

Re-mastering Taylor's *Midwest Masterpieces:* *The Sullivan Banks*

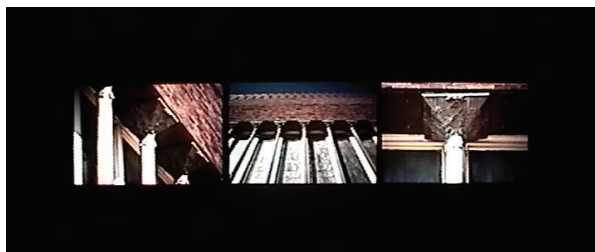
by ERIC FIELD *and* LAIN JIANG

Re-mastering Taylor's *Midwest Masterpieces: The Sullivan Banks*

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The Architecture of Democracy, The Chicago School 1876-1976, Part II Midwest Masterpieces: The Sullivan Banks, produced by Crombie Taylor in 1976, combines color photography of building exteriors and interiors with voice narrative and music in a 19-minute slide show that details the intentions, execution, and continued life of the eight midwestern bank buildings designed by Louis Sullivan at the end of his career.

Taylor produced the show using 35mm slide film photography¹ and a single reel-to-reel audiotape containing voice narrative and accompanying music, all projected at a very large scale—each photographic image was eight to ten feet across—on a wall. The show was composed using multiple slide projectors—six in fact—to achieve a sequence of visual narrative, highlighting the photography that is the core of the work. “Representing architecture at architectural scale,” as Jeffrey Plank explains, was a primary goal of the show, using media of appropriate fidelity available at the time, and taking advantage of new innovations in projection technology.



Photograph from video recording of a live show.

To build sequence, Taylor used a dynamic dissolve system,² a mechanism to fade from one slide projector to another, similar to a cross-fade commonplace in video technology but not at all common in still photography. Each fade used two projectors—upper and lower—aligned to project coincidentally onto the same region of the wall’s surface, and a dimming control on each projector’s lamp to slowly fade out one and fade in the other. First the upper would show, then fade the lamp out while the lower’s lamp would slowly fade in to construct a visual cross-dissolve, building a smoother flow from the otherwise still photographs. Both fades would trigger simultaneously by a single control.

The fade control indicator was built into the dissolve system, accomplished via “sync pulses”—beep tones—written to the second track of the reel-to-reel audiotape and audible only to the slide show’s controller. These tones indicate when the projection fade was to occur. The darkened slide trays advance to the next image after the fade and wait for the next control beep indicating to fade back in.



Six slide trays—the Chicago set—were preserved.

With these, and aligning three pairs of slide trays—left upper/left lower, center upper/center lower, and right upper/right lower—across the wall, Taylor constructed a mechanical system to present a unified visual narrative.

Sullivan Banks remains an important piece of work, representing both Sullivan and Taylor, but the original equipment to present it is long obsolete and difficult to reconstruct, much less port and show easily. Fortunately we have a video recording of one live slide show, along with the slide trays and reel-to-reel audio tape, preserving the complete slide arrangements and clean original audio tracks from the Chicago shows in their original form. From these original sources, we have re-constructed and re-mastered *Sullivan Banks* into a high-definition video that we believe preserves and archives Crombie Taylor's original arrangement and intention in presenting the Sullivan masterpieces.

RECONSTRUCTING THE SEQUENCE: THE SOURCE ARTIFACTS

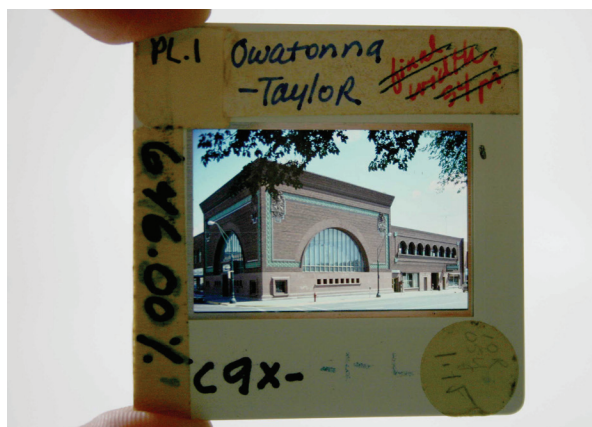
The following original artifacts were preserved and became the basis for our reconstruction.

Slide trays

Original equipment for *Sullivan Banks* includes six slide trays, arranged in two sets of three, positioned upper and lower, each with a left, center, and right tray. The slides within each tray are arranged and numbered sequentially so as to setup distinct triplets (L, C, and R) that progress in unison. In slots where no photographic slide is shown, a black plastic opaque slide is placed, to block the light from the projector's lamp and preserve the uniformity of the sequence progression. The trays would always advance in unison—always an L, C, and R together—even if only one, or none, would hold an image. The trays are the original storyboard of the



The Center Lower (CY) tray.



Slide CX9—Center Upper (X) position 9.

show, from which we know specifically which slides were meant to show together, and in what sequence.

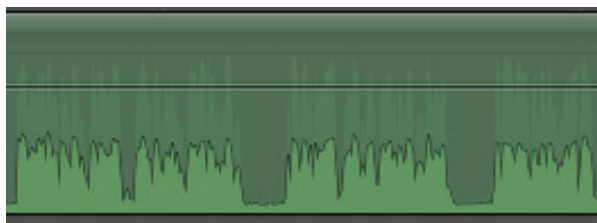
To convert the show, each slide was removed from the tray, independently scanned into a high-resolution digital TIFF file at 4000 dpi, and named according to the slide-tray and slot position within the numeric sequence. For instance center tray (C), upper tray set (X), and slot 9 in the tray would be named *cx09.tif*.

Audio narrative with music

A reel-to-reel magnetic audiotape accompanied the slide tray sets, providing a voice narrative with accompanying music, to tell the story of *Sullivan Banks*. The audio track is continuous from start to finish, and provides both a meter and organization to the content of the show. The audio track was digitized from the reel-to-reel tape into a single continuous audio .WAV file.



Reel-to-reel audiotape with narrative and control tone.



Narrative and music track.



Control tone track.

Audio control tone

A second audio track, digitized simultaneously from the same reel-to-reel tape, contains the sequence of beep tones that were used to control the advance of the slide trays. The beep tones exist on their own unique audio track, separate from the narrative and music track, but are specifically aligned with it. The equipment to fade and advance the slides used the control tone automatically.

Video recording of a live slide show

A video recording, transferred from a videocassette to DVD, shows the full sequence of a running show, videotaped from a central position in the room. The video captured the wall on which the slide show was projected, along with sound of the narrative, music, and even the mechanical changing of the slide tray advances. The control tone is not heard in this video, as that would not normally be audible to the viewing public. This video provides the artifact of a checkpoint against which the slide-tray storyboard, the narrative, and the audio control track can be registered.

ANALYSIS

To properly reconstruct the show from these various inputs, we needed to link the image sequence to the control track to the narrative, and all with an eye for Crombie Taylor's original form and intention. Having no specific written documentation on the

show – Crombie Taylor's or otherwise – and having no specific storyboard or instruction sequence outside of the artifacts presented above, we needed to go through a process of aligning, linking, and analyzing the pieces. No single piece tells the whole story.

Linking the DVD video and the control tone

Using the captured video recording (DVD) as an initial source, we first set out to generate a storyboard outline of the entire slide show. This required converting the DVD into a digital movie file, and then importing that movie file into non-linear video editing computer software to view, analyze, and document the show. We used both Adobe Premier and Apple Final Cut Pro (both fairly equivalent software). The intent was to produce a time-code mapping of the slide sequence and lay down a framework of markers for rebuilding the show.

			
lx3	cx03		
			01;01;17;19 - 01;01;18;02
	cy4		beep duration: 13 fade duration: 10
			01;01;22;24 - 01;01;23;17
	cx04		beep duration: 23 fade duration: 44
			01;01;28;01 - 01;01;28;19
	cy5		beep duration: 18 fade duration: 51

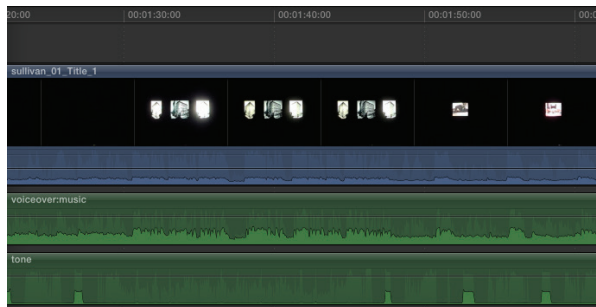
Manual recording of time-codes and durations.

Using software, we documented time-code locations for each slide as it appeared in the captured show. This time-coding was done manually, within the precision of a few video frames (there are 30 frames in one second of video). Along with time-codes for the starting point for each slide transition, we also recorded the visual duration of the transition fade—how long it takes to fully fade from one slide to the next full slide.

The next major task was to determine exactly how the control track of beep tones was being used in the original show. Since the beeps are not audible in the DVD capture, we could not determine directly from

this source what their specific relationship was to the slide timings. We needed to discover if the beep tones occur as a direct trigger for the fade, or for the tray advance which would necessarily occur a few seconds after the fade. Is there any significant delay from the beep to the action, and does the beep sequence even line up? We presumed that it would, but exactly how was worth investigating.

We used digital video editing tools to juxtapose and align the clean audio track as digitized from the reel-to-reel tape against the DVD video. Since the narration audio track is audible (and visible using editing software), we can directly line up the “clean” digitized narrative track to that which played during the video capture. Because the control tone track (also a clean digitized capture) aligns perfectly with the clean narrative track, we then could align the control track of beeps to the DVD captured show.



The DVD video (above) aligned with voice narrative and control track audio tracks (bottom two).

The most difficult challenge encountered during this process was that the physical magnetic tape appears to have stretched. The two audio narrative tracks don’t stay aligned as the show plays on. While aligning both narrative tracks at any given point, they will progress in parallel for a time, but slowly shift out of alignment due to mechanical error. The stretching observed is not linear or predictable, as sometimes the discrepancy will elongate, then slowly return to alignment. This is most likely due to a variable play rate of the equipment used during the live show that was captured and now stored on the DVD.

The stretching created a bit of a challenge for the documentation process, requiring periodic shifting and re-alignment of the audio tracks to continue to align the control track beeps back to the DVD. Ultimately we were able to align the beep positions to the DVD video and determine a general relationship between them (of course with a margin of error due to the stretching).

That relationship shows that the beep tone sequence does align directly with the slide transitions, and is a direct initiator of them.

The slide trays: refining the sequence

The completed storyboard and timing outline of the slide show however began to reveal some oddities. Some slide pairings seemed inconsistent, with slides that didn’t match for content, and a few odd timings were present. There were extra slide transitions—ones that didn’t pair with a beep tone—and cases where it appeared that the equipment had missed changing a slide, likely for mechanical reasons. Slide content sequences would subsequently be out of sync, with what appeared to be manual corrections to the slide advances moments later. Along with the stretching, these inconsistencies called into question the validity of the DVD video capture as a proper marker of the show’s progression (see Appendix A).

At this point, we turned to the original slide trays.

As stated before, the trays are highly organized. There are two sets of trays—an upper (X) set and a lower (Y) set. Each set has three trays—left, center, and right. Each tray has numbered positions for up to 80 slides.



Three pairs of slide trays.

Working from the presumption that each beep tone on the control track would trigger a fade into a complete triplet set, the numeric sequence must progress in order and uniformly across the sets. Thus a sequence as follows would be strictly adhered to and would all advance and show at exactly the same time:

LY1 – CY1 – RY1
 LX1 – CX1 – RX1
 LY2 – CY2 – RY2
 LX2 – CX2 – RX2

The presumption is that slides were never intended to be shown out of this sequence (as we were finding on occasion in the video recording), and that the pairings were to be strict. The reason for this presumption is two-fold: (1) there is only one beep code to advance, not separate beep codes for L, C, and R trays, and (2) the triple side-by-side alignment was likely a physical proxy for the overall structure and intention of the show. Once again, the trays constitute the original storyboard.

Building a new digital storyboard

Moving forward with this working presumption, we then produced a new storyboard, this time in full resolution from the high-resolution slide scans, in preparation for building the final product.

First, the original image scans were cropped (very slightly) and righted (turned to correct for slight angles that the scanning process had introduced). Image cropping simply shaved the edges to make them clean and straight, eliminating the roughness of the original film image's edge and highlighting the photography rather than the film's off-black background. In most cases this was a very few pixels out of the 5905 x 4032 in each image.

Using Adobe InDesign as a layout tool, we created an initial template to structure the video frame. The page size was set to 1920x1080 High Definition (HD) video resolution, establishing the size and output scale. A Master Page was created with three 600px square boxes, side-by-side to hold the slides, and aligned to the

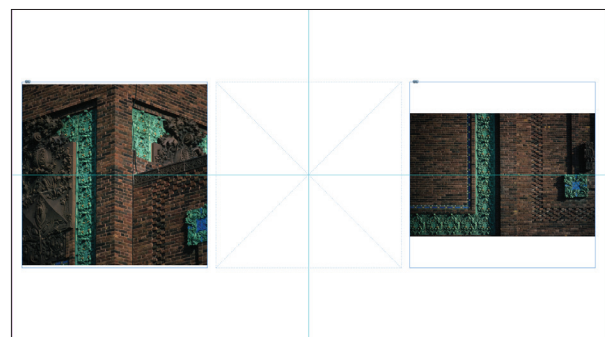
horizontal and vertical centerlines of the page. Using this template, we inserted the newly cropped images into the template pages, ensuring that upper vs. lower sets, left, center, and right trays, and slide location numbers were adhered to strictly. Each change in slide number or tray set created a new page, constructing a series of 138 pages of images in triplet sets.



The layout template for slide triplets.

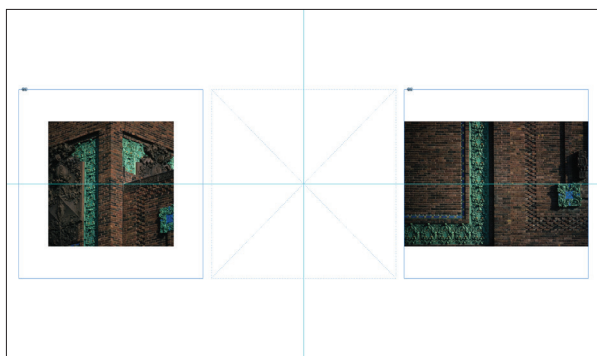
The format now presented two options for sizing and aligning the slides:

Option 1. Allow all slide images to fully fill the 600 pixel squares, with horizontal images filling horizontally and vertical images filling vertically. This permits each slide to reach its maximum visual scale within the frame, for best visibility and detail.



Option 1—images fully fill the frame.

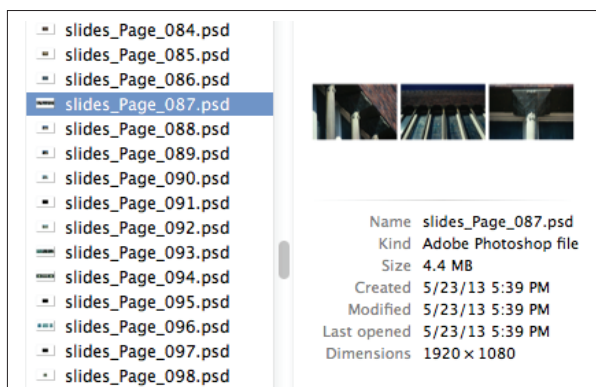
Option 2. Allow horizontally formatted images to fill the 600 pixel square, but reduce the size of vertically formatted images to match the height of adjacent horizontal images, maintaining a consistent horizontal band across the slide triplets for each page. This often includes the need to downsize some horizontal images also to fit the smallest vertical dimension of any slide on a given page.



Option 2—images maintain horizontal consistency.

Ultimately we chose the second option for the final video, as it maintains a better visual consistency and a cleaner horizontal reading across the entire show. Perhaps more importantly, option 2 is in keeping with Crombie Taylor's original format, and thereby his intentions for *Sullivan Banks* photography. We felt that even though the larger vertical slides allowed for more visual detail, the shifts in size and orientation were jarring to the overall composition and intention.

With a full sequence of layout pages completed, the layout is exported into a 138-page extremely high resolution PDF document, which is then further exported using Adobe Acrobat into 138 individual TIFF images, down-sampled to 72 dpi to construct HD video resolution pages (one for each slide triplet) of the entire slide show collection. The TIFF images are then processed through Adobe Photoshop Batch Actions to make the white background transparent, and save each image as a Photoshop .PSD file.



Slide triplets—the final image files.

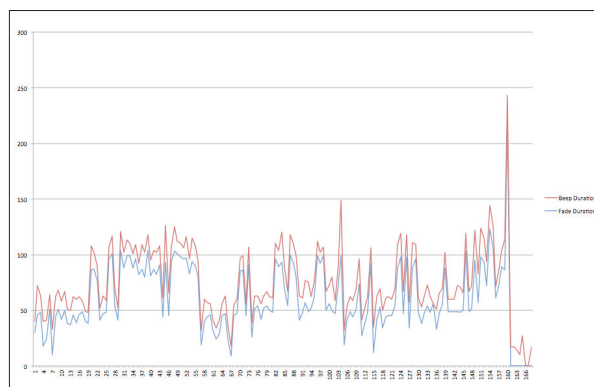
The slide image sets, all perfectly organized and aligned to the original slide tray organization, are now ready to be brought into the video editing software.

FADE TRANSITIONS: A COMPARISON AGAINST BEEP DURATIONS

With the slide sets formatted and complete, the last question is how to transition from one set to the next. For a unified presentation, the transitions between the slides are critical to the overall flow, so we need to look at the fade transition details, particularly their length and uniformity.

As discussed earlier, the beep tones on the control track are the triggering mechanism for the fades between upper and lower slide tray sets. The initial analysis documented both time-code location and length of the beeps, and through this we discovered that the beep tones in fact have a wide range of durations. The shortest beep was found to be 8 frames (0.27 seconds) while the longest was 50 frames (1.67 seconds). Are these lengths intended to mean or control anything? Looking more closely at the DVD, we also documented the duration of the fade transitions—the time from the start of a fade to the completion of that transition—and we found a very similar pattern. There was considerable variation within the fade durations, from 9 frames (0.3 seconds) to 217 frames (7.2 seconds).

Overlaying a chart of beep durations with fade durations, we find a very interesting correlation—longer beeps generally correspond to longer fades, and shorter beeps

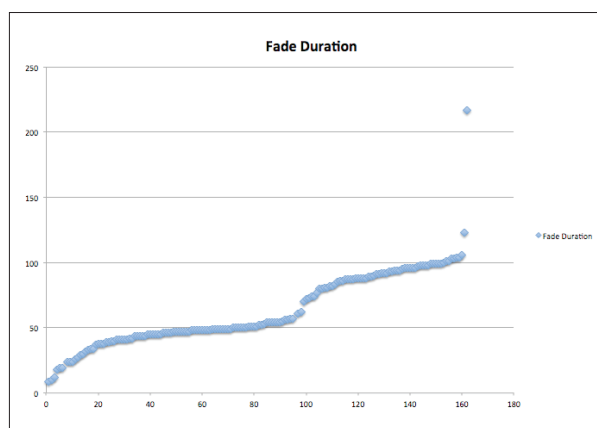


Beep tone duration and fade time duration.

to shorter fades. This correlation suggests that the beeps were a direct control for the slide fading, and that the system was mechanically automated.

With this evidence, we spoke with Crombie Taylor's son John Taylor, who assisted in developing the original slide program. He recalled that there were only two or three different fade times in use, based on two or three button controls that an operator would have programmed into the sync pulse audio track. We thus investigated further to see if there were any general patterns or groups into which the fade time durations would fall, so as to normalize the durations into two or three different lengths, uniformly across the entire show.

The chart "Beep tone duration and fade time duration" above shows every fade transition graphed by its duration in the show, in units of frames (with 30 frames to a second). Notice that although there is a wide range, there are generally two center points around which most of the values scatter. A re-arranged plot (below) shows this even more clearly, where there are two distinct groupings, centering around 45 frames (1.5 seconds) and 90 frames (3 seconds), with a gap between the two sets from 62 to 72 frames. Thus, two general fade timings emerge: a short fade (1.5 seconds) and a long fade (3.0 seconds). For uniformity in the show, we thus chose that each individual fade would be normalized to the closer of these two durations (see Appendix E).



Beep tone duration and fade time duration.

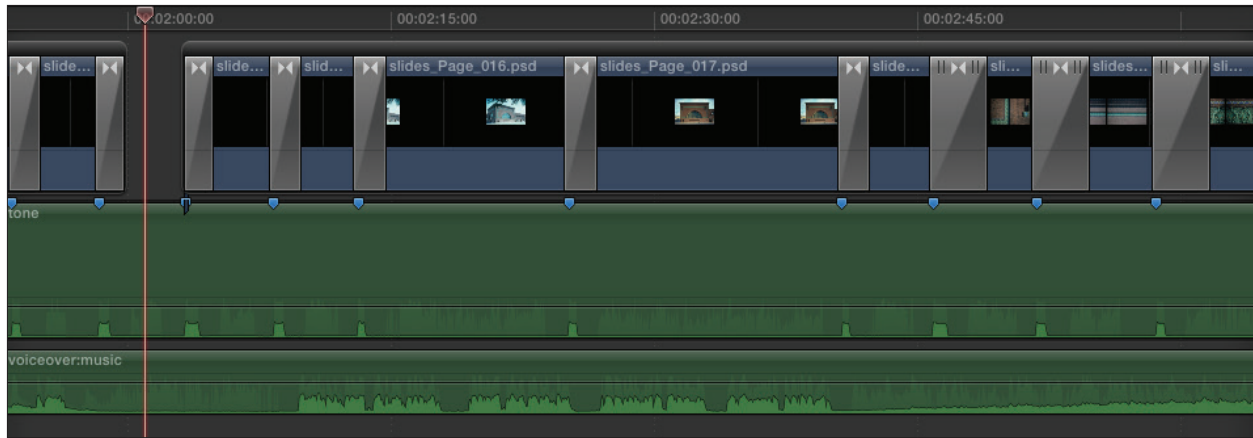
Making this choice, we fully recognize that such a discreet normalization may seem to discount any potential nuance of content—perhaps the incremental variations in fade duration were in fact part of Taylor's intention, used to set a tone and flow uniquely between certain images that such a fixed regularization would counter. We certainly took this into consideration, and we discovered that within the slide content, narration and accompanying music sequence, the standardization into two distinct durations actually enhances the sense of content. Key sequences of images end up being grouped by their fade durations, with changes in the fade duration happening concurrently with changes in content, narration tone, and shifts in musical character. The rose window sequence in the Grinnell bank, for instance, consists of an important sequence of long fades, slowing down to pause on the detail of the window's distinctive stained glass. Holding the transitions to a regularized length through this sequence adds uniformity and pace, much like the visual uniformity of holding all slide images to a single height, as discussed earlier. Additionally, slides which end a particular bank set (fading to black) are almost always a long fade, even if the prior several were short. Fades leading into new title slides are always short. Finally, the coda sequence that recalls all of the major themes of the show consists of entirely long fade durations, as the music and narration both draw to reflection and conclusion. The overall composition of the show is in fact enhanced by the structural device of the strict bipartite fade duration.

RECONSTRUCTING THE SHOW

Alignment and justification of the trays to the beeps to the narrative to the fades

With all of this information and structural decisions in hand, our final step was to compile, align, produce, and fine-tune a final video sequence.

Laying down the narration with music and control tone tracks as a base within Final Cut Pro, then setting time-code markers at the beginning of each control track beep (to within less than 1/60th of a second accuracy), establishes a framework for inserting the slide images.



The final arrangement edited and aligned in Final Cut Pro.

The .PSD slide triplet images, each of which is perfectly sized to the HD movie format, and each of which has a transparent background so only the slide photography shows atop a pure black canvas, are imported and then placed and snapped to the proper time-code markers.



Sample triplet image projection.

To transition between images, the appropriate fade time is found on the chart, and the end-point of the outgoing slide is set to extend beyond the beep tone marker by exactly one-half of the overall fade duration (half out, half in). This fade time setting positions the transition between slides to ensure that the fade begins exactly at the start of the beep tone, and that the fade transition—a simple cross-dissolve with 100% easing—cuts perfectly across the two slides, ramping the first out while the second ramps in over the set duration. This digital fade is equivalent to the mechanical lamp fade in Taylor’s slide projectors, but here even more precise.

The entire sequence is checked against the narration and music to ensure that timings line up, that slides show when the narrator is talking about them, and that transitions in music line up properly with transitions in slides. This crosscheck ensures that we are not missing or misaligning an intention within the content and flow of the production.

Like good architecture, the entire sequence falls together nicely according to its own internal order, and one can clearly see that the control tone meter, coupled with the strict slide tray organization, is indeed the framing structure of the show. Key moments click into position with an accuracy and intention that the DVD capture—as but one artifact fraught with mechanical errors and variations—did not reveal. We believe that we have recaptured Crombie Taylor’s original intentions with a technology now that is able to render forward his vision far better than the technology with which he was working in 1975.

ACKNOWLEDGMENTS

In the preparation, analysis, and production of this work, we acknowledge thanks to the following:

The Estate of Crombie Taylor, Santa Barbara, CA, for providing the full set of 35mm photographic slides, slide trays, and original audiotape, artifacts of the original Chicago production, as well as the DVD video capture of a running slide show, all preserved in original form and format.

Dean Abernathy and the University of Virginia Institute for Advanced Technology in the Humanities, for digital scanning of the 35mm slide collection.

John Taylor, for consultation, advice, and memory of the working formats, equipment specs, slide sequences and many more details surrounding Sullivan Banks productions, and for his review of the working analyses and several rough-cuts as we were producing the re-master.

Jeffrey Plank, for the vision behind the entire project, the suggestion to take it on, the edits and refinements along the way, the continual encouragement for the ongoing work, and the excitement over the details and technical findings as we pieced together this puzzle.

AUTHOR BIOSKETCHES

Eric Field is Founder and Director of the Insight Lab, and lecturer of applied and advanced technologies at the University of Virginia School of Architecture. An architect and technologist, Field's specialty is in computation, visualization, and simulation of the built environment, applying digital and information technologies to architecture, engineering, and public policy. Field seeks out and develops new tools, techniques, and emerging technologies for design and visualization. He is a recipient of collaborative awards for the development of new visualization and simulation tools, and has published several digital analyses and reconstructions of notable historic architectures.

Lain Lai Jiang, Master of Architecture student at University of Virginia in her last year, is especially interested in studying the connection between cinematic and theatrical world and architecture. When she's not doing architecture-related things, she likes to explore the ocean and mountains.

NOTES

¹All slide photography for *The Sullivan Banks* series was photographed by Crombie Taylor, using Nikon F1 and F2 series 35mm cameras. Kodachrome 25 film was used for all exterior photos. Ektachrome was used for interiors. 35mm and 25mm perspective correcting lenses were used for elevation correction on much of the architectural photography, with a 200mm lens for telephoto shots. Thanks to Crombie Taylor's son John Taylor for this information.

²The initial dissolve system was the Spindler & Sauppe Dynamic Dissolve System. The second system used was the Clearlight Microdiamond. Thanks to Jeffrey Plank for this information.

In an advertisement for a Spindler & Sauppe at a recent eBay auction, it is described as follows:

Spindler & Sauppe Dynamic Dissolve Model 772

Spindler & Sauppe Quadra Que Programmer Model 790

The SPINDLER & SAUPPE DYNAMIC DISSOLVE 772 IS AN ALL-PRO UNIT, designed for continuous use, it's rugged and very versatile. The DISSOLVE RATE CONTROL extends to OVER A MINUTE (for the classiest, slow, almost surreal transitions imaginable). The control panel is tastefully lit for darkened room use. Discrete lights indicate function status. A class act.

The Quadra Que 1 is a 4 CHANNEL PROGRAMMER AND CUE READER. The BAT HANDLED SWITCHES go UP and DOWN from centre, and light in different colours as this is done so you know what type of cue is being created, and then read. SYNC pulses are generated and read by this unit.

Typically, you record a soundtrack, play it back with your slides all cued up correctly, and then operate the programmer, after connecting it properly to record on a track on your recorder. A sync track is then created. Then the tape is played again, with the Quadra Que reading the tape's sync signals and translating that to operating the DYNAMIC DISSOLVE unit, which in turns operates the projectors with all the tasteful polish of synchronization that you've just created.

Source: eBay

<http://www.ebay.com/itm/ws/eBayISAPI.dll?ViewItem&item=220844429538&item=220844429538>

APPENDIX A: Notes on DVD Sequence Inconsistencies

Within the DVD video, and matched against the trays and clean tones, the following are circumstances where the DVD appears to be in error. These are sequences in which the alignment of left-center-right is not strict, and where fades happen non-uniformly, which are likely not correct. These errors were most likely due to either mechanical error in the slide tray changes, or human error in loading the slides into the proper tray locations.

Each of these has been corrected within the re-mastered video according to our reading of what Taylor's intent likely was.

Time codes are keyed to the final version of the re-mastered *Sullivan Banks* video.

- 03:32 Owatonna central space: CY15 (central space) fades in first, then fade in LX / RY15 just a bit later.
- 07:05 Cedar Rapids: CY29 into X29 – title slide stays too long. Photo slides show up beside title.
- 11:47 West Lafayette: CX50 comes in first, then LX50, RX50. Why are the left and right slides delayed by a few seconds?
- 12:36 Newark, Ohio: CY52 (title slide) holds too long into side-by-side photos. Is it fading late?
- 13:46 Sidney, Ohio, several slides in: Center slide (CX57) fades in first, followed quickly behind by left and right (LX/RX57). This slight delay probably shouldn't be there.
- 14:40 Sidney, Ohio: "heated bench" RY61 fades in before "children at fountain" LY61. Timings likely should be the same. The narrative mentions them in the opposite order, so this must be wrong.
- 15:21 Columbus, Wisconsin: left and right (LY64 and RY64) hold too long into center (CX64).
- 17:00 Columbus, Wisconsin: side-arch windows (LX70/RX70) and exterior facade (CX71) are all together in one set in the DVD, but they're clearly not all together in the trays (positions 70 and 71). The slides themselves are marked, (but who did this?) so this would indicate that the slide positions are correct, but this sequence doesn't fit the style of the rest of the show. The images make more sense with the windows paired alone, then the facade at center independently following.
- 17:05 Columbus, Wisconsin: narrative "The low tapestry brick walls..." through "a great master of form, space, and color." Should the last two slides be switched in order – interior first then exterior? The narrative is describing the interior elements, while the exterior shows, and then the narrative generalizes to a summation while the interior shows. We believe this should reverse.

Note: In the DVD this sequence is different, with the exterior slide shown between the side-arch windows (see 17:00 above). Because of this, the interior shot holds throughout the duration of both of these slides, holding across a beep tone boundary, which itself is inconsistent.

Our recommendation is to correct this by switching the order of interior and exterior slides (CX71 and CY71).

APPENDIX B: Notes on Sync Pulse (Beep Tone) Inconsistencies

The following are inconsistencies in the sync pulse (beep tone) track, discovered while aligning and justifying the slide trays to the changing sequence.

Time codes are keyed to the final version of the re-mastered *Sullivan Banks* video.

08:10 There is an extra beep tone, with no slides or transitions.

12:21 There is another extra beep tone, this time within a slide sequence. No change in slides or transition seems to go with this extra tone.

APPENDIX C: Notes on Corrections to Slides and Slide Sequence

Slide numbers relate to tray location and slot in tray.

RY15 flipped horizontal

CX57 rotated 180

LX53 renamed to LX56 (correct in slide tray, scan name seems to be wrong)

RX53 renamed to RX56 (correct in slide tray, scan name seems to be wrong)

CX13 moved to left side of video frame rather than center. This is more consistent with the overall layout.

CX71 and CY71 to switch order – CY71 before CX71 –

for consistency with narrative (see note for 17:05 in Appendix B). Were they in the wrong slide-tray locations and wrong written markings on the slides? It makes more sense to have interior details showing while narrative is talking about interior details, and then fade to an external overall shot of the building, as a final slide for this building.

APPENDIX D: The Complete Sequence of Slides, in Triplet Sets

The following sequence of pages reproduces the full set of slide photography, in sequence and horizontally grouped, for the entire show. This sequence is the visual basis and storyboard for *The Sullivan Banks* slide show.

APPENDIX E: Sync Tone Timecodes, Edits and Fade Durations

Sync tone marker timecode	Original fade transition: DVD frames (30fps)	Normalized fade transition: final frames (30fps)	Normalized fade transition: final frames (60fps)	Normalized fade transition: final duration (seconds)	Transition intro: slide triplets image index	Notes
0:00:00						start of show
0:16:38	30	45	90	1:30	1	"The Architecture of Democracy"
0:28:54	46	45	90	1:30		
0:40:07	48	45	90	1:30		
0:48:09	18	45	90	1:30		
0:52:59	24	45	90	1:30	5	intro sequence
1:13:42	51	45	90	1:30		
1:18:54	10	45	90	1:30		
1:24:08	44	45	90	1:30		
1:29:31	51	45	90	1:30		
1:34:48	42	45	90	1:30		
1:39:45	50	45	90	1:30		
1:44:36	38	45	90	1:30		
1:49:26	37	45	90	1:30		
1:54:24	46	45	90	1:30		
1:59:19	39	45	90	1:30	14	"Owatonna, Minnesota"
2:04:22	46	45	90	1:30		
2:09:10	49	45	90	1:30		
2:21:11	40	45	90	1:30		
2:36:46	38	45	90	1:30		
2:41:57	87	90	180	3:00		
2:47:49	87	90	180	3:00		
2:54:39	77	90	180	3:00		
3:01:43	41	45	90	1:30		
3:06:46	47	45	90	1:30		
3:11:58	48	45	90	1:30		
3:17:28	96	90	180	3:00		
3:25:37	101	90	180	3:00		
3:31:42	54	45	90	1:30		
3:49:56	104	90	180	3:00		
3:59:16	88	90	180	3:00		
4:08:31	99	90	180	3:00		
4:17:23	99	90	180	3:00		
4:22:17	88	90	180	3:00		
4:33:27	96	90	180	3:00		
4:38:21	82	90	180	3:00		
4:48:14	87	90	180	3:00		
4:53:07	80	90	180	3:00		
5:04:48	104	90	180	3:00		
5:10:45	81	90	180	3:00		
5:20:32	87	90	180	3:00		

APPENDIX E continued from previous page

Sync tone marker timecode	Original fade transition: DVD frames (30fps)	Normalized fade transition: final frames (30fps)	Normalized fade transition: final frames (60fps)	Normalized fade transition: final duration (seconds)	Transition intro: slide triplets image index	Notes
5:25:38	82	90	180	3:00		
5:34:40	91	90	180	3:00		
5:42:27	44	45	90	1:30		
5:49:07	93	90	180	3:00		
5:56:16	45	45	90	1:30		
6:02:52	94	90	180	3:00		
6:07:41	103	90	180	3:00		
6:12:54	101	90	180	3:00		
6:23:13	98	90	180	3:00		
6:28:00	96	90	180	3:00		
6:32:48	97	90	180	3:00		
6:39:06	83	90	180	3:00		
6:43:59	94	90	180	3:00		
6:48:50	90	90	180	3:00		
6:59:28	81	90	180	3:00		
7:04:19	19	45	90	1:30	54	"Cedar Rapids, Iowa"
7:09:12	40	45	90	1:30		
7:21:07	46	45	90	1:30		
7:26:02	32	45	90	1:30	56	"Algona, Iowa"
7:30:48	24	45	90	1:30		
7:37:35	29	45	90	1:30		
7:43:16	45	45	90	1:30		
7:51:15	85	90	180	3:00		
7:55:59	86	90	180	3:00		
8:00:40	45	90**	180	3:00		**overrode fade duration for visual consistency
8:05:26	91	90	180	3:00		
8:10:09					no slide	extra sync tone
8:14:57	26	45	90	1:30	63	"Grinnell, Iowa"
8:19:40	51	45	90	1:30		
8:41:52	54	45	90	1:30		
8:46:36	42	45	90	1:30		
8:51:31	52	45	90	1:30		
8:56:20	54	45	90	1:30		
9:01:09	50	45	90	1:30		
9:06:03	48	45	90	1:30		
9:14:16	96	90	180	3:00		
9:19:13	89	90	180	3:00		
9:26:48	93	90	180	3:00		
9:34:22	70	90	180	3:00		
9:41:49	54	90	180	3:00		
9:47:00	100	90	180	3:00		

APPENDIX E continued from previous page

Sync tone marker timecode	Original fade transition: DVD frames (30fps)	Normalized fade transition: final frames (30fps)	Normalized fade transition: final frames (60fps)	Normalized fade transition: final duration (seconds)	Transition intro: slide triplets image index	Notes
9:51:55	92	90	180	3:00		
9:56:56	80	90	180	3:00		
10:04:37	41	90**	180	3:00		**override fade duration for consistency
10:09:47	48	45	90	1:30		
10:15:20	57	45	90	1:30		
10:20:02	49	45	90	1:30		
10:42:58	52	45	90	1:30		
10:48:05	99	90	180	3:00		
10:53:54	92	90	180	3:00		
10:59:47	99	90	180	3:00		
11:06:19	50	45	90	1:30		
11:18:55	56	45	90	1:30		
11:26:31	50	45	90	1:30		
11:34:28	47	45	90	1:30		
11:42:04	74	90	180	3:00		
11:47:00	19	45	90	1:30	91	"West Lafayette, Indiana"
11:51:51	41	45	90	1:30		
12:05:56	49	45	90	1:30		
12:15:27	44	45	90	1:30		
12:21:22						extra sync tone, skip
12:27:47	74	90	180	3:00		
12:32:26	27	45	90	1:30	95	"Newark, Ohio"
12:35:41	39	45	90	1:30		
12:44:51	92	90	180	3:00		
12:50:06	12	45	90	1:30	97	"Sidney, Ohio"
12:54:53	41	45	90	1:30		
13:10:54	53	45	90	1:30		
13:15:41	34	45	90	1:30		
13:20:49	44	45	90	1:30		
13:25:56	45	45	90	1:30		
13:30:53	45	45	90	1:30		
13:38:42	54	45	90	1:30		
13:43:38	88	90	180	3:00		
13:50:50	98	90	180	3:00		
13:56:38	47	45	90	1:30		
14:11:48	98	90	180	3:00		
14:22:57	34	45	90	1:30		
14:28:09	88	90	180	3:00		
14:33:32	96	90	180	3:00		
14:38:52	48	45	90	1:30		
14:49:17	47	45	90	1:30		

APPENDIX E continued from previous page

Sync tone marker timecode	Original fade transition: DVD frames (30fps)	Normalized fade transition: final frames (30fps)	Normalized fade transition: final frames (60fps)	Normalized fade transition: final duration (seconds)	Transition intro: slide triplets image index	Notes
14:54:09	54	45	90	1:30		
14:59:06	48	45	90	1:30		
15:03:47	88	90	180	3:00		
15:09:04	33	45	90	1:30	116	"Columbus, Wisconsin"
15:13:56	47	45	90	1:30		
15:20:59	55	45	90	1:30		
15:37:23	58	45	90	1:30		
15:42:15	49	45	90	1:30		
15:47:12	49	45	90	1:30		
15:54:38	49	45	90	1:30		
16:00:53	49	45	90	1:30		
16:08:39	48	45	90	1:30		
16:13:37	50	45	90	1:30		
16:23:03	103	90	180	3:00		
16:29:18	49	45	90	1:30		
16:37:27	51	45	90	1:30		
16:51:41	95	90	180	3:00		
16:57:36	57	45	90	1:30		
17:03:29	98	90	180	3:00		
17:17:07	94	90	180	3:00		
17:27:13	72	90	180	3:00		
17:39:09	123	90	180	3:00	133	conclusion sequence
17:50:45	106	90	180	3:00		
17:58:33	61	45	90	1:30		
18:06:01	73	90	180	3:00		
18:13:30	89	90	180	3:00		
18:20:54	86	90	180	3:00		
18:43:45	217	300	600	10:00		
19:06:00						end of show

APPENDIX F: Technical Requirements to Play *The Sullivan Banks* Video

The Sullivan Banks re-mastered video show is produced and delivered in a digital movie file, containing the complete visual and audio program in a single, portable package. This movie file can be played on any computer or similar digital device, and displayed on a laptop- or desktop-scale monitor screen, a High-Definition TV, or a High-Definition wall-scale projection system.

The video has been produced in two sizes (pixel resolutions), and there is a single video file for each:

1. *High-Definition (HD), 1920 x 1080 pixels, widescreen format*

- To be played on standard desktop / laptop computer equipment and standard digital television or digital projection equipment.
- Most current computer and television displays can display HD content.
- A mid-tier video projector system (for wall projection) will be needed to play HD (1920 x 1080) resolution.
- Two digital video file formats are provided for maximum compatibility. Both are complete versions of the show and are self-contained:
 - i. .mp4 MPEG 4
 - ii. .mov QuickTime Movie

2. *Digital Cinema 4K, 4096 x 2160 pixels, widescreen format*

- To be played using special equipment that is capable of displaying 4K resolutions. High-end digital cinema projection equipment will be needed to take advantage of this format. This is available from several companies, currently including Sony, Projection Design, and others, and is most often used in commercial digital movie theaters.
- Due to its higher pixel resolution, this version more closely reproduces the image quality of Crombie Taylor's original slide photography, the fidelity of which is reduced when fitting to the more standard video formats.
- One digital video file format is provided at this resolution:
 - i. .mov QuickTime Movie

Digital video files are best played with one of the following, but can be played with most common standard video player software:

- QuickTime <http://www.apple.com/quicktime/download/>
- VLC <http://www.videolan.org/vlc/index.html>

NOTE: With any video display or projection system, the fidelity of images depends not just on the type and quality of equipment used, but also on the room it is displayed in, the quality and type of projection surface, and lighting and glare.