"Neglected, Found & Preserved: Architectural Drawings for the School of Architecture."

Libraries Research and Innovative Practice Forum
Thursday June 6, 2024; 1 - 1:30 PM, Special Events Room 6137 McKeldin Library
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Presentation Abstract

A set of 39 architectural drawings for the School of Architecture Building from 1969 was recovered from a faculty office. The drawings are diazotype prints and were bound along the left edge with strips of wood and bolts. Damage consisted of tears & losses to the paper support, fading of the image due to oxidation and extensive pressure-sensitive tape repairs that had deteriorated. This presentation will discuss the history of these drawings, the potential use in Architectural coursework upon their re-surfacing, what damage they had sustained and the necessary treatment needed to stabilize the drawings for digitization.

Introduction and History (Cindy)

Slide 1 - Introduction

Hello and welcome to "Neglected, Found & Preserved: Architectural Drawings for the School of Architecture." My name is Cindy Frank. I am the architecture librarian and I will be talking about the School Building and the set of drawings needed to build it. Then we will hear from Bryan Draper and Kirsten Elliott about the Preservation Issues and repairs needed. Finally Alex Trim will explain the digitization process and challenges.

Slides 2-6 - History of the building

The University of Maryland Architecture Program was started in 1968. Classes were held in four temporary buildings located about where Prince Frederick Dorm is now. Plans for a permanent School building began in 1969. An architect was hired - Fisher, Nes, and Campbell, and they met with the client - members of the Architecture faculty and University money people, to design what became the current school. Think of this set of drawings as a pattern or set of instructions to build the building.

I believe ground was broken in 1970 and construction lasted until 1972. The architect, client, contractor, their subcontractors such as the plumbers, masons, carpenters would have all used the drawing to communicate and understand how the building gets built with this set of drawings. Changes may be made onsite, in the field, and notations are made on the drawings to reflect that. These become part of the official record of how the building is built.

Here are a few photos of the construction of the School of Architecture. In 1973 the building was dedicated and the set of drawings was then kept around the school as a record of where things are.

Where were the drawings?
Over the years faculty used the drawings for design projects, to check the sizes of something like a beam, and to show students how drawings communicate build instructions.

They were in the Architecture School Wood Shop for many years, up through the 1990s. Power tools, sawdust, and sharp implements made it not a great environment for a set of large, chemically treated paper drawings. Early in the 2000's the Architecture Program Director moved them from the shop to his Office, and eventually gave them to the structures professor. In 2019 she brought it to the Librarian to keep in the Special Collections Room.

In probaby late 2022 or early 2023, Alex Trim asked for a tour of the Architecture Library, which included a visit into the Special Collections room. I showed her the drawing set and asked about digitization. She recommended a stop in Preservation first. Mark Coulbourne, head of UMD Preservation, warned me that preservation work could be done, but this was not going to be a quick job. The drawings were sent off to Preservation in October of 2023

The Drawings - Condition and Preservation (Bryan and Kirsten)

(Bryan)
Slide 7- History, Technical & Condition of Set of Drawings
I'm Bryan Draper and am the special collections Conservator; this project has been really wonderful. The drawings are large, complex & challenging.

Before we discuss the treatment of the drawings, I should explain how architectural drawings are made and how they should be preserved. So, what kind of drawings do we have in hand? They do not seem to be “blueprints”.

Slide 8 - The Blueprint

The term blueprint is often used to refer to architectural drawings & designs, much like the term “Kleenex” is used to refer to facial tissues. The blueprint was the first process developed to reproduce or copy hand-drawn architectural designs & provided major labor savings for the practicing architect. It is a photo mechanical printing process developed by the English polymath & photographic pioneer, Sir John Herschel in 1842 & is based on the pigment Prussian blue (Iron (III) Ferrocyanide) and its light-sensitive salts.

To make a blueprint, you start with a hand-drawn architectural design on transparent paper or drafting linen. The design was placed on top of a sheet of paper coated with the light-sensitive chemical, then exposed to daylight. Where the ultraviolet light is transmitted through the drawing paper, the photoreactive chemical is converted to a stable, insoluble blue. This produces a negative image, white lines on a blue background.

In 1872, Paris-based Marion and Co. renamed Herschel’s invention the “ferro-prussiate process” and began marketing it for the replication of architectural plans. Presented at the 1876 Philadelphia Centennial Exposition, the blueprint flourished as the first inexpensive means of duplicating documents.

Slide 9 - The Blueprint & the Architect’s Studio

In this slide, we see on the left an apparatus used in the duplicating process which consists of a glass cylinder around which the drawing and sensitized sheet are placed; a strong light from the inside of the cylinder produces the design image on the copy paper; this apparatus seems to have a kerosene lamp while others had electric lights.

On the right you see a typical architect studio showing a blueprint and a version of the cylindrical duplicating machine. And I think this quote very succinctly sums up our topic:

> From hand-drawn designs to photomechanical reproductions, architectural drawings are “information systems, and that information can be–was and still is–often conveyed not by original drawings but by copies, laboriously produced before the introduction of the blueprint in 1878 and thereafter by various different photo productive processes.”
> –James F. O’Gorman in Forward of Price’s *Line, Shade and Shadow*.

Slide 10 - The Diazotype

Obviously, what we have in the lab aren't blueprints. So, what are they? Our drawings are “diazo types” or “diazo prints” another photomechanical process which is based on Aniline “azo-dyes” derived from Coal Tar which is a by-product of coal processing and

was developed in the 1890s. The German chemical firm Kalle & Co. introduced the diazo print as Ozalid Paper in1923. If Ozalid sounds familiar, the Performing Arts Library is full of Ozalids, “diazo” spelt backwards with an “L” added. The diazo print became the dominant copying technology for architects as well as musicians to copy music scores.

As you can see, in this slide the diazo type has a highly varied appearance, from what looks like a blueprint to positive prints on a cream or tan background. Fortunately, the copying apparatus has become more compact.

Slide 11 - Condition of Sch. of Arch. Drawings
Upon receipt in the conservation lab, the first thing we needed to do was a thorough assessment of the set of drawings. Consulting reference books, we determined our drawings are indeed diazo-types. After we took photographs to document the condition of the drawings, we removed the wooden binding strip so that we could examine each of the 37 sheets, made an inventory and developed a treatment plan.

Slide 12 - Condition
Here is another view of the bound drawings showing the many tatters along the left and lower edge.

Slide 13 - Condition
Diazotypes are sensitive to & need protection from:

- Visible & ultraviolet light
- Oxidation
- pH, specifically alkalinity.

They will fade when exposed to light, and highly alkaline or buffered archival material can affect the image. So it's important to protect the print from light exposure. And, these are documents that you would not deacidify. On the left you can see how white the paper was where it was protected from light as well as the atmosphere and it's much less oxidized than the rest of the print.

Slide 14 - Condition
This is the last sheet in the set; the photo shows losses along the right edge which includes some design element.

Slide 15 - Condition
In this slide you can see the difference in color between the back of the paper versus the front which was coated with the light sensitive dye. In the lower left corner is a detail

showing the image of the original drawing folded over just like if you were making copies in one corner was dog eared you would get that image in your copy.

Slide 16 - Condition: A-6
Now we come to sheet A6 which had the most extensive damage. There were two different pressure sensitive tapes used; the red outline shows masking tape which has a rubber based adhesive that readily deteriorates, and the blue outline shows a scotch-type tape which is a more stable acrylic adhesive.

Slide 17 - Condition: A-6
Here are close-ups of the masking and Scotch tape.

Slide 18 - Condition: A-6
If we look at the back of the Sheet A-6 we can see much more clearly the extent of the tape repairs & tears

Slide 19 - Condition: A-6
Viewed in raking light we can see how distorted and wrinkled the sheet is. We suspect that as the masking tape has deteriorated it has shrunk and thereby calls wrinkling along the short edges. In the upper image we can see the transverse tear and how the paper is distorted and what are losses of image along the tear.

(Kirsten)
Slide 20 - Preservation of A-6
Due to the extent of the tear and tape, we needed a separate workflow for sheet A-6. This involved removing the pressure sensitive tape, doing an aqueous wash to remove some of the grime, flattening the page, and finally lining the entire page using Japanese tissue and wheat starch paste.

Slide 21 - Tape Removal
A-6 first needed the tape to be removed. Some of the masking tape was so brittle that it had already separated from the paper, so we were able to simply remove it with tweezers. The tape that was still adhering to the page was removed with a concentrated source of heat from a heat gun; this softened the binding agent and allowed us to gently pull the tape off of the paper. This is a slow process because you have to make sure that you aren’t pulling the top layer of the drawing that has the information off with the piece of tape. Once the tape was removed, we then removed the residue it left behind. The residue was sometimes hard to see under regular light, so we used an ultraviolet light that highlighted the affected areas, as seen in the center photo.

Slide 22 - Lining Sheet A-6

Once the tape and related residue were removed from A-6, we needed to repair the tear. The tear was so extensive that Bryan made the executive decision to line the entire page with Japanese tissue. This tissue is thin enough to not greatly alter the width of the page, while still providing sufficient support for the tear. The left photo was taken while in the process of lining it, and the right photo shows it directly after it was lined with the excess tissue still attached. We cut off the excess so that the drawing would fit in the same folders as the rest of the drawings.

Slide 23 - Preservation of Remaining Sheets

Both of us worked on A-6, but Bryan did the bulk of that work while I worked on the remaining sheets – rehumidifying, flattening, and mending the pages.

Slide 24 - Humidifying and Flattening

Paper absorbs water very easily and this relaxes or expands its fibers. If left alone then the damp paper would curl back up as it dries, but if the paper is sufficiently weighed down while still damp it will dry flat. The photo on the left shows a drawing in the foreground that has been rehumidified and one in the background that is still curled up. The right shows the humidifying process – I individually misted each fold and curl with deionized water and then placed weights on top to allow them to dry flat overnight. Depending on the complexity of the fold, I would sometimes have to work on it in sections to make sure it would flatten correctly.

Slide 25 - Mending Beveled Tears

Once all of the pages besides A-6 were flattened, I then repaired the tears using starch paste and heat-set tissue. We used these mending methods in tandem because the drawings had multiple types of tears. The first type, beveled tears, had the top layer of paper separated from the bottom layer. The pictures on the left show that the bottom layer had been moved in front of the top layer while the pages were rolled up, so this needed to be fixed during the mending process. We first used starch paste to make sure the layer showing the architecture drawing was properly positioned on top, and then stabilized it with heat set tissue.The photo on the right shows the completed mend that has heat set tissue on both sides of the sheet.

Slide 26 - Mending Clean Tears

This is an example of a clean tear that also sustained a little bit of content loss. For this tear, we applied heat set tissue on both sides of the paper and cut the tissue to be flush with the page. This was done to make sure that this would not get caught on anything when the pages are moved in the future.

Slide 27 - Mending Sheet U-1
As we said earlier, the final sheet had the most loss – the upper right corner was ripped off and it lost one diagram in the drawing. It is up to the conservator's discretion if the heat-set tissue repair should closely follow the border of the tear, make the page completely squared off, or do something in between. This slide shows that for the final page, we chose to repair it with a straight edge of heat set tissue to give a sturdier piece to hold onto when handling the page.

Slide 28 - Progress Sheet
This is the sheet on which we kept track of the location of each drawing during each step of the process. Once the pages were rehumidified, flattened, and mended, Bryan and I gave them a quality control check and then we let Alex know that the drawings were ready for digitization.

The Digitizing (Alex)

The final stage in the process was/is digitization, which is where I come in!

Slides 29-38
Due to the nature and condition of the plans, Cindy wanted to create a digital surrogate to share with potential classes. In meeting with Preservation to discuss what they needed to do and how to get the materials to me on completion, we discovered that we could use Preservation's setup to capture the drawings.

We had originally intended to use one of the scanners in the digitization lab. The Zeutschel planetary scanner is what we use for oversize materials. The architectural drawings are 35" x 44" but our Zeutschel has a scan area of 33 x 23". Obviously the drawings are larger than this so we would have to scan the drawings in segments and then stitch them together. So we decided to use the setup in preservation instead. They have a Canon R10 camera, 2 LED lights, and a softbox.

- Slide 30 - Picture of set up - white background
    - Compare with picture of the Zeutschel
- Slide 31 - Picture of the first test scan - blueish
- Slide 32 - Picture of work done in lightroom/white balance
- Slide 33 - Picture of set up with a black background
- Slide 34 - Picture of second test scan with the black background
- Slide 35 - Picture of the actual capture in progress
- Slide 36 - Picture of the actual image/completed image with all post-processing done

- Slide 37 - Post processing, quality check, determine which might need to be recaptured
    - RAW photo converted to Tiff, then to Jpeg - Adobe Bridge
    - Need a master/preservation copy and an access copy
    - Post-processing - Adobe Photoshop
    - This is a picture of the “problem child” (Sheet A-6). We are working with Preservation to schedule a time to come back and do the recaptures.
- Slide 38 - Shared out the master files (tiffs) with the group for further review. Once done with digitization, preservation will return the drawings to Cindy.

Final Thoughts (Cindy)

Slide 38 (continued) - Current Uses of the Drawings
The drawings have dimensions or sizes of walls, rooms, and column spacings all over them. They show duct locations and plumbing line locations. Having them in a digital format means the drawings will be available to more than one person at a time. They don't have to touch fragile paper that is kept in a locked Special Collections room, try to photograph them with a phone, or flip them over on a flatbed scanner. The drawings are protected from further damage.

Studio Classes reference the dimensions, materials, lighting, and heating or cooling systems. An architecture professor presents the students with the challenge of redesigning the architecture school and they want the drawings for the measurements - in architecture jargon - the As-Builts. Also, the mechanical electrical systems class might want to study the systems right in front of them. Several sheets in this drawing set contain information for where the light fixtures and wiring go, where the plumbing lines and fixtures go, and where the ductwork needs to go. Finally, the structures class will talk about concrete and masonry (brick and blocks); these materials are called out or labeled right on the drawings.

In the summer of 2023, a studio redesigned every bathroom in the building to make them more accessible for all body types and needs, so bathroom dimensions and plumbing line locations were needed.

I want to thank Preservation, and the Digitization team for getting to this place. Many people can now access the drawings!

Slide 39
Thank you to Molly Wulff, Mark Coulbourne, Charlotte Conant, Preservation Staff, HDC Staff and Students.