

## Capturing the light :

### a first-year studio inspired by the history of architectural representation

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The catalogue description for ARCH 1002—the second semester of the first-year studio sequence at Louisiana State University School of Architecture —calls for an emphasis on the organization of spaces, forms and process, through the development of the students’ two- and three-dimensional representational skills. It prioritizes architectural design, drawing and sketching, as well as, modeling and material explorations with a developing sense of process and craftsmanship. “Capturing the light” studio moves beyond an introduction to fundamental design principles and the acquisition of technical skills. Our pedagogical intention is to engage the historical background as students develop two- and three-dimensional skillsets in an effort to help them understand where they stand historically in the continuum of the discipline’s evolution. To this end the projects are structured around significant historical moments of architectural representation. In that way, while exploring sketching, projection, notational and representational drawings, along with model making, the history of architecture would stop appearing as an obsolete source of knowledge unrelated to contemporary design decisions; a view that unfortunately many architectural students share. It is through this path we thought we could then better guide students towards the design of their first architectural project that deals with the organization of spaces, forms and process, as the catalogue requires.

Given the students’ experience creating cardboard models, a skill developed during the previous semester, we set off with the cardboard study of a historical optical device, the *camera obscura*; a device that still attracts the interest of many contemporary artists and designers around the world. A *camera obscura* in its basic form consists of a dark room (*camera obscura* is Latin for dark room actually) and a small hole in one of the room’s walls. Light rays passing through the hole form an inverted image of the scene outside the room. This image, which is not very bright or sharp, may appear on the wall opposite the hole, or can be observed on a sheet of paper or other screen placed in front of the hole (Steadman, 2001). This type of *camera obscura*, which is known as booth-type, became very popular in the middle of the 16<sup>th</sup> century when the introduction of glass lenses in the place of the hole made it possible to have larger apertures and hence much brighter images with great sharpness. “As a result, it became a real practical proposition to use the apparatus for making drawings from life” (Steadman, 2001).

The semester’s first assignment is thus the very construction of a booth-type *camera obscura* in the campus’ quad. The students start by studying the history of the device through selective readings in the course’s reader. The readings are a key resource as many of them are unfamiliar with the term. Our explanations regarding the optics and basic rules of the device’s function are limited to the bare minimum, necessitating that students read to understand for themselves how this phenomenon works. In groups of four they are charged with creating a booth-type camera in a carefully selected location;

one in which they can work with the sun and capture a view they like (image 1). They are encouraged to contemplate issues of space appropriation. For example, critiques stress consideration of the way somebody enters the booth and dwells in it for a while, so as to both enjoy the projected image and produce a sketch if they wish. With these factors in mind the students begin to pay attention at the way the light moves through the quad. They map areas of shadow and light and select their locations accordingly. As they notice possible points of interest that they would like to capture, they start appropriating existing architectural elements and incorporating them in their designs. Some build booths on and around nearby steps and benches to provide a way for users to sit comfortably for an extended period of time. Others become inspired by the grass areas of the quad where usually students lay down to take breaks between classes. By introducing a lying-down *camera obscura* they create an innovative condition in which you can restfully observe and sketch the scene which lays behind you. More ambitious attempts lead to dynamic booths which move with the body's movement and capture a 360-degree view.



Image 1: ARCH1002, Spring 2018

Booth-type camera obscura and captured image (students: Tychele Causey, Christa' Colar, Bria Robinson, Jaisha Victorian)

(images by authors)

As students are working in teams on their booths in the quad, they are creating an individual portable box-type *camera obscura* in studio. The requirement for this camera is that the projected image is inverted and the device incorporates a transparent screen on which the students can place trace paper to draw sketches of the projected image. Once again, the history of the device becomes an essential element of their process. Studying further the course's reader they learn that in 1585 the Venetian author Giovanni Battista Benedetti suggested a method for the inversion of the image, by setting a plane mirror at 45 degrees to the direction of the light coming from the lens. This was essentially the arrangement used in most of the portable box-type cameras manufactured from the late 17<sup>th</sup> century

onwards and these small instruments were actually the forerunners of the modern reflex camera, our well known photographic camera (Steadman, 2001). This realization surprises the students and inspires discussions on how their portable cameras led to the creation of the photographic camera and eventually to the development of digital and smartphone cameras used today.

Initial attempts at the design of these portable cameras are rough cardboard constructions. However, as the designs become refined students create a well-crafted cardboard model and a final wood structure. With wood being a new material for them and use of the power tools in the College's Design Shop also new, we prescribe the material (plywood & mdf), its thickness (1/8 of an inch) and joinery type (butt joints with glue). These portable devices are then used for the students' first sketching attempts, investigations into capturing light, shadows and spatial depths of various exterior conditions and spaces (image 2). As designs they are meant to be strictly personal, shifting students' attention on how their own body works with the camera as they carry it around, fix it on their legs and sketch on it. With the form of the devices freely decided by the students, the last requirement of this assignment is that their cameras incorporate compartments so that they can carry with them pencils and pens, trace paper and rolls, as well as their own cell phones – a device that we assume you have all noticed they are attached to not to say obsessed with. The students' assumptions about the nature of images, driven by the ease to digitally photograph the world around them on a daily basis, is undermined by the constraints of the sketches enabled by this device. This frustration evokes relevant questions. Some of the students decide to hide their cell phones to avoid distractions while they sketch, others place them right next to the sketching area so as to compare their sketch with the image they will get with their cell phone.



*Image 2: ARCH 1002, Spring 2017*

*Left: Students sketching in the quad using their portable cameras obscura (students: Eber Rivas, Cecilia Li, Laila Jones) / Right: Image captured by the portable camera obscura (student: Peter Tinker)*



(images by authors)

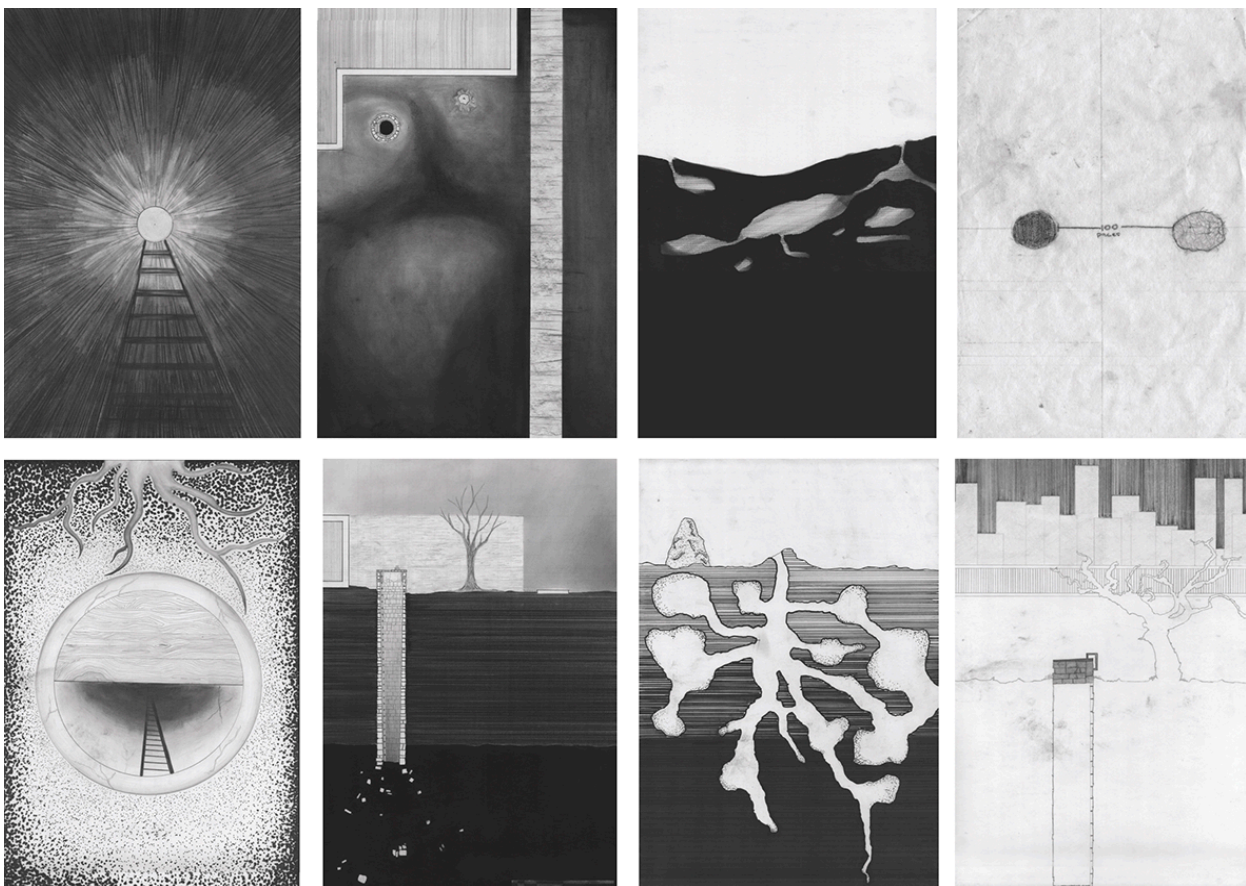
As the final devices come into fruition the studio conversation shifts towards two-dimensional representation of this three-dimensional artifact. We begin by studying how sectional drawings, when first introduced into the process of architectural ideation—also during the 16<sup>th</sup> Century—were understood to reveal the presence of light in a building. This leads to the literal “cut-open” of the refined cardboard cameras, as students have now finalized their devices in wood. Split in two, the devices reveal the mysteries of their interiors, serve to explain the concept of section, and are used to introduce the rules and conventions of the modern orthographical projections. Multiple hand-drawn attempts are made on trace and Bristol paper before proceeding with the construction of digital drawings of their devices. Tutorials on selected software are designed not only to communicate commands and underscore the possibilities of the digital, but mainly to help students realize how the basic principles behind the digital examples and their hand-drawn projections are similar. We start with a free and open-source vector graphics software before moving on to discipline-specific software which allow for higher precision. Our intention is two-fold: to expose first-years to an array of digital platforms commonly used in the design disciplines and to instill a confidence in their ability to grasp foundational familiarity in software through online tutorials and self-directed exploration.

Having focused on the specifics of orthographic projections in plan, section and elevation, the studio discussion moves on to another mode of representation: perspective. At this point of the semester we invite an architectural historian to discuss key moments of the invention of Renaissance perspective (*perspectiva artificialis*). In 2017 the students discuss their work with Alberto Pérez-Gómez, a guest lecturer visiting the School. He presents the earliest examples of systematically “constructed” linear perspectives and emphasizes the Brunelleschi experiment and its connection to optics. He also underlines the fact that perspective is a construction and a Renaissance invention, something we tend to forget given its massive use in nowadays architectural renderings. Afterwards two point perspectives are taught and constructed in studio, using hand and digital techniques, helping the students further grasp issues of foreshortening and depth.

The semester continues with an examination of Piranesi’s 18<sup>th</sup> century Carceri etchings. Through selective readings we discuss the atmospheric qualities of these mesmerizing drawings, their capacity to draw us in and their nature as poetic images inhabitable by the imagination and deliberately questioning any prosaic transcription into building. We open thus the discussion on the role of atmospheric drawings of spatial impressions and the capacity to capture spatial qualities of the imagination and communicate them. With this preparation in place we ask students to study two selective literary narratives, Franz Kafka’s “The Burrow” (1946) and excerpts from Haruki Murakami’s *The Wind-Up Bird Chronicle* (1998).

They both describe underground worlds and spaces; wells, tunnels and burrows. The narratives work as a generative tool for hand-drawn imaginative spatial drawings that depict these underground conditions using pencil, ink or charcoal (image 3). This is an in-studio exercise. We strictly forbid students to search online for images of inspiration or references; something they do almost automatically nowadays. The goal is to press at the possibilities of a linguistic imagination, an imagination that is not influenced or limited by other images, but derives primarily from language.

Following from Paul Ricoeur's seminal philosophical essay "The function of fiction in shaping reality," we insist that the productive imagination – before taking shape in any of a thousand possible images – has primarily linguistic origins and that only the emergence of new meanings in the sphere of language can generate images that may be both new and culturally significant (Ricoeur, 1979).



*Imaginative drawings inspired by the literary narratives, Students' work*

*(image by authors)*

Using the exploration of these imaginative underground worlds we move towards the final assignment of the semester; a culminating project that focuses on the organization of spaces, form and process. The final project is the design of an underground world of interconnected wells. Each student is in charge for the design of a well specifically for his or her own well-keeper. A simple narrative exercise enables them to build these characters (the well-keepers), imagine and define basic everyday activities of their lives which are closely related with the inhabitation of the well. All the wells are required to work as a *camera obscura* exactly at noon on a bright sunny day, capturing the image of the moving clouds, the blue sky and the sun. This requirement along with the well-keepers' behaviors introduce basic programmatic considerations. Historical precedents of catacombs or well-known wells around the world like the well of St. Patrick's in Orvieto, Italy or the Adalaj Stepwell in India are incorporated in the reader and serve as precedents.

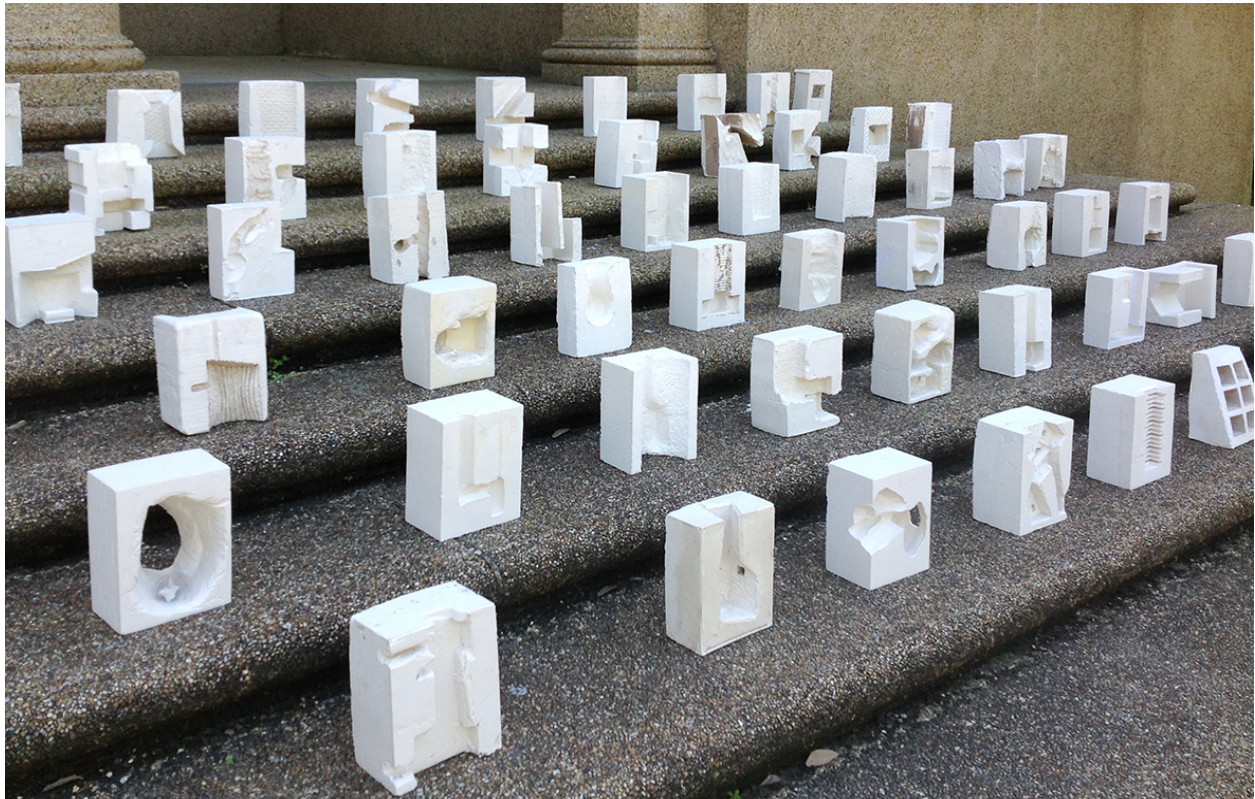




Image 4: ARCH 1002, Spring 2018

*Plaster study models on the School's steps, Students' work*

*(image by authors)*

We start with the creation of concrete and plaster models that aim to capture the basic spatial elements of each well; the overall form, movement, and main underground rooms (image 4). From these initial study models, we move into the development of each space through sketches, drawings, additive cardboard models. Light studies using photography are strongly encouraged as highly appropriate representational tools for the nature of the given program. Tutorials on software which allow for exploration with material textures and light enable students to define the qualities of their wells. Basic knowledge of Photoshop and Illustrator lead to drawings that combine the students' representational techniques and allow them to express how they imagine their wells in space.

The semester concludes with an exhibition of the students' final sectional models, orthographic and representational drawings in the School's atrium (image 5). Depicted only in the drawings, all the wells are interconnected, allowing for the different well-keepers to visit each other underground spaces. The students present their characters and respective places to the invited reviewers and explain how the interconnections work. "Capturing the Light," finishes with a group photo of the underground world under the bright spring light of the campus' quad, where the semester actually started. From the booth-type *cameras obscura*, their historical development to portable drawing ones, the sketches and orthographic drawings the students developed, the representational imaginative underground wells to the creation of their own well-world, the students have not only developed skills and created architectural spaces, but most importantly understood the importance of history as an anchoring element for design. Moreover they started valorizing the necessity of research for design work. Disregarding the idea that architectural design is only a matter of an inspired idea, the historical connections, readings and precedents helped them see that a deeper knowledge of any project's history and nature can only lead to more critical and appropriate architectural propositions.



*Image 5: ARCH 1002, Spring 2017*

*Sectional models of the wells in the School's atrium, Students' work*

*(image by authors)*

## References

1. Murakami, H. (1998). *The Wind-Up Bird Chronicle*. Trans. Jay Rubin, New York City, Vintage International.
2. Ricoeur, P. (1979) The Function of Fiction in Shaping Reality. *Man and World*, 12(2), pp. 123-141.
3. Steadman, P. (2001). *Vermeer's camera: uncovering the truth behind the masterpieces*. Oxford, Oxford University Press.
4. Kafka, F. (1946). *The Great Wall of China. Stories and Reflections*. New York City, Schocken Books.