
GM
General Motors
Futurama

GENERAL MOTORS

Futurama

NEW YORK WORLD'S FAIR
1964-65

Fantastic," the man said. And his awestruck expression as he left the Futurama building made any further explanation from him unnecessary.

He had just had himself quite an adventure. It included: visiting a far-out station for space travelers . . . a glimpse inside a plush undersea hotel . . . journeying through the City of Tomorrow . . . seeing the fastest gun in the world, and what it can do . . . getting acquainted with an engine that starts operating when the sun's heat is applied. And, at that, we've recited only a smattering of the experiences he'll never forget.

The all-under-one-roof adventure that is Futurama really began back in October, 1960. It was then that a group of men gathered in a handsome but unpretentious room in one of a huge complex of buildings in Warren, Michigan. They were all members of a General Motors management team, and they faced a new and gigantic assignment: conceive and bring into existence the GM exhibit for the 1964-65 New York World's Fair. Differing slightly from the objectives of Futurama I of 1939-40, which predicted the *probabilities* for man's future mobility (with, it turned out, uncanny accuracy), Futurama II of 1964-65 was to deal with future mobility on a *possible* basis—and, further, on a global scale and beyond.

By mid-January, 1961, the men had developed sketches and agreed on a basic concept that would project their panoramic story. In the succeeding months, a Futurama building scale model was constructed, with each one-half inch of model representing one foot of the real building. For convenience during planning and development, this scale model was sectionalized so it could be opened and examined inside from every angle.

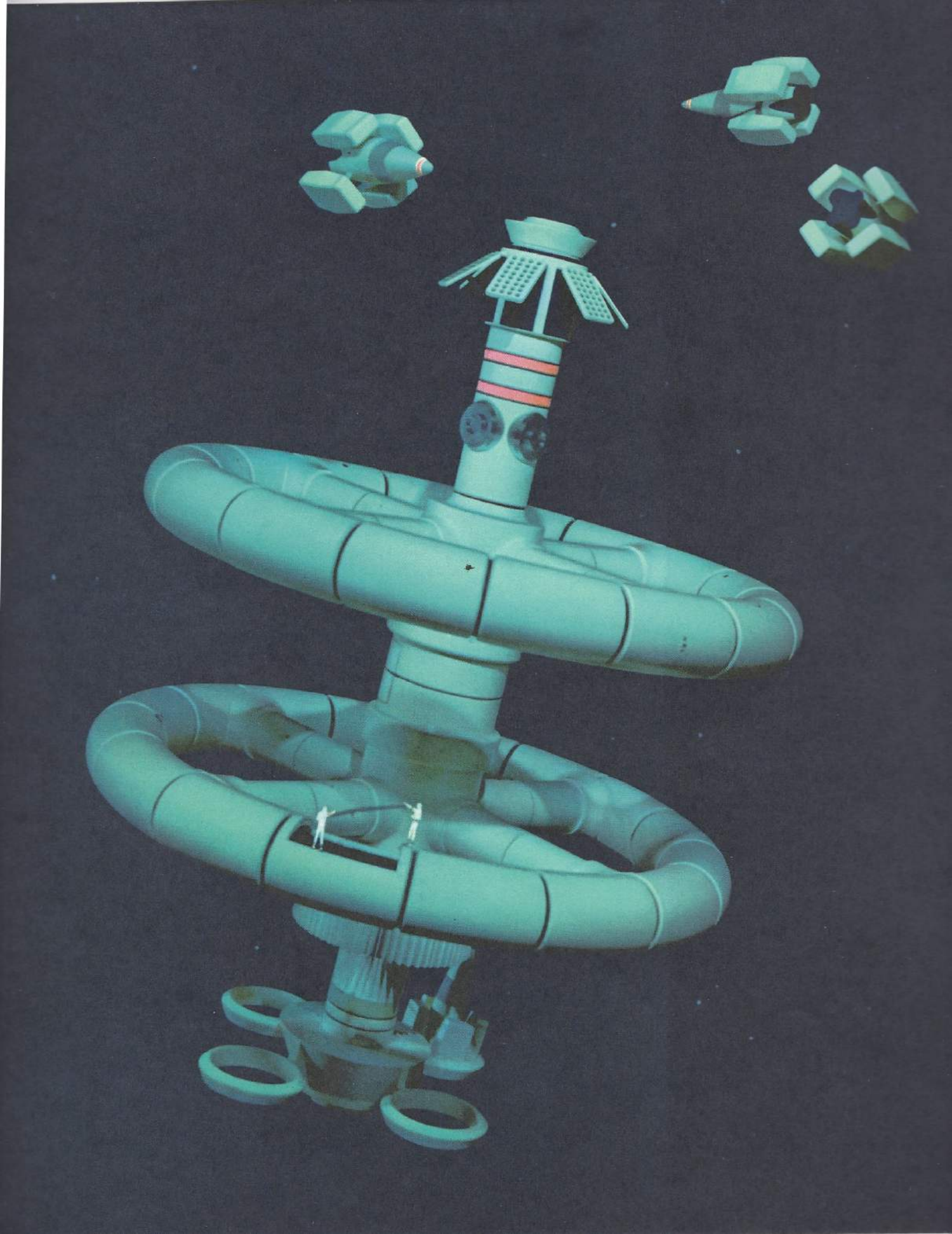
Artists from as far away as Hollywood created detailed paintings of the Futurama Ride sets in the same scale as this model. Before work began on the full-sized sets, these miniatures went to the GM Technical Center to be installed in the model where they were studied for effect and for any necessary changes. During these hectic formative months, the GM planning group worked closely with consultants familiar with practically every part of the world in order to assure the authenticity of every last background and special scenic effect in Futurama.

On schedule at the 8½-acre Flushing Meadow site, countless hours of planning and working came together with hundreds of thousands of board feet of lumber, thousands of tons of concrete and structural steel, a million feet of wiring, and a vast profusion of other raw materials, to say nothing of hundreds and hundreds of exhibit components.

Futurama was born. Before opening day on April 22, 1964, it stood waiting proudly—all 230,000 square feet—for the first of its millions of visitors.

Let's enter beneath the soaring ten-story facade and explore together what Futurama can tell us about the new opportunities, new excitements and new hopes offered by man's future mobility.

We emerge into the large circular Reception Hall symbolic of the global nature of Futurama. Turning majestically on a pedestal in the very center of this Hall is a long, sculptured, "exotic" shape. It's a symbolic car design, setting the theme and the mood for all of Futurama. A visible reminder of the boundless horizons that man's creativity can open. All around us are colorful photo murals especially shot around the world to show the truly international scope of GM facilities, people, and products.



Now we're ready to start a real adventure—the Futurama Ride itself. An observer from another country summed it up when he said, "It's worth coming all the way to the Fair to see." And, apparently, an average of nearly 70,000 people a day who have taken the Ride couldn't agree with him more.

We step from a moving walkway to our personal lounge chairs and settle back with anticipation as sprightly music flows through our own stereo speakers setting the mood for "tomorrow." The music fades and is replaced by the voice of our escort for the trip. Almost before we know it, we're being whisked through the star-studded corridors of space. Suddenly, we are on the moon. Man's mobility is in evidence everywhere. Over there is a "lunar rover" probing, searching, reporting its findings about this weird satellite. We see earth men in their "moon suits" exploring and investigating surfaces never before trod by earthlings.

As we contemplate what it would be like if *we* were on the moon, the scene changes. A space station comes into view. In it are men monitoring Earth. It's also a way-station where space travelers can dock and ready themselves for the balance of their journeys—journeys that can help man better understand and utilize his surroundings and his universe. But no time now to indulge in such speculation, for here we are back on Earth—in a mighty strange place: Antarctica.

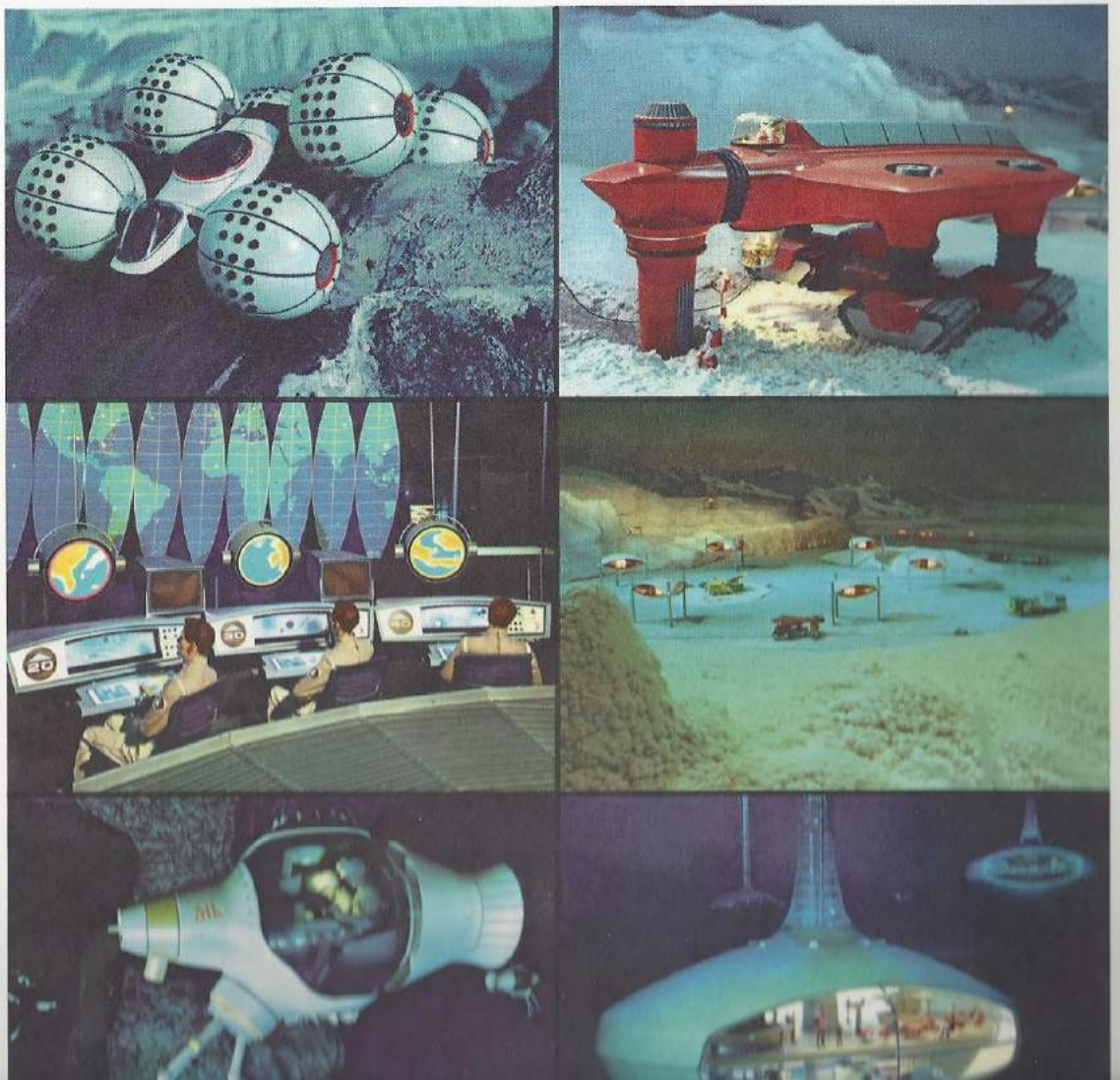
In this part of our journey, we see men scooting over the ice, burrowing under it to extract all kinds of timeless secrets from the age-old ice crust. Scientists in mobile laboratories are engaged in making this seemingly barren land reveal its rich stories about eons past, while atom-powered submarine trains are bringing in cargoes of materials and supplies to support this Antarctic research environment.

At a complex-looking weather center, men are receiving data sent to them from outer space and from the land, sea, and air of our own planet. Computers are digesting this information and sending to peoples in all lands and climes around the world practically instantaneous reports on developing weather patterns.

But our lounge-chair train is leaving busy Antarctica, and out of the shadowy in-between world a brand new vista suddenly emerges. We're in the mysterious world beneath the sea. That is, it has always been mysterious to *some;* but we see here how man's new mobility is enabling him to feel at home and to utilize the oceans that cover two-thirds of the earth's surface. Special undersea drilling rigs are working the rich oil deposits of the continental shelves. Did we imagine it, or did one of the workmen wave a greeting to us? We shrug it off as a whim of our imagination. But there isn't any doubt in our mind about the existence of the next thing we see. It's a train of submarine oil tankers gliding by on the way to discharge its load at a seaside refinery.

Mobility has another side to its usefulness here in the briny depths. It makes it possible for man to participate in many new and exciting forms of recreation. As if to demonstrate this fact, aqua-scooters go by carrying happy vacationers from their luxurious underwater "Hotel Atlantis" on sightseeing adventures through the marvels of this shimmering world. In the hotel, other vacationers are dancing and dining. And we see all manner of diving bells, recreational craft, and exploring aquacopters carrying on this new life under the seas.

While our lounge-chair train prepares to leave the underwater realm, we are reminded of the story we had heard repeatedly about the little old lady taking the Futurama Ride. When she came upon the underwater scene, she was so carried away by the realism of a wiggly octopus that she reached out and whacked the creature mightily with her umbrella. We can't vouch for the authenticity of this story, but it aptly illustrates the sense of "being there" that you feel on the Futurama Ride.



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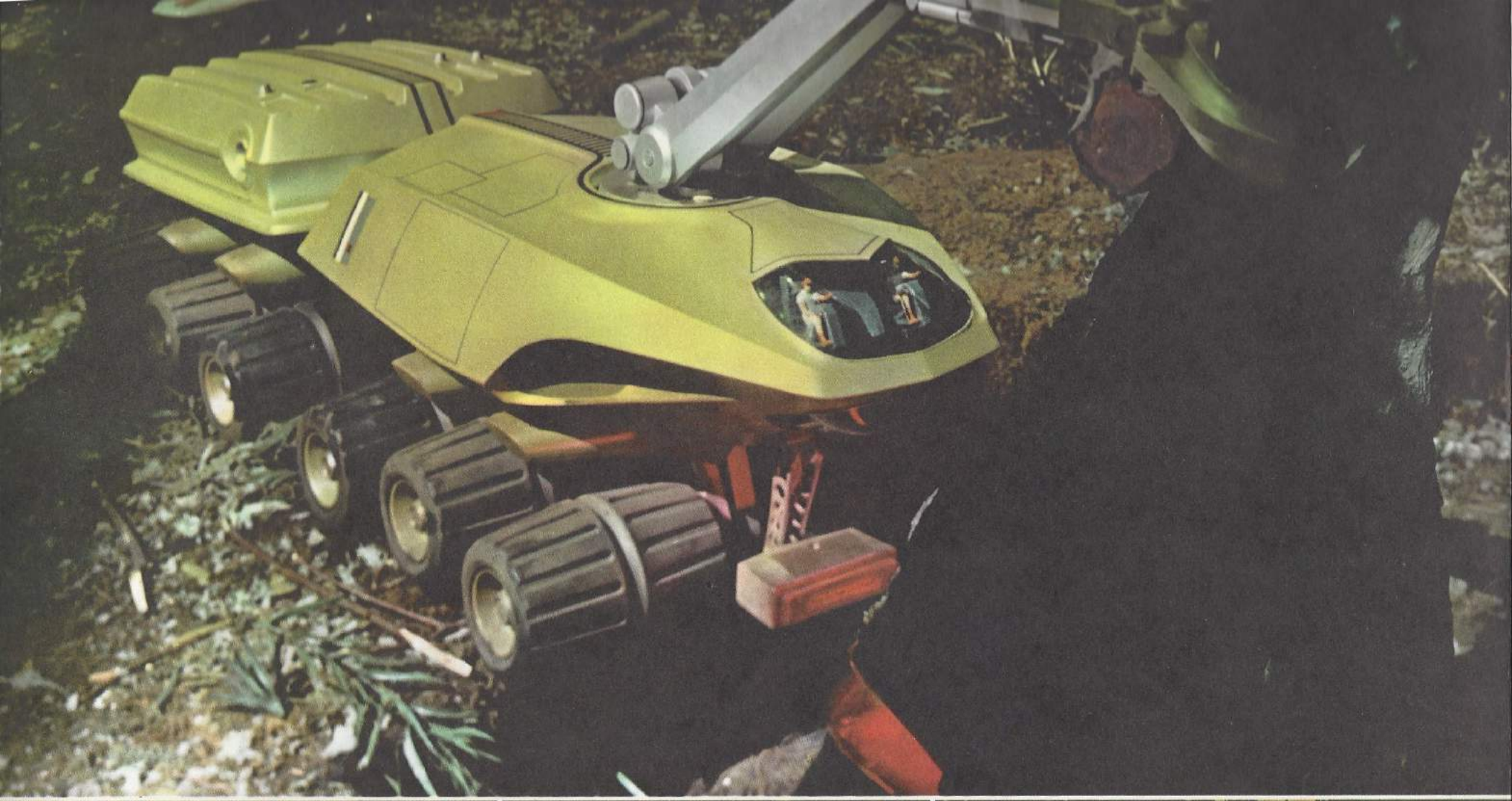
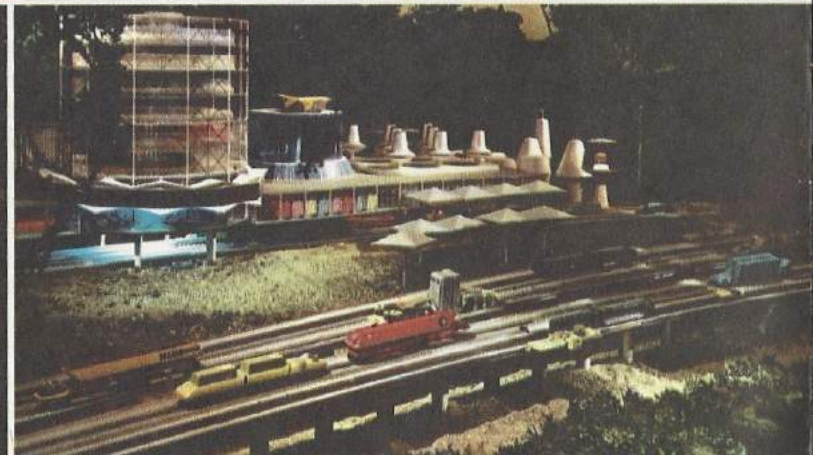




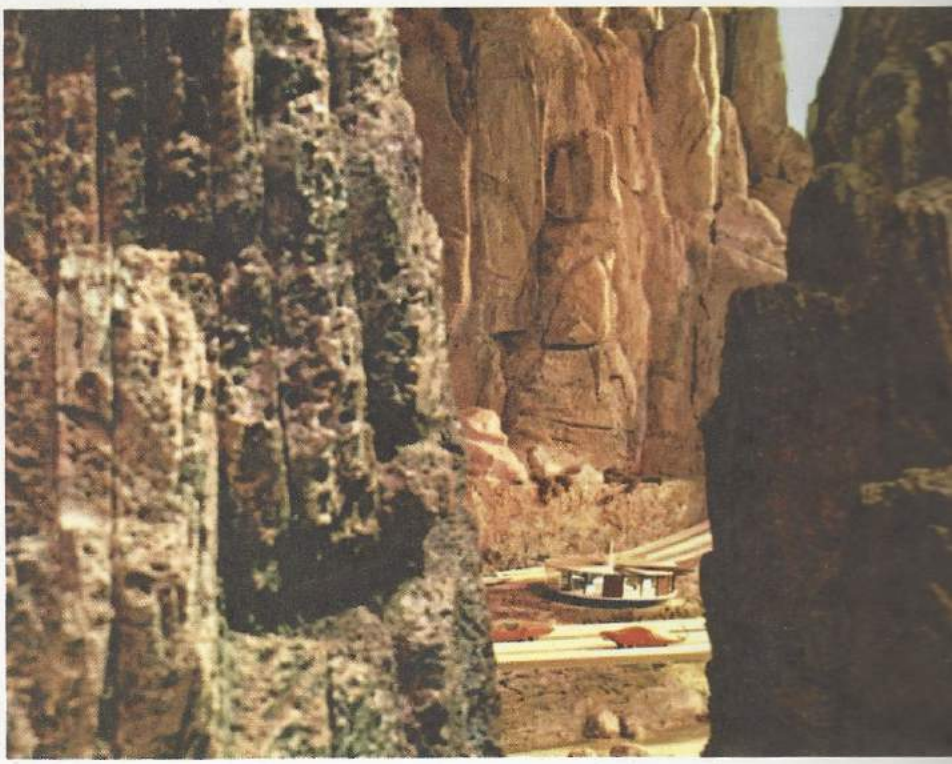
Our course now follows coral reefs that lead up out of the sea and into the wonderworld of a tropical jungle. As we watch, two very special vehicles are in the act of felling 300-foot-tall trees by cutting them with a beam of light—a "laser" beam, to use its technical name. Behind these electronic Paul Bunyans, there moves a strange-looking piece of machinery. It appears as tall as a building and, in one continuous operation, is digesting the felled trees and other jungle growth, and laying out behind itself a paved, multiple-lane highway. Coming along the highway, we see trucks and other vehicles carrying building materials and equipment for man's use in what was once a wild, primitive region attractive and useful to no one but the most adventurous.

In the distance, our eyes make out a jungle metropolis—dramatic proof of how mobility can help man master even this tropical environment and turn it into a productive contributor to the world's marketplaces.

We now find ourselves backtracking over the highway laid by the remarkable road-builder and into a remote mountain area where we are surprised to see a number of comfortable, liveable homes. We're wrong about them being completely off the beaten path, however. For over there is our modern highway. And over that way is still another one. This "remote" area is actually laced with fast routes, so that the people who live here are far from isolated. Obviously, it is now practical for working men to live wherever their fancies lead them.

Where *we* are being led now is into a desert—but one such as we have never seen before. Our eyes are caught by a patchwork of colors on the floor of the desert. They are the colors of crops: corn, wheat, potatoes, and many others. All are practical to grow here "tomorrow" because man is able to convert sea water for irrigation purposes and then readily pipe it to desert locations. In addition, man's mobility is revealed by a collection of electronic cultivators, harvesters, planters, moisture-sensors, seeders, and other sophisticated devices that make desert farming efficient and profitable. We note, as the final touch, an elevated tower where the farmer and his helpers exercise complete remote control over all the busily-working equipment.

Then it's goodbye to the newly-verdant desert. Where our roadway meets the horizon, we see skyscrapers poking up their heads. Apparently, we're about to visit the City of Tomorrow.



1. Using a laser beam to cut down giant jungle trees. 2. Giant road-builder moves along making "instant highways" in jungle. 3. Supply trucks travel back of road-builder. 4. Variety of vehicles move over highway skirting jungle metropolis. 5. "House of tomorrow" in mountain is conveniently accessible on "highways of tomorrow." 6. Desert farming by remotely-controlled electronics.

We move smoothly beside the highway, which is acquiring new lanes and picking up considerably more traffic as we approach the City. But, despite the traffic volume, there doesn't appear to be any confusion or delays. There's a good reason for this free flow; it's the automatic highway that man is using here. How smoothly and effortlessly cars move on and off this road of tomorrow! We envy the drivers in the "automatic" lanes as we watch them relax and read, or talk with passengers, while their cars move along swiftly, safely and surely.

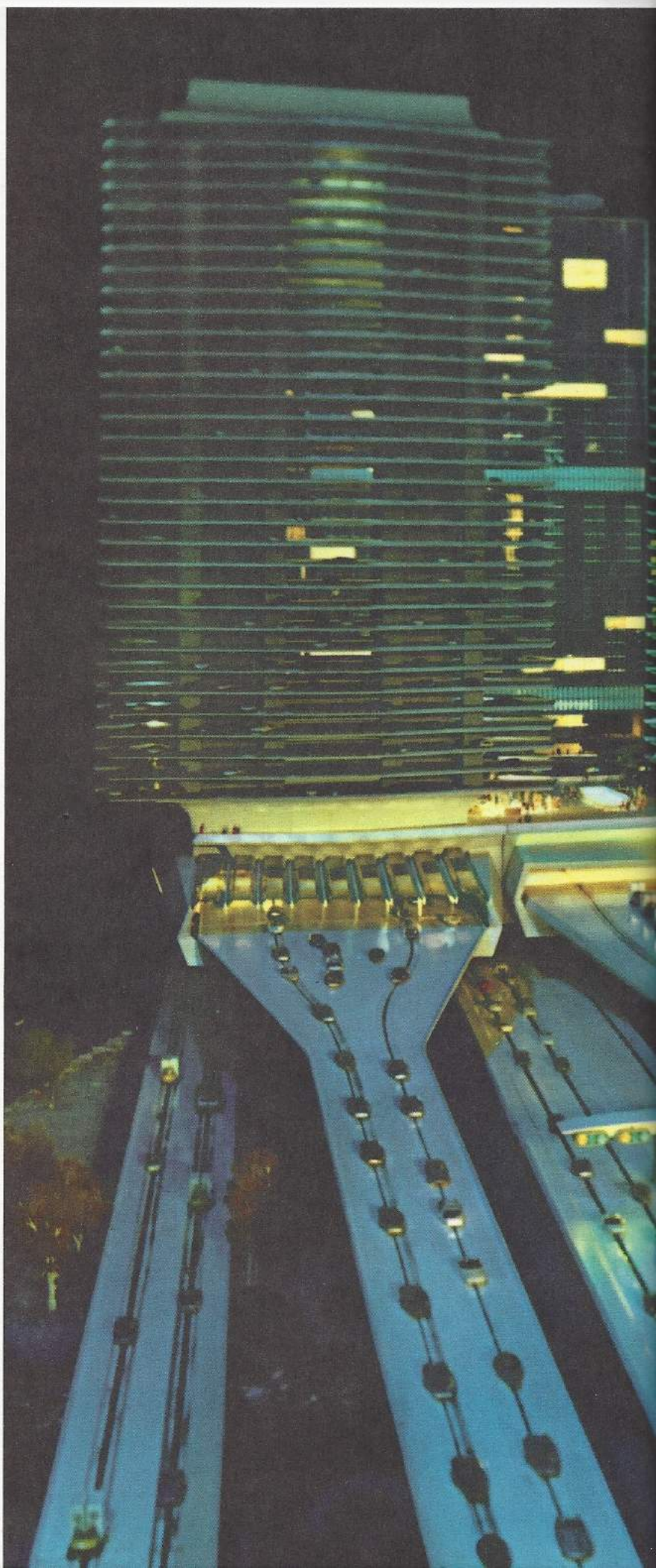
Added efficiencies in the handling of bus transportation, including new concepts of terminal interchanges, are evident everywhere. Highway freight, too, is operating on an efficient new concept, involving the use of "containerization" for better, swifter routing of all kinds of merchandise. In a new kind of highway freight terminal, we see how readily these packaged containers are stored and re-routed as circumstances dictate.

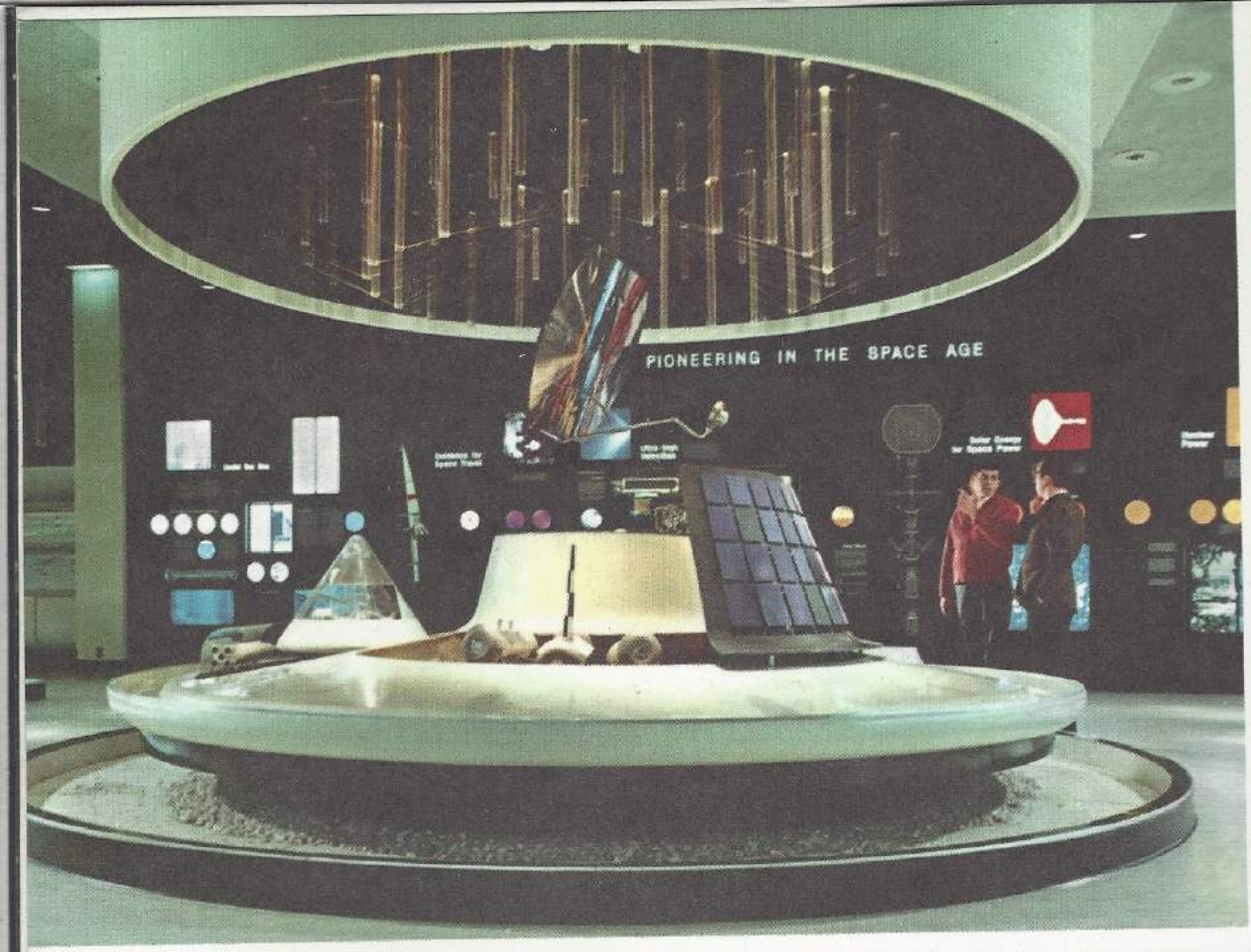
Not least of all is the way that life has been made simpler and more pleasant for the motorist visiting the heart of the City. Parking facilities are automatic —and plentiful. Covered, moving sidewalks disperse pedestrians into shopping and business areas comfortably and easily.

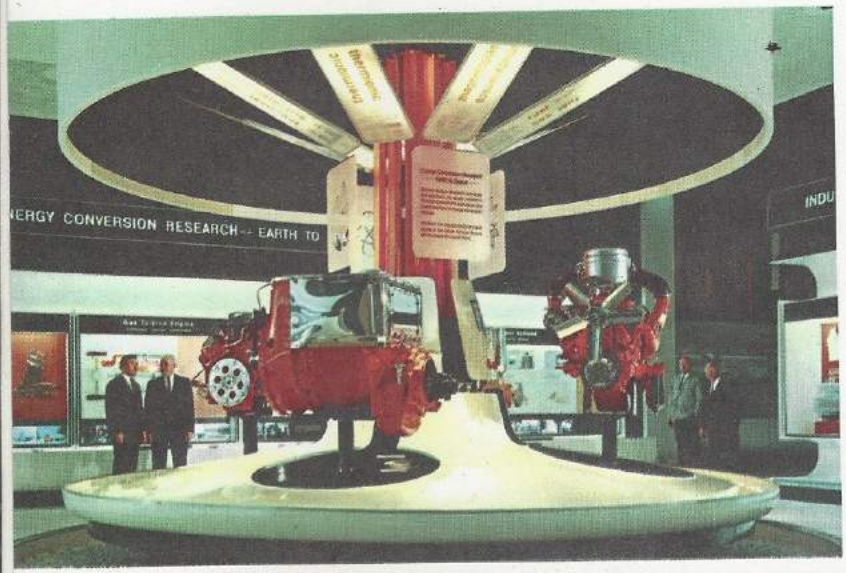
Interestingly, amid all the modern mobility and architecture, there nestles a simple, traditional church in the very heart of the City of Tomorrow.

Turning a bend in our route, we find ourselves gazing down at the City of Tomorrow from a great height. It is night. Thousands and thousands of lights sparkle and wink far below. As if by a prearranged signal (though none whatever is given), the passengers burst into applause, expressing appreciation of their visit into tomorrow. As our lounge chair enters a tunnel, we hear the voice of our Ride escort reminding us that countless other views of tomorrow can be ours if we will but stroll along the Avenue of Progress.

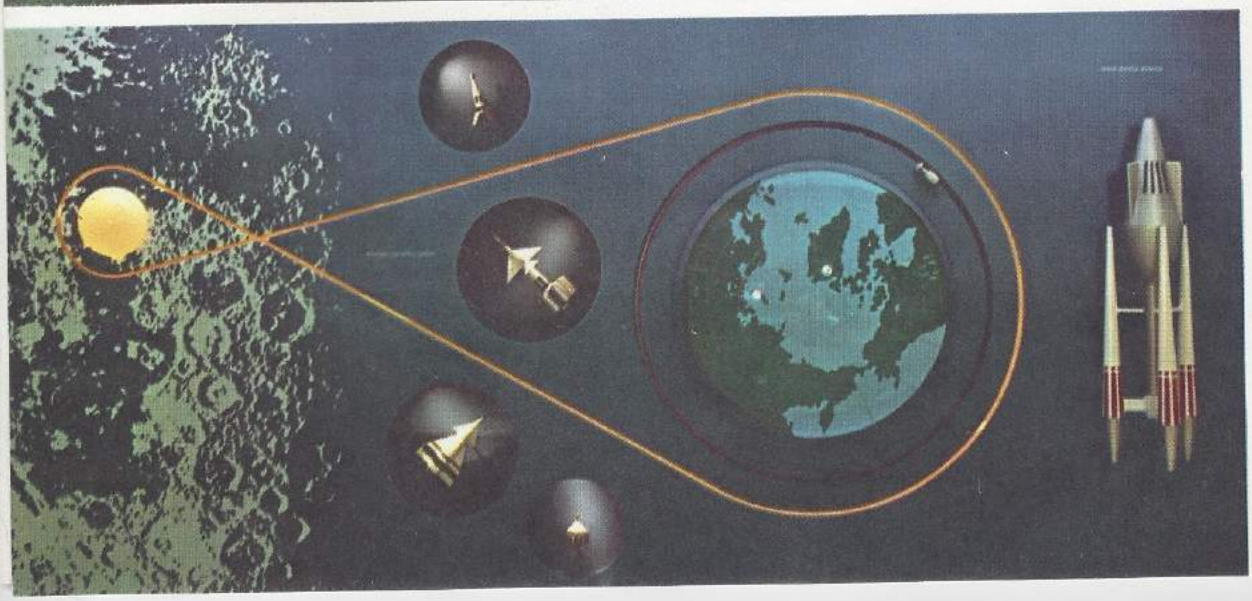
We disembark from our Ride caught up in the excited babble of people who have just spent a continuously breathtaking fifteen minutes. And we recall the words of the Futurama official who had told us that—contrary to what might be expected—children offered no problems at all during the Ride. "They're too busy looking and too awe-struck by what they see," he said.

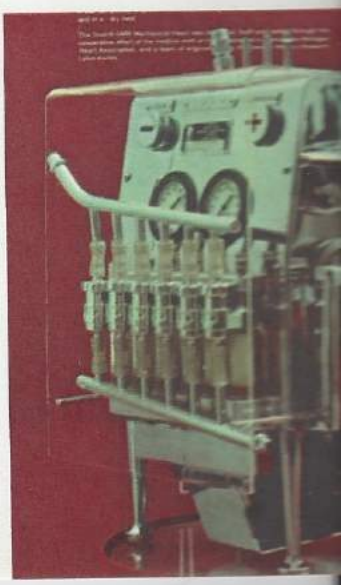



PIONEERING IN THE SPACE AGE


ERGY CONVERSION RESEARCH -- EARTH TO


GMX



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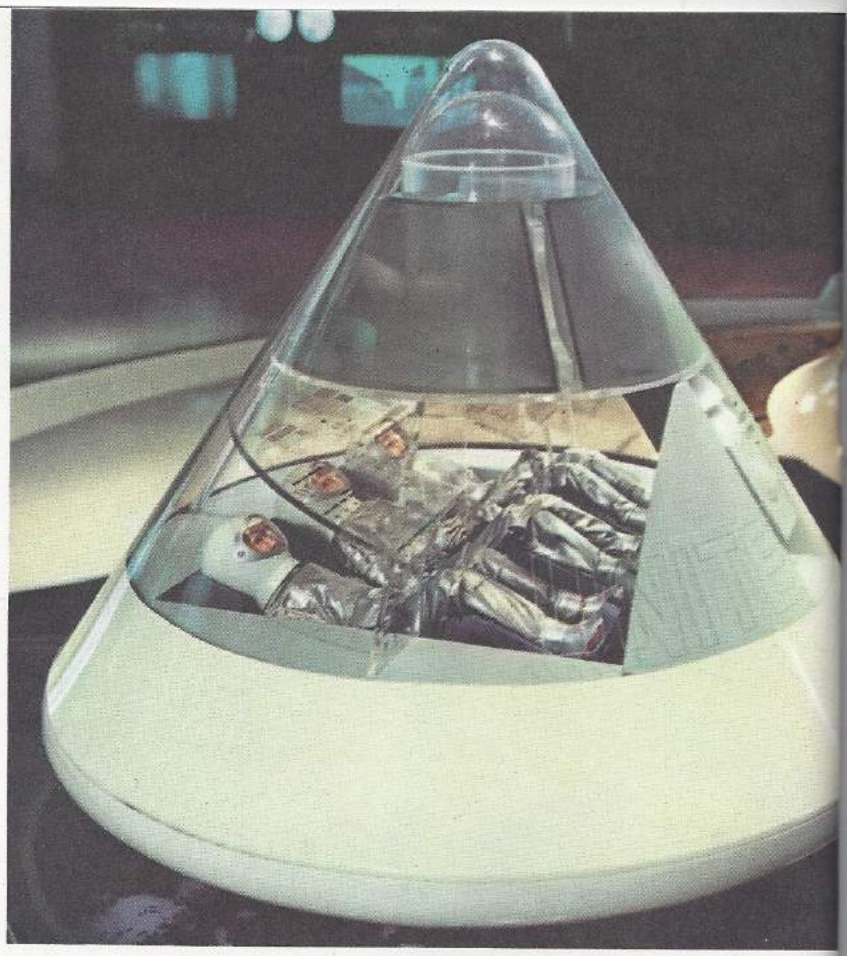
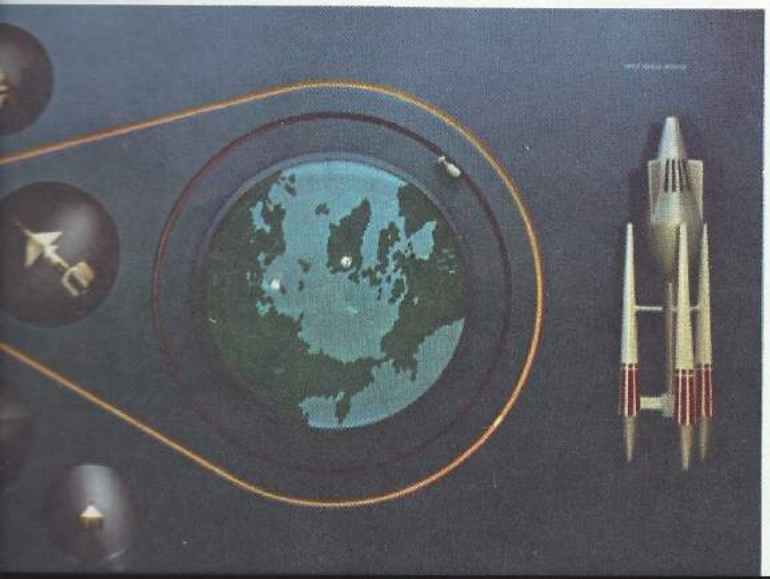
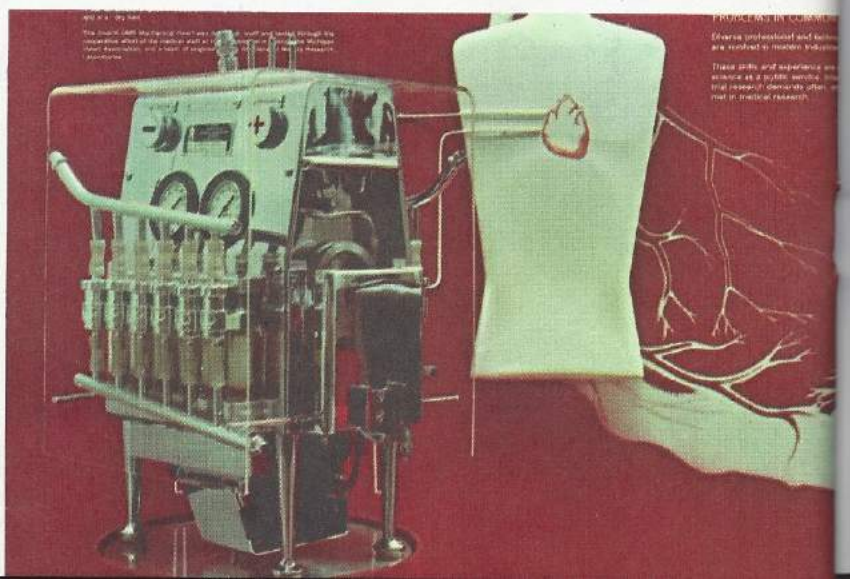



GMX
two passenger, high performance
personal automobile





Even though our trip so far would be difficult to top for sheer fascination, we look forward eagerly to the Avenue of Progress. We know it will bring us a close-up of many of man's developments which we could see only at a distance before. It's a fact that just about everything we saw on the Ride—while highly imaginative—is nonetheless attainable within the near future. This was no science-fiction daydream. Much of it already exists, ready to use as warranted. And, certainly, *everything* we saw has tangible roots in today's research and development work.

While the broad Avenue of Progress contains no less than six exhibit areas, our initial attention goes to three experimental cars tilting back and forth over the center mall. That sleek red one is a high-performance, personal model designed to carry two car enthusiasts of tomorrow. We remember seeing one just like it parked inside a mountain home we passed during the Ride. The second car —a gray, 4-passenger inter-city touring cruiser—is designed for the automated highway travel of the future and is planned to include television, stereo, game table, and family refrigerator. And let's not forget to leave room in our garage of tomorrow for 1—2 that dashing blue runabout with its built-in shopping cart and three-wheel maneuverability . . . should be mighty useful for jaunts to the supermarket and for commuting.

So much for wishing. We point ourselves in the direction of the GM Space Age Research exhibit and approach its "theme center" which, we see, shelters an animated model of the "lunar rover." As it travels over the simulated moon surface, it shows us how an "articulated" vehicle's free-flex lets it undulate gracefully and surely over the rough terrain. We can't leave the theme center without also doing a quick informational "countdown" on a replica of the Apollo spacecraft module that will be home for our astronauts in the moon program. We check out, too, a Satellite Solar Reflector revolving above our heads. It's a part of a new solar powered space system for the United States Air Force.

Even a casual look at auxiliary displays in the 3—4 Space Age Research exhibit reveals many calculated to keep our eyes and minds popping. Who could forget seeing "the fastest gun in the world," for instance? It's there in scaled-down form (in actuality, it's 100 feet long) as part of the General Motors Flight Physics Laboratory equipment. This weapon is quite capable of propelling projectiles at speeds of 20,000 to 25,000 miles an hour. By using it, and similar ultra-high-velocity weapons, scientists are able to study in detail what happens when two bodies collide full-tilt in space. This type of data, in turn, helps tell them more about the composition of the moon; how to protect spacecraft from colliding meteoroids; means of communicating with space vehicles during re-entry; and many other things we must know if we are to understand, and live in, the space age.

From the dizzying speeds of outer space, we move over to the slower pace of underwater communications. Here the exhibit talks about what is called the "Deep Scattering Layer"—a "phantom sound" area that moves mysteriously up and down in the sea. An understanding of why this happens may well lead man to better underwater communication systems.

It's not exactly a subject of regular conversation, but it's still an intriguing fact that all of us, every day of our lives, are being continually bombarded by unseen cosmic rays. The main exhibit in the next Avenue of Progress area—covering Fundamental Research—is the largest known circular cosmic ray spark chamber in the world. It shows, and lets us hear, actual cosmic rays as they come pelting down. While it all looks something like an army of fireflies gone berserk, it's much more meaningful than that, for radiation similar to this, emitted by radioisotopes, can be harnessed by man for practical and beneficial industrial use. For instance, radioisotopes are used today to analyze, measure and evaluate the various properties of metals and metal finishes.

We notice an auxiliary exhibit over on a side wall that, at first, makes us think of microphotos we've seen in biology books. We're actually not too far wrong. This exhibit features color photomicrographs of the natural "hidden" crystal structures existing within metal and plastic objects that are all around us every day. These "patterns of nature" are striking in their intricate and delicate composition. On display is an example of how these patterns can be used in designing fabrics.

We had heard about an exciting new (to us at any rate) kind of engine on display in the adjoining Applied Research exhibit area, so we make tracks for that. And, sure enough, there it is—a General Motors *external* combustion engine. It's one of four different kinds of engines on display. But the other three are more familiar, and so our thoughts and attention focus first on the external combustion unit. It seems that this engine responds to heat applied externally. This puts it in the running for a job on spacecraft where it could operate from heat reflected by a solar mirror. This external combustion principle can also be mighty handy in undeveloped areas of the world where such an engine could be made to operate simply by placing it on an open

1. Part of Space Research center showing unique solar mirror.
2. Replica of Apollo spacecraft module, complete with astronauts.
3. Modern engine display featuring external combustion engine.
4. Looking down Avenue of Progress mall at experimental cars.
5. Animated display illustrating the "how" of space age navigation.
6. World's first "mechanical heart" to take over for human heart.

fire . . . another example of the way man's new tools can serve him in even the most remote locations.

Besides cutaway models of the external combustion engine—and its more conventional brothers: the internal gas combustion, the Diesel, and the gas turbine engines—this part of the research exhibit also gives us animated explanations of new power sources being developed for man's future use, including such wonders as thermionic, thermoelectric, liquid metal cell, and others.

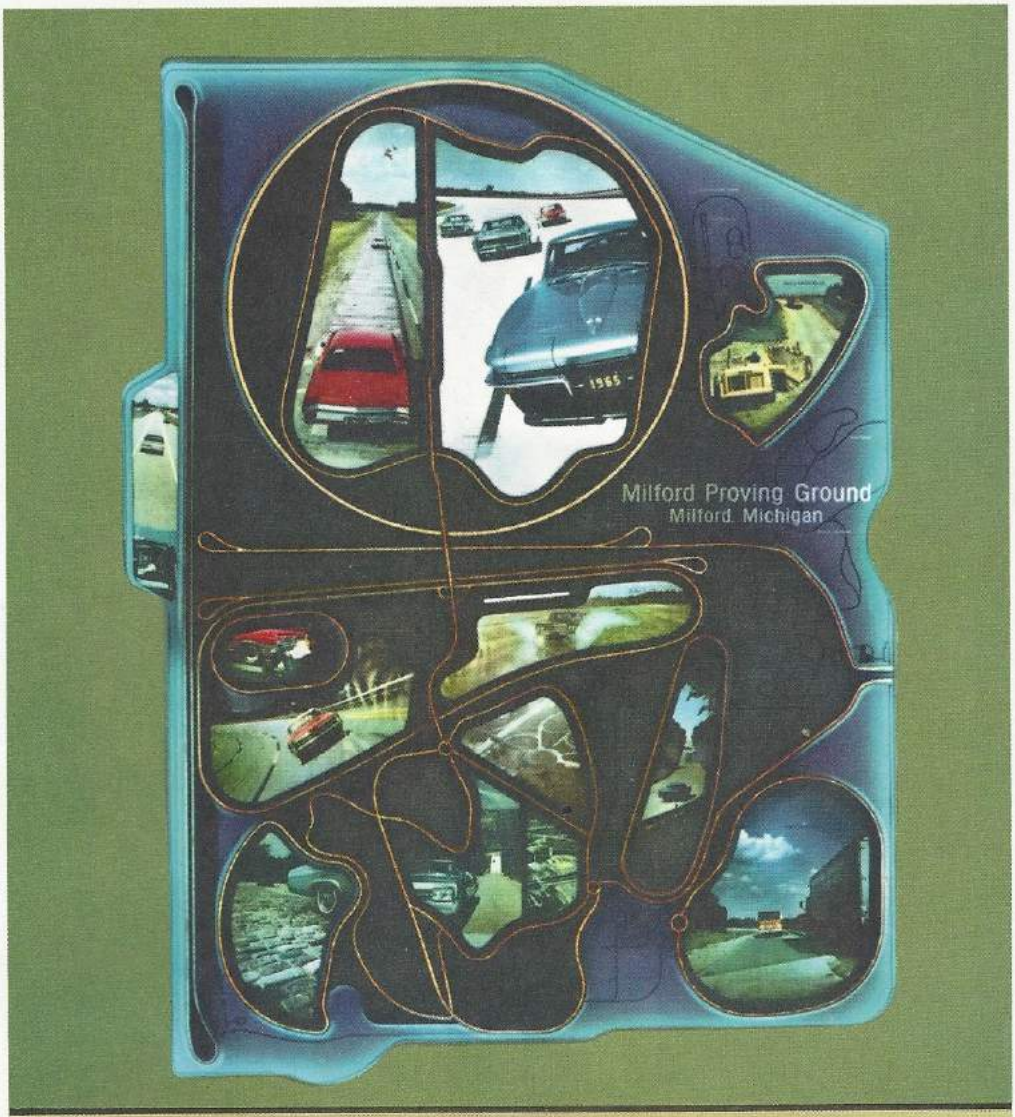
Something of a more personal nature to most Futurama visitors is the medical machinery that has been created as a by-product of GM research. This equipment has made medical history—to say nothing of the fact that it performs a genuine public service to the community of man. We see a replica of the first mechanical device to serve as a stand-in for the human heart. Then there's a centrifuge-like device that sterilizes blood plasma, vaccines, and serums by spinning them into a layer less than half the thickness of a human hair and treating them with ultra-violet radiation. We also note an electronic "detective" so sensitive it can detect a heart murmur in an unborn baby.

One more item draws our special attention. It's an iron "whisker," one of a great many grown synthetically by General Motors Research Laboratories and used in the study of how to control corrosion. What makes the whisker interesting further is the fact that of all the hundreds of items exhibited at Futurama it's the smallest, weighing only a few grams. Hard to see, much less weigh.

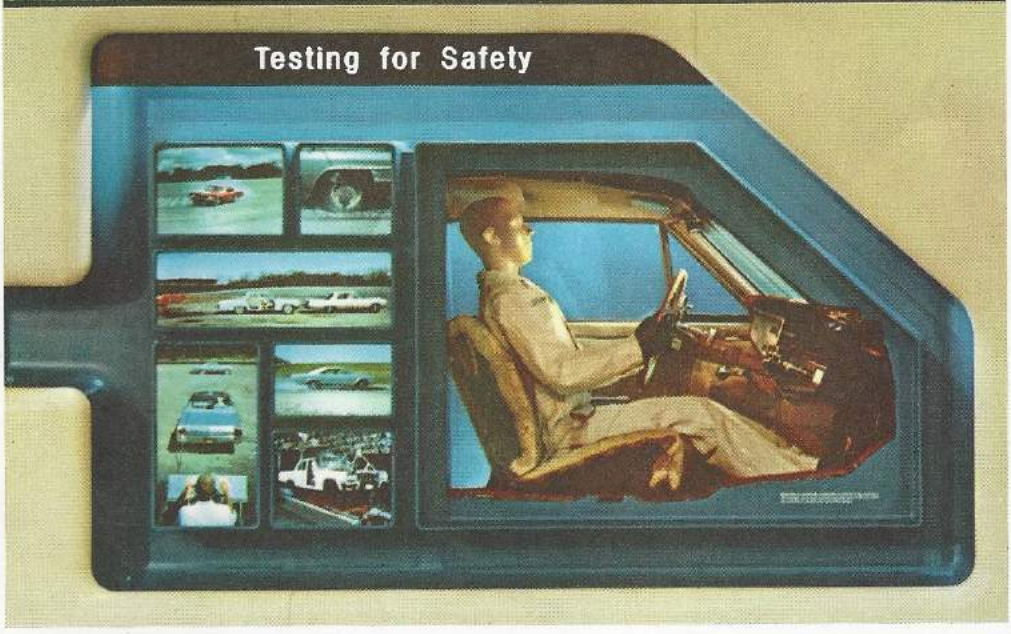
Smog—and its elimination—comes under discussion in still another part of this Applied Research area. We get a chance to learn what the GM smog chamber facility is all about, and how the mobile air sampling truck helped carry out a complete air pollution study in New York City. Of course, modern anti-smog devices are shown and explained.

Exhibits across the Avenue of Progress from the Research centers show us how GM Engineering is a corporation-wide responsibility. One display depicts the ways metals are affected by stress and strain—and by motion, vibration and sound as well. The question is, what do these forces do to metals, and how can man design parts and machines so as to minimize their effects? General Motors knows the answers—as demonstrated by a series of three-dimensional "test cells." We actually see exactly what happens to metal when a brake pedal is depressed and sets up stress waves in the pedal itself and in the brake drum.

In another test cell, this one depicting the effects of "motion," we find out how engineers—with the help of stroboscopic lights—can "slow down," and even "stop," a fan blade traveling at 1,000 rpm. Of course, the blade never really varies its speed at all. It only *appears* to. But the end result is that engineers can "see" rapid motion slowed down and so have time to analyze how it affects parts—


- 1965 -
Milford Proving Ground
Milford, Michigan

1


Testing for Safety

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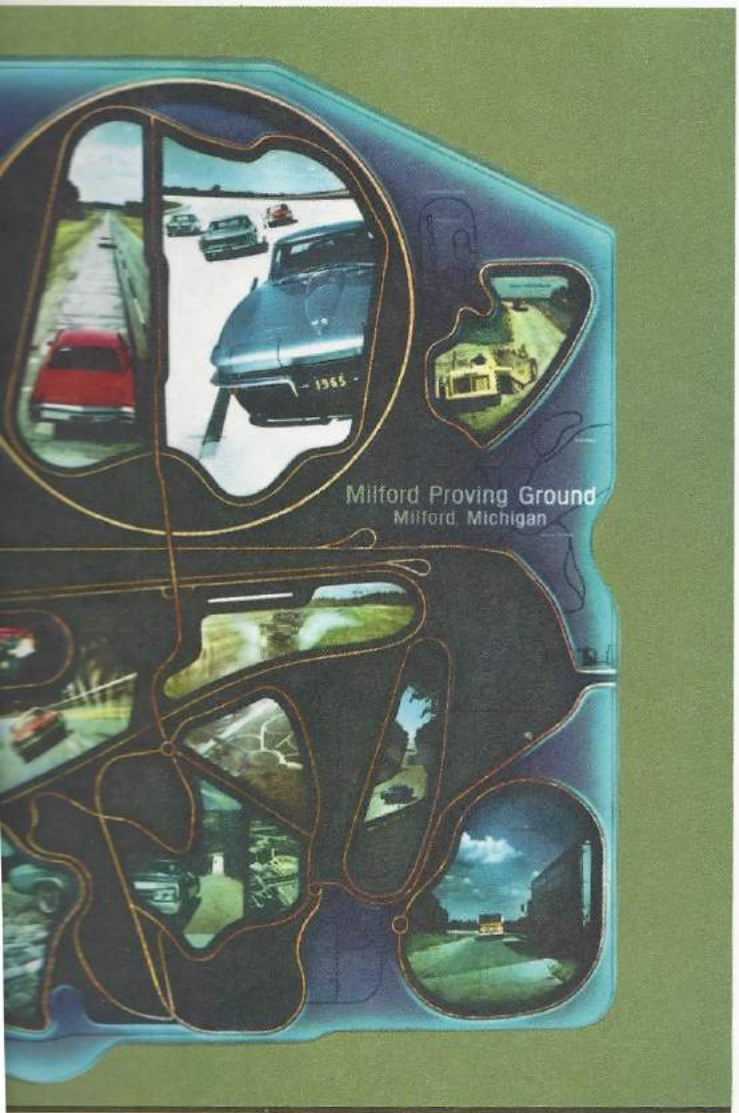


and part design. From this and other visible proof, engineers are able to prevent these "unseen" forces from shortening equipment life.

Another procedure applied prior to the product's arrival on the market is shown on a large, three-dimensional, lighted reproduction of the GM Proving Ground at Milford, Michigan. It shows the various test areas, like the Belgian Block Road and the high-speed test track. Cars—in the form of moving lights—are whirling over the test routes. The total effect is somewhat like the action of a giant pinball machine. But the serious fact is that Milford plays a big part in proving out GM scientific and engineering progress.

The first thing to greet our eyes in the adjoining "Engineering the Product" area is a full-size car that can be truly said to have a "split personality." By slicing it lengthwise down the middle and then separating the two halves, engineers have provided us with an unusual inside-outside view. Around it the story is evident of how individual engineering of body, chassis, suspension, and other major components work together to produce a single, unified final product: the car.

In a product so complex, how is it possible to meet the physical requirements of so many different kinds of people? In the final section of the Avenue of Progress, large diagrams portray five people whose shapes, weights, and sizes represent 95% of the driver population. To accommodate comfortably the different eye levels, hip points, and other physical variations, engineers design into cars such features as: ample interior room; adjustable power seats; and tilting and telescopic steering wheels.

Another interesting eye-catcher is "Safety Sam," shown life-size at the wheel in a cutaway view of a front seat compartment. Sam personifies the structure of Mr. Average Driver. Of course, Sam is a mere dummy. But we really owe thanks to him, and his many counterparts, because the results of their many impact, and other, tests translate into design improvements that increase our driving safety.

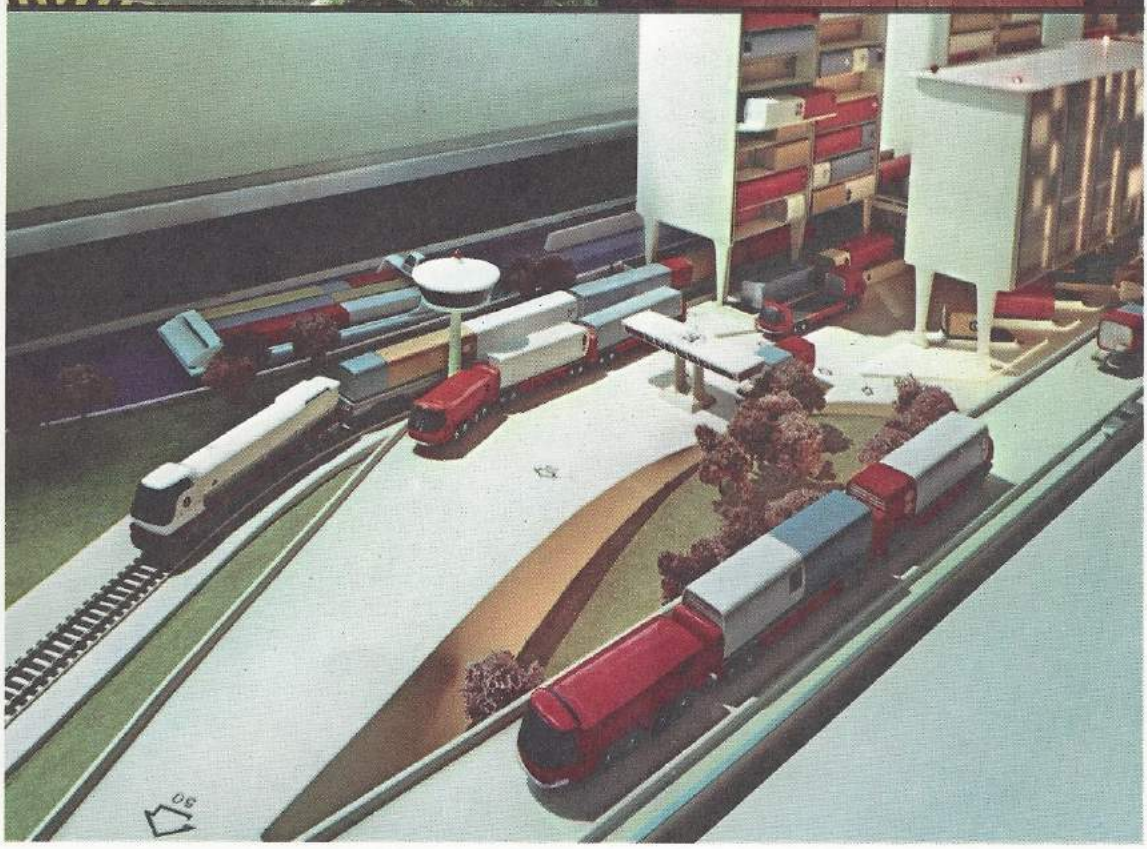
1. Three-dimensional reproduction of GM Proving Ground.
2. "Safety Sam" does his bit regularly for automotive safety.

At the entrance to the Upper Product Plaza, we examine a display of General Motors Overseas' activities, including a display of Opel at a "castle on the Rhine" . . . of Vauxhall before an English pub . . . and of Holden in an Australian zoological park—colorful ways of emphasizing GM as a truly global institution. Then we visit Buick in San Francisco's Chinatown and at Fisherman's Wharf. Then Pontiac in the outdoors of our Great West, Chevrolet in the French Quarter of Old New Orleans, Oldsmobile in the picturesqueness of the Great Lakes. And, finally, Cadillac in the sophisticated surroundings of Manhattan. A last look around, and we board the escalator for the Lower Plaza.

Judging by the attention shown during the first season of Futurama's run, nothing could be more interesting to women than Frigidaire's "Profile of Kitchens Around the World," featuring modern appliances people can actually buy today. Each kitchen—the Oriental, the Mediterranean, the Latin American, the Far Eastern, and the Early American—contains so many intriguing ideas that it's difficult to know where to look and what to look at first. Other Lower Plaza exhibits attract their share of attention, too, including those of AC Spark Plug, Allison, Detroit Diesel, Electro-Motive, Euclid, and United Delco Divisions.

A very special section of the Lower Product

1—2



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Plaza is the GM institutional exhibit with its map showing the full national scope of GM activities. From there, we go to the section devoted to Metro-Mobility. This is General Motors' way of labeling some proposed solutions to traffic problems. Here we see—closer up and in more leisurely fashion than possible on the Futurama ride—various new ideas in the fields of private, public, and commercial transportation.

Working in behalf of the private car driver are many advanced devices. A method of transmitting traffic and other information to him instantaneously as he moves along the highway. A system of "pacing" to make highway travel more convenient and pleasant. A system for taking over electronically the operation of cars on the automatic highway. An automatic parking system that places incoming cars in a garage structure and delivers outgoing cars to their owners at a one-every-14-seconds rate.

On the public transportation side, we're pleased to see the exclusive bus lane concept in action, as well as bus trains and a unique interchange terminal. In the realm of freight mobility, we take a closer look at the "containerization" concept and the special freight terminals with computer-controlled operations. Everything looks workable—and efficient.

Finally, we leave the Futurama building and step outside into the Outdoor Product Plaza with its prize-winning landscaping. Among other things that greet our eyes are: giant earth-moving equipment; a display of four huge trucks stacked one on top of the other; and the largest single equipment exhibit—a locomotive weighing 122 tons.

And now we end our Futurama visit. What was that statement in the beginning? That Futurama was created to show how the knowledge already exists to successfully span new challenges in time and distance and environment? Well, it's been proven to us—in Futurama—hundreds of times. But we still leave with the feeling there are interesting things here we've somehow missed. Whoever said: "If you've seen Futurama only once, you haven't seen it all" knew whereof he spoke.

Personally, we plan to come back for another look at the future. If we can't, we'll just have to wait —and watch it happen.

1. In Outdoor Product Plaza display, Bison I shows what expressway freighters of future may look like. 2. "Kitchens around the world" exhibit is a big hit with the ladies. This is the Oriental version. 3. The containerized freight terminal.

During 1964, more people attended Futurama II than had ever before visited an industrial exhibit at a world's fair in any single year. Interestingly enough, the previous world attendance record was held by the 1939-40 Futurama I.

For safety's sake, twenty-three guards ride the conveyorized lounge-chair train on its trips into the future. Ten more guards are stationed at strategic points around the quarter-mile route.

The time and temperature indicator atop the Futurama building weighs 15 tons and is 40 feet in diameter. It reports the time and temperature every five seconds for a grand total of 17,280 times a day.

A closed circuit TV system enables Futurama officials in a control room to scan five different areas in and around the Futurama building (see picture above) and keep the foot traffic moving smoothly.

One of the neater tricks was moving the 122-ton locomotive in the Outdoor Product Plaza into a new location just before the 1965 reopening. It required two heavy-duty cranes to pick up this monster and reposition it.

The more than 15,000,000 Futurama visitors during the 1964 season mislaid a sizable array of items, everything from a pedometer to a music stand. Listing all the lost articles filled 45 closely-written pages in a ledger book.

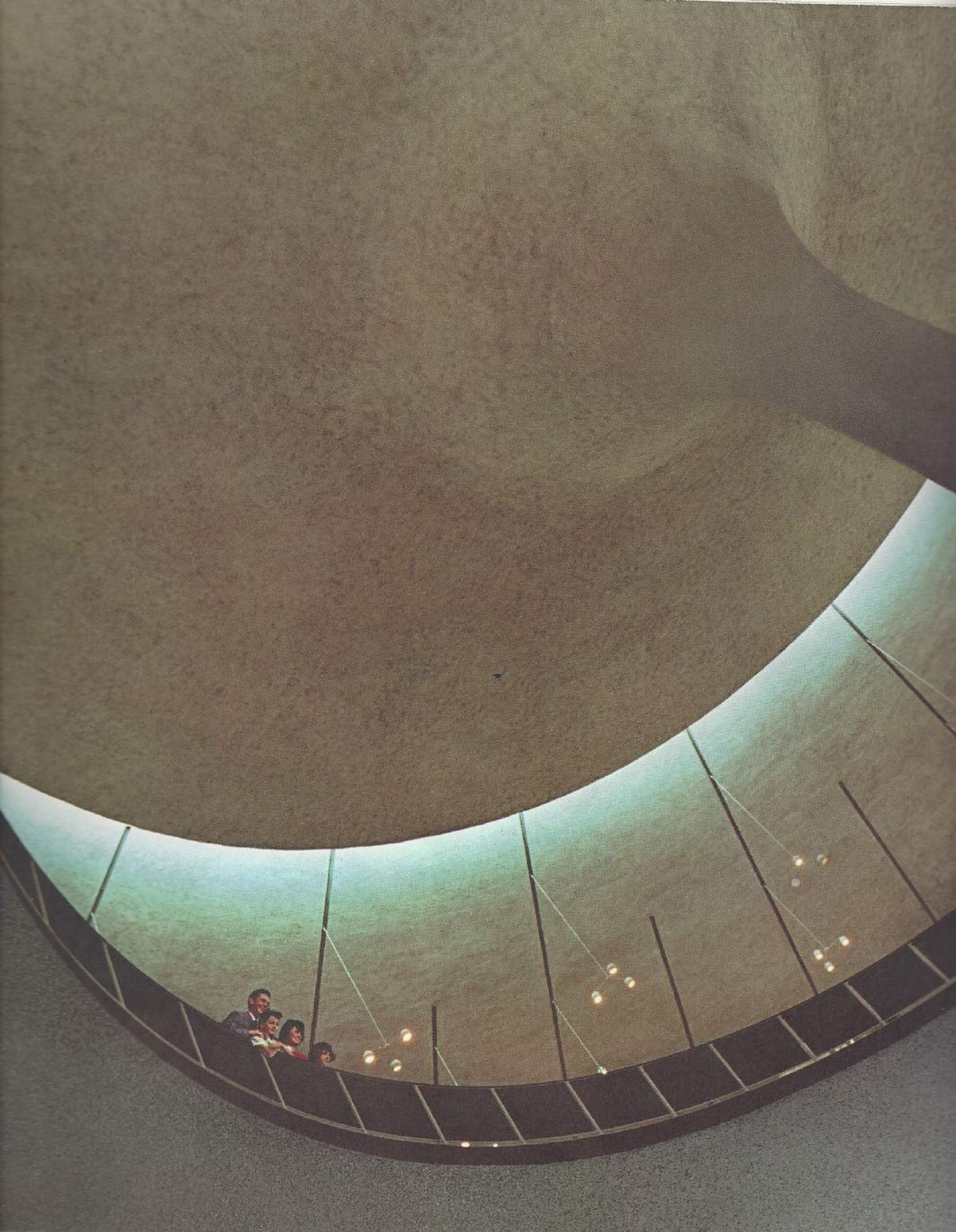
Each of the 1,389 individual seats on the Futurama Ride traveled 3,305 miles during the 1964 season and, in all, carried more than 12,000,000 passengers.

In the jungle section of the Ride are more than 433 make-believe trees bearing a total of three million leaves. It took twelve men three months to hand-wire all those leaves into place.

For the convenience and comfort of the passengers, each of the 1,389 Ride seats is dusted and vacuumed (see picture below) after every third trip—all without the Ride ever so much as slowing down for an instant.

No one knows for sure what individual holds the Futurama attendance record, but a survey of 500 people attending Futurama revealed two people who claimed to be on their 28th visit. Just about half of the people interviewed said they were there on a repeat visit.

Speaking of attendance, the number of people visiting Futurama during its first season was 15,680,923. Of these, 12,193,859 took the Ride. The discrepancy between the two figures is largely accounted for by the fact that many visitors were making a repeat appearance and did not take the Ride again when they returned. Highest single-day attendance in 1964 was 121,077 on July 6.



GENERAL MOTORS CORPORATION

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