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Ghostbusters Revisited 4

With *Ghostbusters*, producer-director Ivan Reitman and company performed a minor miracle by delivering a major effects production in less than a year — from concept to release. The result was the most successful comedy in film history. For the sequel — five years later — production and postproduction schedules were even more intense. Physical effects engineer Chuck Gaspar was on hand for his second *Ghostbusters* outing and Industrial Light and Magic stepped in fresh to handle the visual effects — delivering not only a full array of ghostly entities, but also a subterranean river of slime and an ambulatory Statue of Liberty. As the production continued to grow, other effects facilities — including Apogee — were brought in to absorb the overflow. Effects team members across the spectrum — augmented by screenwriting actors Dan Aykroyd and Harold Ramis — trace the evolution and execution of the long-awaited *Ghostbusters II*. Article by Adam Eisenberg.

Father, Son and the Holy Grail 46

When director Steven Spielberg and producer George Lucas joined forces to reinvent in feature form the action-packed movie series of the past, their stylish embellishment proved a boxoffice phenomenon — from a pair of filmmakers accustomed to making little else. Eight years and three films into the series, the saga of Indiana Jones culminates with *Indiana Jones and the Last Crusade* — a rousing finale in which the intrepid archaeologist's past is explored and his relationship with his father reinstated. Filmed in seven countries on three continents, the massive production relied heavily on physical and optical effects to recreate nearly every mode of transportation known to the period. Also required was the full disintegration of a major character — from flesh to dust — in one uninterrupted take. Rising to the challenge were physical effects technicians under George Gibbs and the optical illusionists at Industrial Light and Magic. Article by Adam Eisenberg.

FRONT COVER — The Ghostbusters fire up their nutrona wands in *Ghostbusters II*. Executed criminal Nunzio Scoleri on a rampage in *Ghostbusters II* — BACK COVER.

GHOSTBUSTERS
REVISITED



Being heroes is not easy. Take the Ghostbusters, for instance. After saving New York City from the forces of Gozer the Gozerian and the Stay-Puft marshmallow man, our boys in overalls found themselves broke and disenfranchised. The city fathers, ever grateful, decided to skip out on their ectoplasmic cleanup bill and the local courts ruled busting ghosts illegal. Illegal or not, when an ominous river of slime starts to flow under the metropolis and a bloodthirsty tyrant from the Middle Ages tries to make a comeback, who but the Ghostbusters can save the city from yet another supernatural shakedown?

Being filmmakers is not easy either. On the original *Ghostbusters*, director Ivan Reitman and his production team agreed to deliver the film in less than a year — a schedule that proved almost impossible considering the effects required. Five years later, for the long-anticipated sequel, they agreed to a schedule that was tighter yet — on a film that in some ways was even more demanding than the first. Caught in the maelstrom were production designer Bo Welch, cinematographer Michael Chapman and visual effects supervisor Dennis Muren of Industrial Light and Magic. “I guess the first *Ghostbusters* set the trend for short production and postproduction schedules,” observed Muren, “and this one was worse. *Ghostbusters II* had by far the shortest schedule of any film I have ever worked on. We had nearly a hundred and eighty shots to complete — and considering they were still shooting with the actors two months before the film opened, it was definitely *tight!*”

Reassembling the original cast was considered essential to the project, and all of the principal players agreed to participate. As the primary Ghostbusters, Bill Murray reprised his role as endearing con man Peter Venkman, Dan Aykroyd returned as the enthusiastic innocent Ray Stantz and Harold Ramis appeared once again as the stoic egghead Egon Spengler. Returning also were Rick Moranis as nerdish accountant turned incompetent lawyer Louis Tully, Ernie Hudson as ghostbusting team member Winston Zeddemore and Annie Potts as their ditzzy receptionist Janine Melnitz. Even Sigourney Weaver — whose career had skyrocketed since the first film — was back as concert cellist and now single parent Dana Barrett.

Ghostbusters II begins five years after the original adventure and finds the former spirit exterminators fallen on hard times. Peter Venkman is hosting a tired talk show for psychics; Egon Spengler is researching the environmental impact of positive and negative emotions; and Ray Stantz is running an occult bookshop while moonlighting with Winston Zeddemore in Ghostbusters regalia at childrens’ parties. To say they have all hit rock bottom is an understatement. Their collective fates begin to change, however, when Dana Barrett’s baby Oscar takes an unpiloted ride in his carriage and ends up in the middle of a busy New York thoroughfare. A covert investigation by the former Ghostbusters leads to the discovery of a subterranean river of slime feeding on the negative energy of the city. Even more startling, they encounter evidence that a centuries old tyrant — Vigo the Carpathian — is attempting to return from

the dead and transform the Big Apple into a psychic cesspool.

The idea for the original *Ghostbusters* came from Dan Aykroyd who developed it into an initial script. Then Harold Ramis joined the project and together the two reworked the concept extensively into what would become the most successful movie comedy in film history. For the sequel, Aykroyd once again wrote the initial script — a story in which Dana was kidnapped and taken to Scotland where she discovered a fairy ring and civilization underground. “My first draft was really too far out,” Aykroyd reflected. “It was also probably too inaccessible, though I thought at the time I wrote it that it was the direction we should go in. I wanted to leave New York City behind because I thought we had done that. But New York really is the greatest arena for our kind of ghost story, and staying in the city gave continuity to the second film. One idea that did stay in our script was the notion of having things occur underground. We went skyward in the first film — up to the top of a skyscraper — so I thought for the second one it would be nice to see the underbelly of the city. But my original concept for going underground was different. It involved a pneumatic tube two thousand miles long that they traveled in for three days. It was like a primitive mail chute.”

As with the first film, Harold Ramis became involved and the story gradually moved in a new direction — one that eventually introduced the river of slime. “We started with the moral notion that negative human emotions have consequences,” Ramis explained, “and that in big cities like New York and Los Angeles bad vibes can build up. What we were working toward — and it took a while for it to develop — was that it would get to the point where everybody in New York would have to be nice or else the city would be destroyed. We did not know by what at first, but eventually we created a tyrant motivating all of this — Vigo the Carpathian.”

“The concept of negative energy really just reflects the nature of human behavior today,” Aykroyd added. “Cities everywhere are dangerous. Life has become cheap. You can go to Westwood in Los Angeles to see a movie and get machine-gunned on the street. That really happened. We wanted to show that you cannot be bad to people without having it go somewhere other than just being absorbed by the person your anger is directed at. Negative energy has to find a place to settle, and it is directly linked to human behavior. It seemed to us that this idea was more grounded than the last film where we were dealing with mythic gods.”

The river of slime was actually the first of two ideas that made the sequel come to life for Aykroyd and Ramis. “The second,” said Ramis, “was an effect I once thought about of an infant not yet able to walk who suddenly wakes up one day with adult agility and focus. I had originally thought of it as a horror story, but then I decided it was just too horrible for a movie. The baby idea did tie into something we were playing around with — that Bill and Sigourney had gotten married after the first movie and had a child and that it was going to be their

article by
Adam Eisenberg

child that got possessed. Having them married, however, proved to be a real dead end for us character-wise, so we dropped that notion. But we stayed with the baby and gave it a different father whom Dana had married and then divorced. Gradually our story evolved. We came pretty far from our original ideas except for what we perceived to be the core of the film thematically — which was that negative and positive emotions affect the way we live.”

Once the story started coming together, co-executive producer Michael C. Gross began coordinating the special effects effort. The original *Ghostbusters* had featured effects created by Richard Edlund and Boss Film Corporation. For the sequel, however, Reitman and Gross turned to Industrial Light and Magic and Dennis Muren. “I thought the first movie was just wonderful and very fresh,” Muren explained. “I have always admired *Saturday Night Live* and been fascinated by the improvisational comedy approach — and that was one of the reasons I wanted to work on the sequel. Actually, I was interested in *Ghostbusters II* for two reasons. First, I wanted to see how Ivan makes comedy films — how he directs and controls situations to get the best moment of humor out of his actors and then how he edits them. Doing the sequel offered an incredible opportunity to watch a comedy film in creation and to work with top creative talent. That aspect appealed to my filmmaking side. The second reason appealed more to my special effects interests. What I wanted to do with the film was to try and create ghosts that nobody had ever seen before. Going in, we knew we had to match the look of nutrona beams and of the Slimer character from the first film; but beyond that, we had the opportunity to create a whole new array of ghostly images.”

“When I went up to ILM the first time,” Gross recalled, “they asked what Ivan was like to work with. ‘Well,’ I said, ‘the thing that will be hard for you is that you’re hardly going to see him. He’s never going to come up here.’ They were pretty surprised. ‘Wouldn’t he like to see our facility? Wouldn’t he like to meet George?’ I explained that he was really too busy finishing *Twins* and that he was not as interested as other directors might be in the technical side of how effects are created. As it turned out, Ivan did in fact go up to shoot bluescreen for three days, but that was it. The schedule just wouldn’t allow for anything more. But the communication between Ivan and Dennis was so good that it didn’t matter.”

Ghostbusters II begins when Dana Barrett pushes her baby carriage over a dab of slime that has oozed up from a crack in a New York City sidewalk. When she stops in front of her apartment to talk with her building superintendent, the carriage — with baby Oscar inside — slowly starts moving off down the sidewalk. Dana tries frantically to stop it, but the carriage speeds up, dodging through traffic and then coming to rest in the middle of the street.

To create the wild ride, physical effects supervisor Chuck Gaspar — a veteran of the first film — built five radio-controlled

carriages. “We placed DC motors inside the buggy baskets. To drive the wheels, we used a drive shaft from a drill attachment that could work at right angles to the motor. We also used some three-inch chrome drive shafts to attach to the wheels themselves. These shafts were tied in with the chrome carriage to conceal what was driving the buggy. They looked nice and they were not too bulky. We then designed a steering system and ran cables through the tubes of the carriage frame and into the basket part where they were operated by another big servo. We also used a servo to operate a braking system we installed. Actually there were two braking systems — the original brakes which automatically locked the wheels and our own brakes which allowed us to slow the buggy gradually.”

A regular on the Clint Eastwood production team, Gaspar drew upon his most recent experience with *Dirty Harry* to execute the sequence. “To steer the buggy, I brought in Jay Halsey who is a two-time national champion driver of miniature cars. I used him on *The Dead Pool* to drive the little black Corvette that races underneath real cars in San Francisco traffic. For *Ghostbusters II*, he had to steer the buggy from as far away as seventy-five feet and make it maneuver in and out of traffic without tipping over or slamming into any cars. The sequence ended up being much more elaborate than in the original script. For one shot, we had to tilt the buggy up on its side on cables and go on two wheels down the street. Jay also had to steer it past huge busses without hitting them. He was great with the controls — so good he could make the buggy do wheelies.”

The buggy ride was filmed at the beginning of the production during two weeks of location shooting in New York. “The city was very good to us,” Gross recalled. “At one point we were shooting adjacent to Second Avenue and they had a lock on the avenue for forty blocks because it was the week Gorbachev was in the city. But they did not stop us from shooting — which I thought was amazing. We shot all over New York. We were there pre-Christmas and we were in the middle of the streets — and we had no problems.”

Despite the cold New York weather, the production crew found the public reception very warm — due not only to the phenomenon of the first movie, but also the subsequent popularity of the hit Saturday morning cartoon series, *The Real Ghostbusters*. “Shooting anywhere in New York in *Ghostbusters* gear is wild,” Ramis explained. “The people love it. They bring their kids and hold them up to us like offerings. One woman said: ‘Egon, he’s got all your action figures. He’s even got the underwear.’ The strange thing is that the cartoon characters have been immortalized in plastic, so a lot of the kids only know us as the cartoon characters. They look at me and they go, ‘Your hair isn’t blond.’”

“When we had the uniforms on we were above the law,” Bill Murray joked. “We could do anything and people really responded. There’s something about those uniforms and walking in New York. Even on the first film when we first put those suits on, people went crazy. I remember one black guy seeing us and

Restored to favor after five years of court-ordered inactivity, the Ghostbusters — played by Bill Murray, Ernie Hudson, Dan Aykroyd and Harold Ramis — train their nutrona wands and slimeblowers on a bloodthirsty tyrant from the Middle Ages who is trying to gain dominion over New York City in the long-awaited Ghostbusters II. / Producer-director Ivan Reitman — who reassembled his entire cast from the original megahit — surveys a location setup from the fender of the Ectomobile. Extensive visual effects for the sequel were accomplished within an extremely tight time frame by Industrial Light and Magic — under supervisor Dennis Muren — while on-set physical effects were orchestrated by Chuck Gaspar and company.

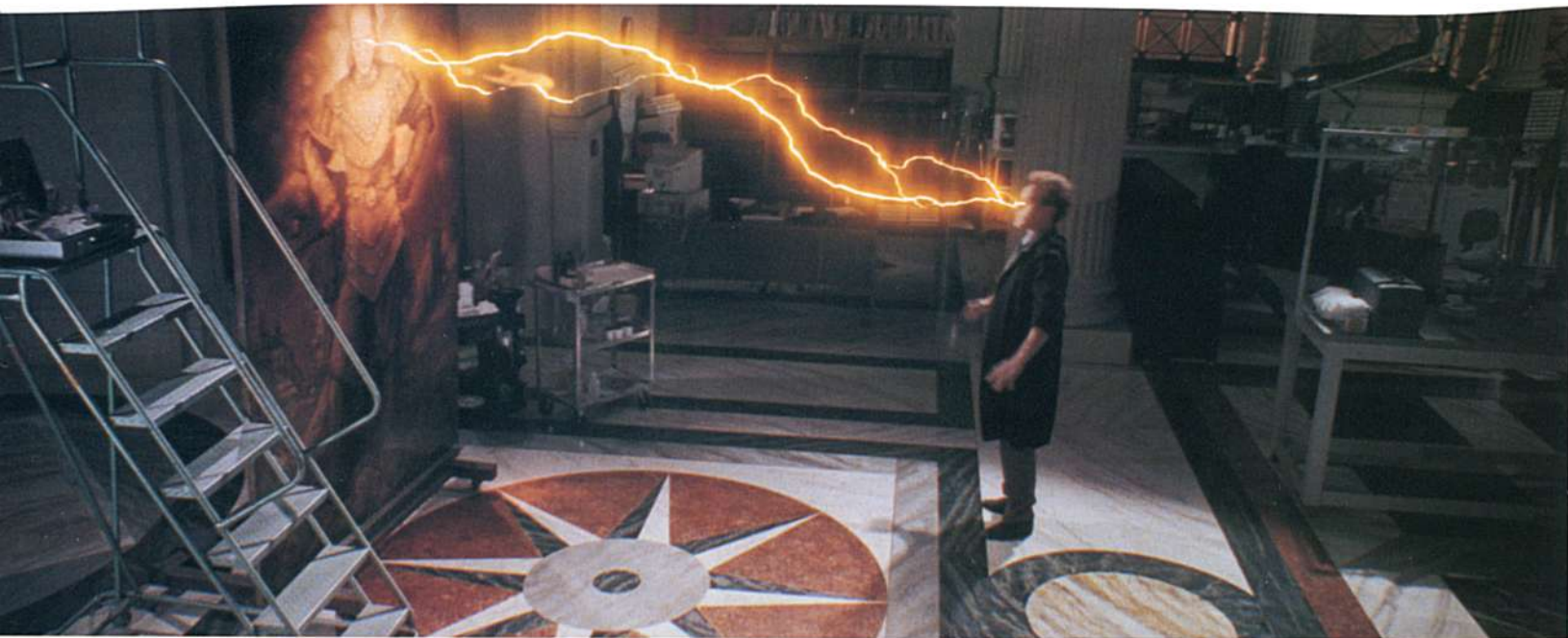
yelling: 'Hey! The *Wrong Stuff*!' But it was not just the uniforms. After we came back from New York, we shot for many weeks on the studio lot before going out to shoot on the street with the car. I was really looking forward to getting off the lot for a while. As it turned out, I had more fun that day than I had any other day during the production. We all had a blast weaving in and out of traffic, screaming out at people from the car and having them cheer and yell back at us."

One aspect of shooting on the streets that the actors did not much enjoy was wearing the bulky proton packs established in the first film. "We ended up not wearing the backpacks that often on the sequel," Murray continued. "On the first film, we had to wear them all the time and the effects guys did not come up with lighter models until right near the end of the shoot. Those original backpacks were really heavy. After that film, we all had to have our spines straightened — our spines looked like Mulholland Drive by the time we were through." To the actors' relief, the lightweight models were more commonly employed on the sequel. "The actual operational packs weighed about fifty pounds," Ramis observed, "but they were almost twenty pounds lighter if the batteries were left out. Fortunately, for the second film they made a lightweight model — only about twenty-eight pounds — that did not light up as much, but still looked good."

Realizing that a self-steering baby buggy is more than a little bit odd, Dana quickly seeks out the only men she knows can help — the former Ghostbusters. An investigation leads them to the street where the incident happened and the subsequent realization that something paranormally powerful is brewing beneath the asphalt — something that could be very dangerous. Meanwhile, at the nearby Manhattan Museum of Art where Dana now works as an art restorer, an ancient painting of Vigo the Carpathian comes to life and zaps her boss, Janosz Poha (Peter MacNicol). Vigo explains that he needs a new baby so that he can be reborn in this century and continue his reign of terror. The spellbound Janosz agrees to search for a suitable candidate.

"The biggest design problem we had on the film was the Vigo painting," Gross recalled. "I literally did not know how we were going to do it, what the painting would look like or if it would even work until the day we shot it. And that scared the hell out of me. A lot of people were involved with it at different stages. ILM did concept versions of it for months, and then we had one that we thought was right and we were refining it when one day Ivan looked at it and said: 'I don't like this at all. It's too Conan the Barbarian.' After that we tried an artist in New York — but his painting did not quite work either for what Ivan wanted. So there we were without a painting, yet the deadline was coming up to build the foreground and Vigo's costume — neither of which had been resolved. Finally we approached Glen Eytchison and 'Pageant of the Masters' in Laguna Beach. Each year they present sixty classic paintings that they bring to life with people standing in costume and in settings that look like the original





artwork. We got them involved, and they came up with a painting that started to work. Their people worked on it, and I went down and worked on it too. Eventually we shipped it to ILM. At that point, not everything was quite resolved, but we had to shoot it in two days. We worked on it and changed it up until the very last possible minute and got it on the set just in time. Fortunately for us, everyone involved was fabulous. Bo Welch's people were great and so were the guys in the painting department at Burbank Studios. They did a lot of it to make it look like a real painting."

Resolving the overall appearance of the painting was not the only problem associated with the portrait. The other involved how the painting should come to life when Vigo needed to address Janosz. "The concept of bringing the Vigo painting to life went through a major change right at the end of production," Muren recalled, "and I think it was wonderful that it happened. Originally the painting was going to come to life with the guy talking in the setting — or we were going to do clay animation or an animated cartoon of his face talking. During production, it just became more and more clear that this would not be very exciting. So the scene got rewritten very slowly. The idea was to get Vigo out of the painting as much as possible. As with other sequences in the film, we did lots of concept art to try and find the best ideas for the scene. Finally, rather than having Vigo talking in the painting, it was decided that the painting would disappear and reveal instead a columned corridor with slime dripping off and a very oversized Vigo head floating in the scene and talking. Visually it became much more exciting and I think it was a major improvement."

To make the image work, actor Wilhelm von Homburg was filmed in front of a bluescreen and then matted over a miniature of the corridor built by the ILM model shop. "The slime corridor was a forced perspective set that was pretty straightforward," model shop supervisor Bill George explained. "Both columns and bricks along the sides had to be built in forced perspective, and they were all sculpted out of foam. There were arches between the columns and beyond those we had light coming in. The only unusual aspect was that the producers wanted slime oozing out of the columns, which meant that we had a major cleanup after each take. It was really no big deal — just a big mess."

For the slime corridor — and most of the live-action scenes as well — the ectoplasmic ooze was made from the same ingredients employed in the first film. Central to the formula was methocel — a thickening agent marketed by Dow Chemical — mixed with water and nontoxic food coloring. To create even more viscosity when needed, a supplemental thickener called separan was added. "The usual formula to create thirty-two gallons of slime," Chuck Gaspar explained, "was about eight cups of methocel to four-and-a-half cups of separan. Then we would add about fifty cc's of red food coloring and thirty-two gallons of water. You could actually eat the stuff. It would not have any taste, but you could eat it. The grade of methocel we

used is also used in pie thickeners and salad dressings."

While Vigo is giving Janosz a personal pep talk to lure him over to the dark side, the erstwhile Ghostbusters return to the site of the runaway carriage incident and jackhammer their way through the pavement. Several feet beneath the surface they find a manhole cover leading into the abandoned Van Horne pneumatic subway station. When Ray is volunteered to be lowered on a rope to investigate, he discovers a river of slime flowing through the tunnel. While the slime river was of course a fabrication of Aykroyd and Ramis, the Van Horne station was actually based on an unusual chapter in the history of New York City's mass transit system. "The real station was not called Van Horne," noted Bo Welch, "but there really was such a station. Around 1870 — long before the current subway was constructed — a man named Alfred Ely Beach built a pneumatic subway tunnel. It was one of the first ideas for a subway. He did it illegally; so when he excavated the tunnel, he had the dirt carried out at night through a department store. I think he built a quarter mile of tunnel. The track was short, but the station was grand — and the train was run by air. When it was unveiled to the public, it was really well received; but the local political powers interpreted it as a power play and eventually squashed it. There are sketches and old drawings, but no photographic research. The actual design would not in reality have lent itself to our scenes, so my design combined what I imagined the station might have looked like with adjustments needed for our particular scene content."

For shots of Ray being lowered into the station, and later scenes with other Ghostbusters on the set, Welch built only a small section of the setting — a curved background wall, steps leading down into the station and a partial platform. This set piece was subsequently combined with matte paintings of the rest of the station rendered by Yusei Uesugi and with a miniature representing the river of slime. Like many other concepts in the picture, the look of the slime river took a while to develop. Dennis Muren and effects art director Harley Jessup were intimately involved in the process. "One of the first problems we had to deal with was the color of the river," said Muren. "We did what was essentially a color animatic on 35mm film because Ivan did not know what the river should look like. Should it be blue or should it be green like the Slimer character that was in the first film and would reappear in the second? Is the slime from Slimer? We had thousands of questions. Finally, when we were filming plates in New York, Chuck Gaspar came up with numerous colors and some practical stuff that was really wonderful, and from those Ivan was able to choose what he liked. Once we had the color down, we worked on an approach we were developing where we did tests on a very small scale of what the actual river should look like."

Tim Lawrence — who had been hired as creature and makeup designer for the film — was given the added assignment of devising a suitable slime formula for the miniatures. "Bill George made a plexiglass trough for us and then I assigned

The evil spirit of Vigo the Carpathian — trapped in a centuries-old portrait — entrances art restorer Janosz Poha (Peter MacNicol) and commands him to find a baby through which his unrepentant soul can be reincarnated. Cel animation was employed to create the electrical effects. / Suspended on a cable, Ray Stantz (Dan Aykroyd) discovers a river of slime coursing through an abandoned subway station beneath the streets of Manhattan. Subsequent investigation reveals that the ectoplasmic flow is psycho-reactive and appears to be feeding off the collective ill will of resident New Yorkers.

Dennis Muren examines the results of an early test for the river of slime. Numerous combinations of materials and colors were considered before a backlit concoction of tinted methylcellulose and mineral oil was selected as most appropriate. /

Assisted by stage technicians Chuck Biagio and Michael Santy, camera operator John Fante lines up a shot on the miniature river. A trough — one foot wide and ten feet long — was erected on a slant so that slime could be released from a holding tank and flow downward via gravity.

The footage was later combined with matte paintings of the subway station and live-action plate material shot on a partial set.

Ralph Miller to whip up a variety of mixtures involving methylcellulose, syrups, oils and colors until we had enough different things for Harley and Dennis to look at and narrow the focus for us. Alan Peterson calculated flow and volume for the delivery system we knew would be required and also determined what the weights at various loads would be. That was important in the construction of the scaffolding that would eventually support the dump tank and the model river trough. After we developed the first incarnation of the river in a reduced scale — including multiple densities of slime, contrasting colors, some solids moving along its bed and a few shadow projections from below — Ivan approved it and the model shop went to a larger scale with a very wonderful miniature of the Van Horne station. At this point I went on to other projects, but the river went through two subsequent changes in concept before it finally wound up in the film."

"What we ended up with was a mixture of methocel combined with mica dust and topped with a layer of mineral oil," explained Harley Jessup. "Inside the river we had injectors and air bladders to bubble slime up and make it swirl around. We also had plexiglass baffles that we puppeteered to create different flows and currents and make it appear like something was alive beneath the surface. The mineral oil was important because it gave the river a greater sense of depth and mystery by creating very strange mercury-like shapes that raced downstream. It looked wonderful, but it was difficult to shoot. We needed a lot of puppeteers working from awkward positions because of all the water pipes, lights and other fixtures on the set. Marty Rosenberg and John Fante headed up the crew and guided the complex physical setup."

The river set was designed to work as a gravity flow system. A large holding tank was placed some fifteen feet up in the air. A track fed the slime down into the miniature river bed, which was tilted slightly to keep the flow going. The main river was one foot wide and ten feet long and featured a curve towards one end. At the lowest end of the trough was another holding tank to catch all the slime that flowed down from above. A large pump would then be used to direct the stuff back up to the upper holding tank so it could be recirculated. Several takes were possible before the colors in the slime became so homogenized that the whole set had to be emptied and then refilled with fresh slime. And a lot of fresh slime was needed. To prepare adequate amounts, four portable cement mixers were rented and a team of four under Ralph Miller worked several days just mixing up enough slime of the proper consistency to fill the large overhead holding tank.

In the sequence, Ray is lowered down close enough to take a sample of slime. As he does so, several small tentacles appear on the surface of the river and then suddenly a larger one lashes out at his foot. Both sizes of tentacles were created by relatively simple means. The smaller ones were slip-cast out of hot-melt vinyl and attached to sticks that could be manipulated from below the river. The larger one was a plastic mechanical tentacle

that was filmed against a bluescreen as it fell away from a stand-in's boot. The footage was then employed in reverse.

When Ray is rescued and pulled up to street level by his cohorts, he accidentally knocks out an underground cable causing all of Manhattan to lose power. One of the people caught in the sudden blackout is Dana Barrett, who gets an unexpected visit from her solicitous boss. Dana gently brushes him off and closes her door. For a moment, Janosz stands silently in the outer hallway which is lit by a dim emergency light. Then, as he turns to leave, two bright beams of light shine from his eyes, illuminating patches of wall on each side of the hallway as he makes his way out of the building. Director of effects photography Mark Vargo suggested an approach to accomplish the effect. "First we shot the scene with Peter MacNicol walking down the dimly lit hallway. As he did so, he moved his head from side to side. Then, to create the look of real light illuminating patches of the walls, we turned off all the lights on the set and did another pass. Michael Chapman held a 2K at roughly MacNicol's head height and walked down the darkened hallway, panning the light from one side to the other. We did a couple of takes like that — fast and slow — and then we did a couple more where we held the light on the right side of the wall and walked along and then did the same on the left side, just in case we had to pick up little pieces. With the lights turned out, you could not see Michael Chapman, and any evidence of the 2K light itself we just garbaged-matted out later. All we were interested in were the puddles of light on the wall. Lining up the patches was achieved by editorially sliding the selected light passes to roughly correspond with Janosz' action. This aspect of the shot was less difficult than one might imagine because it did not have to be frame accurate." The live-action plate and interactive light elements were next turned over to the animation department where the actual beams would be created. "Pat Myers on the motion control animation camera did a tremendous job defining the beams. He put in shards and a little bit of particulate matter so that they looked like real beams, and he lined the beams up so they tracked from MacNicol's eyebrows to the puddles of light on the walls."

Vargo — a former optical supervisor at Boss Film Corporation — was one of the few visual effects people to have worked on both *Ghostbusters* films. "I would say that the primary difference in the look of the sequel was the radical change in angles during plate photography. We used many different angles — and if we were not panning in a given shot, then we were usually in some oblique stance to the action. On the first *Ghostbusters*, the camera was locked off — largely because of the technology that we had at the time. On the second show, we were able to move the camera quite a bit and use a lot of different focal lengths. For instance, for one shot we were on a dolly in Central Park with a gearhead and an 85mm lens and we were tracking an invisible subject that would later be added in optical. Our camera move was very crude and we did it in a very low-tech way — but optical can handle such situations today in ways we

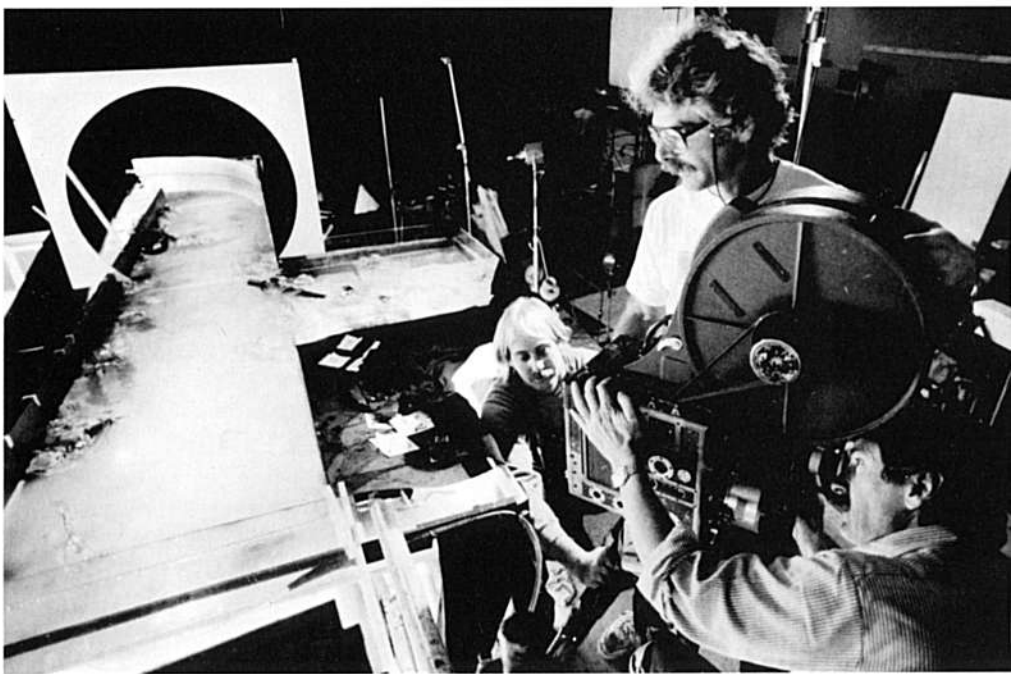
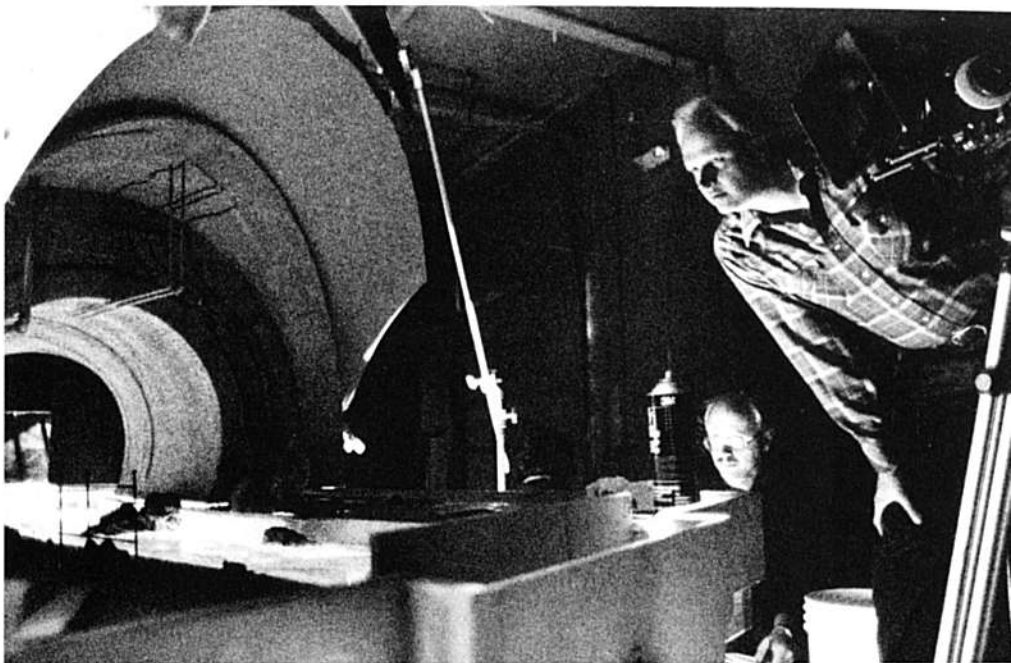
could not have done as easily five years ago."

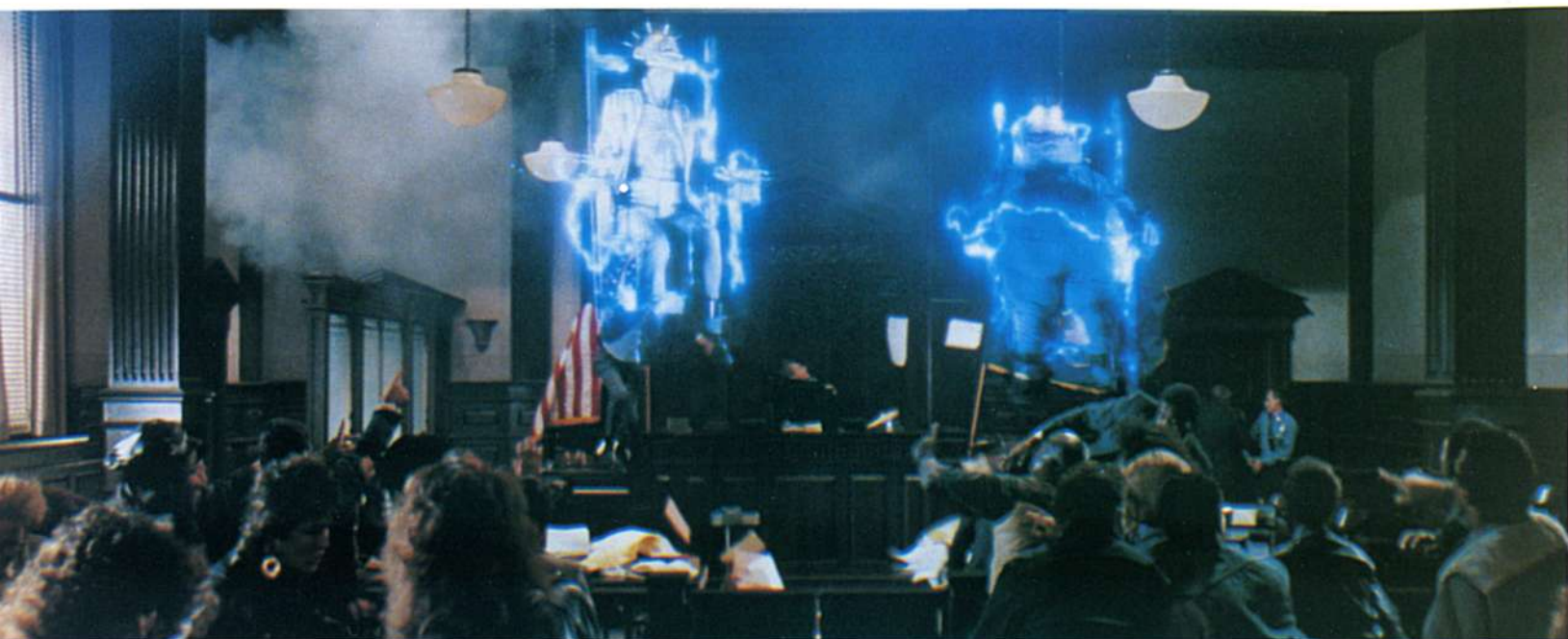
Following the power failure, the Ghostbusters find themselves on trial for not only putting New York into the black, but also for violating a court order restraining them from acting as paranormal exterminators. The presiding judge has little sympathy for the defendants and hands down his ruling with a vengeance. The verbal tirade that accompanies it has an unusual effect on the slime sample that Ray snagged out of the river and which now sits in a beaker on the evidence table. As the judge continues his diatribe, the gooey substance starts bubbling up and expanding until it finally explodes, unleashing the angry ghosts of two brothers the judge had sent to the electric chair.

"The Scoleri brothers sequence was one of those nice discoveries," Ramis noted. "At one point, we committed ourselves to having the Ghostbusters fight their way back to being Ghostbusters rather than starting out with them as successes. With this in mind, we were working toward a courtroom scene, but we did not know exactly what should happen there. Meanwhile, the ghosts themselves were very loosely based on the fact that my father was a storekeeper who was once robbed and assaulted by the Scoleri brothers. The whole point of our trial was that the legal system of New York was completely skeptical of the supernatural. At some point, the idea of the courtroom and the Scoleri brothers came together. We thought, what better way to reinstate the Ghostbusters than at the moment of their sentencing to have two ghosts appear in the courtroom? It was one of those nice discoveries that brings ideas together and says what you want to say. It also connected with the notion that negative human emotions have an impact. The judge is angry — a tyrant in his own courtroom — and he pays the price."

The sequence begins with the slime sample which slowly bubbles up and then explodes. "The bottom of the jar was cut out," said Gaspar, "and we had a plexiglass tube that fed into the glass from below the table. To drive the slime upward, we filled an air piston with additional slime. We also had an air feed to create the bubbles. The jar was sitting on a piece of foam rubber that was inlaid into the top of the table and we had two little motors below to make it shake. Then to create a sense that the slime was coming alive, we had lights under the table that reflected upward. As the slime slowly rose up, we increased the light. For the shot when the Scoleri brothers actually emerge from the slime, we put a big red flash behind the jar and set it off at the correct moment."

The two figures that emerge from the jar are anything but normal death row inmates. Both are free-floating specters who first appear strapped into electric chairs. As electricity arcs around them, their eyes suddenly light up and they break free from the chairs to soar around the courtroom. "The Scoleri brothers were deliberately made slightly cartoonish in their design and actions," said Michael Gross. "At one point, Ivan got a little worried about this and asked me, 'Do you think we've gone over the top?' I said: 'We need it in the picture at this point.







Given how scary some of the other sequences are, it would be good to go over the top with these characters.' I thought it would lighten the moment. It was the first time we saw full-scale ghosts in the film, and I thought we really needed them to be as wild as they were."

To bring the Scoleris to life, Reitman and Gross turned to storyboard artist Thom Enriquez — another *Ghostbusters* veteran — to first lay out the basic action in the scene. "On the first film I boarded the capture scene in the banquet room," Enriquez recalled, "and that was the toughest scene to do. I had the same problem with this — how do you make the action interesting in a room that has four walls and a ceiling? Also, Ivan was really busy finishing *Twins*, so he was not around a lot when I was boarding the scene. It became even more difficult when I was told that, because of time, the courtroom set was being built at the same time I was boarding the action and they needed the boards to match what the expense account could afford for special effects. For instance, there were only a certain number of chairs that could be thrown about in the scene because the rest were rented and they did not want to touch those. So I had to board the scene keeping in mind that I could use only fourteen chairs. I could also only blow up four pillars and break one wall of glass."

During production, Chuck Gaspar and his on-set crew — headed by Joe Day — oversaw the physical destruction of the set. "Everything that was blown up inside the courtroom was made of balsa wood," Gaspar noted. "The railing, the walk-through hinged doors, the judge's box and even the defense table were made so they could easily be blown up or moved. We had to pick the defense table up and fly it across the room for a scene where the brothers uncover the cowards hiding underneath. They pick it up and slam it into the back wall of the room. We had that table on a flying track and just pulled it on a compound cable to slam it into the wall as hard as we could. We also had to throw fourteen visitor chairs across the room, explode the jury box, shatter a glass partition and rig walls and pillars with explosive charges to simulate strafe marks created by the *Ghostbusters*' guns. We had parts made for three takes of everything so we could reset easily."

To aid actors and crew in the courtroom, full-scale cutouts of the ghosts were placed in appropriate positions around the set. One of the most difficult physical effects had no such visual references. "We had to fly the prosecutor upside-down through the open doors of the courtroom and then out into the hallway beyond. That was kind of a trick because Ivan wanted to see the grille work above the door. When you hang somebody, you have to have a track way up above the set and then the wires come down from that. Since Ivan wanted to see above the door, we had to find some way to move the wires through the grille work to fly the stuntwoman out into the hallway beyond. The way we solved that was to build a hinge in the grille work itself. The grille work was made out of iron, but in the area that we wanted to pass the cable through, we replaced the iron with foam

As sentence is being passed on the Ghostbusters for defying a court order and causing a blackout in Manhattan, the Scoleri brothers — two criminals sent to the electric chair by the presiding judge — appear in the courtroom and raise havoc. / Crew members Bob Cooper and Mike Smith assist creature shop supervisor Tim Lawrence into the Nunzio Scoleri ghost suit. / Photographed in front of an ILM bluescreen, Nunzio reacts as electricity passes through his body. The footage thus recorded would later be altered by projecting it onto flexible mirrorplex and then rephotographing the distorted imagery. / Specialty costumers Barbara Hartman-Jenichen and Camilla Henneman make last-minute adjustments to the Tony Scoleri suit worn by actor Jim Fye. / Wire rigs were incorporated into both suits so the characters could be flown about in front of the bluescreen.

Creature shop crew member Howie Weed airbrushes the foam latex Nunzio head. To suggest a character weighing some eight hundred pounds, the body was fashioned by Camilla Henneman from an assemblage of spandex pouches filled with gelatinous materials. / Technician Scott McNamara at work on the armature for the Tony Scoleri head. To create a sense of extreme thinness, the articulated headpiece was configured so that Jim Fye actually wore it in front of his own. / Both character heads were actuated via servo mechanisms and pneumatic cylinders. A computerized SNARK system — akin to a motion control model mover — allowed precise and repeatable recording of specific facial articulations for subsequent playback at normal or altered speeds. By employing the system, puppeteers were able to achieve full and convincing lip-sync on the characters.

rubber made to look like iron. Behind this rubber we placed small steel spring slips so that when the wires hit the grille work, they would go right through and then the foam rubber would spring back into place." Later on, the images of the ghostly brothers would be composited over the wires to help cover the effect. Also matted in was a miniature lintel and frame above the door. "The stuntwoman in the scene wore a pair of flying pants and a vest, and the cable ran up from her leg to the ceiling track above. Ivan wanted her to have one leg free so it could dangle — which made things a little more difficult. All the weight was on her shoulders when she was upside-down, so that was not a problem — but she had to try and hold her leg out and kick and flip it around. There were also all these chairs underneath, and her head was just missing the tops of the ones that we had not already blown out of the way."

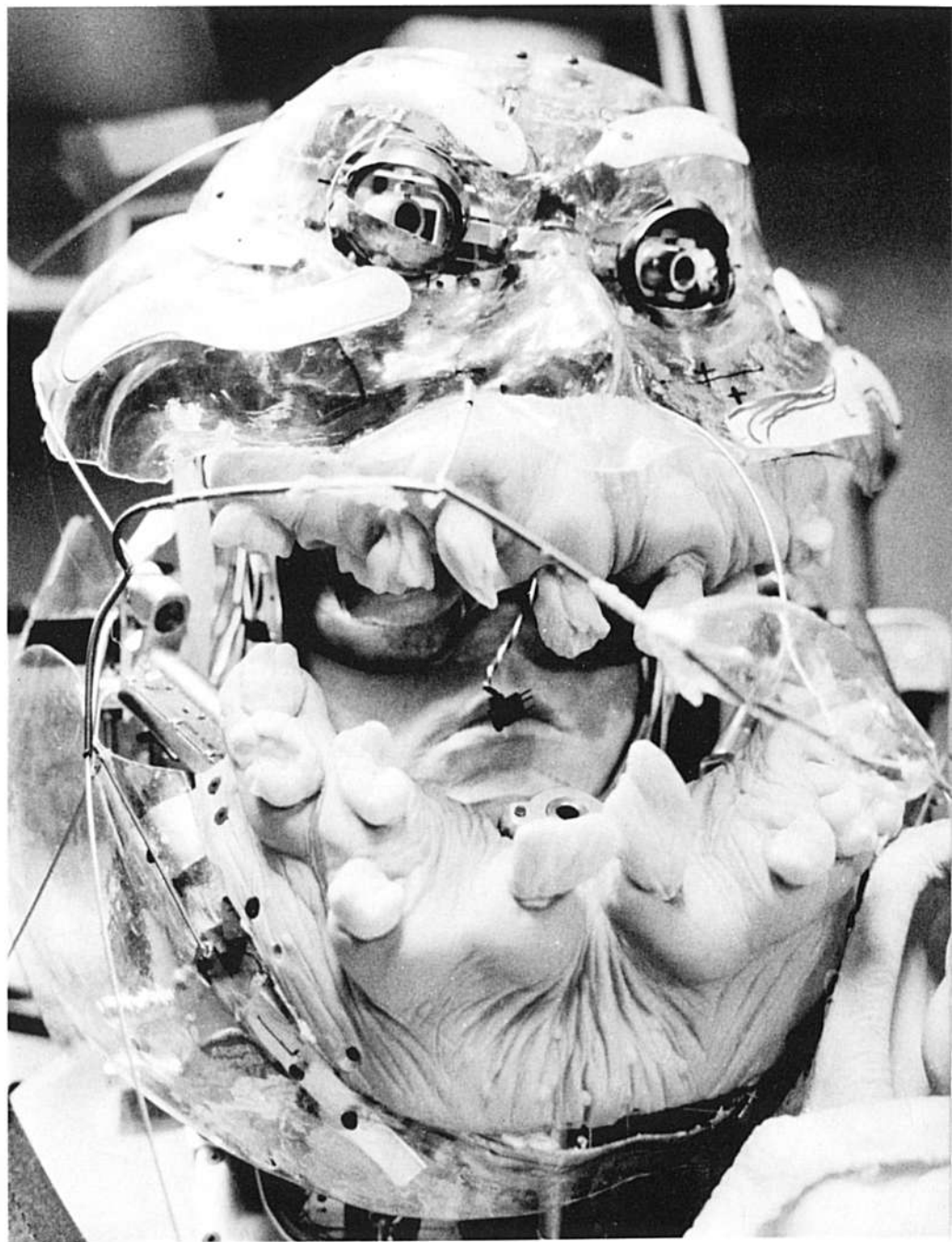
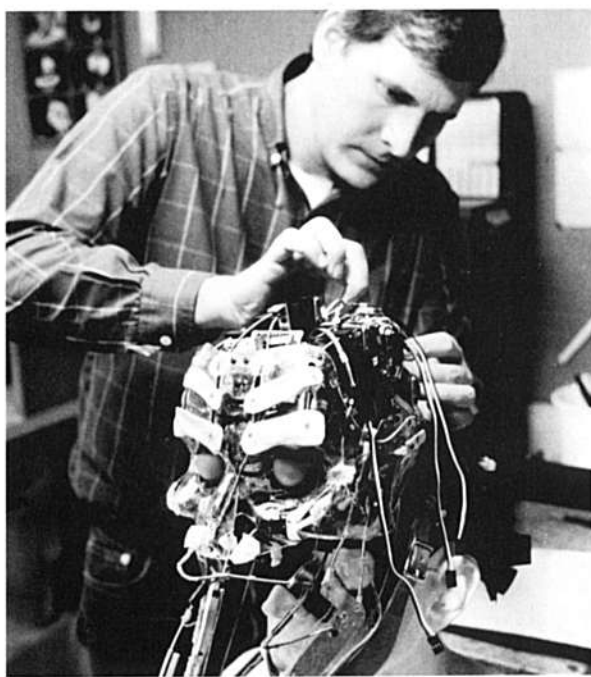
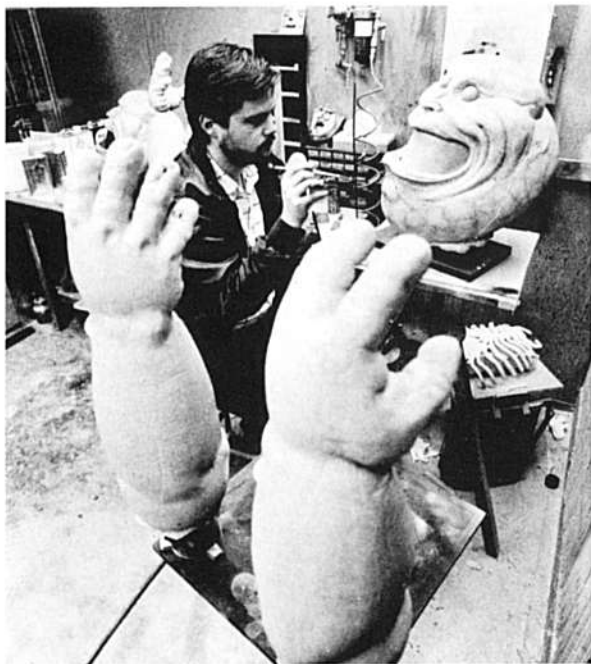
While cast and crew were demolishing the courtroom set, Tim Lawrence and his team were constructing the Scoleri brothers which would later be filmed at ILM. "In the first draft of the script that I saw, the description of the characters was quite vague — as is often the case with fantasy characters that have not yet been fully designed. I believe the script read something like, 'Big in life, even bigger in death, the Scoleri brothers sweep into the courtroom.' Knowing that Dan Aykroyd had written this bit, one of the first images that came to me was the Blues Brothers — and it was this idea of a tall thin guy and a short fat guy that colored my thinking as I developed the characters. I began by generating some rough drawings in my very cartoony style, and then I involved a longtime friend and collaborator, Henry Mayo, to help me firm the concepts into something that was more realistic, yet still broad in intent. It seemed to me that the original draft of the script was 'monster shy' and the ghostly apparitions that did appear were very much of the see-through-person variety. There was no marshallman, no Slimer, no terror dogs — just a variety of vaporous people. I could not imagine a Ghostbusters movie without any creature-type ghosts, so I very consciously began pushing the concepts for the Scoleris into a broad caricature direction. I took my cues from the script and then extrapolated my own interpretation along lines that I felt would represent the brothers' internal evilness rather than merely suggest what they looked like in life — hence the very exaggerated ghosts that appear in the movie. Both Ivan and Michael were enthusiastic about this approach, and so I hoped to generate further characters of this type as the work progressed. Ultimately, the Scoleri brothers would be the first ghost designs in the show to be green-lighted."

It was apparent to Lawrence that the two brothers — fat Nunzio and skinny Tony — could have been realized in a number of ways, and indeed several options were considered before a body-suit approach was finally selected. "My original concept for the brothers' movement through the courtroom had them taking steps where their feet would pass through the floor, causing an explosive rupture and leaving a smoking, splintered

hole at each step. As their feet lifted — losing contact with the earth and thus their electrical ground — the leg that was in the air would become less distinct as an appendage and more like a flaring electrical bolt until contact with the earth again restored its character. The Scoleris were also to have lip-synced some Italian epithets. So with these two basic ideas in mind — walking and lip-sync — we took a full-size approach over a miniature puppet approach to avoid duplicating sculptures in two scales which would have been necessary to accommodate a closeup head. Our schedule was incredibly tight."

As designed, Nunzio appeared to weigh in excess of eight hundred pounds. To achieve this bulk — as well as other specialty costume requirements for the film — Camilla Henneman was engaged to develop a fat-suit that Tim Lawrence himself would wear during the effects shoot. Using techniques akin to those she had employed to put similar poundage on Weird Al Yankovic for his 'Fat' video parody, Henneman constructed an assemblage of spandex pouches filled with a variety of gelatinous materials to simulate the undulating quality of fleshy masses. The finished suit was then sheathed in an appropriately singed prison garment. While the suit construction was in progress, the concept for the overall sequence continued to evolve as the brothers went from walking through the courtroom to walking and sometimes flying to finally being totally airborne. By the time their all-flying status was settled upon, the costumes were too far along to abandon altogether and so flying harnesses were incorporated into the configuration.

Tony Scoleri underwent three successive stages of development. Where Lawrence and crew had gone for the impossibly fat with Nunzio, they wanted Tony to be impossibly thin. "Our first approach was a full-sized puppet with an articulated head directly and analogously attached to a puppeteer. To develop this version, I secured the services of another longtime associate, Mark Wilson, and a prototype was quickly assembled and video tested against black. We achieved a very eerie look — a skeletal locomotion unseen outside of stop-motion, yet with more of a sense of gravity." Though Dennis Muren was impressed with the results, he determined that the rotoscope load for such an approach would seriously compromise the production schedule and so the character was redesigned to fit actor Jim Fye. "We attached the head to a skullcap that positioned it in front of and on top of Jim's own head. Then we lowered the collarbone in the emaciated torso sculpture — which elongated the neck — and styled the hair in such a way that it concealed Jim's head. We dressed him in oversized shoes so that when he was suspended he could direct the toes behind or down, adding a sharper pointed look to the legs. We tattered his prison suit and added extra lengths of cloth strips which were blown about with a fan. We also added small details like finger extensions and droopy pants. All of these measures helped put over the illusion of a much more skeletal being than was actually there." A third-scale marionette was also made in prototype form, but abandoned when the costume approach proved fully workable.





To sculpt the body parts not directly fabricated by Henneman and her staff, Lawrence brought in Mike Smithson to fashion the heads, Bob Cooper to provide Tony's torso and Bill Foertsch to supply Nunzio's arms. Additional details such as tongues and teeth were handled by Buzz Neidig. To provide the broad articulation required of the Scoleri brothers, mechanical animator Al Coulter and his crew employed some nontraditional technology. "For the Nunzio character," said Lawrence, "I wanted a great gaping mouth. I also had an idea to divide the head into two separate units—the lower jaw to be attached to my shoulders and the upper head to rest on a skullcap, with the two joined together by a single foam latex skin. With this approach, the lower jaw could be sent mechanically in one direction while I turned my head in the opposite direction, thus creating a ghastly twisted cavern in the center of Nunzio's face. Al figured out how to do it using a series of proportionally controlled pneumatic cylinders to move the mass of the lower jaw with speed and precision."

To facilitate the lip-sync aspects of the sequence, Lawrence drew upon his prior experience in audio-animation to assemble a memory playback system for the mechanics. Though crude in many respects, the Synthetic Neuro-Animation Repeating Kinetics module—dubbed the 'SNARK' system—performed a number of functions and allowed for considerable flexibility of the characters. From parameters outlined by Lawrence, Coulter supervised the efforts of Tim Gillett in the construction of the electronics necessary to link the characters' servos and pneumatics to a computer. "The technology for this kind of control has been around for decades," noted Lawrence. "I first worked with animation control systems more than ten years ago, and many of the people I count as valuable coworkers were first met in this Hollywood satellite industry. Only within the past few years, however, has the hardware and software approached an off-the-shelf availability, and we incorporated some of this available technology into an original contour with considerable custom interfacing to arrive at the system we used in *Ghostbusters II*. With the SNARK system, we could either perform the character totally live—as the information inputs were typical joystick conformation—or we could record the initial performance, keep the parts we liked, and then go back in and electronically edit the other functions a channel at a time until a complete and satisfying performance was in the memory. This could then be played back as stored, or speeded up and slowed down at the touch of a keystroke. There is also an override switch for each function allowing partial playback and partial live performance, as in an instance where an eyelid might be critical yet you would want to keep the animated lip-sync. It is all very similar to photographic motion control. The potential of this concept for creature work is immense."

Bringing Nunzio and Tony to cinematic life meant that Lawrence and Fye had to wear the full body suits for hours at a time while hanging from wires in front of a bluescreen. Given the bulk of the suits themselves—Nunzio weighed close to eighty

pounds—a great deal of acting and patience was required. "I've done a lot of these types of characters," Lawrence explained, "and I've learned that the trick to performing in suits such as these is to have in your mind a perfect mental image of what you look like in the suit and what you look like when you make a gesture or a move in the suit. It takes a while to get that knack, especially since you cannot see yourself and often you cannot see a monitor when you're doing a shot. It's actually a lot like acting through appliances where you have to really move your face around behind them to get them to register. With a big foam suit, you have to move a lot and be exaggerated to have something come through. You also have to know how to temper your moves—otherwise it looks like just a bunch of waving around. Actually, with the Scoleri brothers that was kind of what the producers wanted—a lot of extreme motions."

When the brothers first appear, they are sitting in the electric chairs that ended their lives. In reality, the chairs were miniatures that were shot separately from the ghosts. To make the two elements merge, Lawrence and Fye had to hang in midair and pretend to be sitting. "In the Nunzio suit," Lawrence admitted, "it was very hard to pretend like I was sitting in midair. Fortunately, one of the crew members was underneath and helped me push my feet up so my legs bent properly at the knees. Then on a certain count, he would duck away and I would pretend like I was bursting out of the chair and falling forward in a dive. To get the best negative, we needed the biggest image we could get—so we had to stay in the center of the frame. Therefore, if Nunzio was sitting and he had to burst out of his chair in an upward arch and then dive back down, I had to move my arms and feet accordingly, but I could not actually swing through the frame. Sometimes if it was a particularly difficult shot, we would do a black-and-white test and make a quick composite to check our moves. Despite the complications, we actually shot the sequence really fast. We filmed on one brother in the morning and one in the afternoon, and we could usually get five or six shots a day of both."

Though the results were impressive, the essential concept for the Scoleri brothers sequence was ultimately altered and simplified to such an extent that the characters could have been achieved much more simply in other ways. "By the time much of the work had been done," Lawrence reflected, "the concept had changed to the point that the brothers were now always in flight, never really spoke, were very transparent and also heavily augmented with roto effects. The facial animation—while excellent—was now all but superfluous. The characters could easily have been done with third-scale marionettes on wires. You just never know how the stuff is going to be used until it is. With the script changing daily, all you can do is adapt and hope you are prepared for anything."

The movements of the Scoleri brothers through the composite frame were created later on a track camera by effects cameraman Peter Daulton. At the same time he was adding moves to

Peter Venkman (Bill Murray) trains his nutrona wand on Nunzio. In a departure from the effect employed in the original film, ILM animators—under supervisor Tom Bertino—incorporated additional character into the beams by rendering them so as to resemble cowboy lassos and fishing lines. / Animator Kevin Kutchaver draws a pattern of arcing electricity over an enlarged frame from the Nunzio stage shoot. / As the spirit world begins to assert itself on the city, a ghostly runner is seen overtaking startled New Yorkers on a jogging track in Central Park. Playing the ghost, Jim Fye was covered with white makeup and photographed against a bluescreen for subsequent compositing into a live-action plate.

Diminutive actress Robin Navlyt performs inside the Slimer suit on the bluescreen stage. Facial articulations were externally controlled. / In the abandoned fire station converted to Ghostbusters headquarters during the original film, Louis Tully (Rick Moranis) encounters the green gobbler engaged in his favorite pastime. / The Slimer character — the only spectral carryover from the first film — became popular with children as a consequence of his nonmalevolent featured status in The Real Ghostbusters cartoon series. For this reason, it was decided that he should also be included in the sequel. But when comic segments involving him proved intrusive to preview audiences, Slimer's presence was trimmed back to only two brief shots, plus one under the end titles. In a scene deleted from the final cut, Louis attempts to trap Slimer by baiting him with fried chicken.

the ghost elements, Daulton was also incorporating an additional effect using mirror trickery. "In our efforts to make the ghosts look really different in *Ghostbusters II*," said Muren, "we decided we wanted to try and alter their shapes in unusual ways. Using mylar — or mirrorplex material — we could squash and squash the shapes like something in a funhouse mirror. To do this, we used very thin mirrorplex that was about a thirty-second-of-an-inch thick and very flexible. If you poke this material on the back with your finger, you get a bump; and if you look at something reflected in that bump, the image is distorted. By controlling how you move and shape the mirrorplex, you can get different types of distortion. And if you put two pieces next to each other and push one and pull the other and line it up to a reflected image, you can make things twist."

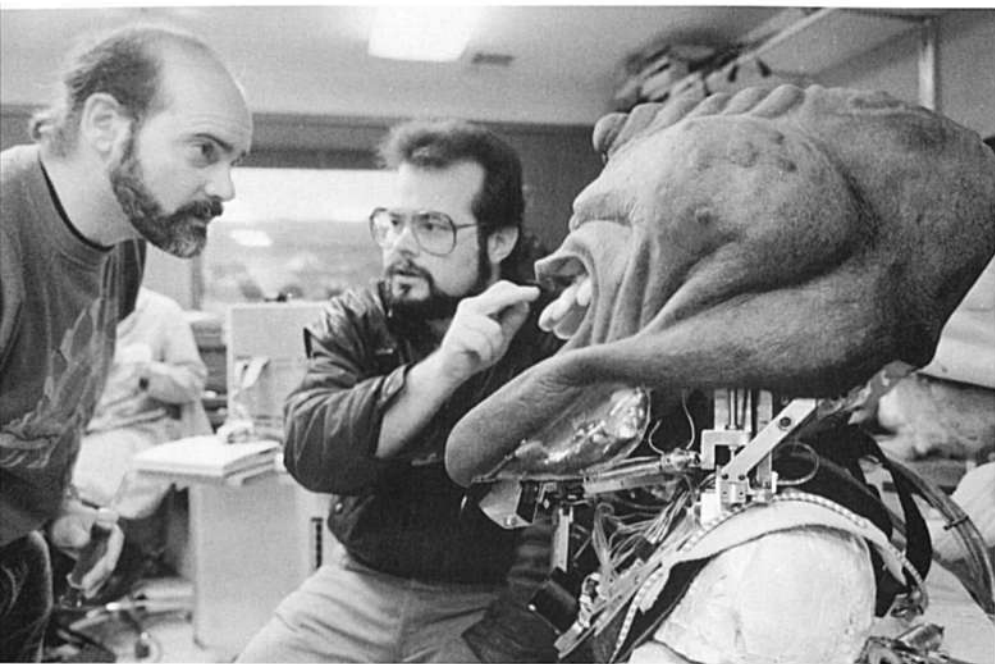
For the Scoleri brothers, a predictable and repeatable means of distorting the imagery was needed. "Basically we rephotographed the images of the ghosts on a rear projection screen and then reflected that image onto mirrorplex that was motion controlled from the rear. The mirrorplex was in a very rigid frame, and behind it we had motion controlled rods that enabled Peter to recreate different distortions over and over. We could program the system to essentially grab the mirrorplex at any point and take the fat Scoleri brother and suddenly make his belly shake up and down, or make both brothers' legs turn into tornado wisps so that they would not look like people or like any cartoon that anyone has ever seen. This way of visualizing was something I had worked out about two years ago on a project that never came through where we were going to do a lot of shape shifting. At that time we were going to do it with computer graphics and go in and image process and be able to grab the image with a light pen and pull someone's head off to one side. The shape shifting in *Willow* also came out of this idea. The great thing about it in *Ghostbusters II* was that we could see that sort of shape changing through the camera and it seemed like something that ghosts could actually be doing."

"Peter did some wonderful things after we shot the bluescreen plates," Lawrence asserted. "As he was motion controlling the photography to make Tony and Nunzio move across the frame, he was rephotographing the images off the mirrorplex to make them go around curves, stretch out at certain points and even bulge. He did a wonderful thing with Nunzio where he got a really good cartoon squash and stretch as the character moved up in the air, stopped and then dove back down into the judge's bench."

Once the Scoleri brothers burst onto the scene, the terrified judge suddenly changes his tune and reverses his decision banning the Ghostbusters from practicing their trade. Vindicated, the supernatural exterminators remove their proton packs from the evidence table, strap them on and unleash their nutrona wands on the ghosts. "The animated nutrona beams in the first film really looked good," said animation supervisor Tom Bertino, "and initially we tried very literally to duplicate that look. But then Dennis and Mark Vargo encouraged us to have fun with







the beams. We all figured that since people have already seen what the beams could do in the first film, the surprise was off. We needed to take them in a new direction. For instance, in the courtroom, the beams act like cowboy lassos or fishing lines, reeling the ghosts in. The beams catch the Scoleri brothers around the ankles, then the ghosts slip through and the beams wrap around their necks. John Armstrong and Peter Crossman did a great job of animating these shots so that the beams almost seem to have a consciousness of their own. When we first suggested these ideas to Dennis and Mark, they liked them. Then we sent pencil sketches down to Ivan and sat with our fingers crossed because we really wanted to get these ideas into the movie. We all felt gratified that nine times out of ten, the answer came back: 'Ivan loves it. Go full speed ahead.'

"It was great that Ivan was open to such ideas," Muren remarked. "I think the lasso was a pretty neat concept that worked well with the squash and stretch effects we were creating with the mirrorplex. Then we thought that if we could line up the mirrorplex and squeeze the ghosts when the nutrona beams wrapped around them, it would show a more direct effect from the beams. One of our animators came up with the next step on that, which was a very obvious lasso that starts wrapping around one of the brothers and then pulls him tight, squeezing him in the middle. It was just wonderful. Anything that had that kind of character was something we all really liked."

In addition to the nutrona beams, the animation department also expanded on the ghost traps that the Ghostbusters use to capture ectoplasmic pests. "Instead of just having ghosts get sucked into the traps and disappear," Bertino said, "we wanted the audience to get the feeling that everything that happened to the ghosts happened for a specific reason. So when these hunks of unearthly ectoplasm get sucked into the traps in this film, we created animation showing them coming apart. We also added comets and lightning inside the trap cone field that appear to have a direct effect on the ghosts. For the scene where Tony and Nunzio finally get sucked into the trap, Mike Lessa devised a great staggered effect where Nunzio went in head first, leaving his shoes behind for just a second before they too dropped in. Then at Dennis' suggestion, we had Tony leave his eyeballs behind for just an instant so that the last thing we saw of him were these two glowing orbs. We wanted to suggest that the ghost trap was literally pulling these guys apart."

With the Scoleri brothers back on dead row, the Ghostbusters reopen their fire station headquarters and find New York once again being overrun with apparitions. Among the entities they encounter in a rapid-fire montage is a ghostly jogger checking his pulse rate as he runs around a track in Central Park. In reality, the jogger was another incarnation of actor Jim Fye who was covered in white makeup and then photographed against a bluescreen and matted into the live-action plates. "Developing the look of the ghost jogger was difficult," observed optical supervisor Tom Rosseter. "We photographed him one way and he looked very white and extremely bright. Then we decided to

take him down a little bit and add more contrast. The ghost jogger became an interesting study in how to use contrast mattes and how to extract contrast from the negative when it is not really there. We fooled around with it quite a bit until we got a look that balanced just right with the background plate and the action in the scene."

The other main ghost to make an appearance during the montage is Slimer—the malodorous spirit that slimed Bill Murray in the hotel hallway in the first *Ghostbusters* outing. Dubbed 'Onionhead' on the original film, the creature got its new name as a regular on *The Real Ghostbusters* cartoon series. In the sequel, Louis Tully sees Slimer twice—first in the fire station and then later driving a bus. The idea of including the character in the second film was a matter of considerable debate. "Kids love Slimer," said Ramis. "In fact, kids love anything associated with slime. Whenever kids would visit the set, one of the first things they would ask was, 'Where's Slimer?' The second was, 'Is there any slime around?' One kid said, 'I want to come on a slime day.' I guess they love repulsive substances in general. The notion was so popular with children, in fact, that whenever one visited the set, Murray would declare: 'Uh oh, is that a kid I see? There's a kid on the set, guys. What do we do?' Everyone would answer in unison, 'Slime 'em!'"

With Slimer's appeal apparently universal, the filmmakers ultimately decided to squeeze him into the second film. In the subplot written for him, Slimer would first be seen eating various types of food around the station house while Louis tried in vain to catch him. Then later, when Louis straps on a backpack and tries to help the Ghostbusters, he finds Slimer driving a bus. Louis hitches a ride on the bus and the two eventually become friends. During editing, Reitman would decide to limit Slimer's role, but all the scenes scripted were completed.

To create the Slimer material, Tim Lawrence and the creature shop began with some new concept drawings by Thom Enriquez, who had developed the prototypical Onionhead character for the original film. "Unlike the character from the first film which was primarily a monster," Lawrence explained, "Michael wanted elements from the cartoon version incorporated as well, and to this end he had Thom do the new series of drawings—which were fabulous. Slimer was not in the first script that I saw, but once we knew that he was going to be in the show, I called in Bobby Porter to play the role. I had worked with Bobby before and liked his facility in suits as well as his easygoing personality." A lot of the technology that was to be applied to Slimer had been worked out earlier on Nunzio. Both had the divided head construction, pneumatic jaws, SNARK capability and a fat-suit base. "The character was going together quite quickly, but then we were notified that it had once again been removed from the script. That was Black Tuesday—we were all very disappointed. The word came down to release Bobby from the show, and I asked them to wait—to be *very* sure that Slimer was in fact gone before letting the guy go upon which everything had been custom fit. But release him they did. Two weeks later

Slimer was not only back in, but he had a role of increased importance to the story. We contacted Bobby to check his availability and found that even though he had signed to another show for stunt work, it looked as though the two schedules would fit and allow him to still perform Slimer. As the time approached, however, weather changed his primary commitment and we found ourselves two weeks from shooting without anyone to wear the suit. Our effects coordinator, Ned Gorman, recalled a person he had worked with on *Willow* named Robin Navlyt. I was convinced no one else could wear the suit, but I had her come in for a fitting and audition. Incredibly enough, she was exactly the same height as Bobby—four-foot-ten-inches—and she fit into both the body pod and the already molded and cast gloves very well. That same day, Chris Goehe and his mold shop crew did a full lifecast on her and Al Coulter jammed on getting the mechanics fit to the new skull cap. It was really close, but we made the first day of shooting."

"Technically," said Mark Siegel, who did sculpting on both the original Onionhead and the new Slimer, "the character was created a lot differently on the sequel than he was on the first film. In the original, he was controlled by cables and handles and things, while on this one we had electronic servo motors in the head and the jaw was operated with pneumatics. On the first one, everything was hand operated and the jaw was moved around by a pole that was puppeteered from below the costume. Also the first one had a tongue that operated like a hand puppet, but on the second one the technology had improved so much that Al Coulter could make it servo-controlled. We got some beautiful movements and we were able to do the eating scenes directly without having a puppeteer standing behind Slimer as we had on the first one. Even though Slimer could be hooked into the SNARK control system for repeatability, it was decided he should be shot live since he was more of a character. During the takes there were about five of us running the joysticks and doing all the functions live so we could react more directly to the situations in the plates."

"We were able to do some really nice things with the face," Lawrence marveled, "mainly because Al and his crew gave us a wonderful mechanical head. It was more than just a monster face. We could do subtle stuff and it would read. When we were originally thinking of Slimer, we had thought of him as this wild, broad character. But Michael Gross has a very good eye for performance and also a very good eye for looking at something and knowing what's wrong—what's too complicated, what's too much, what should be cut back and made simple. He was always on set and kept going for a more subtle approach—which surprised us at first. We thought Slimer's actions should be bigger. But we did a few things his way and realized it was cool. Michael wanted a lovable character—and for him, the lovability of Slimer would come from a subtle, inner humanness that you might not otherwise see because of the way he looks. Once we saw the subtlety of the expression that was possible, Slimer suddenly had an incredible life to him that I

Unlike the character featured in the original film—which was operated primarily with cable mechanisms and direct puppeteering—the revised and updated Slimer in the sequel was actuated via remotely operated servo motors and pneumatics. The range and subtlety of expression was extraordinary for a puppet creation, but much of the fully completed footage was ultimately deleted from the film. Sculptor Mark Siegel and Tim Lawrence confer over the partially skinned mechanical head. / Creature crew members Marc Thorpe and Wim Van Thillo prepare for a scene with the tub monster that threatens Dana and her baby as they are about to bathe. The slime creature—fashioned from dielectric gel—was hand-puppeteered from below the half-scale silicone tub and enhanced with cel animation provided by Available Light.

Late in the production schedule, several effects scenes were added to the film — including one in which three members of the Ghostbusters team encounter a ghost train speeding through an abandoned subway tunnel. Ray Stantz and Egon Spengler leap to safety, but Winston Zeddemore — transfixed by the sight — is frozen in his tracks as the train passes right through him. Since ILM was already swamped with work, Apogee — under effects supervisor Sam Nicholson — was engaged to engineer the illusion. Actor Ernie Hudson was photographed with interactive lighting in a New York nightclub featuring a subway motif. Later an eighth-scale train was shot on a black stage at Apogee — with motion created solely by camera movement — and the resulting imagery was rendered transparent and composited into the live-action plate.

had never seen in such a character before. To see his face light up from very sad to very happy was a wonderful thing. The scene I was most happy with was one that they just threw at us. I wasn't sure we could even do it because it was a thirty-second shot without a cutaway. In it, Louis gets off the bus and heads off down the sidewalk. At this point, Slimer and he are on friendlier terms. Suddenly Slimer enters frame, rushes intently up to Louis and pats him on the shoulder. From his motions, it is obvious he wants to go with Louis really badly, but Louis tells him he can't and Slimer gets all sad. Then Louis tells him something that makes him happy, and Slimer gives Louis a big wet kiss with his tongue coming out and licking him. Then he does a spin and flies off. Well, we did that all in one cut and it looked wonderful. I had never seen a rubber character do what Slimer had done. Michael just flipped — he thought the performance was excellent. But at the same time, he told us that they might not be able to use the shot — and ultimately it did not make it into the film."

"What we found during editing was that Slimer was not working very well," Gross explained. "Whenever he was in there, it seemed like he was really an intrusion. At first we thought the answer was to add more of him, so we had an ongoing confrontation between Louis and Slimer in which Louis was constantly trying to catch him. We thought it would be funny and at screenings we expected the audience to cheer and laugh when they saw him again. But nothing. No reaction. The audience was looking at it as a fresh movie. There were a lot of kids who loved to see him, so we knew we could not abandon him completely, but he never really worked with the audience the way we expected. Ultimately we decided less was better, and in the final film we limited him to two very quick shots."

Besides Slimer and the ghost jogger, the Ghostbusters encounter one other supernatural disturbance during the montage. Upon entering a china shop, they discover a collection of expensive crystal artifacts — angels, reindeer, dolphins and plates — floating several feet in the air. When the Ghostbusters try to neutralize this psychic disturbance, the art pieces crash through a glass case or fall to the floor. "One reason we had the scene in the crystal shop," noted Ramis, "was that — with the exception of Slimer — we did not want to repeat any of the imagery in the first film. We wanted a scene with something other than an apparition or a materialized being of some kind. Another reason we did it was for the budget. Ivan said, 'Gee, can we come up with something that's mechanical and doesn't involve elaborate opticals?' So we thought, 'Yes, the Ghostbusters can encounter other things besides just spirits,' and we came up with just a straight polarity reversal."

To create the results of this psychokinetic energy storm, Chuck Gaspar glued pieces of piano wire to the backs of each crystal object. "Originally I wanted to drill a little hole through each piece and tie the wire through that, but we found that the crystal would immediately start to crack if we tried to drill through it. So we put the piano wire down through a little

plastic disk and then formed that disk to each individual crystal piece and glued it to the back. That supported the weight. The piano wire ran up to a piece of monofilament which was attached to a cord that ran up to a pulley overhead. Off-camera, Joe Day and other members of my crew pulled on the cords to make the crystal float in the air. We taped a bullet effect to the monofilament so that when it exploded, the monofilament would cut and drop the piano wire causing the crystal to fall to the floor. We had sixteen pieces floating in the scene and all of them were triggered together. When we were filming it, I kept my fingers crossed that one would not fall prematurely. In fact, we suspended the pieces a week prior to shooting and just left them hanging on the set to see if they would stay. We did not want the production crew to get ready to roll and then have the pieces fall through the glass cabinet before their cue." The biggest problem Gaspar had to contend with during the shoot was that the overhead pulleys tended to squeak. To remedy this, he went up into the scaffolding above the set and sprayed the individual offenders with lubricant.

With their business going like gangbusters, Ray and Egon show Peter and Winston a discovery they have made about the slime sample Ray scooped out of the subterranean river. Curiously, the substance responds directly to both negative and positive emotions. If, for instance, they get angry and yell at the slime, it expands ominously as it did in the courtroom. But if they play easy listening pop songs — a particular favorite being 'Higher and Higher' by Jackie Wilson — the slime reacts positively. To demonstrate the positive attributes of the psycho-reactive 'mood slime,' they pour a bit of it into an ordinary household toaster. When they turn the music up, the toaster starts bouncing across a pool table. "The toaster gag was fun," Gaspar recalled. "We mounted tiny air cylinders inside the toaster at various spots and used the toaster's power cord as our air supply line. We took that black cord, hooked micro-switches to fire off the cylinders and the little toaster went bouncing all over the table."

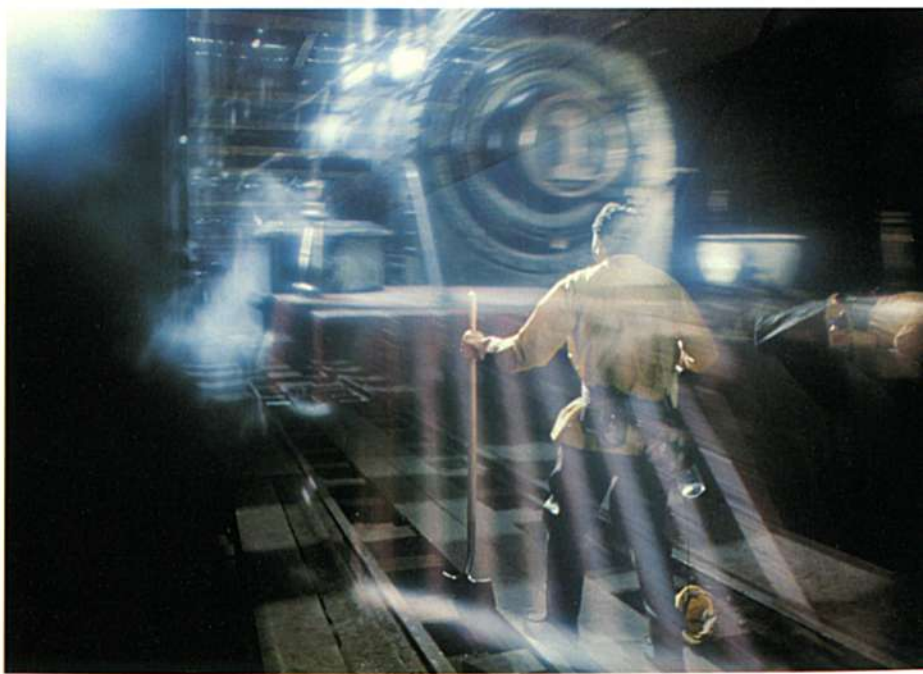
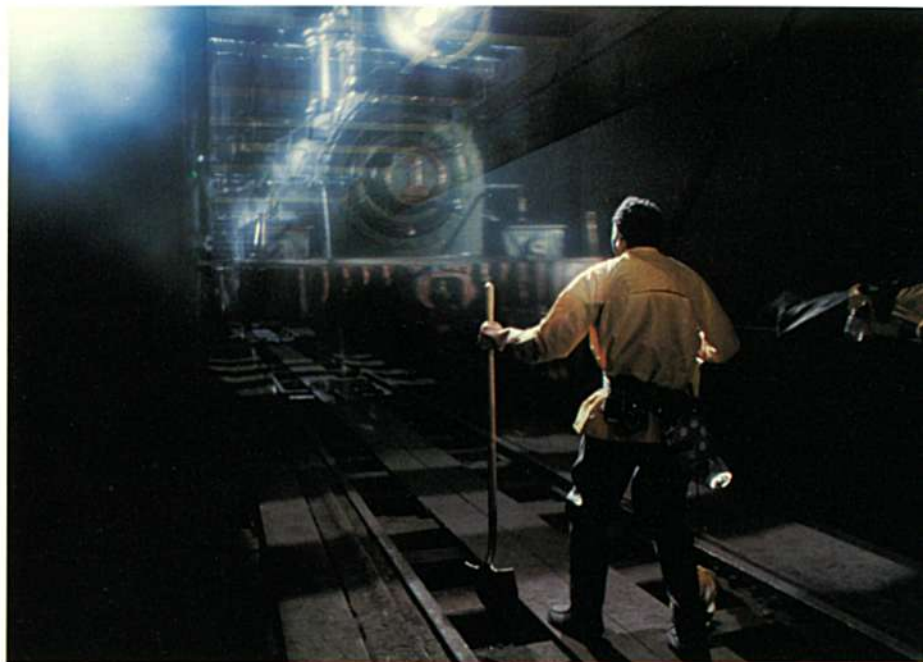
Trapped within his musty painting, the restless spirit of Vigo the Carpathian has little to offer in the way of positive psycho-reactive influence. Dana and her baby — who have been drawn unwittingly into the tyrant's plans for rebirth — bear witness to this fact when simple bathwater becomes a lunging mountain of slime. "Many different ideas were discussed for the tub monster," Lawrence noted. "It went from being something where the tub turns into a porcelain version of Audrey II from *Little Shop of Horrors* to the tub becoming the beginning of a long road that goes down forever. Perhaps the most cartoonish gag was one involving a bubble bath monster. In that incarnation, Dana put bubble bath into the tub and then turned away. While she has her back turned, the mountain of bubbles gets impossibly high behind her and then — when it is up over her shoulder — a dark shape comes up inside it and these eyes open up. With all the bubbles, the lensing effect makes it look like there are hundreds of eyes around this dark shape. When Dana turns back

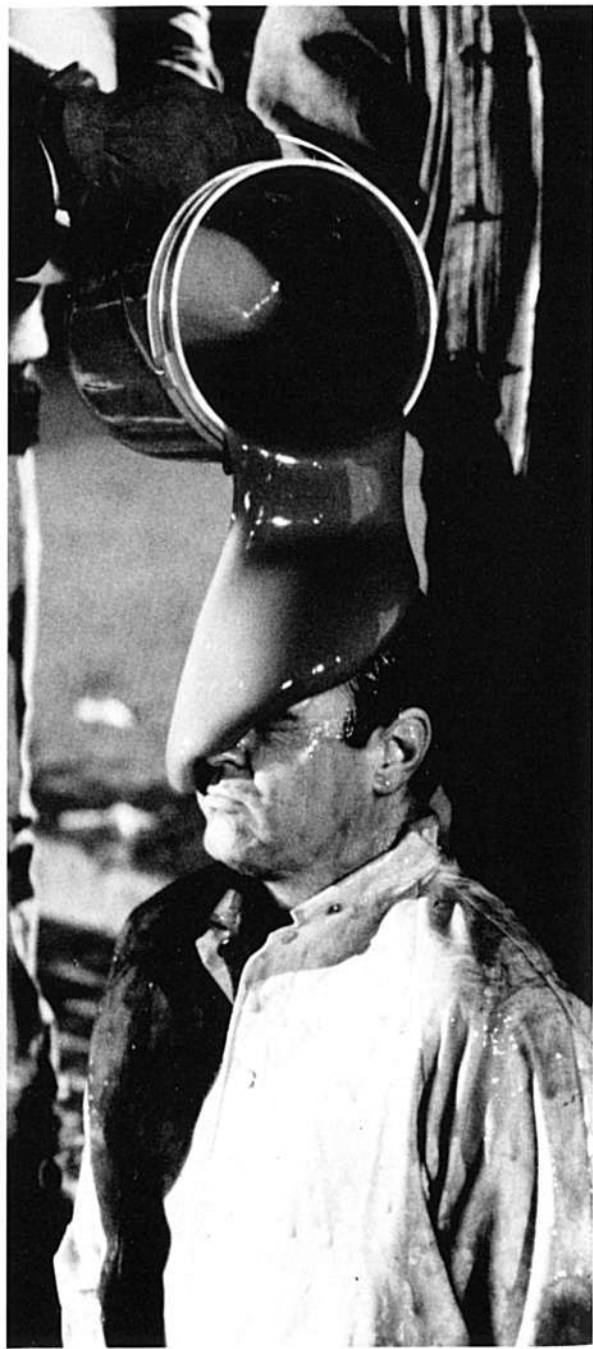
around, the creature opens a big maw and scares her. She drops an electric hairdryer into the tub and there's a big electronic snap. All the bubbles pop, and what's left is a tiny little creature with two great big eyes that crumbles into cinders and goes down the drain. Ultimately, Ivan decided that the slime itself should turn into a creature inside the tub."

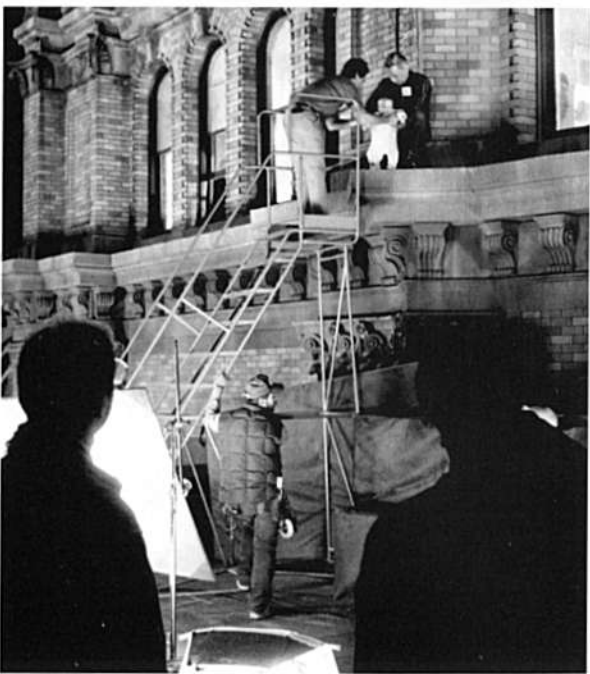
Featured in the sequence was a silicone tub and slime creature that were filmed together against a bluescreen. "We made the tub out of white silicone which looked pretty much like real porcelain when it was all slimed up. It also bent well. Then we made the creature itself out of dielectric gel — a Dow Corning breast implant material. The gel is transparent and tends to be somewhat flimsy, so we reinforced it with china silk and spandex. Since this was designed to work as a hand puppet, Tom Floutz was able to put his arm up through the bottom of the tub from below and operate the creature. Then we dumped slime over the puppet, and poor Tom had to stay down below the tub while all this gunk dripped down on him." To give the creature a mouth, a maw-shaped piece of fiberglass was placed inside the puppet and attached to a vacuum tube. At the right moment, the vacuum was triggered to suck the outer material down into the maw shape and thereby form the mouth.

"Initially," said Muren, "the scene called for the tub to fill with slime, the slime to come to life and lift up, and then Dana would run out of the room. But that was not enough of a payoff, because we had four or five shots in the sequence and the last one was not that much different than the previous ones. Ivan asked what we could do to make a creature come out of this slime. So we went back and had our slime creature come out again and had the tub move around some more, but that still was not quite enough. Then Ivan came up with an idea. 'Why not have it stick out its tongue on the last shot?' That was really what it needed. Each succeeding shot gave you more than the last, and the final one topped them all. Since we were really too busy to handle anything more at that time, John Van Vliet of Available Light did an animated tongue that comes out in the last shot for about twenty-five frames."

Believing that the river of slime holds the key to the escalation of paranormal happenings, Ray, Egon and Winston decide to return to the Van Horne station to investigate further. In the depths beneath the city, the three Ghostbusters follow an abandoned subway tunnel to get back to the river of slime. En route they encounter some supernatural scares — first from a number of severed heads that suddenly appear around them, and then moments later from a mysterious ghost train. Both scenes were among several added to the film after principal photography had officially wrapped — a situation necessitating a return to New York for additional location shooting only three months before the film was set for release. "We went back to shoot some scenes that we thought would help clarify story points or expand certain portions of the film," Gross explained. "More specifically, the ghost train was added because that portion of the film needed more tension, more humor and a few more effects. It







needed to be goosed a bit. The ghost train helped heighten the jeopardy and get across the idea that an evil force was trying to keep the guys away. It also fostered the notion that all these ghost forces were starting to build up — which, in turn, helped justify the ending more. We had the slime and Vigo and the ghosts that appear in New York, but we needed to tie them all together better — at least that's what our early preview audiences told us after our first cut. In fact, many people did not even understand the concept of good slime and bad slime originally, so we decided to reshoot part of that as well."

Adding scenes was not necessarily a simple solution. While the number of shots needed to complete the film was expanding, the time in which to accomplish them was diminishing. "At one point," Gross recalled, "we were going to try and come out July 4th weekend, but then Ivan decided June 23rd was the weekend that would really do it for us. It was going to be tough, but we said, 'Okay, let's go.' When we learned in the middle of production that *Batman* was also going to come out on the 23rd, Ivan said to the studio, 'It would make a huge difference if we could come out on the 16th, right?' And the studio said: 'We'd love you if you could come out on the 16th. Can you make it?' Ivan said, 'Sure we can make it.' Then he looked around the room, and [co-executive producer] Joe Medjuck and I were turning pale. Our editor, Shelley Kahn, I think fainted. We just looked at each other and said, 'Yeah, well, if you say we'll be out on the 16th, we'll be out on the 16th.' But on paper it did not look possible. On paper, it could not happen. It was a real killer. It meant the editing schedule had to be pushed back, and it meant that ILM's dates had to be pushed back — and they were already dying. But we had to do it."

At this point in the production, ILM was indeed dying; and when additional shots of a ghost train and other entities were put on the table, it was simply too much. "Originally," said Muren, "the film was going to come out at the beginning of July and it was going to entail one hundred and ten effects shots. Then it became a hundred and thirty shots and then it became a hundred and eighty. When the release date got moved up to the 16th, that was it. We peaked out at a hundred and eighty shots and we could not take any more without jeopardizing the whole film. Every time we would get involved in new shots, it would take my time away — and others' time away — from following through on the shots that were already in progress. And the schedule was just so tight that we had to be on top of those shots all the time. The question we had to ask ourselves then was, 'Can we handle any extra shots and not have the quality suffer?' We already had nine units shooting every single day for three or four weeks just to get the original shots done, and there was no way we could take on any more and not have the quality suffer. Fortunately, Michael understood this. He kept saying: 'You've got to tell us when you've reached your limit. We're going to keep giving you shots, and at some point you've got to say, 'That's it.' So we did."

"There had to be that trust between us," Gross asserted. "I

A frantic Dana Barrett (Sigourney Weaver) reaches for her baby who has miraculously climbed out on a window ledge in response to the psychic bidding of Vigo the Carpathian. On a studio set representing the exterior of the building, physical effects supervisor Chuck Gaspar constructed a harness rig to support the child and prevent him from falling. / Live-action ledge footage was later incorporated into a matte painting — by department supervisor Mark Sullivan — showing the entire building and the street below. / On a frigid night outside the museum location, effects team members pour buckets of methylcellulose slime on Dan Aykroyd. / Thoroughly soaked from his dip in the ectoplasmic river, Ray Stantz climbs out of a manhole and onto the street. / On the ledge set support rig, crew members secure one of the infant twins selected to play Dana Barrett's baby.

told Dennis that I knew Ivan would keep pushing and that he had to tell me when it was too much and I could deal with that. We sent some work over to John Van Vliet of Available Light. We sent some to Peter Kuran at VCE and we sent some to Apogee. Plus, at one point, ILM had a new printer that was damaged during shipment, so Pacific Title was brought in to help out on some of the optical compositing. This show really was all over town, but it had to be because it simply became too big, too fast."

While Available Light and Visual Concept Engineering helped out with animation effects, Apogee was drafted to create the new sequences that had been added to the film after production had wrapped — including the ghost train encounter. For Apogee, this meant going to New York for ten days of plate photography and location work at The Tunnel — a nightclub that features several hundred feet of abandoned subway track.

The ghost train sequence begins with the Ghostbusters walking down the deserted subway tunnel in search of the Van Horne station. At first all is quiet, but then they start hearing some ominous noises. Suddenly they find themselves standing in the midst of the severed heads — all shot 'live' on the set. In an instant, the heads disappear and the threesome are again alone in the abandoned tunnel. "We bought the heads all over town," said Gross. "We put out a 'dead head' call and found them wherever we could. Pam Easley — our visual effects coordinator — was zombie wrangler for that. Rick Lazzarini made a few. We found a few. A prop house in New York had a few. For the shot, we placed the better ones in the foreground and the less-detailed ones in the background."

Understandably shaken, the Ghostbusters decide to return to the Ectomobile for their proton packs. As they turn to walk back along the tracks, they hear the sounds of a locomotive and then a bright light appears in the distance. The three men freeze. The light comes closer and closer until it becomes obvious that it is on the front of a train. Ray and Egon manage to jump out of the way, but Winston is transfixed — and the ghost train passes right through him. To create the sequence, the actors first did the scene live on the tracks and then Apogee added the train optically. "To help sell the scene," said effects supervisor Sam Nicholson, "we used interactive lighting when we filmed the actors for the plate. We put a 10K light right up behind them and then we put three or four air cannons on them to make their hair blow. There was enough wind to blow Ernie's hat off. Then we blasted them with a bright light that was supposed to be coming from the train."

Originally, the train was going to be a modern-day subway; but there simply was not enough time to build a suitable model, so an existing antique train was chosen. "John Swallow — our production supervisor — tracked down the train," Nicholson recalled. "It was eighth-scale — about twenty-five feet long — and that made it nice for lighting because we did not have to get into fiber optic snakes or anything that small. We could use 10Ks on it and hide the cables in the train. Since we did not

have to sync the shot of the train to any specific mark — other than having it pass through Ernie in the plate — we did not need to film it motion control. The train was stationary, but it had steam and reactive lights that Grant McCune rigged up. We shot it on our effects stage against black — with a snorkel lens about an eighth of an inch away in clearance all the way down the train. We put the camera on a dolly and had four guys just whip it down the track. Since in the scene the train lights had to intensify as the train approached the Ghostbusters, we rheostated the lights on the model so we could dial them up as the camera got closer."

Once the ghost train passes through Winston and disappears down the track, Ray finds a way into the Van Horne station and back to the river of slime. Winston takes out a retractable tape measure to determine the depth of the river, but his tape gets caught up in the slime and he is suddenly pulled in and swept away. Eager to save their friend, Ray and Egon abandon all caution and jump in after him.

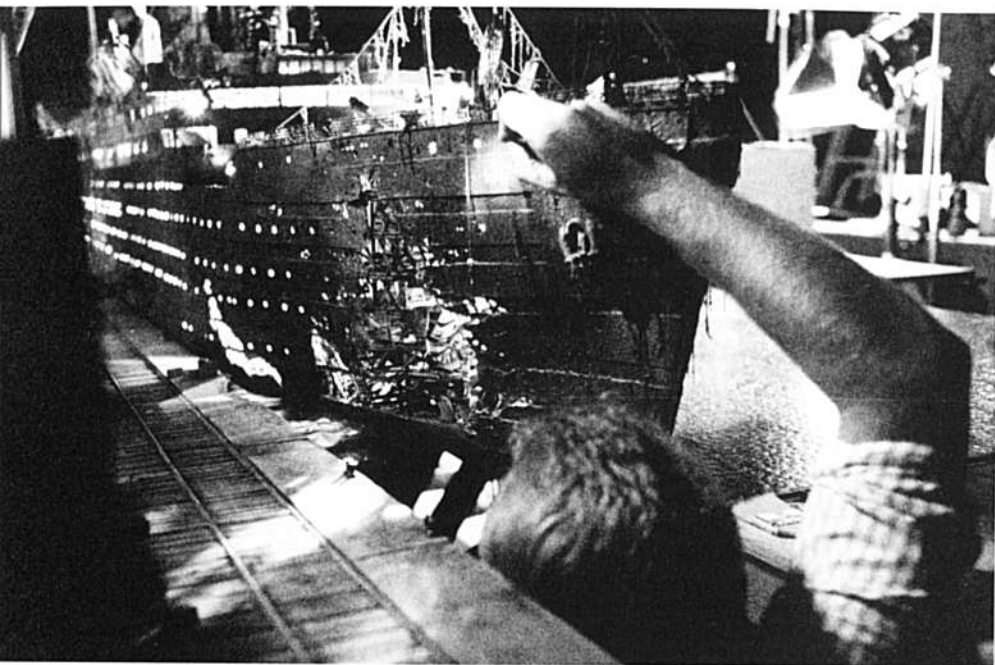
To create the illusion of the Ghostbusters plunging into an imaginary river of slime, Hudson was first filmed falling off the station platform on the partial Van Horne set. Then Aykroyd and Ramis followed suit. Out of view of the camera, the actors landed on slime-free airbags and remained perfectly dry. Later in optical they were combined with ILM's miniature slime river. "The scene where Winston was being carried off down the river of slime required some incredibly difficult roto work and alignment," Tom Bertino recalled. "It was hard to get all the pieces to jibe exactly and to make the motion convincing. With Winston, for instance, Pat Myers had to pinblock a bluescreen element of Ernie Hudson against the background and trace what would be his logical movement in terms of direction and distance. He also had to take into account subtle plays in the slime river in areas where it arched and fell away. It was quite a difficult order, but somehow he did it. He was able to work with every one of those bumps and surface undulations. He also created every bit of Winston's motions in the river — his head bobbing up and down and moving from side to side. Then Sean Turner had to animate a rippling edge around him. In the wrong hands, that could have been disastrous, but Sean did a great job — Winston fits right in there."

"The slime was supposed to look like living energy," added optical team member John Ellis. "It was not liquid so much as it was textured soup, so we did not have to create a splash when the guys fell in. Optically, it was a little tough getting them into the slime. We had to do some soft-edge work and a little exposure shifting so that they would look like they were being enveloped. We also had to shift the exposure of the characters slightly so that they would take on the character of the slime itself before they disappeared into it. In addition, we put smoke into the plate, some nice articulate work done by animation and some wonderful matte paintings of the archway."

The Ghostbusters finally escape from the river and emerge through a manhole right in front of the Manhattan Museum of

A sinister ghost nanny reaches out and plucks Dana's baby from the ledge. / For identifiably close shots, Peter MacNicol was dressed in drag and photographed in front of a bluescreen. The arm stretch was a simple illusion employing a piece of tubing covered with costume fabric and rigged to slide down on a pole. / For wider shots, a miniature rod puppet and buggy were similarly photographed against blue. Character performers Bob Cooper and David Allen choreograph one of the miniature shots.





Art. Covered from head to toe in negative slime, they are overpowered with feelings of anger towards each other. Fortunately, Egon realizes what is happening and orders his companions to remove their outer garments. "We shot that scene in New York out on the street at two in the morning," recalled Ernie Hudson. "I don't know how cold it was, but it couldn't have been more than ten degrees — and with the wind whipping around, we were all freezing. And we were drenched. They poured buckets and buckets of sticky, watery slime over us — over our heads, over everywhere because Ivan wanted it even in our eyes. He wanted us to look like we had really been swimming in slime. Then we had to pull off our jumpsuits — which weren't really warm enough for a New York winter to begin with — and stand there in our underwear. I don't think I've ever been so cold in my life. We shot for hours and we couldn't go into the trailers because they were too far away. So we had to sit outside between takes without the luxury of heaters. Danny was there and Harold was there and *they* weren't complaining, so I figured I shouldn't either. But things did get a little nuts, and at one point I had to ask them: 'Wait a minute. You guys wrote this scene? What the hell were you doing? Didn't you think you were going to have to *do* this stuff?'"

"When we wrote the scene," Ramis recalled, "I thought they would find a manhole and then we would go down a ladder and come up. Well, in front of the customs house that doubled for our museum, there was only a closed box underground for a phone conduit, and it was filled with big phone connectors. We had to wedge ourselves in like contortionists. Before we got down into the hole, the effects guys would cover us with slime. Then they would smoke up the hole and put the manhole cover on it. I kept saying it was as close to being trapped in a mine cave-in or the Armenian earthquake as you could imagine. It was pretty awful and it was just freezing. But that really was not the worst of it. We did eleven takes, and then the next morning Ivan came to us and said the camera motor had run off speed and we had to do the scene again. At first we thought he was kidding. I mean, doing it that once was the worst experience of my life. We thought, 'Great joke.' Unfortunately, it was no joke and the next night we did the whole thing all over again."

When the Ghostbusters inform the mayor that the only way to avoid wholesale disaster is for him to go on television and tell everyone in New York to be nice to each other, the patent lunacy of such a suggestion gets them straitjacketed and thrown into a psychiatric hospital. Meanwhile, Vigo is preparing to make his move. It is New Year's Eve and the tyrant spirit needs to inhabit the body of an infant before midnight. Vigo sends Janosz to capture Oscar. Dana is in Peter's living room when she feels a strange breeze coming from the bedroom where her baby is sleeping. When she investigates, she discovers that the child is free-standing outside on the ledge. "The idea of having the baby out on the ledge was an offshoot of my having a baby walk like an adult," said Ramis. "At one point, we were really considering doing that — but it would have involved either a

stop-motion puppet or an adult in a baby suit. Neither of those approaches would have worked without it being in really dim light. As soon as Ivan thought about making a baby walk, he was not thrilled. It just seemed like too much — it made the baby too important.”

Even though Oscar no longer had to walk, he still had to appear standing on the ledge of the building some ten stories above a crowded New York street. To accomplish this feat, Bo Welch built Venkman's corner loft apartment complete with two exterior walls and a ledge that stood ten feet above the stage floor. Then Chuck Gaspar had the task of devising a fool-proof rig so that Oscar — interchangeably played by William T. Deutschendorf and Henry J. Deutschendorf II — could stand up. “We made a big leather diaper that was attached to a metal pole bolted down into the ledge. The diaper was hidden inside the baby's jumpsuit; and as long as his legs stayed in position, you could not see the pole because it went up the back of his leg and behind his back. For reverse angles, we simply placed it in front of the baby. There was no way the baby could get loose — he was locked in. Of course, down on the floor below we had large air bags for him to fall on, but there was really no way he could get free. Either one of the twins could have become angry or annoyed by the whole thing, but fortunately they both seemed quite content out on the ledge. Ivan got lucky when he chose those twins — they were great.”

The twins were comfortable with the rig — and after some preliminary checking, so too was their father. “I had great confidence in the people involved with this particular project,” said Ron Deutschendorf. “Everybody on the film was very considerate about the kids. When I got the script, I knew there were going to be special effects and that we were going to have to do some tricks with the babies. The first day on the set, I got with Joel Kramer, the stunt coordinator, and Chuck Gaspar and we looked at the ledge and how high it was and discussed how they were going to harness the babies in. I also checked that the harness was safe before I put my baby in it. I had confidence in Joel and Chuck, but I never strapped the babies in without double-checking to see if I could pull the harness off the ledge or if there was any chance of it coming off by itself.” To help direct the children, Deutschendorf stood on a ladder off-camera and made noises to try and make the performing infant appear to be looking off into the distance.

To complete Oscar's dramatic adventure, a plate of the ledge set was photographed and then later reduced and placed into a matte painting by Mark Sullivan featuring the rest of the building and the street below. In order to get the correct angle on the ledge, Mark Vargo and his plate crew had to position a camera some forty feet up in the air along one side of the large soundstage. To reach this location, they had to climb a simple wooden ladder and then walk along a very narrow catwalk to the desired position. The Vistavision camera had to be elevated on pulleys since it was too heavy to be carried up the ladder.

As the sequence continues, Dana crawls out onto the ledge

and tries to reach Oscar. Much to her horror, a ghost nanny pushing a baby carriage appears in the sky above and in an instant swoops down and whisks the child away. Like many other sequences in the film, the ghost nanny encounter went through numerous changes — and at one point was to have involved a two-headed flying dragon. “The ghost nanny sequence is another prime example of how things evolved and got better,” Muren explained. “The way this process of change would usually happen was that Ivan would first send us a script. Three days later we would fly down for a meeting. Maybe Harold and Danny would be there, and the producers would be there and Chuck Gaspar — and we would all sort of hear the script through Ivan for the first time. During one of these meetings, he got to the two-headed flying dragon and he asked, ‘Is this any good?’ I said: ‘I don't think so. We've seen it before and it doesn't really fit in this film.’ He said: ‘Great, I agree. So come up with something else.’ From there it was up to us to do just that.”

“We did dozens of concept drawings,” Harley Jessup recalled. “Working with key elements in the story — baby, ledge, New York, New Year's Eve — we presented a variety of solutions to the problem. It was really a challenge to find something that would work ten stories up in Manhattan and to think of how it would get up there. Some of the ideas involved creatures from a hellish world, while others were more down-to-earth. We had a phantom taxicab that would fly up, transform and take the baby away. We had a giant pigeon and a face that would appear in the moon and a vapor that came up out of the street. Other concepts involved billboard figures and building gargoyles coming to life. We even thought of a horrible Santa Claus. In retrospect, some of the ideas seem a little screwy, but we were trying for really bold images. Ivan wanted the sequence to be one of the scariest moments in the film.”

“We also thought that maybe it could be something inside Peter's bedroom that could come to life,” Muren added. “That notion eventually evolved into the tub creature and the idea of having the tub move around. We just went round and around. Then, somewhere along the line, we had one of our marathon meetings at ILM with about ten people trying to figure out how to get the baby off the ledge and taken away — which was all that had to happen — and it just hit me. ‘How about a ghost nanny?’ It didn't seem like it was necessarily the best idea, but it seemed like an idea that was more appropriate to the film than the dragon — and Ivan really went for it.”

Besides being simpler conceptually, the ghost nanny also proved to be a relatively easy effect to achieve. For closeups, Peter MacNicol was dressed in drag and filmed in front of a bluescreen. For wider shots, a miniature rod puppet and buggy were similarly photographed. Both the closeup and wide nanny elements were then combined with background matte paintings of the skyline above New York. For a shot where the nanny's arm appears to stretch down and grab Oscar, a simple arm rig was built by the creature shop — a piece of tubing covered in costume fabric that could slide down on a pole and appear to

Among the ghostly manifestations featured in montage was a scene depicting the long overdue arrival of the Titanic in New York Harbor. Using photographs and videotape of the sunken luxury liner as reference, members of the ILM model shop created a replica of the ship in plywood and urethane that was accurate in nearly every aspect. Modelmaker John Goodson adds on-set detail to the rusted hull — accomplished authentically by coating the outer surface with iron powder and then spraying it with an oxidizing acid. / On a smoked stage, camera crew members prepare to photograph the vessel in its miniature setting.

Waterlogged ghost passengers file off the resurrected Titanic upon its arrival in port — a mere seventy-seven years behind schedule. Extras dressed appropriately to the period were photographed against black and inserted optically into the miniature plate material. / On stage at Apogee, Rick Lazzarini touches up a mechanical creature he constructed for a montage shot of a winged ghost flying out of a movie theater. Facial articulation was accomplished via an interactive device that translated expressions made by an external operator directly to the puppet. / The flying ghost emerges from the theater. The film being shown — Cannibal Girls — was the second feature directed by Ivan Reitman, and the posters in the foyer acknowledge two David Cronenberg horror pictures produced by Reitman early in his career.

stretch. This was also filmed against bluescreen and then combined with the appropriate background plate and animation.

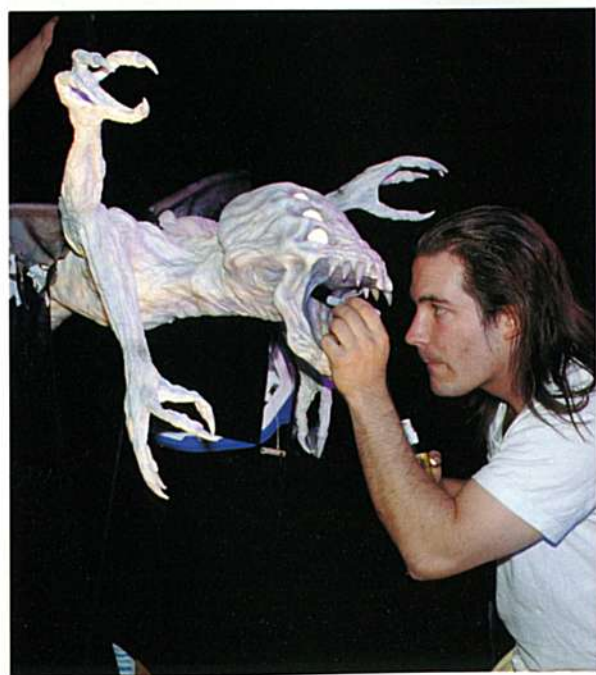
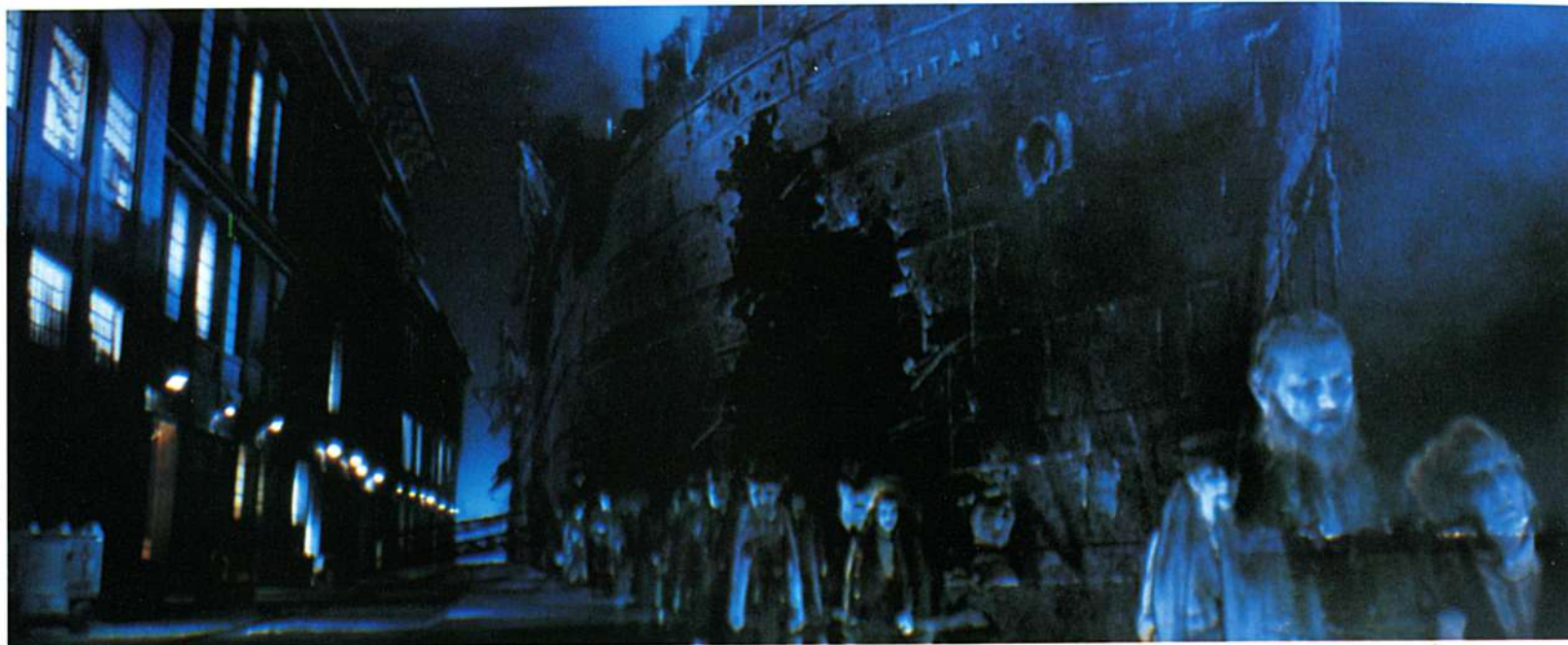
After the ghost nanny has flown off with Oscar, Dana rushes to the museum. While she is en route, a freak eclipse of the sun plunges the city into darkness and New York is once again besieged by an onslaught of ghostly manifestations. In one montage segment, a wealthy socialite suddenly finds her mink coat alive and covered with four very angry animals eager to bite her face off. The woman quickly flings her garment to the sidewalk and then watches in horror as it runs away. Filmed at night on a street location in Los Angeles, the illusion was accomplished using four different coats actuated variously by radio-controlled servos, hand puppeteering and cable-pull mechanisms. Tim Lawrence and his creature crew developed the specialty garments. "When this gag first surfaced, many concepts were discussed and drawn. Some included using live animals — but for obvious reasons, those were discarded early on. What was finally chosen was the approach seen in the film — with one exception. From the very beginning we conceived of the coat as being made from a nonspecific white fur. All of the prototyping and patterns had been generated with a white coat in mind and synthetic fur had been ordered in bulk. The heads and legs — which were sculpted and cast in foam latex — had been hand-laid in a white crepe fur and all that remained was to finish the mechanics, fit the actress with the support harness and complete the assembly. About ten days before we were due to shoot, we sent a film test down to Ivan showing how the coat might photograph in either daytime or nighttime lighting and a test of the 'runaway' gag. He thought the look and the gag were fine — but he wanted to know why the coat was white. Michael was as surprised as we were. It had never occurred to us that it might be anything else. Fortunately we were able to scramble around and redo the coat with darker fur in time for the shoot."

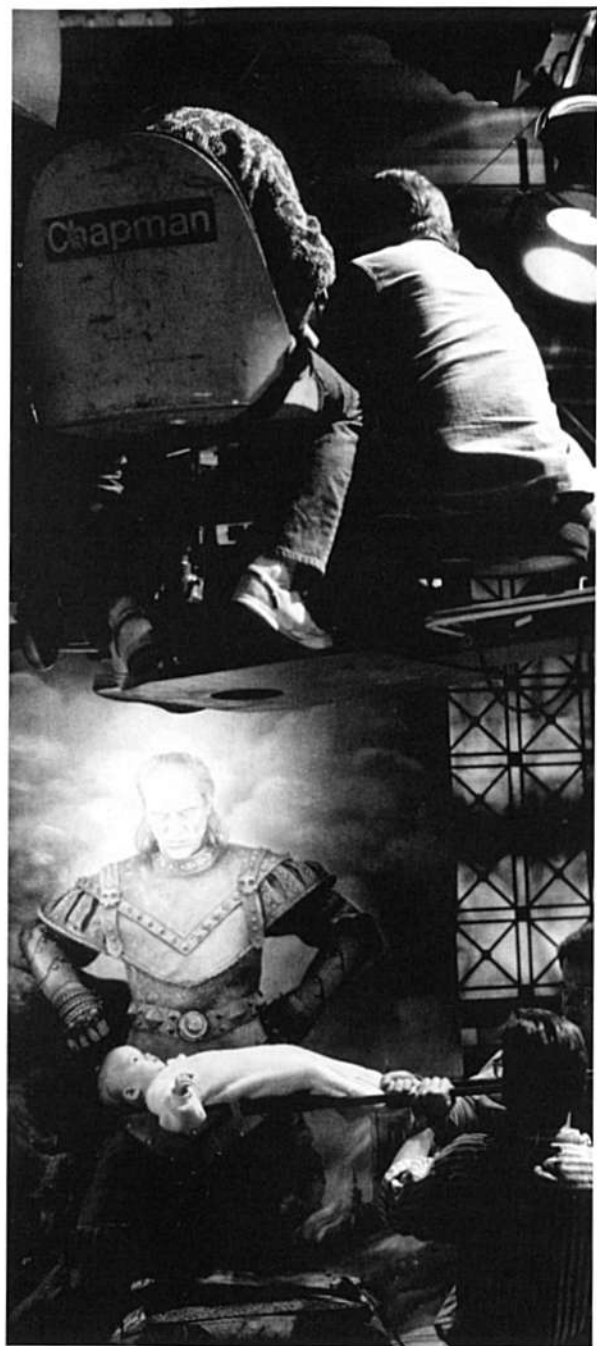
More elaborate means were used to produce two monsters — one observed coming out of a movie theater and a second terrorizing people in Washington Square. The first — photographed at Apogee — was created by Rick Lazzarini of The Creature Shop in Van Nuys. "The theater ghost was based on a drawing by Henry Mayo. It had six eyes, four arms, two wings and a forked tail. The head was nearly human-size and sculpted by John Blake, while the body was made by Dan Frye. I worked on the mechanics. Since the theater ghost was added late to the film, we had only three weeks to build and shoot the puppet." To puppeteer the creature, Lazzarini employed an interactive device he calls the 'Facial Waldo.' "The Facial Waldo is a cap and vest system worn by an external operator. Sensors are attached to the operator's face — on the brows, cheeks, lips and jaw — and these sensors link up to Ziff cards in the vest. Ziff cards were invented by Stuart Ziff to enable radio control-type servos to be operated by direct wire — thus eliminating a noisy radio link. In effect, they fool the servo into thinking it is getting a command from a radio receiver. On *Ghostbusters*

II, the Ziff cards received information from the sensors on my face and head and then sent signals to servos inside the creature. When I moved my eyebrow or any other part of my face, the theater ghost did the same thing; and if I moved my head left or right, the puppet did likewise. Since the theater ghost had six eyes, it therefore had six eyebrows. To make it simple, I had all six hooked up to the sensor on one of my eyebrows so that when I moved my brow, all six moved on the creature. This kept my hands free to puppeteer the wings, and it also allowed me to do the performance of the face without having to plan it out using joysticks. The Facial Waldo really allows for a much more natural performance." Three additional puppeteers were required to operate the tail and the four arms. Since the creature was shot against black, Lazzarini and the other puppeteers wore black beekeeper-style suits with black mesh face screens so they could see without being visible on film.

In a single shot, the creature flies out of the theater, leers at the fleeing crowd on the street and then rushes at the camera. Even with the Facial Waldo, puppeteering the creature was still very difficult because of the number of appendages involved and the short length of the shot. "The real difficulty came after we had rehearsed everything at half-speed to get the moves down and then realized that forty-eight frames per second was necessary to make the movements look smooth," recalled Sam Nicholson. "This meant that the puppeteers had to do the moves two or three times faster — and all within about two-and-a-half seconds. Also, to finish with the creature's mouth just about covering the camera, we had to shoot the whole thing in reverse. That put a real strain on both the camera crew and the puppeteers." To create a glowing effect, the creature's eyes were coated with front-projection material. "We put a ring light on the lens and then dialed up the intensity as we got closer to the creature so it would really look like he was coming at us. Having the eyes lit not only helped increase the illusion of depth, but it also made the creature seem more alive."

Like the theater ghost, the Washington Square monster was a late entry designed to add scale to the sequence. With virtually no time to spare, the production sought out master stop-motion animator Phil Tippett to create the creature. "The people at ILM were good friends with Phil," said Michael Gross, "and Pam Easley in our department knew him from *The Golden Child*. So all of us approached him and said, 'Phil, you've got to do this shot.' He agreed to do it, but only if we accepted certain limitations. Given the time factor, he said he could do it if the shot was only a hundred and sixty frames long and if he could build the creature based on an existing armature. Also, he would only be able to do one take — in camera — because there would be no time for an optical composite. Since it was a see-through ghost, we figured it would be okay — and that's literally what Phil did. He and his people built the creature, shot it and delivered it to us one day early. Right in the middle of all of this, Phil and his wife were in an automobile accident. Both are fine now, but his wife had to be hospitalized and he too was





injured — but he kept working on our shot and he delivered. His name is not on the film because he did not want us to list him for just one shot — but all of us are very grateful to him.”

Both the theater ghost and the Washington Square ghost featured background material shot by Apogee while they were in New York to film the ghost train plates. Like the ILM crew that had shot plates earlier in production, the Apogee team encountered the incredible street-level popularity of the Ghostbusters. “We shot late at night,” said plate supervisor Peter Donen, “and while the call had gone out for about three hundred extras, somehow the word got out that *Ghostbusters* was shooting and two to three thousand people showed up. It was five in the morning in Washington Square and it was just pandemonium. The first take had about seven hundred and fifty people, the second had twelve hundred, and by the time we got to the third take there were thousands! Our Vistavision camera was set up in the middle of the scene and we had people flooding in from three different streets and underneath the arch. On cue, they all started screaming. Some climbed over cabs and others ran through traffic — and all of them ran *right at us!* At one point we had to jump in front of the camera to block them. It was like a riot. It was exactly as if King Kong were running rampant through New York and thousands of people were fleeing in terror.”

The most haunting image to appear during the montage — and one of the first shots completed for the film by ILM — involved the arrival of the *Titanic* and her passengers and crew to New York Harbor. “The idea came up while we were thinking about what big manifestations could happen when all hell’s breaking loose,” Ramis noted. “The idea we were shooting for was that because of all this psychic activity beneath the city, all the dead were returning to New York. We considered several ideas. One had the *Hindenberg* arriving with flaming passengers getting off carrying luggage that was also on fire. Another featured a ghostly subway station with rotting commuters. That was the precursor to the ghost train that is now in the film. We also had a cemetery scene where the gravestones start taking off like rockets. Then the idea for the *Titanic* hit me one day and that seemed to offer the most powerful images.”

To create the shot, modelmakers John Goodson and Jeff Olson constructed a *Titanic* out of plywood and urethane, and also constructed several model buildings for the background. “We tried to be as accurate as we could using books, magazine articles and videotape of the wreck,” said Bill George, “but we still had to make changes in two areas. One had to do with the fact that the smokestacks were torn off when the ship went down — but the ship without its smokestacks is less recognizable. So we built the smokestacks, making them very skeletal to kind of split the difference. The second change was because the director wanted the hole in the bow to be much larger than it actually was, and he also wanted the name on the ship moved so you could read it.” Despite these alterations, the model was essentially accurate — right down to its fractured hull. “Al-

though it’s very difficult to tell in the angle it was filmed at, our model was broken in half because the real ship split into two sections when it went down. Early on we were thinking that it would be great to have the bow section come up and then have the aft section follow. There were also thoughts of seeing the ship floating above the water or rising up out of the water. But the director wanted the audience to be able to see one shot and get the whole joke. He did not want a sequence or any lead-in shots.”

Since the real *Titanic* had been at the bottom of the ocean for more than seventy years, the model had to be aged accordingly. Normally such aging would be simulated with applications of paint, but George decided to try something different. “We had reference photographs of this stuff that has been growing on the *Titanic*’s hull for years. The real ship looks like it’s dripping with moss, but the ‘drips’ are actually rust deposits. So rather than paint the model, we sprayed glue on the boat and sprinkled iron powder onto it. Then we sprayed the iron with an acid so it would oxidize. When it oxidized, it also kind of bonded together. As a result, we did not have to paint or mix colors — it just got genuinely rusty.”

In addition to the *Titanic* herself, the scene also featured a parade of ghost passengers walking away from the docked vessel. To create these ghosts, extras dressed appropriately to the period were photographed against black and then added to the model ship footage in optical. “It would have been nice to cut in for a couple of shots of the people,” Muren reflected, “because they were dripping with water and carrying seaweed-covered luggage. We had the details there, but in the long shot you cannot see them. We also thought about having a male ghost come up close to the camera and wonder where he is, while behind him you would see distorted people and two ghosts walking through each other. The shot is really a pretty minor one in the film; but like so much of the film, we did a lot of concept art on it and thought of a lot of different details and ideas that we could add.”

With the city plunged into darkness and chaos, Dana arrives at the Manhattan Museum of Art and rushes inside. The moment she enters the main lobby, the outer doors close behind her and slime begins to blanket the exterior of the building. For dramatic closeups, a full-scale replica of part of the museum was constructed inside a soundstage at the Burbank Studios. “Ivan wanted the slime to really ooze out from the mortar joints, from above the doors and all over the building exterior,” Chuck Gaspar recalled. “So we cut slits in the walls, over the doors and so on, and then attached hoses to the slits and controlled them with valves. The hoses were connected to eleven dump tanks that held a total of eight thousand gallons of slime. There were so many hoses and valves that we needed forty people to operate them all. In front of the set we had another tank to catch the run-off, which later we pumped back out with a vacuum truck. All together, it took about a week-and-a-half to rig the set.” The slime wall had to be filmed twice. The first time

For the last-minute addition of a giant ghost monster striding through the arch in Washington Square, stop-motion animator Phil Tippett was persuaded to accept the assignment even though there was time to execute only a single in-camera take. Working over an existing armature, Tippett and Randy Dutra sculpted the lumbering creature in clay. / Crew member John Reed prepares the completed sculpture for molding. The finished puppet was animated by Harry Walton who also shared the camera work with Peter Kozachik. / Delivered to the art museum by the ghost nanny, Dana’s abducted baby is lowered onto an altar before the glowering portrait of Vigo the Carpathian. Scenes requiring the infant to be floated through the air employed a variety of wire and platform rigs devised by Chuck Gaspar.

the slime was too thin and the set was not quite wide enough for the effect Reitman wanted. For the second take, the set was extended and Gaspar ordered a thicker slime mixture. The re-take was much more successful, though some of the hoses squirted out so far that slime actually struck one of the five cameras recording the event.

Faced with the second supernatural crisis of his administration, the mayor of New York orders the Ghostbusters to be released from psychiatric confinement and urges them to save his imperiled city. Back in uniform and ready for action, the boys race to the museum to find it completely encased in a rigid shell of slime that appears to be alive from within. "To create the slime shell," George said, "we first did a sculpture out of clay, made a plaster mold and had it vacuformed in clear plastic. Then we put a piece of plexiglass on the back of the vacuform shape, which effectively made it a clear tank shaped like the slime shell. We mounted this in a large metal frame and placed tubes, injectors and bubble makers inside. Next we filled the whole thing with water and injected diamond dust — a fine metal powder we first used on *Innerspace*. The slime shell was shot high-speed with bubbles going in it to create water currents. During each take, cameraman Marty Rosenberg would cue different people to inject different colors into the tank. We could do two complete takes before the colors mixed together so much that we had to drain the tank and refill it again. The tubes with different colored dyes in them were placed all over the inside, so we were able to inject colors selectively. The effect looked pretty neat, and it gave the slime shell the look of life and purpose that was needed."

Inside the museum, Dana finds Oscar on an altar before the sinister painting. She grabs her baby and tries to run away, but Vigo is too powerful. An invisible force rips Oscar from her hands — then floats him across the room to his former spot in front of the painting. "Floating that little baby was a bit hair-raising," Gaspar admitted. "I don't mind floating a grownup, because if they fall, at least they can protect themselves. But a baby doesn't know how to do that. The gag worried me, but we did it in such a way that the baby could not possibly get out of the harness. The unit we made was a piece of sheet metal hidden inside his suit and suspended on four wires attached to an overhead rig. The metal pan was attached to the suit with velcro so there was no way the baby could move. It was so tight, in fact, that at one point the baby started fussing and we had to loosen the velcro a little bit. Even so, he could not roll off the pan because it was inside his suit. During the takes, we had everybody standing around watching pretty closely, and as soon as the baby traveled from point A to point B there were people right there to grab him. Once again, the baby was amazing. He never cried or did anything."

The master shot of the action required three moves — a pull-through where the baby floated in a straight line across the room toward the Vigo painting, a turn to line him up with the altar and then a set-down where the baby was lowered slowly

onto its surface. "For the straight pull-through across the room, the rig was controlled by a rope that I pulled myself because I was kind of nervous. The turn was so delicate that to make it nice and smooth we did it with a radio-controlled servo. For that move, I once again brought in Jay Halsey. At the beginning of the shot, I just pulled the rope and walked the baby along the straight path. When he got to the point where he had to turn, Jay radio-controlled the move. Then we simply lowered the baby down onto the podium." For additional closeups where wires would have been visible, the metal pan was attached to a straight pole and then once again concealed under the baby's suit. Depending on the angle, the pole was either held by hand or placed on a cart underneath the camera.

Even with their proton guns, the Ghostbusters are unable to penetrate the slime shell surrounding the museum. Realizing that the accumulated negative energy has become too strong and that only an overwhelming mass of good vibes can stop Vigo and the river of slime from overrunning the city, the Ghostbusters try to think of something that might be used to rally good feelings among New Yorkers. Finally they latch onto an idea. Determined to try out their jumping toaster theory on a truly grand scale, the Ghostbusters proceed to Liberty Island where they spray the inside of the Statue of Liberty with positively charged ectoplasm. At the same time, they rig the structure with loudspeakers and begin playing Jackie Wilson's "Higher and Higher." Within minutes, Lady Liberty feels the positive beat and begins to move.

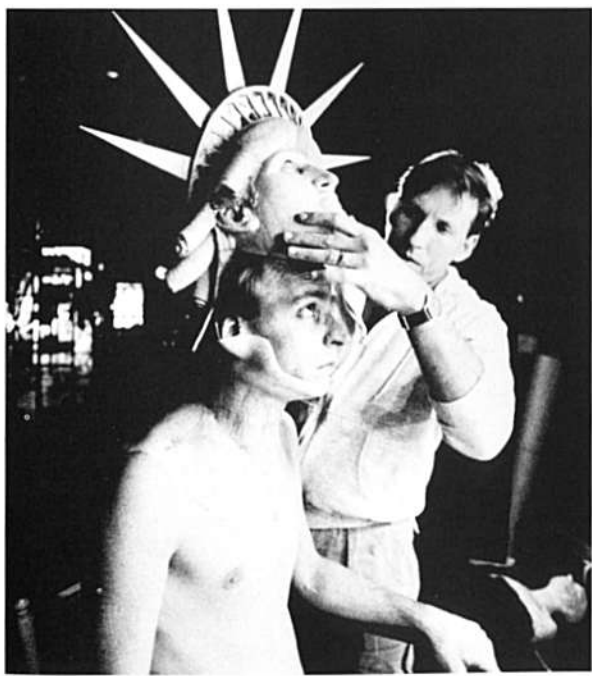
The notion of bringing the Statue of Liberty to life was one of the first developed by Aykroyd and Ramis, though at first it was to be used by Vigo as a force of evil. "This changed in part because it took us nowhere storywise and also because of a respect for Liberty herself," Aykroyd explained. "She had to be a positive influence. Really, we were just looking around for a way to get her off that pedestal and into Manhattan. We loved the idea of setting into motion a massive fixed image that you normally could never conceive of having motion. It's like seeing the Eiffel Tower skipping down the Seine or seeing Victoria Falls suddenly reverse themselves. Making the Statue of Liberty move also offered a great opportunity for the ultimate special effect."

Bringing the towering landmark to life required a wide range of techniques, from miniatures to a costume worn by an actor to large full-scale set pieces. The earliest shots completed involved a larger-than-full-size replica of the crown constructed on stage at the Burbank Studios. "When you are up inside the real crown in New York," said Bo Welch, "it's shocking how small it is. If we had kept ours to the exact same scale, you would only be able to see a little bit of the guys' faces and they would not have had enough room to stand up and move around with their backpacks on. So we made ours a good thirty percent larger than the real one so that we could accommodate the four Ghostbusters and see their faces and shoulders through the windows. We also left the glass out of the windows. That was Ivan's choice simply because the glass got in his way. We altered

When the Ghostbusters arrive at the museum where Dana has gone to rescue her baby, they find the entire structure encased in a shell of hardened slime. Even a sustained blast from their nutrona wands — a cel animation effect — fails to penetrate the crusted surface. / Determined to overcome the dark forces at work, the Ghostbusters spray the Statue of Liberty with positive slime and thereby mobilize the towering landmark to carry them back through the crowded streets of Manhattan for an all-out assault on the museum.







the scale, but everything else is extremely accurate — the colors, the finish, the hair and the underside of the structure. The other license we took was with the base of the statue. The stair that goes up to the head is really a double helix — it goes up and right underneath it is the stair coming down. We just did a single spiral stair. Basically it's the impression that was important. It *felt* like the Statue of Liberty."

The interior of the statue base was built for scenes where Ray and Winston first spray positive slime to bring the statue to life. "The slimeblowers were three times as heavy and four times as bulky as the original packs," Aykroyd said. "I think it took three or four guys just to get us into them every time. These slimeblowers are going to be every mother's nightmare if they ever go to the toy market, believe me — they were built to spew slime all over the walls. They were fun though — and a beautiful practical effect. The only thing that worked on ours were the guns. The tanks were empty. The gun was actually a practical device with a spinner in it that sent the slime out, and it was driven by a lot of compressed air. Off camera were the real tanks that fed our lines. These tanks were huge — four or five feet high — and contained slime and air. So every time we blew slime on screen, we were actually attached to these huge external tanks."

The full-scale crown was built on top of a gimbal so that it could be rocked back and forth to simulate the movement of the statue walking. Unfortunately for the production, the gimbal broke down during the first day of shooting on the head set. "In the past," Gaspar explained, "gimbals were used a lot in Hollywood. But there are not many left today, and the ones that still exist are old and have not been well maintained. The first one we used for the statue's head was the Burbank Studios gimbal that was probably built around 1940. It has been sitting on the backlot for years. One of the movements that Ivan wanted was a real heavy jolt when she looks down at the ground, and the rocking put too much of a load on the old casters. We tried to remedy the problem, but then something started to break in another section of the gimbal and I realized that we needed to get another one. I hated to do that because I knew how much it would cost us, but the old gimbal just was not safe. So we got another one from CBS and remounted the head on that. It too was old and some of the swivel joints had cracks in them, so we had new cylinders flown in overnight and repaired it. From then on, we had no problems — the gimbal was better than it had ever been."

Riding inside the crown proved to be a unique experience for the actors. "Actually it was a little scary," said Murray. "The rig would do strange things and would pitch and turn in ways that even the effects guys did not expect. At one point, Ivan told them to tilt it down even further than usual because he wanted us to be really surprised. Well, that was real fear you see on the screen. It went down so far we thought it had broken again. It was quite a ride — nausea, sea legs, the whole thing."

Since the large-scale crown was used primarily for closeups

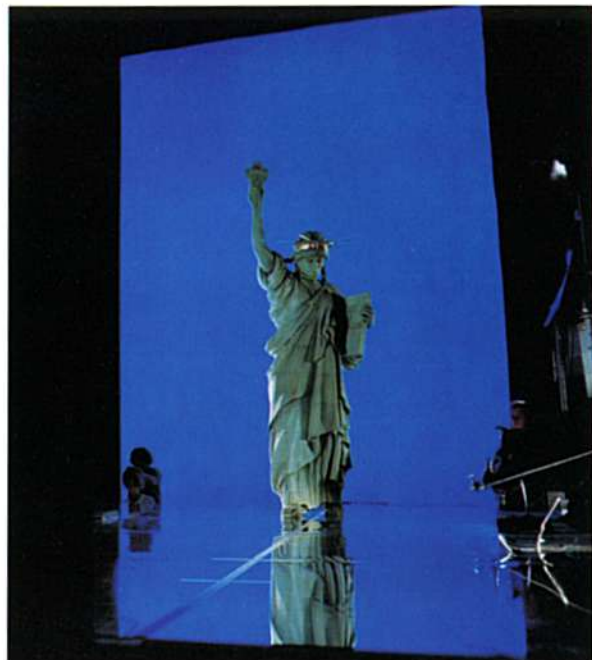
A larger-than-full-size replica of the Statue of Liberty crown was constructed for closeups of the actors inside. Mounted on a gimbal mechanism in front of giant photo transparencies, the set piece was able to rock back and forth and from side to side in a passable simulation of movement down the street. / For full-length views, a man-size Statue of Liberty suit was fabricated and used both in miniature settings and bluescreen environments. Creature shop crew member Bill Foertsch fits a crown to the sculpted head. / Mark Siegel and Richard Miller sculpt a larger head and torso used selectively in closeup scenes requiring more detail. / Miller at work on the man-size body. / Crew member Buzz Neidig helps Jim Fye into the completed suit. Only the neck piece was appliance makeup. To preserve the stern expression of the actual statue, the head was a rigid casting worn like a helmet.

The Statue of Liberty suit — with Jim Fye inside — is photographed on the ILM bluescreen stage for later compositing with live-action plates recorded in Manhattan. / Closer views not requiring ground-level activity were shot in a set consisting solely of scale model buildings. / In the miniature setting, stage manager Edward Hirsh prepares the statue for a low-angle shot. To insure proper flame scale, pyrotechnic elements were photographed separately and fitted to the torch during optical compositing. / Camera assistant Ray Gilberti takes a light reading off the closeup torso. / For a severe down-angle looking past the statue to the Ghostbusters standing below, a matte painting was prepared showing the base of the statue with a holdout area for the live-action performers. The closeup torso was then aligned in front of it on the matte stage. Matte photography supervisor Wade Childress takes a light reading off the statue while Mark Sullivan makes last-minute adjustments to his painting.

of the statue moving along Fifth Avenue, it was generally filmed against two large photo transparencies of Manhattan taken from one hundred feet above street level. Each transparency — lit from behind — was approximately twenty feet high and forty feet across. Both nighttime views were suspended on winches so they could be moved up and down, and on overhead tracks so they could be slid backward or forward. This enabled them to track backwards behind the head, thereby creating the illusion that the statue was moving forward.

Long shots of Lady Liberty were produced using a meticulously crafted costume designed to fit Jim Fye in his third unidentifiable appearance in the film. "The statue was the hardest thing we had to create," Tim Lawrence recalled, "in part because it is such a familiar icon. There are not too many people who do not know what it looks like — from here to China. The other reason was because at the time the statue was built, it could only be viewed from the ground — so it was designed with a built-in forced perspective. For instance, it has a neck that is longer than a normal person's and a head that in proportion is slightly small. It also has a real beefy right arm. When you look at it from the ground it looks pretty natural, but today we are used to seeing it head-on from helicopter shots in movies where it looks different. So there were some subtle art direction choices that had to be made on the design so that our costume could fit on a person and still look like the Statue of Liberty. We cheated the head up on the real person's head, lowered the collarbone to suggest a longer neck and made the arm just a normal person's arm. Beyond that, the statue has a lot of linear folds on the toga that look natural on the statue, but which had to be adjusted slightly for movement. I eliminated some of the smaller ones and moved others so that when our statue moved, we would hopefully get the look of some sort of flowing metal and not just creases in foam."

The most difficult area to recreate was the face. Lady Liberty wears a stoic expression — one that had to be matched carefully. "While we were sculpting it," Lawrence continued, "we worked pretty closely with Harley Jessup. He made the tight calls on how the different features needed to be adjusted. Harley came up with a really good system for checking our design. We had our favorite photos of the statue that we used for reference, and he would come in every day or two and take photos of the sculpture from the same angles. Then we would get one hour processing and stick his snapshots next to the reference photos and see what changes had to be made. When it came time to make the face for the costume, it had been decided that the statue should be barely animated — with essentially no facial movement so she would keep her familiar stern-faced expression. We cast the face area out of a very thin urethane noncellular called RP 6405 — made by Rand Plastics. It is a really high-impact plastic that holds its shape very well. I figured since we were not going to have to change the expression, I did not want to run the risk of gluing something onto Jim's face and having it go down in such a way that it altered the look







of the statue. With the hard and fast urethane plastic, the integrity of Bartholdi's original design would be maintained."

To further insure the design, the face plate was not glued directly onto Fye's face. Instead, it was attached to a headpiece that included a wig and the crown. "The wig section was cast out of dense polyurethane foam. It had a certain amount of flex to it and it fit like a cap. The crown was cast out of the same material as the face, and Bill George outfitted it with an interior model piece complete with miniature Ghostbusters and some lights. Then we married that to the wig and attached our face plate to it to make what amounted to a helmet that Jim could wear. The only appliance that he wore was a piece for the extended neck." To complete the Lady Liberty ensemble, Fye wore a one-inch-thick foam toga, foam arms and polyurethane flex-foam boots that were sculpted to look like feet in sandals. In addition, the model shop provided urethane castings of the torch and book for Fye to carry. "To get Jim ready for a shot, Buzz Neidig first glued down the neck piece. Next we put Jim into his toga piece, then the feet and the arms. The last thing that went on before we shot was the helmet. When we put that on him, we had to be very careful to run the wires out the back so the lights would light up."

For closeup shots of the lower portion of the statue, Lawrence created more detailed subsections of the costume. "I had a closeup skirt with finer detail. Also for the closeups, I created some thin vacuform plastic plates that we could attach to the closeup sandal so that when it moved, these individual plates would move. Thus, instead of seeing a curve of foam, the plates created straight lines to help suggest that the sandal was made out of individual copper plates. This was important for the shot where her foot is first seen stepping down onto a New York City street. We also used it for the shot where she first pulls her foot away from the pedestal on Liberty Island. When we did that shot, we put miniature debris underneath so that when the foot pulled away there would be concrete and wires hanging from its underside."

Besides the costume, the creature shop also constructed a bust of the statue from the collarbone on up that was twice human-size scale. "The bust was originally made just for the first pullback shot of the Ghostbusters in the crown. The guys were shot bluescreen with a move on them. Then we shot the model with a matched move and a model of the interior with another matched move. These were married with the background plate. It was then decided that the head would also be good for the front shot of the statue walking through the water on her way from Liberty Island to Manhattan. The first shot of her moving from the back was the costume shot against bluescreen and inserted into a background plate. But the front view of her moving through the water used the double-size head." To accomplish the scene, the head was filmed at night in a makeshift pool constructed between two buildings at ILM. The head was placed inside the tank on a simple cradle-like apparatus attached to two poles that went to opposite sides of the

tank. Standing outside the tank, two crew members held the poles. As they took synchronized steps, their movements transferred directly to the statue head so that it appeared as though the statue were walking along the riverbed.

Most of the time, the costume and double-size head were filmed against a bluescreen — a factor that brought into question the matter of color. The real statue appears to be different colors depending on the time of day. Somehow the costume and bust had to likewise suggest this apparent anomaly. Optical supervisor Tom Rosseter — who would have to produce the final composites — became directly involved in helping to determine the paint scheme and lighting. "I started on the sequence very early. I met with Harley Jessup, and together we discussed what color her clothing should be — specifically how much blue there should be in it. We spent time going over color patches and then photographing them on stage and doing tests to see what worked and what did not. Once we had picked out the color we all thought was best, we found we also had to make adjustments in how we lit and shot it. Dennis, cameraman Terry Chostner and I worked together on this. They would adjust the way they thought they might light on the stage, and I would make some adjustments on my intermediate film elements. It took a lot of testing before we found the right balance. Every morning I would look at what they had shot the day before and make suggestions for the scenes they were going to shoot that day. Or they would offer to adjust something for me so their elements would fit better into the background plate. Another question we had to address was how much should the natural lighting affect the color. If you look at the statue during the day, she is very green. But if you look at her at night when the lights from Liberty Island are on her, she looks very blue. Walking through New York City, she would have completely different lighting on her feet at street level than she would on her crown. So we had to work on this problem a lot — the interaction of light with the actual color of the statue. We might take a little bit of extra neutral density and run it across her feet when she walked through one kind of light, and then do some more when she walked in and out of a shadow. In the end, we did all kinds of subtle little things to make the shots work."

In most instances, Rosseter had to combine the statue with background plates filmed in New York. Often these plates featured wild, unruly crowds that looked great on screen, but caused headaches for the animation department. "Anything that involved the Statue of Liberty with a crowd meant very difficult rotoscope work," Tom Bertino noted. "I remember when the plate crew came back from New York. One by one as they met me in the hall, the first thing they would say to me was: 'Hi, Tom. Just remember, it wasn't my fault.' I didn't quite know what they meant by that until I saw the dailies in the screening room, and I thought, 'Oh, my God!' There were scenes where the statue had to be put behind a crowd and there were all these little waving hands — and everybody was dressed for winter so they had tassels and scarfs and little mittens hanging

For scenes of the statue striding through the watery expanse between Liberty Island and lower Manhattan, a makeshift tank was fabricated in the ILM parking lot and filled with water. The closeup torso — mounted on a simple pole assembly — was then maneuvered through the water by crew members moving in synchronous steps down opposite sides of the tank. / Modelmaker Randy Ottenberg adds finishing details to one of the miniature buildings used in the street set. / During her passage through the streets of New York, the Statue of Liberty accidentally crushes a police cruiser. Live-action location footage was deftly combined with an eight-inch wax miniature car destroyed on the effects stage. Margarita salt blown through a tube on impact simulated broken windshield glass.

When Vigo the Carpathian speaks from his painting, the setting behind him vanishes and is replaced by a long corridor lined with oozing stone columns. Camera operator Don Dow lines up a shot on the forced perspective miniature whose columns — made of foam — are rigged from above with slime injectors. / Standing in a setting that duplicates Vigo's portrait environment, actor Wilhelm von Homburg is prepared for a shot in which he comes alive within the painting. / When his plans for rebirth are thwarted by the Ghostbusters, Vigo is sucked back into the painting where he begins to transform into a literal manifestation of his evil inner self. Spellbound by the eerie sight, Ray is rendered vulnerable to the psychic power within the painting and the demon form takes sudden possession of his body — but only for a moment. A blast of positive slime from the other Ghostbusters restores their friend and sends Vigo into oblivion.

off their hands. Since this was set to occur on New Year's Eve, there were also balloons and flying confetti. One guy was even waving a crutch in the air. They were all so small in the frame that it looked like the ultimate rotoscope nightmare. But some of our star people just did an incredible job. Barbara Brennan did the first scene where the statue is seen walking in Manhattan — where her foot comes out from behind a building. The foot had to be placed behind a small crowd that was in the foreground, and the rotoscoping on that was as close to seamless as anything I have ever seen. There were nearly two hundred frames that had to be rotoscoped just in that one shot, and everything had to match from frame to frame."

Several shots did not involve background plates. For one closeup of the statue turning the corner onto Fifth Avenue, Jim Fye was filmed in costume walking among model buildings. Other views of Fifth Avenue required the broader perspective that only a matte painting could provide. "The main reason Fifth Avenue was done as a painting," Mark Sullivan explained, "was because it is virtually impossible to shoot in New York at night and get a good exposure above street level. There is just no way to light up all the buildings. Caroleen Green did the main painting, and she not only had to work with the buildings that were there in reality, but she also had to rework the left side to open up the view. Ivan did not want the city to appear claustrophobic. He wanted to see it go for miles so the shot would have an openness and grandeur about it."

Closeup shots of Lady Liberty required some unique solutions. The view of the torch first exploding to life — and then subsequent scenes where it is seen burning — involved shooting pyrotechnic elements on a separate stage and then matting those into either shots of a double-sized torch or shots with Fye in his costume. A scene where the statue accidentally steps on a police car required yet another solution. "We wanted to build a big foot and a big car," Bill George recalled, "thinking, of course, that the larger the scale the more successful the crush would be. But Dennis was concerned about a big foot looking mechanical, so he wanted us to use a real-sized foot and build the car to match the scale. We figured out what the scale would be, and it turned out to be the size of a standard eight-inch-long model car. We located a car kit that matched reference photos we had of the real police car in the plate. Then we made a mold of it and cast a bunch of them out of wax that were hollow inside and without windows. Charlie Bailey — who built the cars — put a small tube inside each one and filled it with margarita salt. Then, when the foot came down and crushed the car, he blew through the tube and margarita salt would shoot out the window areas and simulate broken glass."

The key to the shot was the manner in which the wax car was inserted into the plate. In New York, the crews shot a plate of the real police car on the street. Then they shot the exact same setup without the police car, but with people standing behind where the car had been. At ILM, the real car was rotoscoped out of its plate and inserted into the other so that it looked as

though it was now in front of the people. The next step was to film the Statue of Liberty sandal against bluescreen as it stepped down and crushed the wax model. Next the foot was matted into the plate. As the foot came down, the real car fell under its shadow. At that instant, the wax car was slowly dissolved in over the real car so that by the time the foot made contact, it appeared to be crushing the real car though it was actually the wax one. Then the foot lifted back up and continued on its way, leaving the crushed wax car in the plate with people reacting behind it. To help add to the realism of the shot, the wax model was built with a light bar on top and an additional flashing element was laid over the completed scene.

"The whole effect was like sleight of hand," Michael Gross observed. "The foot did not step on the real car, but it looks like that to your eye in the final shot. Originally they had people running across the front of the scene to help hide the switch of the cars, but Ivan said, 'I can't have guys running in front of it.' We laughed about it. It was like they were trying to pull a magician's trick — a little misdirection to conceal the switch. But if we had shot a real car being crushed, we would never have had people walking in front of the action, so Ivan said the people had to go. Of course, the ILM guys changed it and it worked wonderfully. It was really just one example of the entire Liberty sequence. We never had any doubts that ILM's statue would look like the real thing and be perfect. And in the end, our confidence was justified. The Statue of Liberty sequence is the one I am most proud of. One shot that I doubt anyone will know is an effects shot is the one where the guys are first seen inside the statue. You see them inside and then the camera pulls away until you see the whole head and shoulders. It looks so real you would think it was a helicopter shot pulling away from the real statue, but it was a bluescreen shot of the boys and the model — an amazing composite."

As the Ghostbusters take Lady Liberty on a stroll through Manhattan, they blast 'Higher and Higher' over loudspeakers and encourage thousands of people to sing along and be happy. By the time they reach the museum, they have amassed a giant crowd and a potent source of good will. The Ghostbusters use Liberty's torch to break through the skylight and together they slide down ropes into the building to do battle with Vigo. The torch was the double-size one filmed against black, but for the shot where the Ghostbusters had to slide down to face Vigo, the actors themselves rose to the occasion. "The nice thing about *Ghostbusters*," said Ernie Hudson, "was that nobody held back, no matter what we were asked to do. Everybody was committed, having fun and giving one hundred percent. When we did the scene where we slide down the rope and landed in the restoration room, we had to go pretty high up in the rafters to slide down the rope. But Bill was there, Danny was there and so was Harold. That made it pretty hard not to commit. We were up there with our backpacks on, and I was thinking, 'Gee, I don't know about this.' But Danny was all excited about it and Harold loved it so much that he went up and down five times. In fact,





I think the next day he went back up to the top and slid down the rope again. You figure if the stars are up there, how can you not do it?"

"I had a great time," Ramis confirmed. "I kept sliding down from the top of the stage — about seventy feet. Of course, they had us on safety rigs. We were not using rappelling rigs. They were the kind that rescue teams use to lower injured people from high places or to lower nonprofessionals off ski lifts or high mountain ridges. So it was foolproof — there was no way we could get hurt. We could be unconscious and be lowered down one of those rigs. So I got a lot of confidence and I went back to do it over several times. Whenever I went up to the top of the stage, a stuntman went with me to make sure I was hooking the harness securely." To help create the illusion that the Ghostbusters were crashing through the skylight, Chuck Gaspar and his crew threw debris, breakaway glass and foam beams down from the top of the set as the actors slid down their ropes and landed firmly on the floor.

Once the Ghostbusters arrive, they blast Janosz with positive slime and then zap the painting. At first this seems to do the trick, but then suddenly Vigo appears among them and spits out a fireball that knocks the Ghostbusters to the floor and restrains them in a strange field of light. The energy bolt and field of light were both concepts added late to the picture when ILM was too overloaded to take on any more assignments. As a result, the scenes were turned over to Apogee. The bolt of light was a slitscan effect that employed a xenon light source rear-projected, while the energy field was a moving laser beam pattern combined with articulate holdout mattes to impart a Kirlian-like glow around the actors.

Just as the Ghostbusters appear to be losing their battle, the clock strikes midnight and the tyrant finds he has passed the dawning of the new day and year. Though he struggles to remain in the world of the living, forces stronger than he draw him back into the painting where his features undergo a startling transformation. The change was accomplished primarily by makeup applications devised by the ILM creature shop. "It was not the first work we did on the Vigo character," noted Tim Lawrence. "Early during preproduction, we were given a variety of sketches by Thom Enriquez depicting a very overweight-looking character with a wild-eyed look and a facial structure such that it would have been impossible to find anyone who actually looked like that. So at the beginning, we were going to be designing a makeup that would be used on an actor throughout the film. Then when it came time for the transformation at the end, Vigo was going to become something much more monstrous — some kind of a huge construction that we never quite worked out completely because the whole concept went off in a different direction once Wilhelm von Homburg was cast for the part. Wilhelm has a very distinctive 'bad guy' face and Ivan decided to use it without a whole lot of alteration — but he did still want *some* appliance makeup. So we did lifecasts on Wilhelm and then Mike Smithson and I did a variety of alterations in clay

—fairly subtle things like strengthening his jaw line, straightening out his nose, giving him a more sinister brow, elongating his earlobes and sharpening his cheeks. We did ten or eleven versions of the makeup in clay and then photographed them in black-and-white and made up a little book that we sent down so that Ivan and the producers could see the various directions it could go in. They picked one that they liked and we made a set of appliances for the guy. The problem was that they wanted this very elaborate makeup to be used for the whole film and I had asked for three weeks to do it. They said they could only give us two weeks and then wound up giving us one; but they said, 'Don't worry about it, because it's just going to be used for a photo shoot as a guide for the artist who is doing the painting.' The reasoning was that the makeup was appropriate for Vigo as he was in the painting, but that when he comes to life he should look more realistic and less stylized. So we did the makeup very quickly for the photo shoot and then Wilhelm was used without makeup for the film itself."

The final transformation was likewise toned down. "We did a lot of drawings for the Vigo monster — some of them pretty horrendous — and we had other things going on as well. At one point the slime was going to bring to life things from some of the other paintings — so we had little Hieronymous Bosch characters running around and a spirally kind of Escher character. Over time, however, all that got more and more watered down to the point where instead of making a Vigo monster we were asked to come up with a makeup that simply represented Vigo's inner evil essence. We sent about fifty concepts down to Michael Gross — some of which were altered photographs. Early in the show there had been some mylar tests done on Ned Gorman — our effects coordinator — to show how the Scoleri brothers could be distorted and stretched. Some of those bizarre photos were blown up and artwork was done on them — and it was one of those that was selected. The difficulty for us when it came time to do the makeup was that the basic understructure was not a human head. Obviously the makeup had to be something that could be added to a real person — we could not stretch a person's head to do it — so we had to start by roughing in a sculpture and getting a lot of people's interpretations as to what the stretch marks and bizarre washes of color on the photograph actually meant in three-dimensional terms. When we got as close as we could to the accepted design, we molded and cast the makeup in about seven pieces." Howie Weed — one of the creature shop crew members — wore the makeup for scenes of Vigo transformed within the painting and for a subsequent scene when Ray becomes entranced by Vigo and momentarily turns into a demon before his friends restore him with a blast of positive slime.

As the clock chimes out the last stroke of midnight, the image of Vigo and his slime corridor explodes and disappears. Simultaneously, the slime shell that has been covering the museum shatters and flies up into the heavens. "To create the destruction of the slime shell at the end," said Bill George, "we

first did a sculpture of the full slime shell and then made a black urethane casting. Over this black slime shell we painted on a brittle polymer that was pinkish in color. Once that was done, we hung the shell upside-down in front of a black backdrop. The black casting effectively served as a support plug inside the brittle polymer. The plug was flexible, but the polymer was not. So when it was time for the slime to break away, we hit the inside of the plug and simultaneously inflated an innertube with air to make the plug expand. This caused the brittle polymer to shatter and fall away. When the polymer shattered, the black plug underneath blended in with the black background and was therefore invisible to the camera. The shattered shell was added over a model we built of the museum and both were later combined with a matte painting of the surrounding area."

"Ultimately, a movie like *Ghostbusters II* is not about effects," Muren observed, "it's about making people laugh. Working in an improvisational environment, you have to be ready for anything and be prepared to take advantage of new ideas as they come along. To do that, you cannot give up. I believe the slogan, 'It isn't over 'til it's over.' Of course, you can decide when something is over. You can get tired and say, 'Well, I'm done with it.' Or you can say: 'Wait a minute. We still have time. Let's keep making these shots better. Let's not give up thinking about them. Just because we haven't figured out something doesn't mean that with two more minutes of thought we're not going to come up with some great solution to our problem.' Basically I believe in working up until the last possible minute. Ivan seems to work on the same wavelength. He just worked and worked to make this film the best that he could within the time frame that he had to make it."

"When we made the first *Ghostbusters*," Michael Gross concluded, "I thought no schedule could be worse — but this one was. It was scary and exciting at the same time to see if it would all really come together. There was one point during a meeting with Columbia where studio representatives were getting really nervous about delivery. They kept saying: 'The 16th is locked. We've booked theaters. Are we going to make this?' Ivan said: 'I can deliver the picture. The only thing we have to worry about is whether the effects will be done in time.' At that point the whole room turned and looked at me. I said, 'I swear to you, they will be done in time.' Then when we left the room, I said to Ivan, 'I don't know how good they'll be, but they'll be in the picture.' But we never had to sacrifice quality. It was a great team effort by a lot of people — and everybody delivered."

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Makeup artist Mike Smithson adds finishing touches to the Vigo demonic form. Creature shop crew member Howie Weed — who was similar in stature to Dan Aykroyd — wore the multi-piece appliance makeup as both the transformed Vigo within the painting and the possessed Ray Stantz without. / For scenes of the slime shell shattering and flying up into the heavens, a brittle polymer shape was suspended upside down and shattered in front of a black backdrop. The inverted footage was then composited over a miniature of the museum — which itself was incorporated into a matte painting of the surrounding area. Modelmakers Brian Gernand and Bill George dress the museum grounds prior to stage photography.



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