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Journey's End

ARTICLE BY JOE FORDHAM

J.R.R. Tolkien completed the first draft of his novel *The Lord of the Rings* in 1949, but the book did not see publication until its first installment, *The Fellowship of the Ring*, appeared in the summer of 1954. *The Two Towers* followed in November of that year, and *The Return of the King* in January 1955. In part, the delay was due to the intimidating size of the manuscript and Tolkien's reluctance to see his book — which he had constructed as a single, long story — compromised in any way.



New Line Cinema's three-part film presentation of the fantasy epic remained true to the single narrative intent, with director Peter Jackson shooting the entire story in one 15-month stint spanning 1999 and 2000, then meting out postproduction at one film per year. The studio's huge investment in the material, in Jackson and in the effects artisans at Weta Workshop and Weta Digital in Wellington, New Zealand, paid off with 19 Academy Award nominations and six Oscars for the first two installments. But even with this momentum behind them, the filmmakers would find the seventh and final year of production, devoted to the completion of *The Return of the King*, to be the most challenging.

Shooting all three pictures at once had been a Herculean undertaking, but among its advantages for production of *The Return of the King* was that it afforded editor Jamie Selkirk and Jackson four years to cut the film, its visual effects shots represented by animatics in the initial cut. With the start of postproduction shortly after completion of *The Two Towers*, Jackson began ruminating on the final film and rethinking shot designs. "In January 2003," recalled Barrie M. Osborne, producer for the films' production company, Three Foot Six, "Peter came back to the movie with a fresh perspective. We started to figure out which scenes were not as strong as we might have liked, and where we wanted to heighten and hone moments in the story." To accommodate new scripted material, Three Foot Six scheduled pickup photography with many of the principal actors — as it had for the previous two films — this time spreading the postproduction shoot over more than 80 days as Jackson edited concurrently.

At the same time, Jackson delved into a new round of shot design, working with previsualization supervisor Christian Rivers. "We reevaluated what areas needed filling out or clarification," stated Rivers, "and started planning new shots in Maya. We brought in other animators from Weta Digital to help when they could be spared, and we developed sequences in quite a freeform way with Peter."

Whereas the previous films had established production and postproduction infrastructures, *The Return of the King* set daunting challenges for Jackson's effects teams at Weta Digital and Weta Workshop with more characters, more creatures, more environments and even more epic battle sequences. Under the leadership of Richard Taylor, Weta Workshop continued to supply new creature designs, armor, weaponry, makeup effects and miniatures until just weeks before delivery of the final film negative. Among the Workshop's contributions were those by visual effects art directors Alan Lee and Jeremy Bennett. After initiating the project as conceptual artist, alongside fellow Tolkien illustrator John Howe, Lee embarked on his sixth year with Taylor's team, feeding production with artwork for every shot of the film. "The design process never stopped," said Lee. "We were designing shots with all-new concepts thrown into the mix at quite a late stage."

Lee and Bennett also conducted scenic shoots, returning to some of the original principal photography locales on New Zealand's South Island to gather raw material for digital matte paintings. The quantity of photographic material led Lee to render environment designs entirely in Photoshop. "I had been very much a traditionalist," Lee said, "working mostly in watercolor, pencil and charcoal. But working on the computer was absolutely vital for this end of the production. I would take production plates, remove bluescreens and paint in backgrounds — which was completely new to me."

To help guide assembly of scenic, digital and miniature elements, Bennett produced several thousand three-by-seven-inch acrylic paintings. "They were fast to do," Bennett noted. "Alan gave me rough thumbnail pencil sketches; then I produced, on average, six small paintings per day. They were like slightly more finished storyboards, and they helped determine what parts of a shot would be live-action and what the environment would look like around it."

While the art department rendered new shot designs and film crews gathered additional footage, Weta Digital producer

Eileen Moran — faced with 1,527 visual effects shots — expanded the Weta crew to more than 400 and ramped up the company's technical capacities. Whereas *The Fellowship of the Ring* had accumulated 7.5 terabytes of online data and *Two Towers* had 30 terabytes, *The Return of the King* would amass 72. “We added another 200 workstations and 1,200 processors,” said chief technical officer Scott Houston, “and we set up a larger render farm — primarily because of the number and complexity of the shots in the huge battle scenes. It was about the same amount of work as *Fellowship* and *Two Towers* combined.”

The Return of the King opens 500 years before the action of the current story, with Gollum's discovery of the One Ring and the consequent murder of his cousin Déagol (Thomas Robins) during a fishing expedition. Fran Walsh had written and directed the expository scene for *The Two Towers*; but, at five minutes long, the sequence had interrupted that film's pacing, and was subsequently transplanted to the opening of *Return of the King*. Makeup supervisor Peter Owen and Weta Workshop helped to realize Sméagol — played by Gollum performer Andy Serkis — and Déagol, applying physical makeups on the performers to depict the primitive Stoor hobbit breed. “We gave Andy gelatin ears,” said prosthetic lead Gino Acevedo, “shaved his hairline by almost two inches, and gave him a wig of human hair that was hand-tied into lace. It gave him a really high forehead and made him look pretty twisted.”

Déagol is pulled overboard by a feisty trout — a digitally animated creation composited with greenscreen photography of the wire-flown actor in a dry-for-wet simulated underwater environment. Déagol discovers the Ring in the riverbed, and when Sméagol takes interest, violence ensues. Sméagol is subsequently banished to the Misty Mountains where possession of the Ring causes his physical decline and eventual transformation into Gollum, revealed in a three-stage makeup on Serkis. “The first stage was quite pale, with airbrushed veins on his face,”

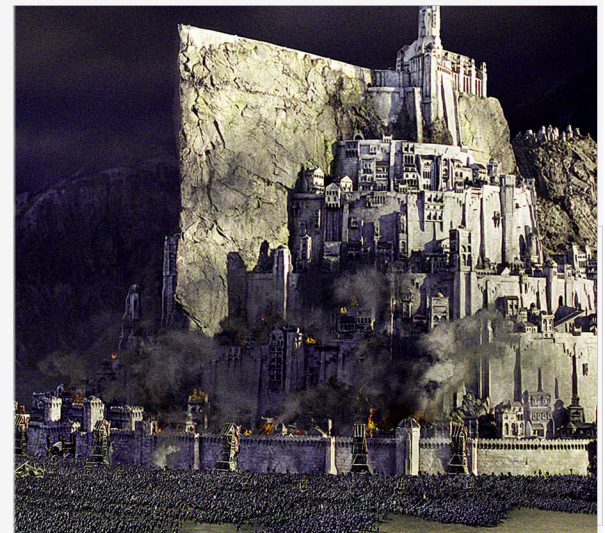
observed Acevedo. “The second stage, which didn't end up in the film, had a silicone facial appliance on his cheeks, nose and forehead, as well as a full bald-pate. The third stage was a full head prosthetic with contact lenses, plus finger extensions and a prosthetic back hump.”

Weta Digital assisted Sméagol's degeneration for shots of the creature scrambling across a rocky mountainside. “Peter wanted to emphasize the half-man/half-Gollum transformation,” noted Three Foot Six visual effects supervisor Jim Rygiel. “We had Andy crawl about in his Gollum makeup, then we digitally removed the bottom half of his body and added CG Gollum legs.” For shots of the character coveting his ‘precious’ inside the cave, Weta Digital enlarged Serkis' eyes 20 percent to more closely approximate his digital persona.

Gollum rouses from his reverie and hurries Frodo (Elijah Wood) and Sam (Sean Astin) along on their trek toward Mordor. Throughout the film, Serkis and the effects crews realized the character of Gollum using techniques established in *The Two Towers*. Serkis performed Gollum on set in a body-hugging ‘gimp suit.’ Weta Digital's camera department then generated ‘rotomation’ from Serkis' performance, which animators — led by animation supervisor Randall William Cook — blended with key-frame animation and motion capture. A 40-person paint and roto department, led by Sandy Houston, performed rotoscoping and then digitally painted Serkis from plates. Finally, 2D supervisor Nelson Sepulveda and his team composited in the 3D Gollum puppet.

The success of the computer animated Gollum in *The Two Towers* inspired a retooling of the creature pipeline for all the computer generated characters in *Return of the King*. “Halfway through production on *Two Towers*,” recalled digital model supervisor Matt Aitken, “we had converted our Gollum puppet from a NURBS model to a subdivision surface model. That paid off so well, it became the de facto technology for all our modeling. It was much more powerful and gave us much more control over how we built the models for animation and texture. So we took models that had been perfectly adequate for the first two films, including all our digital doubles, and rebuilt them from scratch as completely new, subdivision surface models.”

Weta treated Gollum to a cosmetic as well as a technical makeover, the efficiency of the new pipeline allowing the digital team to implement refinements. “We didn't want to rest on our laurels,” said Gollum CG



A seven-year odyssey came to an end with The Return of the King, the final installment in director Peter Jackson's three-part adaptation of J.R.R. Tolkien's epic fantasy, The Lord of the Rings. Continuing to work until just two weeks before delivery of the final film negative, Jackson's effects teams at Weta Workshop and Weta Digital in Wellington, New Zealand, supplied new creature designs, makeup effects, armor, weaponry, miniatures and 1,500-plus visual effects shots for the film. The creative output resulted in more environments, creatures, battle scenes and effects than the previous two films combined.

supervisor Greg Butler, “so when we started work on shots for *The Two Towers* expanded DVD, we incorporated subtleties that we had dropped when we ran out of time previously. We painted wrinkles on Gollum’s forehead, on the sides of his nose, in the corners of his eyes and around his lips.” Animator-controlled sliders triggered wrinkle values in the shader. “Gollum reveals more of his dark side in *The Return of the King*; and when

he gets angry, the wrinkles appear and help cue the audience to his emotions.” Weta Digital also fine-tuned Gollum’s eye shaders and implemented more complex hair simulations.

For all the technical refinements, Gollum’s greatest impact remained in his emotional range, displayed in an early scene when the creature crouches by a pool to address his reflection as Frodo and Sam sleep nearby. The scene was reminiscent of one in *The Two Towers*, another written and directed by Walsh, in which Gollum addressed his Sméagol alter-ego in schizophrenic fashion. “Fran had felt strongly that the film and Gollum’s story needed that scene,” commented Peter Jackson, “and she was quite right. That became Gollum’s signature scene, and it really nailed the character.”

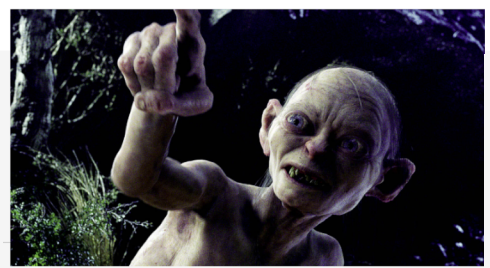
Production had staged and shot the sister scene with Gollum at the reflecting pool simultaneously; then, to amplify its emotional content, Jackson shot additional footage of Andy Serkis with new dialogue during the pickup photography schedule.

In Apple’s Shake, compositors assembled key-frame facial animation blended to Serkis’ motion-captured performance, live-action water elements and a Maya ripple plug-in. “We tried to figure out how the scene would look in real life,” said Gollum 2D lead G.G. Heitmann Demers. “We tapped puddles and pointed cameras into bathroom mirrors to work out, scientifically, what would happen to the light. But then we came up with an entirely different look for artistic reasons, without completely giving up on realism. We used real water elements for the refraction at the bottom of the pool and the upper layers, and used 2½D projections onto our imaginary surface to draw attention to Gollum’s eyes. We even had some real Andy spit in there!”

Intercutting the hobbits’ journey into Mordor, the wizard Gandalf (Ian McKellen), Aragorn (Viggo Mortensen) and other survivors of a recent conflict with the forces of evil journey through Fangorn Forest to the ruined fortress of Isengard. Featured prominently in the first two films, the matte-painted Isengard environment required modification for its depiction in *The Return of the King*. “Isengard goes through a lot of changes over the course of the story,” related matte painting supervisor Max Dennison. “In Film One, there were trees everywhere. For Film Two, we deforested the region and created a very oppressive look. For the beginning of Film Three, the flood is now over, Fangorn has returned, and there’s a clear blue sky. That meant we couldn’t just take our existing Isengard elements off the shelf — we had to revise them. Also, we could clearly see a rocky spur jutting from the nearby mountains, so we had to create that using a mixture of low-rez CG geometry projected with matte paintings to create parallax whenever the camera moved.”

After Treebeard, leader of the ents (voiced by Gimli actor John Rhys-Davies) reveals the wizard Saruman (Christopher Lee) ‘treed’ in Isengard,

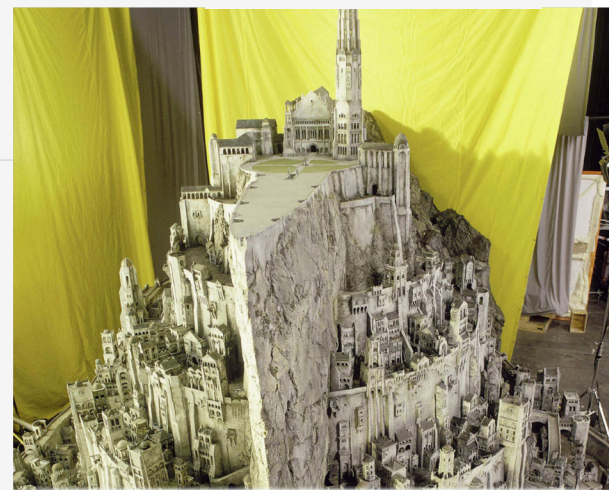
Gandalf departs with Aragorn and the Rohan king Théoden (Bernard Hill) for Edoras — the Rohan hilltop stronghold seen in *The Two Towers* — to discuss the fate of the One Ring. Hobbits Merry (Dominic Monaghan) and Pippin (Billy Boyd) meanwhile dance among the jubilant Rohirrim, celebrating their recent victory at Helm’s Deep. Film crews created the illusion of the hobbits’ diminutive scale in the manner that had been perfected during production of *The Fellowship of the Ring*, first shooting the party scene motion control, the camera executing a large move that ended in a closeup of the tabletop where the hobbits would be dancing. Greenscreen stage crews scaled the move to hobbit-size and re-created it with Boyd and Monaghan, and compositors married those elements to the



*The creature Gollum leads hobbits Frodo and Sam on the last leg of their mission to destroy the evil and all-powerful One Ring by casting it into the fires of Mount Doom. As with the previous films, Gollum’s performance was based on the emotive on-set presence of actor Andy Serkis, and was generated digitally using blends of key-frame animation, motion capture and ‘rotomation.’ Taking advantage of technical advances that had arisen since the creation of Gollum for *The Two Towers*, Weta Digital treated the character to a subtle makeover for *The Return of the King*, enhancing facial wrinkles, eye and skin shaders, and hair dynamics.*



*The Gondorian city of Minas Tirith, glimpsed in earlier films, becomes a focal point in *The Return of the King* as a final refuge for the embattled people of Middle-earth, outnumbered and besieged by troops loyal to the Dark Lord Sauron.*



Inspired by the art of conceptual designer Alan Lee.

original live-action party scene.

For expansive views looking out from Edoras — a practical set built on Mount Sunday — Weta Digitally painted out contemporary buildings and roads from the countryside surrounding the location and created the Rohan throngs by replicating extras filmed motion control.

Inside the Rohan hall, Pippin activates a Palantír seeing stone retrieved from Isengard, staring into its depths and attracting the attention of the Eye of Sauron. Peter Jackson deviated from his approach to previous Palantír scenes, photographing Pippin's encounter using a black sphere to represent the stone in its dormant state, and a white sphere — with a variable internal light source powered by an electrical cord running up Boyd's sleeve — for its illuminated state. Weta compositor Charlie Tait and 2D programmer Shane Cooper handled the Palantír effect, which for the previous films had been generated by outside contractors. "There were elements of the earlier Palantír effects that Peter liked and referred me to," Tait commented, "but he didn't want the same look, because we were seeing it in a different context — very aggressive and scary."

Tait first removed reflections of set lighting from the surface of the black ball and replaced the white globe with the same black 2D object, retaining interactive lighting and creating a consistent surface on which to generate effects. For speed and economy, Tait created all the effects in Shake, entirely in 2D. "We already had the Eye of Sauron as an asset from the earlier films," Tait explained. "I rendered that in the middle of a frame, placed it within the sphere using shading and bulging, then warped the opening of the iris. For the swirling fire elements, I figured the only way I could create spherical imagery in 2D was by rendering a ring, duplicating it and spinning it around, like a gyroscope." Cooper wrote color filter nodes that Tait blended with fractal noise effects in Shake, creating directional blur based on the flow of noise around the spinning shape. "I color-graded the noise to create a fiery appearance, placed Pippin's hands back on top, and revealed bits of fire coming through his fingers. We also added a time-lag effect to control the direction of smear in frame, so as Pippin shook the Palantír around, there was a 'history' of flames lagging behind."

Bragorn, Gandalf and Legolas (Orlando Bloom) run to Pippin's aid and rip the Palantír from his hands. Greenscreen elements of Monaghan and Boyd entirely replaced small hobbit doubles in the live-action plate to create scale effects. "We did very few face replacements in the third film," remarked Jim Rygiel. "It was much easier to replace the whole hobbit on top of our scale doubles. If a little bit of the double stuck out, we just painted over it."

Gandalf flees Edoras with Pippin, urging Théoden to prepare for war, the threat of which hangs over the nearly deserted elven city of Rivendell. Fearing for her safety, Lord Elrond (Hugo Weaving) begs his daughter Arwen (Liv Tyler) to abandon hope for her lover, Aragorn, and to leave. Referencing conceptual art by Alan Lee and technical breakdowns of performers filmed against greenscreen, director of miniature photography Alex Funke and his team reconstructed Weta Workshop's Rivendell miniature for its grand farewell. "Peter wanted to make this a very poignant and powerful moment," said Funke, "so he designed some beautiful live-action shots specifically to work with the miniature. Our tree team, lead by Verena Jonker, created autumnal qualities by dressing trees with spices — chili, curry powder, dry mustard and paprika — which were perfect dying-leaf colors."

Funke lit the miniature to re-create the barren mood and look of the live-action photography. Weta Digital then generated a 180-degree matte painting and handed elements for compositing to Sandbox Pictures in Massachusetts, supervised by John Nugent, who had been a 2D supervisor for the first two films. "John had been with the films almost longer than anyone," observed Three Foot Six visual effects producer Dean Wright, "but he'd had to return home for family reasons. Rivendell had always been his favorite location, so we sent him those 45 shots." Nugent's team assembled the somber scenes using Weta's scenic backgrounds, waterfalls and low-lying mist, rendered with desaturated colors to signal the end of elven domination.

Gandalf and Pippin arrive at Minas Tirith, a gleaming, seven-tiered white city, revealed in a dramatic craning shot that rises over a grassy bank. While the previous two films had included glimpses of the city — inspired by the art of Alan Lee — the location required deeper exploration in the final film. "I did a series of drawings," Lee noted, "entering the city as a visitor and making my way through the front gates, up through the streets, following Gandalf on his first ride. By being a tourist in this imaginary city, I developed building styles. While I was doing that, I built a three-

Weta Workshop built the seven-tiered city as a 25-foot-tall miniature, detailed with more than 1,000 buildings and other structures. Key features included a giant stone 'prow' carved from the surrounding mountainside, backed by the Gondorian royal residence — the Court of the Kings — and the withered remains of the Tree of Gondor.



Model technician and master painter Alastair Maher dresses the Minas Tirith miniature prior to shooting on the Weta miniatures stage. The set's fine detailing of stonework, moss and weathering was based on reference gleaned from full-scale portions of the city constructed in a rock quarry by production designer Grant Major and his team.