

Production

Showscan: Doug Trumbull's new 70mm Format

Motion pictures proved to be a pleasant diversion for a paying public when they were first shown at penny arcades via Thomas A. Edison's peep-show device, the Kinetoscope. That was in 1894. A year later, the Lumiere brothers of Paris expanded the possibilities of the movies enormously by projecting them on a screen. Within a few years the motion picture became not merely a novelty but a practical way of telling stories visually to an increasingly eager public. It became, eventually, an enormously powerful industry in which technology and artistry are exploited to sometimes marvelous effect.

Technology and artistry are the tools of Douglas Trumbull, whose latest contribution to the movies is a striking process called Showscan.

Trumbull first gained fame as a creator of special visual effects whose work was vital to the realization of *2001: a Space Odyssey*, *The Andromeda Strain*, *Close Encounters of*

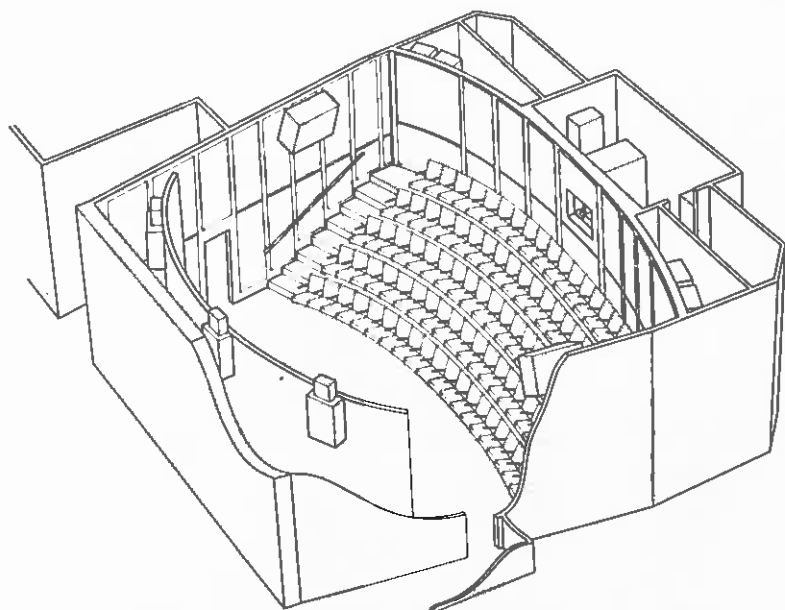
the Third Kind, *Star Trek: the Motion Picture* and *Blade Runner*. He directed *Silent Running* and *Brainstorm* and founded Entertainment Effects Group (EEG), an outstanding visual effects company at Marina del Rey, California.

"One thing that has diminished movies is a lack of showmanship," Trumbull believes. "All the other entertainment industry technologies are going crazy, but movie exhibition hasn't done a thing to make movies better. Most of the people who go to movies today have never seen Cinerama or Todd-AO. The theaters that run 70mm prints are showing, for the most part, 35mm productions that have been enlarged for 70mm projection. Also, many theaters are running 70mm on small screens with inadequate projection.

"A decision to go out to a movie means considering more than just the cost of a ticket. It must include accessibility, baby sitters, parking, and so on. It's so easy to stay home and



Left: Douglas Trumbull and the Panavision 70 camera adapted for Showscan. Below: Plan of a Showscan theater.



watch TV. High resolution television is definitely coming, although it will require from 1250 to 2000 lines of resolution to even approach the quality of 35mm movies. The gap between television entertainment and theatrical films will continue to grow narrower and narrower, so to compete with TV we must create a *bigger* difference. It would take a hundred high resolution TV channels banked together to present our kind of quality."

As regards developments in the film medium itself, Trumbull believes that the industry has permitted stagnation. "Some fine movies have been made, but nothing of importance has happened for some time," he said. "The great movements have been sound, color, and, more recently, Dolby sound; but since that, no major steps have been taken to really push the boundaries forward. Some of the technical improvements have led to a degraded technique by making things too easy - zooms instead of dolly shots, for example."



Above: Set up for the magic mirror shot in which the actor's hand breaks the surface of a liquid mirror. **Below:** The Showscan camera mounted on a dune buggy.

New Magic, which is now being exhibited at Showscan theaters in Dallas, Springfield, Missouri, Fairfax, Virginia, and Huntsville, Alabama, is designed to showcase the special qualities of the system. It has a running time of only 22 minutes, yet its audience impact is undeniable.

Showscan is not intended for showing in normal theaters but in specially designed, intimate showplaces called SuperCinemas that seat from 60 to 100 patrons. These houses are being built in many areas of the United States at Showbiz Pizza Place entertainment centers, which are owned by Brock Hotel Corporation.

The theaters are practically square and the seats are arranged on curved tiers in close proximity to the screen – which is made of a special material developed by the Stewart Film-screen Corporation – is 17' x 34', about three times as large as the screens in the average theater. There is no proscenium; the curved screen fills the front wall from floor to ceiling and wall to wall.

The movies are photographed on 65mm film using a height to width ratio of 1:2.21 in specially designed

cameras running at 60 fps. The projection prints are on 70mm.

"Ever since the talkie era began it has been the rule that 24 fps is the way to make movies," Trumbull explained. "Nobody breaks the frame rate rules. We decided to test different frame rates to see how it affected photographic quality and audience response. We used encephalographs and other scientific methods to test audience reactions through brain waves, pulse and skin responses. Our demonstration films were shot at frame rates up to 96 fps. Data analysis showed that the standard 24 fps stimulated relatively low physiological responses, but as the frame rates increased viewer responses jumped. After we passed 60 fps the intensity levelled off.

"That," Trumbull said, "is why we settled on 60. It seems to be the optimum speed at which the eye can receive information and transmit it to the brain. We think 60 fps approximates the speed at which the eye normally senses reality, and so it gives us an incredible illusion of reality."

Trumbull is quick to point out that Showscan is not a 3-D process, but that it produces a sense of depth not present in normal cinematography. His interviews with scientists taught him that stereoscopic vision is dominant only to about 10 feet from the eyes. Beyond that, other factors determine the effect of depth: linear perspective, velocities, relative sizes, atmospheric perspective, and the movement of one object in relation to others.

"Because our image is so sharp, the viewer subconsciously constructs a three-dimensional model of the world, resulting in a powerful feeling that the surface of the screen has vanished and he's looking into a deep world."

Development of the system required a great deal of special equipment. The camera was adapted from a 65mm UltraPanavision camera and geared to a constant speed of 60 fps. A newly designed 70mm projector with custom lenses includes a special lamp system that greatly increases the amount of light thrown to the screen. The sound is a separate six-track, magnetic system with a decibel range from zero to 130 – well beyond the limits of human hearing. These elements are integrated precisely to the design of the theater to heighten the sense of reality and audience participation. Speaker placement and acoustical details are identical in all Showscan theaters.

Trumbull has definite ideas about the proper length for special presentations such as *New Magic* and a second production, *Big Ball*. "Movies started with loops and one-reelers and by now the attention span of the audience has changed. I believe that for this type of show it is well under the length of a theatrical feature, somewhere between 22 minutes and an hour."

New Magic opens with some shots from a documentary about a fireworks show. The film is scratchy, the noises from the back of the theater



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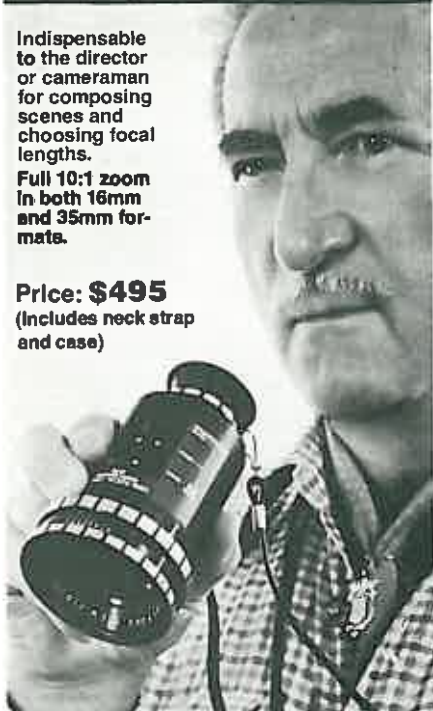
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suggest it is being run on a projector which was oiled once several decades ago, and the projectionist's attempts to adjust the focus are rambunctious. Then the film jams in the gate and burns. The apologetic mumbblings of the projectionist, Jeremy, - played by Gerrit Graham - mingle with his clumping footsteps as he is heard walking down the left side of the theater. He emerges *behind* the screen and turns on the backstage lights while he gets another film, which he promptly spills.

The effect of the backstage as seen through the translucent screen is strikingly realistic, particularly convincing are scenes in which he seems to touch the screen, creating ripples that do not appear to be part of a projected image but of the theater screen itself.

Jeremy then discovers an illusion device invented by his boss, Mr. Kellar. Pressing buttons recklessly, he sets into motion a series of breathtaking moving images - a scene photographed in the Showscan process from an airplane soaring among icy mountain peaks, undersea creatures, a driver's-eye view from a sports car speeding over a hairpin road, a closeup of a pretty girl, and more. He presses one button too many; the building shudders and a steel door opens, revealing a room filled with magical paraphernalia ranging from the tools of ancient necromancy to miracles of the computerized, laser-beamed age.

A number of strange adventures follow. A mirror proves to be a pool of water hanging on a wall; Jeremy ripples the surface with his fingers and, an instant later, a killer whale leaps out and seems to swallow the camera. Encounters with lightning machines, a giant spider, robots, talkative ventriloquist's dummy and a guillotine cause Jeremy to holler for help. A knife slashes down the screen and bolts of lightning announce the arrival of Kellar - none other than the tall, sepulchral-voiced Christopher Lee. Kellar shows the promised fireworks show in brilliantly photographed detail, then explains briefly how the process works. As he talks, he moves closer and closer to the camera, to be seen at last in possibly the most detailed extreme closeup of an actor's face that has ever been presented to an audience.

Needless to say, viewers are fairly bowled over by such a barrage of images and sound. It is a curious fact that the general effect upon the viewer is that he has seen a much longer show. This is due, in large part, to the fact that he has received a great deal more visual and aural information than is usual during a brief span of time. The degree of audience involvement also is greater, which tends to elongate time in the viewer's mind.

Trumbull described the distinctive qualities of the Showscan images accurately:

"Water movement, such as ripples and splashes, have a smoother quality, showing details of water never seen before in films shown with a 'slow motion' effect. Lightning is seen as it appears in life. There is no strobing at all, even in a rapid pan or tilt shot, yet there is no blurring of the image."

The most remarkable effect, visually, is the convincing impression that there actually is a man behind the theater screen and that the screen ripples and wrinkles at his touch. The sound reproduction is superbly realistic in its detail, capturing directional subtleties and even Doppler effects with no suggestion of contrivance.

"We keep the sound system separate from the film the pictures are on," Trumbull pointed out. "We aren't trying to shove it down the side of the frames. It's a six-track Dolby system, made to be heard from front channels, surround speakers and subwoofers for subaudible vibrations. It's recorded on a 35mm perforated tape that's interlocked electrically with the picture. The theater walls are covered with sound-absorbing surfaces which, along with the acoustically ideal design of the theater, contribute to what someone called 'the awesome reality' of our sound."

American Cinematographer visited the set at Laird International Studio in Culver City while *New Magic* was being filmed. The stage was cluttered wildly with a collection of props that included some of the electrical machinery created by the late Kenneth Strickfaden and seen in the *Frankenstein*, *Flash Gordon* and *Fu Manchu* movies of the early Thirties. Trumbull, cinematographer, James R. Dickson; producer, Peter Beale; special effects supervisor, Eric Allard; and magic con-

sultant, Ricky Jay were the key personnel overseeing the operation. Jay, a noted magician-illusionist, supplied many of the bizarre props from his collection of historic gadgets.

Dickson, appropriately, has worked in special photographic effects as well as production photography. He was half of an animation and optical effects company in partnership with Nick Vasu and photographed numerous commercials for Texaco, Datsun, Toyota and others. He photographed special effects for seven films shown at the the 1963 World's Fair and his work is much in evidence in *2001 - A Space Odyssey*, *Cosmos*, *Star Trek*, *Blade Runner*, and *Brainstorm*.

"Our camera is an Ultra Panavision 70 on the outside and there is an old Mitchell inside," Dickson said. "It was specially adapted for us by Panavision, the camera used in filming *Lawrence of Arabia*. It's crystal controlled at a perfect 60 fps. Surprisingly, even with the wide film, there have been few troubles with the high speed. Most of that has been ironed out, but any cameraman can expect to have some troubles at 60 fps, even if he's shooting 35mm or even 16mm."

Lighting on the set seemed little if any brighter than would be necessary for normal 35mm photography despite the reduced exposure necessitated by high speed work. "We're using Eastman 94 for the interiors and shooting at f.4 with fairly normal light levels," Dickson noted. "MGM Lab has been very good about helping us cope with the new technology."

In filming the mirror-water gag, a wall was built parallel with the floor and the water tank was set into a frame. The actor, riding in a body form concealed under his clothing, was lowered on a teeter until he seemed to be standing in front of the "mirror." The camera, positioned above him on another crane, photographed the action as the actor thrust his hand into the water. A sudden cut to a previously photographed scene in which an orca leaps up toward the camera, gives the impression in the edited film that the whale has burst out of the "mirror."

Eric Allard, husky and energetic, provided on-the-spot special effects work. A five-ton truck filled with equipment, a production assistant and

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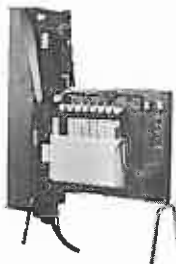
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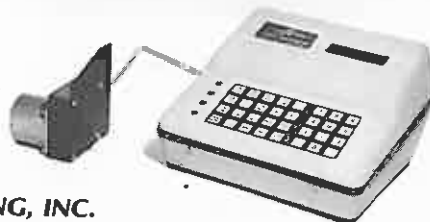
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five special effects men were brought to the stage by Allard, who tries to be prepared for *anything*. "I can go anywhere and rig anything on any location," he said. "We only had three days to rig the effects for this film. We came on stage with the materials, but none of the props or gags had been prepared, and we put in four 16-hour days in a row. We put 60 feet of flying tracks in the rafters, made a lot of heavy-looking debris, such as wooden beams out of balsa, for the earthquake sequence, built a miniature brick wall for a miniature car to crash through, and made other strategic use of plaster and break-away glass. Allard rented the belly pan for the water gag from Disney Studio. His car-through-wall sequence was shot by Pete Slagle, a specialist in miniature work.

Allard, like all special effects men, is typically untypical. He was a demolitions engineer in the American Special Forces - "You'd be surprised how many of those A-Team riggings I've applied to special effects," he revealed. He was a set carpenter at Universal and segued into special effects at Disney as assistant to Danny Lee on *The Black Hole*. He also worked with another master, Chuck Gaspard, on *Sudden Impact*, *Deal of the Century* and *Ghost Busters*. Today he freelances, but keeps himself on call for Trumbull, for whom he did a great deal of work on *Brainstorm*. He is versatile, doing his own designs and storyboards, and even miniature construction and optical effects when necessary.

"I always work in a certain sequence, step by step," Allard explained. "First there is a planning phase, putting the designs and plans on paper. Second, the setting up - purchasing materials and so on. Finally, the execution, for which you must be ready to deal with everything foreseeable as well as any directorial inspirations that come up on the set. If you have time to prepare, there is no excuse for anything not to work. Working for Showscan is special; the vivid image creates problems for everyone."

Trumbull echoed the last sentiment. "It especially is tough on the makeup artists; you can't put a pencil line under a man's eye without it showing up. We had to make great improvements in light projection because

there's about 300 percent more area to project. We tried to make everything compatible with normal movie techniques as to lights, film, set construction and so on, but there are some differences. It has more voyeuristic quality than other processes. It doesn't seem to jump out at you, like 3-D systems, but sort of opens up to invite you in.

"The Showscan camera sees *everything*, including every flaw. The actor can be more subtle and you're able to keep camera movements fairly simple, with no need to cut to closeups. It changes your way of directing. Even the basic 'over the shoulder shot,' which has always been one of the most common setups for conventional films because it makes the viewer feel that he's part of the experience, becomes obsolete. In Showscan, looking over somebody's shoulder makes the viewer feel that he's being left out, because he already feels involved and wonders why he isn't being included. It's more like live theater, with the actors playing to the audience - that is, to the camera."

As to Showscan's future, Trumbull remarked that "a minimum of 200 theaters are planned, but we hope for many more than that. We now have the first high-speed 65mm reflex crystal sync camera, we invented a new underwater housing for our system, and we plan to get new lenses made that are sharper than any in existence. We have an experienced management team now and I can devote my time to supervising the creative aspects of the film program." He indicated that a number of producers and directors have become interested in utilizing the process in future film work.

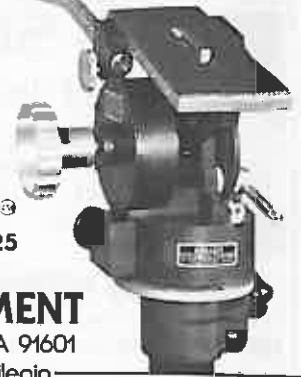
"Recently I went over Variety's list of the top 50 films at the boxoffice," Trumbull noted. "Seventy-five percent of the pictures were heavy on special visual effects to a significant degree. An audience sees *Star Wars* and it says, 'what's next?' The more bizarre it is, the more interesting. I want to combine Showscan with my past knowledge of special effects and push them to the limit. Showscan may be cumbersome and difficult, but the process works. I've been working with it for eight years and it *works*." ■

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