, and more. The finest nuances and varieties of manual dexterity are interfaced with the televised display. Typewriter keys become infinitely multipurposed, the TV screen leaves behind the human drama it borrowed from our past to get into our homes, and biotechnical handicraft takes a giant step forward.

The full sequencing, calibrating, caressing potentials of human hands now create sights, sounds, and movements. And the eyes are free to watch, wonder, and direct from above, free to witness the spectacle and help the hands along without looking down. A keyboard for painters, a canvas for pianists. With lots of programs to choose from, lots of ways to instantaneously vary and organize the tunings and makeup of the palette. All the customary boundaries get blurred when you're painting paragraphs, performing etchings, sketching movies, and graphing music.

I was hooked.

Eyeball

They were all out of *Missile Command*, damn it. I'd woken up in the morning with the silhouette of that psychedelectric landscape still etched on my retina. Wouldn't it be neat if a "city in memory" came up looking a little different, more imperfect than the original, say, with just the essence suggested? That would at least make it appear computers remember sights as we do, rather than as just series of numerical values for each grid point on the screen. Remembering the looks of things, we forget aspects of them in ways we can't predict in advance, which is to say images live a history within our lives. Computers don't have that kind of memory. How could they?

Herb had another game called *Breakout*, which I'd glimpsed some guests play during timeouts from the favored bouts at nuclear defense. Was there a truly worthy video opponent - a Don Juan of Silicon Valley? Who knew, but the salesman said this *Breakout* thing was a real good game, the TV was sitting in the backseat of the car, and rather than drive around all day looking for missiles, I figured I'd take this one home for starters. How was I to know it would become "my game," that I'd get so obsessed with it as to live out the next three months of my life almost exclusively within this nineteen-inch microworld, heaven help me.

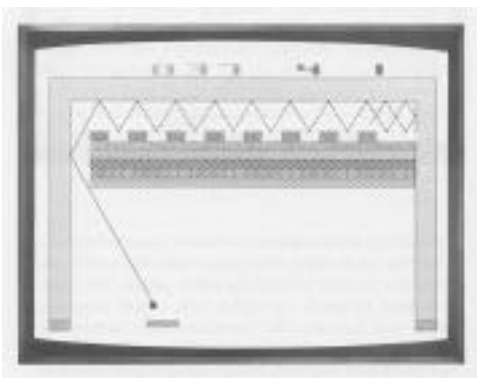
My next door neighbor must have seen me coming in and out, first carrying the TV up the stairs, then the box marked

Atari, for no sooner was the configuration set up and ready to go than he appeared. And inside of twenty minutes versus this young San Francisco lawyer I'm in a cold sweat. Here's a snapshot of the pristine landscape:



At bottom screen there's a paddle, controlled by a steering wheel knob that comes with the unit, along with the joystick you get for other games. You push a button to serve yourself a ball, which descends from just beneath the barricade strip across the screen. Then you hit it back, and every time you do an unmarked half-inch brick segment gets knocked out of the wall. Of course size is relative, the more competent you become the more these lights take on a sort of environmental density and you're pulled by the fingertips onto a full-scale playing field whose dimensions aren't found on rulers.

The immediate object is to chip through to the open space on the other side, and once you've made this *Breakout* the ball rebounds like crazy between the far wall and the band, moving from one side to the other and then back again to knock out bricks from above unless none obstructs its path and it therefore returns down to you:



The overall goal, fat chance, is to eliminate the entire barricade until paddle and ball are alone in empty court, victors.

The wall is composed of six differently colored strata, and if and when a ball first gets through to hit the fourth one from the bottom, it takes off fast in a sudden break slam shot and then holds at this new speed till you miss and have to serve again. You get five balls per game, can set the console to play solo or in turns with an opponent, and can of course hit the reset switch at any time to reconstitute the whole barricade and instantly get a fresh five serves.

Within about twenty minutes my neighbor had cut through the wall a few times while I couldn't even get close, and when he insisted he'd only played the game once before for an hour, my evening was decided. Some piano player. As if last night's effort to save the world wasn't bad enough, I must have now gone on for four hours by myself after I finally got him to leave. And by the time I gave up for the night, I'd broken out one lousy time. I relentlessly served that damn speck of light without intermission, couldn't pull myself away from the thing. Two hundred bucks after all.

I tried rationalizing my initial anxiety with the conviction the guy was lying. But then again, he didn't smoke, was ten years younger, who knows? Maybe some basic nervous system

capacities were involved, rhythmic acuities different from what you need for jazz, say. Maybe microworld mastery varied by age, metabolic or alpha wave rates, astrological signs for all I knew. And how about cultural factors? I didn't see a TV before the age of ten, probably haven't logged a thousand hours in thirty years. Maybe he'd grown up with several hours of television a day. For all I knew extensive tube time trained micro-muscles for neuroathletic competition and I was thus irrevocably consigned to the video boondocks.

At least the rudiments of slower play were easy enough for me. One of the guys at the party had created a big laugh, throwing himself back and forth while swinging his entire upper torso and arms and almost falling off the chair to hit the *Breakout* ball. He took the ribbing with good humor, exaggerating his incompetence for the sake of the party, but actually seemed unable to effect that transformation of sense needed to engage himself with big looking movements through little feeling ones. He couldn't project a comfortable scale of being into the confining detachment of the interface, couldn't trust the efficiency of a mere knob, but instead handled the encounter like those proverbial preliterate aborigines who respond to a photograph by looking around at its reverse side. The guy acted at the controls as if there were no video fence in the way. It probably took him a long time to get used to automatic transmissions and electric typewriters, not because the skills are so different from a technical standpoint, but because he refused to adopt the postural respect solicited by new embodied equipment. The guy just wasn't a button pusher.

I didn't have his sort of quaint confusion, but automatically made the necessary shift in stance to control the paddle while sitting still in the right terminal position. And it only took a little time to transcend the physical awkwardness of the knob so I could get the racket more or less where I wanted, more or

less when I wanted, without too often over or undershooting the ball.

Line up your extended finger with the lower left corner of the TV screen a comfortable six feet away. Now track back and forth several times in line the bottom border and project a movement of that breadth onto an imagined inch and a half diameter spool in your hands. That's how knob and paddle are geared, a natural correspondence of scale between the body's motions, the equipment, and the environs preserved in the interface. There's that world space over there, this one over here, and we traverse the wired gap with motions that make us nonetheless feel in a balanced extending touch with things.

They had it set just right. Held by fingertips and rotated through a third of its revolution, the little paddle steering wheel afforded rapid enough horizontal movement anywhere along the backcourt to handle the pace of action without wrist or forearm aid:



Not like a very fine tuning knob to change hi-fi stations, for with such a gearing you've got to spin the dial to traverse full field, letting go with your fingers and losing all accuracy. Very fine tuning knobs are meant for slow motions, and while you can twirl these dials to reach a rough vicinity quickly, to hit *Breakout* balls a vicinity isn't enough. On the other hand, were the gearing too tight, the slightest motion would send the paddle right

across screen. Ideally geared for travel through the terrains and tempos of a microworld, the dial had enough resistance so an accidental touch didn't send the paddle too far, but not so much that you had to exert yourself to move through the court.

I served myself a ball. It came down. I went for it and missed. I centered the fingers in relation to the knob's range so I could swing back and forth across the field with hardly any elbow play at all. I rotated some partial practice strokes, trying out each side to test the expanse and timing of the whereabouts, appraising the extent of pressure needed to move various distances at various rates.

I served again. The ball's coming down over there and my paddle's here. How fast to go? A smooth gesture knows from the outset when it'll get where it's headed, as a little pulse is established that lays out the upcoming arrival time, a compressed "ready, set, go" built into the start of the movement. The gesture then feels when to speed up and slow down to attain the target. I swing the bat back and forth to acquire its weight, establish a usable rhythm then held in reserve as I await the ball, preparing for a well timed movement anywhere within the arc of the swing.

Within fifteen minutes I'm no longer conscious of the knob's gearing and I'm not jerking around too much. So far so good. Slow down, get rid of the neighbor, get a little rhythm going, and in no time at all you've got a workable eye hand partnership, the calibrating movement quickly passes beneath awareness, and in the slow phase the game is a breeze, doesn't even touch the fingering you need for 'the eentsy, weentsy spider went up the water spout....' Here I was lobbing away with a gentle rhythm, soon only now and then missing a shot through what seemed a brief lapse in attention rather than a defect in skill.

Then came the breakaway slam when the ball reaches the

fourth layer, and the eye-hand partnership instantly dissolved. *Woosh*, there it goes right past, coming from nowhere, a streak of light impossible to intercept. They've gotta be kidding. Out of the playpen onto the softball field. I missed every one, each time left standing with bat in hand swatting video air. The lawyer had to have been lying, had to have put in more hours than he said.

I tabled my anxiety and simply figured more delicate paddle handling skills were called for. Besides, just as the panning shot made *Missile Command* fun, I began getting off on the action, building control and precision in these gentle little calibrations. With slow shots my gaze could lift a bit off from the finer details of the ball's path to roam the court analytically, to glance at my paddle, then where the ball would hit the barricade, and then ahead to predict where it'd hit the side so I could position myself in advance. And I'd get there, sometimes in sync with the ball and sometimes ahead of it, just waiting. My glance took snapshots of the overall neighborhood, there was enough give in the tempo to allow for some instant geometry during play, enough casualness to the pace that looking could disengage from tracking to analyze the opponent's ways and fit the rhythm of its queries into the timing of the shots. Scrutinizing the neighborhood to learn my way around, I could still bring the paddle where needed on time.

The sounds helped. Every time you hit the ball there's a little bleep, then a differently pitched tone if you hit a side wall, and still another one for each different bandful of bricks. These recurrent bleeps helped you gear into the overall rate of action. The sights helped. The more or less steady passage of the ball painted the action's tempo in broad strokes, so when the eyes loosened their hold on it to take in a wider or different territory, that gently tracing light kept the fingers continuously alive

to the whereabouts and pace of things.

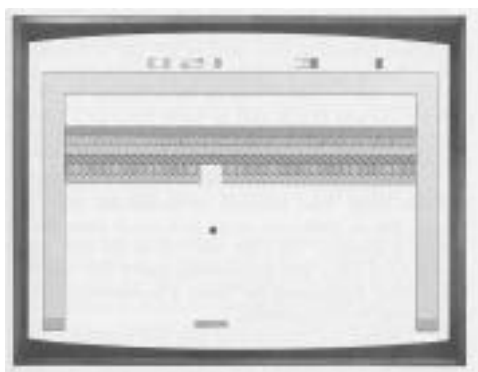
At first it felt like my eyes told my fingers where to go. But in time I knew the smooth rotating hand motions were assisting the look in turn, eyes and fingers in a two-way partnership. Walking a rainy street, you identify the dimensions of a puddle in relation to the size and rate of your gait, so the stride itself patterns the style of your looking, how you scan the field's depth of focus and extent of coverage, what you see. So too with sight reading music at the piano for instance, where you never look ahead of what you can grasp and your hands' own sense of their location therefore instructs the gaze where to regard the score. So too again with typing from a text, where if your eyes move in front of where your fingers are, you'll likely make an error, and thus hands and gaze maintain a delicate rhythmic alignment. And so too here, you'd have to sustain a pulse to organize the simultaneous work of visually and tactilely grasping the ball, your hands helping your look help your hands make the shot.

I played around with slow balls, getting the first chance I'd had in years to handle Ping-Pong-type action, listening to the bleeps and feeling my way round the court. I hit a shot over to the left. Can I place the next one there as well? Of course the lights didn't obey the laws of physics governing solid objects, like billiard balls, say. But Atari had rather decently simulated a sense of solidity. The light came from a certain angle toward the side wall, and then followed out the triangulation by going in the direction you'd predict for a real ball. What about the paddle? Hit on an off-centered portion of a tennis racket or hand, a ball will deflect on a different path and you can thereby place shots. Sure enough they'd programmed the trajectories and different parts of the paddle surface to match, so the light-ball behaved rather like a tangible object, refracting and deflecting so it seemed you could at least somewhat control the

ball's direction.

I watched the paddle and ball at the precise point of their contact, refining the control I could exercise over placement. Could I hit it on the left third of the paddle? How about the left fourth? Could I hit balls with the paddle's side rather than its upper surface, maybe useless in actual play but fun, and perhaps good for improving touch? I tried knocking out all the bricks of the lower band before the ball broke through to the next layer, eating corn on the cob. Virtually impossible. I tried putting more English into the shot, coming at the ball from the side and swooshing the paddle across quickly beneath it at the last moment, trying a spin. Did Atari accommodate that? I thought so, but wasn't sure.

It was here I discovered an ethically troublesome defect in the game. I'd hit a brick and the ball would come down. Taking care to line up the paddle, I knocked out an adjacent one, or even knocked out one above it, entering the open slot made by the preceding shot:



Again I aimed. The lights faked enough solid physics and the placement was tight. With still more barricade cut from the same narrow region, the ball once again dropped almost straight down as you'd expect. So I hit it square on again to further eat away that vicinity.

Poof. It veered radically to the side, a full sixty degrees off

course. I went through the same sequence enough times to make sure it wasn't my mistake. And it wasn't. They'd messed with the rebounds, by God, preventing you from breaking through too fast. A few shots straight up and down to the same vicinity, and then Atari took the mathematically cheap way out. The arbitrary and sharply pitched deflection they used to get out of trouble sent the ball into a low horizontal pattern for several volleys, and I couldn't redress these returns to pursue a vertical attack, had to wade through a long drawn-out exchange until the trajectory gradually became more upright.

Three explosions on screen at *Missile Command* is one thing. That becomes an acceptable rule of play. But an electronic tactic to forestall your progress is another. "All right, veer off to the side. I'll wait it out. Mess with my carefully aimed shot. But if you want forgiveness for being a computer, don't put rocks in the snowballs."

I stored the disturbance like you register a lie on the first date and puzzled for a moment over the game's moral integrity. If the programmer could patch up an organizational weakness with a trivial trick like this, where else might there be monkey business? If it was their way to let you feel competent, giving you three easy placements and then veering off as if you wouldn't notice it, they were stupid. Anybody would see what was up after a few times at the controls. The tactic didn't speak well for *Breakout*. What if she lies all the time?

By this point I was getting pooped and needed to go for the score, to break out at least once before calling it a night. If my neighbor could do it after an hour, certainly I could after three. The slam shot had been putting me out of commission every time. Mostly, by the time I knew it was coming, it was gone. You're going along at a comfortable pace, hit the fourth band, and then whap, the ball goes double time on you and you're wiped out.

Now I told myself, "Concentrate". I did a little seat squirm, as when entering a freeway on-ramp and you have to hit sixty in a real hurry, peeked up to the band to get the jump on when it was coming, stiffened up and sat on the edge of the chair, and handled one. I missed the follow-up but had returned my first slam. Actually, I got myself in its way.

In a half hour of just "concentrating" I'd refined the instruction. I discovered if I told myself to "glue my eye to the ball" I could start fielding first slams much better and get some of the follow ups as well. For about twenty minutes I sat there mesmerized, tracking the ball like my life depended on it, my entire being invested in the hypnotic pursuit of that pea sized light. Kneading my eyeballs into the guts of its movement like following a guy in a fast crowd where a momentary diversion would lose him, I soon got to a four or five round volley of fast ones. Knocking out that many more bricks a hole opened on the side of the barricade, and I watched the ball break out, ricochet like crazy between the back wall and the band, eat up six or seven more bricks, then fly down right past me. Had I not been taken in by the new quickened sights and sounds, I might have fielded it back up. My first breakout. Thank God, I could go to bed.

I'd qualified as a contestant, the money wasn't for naught, and I had a good night's struggle. If the slam could be managed and you could breakout in an evening's play, mastery couldn't be that far ahead. Over the course of the next several days, gluing my eye to the ball, I made steady progress. I couldn't eliminate all the bricks, didn't come close, though pretty soon I got to break through the barricade once out of every two or three trials, and after about a week I could get through nearly anytime.

But I couldn't control the shape of things at all, and it began to be clear that there was a good deal more to this simple

looking computer scenario than I'd imagined. It seemed easy enough to get a rough hang of things, to gain a bit of mastery over basic game events. But beyond some rough paddle handling skills I was stumped. During slow phases of the game, at least it felt like some command was to be had over the placement of shots and systematic destruction of the wall. But when things picked up the gaze lost all its freedom and there was no time to see where you were going. On a roller coaster under somebody else's management, taking charge of the action was reduced to your capacity simply to hold on. A discouraging situation. Then one day, as I was just fooling around at some makeshift science, I glimpsed at least the prospect of a more dignified option.

Just for kicks I covered the paddle path all across the bottom of the screen with an inch-thick strip of black tape. I tried playing blind, and could return only very few shots. I shortened the tape to leave a visible slot of two inches on each side of the screen, so when I was in the corners I could see the full paddle plus a bit. I swung back and forth again and again, end to end, trying to assess the gearing sensitively enough to field balls in the wide hidden area. When they came slowly, I could return about sixty percent of them, give or take a little.

Okay, you had to see paddle and ball at or very near the point of contact to handle each and every shot. But eyes and hands could get real close without that. I wondered if peripheral looking could do the job. You may have to see the point of impact, but there are lots of ways to look: out of the corner of your eye, in the immediate background, scanning by, just any old where in the periphery, with the quickest glance. I took off the tape and fixed my gaze right where the barricade touches the edge of the screen on the right, stared intently there without moving my eyes, and served a shot. I returned it. In fact I could play through a long volley gluing my eye away from the

ball. Peripheral vision sufficed.

Then came a slam, and my eyes were still experimentally riveted on this edge of the field. How do you like that! I returned it, and the next and the next, handling several fast balls without moving my eyes. Called upon to heighten its powers of observation, my gaze rose to the task. For ten days I'd been convinced you had to fixate tightly to handle fast shots, the time-honored method for dealing with a tricky coordinational problem at a fast tempo. And I'd played that phase of *Breakout* frantically sitting still. With slow balls I tried to find targets, control shots, to aim. With slams I dared not take my eye off the ball long enough to see where I was going, just hung in there waiting to cave in.

My little test for peripheral vision came as a surprise. You could in principle aim the ball right through the fast phase, from front to finish, stay right in there playing all the way, handling fast action and long range vision as well. Looking could stay mobile, thinking expansive, the eyes could plan. The game would take on new character as something more than just an endurance heat.

What was going on? I'd looked around here and there, checking out the barricade, preparing to focus tightly on the contact point for a carefully aimed next shot, readying my look to assist a delicate calibration. Then the slam. By the time my gaze could catch it, and then change over from the speed it ran to get there to the speed the ball was moving, it was all over. So I'd started tracking very precisely in order to be most pointedly with it on the barricade at the instant of rebound. You don't stand still on the platform and lunge onto the train when steps come by. You make a running jump. I'd glued my eye on the ball because that felt like the natural thing to do in anticipation of a slam. So it went, and so I became skilled at handling quick turnarounds. The ball lobs up, then shoots down, my eyes

inhabiting it all along the way, absorbing its speed as their own and pulling the fingers to the meeting place.

The experiment made me realize an evolution had been taking place for some time. It wasn't just eye work at all. And even without the experiment I would've soon noticed my eyes regaining their freedom. I'd already been looking away a bit without knowing it.

For instance, after the first few days of intently focusing the ball, I began noticing that my head was inscribing a path that followed its passage as well. So tightly glued to the ball's route, I was now nodding through the TV court as if it were a full-scale handball game seen from above. I look at my index finger held a foot and a half in front of my eyes, my head perfectly still, no sideways movement at all. Quickly tracing the finger a couple of feet back and forth from left to right to left to right, I track with only my eyeballs. First, it's strainful. Second, it feels inaccurate. The finger goes by in a blur at times, is hard to hold on to, and at various places the eyes fall out of phase and move in spurts. Now I move my head to track the finger in the natural way, finely synchronizing the scan. Eyeball movement proportionately lessens, the finger is seen clearly throughout, and even appears to move slower. Eyes don't sense their movements' pace, so to coordinate motions in tight alignment with a visible object's rate, we must follow with other moving parts. As we watch racehorses cross the finish line, our full upper torsos synchronize a pan to follow the heads in sharp focus and feel the winner's nose touch the ribbon.

After a few sessions gluing my gaze on the ball, the eyes were bringing the feet into play. I caught myself tapping tempos along with the bleeps. And several days later still, I found I was hitting fast shots with the slightest little upbeat twist, a zestful flick of the fingers, stylistically accenting this one, then that one, then this one, then that. A slight waist pivot had been

joining in too. Day by day the fast *Breakout* rates were more and more systemically acquired. So the test for peripheral vision confirmed what my body was learning all along. Gluing my eyes to the ball had brought the rest of me along, and my look then gained some freedom.

At the instant the pace changes when the ball strikes that band, you at first watch intently for the onset of the slam. But when it shoots down and the eyes try to grab it, they can't possibly hold on not knowing how fast it'll go. That's why we need a "get ready, get set, and then go" should we specially care to coordinate an action at some pace.

As the *Breakout* ball heads toward the critical band, there's no "get ready, get set, and then go." Just a "go." So to grab a firm hold you must possess the game's rates, and supply the "ready, set, go" missing on screen. Your eyes beckon you within range of the pace, but till you more thoroughly learn to feel how fast upcoming slams go in relation to how fast slow shots rise, there's no way at all to ride on the wave.

Playing *Breakout* again and again and again, through the slow phase and fast, from the one to the other to the other, I hit slam after slam after slam after slam, and was nodding, and bobbing, and tapping. I was learning to feel it go fast and go slow, to feel how fast fast is from this slow and that. And just as I may move into a song at the remembered same tempo day after day, I've been going back and then forth and then back and then forth, and it's ready, and get set, and go wooosh into this, that, this, that, this, that.