Mother Is A Pinball Machine

by Tom Buckley

For only five cents,
comfort,
warmth and bliss

Night or afternoon, the girl with the long red hair, the old man in the brown overcoat, the young fellow in grey factory denims, the college student who bites his nails, the lawbook writer and the cool colored boys slide down Market Street to the edge of skid row in Newark, New Jersey, and swing open the glass door beneath the red-and-white neon sign that says AM SEMENTS.

The place is called Sportland. Along its walls the red and green and yellow and blue lights of thirty pinball machines wink an invitation. Buckaroo, Trio, Kings and Queens, Sweethearts, Teacher's Pet, Eight Ball, North Star, Flying Chariots, Skyline, Bongo, Moulin Rouge, Hi Dolly. Each regular player has his favorite. He goes quickly to it, drops in his nickel and in solitude holds it close.

Suddenly there are sounds, colors, symbols, a flow of energy through the solenoids and relays and the bundles of wires striped like candy cane in the cabinet. It goes to the player himself, who completes the circuit. This is pinball, the modern, electromagnetic, nonverbal fantasy game.

In *Understanding Media*, Marshall McLuhan writes: "The games of a people reveal a great deal about them. Games are a sort of artificial paradise like Disneyland, or some Utopian vision by which we interpret and complete the meaning of our daily lives. In games we devise means of nonspecialized participation in the larger drama of our time. . . . A game is a machine that can get into action only if the players consent to become puppets for a time."

There are so many misapprehensions about pinball. Millions of players all over the world don't know that the machine is playing *them*. Phil Gould, the owner of Sportland, is interested only in proving a negative—that pinball is not a gambling device. The manufacturers, still bound by the traditions of the carnival midway, allow the machines to be placed in bus stops and candy stores instead of schools and parish halls.

Public officials permit pinball in some cities for the wrong reasons. It is forbidden in New York City, Chicago, scores of other places and the entire states of Alabama and North Carolina because of political pressure, whispers of underworld influence and dubious, outdated scientific evidence. Thus pinball, a game for contemplative man, becomes a hostage of the technological and cultural revolution.

It's a Friday night and Sportland is crowded. Morris Lee, the floorman, is playing Hi Dolly with David Abnathya. Morris, a tall, slim Negro in his early twenties, is the best player at Sportland and one of the few who would rather play with someone else than alone. Hi Dolly has been his favorite game since it arrived. In emulation, other players have taken it up. A couple of them are standing around, watching him and shifting from foot to foot, hoping he will quit soon.

"Because they think they can beat it, that's why they're waiting," says Morris, cool and ironical, not taking his eyes off the playfield. "They *can* beat it. Once in a while. That's why they keep coming back. Hi Dolly or North Star or Kings and Queens. They can beat them *sometimes*. That's okay. They beat them all the time and we'd have to tighten them up. If they never beat them, they'd give up."

While Morris is talking, the ball is spinning all over the board. He has his palms cupped around the corners of the cabinet, pushing, vibrating, making the glass top rattle, keeping the ball up there. His long index fingers rest on the red buttons on each side that control the flippers, the pivoting fingers that guard the run-out slot at the bottom of the playfield.

Morris launches another ball. It spins along the ellipse at the top of the board, loses momentum, kisses two bumpers and goes where it was supposed to, through a passage that says "special when lit." It is lighted. One hundred points. The ball then strikes a thumper bumper that bounces it against a white rubber rail. The slingshot behind the rail sends the ball down the playfield. In the time of one heartbeat it is in range of Morris' left flipper.

He could press the button now, sending the ball back up the board, but without direction. Instead he waits for a fraction of a moment. Then he pivots the flipper slowly, trapping the ball in the acute angle that the flipper makes with the rail alongside it. All concentration, he eases his finger off the button. The ball rolls downward a half inch along the flipper. Now! Dead on the mark, the ball hits the ultimate target, Hi Dolly's most secret spot, guarded by baffles and buffers, where the big scores are multiplied by five when the yellow light glows. Five hundred points. An extra ball. The machine becomes incandescent. On the back glass, where the score is clicking into the stratosphere, Dolly, represented as a blonde show girl in a dressing room, surrounded by admirers, seems to smile. There is the pistol-like CRCK of a free game, and then another and another.

"Eighteen hundred and eighty, that ain't hard to beat," says cool Morris, and turns away to make change for the jukebox out of the canvas apron he wears beneath his starched grey clerk's jacket.

The jukebox never stops at Sportland. Half-a-dozen free and easy youths dance in turn with a couple of girls in their teens. They barely move their feet and their bodies, suggesting the steps rather than doing them. The hard green walls vibrate with the pounding of the drums, the swelling organ, the wailing voices. Over and beyond these sounds, there is another music. It is the random, arhythmic electron dance of the steel balls vibrating in their closed systems, producing sounds from each sensitized surface.

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                    ping
   B    B
    O    O    clickclick          clickclick
     N    N                                  pingpingpling
      G    G         G        ratatat
dingingding          N
. . . Ah need him     U . . . Ah wan him. . . . oooOOOooohhh
                     L      clickclick
                    B
  CRCK!          dinging                     pingpingclckclick
                              BONGBONG
       prpprprp                                   ding
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The two dancing girls, white faces blank beneath great mows of honey-coated hair, walk over to Morris. "How come you don't have no Beatles records?" one asks.

Morris, watching David's last ball sink out of sight, smiles and turns away. "Don't talk to me about no Beatles." To no one in particular, he adds, "It would be different if they could sing," and goes back to his game.

The express bus makes the trip from the Port Authority Bus Terminal to within a couple of blocks of Sportland in thirty minutes, but it carries no finger-twitching pinball addicts. New York City has forgotten the game it banned nearly twenty-five years ago. The end came in January, 1942. Under cover of Pearl Harbor, a decision was handed down that pinball machines were gambling devices. It was a black day. The police mobilized a fleet of trucks. They seized as many of the 11,080 machines in the city as they could get their hands on. Mayor LaGuardia was photographed breaking up mountains of the captured games with a sledgehammer. The legs of the cabinets were sawed off and issued as nightsticks to civilian-defense patrols.

For the Mayor, it was a moment of triumph. He had been saying for years that storekeepers were paying off high scorers with cash instead of free games, which was true; that school kids were spending their lunch money on the machines, which may have been true, but in any case was a less harmful purchase than loose cigarettes at a penny apiece or pornographic booklets; and that the underworld controlled the distribution of the games, which was never proved, and was not a surprising allegation in view of the fact that the underworld has been credited with owning almost everything else.

LaGuardia could also call on science to support him. A few years earlier a New York University professor rounded up a hundred of his students and put them to work playing pinball. One group was instructed to release the ball and let it roll without interference. (This was before the introduction of the flipper, which makes the game beyond question a test of skill.) The others were told to become proficient in all the techniques of the game.

After a month the professor announced that the second group had done "only" ten percent better than the first. Aside from the fact that you clearly can't order someone to *(Continued on page 134)*

Photographed by Saul Leiter

V. *The Americans* (The order is Picture—Name—Description)

A-f-11	B-e-1	C-h-12	D-l-10
E-a-9	F-k-4	G-c-3	H-d-5
I-b-8	J-g-2	K-j-6	L-i-7

The Asians (Split credit is permissible on this question.)
There are three items to be matched: picture, name, description. If you match two of them correctly, give yourself 3 points. If you match all three, give yourself 6. (Picture—Name—Description)

A-4-l	F-11-b	K-16-r	P-18-a
B-12-h	G-6-o	L-7-j	Q-3-m
C-14-e	H-15-p	M-13-d	R-10-n
D-2-i	I-8-q	N-9-c	
E-17-f	J-1-g	O-5-k	

VI. *Bonus Question*
If you have scored 265 already, there is no need to take this Vietnam trivia test. If not, you need the points.

1. Any of the following is permissible: Nguyen Van Thanh, Nguyen Ai-Quoc, Nguyen Tat Thanh, Nguyen Sinh Huy.
2. Backers of the enclave proposal
3. Ca Mau
4. Lyndon Johnson. This is Vietnamese for "We seek no wider war."
5. Thich Tri Quang
6. Cans of hair spray ###

THE LINCOLN CENTER SYNDROME

(Continued from page 94) you when you know that you have satisfied your psychic needs?

"Now you have your million-dollar center. It is unmistakably a million-dollar center because your building plan will be an exact duplicate of an existing million-dollar cultural center I have recently created. Just one look at it and you'll see a million dollars written all over the building. Sit back, if you will, and close your eyes, while I tell you what your million-dollar cultural center will look like. From the outside, the building will speak art. Because it is important to satisfy every element in the cultural spectrum, from the Gregorian-chant enthusiast to the Lawrence Welk lover, the building will be modern in execution, Gothic in theme, and rococo in spirit. Upon climbing the eighty-seven steps to the entrance, framed in a setting of massive columns, we enter the Grand Foyer. It is dominated by two massive statues, one of Erato and one of Terpsichore. Off to our left is the little art gallery. In front of us is the large auditorium with a seating capacity of 2256, ringed by four splendid tiers. Behind it we have our dressing rooms, both male and female, our rehearsal rooms, and, of course, our patrons' room. We then descend a flight of simulated marble steps to the Petit Foyer. At this lower level we find the little theatre, seating 298, for the presentation of the venturesome and the avant-garde. Here you will experiment with culture. To the right of this theatre is a small motion-picture studio. There you have it. A multipurpose cultural center ready for any kind of performance."

Mr. Stock pauses to answer a question from the audience. "Yes, sir, what is that? . . . A livestock show? Well I hardly think that can be classified as culture. However, if you must have a livestock show, I suppose we can put in removable seats and have specially treated floors. Of course it would help to pipe in stereophonic music, classical and bucolic in feeling, during the show. Now are there any more questions?"

He recognizes a lady seated in the back of the auditorium. "Good question. What besides the livestock show goes into the cultural center? I'm glad you asked that. I have with me a list of the cultural organizations in your community. Now, let's see. You have a stamp club, barbershop-quartet chapter, flower society, a combination piano, voice and wood-carving workshop, two garden clubs, a dance and elocution studio for the young, a high-school marching band. Any theatre? What's that? Two outdoor movies. . . . Ah, yes, I see you do have a little-theatre group. Let's see. Music, dance, theatre, the visual arts. Perfect. You have every discipline represented. Now, of course, this might not give you enough to program for the entire year. You might have to bring in some outside productions. But we can worry about that after the center is built. A management-consultant firm may be of some help then. They can come in, analyze what you have, and recommend your future artistic policy. But get a good one, one that has relatable experience in the non-profit field. A firm that's worked with cancer, heart disease, community chests, understands your problems.

"My friends, that concludes my prepared remarks for the evening. Are there any further questions before I bid farewell? . . . What is that, sir? You don't think there are enough people interested in the arts to warrant building a cultural center. Let me just say this and I hope you'll remember these words. If there is one American child in your community who is thirsting for culture, even one child, should that youngster be denied the opportunity to have a cultural center? No. No, indeed not. Let me leave you with those words. Thank you, my friends."

Mr. Stock hurries off the stage to a thunderous ovation. Miss Jones is waiting to congratulate him in the wings. Mr. Stock speaks. "Miss Jones, I'm afraid I'll have to rush off. I'm due in Grand Valley tonight to deliver another lecture on How to Build a Cultural Center. They're very eager and I can't disappoint them."

Miss Jones answers him reassuringly. "No need to hurry, Mr. Stock. Take your time. Grand Valley is only five miles away." ###

MOTHER IS A PINBALL MACHINE

(Continued from page 85) become a pinball shark any more than you can order him to write a poem, a difference of ten percent would be regarded as an overwhelming margin of superiority in any game. The professor said it proved that pinball was a matter of luck.

"Ridiculous!" Phil Gould shouts. He is seated in his office a half-flight up at the rear of Sportland, watching the action through a one-way window that, from the front, looks like a cloudy mirror. Gould is smoking a cigar, glancing at *Cashbox*, the journal of the coin-machine business, and thinking about Hot Springs, Arkansas, where he will be going in a couple of weeks to take the baths.

"Gambling, that's a joke," he says. "They don't carry anything out of here. No money, no prizes. Just amusement, that's all we offer. I've got a guy who comes in here every Saturday about noontime. He writes lawbooks. Lawbooks! He comes in and plays for a couple of hours. He says it relaxes him. Once I asked him how much he spent. You know what he told me? 'One buck.'

"Where else can you do anything for a buck today? You go to a movie, I guarantee you've got to go for a buck, a buck and a half. Hell, you can gamble on anything, when it comes down to that. If I tossed these kids out of here, where would they go? They'd be inking spots on sugar cubes and playing craps with them in some hallway somewhere."

Gould, a plump, greying man who wears a checked jacket and a Tyrolean hat pushed back on his head, sometimes wishes he had gone into the casino business instead of arcades. "If I were twenty years younger . . ." he says, thinking of riffling packs of crisp C-notes and okaying markers. But he isn't, and it doesn't even look now as though he'll ever get pinball back on Broadway. Gould is above all a realist. Many pinball places have doubled the price of the game in recent years. But not Gould. He knows his customers. "Better a fast nickel than a slow dime," he says.

Bagatelle was a nineteenth-century English tavern game, played with a cue and nine balls on a baize-covered table that had nine holes arranged in an ellipse at one end. From it developed Russian bagatelle—"a childish variety having holes, pins, arches and bells," according to the dictionary—and from Russian bagatelle came pinball.

In the late Twenties, according to Herbert B. Jones, the advertising manager of the Bally Manufacturing Company of Chicago, and the unofficial keeper of the traditions of the industry, an advertising solicitor for *Billboard*, the carnival and circus magazine, found the janitor of his apartment house playing Russian bagatelle, using a board of his own design. Borrowing it, the solicitor took it to a concern that manufactured gaffed wheels of fortune, shell games without peas and other carnival items. The company designed a coin mechanism for the game and sold a few before it foundered in the Depression.

In 1931, another concern picked up the idea. It built a game and named it Ballyhoo, after a popular magazine of the period. Ballyhoo was the archetypal pinball game. Within a few months 50,000 were sold. The company thereafter identified itself as Bally, which is a shortened version of the name.

Ballyhoo consisted of a cabinet that was small enough to be placed on a cigar counter, a playfield in which there were nine holes guarded by brass nails or pins, a spring launcher, and a marble. It was manually operated, there was no scoring mechanism, and once the marble dropped into a hole, it was out of play. The machine cost $16.50 and players got seven balls for a penny.

"Incredible as the fact may seem to a generation which regards the one-cent coin as a nuisance necessary because of sales tax," Jones, a Harvard man who has mastered a literate pitchman's prose style, wrote to a friend not long ago, "many men amassed fortunes operating penny-play Ballyhoo games."

By 1933 battery-operated games were being produced. The next year they went to plug-in power. Soon after, the automatic scorer, free-game award and tilt mechanism were devised. After the Second World War came the flipper, thumper bumpers, multiple-player scoring and several minor innovations.

"Indeed," writes Jones, "the [present-day] pinball game is a form of computer with an elementary 'memory' mechanism. Many games contain a bonus feature in which, by hitting certain targets, the player advances the *tentative* value of the bonus. When and if he then hits the target which awards the accumulated bonus, the mechanism must remember that the game owes the bonus to the player, must erase the bonus from the accumulator and add the bonus points to the player's score. Moreover, in the case of multiple-player games, the bonus must accrue to the proper player."

The Bally factory in Chicago, which I decided to visit after Jones's letters got to be too much for me, builds about a quarter of the 50,000 pinball games that are manufactured in this country each year. About forty percent are sold in this country. For the past decade pinball has been a world-circling pastime, except for the Soviet-bloc nations of Eastern Europe and a couple of authoritarian enterprises like Spain and the Union of South Africa. France and Germany are the industry's biggest foreign customers. Second- and third-hand machines end up in odd corners of Africa and Asia. Bally received an order a couple of months ago for parts for a ten-year-old model from a Chinese merchant in Libreville, Gabon. There is also vintage equipment to be found in bazaars in Qatar and tearooms on Taiwan.

"Pinball is tremendously popular in Germany," Jones, a tall, baldish man who has been with Bally since 1932, told me. "It's such a big thing that we translate the instructions on the back glass and playfield—things like, 'Hitting buttons 1 through 10 lights special'—into German. In France the game is known as Les Flippers. For games that we're shipping to France we leave the instructions in English. The distributors insist on it. They say that no one over there would play them if they thought they were built in France."

Pinball players demand novelty, or at least the appearance of novelty, so Bally tries to put ten or twelve new models on the market each year. The man in charge of quenching this thirst is Ted Zale, the company's chief designer. The first time I visited his office I saw a sign on the frosted-glass door. It said, "Restrict Area. Keep This Door Closed." The door, of course, was open, and I could see Zale playing pinball on a machine that bore no markings except for a strip of gummed paper pasted on the back glass on which was written, "Monster No. 2." On a table alongside a stopwatch was mounted.

Zale, a leathery man in his sixties, played game after game. When each was completed, he noted the elapsed time on a pad, his score and the number of times the game's special features—in this case a gate that scored only when the ball passed through it on the way up the playfield—came into play.

"That gate is my invention," Zale said. "And look here. That's a free-ball gate. Mine, too. And the mushroom bumper. When the ball hits it, it raises the top of the bumper and you get the score.

"I get my best ideas in the middle of the night. I'll be dozing off and something comes into my mind and I wake up. I've got a drawing board alongside my bed, so I can get everything right down on paper. Then, like as not, a couple of days later I'll take a look at my brainstorm and say, 'Oh the hell with it!' "

"The designer is essentially a composer," Jones had written to me, "who, as the musical composer endlessly rearranges the notes and half-notes of the scale, rearranges standard components to achieve novelty in play. He also, of course, invents (or more properly evolves) new actions and scoring situations."

In manipulating bumpers, gates, traps, slingshots, flippers and the rest of the hardware of pinball, Zale is limited only by the size of the playfield, which has become standardized thoughout the industry at 40⅝ by 20⅛ inches; by the diameter of the steel ball, which is 1 1/16 inches, and by the incline of the playing surface, which is 3½ degrees, but can be adjusted a half degree either way to speed up or slow down the game by means of screws in the legs.

Zale, a seat-of-the-pants engineer, has been designing pinball games for fifteen years. He joined Bally in 1962 after quitting a job with a firm that he decided was hopelessly conservative in outlook. Bally, which was returning to pinball manufacturing after several years of turning out electrical specialties and had a lot of ground to make up, gave him a free hand.

Until then pinball layouts had been severely symmetrical. Zale devised the first asymmetrical playfield, and in recent months half of Bally's machines have been off-center one way or another.

At the time I visited the factory Bally had already built fifty machines for testing in locations around the country, which is the usual practice, of a machine called Loop the Loop, in which the ball is launched across the center of the playfield and then to the top in an "S" curve. By fall, Zale told me, a game will be in production—it's top secret now—in which the technique of flipper play will be radically altered.

Zale was telling me that he always allowed the player more than one way of getting to a target when he was called away to the telephone. It turned out to be a long conversation, and although I refrained from peeking in an inner room where he had told me his most secret designs were kept, I began fooling around with Monster No. 2.

For the first time I was playing pinball without performing the first and most important act, the insertion of a coin. Then, too, since there was no glass cover on the playfield, I was able to intrude my hand into the subtle equation of the game, or, to put it another way, to cheat.

The first time I did it, picking up the ball before it dropped through the runout slot, I had the uncanny sensation that my hand had somehow passed through the glass. The second time was easier, but within a few minutes, deeply offended by my conduct, I left the office.

After an experimental machine is wired and tested it goes to Bally's chief engineer, Joe Lally, who decides whether it has that indefinable quality that the industry calls "play appeal."

Like Zale, Lally operates almost entirely on intuition. "There are no guidelines in this business," he said. "You just build up a feeling about what will go over and what won't. That's why most of the people in the industry are old-timers. Every once in a while some new outfit starts up to make pinball games. It hires psychologists and industrial designers and it's going to sweep the field, but somehow it never seems to last very long."

I asked him, even so, to make an effort to put into words the elements that led to play appeal.

"A machine has got to have what we call 'last-ball suspense,'" he said. "What that means is that, supposedly, no matter how far behind you are, whether you're playing against someone else or just trying to match the score that will give you a free game, you can bail yourself out on the last ball.

"Another thing is the 'plateau system,' the attaining of awards that are larger and more difficult than the ones that precede it. Then there's the 'cumulative effect.' Right from the start of the game, in other words, you're building up what you're going to have in the bank when and if you accomplish one of the difficult tasks that confronts you later in the game."

Lally went on, "Basically, what we're selling is time, the length of time it takes an average player to play a game. We think three minutes is about right and that's what we try to average out to on our tests."

As to the free games, which are the only permissible rewards virtually everywhere pinball is played in this country—a couple of wide-open communities in Kentucky and downstate Illinois permit cash prizes—Lally said he thought that the required score should be set to give out one free game for every two that are paid for.

"I'm convinced that that ratio leads to the biggest returns for the operators, but I have to admit we haven't been very successful in convincing them. They think it's too high."

While I was with Zale, he had given me a guided tour of the inside of the pinball cabinet, and I had learned that, contrary to my belief, the technology of pinball was not of a particularly high order. It consisted for the most part of a good many devices called solenoids and relays, which converted electrical energy into mechanical energy to operate thumper bumpers, slingshots and the rest. The tilt mechanisms, which I asked to have pointed out, were almost primitive. The one that controlled nudging being nothing more than a plumb bob hanging in an electrically charged circle. The two that limited sideways pushing and the lifting of the legs of the cabinet looked like a New Year's Eve clapper and a carpenter's level.

I told Lally about my recently evolved theories on the improvements that could be made in pinball, proposing the creation of a two- or three-level game as well as the free use of what I grandly termed "various electronic techniques," although I wasn't quite sure what they were.

"Just think," I said enthusiastically, "electronic chess, thinking man's pinball. You could put in those far-out computer sounds, too, instead of nothing but bells."

To my disappointment, Lally had no trouble refraining from leaping out of his chair to congratulate me on my revolutionary proposals.

"We once tried a photoelectric cell," he said politely. "When the ball broke the light beam it lighted a special bonus. The players didn't like. They couldn't *understand* what was happening, and they couldn't *see* why it was happening. From time to time we've tried electric components—simple ones—but electronics scare our servicemen. A lot of them date back to the days when the games were manually operated or battery-powered. For a two-level game you'd have to use a transparent plastic and we've found that they get dirty quickly and they're hard to keep clean."

"We like a spare, uncluttered look," says Herb Jones, who names the games and supervises the art work on the playfield and backglass. "It's just as well. There isn't much room for subtlety in color and design. All we want, really, is enough flash so the game can attract its share of attention."

The result is the repetition of a limited number of themes, mostly bathing beauties, in the cartoon style of the Thirties that is now driving everyone mad with joy as pop art. It's entirely likely, in fact, that one or two outstanding backglasses, or entire machines, for that matter, may end up in museums.

In naming the games, Jones looks for appropriate words beginning with the letter "B" for alliteration, like Bally's Blue Ribbon. Others are chosen to cash in on some momentarily popular phenomenon, like Hootenanny, Discotek and Moonshot. At the time of the release of the film *It's a Mad Mad Mad Mad World*, Bally put out a game called Mad World.

In any event Jones wonders whether the names and colors and themes of the games make much difference, or, for that matter, whether the players ever really see anything except the score.

I went back to Sportland with a clearer idea of what went on inside a pinball machine and now I began trying to figure out what went on inside the heads of the people who played it.

Lally had said, "The player knows that the machine isn't going to get mad at him, even if he wins. You take someone who beats his best friend playing gin and if it happens a lot they may not be friends anymore. But the machine is always happy, whether you beat it or not."

"This writer's opinion is that the great glory of pinball is that the device is designed for deliberate waste of time and is, therefore, welcomed by a society ceaselessly flogged by the pundits of the Purposeful Life," Herb Jones had said in a letter. "Considered simply as a pastime pinball is vastly less expensive and less taxing to the bodily and cerebral resources of the human organism than other forms of participant pastime."

In the course of my investigations I naturally played a little pinball myself. As time went on, I found that Eight Ball, my favorite, was exerting a considerable power over me. I would go out to Newark, intending to analyze the motivations of the regulars, who were, I soon found out, notably taciturn, but I found myself barely saying hello before changing a couple of dollars into nickels and stepping up to my machine.

A couple of hours later, my legs aching, the palms of my hands sore from relentless and generally ill-timed nudging, my eyeballs bouncing back and forth like twin yo-yo's, I would reluctantly quit and go next door to the Hollywood Room of the Novelty Bar & Grill to compose myself with a couple of Scotch-and-sodas.

I was there one night at eleven o'clock, Sportland's closing hour, thinking how right Lally had been when he told me that teen-agers were, by and large, the best players and that the pinball reflexes deteriorated alarmingly in the thirties, when Morris came in with Lucius Chance, the day floorman, who had been playing pool on the half-size table at the rear of the arcade.

Setting up drinks for them—gin with a beer chaser—I mentioned casually that I didn't seem to be able to roll up top scores even once in a while.

"It's the wrists," Morris said. "I used to play basketball when I was in high school. Shot two-handed at first but I didn't do so good. Then I learned to shoot with one hand, just using my wrist." (He demonstrated, letting his wrist bend back and then bringing it slowly forward like a temple dancer.) "Same thing in pinball. Some people, they push with their shoulders. All they get is a tilt. Me, I use my wrists. On Dolly I can push that machine so that you wouldn't believe it. It don't tilt on me. Somebody else come in, they just *touch* it and it tilts."

Turning to me, Lucius, who is in his fifties and as amiable and animated as Morris is reserved, said, "I'll tell you one thing. After you tilt, it's best to wait a few minutes, let that little gizmo stop moving, else it'll tilt on you again, sure as shooting."

I recalled that Pat Briecker, the girl with red hair, had told me a couple of weeks before that pinball provided an index of character. "I can tell from the way you play," she had said, while I was in the middle of a run of bad games, "that you're self-centered, impatient and used to having your own way all the time."

"I don't know nothin' about that," Lucius said, "although you got to be patient, I don't care *who* you are. Seems to me it's the young ones who want to win all the time but it's the older ones want a *challenge*."

Returning to a subject that seemed to obsess him, for I had heard him talk about it before, he said, "What matters anyhow is that you can go in there tonight and win *eight* or *nine* free games. The next night I can tighten up that machine—*this* much here, *this* much there—so that you, or Morris or *anybody*, he can play for four *hours* and he ain't gonna win nothin'."

It was a couple of weeks later, a mild night in early spring. The odor of thawing ooze, burning garbage and oil from the refineries was drifting across the city from the Jersey Meadows, the industrial wasteland along the shores of New York Harbor. It was late and I was as bad as ever, but I thought of what Pat had told me, and I decided to stay a while longer to cultivate patience. Morris, who was mopping the linoleum, covered with cigarette burns that looked like squashed cockroaches, gave me change for another dollar.

"I am not going to play the machine," I told him. "The machine is

CREDITS
(See page 5)

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not going to play me. I am going to *become* the machine."

"You do that," he said.

Somehow I managed it. One superb game followed another. I felt the weight of the ball in my fingers, the pulse of the alternating 50 volts in my heart. I saw the tilt pendulum swinging in its circle of wire, and I made sure that the two never touched. The scores mounted and the blackness of the 8-ball in the center of the backglass reached out and engulfed me. As though from far away, I heard the crack of the free-game, a sound like the hammer of a revolver snapping down on an empty chamber.

"How's that, Morris?" I said, trying to sound cool.

"Good shootin'," he replied, sounding, I thought, as though he might possibly have meant it. ###

THE OPPOSITE OF YOU IS UOY

(Continued from page 83) the laboratory rather than in space for the logical but elusive mate of the positron, the antiproton.

Physicists reasoned that the antiproton had a virtual rather than a real existence. That is, they could predict it, but only by shattering atomic nuclei and in the process converting some of the available energy into a tangible antiproton could its existence actually be proved. But there was an energy barrier that had to be hurdled. A proton is a heavy particle, nearly two thousand times more massive than an electron. To fabricate such a particle or its antithesis, the antiproton, calls for a tremendous surge of power—a burst of energy that physicists calculated at six billion electron-volts or six bev. An atom smasher of such power simply did not exist.

But the compelling lure of the antiproton, like some intellectual musk released in the rutting season, finally resulted in the building of the bevatron—a six-billion-electron-volt atom smasher at the Berkeley campus of the University of California in 1954. Its main task was to make an antiproton.

With the price of atom smashers then pegged at about one million dollars a bev, some scientists thought it a ridiculous waste of research funds. One well-known physicist went so far as to label the search for an antiproton hopeless, and backed his opinion with a five-hundred-dollar bet.

In 1955 he paid off when Emilio Segrè and Owen Chamberlain, two University of California physicists, produced an antiproton with their expensive "nuc-cracker," as they called it.

Now the proton had its mate in the antiproton and things were looking up (or was it down) in the antimatter derby. Other bevatrons, of even greater power than the one at Berkeley, were built and each began shattering atoms and littering the fields of physical theory with a confusing proliferation of subatomic particles that were part of the proton and neutron, or elements of the glue that bound these nucleonic components together. And for each of the so-called elementary particles that was found—including such exotic specimens as mu mesons, pions, lambda, sigma and xi hyperons, thirty in all—there was a corresponding antiparticle produced in the atom smasher.

So far, no one had succeeded, or even attempted, to fit antimatter into the existing theories of the creation of the universe. However, there was no lack of such theories and each had its adherents and detractors who agreed on but one point—the universe was basically symmetrical. As it turned out, the theories were inconsistent. With the discovery of the antiproton, Maurice Goldhaber, an eminent physicist at the Brookhaven National Laboratories on New York's Long Island, declared, "Some of the current theories of the origin of matter tacitly or explicitly assume an asymmetry in the process of 'creation'—that is, the creation of nucleons, but not antinucleons."

Examination of the various theories revealed that this was indeed the case. One idea, for example, held that in the beginning there was a dense, neutron-rich atmosphere called the "ylem" which, by processes called neutron capture and electron decay, was transformed into the elements that make up our universe.

A second theory held that there was really no beginning, middle or end to the universe. The stars, galaxies and other members of the cosmos remain at a constant number, with new galaxies being formed as soon as old ones disappear. This "steady-state" theory insisted that hydrogen, the basic building block of all matter, is continually being formed somewhere in the void. The virginal hydrogen is then called up by gravitational forces into new stars, and eventually galaxies.

A third, "the pulsating theory," suggests that the universe is expanding and contracting in some unknown rhythmic pattern. The creation is ascribed to an exploding nucleus which gave birth to the galaxies and thrust them out into space. At some unknown distance from the original explosion they will contract to their original density and explode a second time and begin the process all over again.

The last of the popular theories, and the one which seems to benefit the most from the presence of antimatter, is the "big-bang" idea. Formulated first in 1927 by a Belgian priest, Abbé Georges Lemaître, the theory holds that the universe began with the explosion of a "primeval atom" or cosmic egg. The debris coalesced into local pockets that formed stars and galaxies which rushed outward away from each other.

To add antimatter to the creation and at the same time preserve symmetry, Goldhaber modified the big-bang theory. "We shall assume," he said, "that there existed at first a single particle, containing the mass of the whole universe, which we shall call here the 'universon.' We shall further assume that at a time unknown at present, the universon divided into a particle and its antiparticle, which we shall call the 'cosmon' and the 'anticosmon,' each possessing a large 'nucleonic charge,' but of opposite sign (where nucleonic charge is defined as +1 for a nucleon and −1 for an antinucleon). The cosmon and the anticosmon similarly may have flown apart with a large relative velocity. After the separation, the cosmon, which replaces here Lemaître's primeval atom and must therefore be assumed to be the particle of positive nucleonic charge, 'decayed' possibly through many intermediate steps, into nucleons, which in turn formed our present expanding cosmos."

Goldhaber did not at the time know whether or not the other half of his universon, the anticosmon, also decayed to form an anticosmos or antiuniverse, and he admitted his speculations raised many questions that might "ultimately prove answerable by observation."

Since Goldhaber first set down these ideas in 1956, a startling and mysterious new finding in the heavens has sent a number of other scientists into excited speculations about antimatter and creation. The source of all the excitement is about a hundred incredibly energetic objects discovered at the outermost horizons of the universe—from two to ten billion light years away. First uncovered by radio telescopes, which then guided optical lenses onto them, they are by far the most brilliant objects in the heavens, but appear as dim specks of light because of their incredible distances from earth.

One such quasi-stellar radio source, or quasar as these mysterious objects are called, was reckoned to be about two-and-a-half trillion times as luminous as our own sun. Astronomers have calculated that to keep such an object at its current brightness for even a million years—a mere eye blink as astronomers reckon time—matter equal to that contained in 100,000 suns would have to be converted into radiant energy.

All of the quasars thus found produce equally prodigious energies, gigantic outpourings of radio waves that dwarf the production of all other stars and even entire galaxies. And when it was realized that the source of these fantastic energies were not galaxies at all, but massive organizations of star-like objects, a number of theories were proposed to explain them. All were scrapped as most scientists agreed that such enormous energies could only be emitted by a catastrophe of cosmic proportions.

Yet what possible form could such a catastrophe take? The most awesome disaster man can envision is a collision of galaxies, a cosmic derailment as a train of stars sideswipes those of another galaxy. But even such a monstrous crash would produce only a candle glow compared to the arc-light energies emitted by the quasars.

Other ideas were explored. A chain reaction of exploding stars was one, a cosmic string of firecrackers, each popping off in rapid succession until an entire galaxy had been detonated.

Such an idea required a galaxy constructed along lines never before seen in the heavens—a core of stars timed to explode one after the other and spaced so close together they could be set off at a rate of ten or so a year. But in our own galaxy such supernova—exploding stars—are seen barely once in two centuries.

Another idea envisioned a star of enormous size which collapsed in upon itself until it reached a critical point and exploded. The gravitational forces created by such an enormous mass falling in upon itself would turn the explosion inward, containing the energies and igniting still more complete conversion of matter to energy and eventually achieving a tremendous blaze of the quasars. But no star could possibly attain such cumbersome obesity without exploding long before reaching a size where gravitational collapse could take place. The most massive stars known are only sixty-five times larger than our sun and the order of magnitude required to achieve gravitational collapse is hundreds of thousands of times beyond that.

There remains but one other theory that fits the facts and still conforms to physical law as we know it—antimatter. There is, of course, no means of analyzing the makeup of a quasar and thereby determining whether it is antimatter, matter, or a combination of the two. But the collision of a star with an antistar might produce energies on the order of those emitted by quasars. Such a meeting of matter and antimatter also fits the newly emerging models of creation now being evolved to account for both states of matter. For the vast distances that separate us from the quasars give them an antique origin that reaches almost *three quarters of the way* back into the incredibly dim recesses of creation. Astronomers can clock the speed and distance of heavenly objects by observing their so-called red shift—the movement of the spectral lines of an object's light toward the red side rather than the blue side of the spectrum. Such red-shift clockings of one quasar revealed it speeding away from us at almost 150,000 miles per second, or almost eighty percent of the velocity of light, which is the maximum speed limit of the universe. Quasars already incredibly distant and moving at such speed are sending us radio waves that originated more than *ten* billion years ago. This means that light emitted from the quasars at this very instant and traveling at a speed of 186,000 miles per second, or six trillion miles a year, will still take ten billion years to reach the earth. Conversely, the light we are already receiving must have blazed forth when the universe was in its infancy, assuming, as most experts do, that the universe is approximately 13,000,000,000 years old.

In one sense this peering backward across time to the beginning is like running a film backward to the beginning. Technological advances such as radio telescopes and orbiting observatories that give us a view of such far-distant objects as quasars enable us in effect to run the film record of cosmic events backward until eventually we may be able to perceive the actual act of creation or come close enough to it to deduce the actual happening.

Now, as each new-old frame pops onto the cosmic screen, it becomes increasingly apparent that the story we presumed could be told only with the aid of a *deus ex machina* suddenly has a new component that need not rely on a *supernatural jack-in-the-box. Deus ex machina* in this case is antimatter: not simply a microcosmic particle of antimatter, but a vast, organized universe of planets, stars and galaxies of antimatter.

"A literal antiworld populated by stars and planets and made up of atoms of antimatter may well exist physically in addition to the known