Wonders of the Sea

21 cinematographers contribute spectacular imagery to the nature film *Oceans*, directed by Jacques Perrin and Jacques Cluzaud.

By Benjamin B

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The Disney film *Oceans* begins with a question, asked by a boy on a beach: "What is the ocean?" The answer that unfolds in the following 90 minutes takes the form of a dazzling nature film that defies categorization. The movie starts in the sand underwater, with an iguana slowly making its way from the ocean floor to the surf, finally putting one claw on dry land. A little later, a rocket takes off in the distant skies, and its bright glare is reflected in the iguana's eye. With a few simple shots, *Oceans* has visually evoked the story of evolution.

The film offers many such rich moments. In the sardine-run sequence, an army of dolphins rushes to meet a gigantic school of fish, starting a feeding frenzy that is soon shared with sharks and birds. There is drama when baby turtles hatch in the sand and make the dangerous journey to the nearby water, preyed upon by a flock of rapacious birds along the way. The film is also replete with scenes that reveal man's kinship with animals.

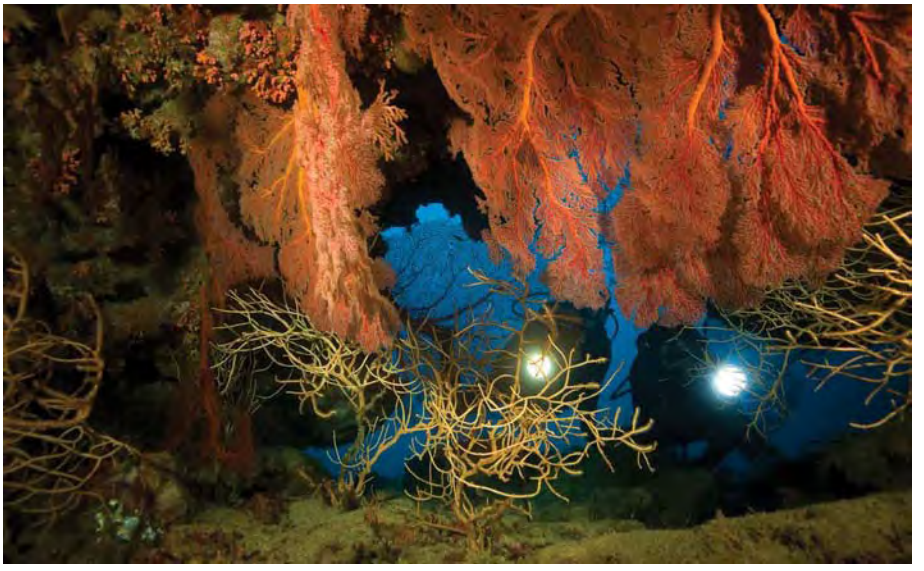
The camera is the invisible hero of *Oceans*. It is placed and moved in novel ways that give the viewer the impression, time and again, of seeing marine life as it has never been seen before. The film is the brainchild of Jacques Perrin, who has long experimented with new formats for nature films, starting with *Microcosmos* (*AC* Jan. '97), about the world of insects, and including *Winged Migration*, an epic that follows birds around the planet (*AC* July '03). Perrin produced *Oceans* and co-directed it with Jacques Cluzaud, a collaborator on *Winged Migration*. Cluzaud notes, "These films are a matter of going ever further and continually asking ourselves, 'What can we invent?' Jacques Perrin is not interested in making a film we've already seen. We're always looking for something more."

Opposite: An Asian Sheepshead Wrasse is one of the many exotic sea creatures featured in *Oceans*. This page, top: Weddell Seals in the Antarctic. Middle and bottom: Divers explore colorful nooks while swimming through underwater caves in Hienghiène, New Caledonia.

Oceans was a seven-year undertaking that involved 340 weeks of shooting spread over almost five years and 54 locations, notably several wildlife sanctuaries. The film's 21 cinematographers included 10 underwater specialists, and there were up to six units shooting simultaneously. The filmmakers also researched, designed and built an array of custom camera tools so they could achieve what they wanted.

Cluzaud recalls that the starting point was a script comprising poetic sequences that had working titles such as "the dragon and the rocket," "cavalcades," "sea feasts," "chilling out on the beach," "predator" and "the night world." "Before we set out to shoot, we asked ourselves which animals could illustrate a specific sequence, and then we selected those that seemed the most interesting," he says. "For example, the beginning of the film was called 'the conquest of the shore,' and we chose the iguana for its prehistoric look. Our choices were about which species would best serve the sequence, and from there, we decided where to shoot and when."

Cluzaud emphasizes that the film's point of view was defined by a desire to identify with its animal subjects. "The two key words were 'proximity' and 'dynamism.' We told the operators to seek out the animals' gazes and eyelines. We spent a lot of time and effort to catch an animal's gaze and film



Photos by Alexander Bugel, Oliver Guéneau, Pascal Kobeh, Christophe Pottier and François Sarano, courtesy of Galatee Films, Pathe Production, Notro Films, France 2 Cinema, France 3 Cinema, JMH/TSR.

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Top: An intrepid cameraman captures a bold shot of a great white shark off Mexico's Guadalupe Island. Middle: The filmmakers take viewers straight into a formation of bigeye trevally in the Indian Ocean's Cocos Islands. Bottom: A clownfish gets his close-up in Nouméa, New Caledonia.

it like a character. I think what distinguishes this film in particular is that we are dealing with *characters*: you experience the animals differently because they are filmed differently."

Identifying with the animals also meant "being a fish among the fish," he continues. "There are very few static shots. The principle was to always be moving because living things move — even the tiny feet of a starfish are moving, however slowly. With fast species such as dolphins, the question was what could we invent to follow them at full speed both above and below the water. We created the Thetys head above, and the Torpedo and the Polecam below. We've seen whales, dolphins and sharks underwater before, but never at such a speed."

Cinematographer Philippe Ros shot *Oceans*' night sequences, among others; was involved in developing some custom tools; and supervised the workflow as digital-imaging director. The production decided to shoot Super 35mm for material above the water, and high-definition video for underwater work except for slow-motion material. Ros explains that the main reason for choosing HD was the ability to run cassette loads of 50 minutes. The production designed and built four autonomous underwater housings for the diver operators. The housings were

outfitted with Sony HDW-F900/3s shooting in HDCam format, which was the HD standard in 2005, when shooting began.

Speedy animals were shot from a boat, and Sony HDC-950s were used in those instances because the camera head could be separated from the camera body; the camera heads were placed in small capsules that were then fitted to custom-designed Polecams or Torpedoes linked to the boat via fiber-optic cable, a technology the filmmakers refined over a year of development. The Polecam consisted of a submerged camera capsule attached to a large triangular support fastened to the side or the prow of the boat. The Polecam could not be used to shoot backwards because the boat's wake would spoil the shot, so it was used to capture side angles of the creatures right below the surface of the water. For shots from the back of the boat, camera capsules were placed in Torpedoes that were attached to the stern with a long, metal leash; this arrangement allowed for shooting as far as 100 meters away and avoided the boat's wake.

The Panavised Sony cameras were outfitted with Zeiss 6-24mm and 17-112mm DigiZooms. In order to get the proximity requested by the filmmakers, the dominant underwater focal length was about 7mm, which Ros says is equivalent to about 18mm in 35mm. The lenses were often set to the hyperfocal distance. Underwater camera operator René Heuzey recalls, "The directors really did want us to be 'a fish among the fish.' The fish could not be shown to be curious of the camera. We also had to avoid seeking out the fish — the image had to float by itself. You couldn't feel the camera chasing after the animal. Another rule was to always shoot with natural lighting."

Heuzey shot a unique sequence while moving with a large blanket octopus that unfolded an orange cape as it glided above the ocean floor. "I call that 'the Batman shot,'" he says. "To get the images, I shot for 12 days, spending three or four hours underwater per day. First, you have to gain the animal's acceptance so he understands you're not a predator. You don't want to startle the blanket octopus, or it will let go of its ink and change color." Heuzey often swam in the direction of the current, using the flow to help stabilize the image. He notes that he was given a very specific shot list. "For example, the directors asked me to match the blanket octopus to the sails of a sailboat featured in another shot. That took me a couple of days."

Working with wild animals demanded patience and persistence, and produced many surprises. Heuzey remembers an orca that sought him out after he had returned to his boat. He dove back in, and the orca led him away from the boat and gave him a private show. "When I blew bubbles, he blew bubbles, and when I nodded, he

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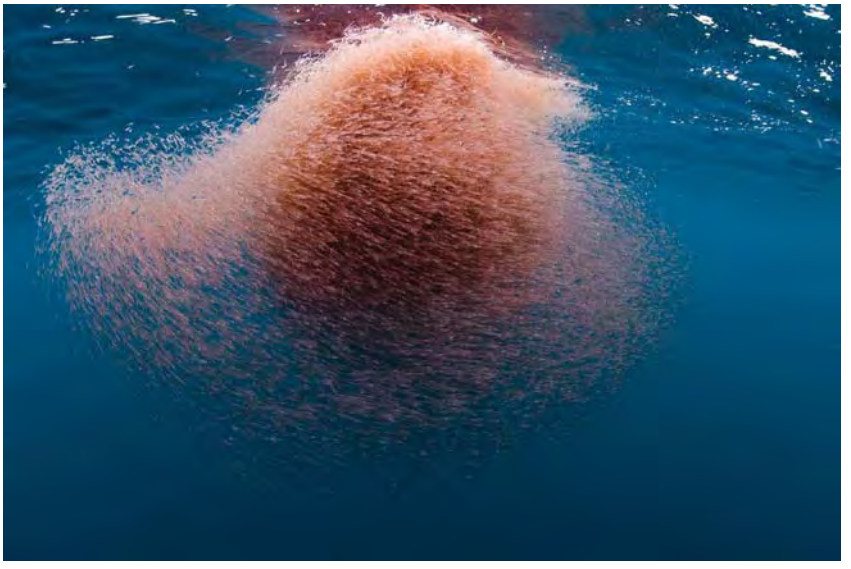

Top left: A cloud of krill. Bottom left: Filming sea nettles in Monterey Bay, Calif. Above: For shots taken from the back of boats, camera capsules were placed in Torpedoes that were attached to the stern with a long leash, which allowed the filmmakers to avoid the boat's wake while shooting.

nodded. It was incredible — I felt like we knew each other."

The production's main film camera was the Arri 435, which was used on boats, in helicopters and on land. An extensively modified Arri 2-B was used in the tiny Birdy Fly helicopters that could hover above whales and other large mammals without startling them. Much of the above-water work was done with a 435 on a small crane with a Thetys, a rugged, gyrostabilized head designed and built by the production. Because whales and other mammals are less threatened by smaller boats, the Thetys rig was often put in an inflatable Zodiac. Operating the Thetys was cinematographer Luc Drion, who used a variety of Angenieux zoom lenses, including the Optimo 17-80mm, the Optimo 24-290mm and an HR 25-250mm.

Drion recalls that his job involved a blend of patience, guesswork and reactivity. As example, he cites the shot of a huge shark leaping out of the ocean, capturing a bull seal in its jaws. "We spent a lot of time on that shot, and the game was to follow a seal, hoping it would be eaten by a shark," he says. "That shot was the result of stubbornness, ours and the production's! We had to throw away 20 or 30 1,000-foot loads, unprocessed. We didn't get the shark the first year, so we went back in the second year and got it. Then they said they wanted a close-up for the edit, so we went back the following year and we got the shot!

"The work was a mixture of joy and frustration," he continues. "It was fantastic at certain moments, and completely depressing at others. Sometimes I just missed an extraordinary shot because I was a little too tight, and I was only too tight because I'd zoomed in for no particular reason right before the whale jumped." Many of the most spectacular jumps were shot at 50 or 100 fps. Drion used an Easy Look unit with the video assist to simulate the slow-motion playback. Although the land-based footage was shot in 3-perf Super 35mm, less predictable material was shot in 4-perf to allow for reframing in post.

Drion also remembers moments of bliss: "You're there with hundreds of dolphins jumping around you, and you've been looking for this shot for two years. You've already seen dolphin cavalcades, but they didn't have the same energy, the same sea, the same everything! There's a kind of miraculous synchronicity, and that's also due to the directors, who wanted this shot and sent you back to the same spot the following year because you didn't get what they needed the first year. It's stubborn work at every level."

Drion was also the operator for a

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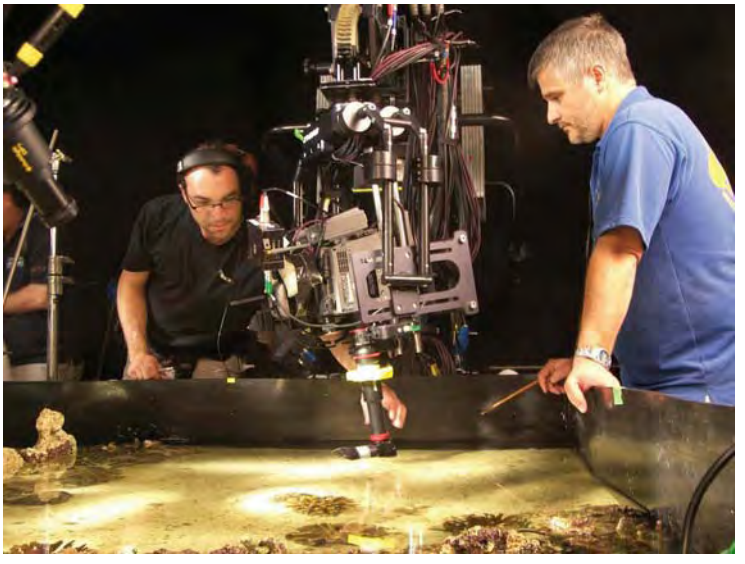
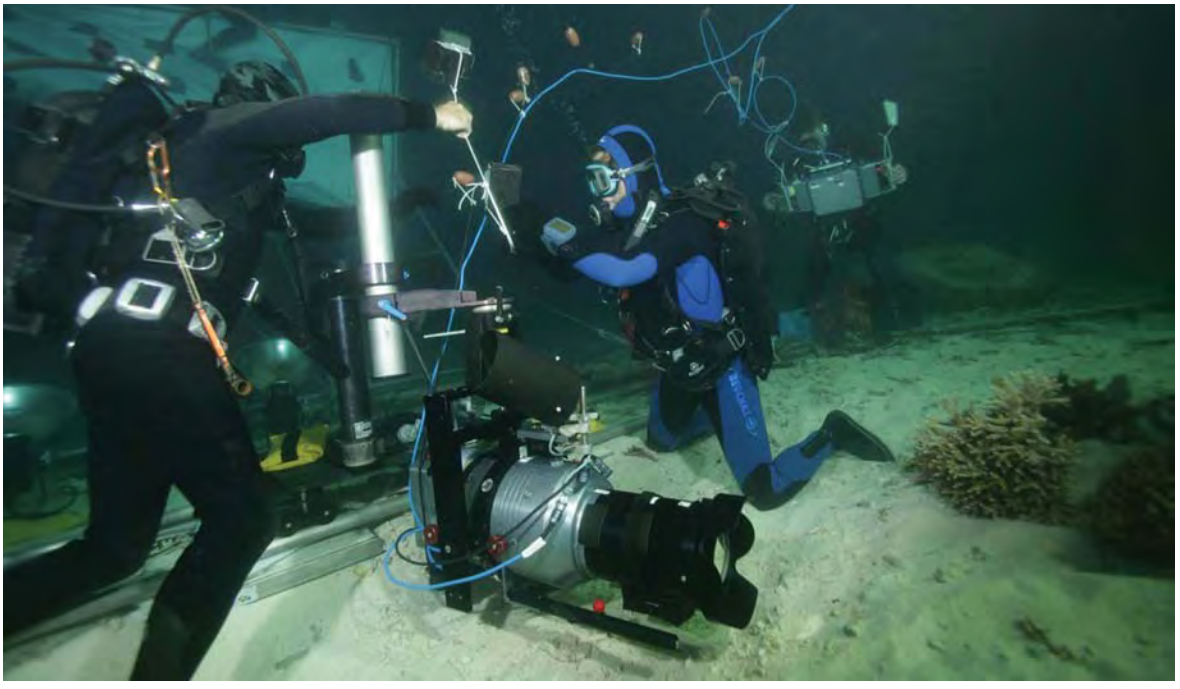


Top: To capture side angles of animals just below the surface of the water, the filmmakers used the Polecam rig, a submerged camera capsule attached to a large triangular support fastened to the boat. Middle: Macro shots of squillas were captured in a shallow pool that afforded more lighting control. Bottom: A radio-controlled Birdy Fly helicopter was used to capture dynamic footage of whales and other mammals.

violent storm sequence, which shows large boats dwarfed by powerful waves. In one shot, a warship is filmed head-on and then completely obscured by a huge, oncoming wave. Drion reveals that the scary image was shot from a helicopter. "The waves were 15 meters [49'] high. Because they were spaced far apart, we'd go down above the water when the wave was low, and the pilot would look behind him to get back up before the next wave arrived." Drion's Arri 435 was in a gyroscopic Stab-C mounted on a side bracket. "I had absolute trust in the helicopter pilot. To get the waves to hide the ship, I would say, 'Lower, lower,' but when he refused, I didn't insist! It was impossible to use a rain deflector, so the camera assistant, wearing a harness, would lean out of the chopper and wipe the lens by hand."

Part of an especially memorable underwater night sequence was shot off a dock. The protagonists are squillas and crabs, and the filmmakers created an underwater dolly setup complete with tracks to follow "Joe the crab" as he hustles along the underwater reef. To key the scene, Ros set up Dino lights shining down into the water through cookies. The Dino bulbs were made to flicker independently to emulate dappled wave patterns underwater. The sequence also contains a macro shot of the squilla's extraterrestrial eye, which was shot in a shallow pool that afforded more lighting control.

One of the major challenges in post was matching HD to the film footage, which was scanned at 4K by a team (including Tommaso Vergalo, Juan Eveno and François Dupuy) at Digimage Cinema in Paris. The results look seamless, which is especially impressive given that most of the digital footage was shot in the 8-bit HDCam format, which has a recorded horizontal resolution of 1,440 pixels. Ros emphasizes that he designed the workflow with the final goal of 2.40:1 exhibition in mind. To create an HD image that would match the 35mm as closely as possible, he did extensive testing and worked in coordination with Olivier

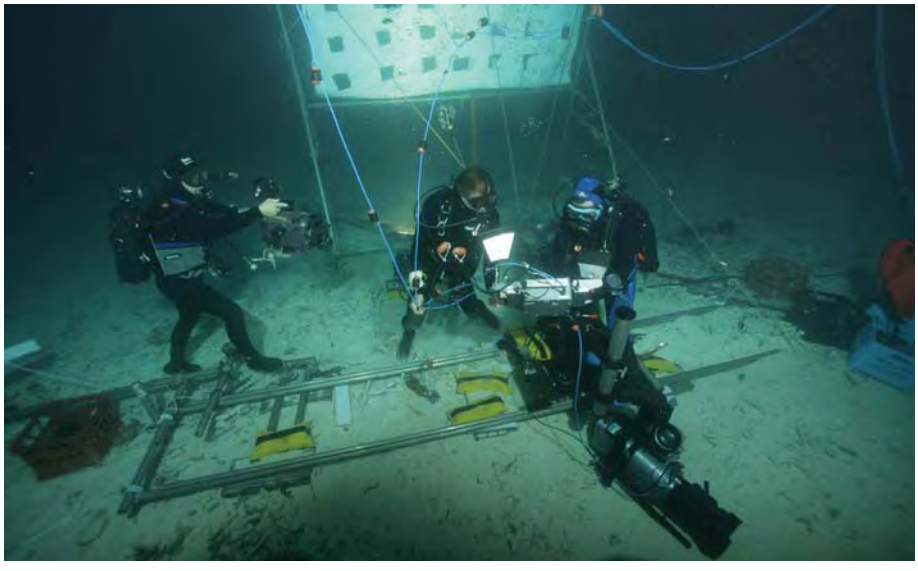


The filmmakers employed an underwater dolly to great effect, especially for a night sequence that follows a crab hustling along a reef.

Garcia and Christian Mourier to develop a series of custom gamma curves and scene files for the video operators to use. The low-contrast curves were varied to address different lighting conditions. To accommodate different sea coloring, Ros notably reduced and isolated the blue or green vectors in the F900 multi-matrix menu. He also tweaked the levels in the detail menu for murkier scenes.

Ros and his team created two simple knobs on the underwater housing to apply this range of settings. One knob was for the ocean color, and the other for the scene's contrast and visibility. Each knob had five settings, creating 25 possible combinations, or, as Ros says, "25 digital film stocks." Matching HD to film, he continues, "had two components: preserving the highlights and getting maximum resolution when shooting, and reducing noise in post. In production, we strove to have the right gamma curve for the highlights, the right saturation for the sea, and the right setting in the detail menu, usually between -45 and -60, for the scene.

"I knew that up-converting from HD to 4K in post would work if the images had little noise, but the thing we couldn't correct for was the solarizing



effect, when you lose detail in the whites. So we always chose to protect the whites, even if it meant more noise. But when we didn't have strong highlights in the image, we used curves that had less noise. That's why we had several gamma curves."

Key for Ros was the constant communication between production and post, and the constant verification of the dailies by the cinematographers, the digital-imaging technicians (led by François Paturel) and the colorists. Ros also instituted a daily testing procedure that accustomed the operators to evaluate the rendering of a test chart. "Above a certain threshold, around 2K, it's not the number of pixels that matters, but the quality of your pixels," he observes. "That's why we did a lot of work on certain menus and, especially, why we diminished the level of noise. When you can get rid of the noise, each pixel is cleaner, and you can increase your MTF because you can then discern detail."

Def2shoot in Paris applied a proprietary noise-reduction process to the HD material and a degraining

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Designed and built by the production, the rugged, gyrostabilized Thetys head was often set up in an inflatable Zodiac, which was less threatening to sea creatures than larger boats.

process to the 35mm. The HD up-conversion to 4K was done after the digital grade, using a custom Digimage process. Digimage also applied a proprietary process called "wide range" to get slightly stronger whites in the filmout, and created multiple digital negatives, which were used to print positives directly so as to avoid the loss of two extra generations. For the DCP master, selective focus was applied to 200 shots as a way of emphasizing certain elements in the frame.

Perrin asked an old friend, cinematographer Luciano Tovoli, ASC, AIC, to shoot a few fictional sequences that are absent from the U.S. version of the film, and also to supervise the DI at Digimage. "Jacques said he wanted an eye to harmonize the different footage according to the vision of the directors," says Tovoli, who spent 12 weeks on the grade with Ros and colorist Laurent Desbruères. "I was lucky to work closely with Laurent and Philippe," says Tovoli. "As always with Perrin productions, the atmosphere was one of honesty and profound respect for the professionalism of others."

The main challenge, notes Tovoli, was matching disparate footage cut together in a scene. "One scene could contain shots done three years apart in different seas — they were edited together to look like reversal shots," explains Tovoli. Desbruères adds that another challenge was the multitude of ocean currents, which created variegated colors, sometimes even in the same shot. He cites the sardine run as an example. "It's amazing — you get a variety of nuances from blue to cyan and then magenta which appear with small changes of depth." Another difficulty came from murky waters, which the colorist brightened by enhancing beams of light.

Desbruères graded the film on a DaVinci Resolve, spending a lot of time drawing dynamic grading windows to compensate for constantly changing hues and luminosity. He remembers that one shot moving toward the surface of the sardine run required almost 60 tracking windows. "A window may only last 10 frames and then fade out," he notes. Sometimes he would outline a small creature in the frame to make it more visible onscreen. Desbruères remembers the intense grading sessions fondly: "I didn't feel the fatigue because I was at the heart of something that transported me."

Tovoli recalls that the grade evolved with time. "Our first timing was pretty contrasty, with beautiful blacks, but the directors didn't want too much contrast underwater because they didn't want it to be scary," he explains. "For them, the color of the ocean was the color of life. They wanted a blue that isn't heavy, that is transparent, agreeable and light, so we chose the lightest color, because color can become threatening. We never left any impenetrable dark zones, even in the night sequence with predators."

Perrin has described *Oceans* as "an underwater wildlife opera." Whatever the genre may be, one word that arose frequently during *AC*'s interviews was "collaboration." After initial shoots with the directors, many cinematographers were trusted to continue on their own. "We were both amazed and yet not surprised by what they brought back, because we were on the same wavelength," says Cluzaud. "Having many cinematographers meant having many different ways of filming, and that gives the film an incredible richness."

"I never believed filmmaking was a collaborative art," Tovoli confesses, "but this film proved me wrong. Putting 21 cinematographers and two directors in harmony, now *that* is collaboration!" ●

TECHNICAL SPECS

2.40:1

Super 35mm and High-Definition Video

Super 35mm (4- and 3-perf): Arri 435, 235, 2-B, 2-C, 35-3; Aaton 35-III
Angenieux, Zeiss and Cooke lenses

Kodak Vision2 50D 5201, 250D 5205, 100T 5212, 200T 5217, 500T 5218; Fuji Super F-64D 8522

HD: Sony HDW-F900/3, HDC-950, F23
Zeiss and Panavision lenses

Digital Intermediate

Printed on Kodak Vision 2383