

# WED ENTERPRISES

## INTER-OFFICE COMMUNICATION

P-1328 R-2

TO \_\_\_\_\_ DATE December 10, 1981  
FROM CARL BONGIRNO EXT: \_\_\_\_\_ SUBJECT \_\_\_\_\_

To our WED AND MAPO Staff:

The attached publication is being distributed by Walt Disney World Marketing to outside organizations to help communicate the scope of this project. It is published on a quarterly basis.

I thought you all might enjoy receiving this publication and sharing it with your families. We will continue to distribute them to you as they are published.

*Carl*



# GEOSPHERE FORMS FUTURE WORLD LANDMARK

Spaceship Earth, the world's first geosphere, will dominate the entrance-way to Epcot Center when it opens at Walt Disney World, October 1, 1982.

A unique architectural achievement, the 18-story sphere houses one of Future World's most exciting presentations, dramatizing man's ability to survive by communicating with fellow humans.

It is the first large-scale geodesic structure to achieve a complete sphere shape, being supported 15 feet off the ground by six huge steel legs.

Visitors to Future World will pass beneath the mammoth globe.

One hundred and sixty-five feet in diameter, the geosphere encompasses 2,200,000 cubic feet of space with an outside surface area of 150,000 square feet.

Actually, Spaceship Earth is two separate spherical structures, one inside the other. The inner sphere is composed of 1,450 structural steel members arranged in giant triangular fashion, typical geodesic form.

The inner core also contains decking at several levels, and a spiral route for Spaceship Earth's ride system which carries visitors through centuries of man's achievements in communication arts. It is covered by a waterproof membrane to protect the inner workings.

The outer-sphere facade is held about two feet away from the inner core by aluminum hubs and contains aluminum support frames for 954 silvery triangular aluminum panels. With spotlights at night, the highly reflective surface will be visible for many miles.

While there are other large geodesic domes in the world covering arenas, oil tanks, etc., they are only half spheres.

Spaceship Earth is raised clear of the earth beneath it to make a dramatic entryway which could rival some of the world's most famous uniquely shaped structures.

Nearest rival to the Walt Disney World structure probably was the 180-foot nongeodesic perisphere built for the 1939 New York World's Fair with a smooth exterior supported on eight legs. It was just barely off the ground, served as a visual symbol and was demolished at the close of the fair.

Other structures considered by architects in designing Spaceship Earth include the Roman Parthenon in the second century, the dome of Saint Peter's

Cathedral in the Vatican, which is 150 feet high and 107 feet in diameter, and a 125-foot diameter steel frame supporting a map of the world at the 1964-65 World's Fair.

The U.S. Pavilion for Expo '77 in Montreal, while larger at 200 feet, was only a three-quarter sphere.

Architect Peter Floyd, a San Francisco planner, says the structure presented many unique engineering challenges.

Once the basic design was decided, planners had to determine how to make it weatherproof — what to do with tons of water plunging down from the globe's "equator."

*Geosphere, page 2*



Artist Herb Ryman completes his latest Disney painting. His sketches of Disneyland, drawn one weekend in 1954, helped convinced bankers to finance the \$17 million project. This latest work (shown below) features Spaceship Earth, the Epcot Center equal to Disneyland and the Magic Kingdom castles.

## NEW "SCENTS" ADDED TO EPCOT CENTER

Disney imagineers have added a fifth sense to the newest attractions at Epcot Center. The sense of smell will be added to scores of other special effects in a new generation of Disney shows now being designed for Future World and World Showcase pavilions.

Working with the imagineers at WED Enterprises in California, Bob McCarthy has developed "a smeltizer machine" to add the aroma of everything from an erupting volcano in the Universe of Energy show to the tantalizing smell of a barbecue or the fragrance of orange blossoms.



WED Imagineers add another dimension — New smells, from citrus to "Essence of Volcano" are being added to enhance shows in Epcot Center, consultant Bob McCarthy shows his "smeltizer."

Each will be keyed to a particular show scene to enhance the realism of experiences in Future World and the World Showcase.

WED designers are collecting scents from suppliers all over the world and blending them to produce the desired effect. So far, more than 300 odors have been tried, but more than 3,000 will be tested before the final choices are made. "Scents," page 4



The 21st Century opens October 1, 1982.



## Geosphere, page 2

A globe-girdling gutter was developed to collect the water at midpoint and channel it through the structure and its supporting legs to underground drains.

The upper portion of the dome's interior becomes a giant projection screen where a planetarium effect is achieved — one of the largest such show surfaces ever created. Achieving an unpainted appearance was another challenge for this night-sky effect.

The structure not only serves as housing for the Spaceship Earth ride system, itself a unique achievement, but each of its legs becomes a part of another structure housing service and show function — retail sales, guest restrooms

and stroller rental shops in the east legs, camera sales, lockers, more restrooms and Tour Guide offices in the west.

The two rear legs become a part of the Earth Station, the City "Hall" of Epcot Center. It houses the World Key Information System, an electronic guest service network presented (as is the Spaceship Earth adventure) by the Bell System. The ride system track is 1,520 feet long. It accommodates 152 guest vehicles and 76 spatial effects vehicles. The cars rotate as necessary for maximum impact of show scenes.

Ascending the spiral trackway the ride vehicles, holding four passengers each, finally emerge into "outer space" then rotate 180 degrees descending back-

wards down a slanting ramp structure.

Fitting the giant show elements tracing human communication from the days of the cave dweller to a walk on the moon into this great sphere was another challenge, since the structure needs to be weathertight before sets are installed.

Providing a means for continuing service to the exterior of the geosphere was another solvable problem which begins with a ground to midsphere service elevator and then another lift traveling the narrow space between the inner and outer cores to reach the uppermost area of the sphere. Thus a problem, anywhere on the "roof" is accessible.

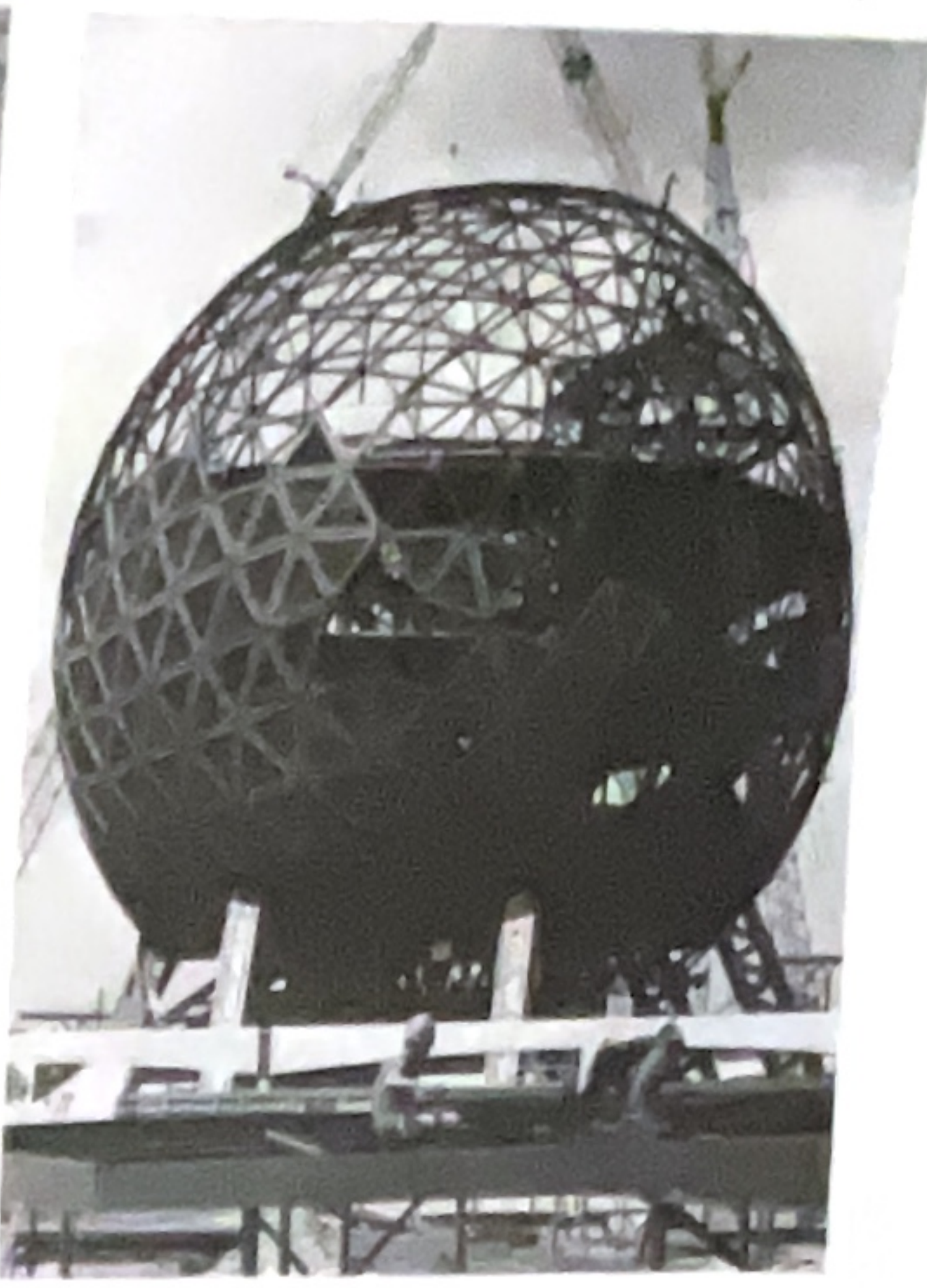
Outer surfaces will be covered with highly reflective metal on the supporting

structures so that the "Earth" will appear to be almost floating in space.

Methods used in design and construction of the building are in themselves unusual. A detailed structural model made of plastic "I-beams" was built so that all details could be studied in three dimensions in advance.

Then three-dimensional blueprints had to be developed to enable contractors to visualize how the full-scale elements fitted together to achieve the spherical shape.

Then the work of putting scenery "flats" into this totally circular environment had to be studied and adjusted to create the effects, illusions and dramatic impact of the Spaceship Earth Story.



**Steel Spiderweb** — Spaceship Earth, the 180-foot tall Epcot Center landmark, towers over the construction site with geodesic patterns of steel. Several of the nearly 2,000 workers on the job assemble the huge globe.



# PLANTS BECOME STARS OF LAND PAVILION SHOW

Columns of lettuce and tomatoes marching through the humid air of an Arizona greenhouse look like a parade of green uniformed soldiers.

They aren't sentries — but the advance guard for a revolution in the field of agriculture being developed at the Environmental Research Laboratory (ERL) at the University of Arizona.

This Tucson-based group is pioneering work in a number of areas, including development of part of a major Epcot Center pavilion opening Oct. 1, 1982. The Land will be part of the \$800 million fulfillment of Walt Disney's greatest dream for communicating to the public about the technology of tomorrow.

The Land, an enormous Future World attraction the size of Tomorrowland in the Magic Kingdom is presented by Kraft. A major ride-through attraction, the Harvest theatre and an Audio-Animatronics show called the Kitchen Kabaret are part of the pavilion.

Boats carrying more than 2,000 guests an hour will travel through three agricultural areas. In the desert, aqua-cell, and tropical regions some of the 150 crops that the world depends on for food will be grown side-by-side with superstar plants of the future and some unique new growing methods for new food production systems.

These leafy sentinels are part of the ongoing experiments in Arizona soon to be transferred to a greenhouse operation at Walt Disney World. They allow crops to grow vertically rather than horizontally, to be fertilized by a constant nutritional spray — like a carwash — and to be exposed to light and shade necessary for maximum growth potential. The result is often 20 times the normal crop.

This is just one growing system planned for the Land. A recent visit to the ERL facility provided a wealth of information about the project and its application in this new Epcot Center adventure.



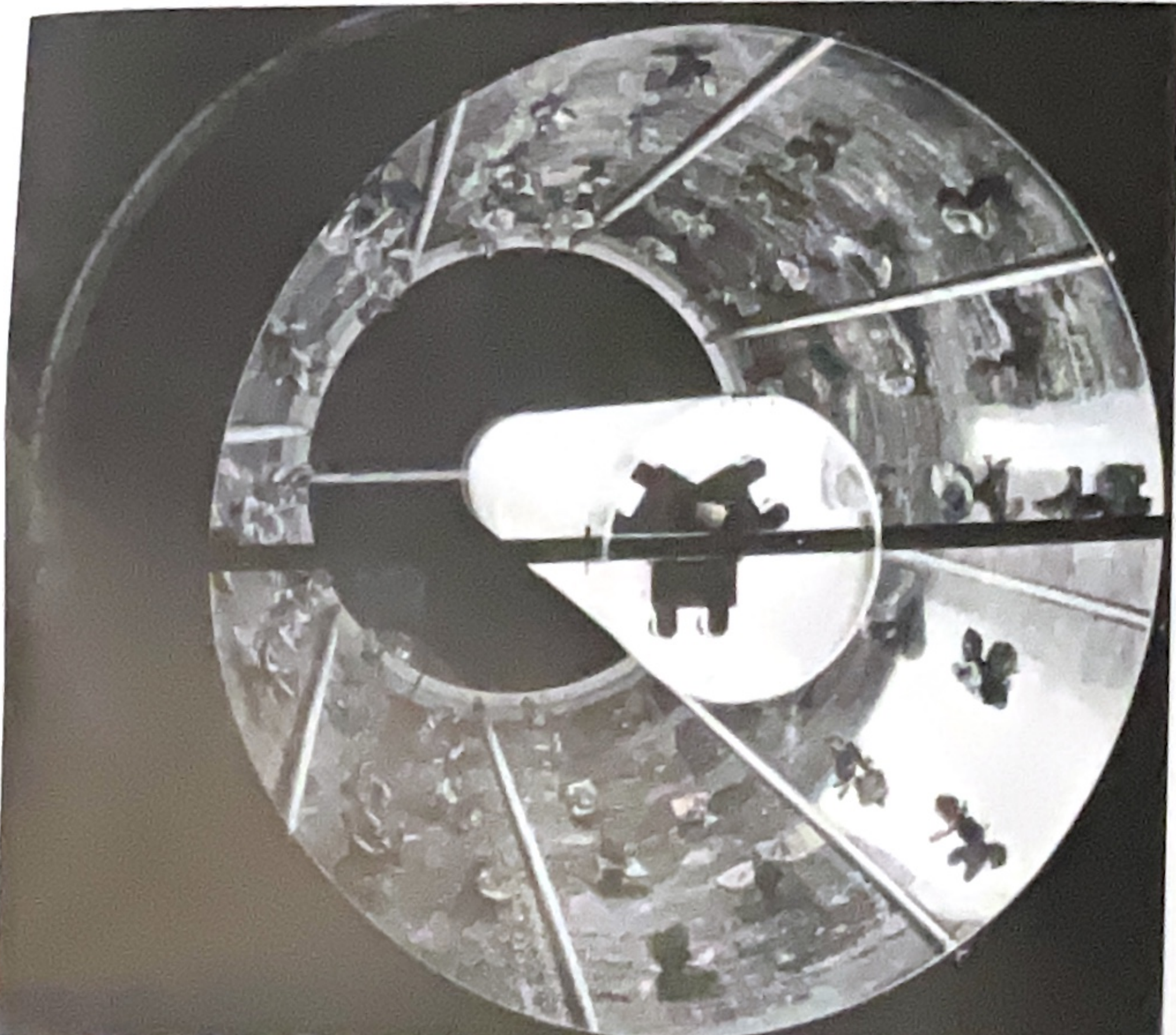
**Maximum use of space** has melons growing on an A-frame above lettuce, planted in styrofoam and floating on water. University of Arizona researcher examines melons.

The facility is discreetly located behind the Tucson Airport parking lot. It consists of a stone office building, several temporary trailers and a couple of plastic greenhouses. The entire facility is staffed by a staff of 85.

The facade of the office is a small stone wall, flanked by metal frames covered in plastic — opaque with moisture.

When the door is pushed inward, a rush of warm air meets the visitor. Inside, a small cubical antechamber is shrouded with the dripping plastic cover. Beyond a second door is hot air, hot enough to take your breath away. The guest is surrounded by a tropical jungle.

Inside the building awaits Merle Jensen — our tour guide, host and font of



**Space farmers might** use this unique method to create artificial gravity for crops in outer space colonies. Eight-foot drum rotates around light source and plants are fed by nutrient spray.

information. Jensen is also a research horticulturist and professor at the University of Arizona. The former poultry farmer from Washington state becomes animated as he explains the ERL concept and how the Disney organization became involved.

Before long, words like euphorbia, amaranth, halophytes and trickle irrigation crop up. With patience, further explanations and a tour, the pieces fall into place.

Jensen begins our tour with a foundation of facts about the world's supply. A half million varieties of plants are potential food sources for the world; only

about 150 are cultivated today. Just 10% of the land in the world is arable, and we only use half of that for growing food. As our population expands, even that small amount of land is decreasing. Thus the tropics, desert regions and other land not now used for agriculture become more important to feed the world, that is, if new crops and growing methods can be developed to take advantage of that wasted land.

An Epcot Forum in Florida on agriculture brought the ERL and its charismatic director, Dr. Carl Hodges to the attention of the Disney imagineers.

**Plants, continued page 3**



## PLANTS

Publicity on the project in the New York Times, Life and People magazines, and ABC TV have added to the reputation of the ERL.

A major section in the Land, is devoted to the display of 40 different crops and 16 growing systems to demonstrate the potential for the future.

New crops include the winged bean. It is a legume, or pod-producing plant that makes nitrogen, a fertilizer, while it grows. The roots — or tubers — the leaves, the flowers and the beans are edible. High in iron, protein, carbohydrates, and vitamin A, the plant tastes like mushrooms or potatoes or nuts depending on how it's cooked. It can also be made into a bean curd or a flour. The rest makes good animal food.

There are plants that produce their own insecticide, plants that thrive in saltwater, plants that grow into a bath sponge, plants that purify water, and even plants which produce a hydrocarbon that could provide an alternative energy source in the future.

These superstar crops will be part of the show along with some more conventional crops which are being grown in unique new ways.

Jensen leads the way to the plastic half-moon canopy over the desert floor. This shell controls water evaporation and provides a cool atmosphere for the abundant foliage it holds.

Inside, it is warm and humid, but not too uncomfortable. Fans move the heavy air through a lush garden thriving with life.

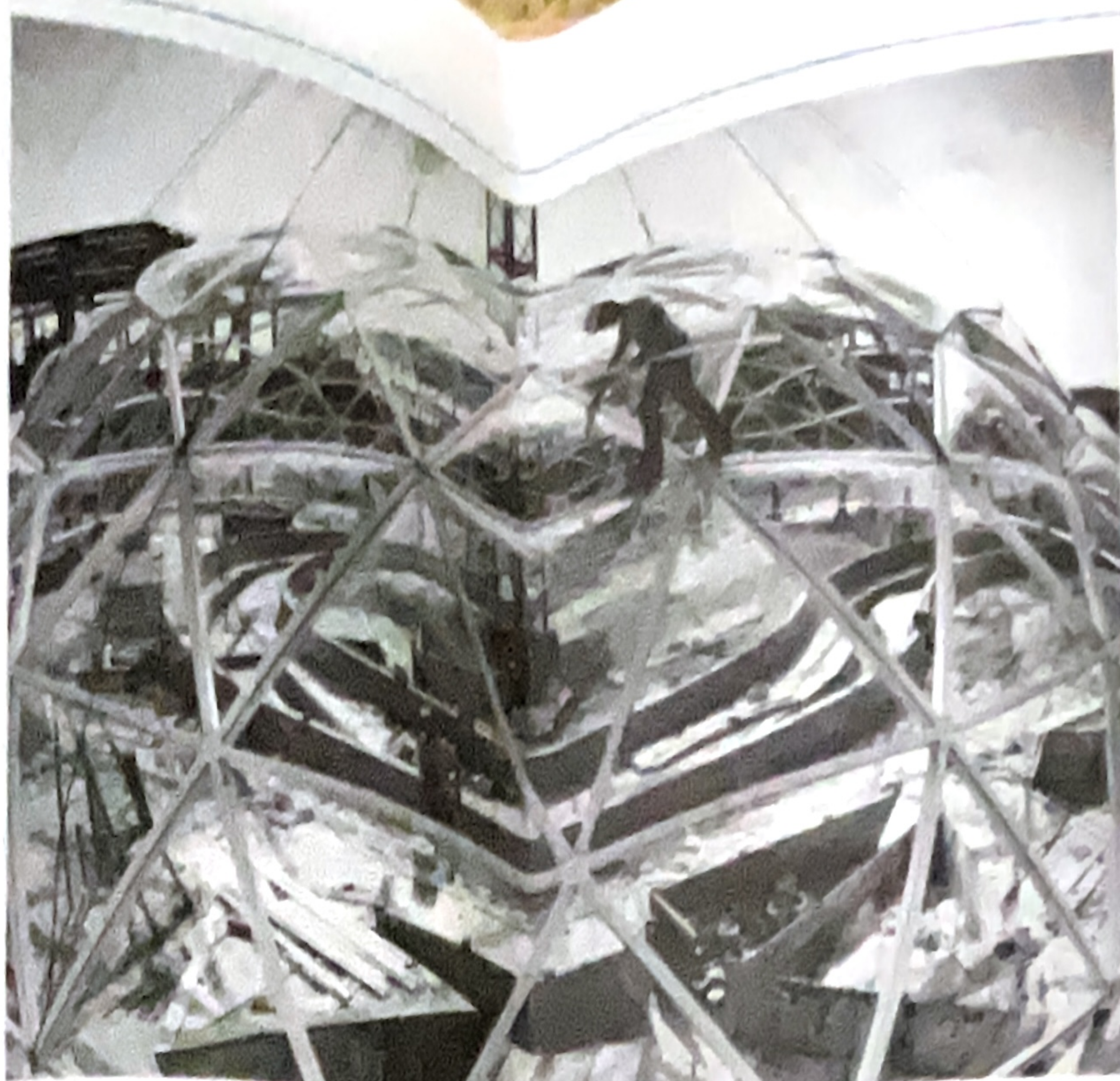
Lettuce grows from styrofoam boards floating in water-filled troughs. Jensen explained the technique of hydroponics, or growing plants in a nutrient base of peat moss while floating in water.

Another pool of water demonstrates polyculture systems where aquatic animals and plants grow one above the other.

To our left, stand tall trellises. Vines



Harvesting takes on new look as workers use stilts to reach the crops grown vertically.



Workmen at Epcot Center construction site assemble dome for tropical growing area in Land pavilion. Clear, 120-foot diameter roof will cover a controlled, rain forest-like environment where papayas, bananas, rice, soybeans, corn and other staple crops will be grown.



Leafy crops, like lettuce and spinach, produce nearly twice the yield when grown in vertical structures like these at ERL.

which usually creep along the ground, now hang high above our heads bearing ripening cantelopes. "As the fruit becomes ready for harvest," Jensen explains, "they will be gently shaken free and fall into a pool of water."

To exhibit the process of intercropping, pineapple plants grow next to papaya trees, with sweet potato plants interspersed. All are planted within a limited growing area and provide each other with necessary nutrients and a maximum crop yield.

Chinese cabbage growing out of styrofoam boards are propped up against each other to form pyramids of plants at various stages of growth. Inside the pyramids, pumps whoosh and surge nutrients upward to mist the plant roots every three minutes.

Those marching tomato plants represent another growing method developed here which is applicable to a variety of plants and environments.

Nearby, future stars of the plant show

appear to grow as we watch. They are halophytes, plants that survive and even thrive in a brackish or saltwater environment. These, says ERL Director Hodges, as he joins the tour, are a potential solution to the world's food shortage.

Guests visiting the Land will view these systems while riding aboard boats. For those who want additional information on these wonders, special "backstage" tours are planned to allow guests to walk through the growing areas with a trained host or hostess.

Hodges has pioneered research into many areas of food production all over the world. An atmospheric physicist, Hodges turned his interest to utilizing saltwater beaches to grow food crops and developing a method for rapidly producing large quantities of shrimp in a controlled situation. The soft-spoken

from page 2

Merle Jensen, poultry farmer turned plant researcher, displays young papaya plants readied for transfer from Tucson, Arizona, greenhouses to Land pavilion greenhouses in Florida.



Hodges says, "the theme of our operation is to combine the practical with the visionary, to find new ways of feeding ourselves."

As the visitor leaves the heavy, hot air of the greenhouse, a shiny, spinning aluminum drum filled with growing plants catches the eye. Its core glows brightly as the lettuce spins busily around the lighted center. It's a "Buck Rogers Project," designed to show how plants could grow in outer space. The system could save the \$500 a pound cost of flying food into space. But more importantly, it symbolizes the thinking behind the project: finding new ways of growing more and better food from new crops and new methods. It's a futuristic conclusion to an amazing exhibit, which the 8-10 million visitors to Epcot Center will have a chance to appreciate.



Disney artists and modelmakers have finished the latest version of the Epcot Center scale model, now being seen by thousands of visitors to Walt Disney World Magic Kingdom. The Epcot Center Preview, located on Main Street, U.S.A., includes models, renderings, and new film.

## Disney Imagineers Fooling Mother Nature

It really is fun to fool Mother Nature! At least that's what the "illusioners" at WED Enterprises believe. And they think they have done it with their latest bag of tricks.

Their challenge was to create the illusion of an erupting volcano for the Universe of Energy pavilion, presented by Exxon. Guests traveling through three-dimensional scenes depicting our main sources of energy will be so close to the spewing mountain that they will almost be able to reach out and touch the lava flow. So, the volcano had to be completely realistic.

Lighting and Special Effects Manager Bud Martin and his team went to work on what is perhaps the most complex special effect ever attempted by WED for a Disney show.

One unusual feature of the volcano is the lava flow. Since guests will skirt the edge of the eruption, the lava could not be hot, yet it had to have a fiery glow, bubble and congeal like real lava. Several materials were tested including Jello and a bizarre concoction of mineral oil and talc. Chemists were called in. Nine months later they discovered

"orange goo," a custom blend of polyacrylic acids. It's the same substance used in toothpastes, and some laxatives. When orange dye and black light pigments are added, it glows just like the real thing.

Finding a pump to cycle all that "goo" up and down the mountain was another challenge. One designed to squeeze the filling into hot dog skins made the lava too thin. Designers finally decided on a pump used to fill dog food cans. It will take the demands of continuous performances and spew out the lava in just the right consistency.

But guests experiencing the Universe of Energy will not only be able to see the molten-glow lava and hear the constant rumblings from deep within the mountain, they will also be able to smell the steamy volcano. Believe it or not, the WED research men are busy creating "Bouquet of Volcano" which will be sprayed from a "smellitzer" scent cannon as guests go by.

Only one more task remains — to make sure that both Mother Nature and Hawaii's goddess of fire, Pele, can take the heat of competition.



WED Illusioner Bud Martin checks mock-up of volcano being used to fool Mother Nature.

## Time Inc. Joins Epcot Center Project

Walt Disney Productions recently announced that Time Inc. has signed an agreement to participate in Epcot Center.

The Time Inc. presentation, located in the CommuniCore of Future World at Epcot Center, will feature informative shows and exhibits relating to our ever-changing world.

In a "hands-on" exhibit area, individual kiosks — themed to the worlds of global and national events, sports, business, cable television and science — will showcase the world in perspective and as it's happening right now, through electronic news displays, quiz terminals and video data banks.

A major portion of the Time Inc. show will be the exciting Future Choice Theater, where visitors will explore the world as seen through imagery drawn from the vast photo archives of Time Inc. Visitors will see the world as it was yesterday, as it is today, and witness the accelerating changes of the "Information Age."



## ANTIQUES, Collector Items Become Props For World Of Motion

From a Cadillac convertible with a mohair interior to a Wells Fargo stagecoach, the vehicles that changed transportation from a luxury to a necessity are part of the World of Motion pavilion at Epcot Center.

Thousands of hours of searching went into discovering the coaches, cars, trucks and buses, that make up the history of transportation in one of the major Future World pavilions at Walt Disney World. WED imagineers have traveled the globe, contacting collectors, museums and manufacturers to provide the authenticity that makes Disney-designed shows unique.

The stagecoach used in the show is as authentic as the Old West. It originally traveled with passengers, freight and mail from Tucson to Phoenix, Ariz., during the late 1880's. Its weathered paint, wood and leather speak of blazing sun, Indians, and the Wild West. It was discovered by WED imagineer Lee Congiardo at a Phoenix farm, carrying children as a weekend attraction. Lumber, paint and the careful work of craftsmen who restored it make the coach part of the World of Motion.

The World of Motion pavilion in Future World is presented by General Motors, which plays a major role in the story of transportation. Many of the company's classic cars, worth a fortune in today's collectors' market, will become props for the dozens of show scenes depicting the history of movement, from primitive footpower to a joyride on the Moon.

Some of the props, like the chariots and Trojan horse in the Roman-era scene, were made from scratch by Disney craftsmen.

More modern vehicles, from a 1924 high-cab Chevrolet coupe to a souped-up Camaro, were assembled from collectors around the country.



Future World's World of Motion pavilion includes this original Wells Fargo stagecoach. Animator Ward Kimball explains scene.

### "Scents," from page 1

The smellitzer operates like an air cannon, aiming the scent up to 200 feet across a room toward an exhaust system. Guests traveling on moving vehicles will pass through the scene as the appropriate scent drifts across their path.

Regulated by computer, the scent can be triggered for a fresh aroma just prior to each vehicle's arrival.

According to McCarthy, the use of smell has fascinated the entertainment industry for a long time.

"Back in the fifties, Mike Todd developed a process called 'smell-a-vision,'" McCarthy said. "The idea was to release certain scents into the theatre as the visual counterpart was shown on the screen."

McCarthy, who worked with Todd on the project, claims there were many problems with "smell-a-vision." "The main problem was that odors tended to linger in the air, and after awhile they all blended together," he said. "We couldn't get the scents in and out of the theatre quickly enough."

At Epcot Center, the situation will be different because the audience will be moving through each of the many experiences in each pavilion.

Some of the most unusual scents will be in the Land pavilion at Epcot Center. Here, visitors will experience tropical vegetation, rain forests, deserts, some of the great natural terrains found on Earth. Of course, the Disney "imagineers" plan to supply all the appropriate smells.

Guests traveling through a farming scene may detect a faint animal smell. In another scene, an orange grove will smell like the real thing. Still another effect calls for the smell of damp earth.

Some of the smells will hardly be noticeable to most people. The aroma will be there, but the sensory perception may not be a conscious one.

The WED imagineers have learned how to regulate the strength or intensity of the odors used.

A whole new generation of unique techniques, special effects and transportation systems are being developed for Epcot Center.

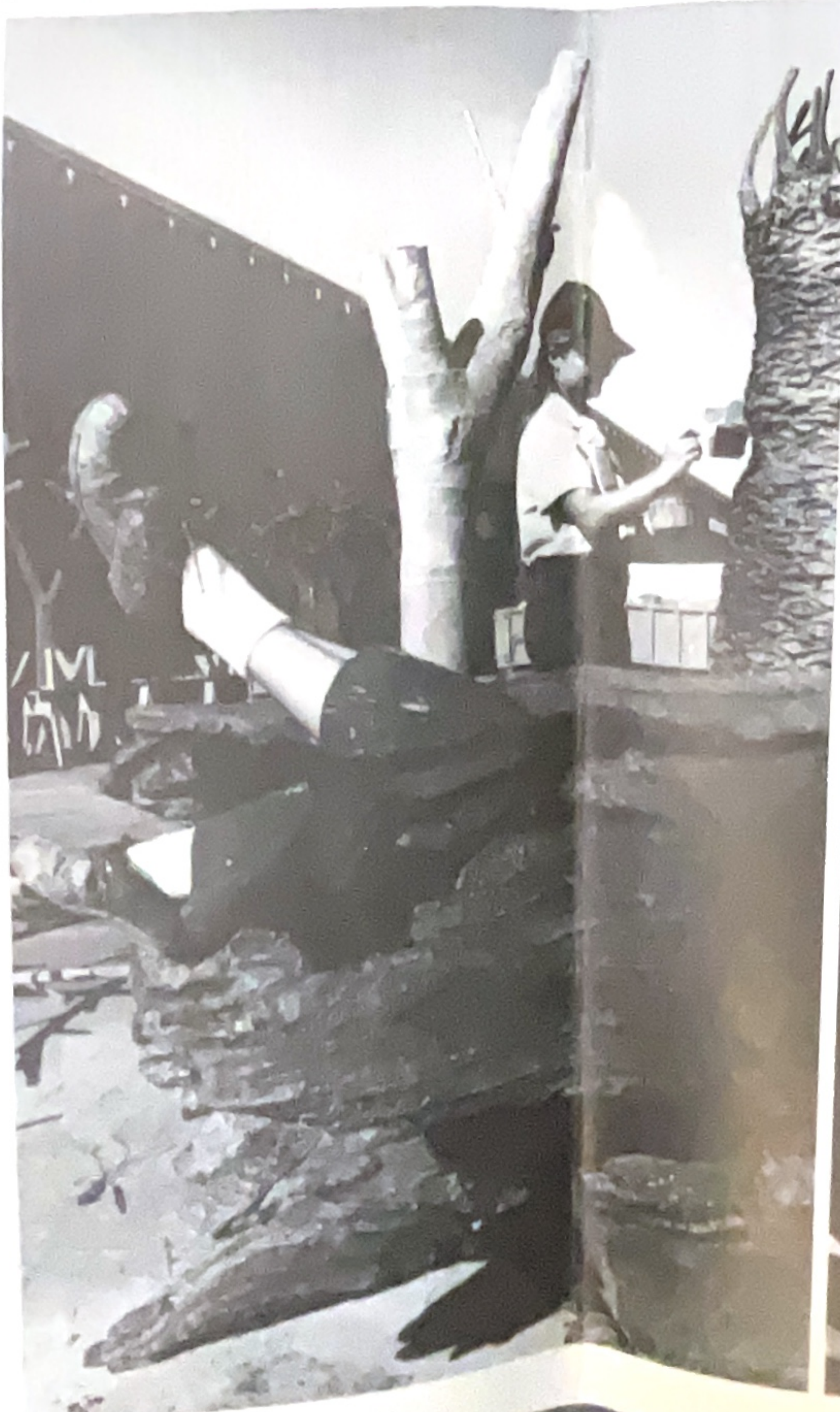
### DID YOU KNOW ...

That about one hour of film was produced for the opening of the Magic Kingdom in 1971. Epcot Center has about eight hours in production, including CircleVision and three-dimensional films as well as a variety of other large-screen film formats, the largest animated film ever shown and even an animated motion picture screen.

### DID YOU KNOW ...

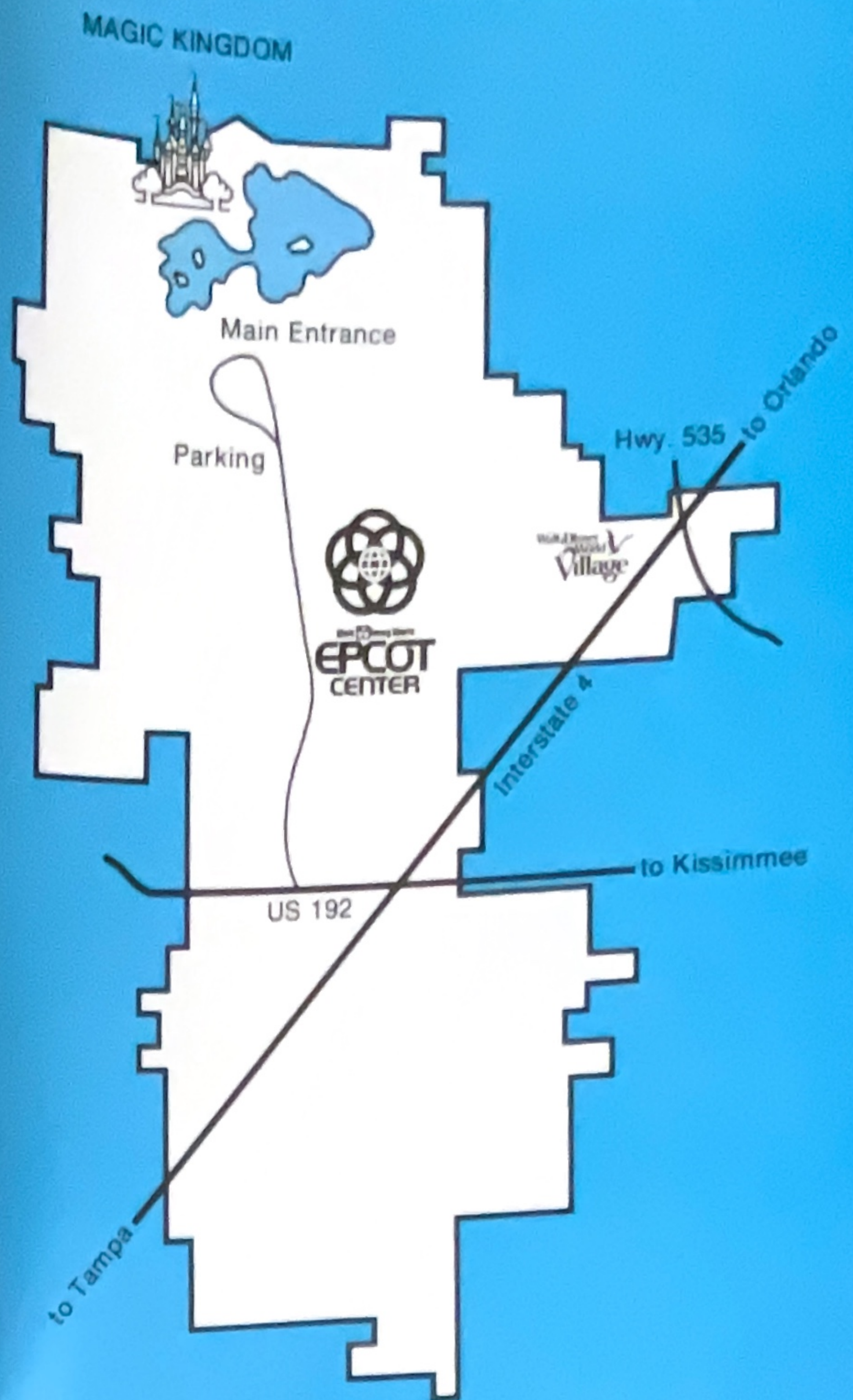
The roof of the Universe of Energy covers nearly an acre, supporting 80,000 photovoltaic cells that produce 70,000 watts of DC electrical power.

## POSTSCRIPT



## Where is EPCOT Center ... ?

Epcot Center's 260 acres lie two miles south of the Magic Kingdom



## GUESS WHAT ... ?

(see story page 2)



NO, IT'S NOT A CARNIVOROUS TREE! It's a team of painters in Florida putting finishing touches on part of primitive swamp in Universe of Energy.

### EPCOT CENTER TODAY

Published by Walt Disney World. Material used in this newspaper is released for reuse. Copies of photographs are available for editorial purposes.

Contact EPCOT CENTER Office  
Walt Disney World  
Box 40 EC  
Lake Buena Vista, FL 32836