



Alice Through the Looking Glass

A torrent of projections, mirrored floor, and reverse tech process are among the challenges posed by *Alice in Wonderland* at the Shaw Festival

By: Alan Hardiman

Suspended between the scrim and an enormous upstage screen—between front projection and rear—a diminutive Alice swims in a sea of her own tears in the Shaw Festival's original production of Lewis Carroll's classic *Alice in Wonderland*, adapted by Peter Hinton. In fact, all of Wonderland hangs in this weirdly wonderful space, defined largely by thousands of projected images created by the video designers Beth Kates and Ben Chaisson.

Featuring 19 original songs by Allen Cole and a cast of 22 in hundreds of costumes designed by William Schmuck, *Alice in Wonderland* is arguably the most ambitious production in the Shaw Festival's 54-year history.

Designer Eo Sharpe's mirrored floor morphs from a pond, in the opening and closing scenes of 19th-century Oxford that frame the story-within-a-story, to a looking glass reflecting the topsy-turvy world of Wonderland.

"We workshopped the play over a period of two years, during which we determined what would be done with the

set, what would be said with lights, and what would be said with projection," Sharpe says. "There was a language that was going back and forth between the set design and the projection design. We decided to stay in the language of the 19th century, reflecting the art and architecture of the time—for example, using periaktoi structures to create a Victorian conservatory."

This visual language was based on 29 images curated by Hinton, who also directed. "Peter would find the odd image or point us in a particular direction," Kates says. "Victorians had bizarre and enigmatic scrapbooks; they cut up all kinds of pictures and played with scale a lot, and that was a big part of our approach. Peter also wanted a transition through color and black and white, which is where the whole daguerreotype thing came from. It worked well with the degrading of images, allowing other worlds to come in and out. The book's author, Charles Dodgson, was a photographer, and daguerreotype was the medium he worked in."



Rear projection of the Cheshire Cat, a fusion of video and CGI elements.

Kates and Chaisson built a 100-page storyboard that served as a guide to the number of images required for the show, “but it just kept growing,” she says. “There are 80 objects that go down the rabbit hole alone. With all the edits, we created about 280GB of data.”

Video playback from four PCs is remotely controlled via Dataton Watchout 6.0.2 multi-display software over a gigabit Ethernet network. Chaisson notes that the final Watchout show is only about 17GB, “but to get to that point, it was endless. The back wall is eight projectors, blended, which works out to almost 2K, because the resolution of those projectors is just XGA [1024 x 768]. We’re lucky that Watchout scales things up nicely.”

Kates says that in a trial scene with playing cards, “The Photoshop file is 40,000 pixels by 20,000 pixels, because we had to go from these giant cards to teeny-tiny cards and maintain the resolution. There were enormous files that we processed through [Adobe] After Effects.”

The Cheshire Cat was also created in video, appearing first in a tree as a projection onto a small portal scrim, and later as a huge image occupying most of the upstage

screen. “We captured Jennifer Phipps’ performance in makeup in a green-screen studio,” Chaisson says. “CITYfx, in nearby St. Catharines, developed the body of the cat for us. The body has a little bit of breath to it and the tail moves, but there’s not much else to it—the cat doesn’t have to walk around or dance or anything like that. Our original idea was to softly meld the two together. Jennifer’s performance was so active that it did not allow for motion capture very well. Eventually, we asked our animation team to remove the original head of the cat and just use Jennifer’s head to get the best out of her performance. The appearing and disappearing we took care of in either Watchout or After Effects, once we had the final footage.”

For a swimming scene, water effects were created in Psunami, an After Effects plug-in from Red Giant. “We also used Shine, part of the Trapcode Suite, which allows light beams to come through the water to give it more of an underwater feel,” Chaisson says. “We mucked around with the levels and manipulated those plug-ins to create the content that we liked.”

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“That sequence is one of our favorites,” Kates says. “It’s a beautiful moment when you get to breathe for a second and just watch. As Alice, Tara Rosling is so good at the swimming. She does all these little things that make one of those great moments where everything works together.”

Video technician Trevor Hughes adds, “We’re using the scrim in a non-traditional way, more as a texture. Usually, you just light it from the front and it looks like a drop, or you light it from the back and it’s opaque. But we’re lighting it from the back and texturing with other images. I thought that water effect was probably the best I’ve seen.”

The projection system comprises 11 Christie DXG1051-Q 10K projectors, eight rigged behind the 61' x 26' curved projection screen for rear projection and three on the balcony rail out front. A Christie Roadster 12K projector, located in the followspot booth, is used mainly for a sequence in which Alice grows larger and larger, and was required “due to the size of the image; with a single projector, the image stays constant on the scrim,” Hughes says.

Given its size, the upstage screen is curved, with a 45° radius, and is hung on matching pipe arcs at top and bottom. Free-floating, the bottom edge sits against the matching arc of the upstage edge of the mirrored stage floor, which is raised some 10" above the deck. It is subject to wafting, due to air currents, “but this is minimized, given that the top and bottom are stable and the theatre has a controlled HVAC system,” Hughes explains. “It is hung in show position and moves upstage on motorized lines for changeover into the other two shows playing in repertory in the Festival Theatre, *A Woman of No Importance* and *Sweeney Todd*. The screen is west-coast-



Wonderland emerges from the interplay of projection, set design, and lighting.



Tara Rosling as Alice prepares for a game of croquet with the Queen of Hearts.

“The show was so complicated that Peter felt we would never get to the end. In some shows, you can get really bogged down in the beginning, and, due to the tight schedule, getting to the end is sometimes rushed. In *Alice*, we went backwards in chunks of scenes, then put it all together going forward. You knew what it was going to look like at the end, and going backwards gave us a unique opportunity to look at it that way—odd, but definitely cool.”

— Lamotte

ed—bagged—when not in use, and needs at least 90 minutes of stretch time when put in place. Two separate warping tools are used to align the overall image projected. The internal Christie warp tool for the DXG1051s gives a coarse warp as a base, and Watchout’s geometry tool allows for fine tuning of the warp. The warp evolved over the tech period and now needs to be tweaked only when necessary due to humidity changes.”

The eight projectors behind the screen are each fitted with a Hitachi USL-901CH ultra-short-throw lens. “There is a row of four projectors 7’ high, splitting center 10’ apart, and a row of four directly above at 16’,” Hughes says. “The upper and lower outside projectors are pushed forward 16” to accommodate the curve of the screen and maintain uniform brightness. While this takes up a lot of real estate, it worked out rather well, since we were able to locate quick-change booths for the actors directly beneath them. Because the bottom projectors are 7’ high, people can walk under them along the back wall, as long as they stay far enough upstage, and we give them a clear crossover line. The hanging positions and distance from the screen were calculated by the TD, Mark Callan.”

The eight rear projectors are served by two quad-output, quad-core Intel Xeon E3-1271 V3 3.60GHz PCs with 16GB of RAM, running Windows 7 SP1. “The computers are connected via Gigabit Ethernet cards to a 16-port Gigabit switch connecting both computers and the eight projectors to the overall private network,” Hughes says. “The switch connects to a back-wall Ethernet input that runs to the stage-right gallery alcove Ethernet switch. A separate jumper is connected to the lighting booth run and downstage right for onstage re-warping of the image.”

On the balcony rail, the two outside projectors are

equipped with Hitachi SL-902CH lenses. “These are overlapped and blended to give full coverage of the proscenium opening, and they project on the scrim and cutout drop,” Hughes says. “The center projector has a Hitachi SD-903X lens and projects on flying scenery as well as the screen. DVI video runs go through the balcony ceiling to the stage manager’s booth at the back of the house, where one finds the quad-output computer that serves these projectors. An Ethernet line originating in the lighting booth is patched into a switch in the stage-left gallery alcove and out to the balcony rail to another switch that sits on the center projector’s hanger and connects the three projectors together.”

A fourth PC in the followspot booth, equipped with an M-Audio Fast Track Ultra 8R interface, synchronizes sound effects playback from QLab, and generates a click track to allow the conductor Paul Sportelli to keep the six-piece orchestra in sync with the video.

A master production computer running Windows 10 is the interface to the other four computers. “Watchout uses this computer to build and play back the video show,” Hughes says. “As you build the show, parts of it are uploaded to the various computers over Ethernet for play-

back later. This means that each computer has the files it needs to play the show, allowing for smooth playback in real time.”

Lighting

“I like the way the mirrored floor reflects the world so that there is a dual world,” Sharpe says. “I like the fact that it could be water, that it could be a hard surface but also something that is completely ethereal at the same time. There were a lot of qualms about having a mirrored floor, and we went back and forth about it, but we decided on it very early in the process. I think there was a lot of, ‘Are you really going to do a mirrored floor?!’”

The projections and mirrored floor presented something akin to a minefield for the lighting designer Kevin Lamotte, who had to stay off the back wall completely, taking a surgical approach to the stage to keep the light simultaneously off the projections and out of the auditorium.

“There’s really no frontlight at all, because it would strike the floor and get up on the screen directly,” Lamotte says. “There are two followspots at pretty steep angles, off to the sides; they’re not straight-on. Those followspots were really the only frontlights I used. There’s a lot of top-



The cast in a sampling of the hundreds of costumes designed by William Schmuck.



Who stole the tarts? Alice and the Mad Hatter debate before the King and Queen of Hearts.

light that colors the floor, and the reflection goes straight up again; if some of the scenes feel bright, it is because they are being lit by a toplight that strikes the floor and then bounces back up underneath the chins. At times, it looks to me like it is upside-down, as if the actors are standing in front of a footlight, being lit from below. Sometimes, when Alice is walking around, you see a double image of her on the background. When you light a person and hit a mirror, their reflection bounces up onto the target behind, and so does their shadow. You get these images of a right-side-up Alice-shadow and an upside-down Alice-shadow connected at the head, which speaks a lot to Lewis Carroll's games, which is all part of it."

"There's some sidelight as well, but not in a traditional sidelight system," Lamotte says. "It was a challenge physically getting sidelight positions to fit because of the set with the periaktoi parked on stage right and stage left. However, if I lit straight across to the other side, I would be just piling into that periaktoi, which has Plexiglas in it, and it would come right back in a bad way, because the periaktoi have various angles on them and I can't keep that

angle of sidelight out of the house or off the screen. I ended up taking the sidelights, which are up pretty high, and focusing them on a short shot, hitting the near side of the mirror and bouncing the sidelight to the other side of the stage. This takes some of the curse off it and also tends to make it more interesting, so it looks like a shin-buster, even though the light is hung up high."

While the reflective floor makes backlighting next to impossible, it opens up other avenues of creativity in the lighting design. "Backlight is a very basic tenet of stage lighting, but any backlight that I used hit the floor and then reflected directly in the house," Lamotte says. "Depending on the angle, it would get up into the balcony's eyes. That floor takes color from the projection and some texture from the lighting as well. It takes on all the colors around it. And a great thing about mirrors is that when the stage is in darkness, it's really dark. As Alice goes underground, a lot of that look comes from the inky blackness in the floor."

Challenging as it was to light *Alice*, Lamotte had to keep in mind that he was working with a rep plot and had to accommodate two other shows: "I found that the floor

really forced us into meeting everything at a 90° angle, so I straightened up all the sidelights and straightened up the toplights so they were true toplights; they weren't slightly backlights. Had they been so, they would have kicked into the house, so I ended up taking the rep rig and squaring it all up to the mirror. Fortunately, that worked for the other two shows as well."

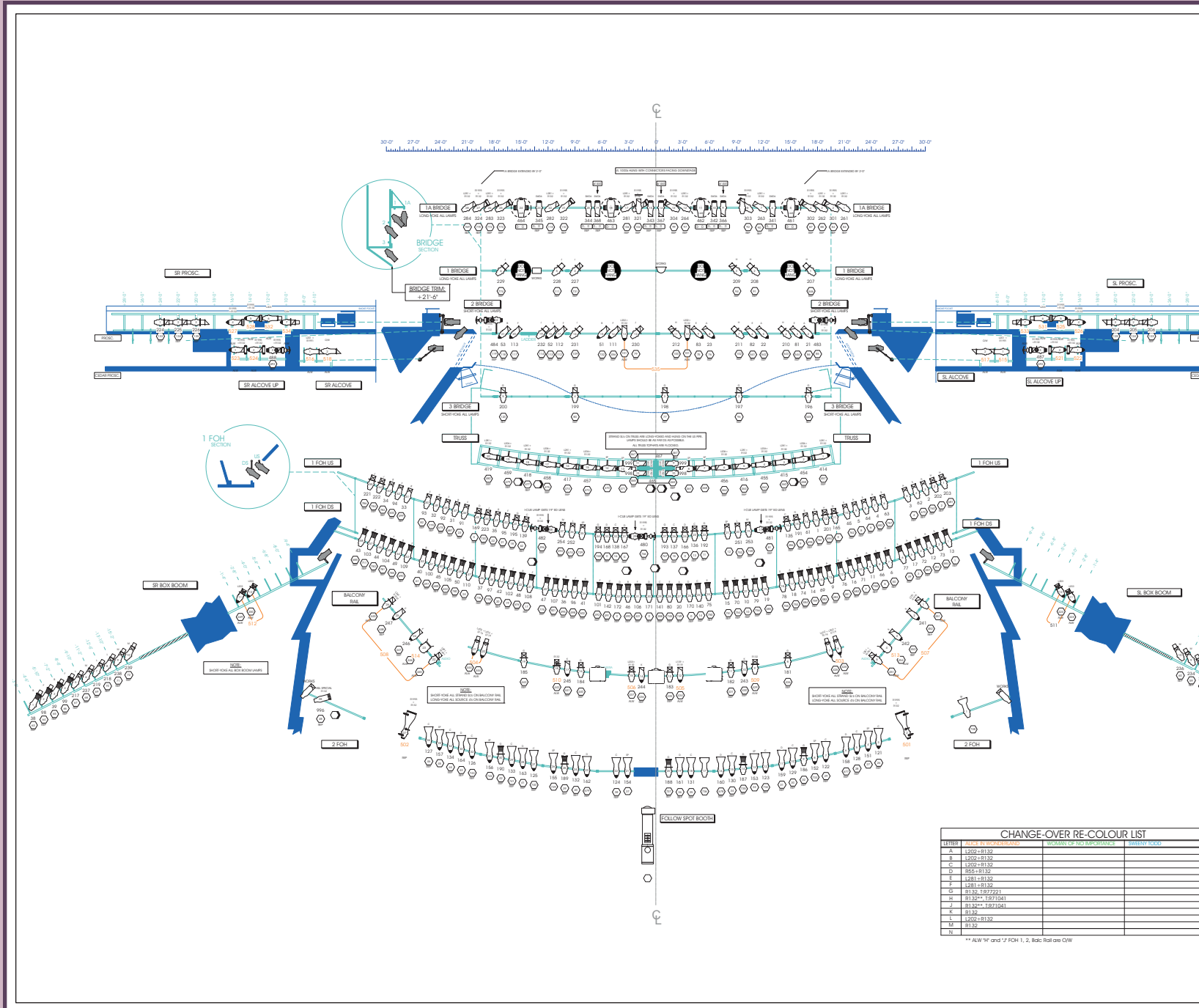
Perhaps a greater challenge—Lamotte calls it "a curve-ball"—was that the show was teched backwards from the final curtain. "The show was so complicated that Peter felt we would never get to the end. In some shows, you can get really bogged down in the beginning, and, due to the tight schedule, getting to the end is sometimes rushed. In *Alice*, we went backwards in chunks of scenes, then put it all together going forward. You knew what it was going to look like at the end, and going backwards gave us a unique opportunity to look at it that way—odd, but definitely cool.

"On top of that, we never worked outside of the scenes we were currently in so I wasn't able to work ahead on anything. We worked in situ with everybody all together all the time. When you're staring at a schedule, you usually want to find moments where you can get ahead, but working out of context didn't help me or anybody else. For example, we couldn't look at projection from one scene and lighting from another. It took a little while to get used to that, but I enjoyed it in the end."

The instruments are a mix of LED and incandescent units. "We've been getting rid of scrollers and replacing them with [ETC] Source Four LED Series 2 Lustr arrays," Lamotte says. "The toplights include a lot of moving lights. This show doesn't have a lot of frontlighting, of course, but the side light and follow spots are incandescent. It's a mix. We also rigged about a dozen wireless circuits in the periaktoi, and in any truck that got pushed on, such as the large throne cupola for the King and Queen of Hearts."

Lamotte's rep plot for the Festival Theatre includes 321 ETC Source Fours, 127 Philips Strand SLs, 55 Source Four PARs, 30 Source Four LED Series 2 Lustr arrays, 16 Philips Vari*Lite VL1000 AS units, one Vari*Lite VL4000 Spot, nine Rosco I-Cue Mirrors, nine Rosco DMX Auto Iris units, 39 Chroma-Q Broadway scrollers, 14 Apollo Smart Color PRO scrollers, two City Theatrical followspot kits for Source Fours, two Wybron Coloram II 10" scrollers, 24 Strand Orion Groundrow Cyclights, 16 Strand Iris three-cell cyc lights, 18 Strand 8" Fresnelites, and 20 channels of RC4 Wireless dimming, the latter used to handle all set-mounted striplighting on the periaktois, the Queen of Hearts' truck, the White Rabbit's house, and a trap lid. Control is via an ETC Gio console. Since this is the repertory plot, not all of it is put into use for *Alice*. Mikael Kangas is the assistant lighting designer and Bill Talbot is the electrician.





Sound

The show also presented a few curveballs to the sound designer John Lott, who generally favors a naturalistic approach. “I want it to be as absolutely realistic as possible, meaning that I want people in the seats not to realize that it’s miked,” he says. “The sound-reinforcement system is all point-source. The left and right are Meyer CQs at top and bottom, with some Meyer UPJs for infill. The center cluster is a combination of Meyer UPJs and UPAs. All the

loudspeakers are powered, except for two Meyer 650 subs that are non-powered.”

In order to psychoacoustically localize the reinforced sound of the actors to their physical positions on the stage, Lott takes advantage of the Haas effect and manipulates the delay from each actor’s microphone to each loudspeaker in the system. “Everything’s time-aligned differently, so every loudspeaker has its own zone, with its own output from the console and its own delay line,” he

Images: Courtesy of Kevin Lamotte



says. “Depending on where the actor is standing on stage, we can change their relationship to every loudspeaker. We break the stage up into a grid pattern of nine, and program their location based on where they are in the grid.” As an actor moves around the stage, the front-of-house mixer Walter Lawrence switches that microphone from one console output to another. “Most of that is pre-programmed into Walter’s cue book,” Lott adds.

This naturalism quickly evaporates, however, when the pitch of Alice’s voice rises as she shrinks, and falls as she grows larger. “It becomes a challenge when you’re doing all kinds of pitch shifts and special effects on voices and you’re putting people in unnatural places,” Lott says.

The pitch of individual actors is changed in real time, using special effects units from Lexicon and Yamaha, triggered by MIDI commands from QLab, which are, in turn, triggered by MIDI commands executed at the LCS CueConsole.

So that audience members close to the stage don’t hear a double of Tara Rosling’s natural voice with her pitch-shifted lines, she sings at half-volume. “She is amazing,” Lott says. “She sings basically to the conductor and that’s it. The three times we hear Jay Turvey and Moya O’Connell [as the King and Queen of Hearts] pitched, they all do their lines at half the normal volume so that they are inaudible from the audience perspective. Alice goes in both directions, lower and higher pitch; Jay and Moya just go up.”

Lott found it impossible, however, to apply a similar technique to alter the pitch of multiple voices simultaneously. In the trial scene, where the jury shrinks and the pitches of their voices rise, the designer says, “We tried about 20 different processes and nothing was consistent enough to accomplish pitch-shifting of multiple voices doing multiple parts, with all of them pitch-shifting in the same time, tune, and tempo. The way all the pitch-shift technology works is that the processor determines, based on a mathematical equation, what it’s going to do first. However, if one singer is not singing the right note or singing at the same level as yesterday, the processor will change its decision as to how it processes the data.”

More robust studio technology might get the job done, but with significant latency, and in a live a show, any latency greater than about 30msec will be noticeable. For this reason, the jury’s pitch-shifted voices were pre-recorded and are played back via QLab.

“We had Allen Cole reorchestrate the piece dropped in pitch and timed so that it was ridiculously stretched out, and the cast relearned the music five semitones lower and really slow,” Lott says. “Then we sped up the track. That was the only way we could get all the voices to be accurately pitched to the music in time and in tune; then we had the conductor Paul Sportelli play that piece to a click

track to ensure that the vocal track on tape would line up with the live orchestra.”

QLab was also used to replay Lott’s “ridiculous amount of soundscape,” consisting of such elements as crickets, birds, frogs, cicadas, wind, and water drops. Some of it was locked to video and synchronized with Watchout.

“Each one of those moving backgrounds was a mini-film, because it included sound effects,” Lott says. “In some cases, such as Jenny appearing as the Cheshire Cat, all of her lines were pre-recorded and synchronized with the videos. Again, Paul has to conduct to click because Jenny also sang as the cat as a projection. The click track is on the video so that when the video rolls, the click times the orchestra to the video.”

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Lott uses 32 channels of Lectrosonics LMA wireless microphone transmitters on stage: 30 on actors and two on various set pieces. Wired mics are used for the offstage chorus. For the orchestra of violin, viola, cello, flute/clarinet/bass clarinet, trumpet/flugelhorn, and keyboards/ percussion, he specified four Audio-Technica AT4051s and four DPA 4021s. In addition to these 40 mic channels, 16 QLab outputs and eight Watchout outputs feed the 128-input LCS front-of-house console. The show uses 63 of the console’s 72 outputs.

“I think the outcome of the show from all angles is pretty spectacular, particularly the technical accomplishments of video and automation,” Lott says. In that regard, *Alice in Wonderland* marks a new direction for the Shaw Festival, a bid for a younger audience than has traditionally been associated with Shaw and his peers.

As Sharpe says, “We were aiming it at everyone. You can bring your grandmother and your six year-old. Children are not an audience that the Shaw Festival tends to get, and it’s been great to see how many kids have attended.” *Alice in Wonderland* runs at the Shaw Festival in Niagara-on-the-Lake, Ontario, until October 16. 📺