

On New Techniques in Animation

Producer Les Novros Details His Company's Experience on Four World's Fair Projects

TOO OFTEN, the claim for new techniques in animation turns out to be disappointing, either because the technique may not be new at all or because novelty, of itself, just isn't sufficient to recommend it.

For example, the manipulation of frames to suggest movement with a minimum of visual change is as old as animation itself, yet the phenomenon is constantly being re-"discovered." Computers do not contribute anything to the animated film when they merely replace the assistant animator.

New experiences require new modes of expression, but not necessarily new techniques. The early UPA films were not essentially different *technically* from the Disney films, although they differed widely in form and content.

New Forms in Our Future

On the other hand new forms do invariably follow from technical discovery and invention. The forms of contemporary architecture, for example, derive from the availability of materials made accessible by new industrial processes. "Glass alone," said Frank Lloyd Wright, "with no help from

us (the architects) would eventually have destroyed classic architecture, root and branch."

In film, the wide screen in itself produced nothing, whereas the stereo-film of tomorrow, used by film-makers aware of its expressive power, will encourage—or more—*demand*, the creation of new forms. The present uses of visual and acoustic elements and their dynamic inter-relationships, that have assumed the authority of principles, may all be incompatible with the new technique. Content itself may be subject to its strict demands.

Four Films at World's Fair

During the past year, Graphic Films was largely involved in the production of four films for the New York World's Fair. Of these, two use familiar techniques and the somewhat incongenial limits of the Cinemascope field.

A third film is a version of one produced earlier for an Abbott Laboratories' exhibit in Chicago: *Chemical Man*. What was novel there was the shape of the screen, which was round, and its position—in the floor of the theater.

We had to accommodate the

design of the film to the circular field and to a 360-degree viewing ramp. This meant an up/down, right left orientation that shifted with each viewer. However, it was not until we were asked to produce the Cinerama film for the KLM exhibit that we were confronted with formidable problems requiring novel technical solutions.

Exploring Space on a Dome

Cinerama had used a dome to house the Boeing exhibit at the Seattle Fair and wished to use it again in New York. There were two conditions: First, a greater technical control and a greater variety of content. From a number of themes under consideration we finally chose to develop one which came to be titled, *To The Moon And Beyond*.

The film is, in fact, an exploration of space—the vast events in outer space and the intricate workings of molecular and subatomic space. A rough script and the most tentative of storyboards were developed. (A final storyboard was never produced because we could never render in static drawings the qualities of continuous change that we were

seeking. There were doodles, fragmentary pieces of action, charts, working diagrams, abstract patterns, camera tests, countless photographs cut from magazines and mounted on the wall in the hope that they might suggest a clue for the organization in a few shots of the inexhaustible variety of matter.)

Modified a 65mm Mitchell

Simultaneously, Lin Dunn was modifying a 65mm Mitchell camera for the project . . . *one* camera which we were later to mount on the animation rig, dismount and remount in an airplane or a trip for the live sequences and dismount again for use on the optical printers. These actions were not consecutive so that the tactics of the job, in view of a fast-approaching deadline, were not the least of the difficulties we faced every day.

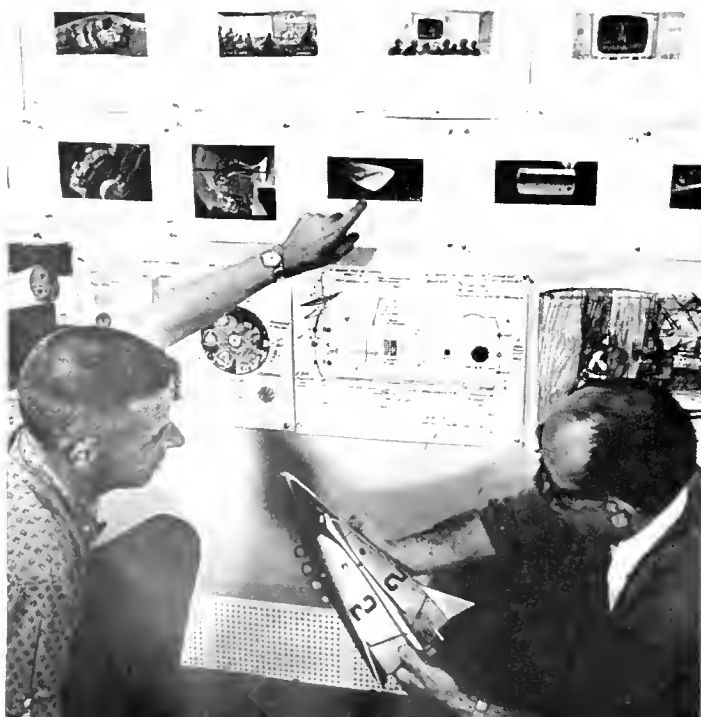
The building that housed the exhibit—the Transportation and Travel Pavilion—was not completed until the day before the scheduled opening. So we were never to know whether our calculations were accurate until it was too late to make corrections.

Simulated Dome in the Studio

The best we could do was to set up a small dome at our studio; it had a nine-foot diameter and was tilted on its side. The projector was used primarily to analyze

The Varied Skills for Aerospace Production

Below: Graphic Films' director Ted Parmelee (at left) discusses the story board and models for sequences in "Rendezvous in Space" film.



Animation rig and camera capture scene from the molecule sequence in "To the Moon and Beyond." Director Con Pederson is at lower right.



the distortions with which we would have to cope.

The dome of the building would measure approximately 106 linear feet across its surface from edge to edge, about three times the area of any previous motion picture field. The actual film image has a circular aperture about two inches in diameter, twice the size of a standard 70mm image. Only 10 circular 2-inch frames could be exposed per second. Since the film would be projected at 18 frames per second, we were forced to work with ratios which, in the live action photography, accelerated normal speeds.

Had to Avoid Tracking Shots

This fact, the inadequacy of the camera for tracking shots of any kind, the lens and the shape of the dome—all were factors in the choice of specific content. So, in our film, a spider may spin its web, but no birds fly.

The 160-degree lens was designed especially for the project. The front surface measures almost a foot in diameter and its weight required that it be fastened to a large solid steel bed on which the camera was also mounted.

The form of the film was largely influenced by the picture field of the dome. In the traditional film, the dimensions of the screen furnish the coordinates for the basic pictorial plan. The dome effectively destroys the two-dimensional screen surface. We are only once removed from the stereo-field. Objects may occupy

Moon background for the Cinerama film: the distortion required by projection on the dome was "built into" the layout and painting

any place in the vaulted area, suspended or moving without reference to a frame. When the dome is filled, the viewer experiences a space, shaped but unbound. He is enveloped and sometimes engulfed.

Picture Has Four Sequences

The content of the motion picture is roughly divided into four sequences: 1. Prologue; 2. The origin of galaxies and stars; 3. Earth; and 4. Sub-microscopic space and substance. Animation and 3-dimensional models were used for all sequences except the exploration of earth.

In the representation of galactic space, verisimilitude was of primary importance. This ruled out the use of painted representations, in the ordinary sense: brushstrokes and the grain of paper magnified over 600 times would certainly weaken the effects we wished to create.

Astronomical photographs were also ruled out. For one thing, the stars recorded on photograph plates, due to long time-exposure, possess softening halations; when projected on even the small dome, it was found that great magnification made them lose their sharp, star-like quality and appear, instead, as large, soft, blobs of light.

Giving Viewer Depth Feeling

Further, we wished to intensify the viewer's experience of depth and movement, to surround him

the picture and the movement through these elements.

Three-dimensional models of galaxies and nebulae with suspended points of light representing stars were inadequate for our

Below: this nine foot dome was constructed for viewing dailies on "To the Moon and Beyond." Les Norros is standing at the projector.



On New Techniques in Animation:

purpose. Bright clouds of incandescent gas and dark clouds of dust had to be penetrated by the camera. "Stage-smoke," even if its movement and density could be controlled, would in no way resemble the formations of galactic clouds.

After a great deal of experimentation, a process was developed employing special pigment suspended in liquid, by which the various galactic cloud and dust formations could be duplicated with considerable accuracy and control. The luminosity, density and color were regulated through photographic processes and transparent dye.

Achieving Scale and Depth

The suggestion of immense scale and depth was achieved by plotting the relative movements of all the component elements and moving them, while being photographed, along an extremely fine scale of increments, sometimes figured in thousands of an inch per frame.

The experience of depth was increased through multiple exposure and travelling mattes. For large, bright stars, it was necessary to use small, intense light sources shining directly into the camera lens. Diffraction gratings were used to produce the flares.

In approaching the earth, movement through cloud formations was photographed from a specially modified aircraft. The camera had to be mounted upside down and in a manner which would not include in the frame parts of the aircraft itself—particularly difficult due to the wide-angle coverage of the lens.

Visual Experience in Nature

We shot canyons in Death Valley, redwoods in the California State Park, fish underwater; we shot a dandelion, ants in their

hole, a butterfly, an owl and a spider. In deciding to include the spider we reckoned without his behavior patterns. The native spider spins only in the summer months and we were obliged to import willing specimens from Mexico.

Several methods were devised to represent sub-microscopic space. Depth was usually suggested by superimpositions of many levels of art-work, and for some sequences a multi-plane device was constructed using large circular panels of glass. The molecular structures delineate a protein-building process, slowed down about 100 times.

A unique computer-driven device was used for part of this sequence. It could be programmed to follow an infinite number and variety of eccentric movements. By shooting through variably arranged apertures, simple geometric shapes were broken up into myriads of projected images and, by a repetitive process called "stepping," evolved into intricate and complex patterns.

No Precedents for Reference

In reviewing the making of the film and taking into account that there were no precedents to which we could refer . . . that the day the camera came out of the shop it went into production . . . that there were days of equipment mishap beyond our understanding . . . that we relied almost completely on mathematics of a sort to transform distorted images into an enveloping visual experience . . . we recall almost with unbelief that day when the first audience came into the theater, the projector switch was turned on and the dome was filled with a great flow of images and sound that combined to form a unique film experience.

Below: one of cel sketches made for Abbott Labs' "Chemical Man" exhibit.



These Americans Need Your Help

Food for Business & Community Discussion in Two Pictures on Unemployment and the Migrant Worker

TWO RECENTLY-RELEASED motion pictures offer many discussion points for business, industrial, education and community leaders working to improve employment and living conditions. *The Newcomers*, a 25-minute black & white film, was produced by The Methodist Church, which is also one of seven denominations in the National Council of Churches sponsoring *The Captive*, an Edinburgh Festival entry (black & white, 28½ minutes).

The Captive documents poverty in West Virginia. Herb Honaker, 33, an unemployed coal miner



"The Captive" takes the viewer into the life of one unemployed man . . .

with a wife and three small children, tries to find "some kind of substantial work to do."

Herb's conversations with his wife and neighbors are recorded "just as they happened."

Getting Rapport With Herb . . .

The producer-director, William C. Jersey, of Quest Productions, was asked how he established rapport with Herb. He credited Herb's confidence in his neighbor, Rev. Jack Weller, the narrator. Mr. Jersey said, "You have to respect the people and the situation before you can ask them to be themselves."

Throughout production, Jersey worked with Rev. Dr. Henry A. McCanna, Executive Director of the Department of the Church in Town and Country of the National Council of Churches, which in March 1962 undertook a film to point out the extent and effect of poverty, especially poverty of the spirit. It is intended to help stimulate discussion of steps toward elimination of poverty. Dr. McCanna's discussion guide is provided with *The Captive*.

A Stimulus to Government

To Dr. McCanna, C. B. Gilliland, Executive Secretary of the Advisory Committee on Rural

Areas Development of the Department of Agriculture, wrote,

"*The Captive*, with its human interest story, has stimulated much poignant thought and discussion among Federal people as to just how the government programs can assist the people in most need. The job of motivation will be one of our greatest challenges."

Problems of "The Newcomers"

The Newcomers shows Appalachian families who have migrated to Cincinnati and the inner-city church workers who do their utmost to help the migrants find jobs, decent housing and the companionship of people from "back home."

A former coal miner, Curtis Ayres, and his wife and five children, the Burton family who are "bulldozed" by slum clearance projects, and numerous newcomer children and teenagers are befriended by Mrs. Worley of State Avenue Church, Bill Nelson of Emanuel Community Center, and the Rev. Robert Sinks.

How Communities Can Help

Staff members' remarks and the narration were scripted by the director, George C. Stoney, "by re-writing material I gathered in taped interviews." As the church personnel demonstrate practical guidance, they indicate additional help needed from the community. Eight steps for helping newcomers are suggested in the discussion guide.

Under the supervision of Dr. Philip C. Edwards, Director of the Department of City Work in The Methodist Church, *The Newcomers* was produced to guide groups exploring the 1963-64 Mission Theme, "The Changing City Challenges the Church."

Job Corps Using Both Films

One indication of the usefulness of *The Newcomers* and *The Captive* throughout community and nation is the fact that both are used in staff training by the Job Corps, part of the Office of Economic Opportunity.

The Newcomers may be purchased from A-V Services, The Methodist Board of Missions; *The Captive*, from the Broadcasting and Film Commission, National Council of Churches. Both are at 475 Riverside Drive, New York, N.Y. 10027. The price of each film is \$149.00.

MORE FILM NEWS ON PAGE 50