

Chapter 15

Paranormal Panorama

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This is an account of a collaboration between our practice, First Office, and two Austrian film directors, Constanze Ruhm and Christine Lang, for the MAK Center of Art and Architecture. The installation involved the design of a temporary screening room for the projection of the film *Cold Rehearsal* (2013). Paranormal Panorama was the title of the installation, and was on view from November 8, 2013 through January 3, 2014 at the Mackey Garage Top Gallery in Los Angeles. The LA-Vienna exhibition program was curated by the MAK-LA Director Kimberli Meier and made possible by the Austrian Federal Chancellery/Arts Division.

A blank image

Some time in the middle of the summer of 2013, we came across a photograph of a modern interior, its walls covered in a mural of a mountain range (Figure 15.1). The Swiss house, also known as La Vedette, turned out to be the final home of the nineteenth century French architect, Eugène-Emmanuel Viollet-le-Duc, during his work on the restoration of the Lausanne Cathedral. In the same year, 1876, he painted the Alpine panoramas, based on his geological research of what he believed to be the deteriorating topography of Mont Blanc, a mountain he at times referred to as the “Monument of Europe.”¹ He believed this natural monument to be in great disrepair and imagined restoring its “shattered rocks” and “gigantic ruins” according to certain geometric principles.² Viollet published the complete account of his Alpine survey in *Le Massif du Mont Blanc*, which was then translated by Benjamin Bucknall in 1877 under the title, *Mont Blanc: A Treatise on its Geodesical and Geological Constitution; its Transformations; and the Ancient and Recent State of its Glaciers*.

In the translator’s note to the English edition, Bucknall ascribed the care with which Viollet mapped the Mont Blanc region not only to the correctness of his instruments and the rapidity of his delineation, but also to the incredible endurance and perseverance with which he worked in the changing and often violent Alpine landscape over a period of eight summer holidays. To convince the readers of the danger of Viollet’s task, Bucknall recalled the following event:

Severe fatigue, and even the risk of life, was involved in the undertaking. On one occasion, when crossing a glacier with a single guide, he slipped into a crevasse to a depth of forty feet . . . [H]is fall would have been fatal but for the existence of a block of ice, which, wedged between the walls of the crevasse at that particular spot, fortunately arrested his descent . . . Yet even then, in spite of the dark abyss beneath him, and his sufferings from the intense cold, he occupied himself with examining some phenomena presented in the structure of the ice which his singular position enabled him to see to advantage.³



Figure 15.1 Salon of the house called “La Vedette” with wall paintings of mountains by Eugène Viollet-le-Duc. The wall paintings were destroyed in 1975.

Source: Photography by Jean-Eugène Durand © Ministère de la Culture/Médiathèque du Patrimoine, Dist. RMN-Grand Palais/Art Resource, NY.

This near-death experience, it seems, only brought Viollet closer to his goal of representing the crystalline structures of the glacier.

Upon our discovery of La Vedette, we sent a photograph of a door detail from the grand hall to the filmmaker Constanze Ruhm in Vienna. To her, it brought to mind the image of Ewa, one of the characters in *Cold Rehearsal*, a film she had made with Christine Lang. In a pivotal scene in the film, Ewa, the undead Polish babysitter appears barefoot, clad in a summer dress, against a backdrop of the snow-capped Mont Tendre—a mountain peak in the vicinity of La Vedette (Figure 15.2).⁴ She is one of several women who haunts the hero, a former director, Hans, a name given to him by Ruhm as an equivalent to the French name “Jean,” as in Jean-Luc Godard. She recounted that this was the site of a tragic scene where Ewa fell to her death into an icy crevasse while on a family outing along the Juras Mountains’ glaciers.⁵ In the film, the scene repeats, as if to recount the death (perhaps the proper word here is *to rehearse?*) over and over again. This repetition breaks the typical linear narrative of film and introduces certain elements of the production—the *mise-en-scène* equipment and technical infrastructure. False backdrops, fake narratives, real people, rehearsed scripts, accentuated make-up, and theatrical lighting, all become part of the internal staging of the scene. From Ruhm, we received the collaged still-shot of Ewa positioned against the backdrop of the glacier with the above explanations.

Perhaps the nearly overlapping stories of Viollet and Ewa, recounted by their translator and director, respectively, are not a mere coincidence. The encounter with death in the mountain range is possibly best personified by the lone figure who stands above the vast landscape in Caspar David Friedrich's 1818 painting, *Wanderer above the Sea of Fog*. His red hair blows in the foreground, the wanderer faces a formless abyss filled with fog extending to the background. The middle ground is all but erased; the horizon line is eradicated. Blurry brushstrokes bring forth an image of irrational whiteness, hindering the ability to see and thereby blocking any ability to understand the scene. The wanderer's gaze thus moves inward, encountering an experience often called the sublime. Consider a literary representation of a similar image in Thomas Mann's *The Magic Mountain* where the protagonist, another Hans—Hans Castorp—is swept up in a snow storm during his excursion along yet another glacier high above his sanatorium:



Figure 15.2 Ewa (Agnieszka Wellenger), still from *Cold Rehearsal* (Constanze Ruhm/Christine Lang 2013).

Hosts of [snow] flakes . . . flew against his eyelids so that he winked, overflowed his eyes and made seeing as difficult as it was now impossible for other reasons: namely, the dazzling effect of all that whiteness, and the veiling of his field of vision, so that his sense of sight was almost put out of action. It was nothingness, white, whirling nothingness, into which he looked when he forced himself to do so.⁶

Viollet, Ewa, Friedrich, and Castorp all appear to walk into whiteness and experience nothingness, blankness, a total eradication of the visual senses, or death. Whether death is almost real, literal, or literary, is not important; in all accounts, its presence seems to be inextricable from a nearly blank image of a vast mountain range.

Material composition

Now let's return to Viollet's mural of the Alpine landscape to dwell on its material detail. The panoramic mural of the mountain range on the walls of the grand hall at La Vedette presents a very different kind of atmosphere from that in the stories retold above. The painting depicts a summer day in the bright Alpine landscape, rendered in equally high contrast from front to back. The mountain peaks are not only visible, they seem to be in focus as their forms are outlined with blocks of shadow and highlighted with packs of snow. It is an image made vivid by artificial means: focused and centered, cropped and composed; perhaps we can even say that it is tamed, or domesticated.

The unrolled elevation develops a scalar superimposition of two parallel worlds: that of the infinite, ever-changing, wild landscape on the one hand and the limited, formal, comfortable interior on the other (Figure 15.3). In front of the mountain are three beige rectangles, each corresponding to the proportions of three architectural details of the room. From left to right: the largest rectangle blocks out the placement of the main double-doors that lead from the vestibule into the grand hall; the central rectangle, a bit narrower, stands in for a more intimate single door that leads into the hallway of the private home; and the smallest rectangle delineates the position of the fireplace on the same northern wall. Upon close inspection, another interruption to the continuous panoramic image occurs in the breaks between the frames, each depicting a painting with its own sky, perspective, and foreground. These vertical cuts disclose the extents



Figure 15.3 Eugène Viollet-le-Duc, Project for the imaginary alpine decoration of the wall paintings in the large studio at Villa La Vedette. It might show the south side of the Mont Blanc near Entrèves.

Source: © Ministère de la Culture/Médiathèque du Patrimoine, Dist. RMN-Grand Palais/Art Resource, NY.



Figure 15.4a, b, c Interior elevations of the salon at La Vedette with a panoramic wall painting of a mountain range by Eugène Viollet-le-Duc.

Source: Photography by Jean-Eugène Durand © Ministère de la Culture/Médiathèque du Patrimoine, Dist. RMN-Grand Palais/Art Resource, NY.

of the three separate compositions, stitched together by Viollet to map onto the perimeter of the room: the first alignment corresponds to a corner of the room where the panorama takes a 90-degree turn, and the second matches the position of the structural pilaster that bears the load of a wall separating two bedrooms on the floor above.

The photographs of the room allow us to understand the care with which Viollet considered the placement of the mountain landscape inside the room and the choice of architectural ornaments and materials that, in turn, reinforce the image (Figure 15.4). The highest peak frames one of the doors, its center aligned to the opening. Another lower peak rises barely over the public entry; its profile just misses the left corner of the trim surrounding the jam. A third peak hovers above the fireplace. But unlike the others, it reveals a tree-scattered scree, which seems to rest on top of the mantle, as if producing a clearing for the fire to be set into the perspective of the landscape image. The rocks increase in size and populate the foreground as the painting approaches the floor. They are depicted in increasing resolution until they become deeply textured, nearly real, and finally get cut off by the chair rail. But this is not the end of the image, just the limit of the paint. Beneath the chair rail, the room is encircled in a stone base. This is real stone, composed of broken and uneven slabs; volumetric rocks have broken out of the flattened image to enter the real space of the room as a thin layer of cladding. And while the chair rail implies a border, it is in fact an architectural transition, a bond between representation and material reality.

Looking up above the mural, we find another such transition. While the chair rail, door trim, and baseboard are all treated in a dark finish, the crown molding is painted in a color that merges with the tone of the sky in the panoramic image. The edge of the room seems to break open and the ceiling joists appear to hover, as they too are painted in matching tones.

Techniques, modern and contemporary

We have suggested above that the architectural details of La Vedette domesticate the vast representation of the mountain range. The taming of landscape occurs in two ways, quite literally by being subjected to the domestic scale of a room, as well as technically, by being subjected to the miniaturizing technical processes of drawing. To project the panoramic mountain range onto the interior walls required several well-known instruments of translation and comparative models. All of these have certain historical significance, and even in our current day can be traced into digital tools that have become pervasive.

When we encountered the photographs of La Vedette, our first thought was that the landscape had been projected onto the interior walls directly, translated through a *camera obscura*. In the history of painting this instrument relied on a closed space of the camera—i.e. room in Latin—to allow light through a pin hole and project an image of the exterior onto the interior. Depending on the size of the enclosed space, the artist could either enter it or extend a hand inside it to trace the projected image onto the wall or a piece of paper. But it does not appear that this technique was used by Viollet. By the end of the nineteenth century, the camera obscura had already evolved into the modern day photo camera—the room had been transformed into the mechanical space positioned in front of a chemically treated light-sensitive surface.⁷ We then conjectured that Viollet may have scaled up three photographs to produce the mural. But we only found evidence against any use of a mechanical camera in the mountains. In *Mont Blanc*, Viollet writes:

[D]rawing always has an advantage over photography . . . for photography reproduces the illusions to which the eye is liable amid these solitudes where there is nothing to indicate the scale . . . and where the transparency of the atmosphere almost entirely nullifies aerial perspective.⁸

The Alpine mountains were difficult to see or to photograph in any direct way. This landscape not only projected a blank image to the naked eye, it also appeared out of focus to a photographic lens. Technical realism offered little clarity.

Besides, although Viollet painted mountains, he was not a painter. He was an architect and a preservationist. He looked at mountains with an analogy to buildings in ruins, that is, with some amount of precision. We do not use the word *precision* here to indicate that Viollet sought an exact representation of how something really was, but to predict how it should be, or how it could be corrected. Precision, in this case, was linked not to realism but to artifice. The instrument that he claimed to have used functioned very differently from the camera obscura, although it had a somewhat derivative name: *camera lucida*. Unlike the name suggests, this was not a bright room, and it did not capture images directly. Rather, the camera lucida was a small prism that bent the incoming light as if to hold the image suspended inside of the crystal. Only by looking into the prism could the image be seen to be superimposed artistically onto a page. The projection of the image had to be constructed by coordinating the eye to the hand; it was not directly cast by the prism as it would have been in the case of the camera obscura.⁹ Viollet used a special version of this instrument in the field, which brought together the prism and a telescope, allowing him to capture large objects at a great distance on a piece of paper, producing a technical image, or to borrow Bruno Latour's term, an "immutable mobile."¹⁰ This data set could then travel and transform to fit other scales and contexts, as in the case of La Vedette. The instrument that allowed for this digitization of nature into portable information was called the *téléiconographe*, and it collapsed three worlds onto one working space: the telescopic image of the mountain, the eye of the beholder, and the piece of paper.¹¹ He described the instrument as follows:

I had a more accurate instrument constructed by an excellent optician, M. Lefebvre, consisting of a sketching-board, on which, and parallel to it, a telescope is firmly fixed. The prism of the camera

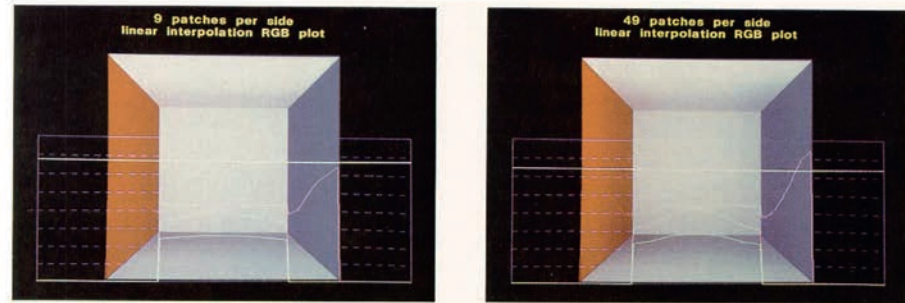
lucida being applied to the eye-glass of the telescope, distant objects are pictured on the board, always in proportion to the power of the telescope and its distance from the board. The latter is moved by means of graduated circles in a horizontal or a vertical direction, the telescope being moved with it. By this means, exact and enlarged views can be obtained from long distances, and, if required, an entire panorama on a scale of twenty times the apparent size at a radius of eight or nine miles.¹²

Each drawing was composed with a singular vanishing point captured by a telescope that was held steady throughout the process; and if a panoramic description was desired, it was possible to stitch several such views together. Viollet's use of the camera is an early example of a technique used in contemporary panoramic constructions in photography and film, called *slit scanning*. Slit scanning constructs a projection of an image across time by replacing the picture frame with a "slit," allowing a scene to be rendered as the slit "scans" across its object. Each one of these slits contains a vanishing point stretched over an increment of one pixel perpendicular to the direction of movement. As the camera moves by a pixel, it renders a vertical frame before moving by another pixel-increment to the next slit, and so on, until it completes a full circle. While the téléiconographe could capture the panorama in as few as three 120-degree increments producing visible cuts between its frames, the slit scan offers a seemingly smoother image that equates the number of its frames to the number of pixels in the horizontal dimension. But this optical seamlessness is just a higher resolution Riemann Sum; seams abound in a slit scan as the panorama stitches one pixel width image to the next. Let's leave this strange image type for a moment, and return again to Viollet's rendition of its predecessor.

The téléiconographe helped to capture vast mountains as simple profiles on paper that were measurable and drawn to scale set by the telescope's power of magnification. Viollet was certain that he could uncover an innate mathematical logic for the mountain through these geometrically constructed lines and arcs. He abstracted summits to geometric form, with repeating polygons and dashed arcs that diagrammed the deterioration of pure diagrid into ruin.¹³ But drawings were not the only things Viollet was after. In his encounters with Mont Blanc, he explained the limitations of lines and contour drawings as a means to accurately represent important features, or as he called the "physiognomy" of the mountain's formations.¹⁴ Here, he turned to a familiar method of representation in architecture, the rendering. The lines, coordinates, and other descriptions of his measurements became toned and shaded "by the sun set at about eleven in the morning"; they were rendered to become legible to a non-technical audience.¹⁵ If we are to believe Viollet's working process, his mountain paintings were then not mere snapshots of the surrounding mountain landscape. Rather, they were téléiconographically aided models of triangulated coordinates made visible through the use of rendering techniques. It follows that the image that we have been describing on the walls of the great hall was visually developed from a set of data. Virtually rendering a data set within the space of an interior forecasts later models of comparative representation that are of interest to us, most notably, the Cornell Box from 1984.

Cornell Box

Viollet's rendered mountains seem at first glance more elaborate than the mundane scenes of colors and, at times, cubes presented in the Cornell Box; the latter evoke the rather humdrum ambition to produce a realistic and entirely data-based image (Figure 15.5). Yet we think it is important to relate this late twentieth century technological object to the romantic production of the nineteenth century. Its light effects, painted finish, and capture through photography similarly engage problems of constructing realism by means of rendering. Our interest in both periods is based on our belief that architecture always participates in the



(a) Figure 8. Simulated Cube with Two Wall Subdivisions and Linear Interpolation Over each Element (Patch). (b)

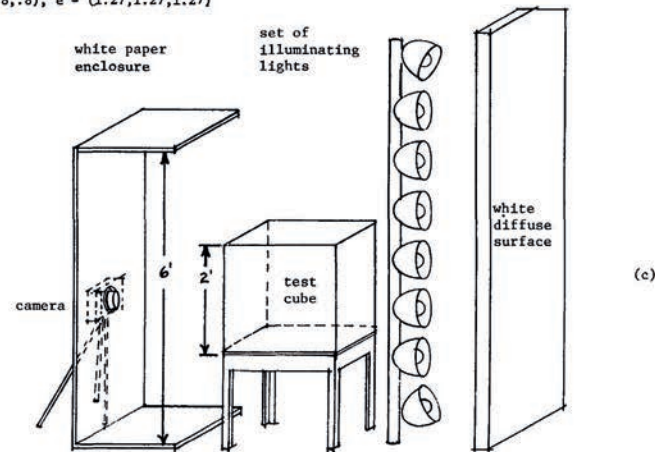
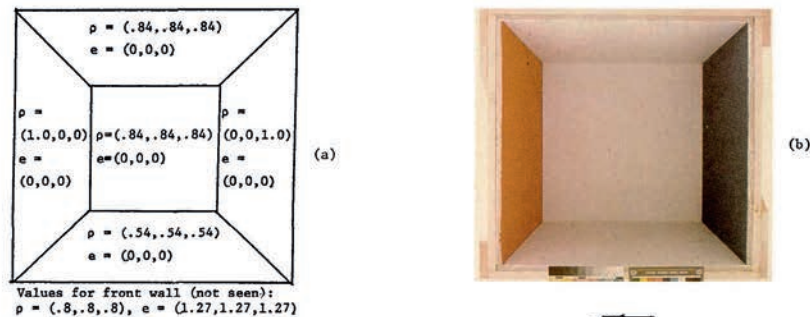


Figure 9. Diagram of Experimental Test. Reflectivity and Emissivity Values of Simulated Model are Shown in (a). Photograph of Real Model (b). Schematic of Environment (c).

Figure 15.5 Page from the original publication describing the *Cornell Box* experiment in the SIGGRAPH Proceedings by Cindy M. Goral, Kenneth E. Torrance, and Donald P. Greenberg of the Program of Computer Graphics at Cornell University, titled "Modeling the Interaction of Light Between Diffuse Surfaces" in *Computer Graphics*, 18, no. 3, July 1984.

technical composition of such models and images. The Cornell Box was a 1980s experiment in computer graphics in which computer scientists arranged a diptych model at Cornell University to study and compare the fidelity of computer generated renderings to photographs.¹⁶ In order to carry out the experiments, the researchers had to construct two Cornell Box models, a digital one (an image) and a plywood one (more like architecture). The digital model was rendered to simulate the diffuse light from a scene, while the plywood model was painted to closely resemble the impossibly diffuse "materials" of the digital model. Comparisons of the two images allowed computer scientists to identify differences between the "real" image and the "digital" one.¹⁷ The fact that similar images were produced from these two models was essential for their comparison. In all other respects, the two models were very different. One existed in a world of electrical signals and binary code; the other existed in a world of wood, screws, and paint. The efforts to produce similar images from different models were often strange and counter-intuitive.

For one, photographing a hermitically sealed box is impossible, but rendering one is not. Light bounces when it reflects off surfaces, and diffuse lighting calculations in the computer model assume a closed interior environment. In the computer, the processes used to capture images and calculate light are separate; they are not simultaneous. The computer image is made after the light processes are calculated, making it possible to visualize a hermitically sealed interior. However, in the plywood box, to pause the effects of light reflection while removing a face of the box to mechanically capture an image on a photosensitive surface is physically impossible. Please excuse such an obvious statement, but the most banal differences between the world of the computer—where each discrete process allows us to push the pause button on simulations of reality—and the parallel world of real-time analog processes of a plywood box—where all effects are synchronous, inter-dependent, and ever-present—cannot be taken for granted when producing an image for comparison. To add to this conundrum of documenting a sealed box, the invisible face of the digital model also provided the primary light source for the computer image.¹⁸ So the simulated version of the digital face in the physical model had to take on three competing functions simultaneously: it had to bounce light, capture the scene, and emit light.

The solution was to construct a big box around the original box.¹⁹ This big box helped solve many of the problems by positioning technologies around the scene. As an example, the second box created an external hermitically sealed environment around the original box, allowing for a dedicated hole for positioning the camera. It also allowed the researchers to tune the distance required to capture an image with a view angle that better corresponded to the view angle of the computer image. Finally, it also provided additional space for placing lamps behind the smaller box to light the interior of the scene through a diffuse source within the invisible wall of the smaller box.²⁰ Of course, there were more issues when it came to matching the sheen and color of diffuse materials. Selecting a paint that looked like and reflected like the material rendering (the actual material of a digital image, such as the liquid crystal of a pixel) was fundamental to making the image of the physical scene look like the image of the digital model. Interestingly, the process of constructing the experiment to test the digital algorithm as a photo-realistic image matched reality to digital standards, not the other way around.

It turns out, and perhaps this should not surprise us, that real materials are easier to change than their digital counterparts. It doesn't take a computer scientist at Cornell in the 1980s to figure that out. As a couple of underemployed architects in Los Angeles, we backed our way into the world of mutable real things without ever thinking otherwise.

Paranormal Panorama

As we started working on the screening room for Ruhm and Lang's film at the Mackey Gallery, we realized that we might test some of the bizarre interests that we have tried to outline above as clearly as we can in



Figure 15.6 First Office, Paranormal Panorama screening room for *Cold Rehearsal* (Constance Ruhm/Christine Lang 2013) at the Mackey Gallery, MAK Center for Art and Architecture Los Angeles, 2013.

this installation (Figure 15.6). The gallery itself, perched above a five-car garage, was painted white on the inside and black on the outside. A series of sliding doors opened its long side to the court, so that one face of the box was fully absent. Across from the gallery were the Mackey apartments, designed by Rudolph Schindler, where the party was going to take place. On the second floor, a series of windows looked out across the court directly at the open face of the gallery. The gallery's blank interior, absent wall, and a facing audience presented us with a kind of architectural version of the Cornell Box for placing and viewing our installation.

First, we located a square room at the center of the big box gallery, rotated 15 degrees in a counter-clockwise direction from the rest of the interior (Figure 15.7). This was the screening room. Then, we wrapped a panoramic rendering of a mountain range, the Juras mountains that appear in the film, along the perimeter of the walls. This image was rendered as a slit scan, unrolled into a single strip and folded into place (Figure 15.8). The continuous surface of paint connected the new walls to the old walls, making it impossible to see the difference between the new construction of the room and its original gallery context. A few additional domestic details further confused the difference between the old and the new as well as the background and the foreground. Ordinary things such as doors, molding, conduit, light switches, and vents, formed a continuous network of objects that populated the walls of the gallery and the exterior of the added room. They were there, at times, merely for visual continuity. While molding naturally helped to hide certain joints of construction, light switches and vents did nothing nearly as practical. For example, the rendering of an unfolded elevation reveals conduit connecting two light switches as well as two electrical outlets to one another. All the vents were simply screwed onto the walls as decoration. There were no ducts behind them, only paint and gypsum board. This system of architectural elements took on a truly representational character on the interior of the rotated screening room—the backside of the panorama—where the cast shadows of these objects were painted onto the wall; the objects themselves were absent. As a result, the walls were backdrops to two different but related images: a frozen projection of the Juras mountains panorama on the one side and a moving image of the film framed by projected shadows of a domestic interior on the other. Together, the images constituted what we, along with the film makers, collaboratively titled *Paranormal Panorama*.

Figure 15.7 Plan of the screening room at the Mackey Gallery.

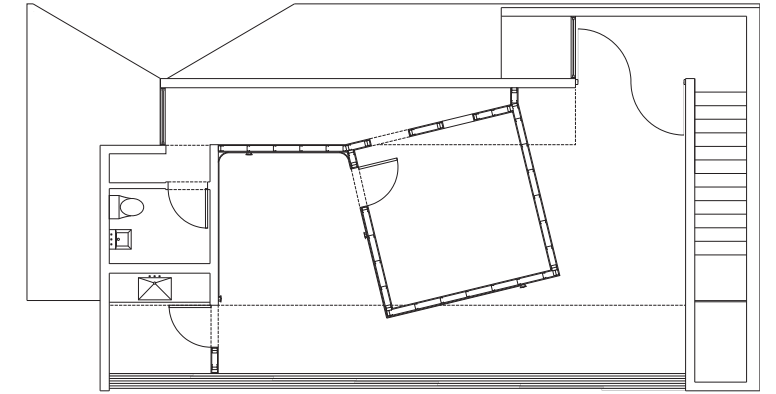


Figure 15.8 Developed interior elevations of the screening room with paint, conduit, molding, and vents.

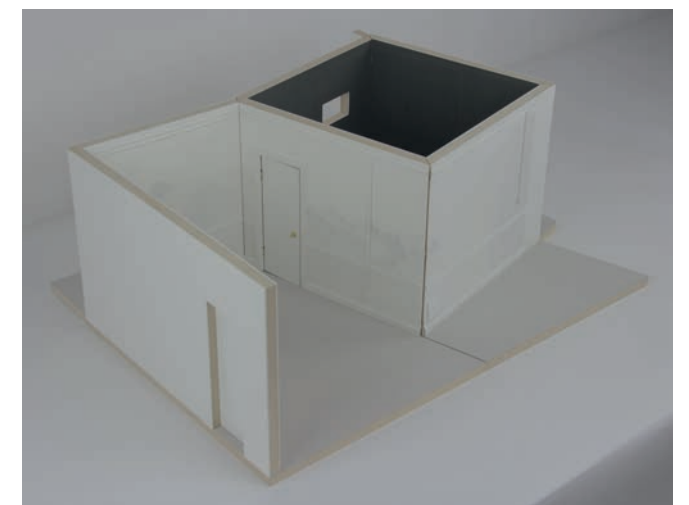


Figure 15.9 Operable model of the screening room, Scale 1" = 1'.

Although most other art disciplines were able to follow painting and to define their corresponding medium and problems that emerge from it, architecture has struggled to focus in any one conceptual framework. Perhaps there are too many factors that coalesce in any one project, even one that is strictly theoretical; so the idea of medium enters our field only out of art envy. If architects cannot claim a specific medium, however, they could claim something slightly less well known: the specification. A “spec book” is a necessary and legal document given to a builder, and we usually write these notes at the end of a project, once everything has been said and done. Most projects end with the delivery of two elements: a spec book of written instructions and a construction set of conventional drawings. Here is what a spec book might sound like:

Deliver materials to the job site in the manufacturer’s original, unopened packages and containers bearing manufacturer’s name, label, and the following information: product name or title of material; contents by volume; thinning instructions; application instructions; color name and number. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application. Surfaces for which painting is prohibited: sprinkler heads, heat and smoke detectors, pre-painted electrical equipment in equipment rooms including lighting inverters, VFCs, MCCs, switchboards, fire alarm and facility control system (FCS) panels . . .

Spec book instructions, we like to think, read somewhat like Samuel Beckett’s stage instructions. You might go so far, as a good modernist, to say that they read kind of beautifully. They are strange directives for a play that takes place on a slow construction site. We thought, perhaps the spec book could be architecture’s professional version of the concept of medium specificity? Just as Duchamp called the manufactured tube of paint a “ready-made” and, therefore, art, might the architects’ selection of paint, choice of masking tape, and specification of rollers be considered architecture?²³ As these choices are assembled in the spec book, it is here that architecture would then play itself out.

We don’t have much to do, so, as they say: we like to watch paint dry. We decided to make a spec book that would precede the design process. To translate a smooth gradient of a slit-scan into ordinary hues of house paint required a limited number of paints in the palette. We constrained the gradient to five tones, calling the new image a “render by number” (Figure 15.10). The width of tape and its straight edge became limiting factors for disciplining the digital image into a limited set of coordinates and outlines. Each masked layer was assigned a value of flat white interior base paint from a different manufacturer. It turned out that base whites from Sherwin Williams, Benjamin More, and Glidden, to name a few, when juxtaposed against one another on one wall, produce discrete differences in tone, hue, and reflectivity. They ranged from warm highlights to cool shadows, just different enough to make the painting visible (Figure 15.11).

We consider this installation a kind of model. Sure, it exists at the scale at which it was intended to be built. But it is composed of representational parts that are not functional in any sensible way. As much as the project exists in a world of optical effects and ornamental details, it is also pointing out the processes that built it—the technical problems, tools, and labor. Perhaps that is what models tend to do: they are objects that are both physical and mental; they exist here in this instant and they also comment on problems of their own production. In building the screening room for *Cold Rehearsal*, it seems that not unlike the characters in the film, we in turn were rehearsing to practice architecture by using our professional instruments and bringing them into the installation’s mise-en-scène.

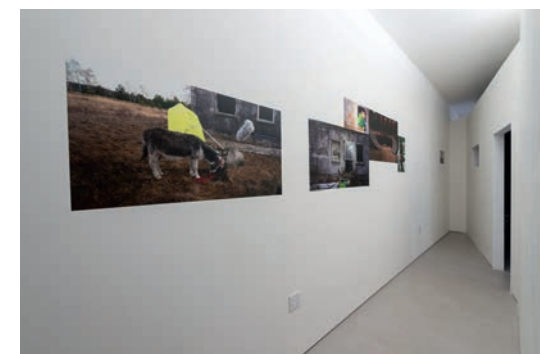
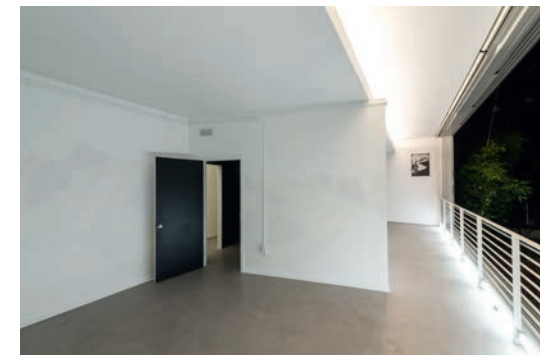
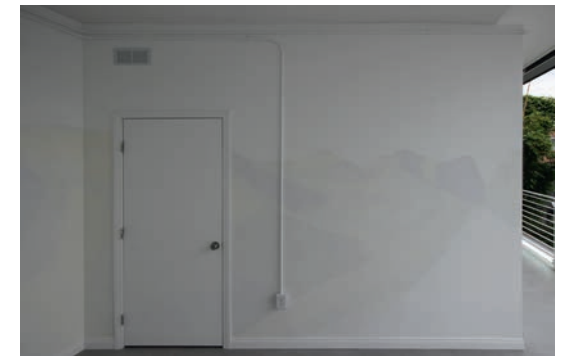
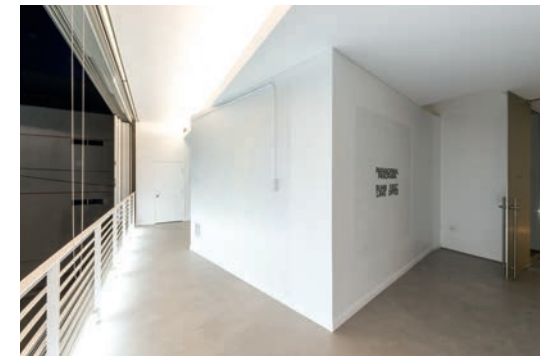


Figure 15.11 A walkthrough *Paranormal Panorama* by First Office; film by Ruhm/Lang (2013). Source: Photography by Joshua White/JWPictures.com.

Notes

- 1 Pierre A. Frey, *Viollet-le-Duc et le massif Mont-Blanc*, (Lausanne: Payot, 1988), p. 26.
- 2 Eugène-Emmanuel Viollet-le-Duc, tr. Benjamin Bucknall, *Mont Blanc: A Treatise on Its Geodesical and Geological Constitution; Its Transformations; And the Recent and Ancient State of Its Glaciers* (London: Gilbert & Rivington, 1877), p. 12.
- 3 Bucknall, in his introduction to his translation of Viollet's *Mont Blanc*, p. vii.
- 4 The actual photograph dates from 1915 and is not of Mont Tendre, but of Tschierva Glacier flowing down off Piz Bernina, located also in Switzerland, about 100 miles to the east. Tschierva Glacier is just south of Davos and is incidentally the site near the sanatorium in Thomas Mann's *Magic Mountain* where Hans Castorp goes on his mountain walks.
- 5 Constanze Ruhm, from an email exchange, May–September, 2013.
- 6 Thomas Mann, *Magic Mountain* (New York: Alfred A Knopf, 1939), p. 609.
- 7 For more on nineteenth century instruments and vision, see Jonathan Crary's *Techniques of the Observer*, (Cambridge and London: The MIT Press, 1990).
- 8 Viollet, tr. Bucknall, p. 7.
- 9 Paula Young Lee, "'The Rational Point of View': Eugène-Emmanuel Viollet-le-Duc and the *camera lucida*," in *Landscapes of Memory and Experience*, ed. Jan Birksted (New York: Spon Press, 2000), p. 73.
- 10 Bruno Latour, "Visualization and Cognition: Thinking with Eyes and Hands," in H. Kuklick (ed.) *Knowledge and Society Studies in the Sociology of Culture Past and Present*, Jai Press vol. 6, pp. 1–40, 1986.
- 11 Viollet, tr. Bucknall, p. 8.
- 12 Ibid.
- 13 Ibid., p. 9. For more information on geographic mapping, see David Gissen, "Architecture's Geographic Turns," *Log* 12, 2008.
- 14 Ibid., p. 10.
- 15 Ibid.
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