

TECHNOLOGY

3-D: A Two-Eyed Wonder

There is more to third-dimensional movies than meets the eye. Perched high above the balcony in his 3-D projection booth, the operator labors to keep things under control.

By ALLEN LONG

► IF YOU think it is bothersome to put on a pair of polarized glasses to watch a third-dimensional movie, pity the poor projectionist who must show the movie to you. He really has it tough.

Perched high in the balcony in a crowded projection booth, the nameless operator must look after a baby of a new mechanical species. In some ways the new baby resembles his big brother, the 2-D movie. But the character and personality of Hollywood's youngest child are wrapped up in new techniques.

They involve two complete films and often a stereophonic sound-carrying magnetic tape. Keeping films and sound properly synchronized can be a headache.

Born of an ailing boxoffice, the baby was christened Natural Vision. To see all three dimensions of him, you must don a pair of special specs. Without them, he is frustrating and fuzzy.

Natural Vision pictures are shot in the movie studio on two films at once. One film captures the scene for your left eye and the other film records it for your right eye. Prints of these two films are shipped to local theaters and must be shown simultaneously on two movie projectors.

Intermission for Changing Reels

Until now, most theaters have needed only two projectors. But now two machines are needed just to show one "reel" of movies such as "Bwana Devil" and "House of Wax." An intermission must be called when the first pair of reels has been shown. When both projectors have been reloaded, the show resumes.

If Natural Vision movies sweep the country as their sponsors hope, chances are that the intermission will be dispensed with in time. Projection booths soon may be equipped with four projectors instead of two. This will be done so that when one set of projectors runs through, the other set can flash on instantly.

There is more to a properly shown 3-D movie than meets the eye. And, indeed, strange things can meet the eye if the movie is not properly shown.

Each of the films sent to the theater is exactly the same length. To produce the illusion of three dimensions, the projectionist must show these films in frame-for-frame synchronization.

If the projectors get out of "synch," the

third-dimensional effect can go to pot. When the hero whips out his revolver to plug the villain, the hero's arm suddenly divides during the fast action. It looks as if the hero had two transparent right arms, each gripping a trusty but transparent six-shooter.

Projectors Must Synchronize

Since movie audiences are not accustomed to actors having extra limbs, technicians have created devices for keeping the two projectors in exact step. A whirling metal bar linking the two projectors can do the trick. If one projector tries to run faster than the other, it is held back by the slow projector.

The coupling is more conveniently done electrically by selsyns. Selsyns are motor-like machines that work in groups of two or more. What one does, the others do. To show his 2-D shorts and previews, the projectionist merely flicks a switch. That uncouples projectors and sound reproducer.

Selsyns are almost a necessity when the 3-D movie is supplemented with stereo-

phonic sound. This sound system involves a magnetic tape carrying multiple sound tracks that feed a number of loudspeakers scattered through the theater. It replaces the usual sound-on-film tracks. Selsyns are needed to keep the sound reproducer in step with the projectors.

The critical business of holding films and sound in exact synchronization is reflected even in film splicing. If a film snares or snaps so that a part must be cut out, the patched film must be exactly as long as the original. If the projectionist snips out five frames of one film, he must replace the strip with a piece of black film five frames long. If he doesn't, the heroine suddenly may sprout two extra arms and legs and a spare head.

Mistakes Produce Laughs

A bunch of patches in a short strip of film can give you the impression you have a loose connection in your optic nerve. At one moment your left eye may go "dead," then come "on" again. It may black out a second time and flash back on just in time for your right eye to go off momentarily. No matter how miserable the hero is, this on-again, off-again business is so startling that it usually gets a laugh.

In addition to the business of keeping things running smoothly during the screen-



ANOTHER 3-D TECHNIQUE—This squeezed-up version of Marilyn Monroe will be fanned out by an anamorphic lens to cover a screen nearly two and a half times larger than today's standard. Known as CinemaScope, the process uses one film, a different set of 3-D "cues" and no viewing glasses. It promises to give bespectacled Natural Vision stiff competition.

ing, the projectionist has other things to work out. His two projectors must be aligned so that the pictures from each projector fall upon the screen at the proper point. Misaligned machines may give the audience a crick in its neck.

Furthermore, the focal lengths of the lenses in the projectors must be much more closely matched than they usually are. And the third-dimensional effect can be killed if the projectionist fails to check the polarizing filter that screens each light beam as it leaves for the screen.

Pictures Tend to Darkness

Since these polarizing filters knock out about half the light leaving the projector, and since the polarized glasses worn by the audience filter out about half of what is left, the 3-D picture tends to be dark.

To increase brilliancy, the screen can be covered with a special aluminum paint. But this must be done with care or the pores in the screen will become clogged. Sound coming from behind-the-screen loudspeakers thus will be blocked and the audience will find it hard to hear.

These are not all of the 3-D projectionist's troubles by any means, but they should give you an idea of the complexities attached to adding one mere dimension to your theater enjoyment.

If three-dimensional movies become commonplace, it may turn out that many a projectionist will have a better build than muscle-men actors starring in the films. In an effort to keep intermissions at a minimum, film makers now are putting their 3-D movies on giant reels.

These reels, nearly two feet in diameter, hold 5,000 feet of color film and more than a mile of black-and-white film. The reels weigh about 50 pounds each and some of them must be fitted on a spindle only 5/16-inch in diameter.

Broken-Film Problem

In itself, this is hard to do, but the task is complicated because some of the reels go on spindles above the operator's head. Jockeying these heavy reels into position for a hard-to-hit spindle is bound to be good exercise for the arms and shoulders.

Another complication is brought on by the overweight reels. Unless made of a suitable steel, the 5/16-inch spindle is almost too weak to hold them. The spindles sometimes bend. This leads to snapped film as the reels wobble uncertainly in the projector's magazine.

Broken film was quite a problem at the outset of Natural Vision movies. Big take-up reels, never intended to perform such duty, moved slowly when the projector first came on. As the reel gathered speed, it quickly took up slack in the film. But the reel was spinning so fast when all the slack was absorbed that it frequently snapped the film.

The key to Natural Vision 3-D lies in polarizing light from the two projectors.

Facing the screen, the left projector shows, for instance, the picture to be seen by the left eye. Light from this projector shoots through a filter in front of the lens which polarizes the light in one direction.

The same thing happens to light leaving the right-eye projector, except that the light is polarized at right angles to that of the left-eye projector. This means that light from the projectors can enter your eye only through the proper polarized lens in the glasses you wear.

Since the whole polarizing job is done right at the projectors, the operator must keep a wary eye on the polarizing filters.

Heat from the strong arc lamps deteriorates the filters. To check the filters to see if they are polarizing the light properly, the projectionist must have someone down in the house look back at the projectors through polarized glasses. If the light beams appear a deep blue, the filters still are working. If the beams are blotchy, the filters need replacing.

To date, Natural Vision has broken box office records in town after town. Its promoters hope it will snatch persons away from their television sets. It is still uncertain, however, what will happen when the novelty of 3-D wears off.

But when opticians begin polarizing the lenses of your glasses, you will know that Natural Vision is here to stay.

Science News Letter, August 1, 1953

GENETICS

Growth Studies Aimed At Tracing Abnormalities

► GROWTH ABNORMALITIES may some day be traced back to the specific genes, the tiny hereditary units that caused them, and thus may be corrected.

This was foreseen here by Dr. Paul B. Sawin of the Roscoe B. Jackson Memorial Laboratory. Such backward tracing of growth can be likened to counting the rings in a tree's trunk to tell its age.

Variations in the structure and size of parts of the skeleton, digestive and endocrine systems in animals can be used as the growth landmarks, Dr. Sawin said. They give clues to the inherited and environmental factors responsible for the growth pattern, which lead either to favorable or unfavorable body proportions and to endocrine imbalances. These in turn may lead to abnormalities in reproduction, sex and maternal behavior.

Rabbits from the Memorial Laboratory have been bred with specific differences in ribs, or in size and shape of glands, for instance. Such rabbits are being used in cross-breeding and egg transplantation experiments to measure the differences in growth responsible for them.

Scientists hope to trace the growth patterns back to the embryonic stage, and then correct experimentally those differences in pattern that have led to the most unfavorable developments.

Science News Letter, August 1, 1953

AERONAUTICS

"Brain" Lands Airplanes; Wins Prize for Inventor

► AN ELECTRONIC device that schedules airplane landings at bustling airports won the Thurman H. Bane Award for its inventor, Benjamin F. Greene Jr. of the Air Force's Cambridge Research Center, Mass.

The award is given annually by the Institute of the Aeronautical Sciences.

Designed to cut the traffic snarl in skies over airports, the electronic machine figures out when a certain airplane should arrive at the airport. Then it determines whether any other plane is scheduled to land at the same time.

If the airstrip will be in use at the scheduled arrival of the plane, the machine calculates a slight detour for the pilot to fly. The detour will delay the plane's arrival until the first moment the landing field is open. The detour path is relayed by radio to the pilot.

This eliminates the conglomeration of planes "holding" at certain altitudes over the airport while waiting for landing instructions. Theoretically one landing every 30 seconds can be made at airports equipped with the device, providing the field can be cleared of passengers and plane.

Science News Letter, August 1, 1953

Free Booklet Tells How Deaf Hear Again With Startling Clarity, Ease

New hope for the 15 million persons in the United States who are hard of hearing was voiced by a noted Chicago acoustical scientist.

He reported that through the miracle of modern electronics it is now possible to overcome deafness even if the loss is severe.

He demonstrated how the deaf can hear again with a clarity and ease they never dreamed possible.

According to this electronic engineer, Mr. S. F. Posen of Beltone, "the longer a hearing loss is neglected, the harder it is to recapture certain speech sounds and understand them."

To acquaint the hard of hearing readers of this magazine with what may be done to help the deaf hear again with miraculous clarity, full authoritative details about deafness and how to overcome it are described in an informative, new, illustrated booklet, which will be sent in a plain wrapper without any cost or obligation. Send for your valuable free copy today. A postcard will do.



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