

## Thermally Active Narratives

ALEX TIMMER

University of Wisconsin - Milwaukee

The act of creating new worlds in architecture does not require the creation of a world; it mandates the creation of tools which make visible the hidden aspects of the world we already exist within. It requires a shift from closed and isolated modes of representation towards new non-isolated systems. It necessitates new types of description and new ways of looking at existing methods of representation. Thus, for architecture to construct new worlds, we must develop new tools and techniques to be able to see those worlds. The gap between the analytical and experiential provides the space for this type of artifact. It is in this gap that we find new modes and methodologies. The created world is not a new physical space, but a new worldview, requiring that we rethink our methods with a similar enthusiasm to that of Goethe who in 1837 illuminated Luke Howard's new classifications of clouds through poetry. Goethe's work would then become the introduction to the third edition of Howard's work "On the Modifications of Clouds." The essay paired with Goethe's poems provide a complete understanding of the cloud, it's analytical and objective reality juxtaposed against its experiential and subjective reality. Thermal aspects of our world, as with of many atmospheric principals, provide a productive area of focus to explore this issue as they tend to either be pulled to the analytical worldview, that of data, optimization and objective realities

or to the experiential worldview, that of atmosphere, speculation and subjective reality. New technologies such as the thermographic camera now provide a visual point of access to these new worlds, allowing the designer to play in the gap of the analytical and experiential. As the tools become cheaper and more readily available, a technology once inaccessible due to cost and fabrication, can now be attached to one's smartphone with minimal effort. What then is the role of these new tools placing designers within this gap? How does this representation account for the inherent stability of drawing? How does that same representation account for variability in perception? Too easily these questions have resulted in two separate camps that continue to talk past each other. One unwilling or unable to accept energy's role as a design element, and one comfortable residing in the speculative work, unable or unwilling to tackle the pragmatics of its application. This essay discusses the relationship between these two dichotomies, by exploring the history of the analytical and experiential forms of atmospheric representation and proposing new methodologies that occupy the gap between the extremes. Somewhere between the gestural ventilation drawings of the 1880s and the highly controlled and articulated data-scapes of the current practice are the Thermally Active Narratives.

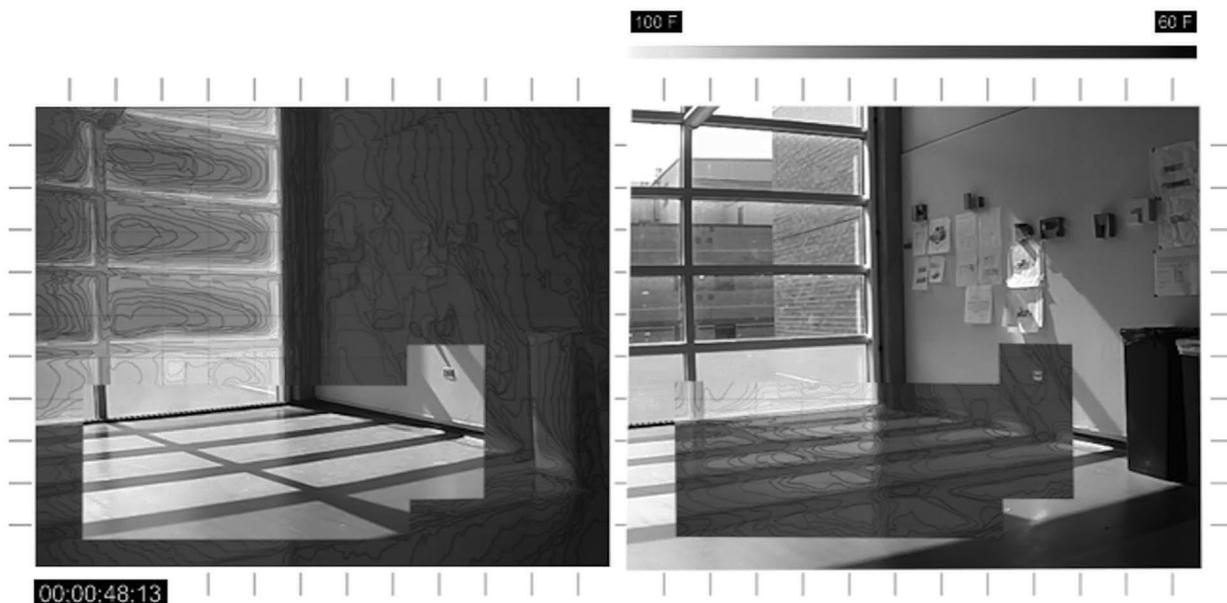


Figure 1: Still from Animated Diptych, Milwaukee, WI 2018, Alex Timmer

### THERMALLY ACTIVE NARRATIVES

The act of creating new worlds in architecture does not require the creation of a world; it mandates the creation of tools which make visible the hidden aspects of the world we already exist within. It requires a shift from closed and isolated modes of representation towards new non-isolated systems. [1] It necessitates new types of description and new ways of looking at existing methods of representation.

For architecture to construct new worlds, we must develop new tools and techniques to be able to see those worlds. The gap between the analytical and experiential provides the space for this type of artifact. It is in this gap that we find new modes and methodologies. The development of the still photographic camera closely resembles this relationship of analytical and experiential. The photographic camera's introduction allows for the capture and reframing of the world, and subsequently the development of a new worldview. The camera acted as the tool to enable us to see what we could not have seen otherwise. This apparatus also made certain ways of seeing the world obsolete; requiring reinvention. In the case of photography, this led to the development of new types of painting as the camera was better at freezing reality than the realist painter could be. This shift from realism, a purely analytical mode of representation, to the gestural and approximate representations of the impressionism is of interest to this paper. Specifically, it is the space between the two that holds the potential, both seeing the world as a source of analytical specificity and experiential ambiguity. Rather than see this as an in between, we could develop this as a new worldview.

Thus the created world is not a new physical space, but a new worldview, requiring that we rethink our methods with a similar enthusiasm to that of Goethe who in 1837 illuminated Luke Howard's new classifications of clouds through poetry. Goethe's work would then become the introduction to the third edition of Howard's work "On the Modifications of Clouds." [2,3] The essay paired with Goethe's poems provide a complete understanding of the cloud, it's analytical and objective reality juxtaposed against its experiential and subjective reality. It is by taking in both the poem and the scientific analysis at the same time that allows one to see the cloud as a system of meteorological, cultural, and social forces that shape its formation and its meaning. Neither the analytical or experiential exists in isolation; they are codependent and interrelated. Can we develop a way of utilizing them as designers at the same time and as a unified system?

Thermal aspects of our world, as with of many atmospheric principals, provide a productive area of focus to explore this issue as they tend to either be pulled to the analytical worldview, that of data, optimization and objective realities or to the experiential worldview, that of atmosphere, speculation and subjective reality. While Goethe's poems provided a

new medium, or filter to see the world that already existed as a compliment to the analysis of Luke Howard in "On the modification of Clouds." New technologies such as the thermographic camera now provide a visual point of access to these new worlds, allowing the designer to play in the gap of the analytical and experiential. Thermographic or infrared cameras are a non-contact measuring device that uses a sensor that can read radiation given off by an object as electromagnetic waves and translate that into a false-color image. [3] This image, a rJPEG, stores temperature data in each of its pixels which can be retrieved individually and acted on through more common tools within the architectural profession.

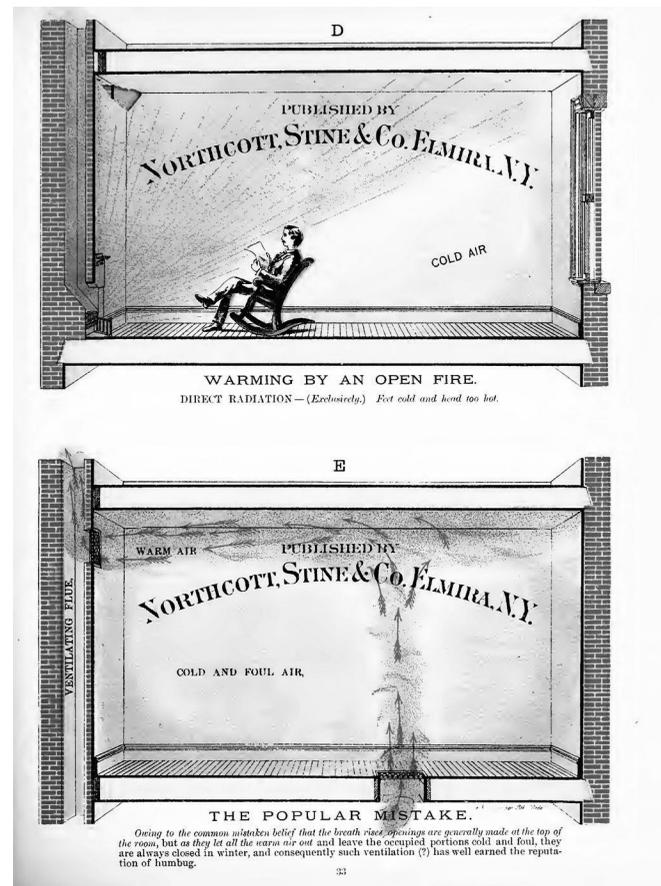


Figure 2: Lithograph, Locke and Trowbridge Litho Company, 1886

As the tools become cheaper and more readily available, a technology once inaccessible due to cost and fabrication, can now be attached to one's smartphone with minimal effort. What then is the role of these new tools placing designers within this gap? How does this representation account for the inherent stability of drawing? How does that same representation account for variability in perception? Too easily these questions have resulted in two separate camps that continue to talk past each other. One unwilling or unable to accept energy's role as a design element, and one comfortable residing in the speculative work, unable or unwilling to deal with

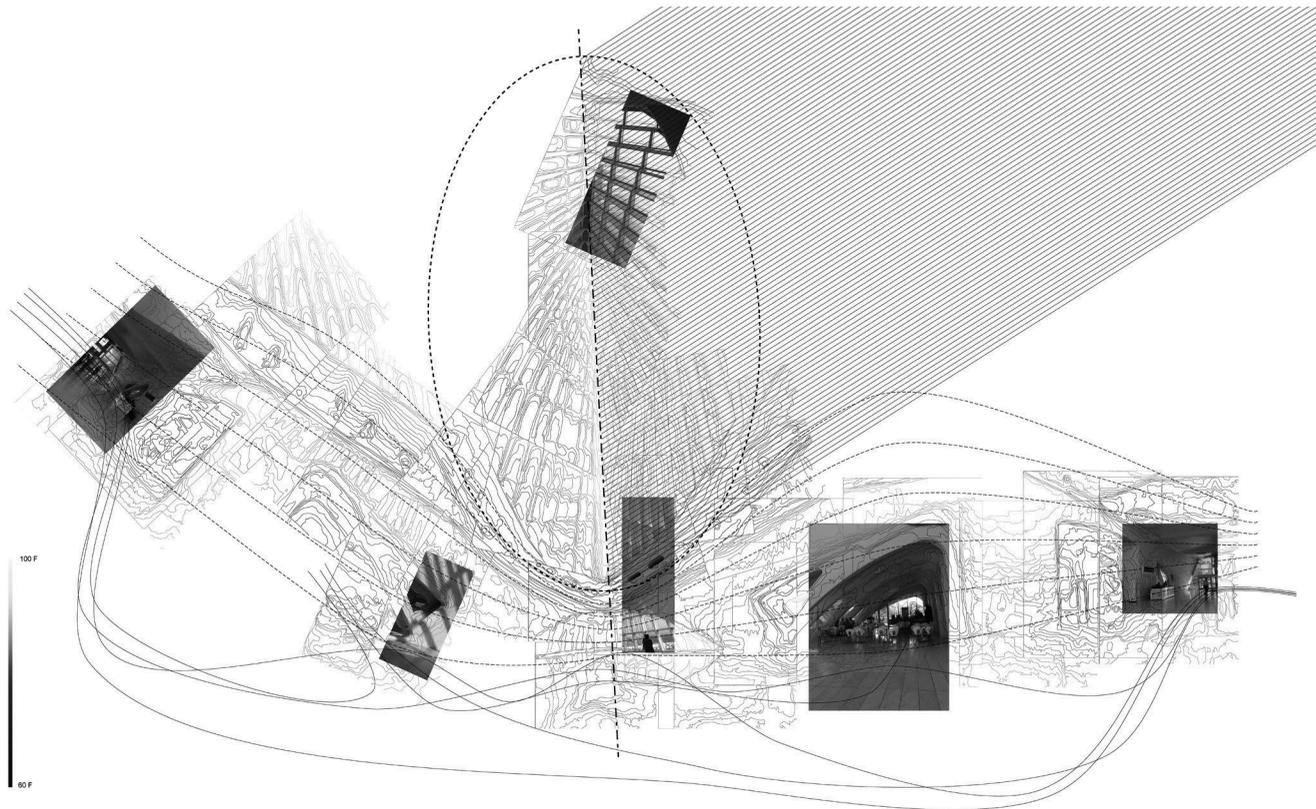


Figure 3: Thermal Mapping, Alex Timmer, 2018

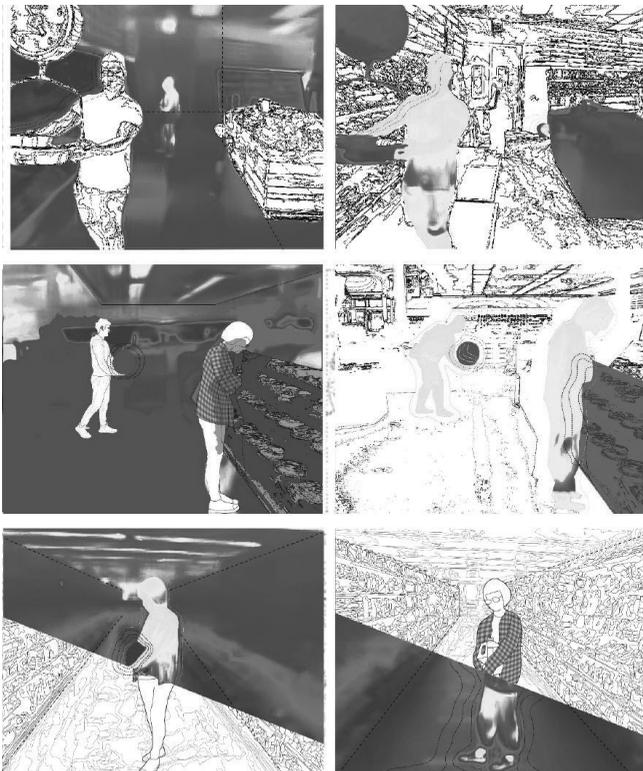


Figure 4: Thermal Camera Workshop Student Work, Image by Pan, Zhang, Xu, Reyes

ideas but a new technique; drawing the air. Rutton realized that he needed a new way of representing these phenomena to make his perception of the world accessible to others. In doing so, Rutton extracted a new world from the existing through drawing.

Extracting a new world from the existing requires new tools and new techniques applied to the design process. The tools in this kit being the GoPro, thermal camera, temperature sensor, humidity sensor, and iPad. The first deployment of this toolkit was for a series entitled, *Thermal Stories*. [Figure 5] First published in *MASKS*thejournal, these diptychs juxtaposed the visible reality with the invisible reality while supplementing it with short explanatory text. [6] The trading of information between the sides of the diptych emulates one's experience of the world bouncing back and forth between various senses, not allowing the viewer to fixate on one plate or the other. The viewer must complete the "image" or meaning of the representation through repeated and continuous viewing.

Present in these explorations is the work of philosopher Nelson Goodman. In his book *Ways of Worldmaking*, Goodman states that the methods for world making are Composition and Decomposition, Weighting, Ordering, Deletion and Supplementation, and finally Reformation. [7] These images use composition and decomposition, which he

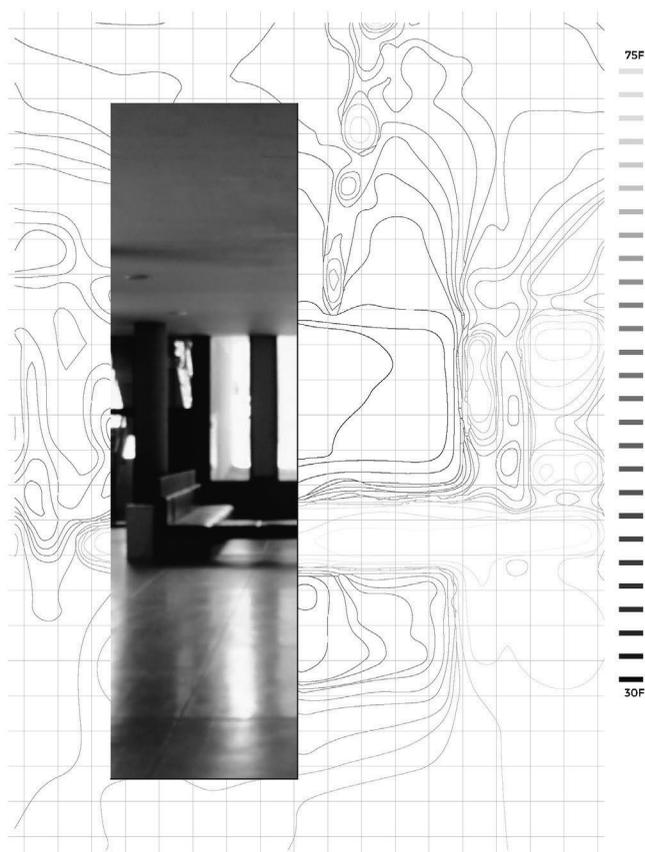


Figure 5: Thermal Stories Diptych, Alex Timmer, 2016

defines as the process of integrating and dividing into parts. Goodman saw this as a cycle: we divide existing worlds into sub-worlds, analyze their features and make new connections until we recombine the pieces back together. This was explored through a mapping exercise. [Figure 3] This cycle is present both in the format of the diptych dividing a single image into two parts, as well as the content of that image, extracting the thermal from the visual and asking the viewer to cycle through the plate to recombine the pieces.

### THE WORKSHOP

This technique was tested as a workshop at Illinois Institute of Technology with early design students, asking them to develop narratives around thermal experiences using the thermal camera. The workshop was part of the summer studio taught by Joseph Altshuler. A diptych is an artwork consisting of two painted or carved panels. [8] These panels can be attached or presented adjoining each other, sometimes connected with a hinge allowing them to be closed. In medieval times this allowed for the artwork to be protected and stored. Often these diptychs would have religious or sacred imagery carved into them and would be located about the altar. In each case, the panels showed separate but related scenes. In the case of these thermal narratives, the scene in each panel is the same, but the information provided is separated.



Each student was expected to produce a sequence of diptychs which describe a single thermal experience. [Figure 4] Each diptych consists of two plates. These plates represent the same scene but different aspects of that scene. Visual information and non-visual information must be shared between the two plates but not duplicated. The reason for this is akin to the cubist understanding of how the viewer engages with a piece of representation. In Duchamp's nude descending stairs, for example, we see multiple points of view overlaid and juxtaposed to help us fully understand the actual act of descending the stairs. A motion that is hard to capture in a still photograph for example. These two diptychs ask the eye of the viewer to jump back and forth between the plates. In this way, the experience of viewing this bit of representation is closer to the experience one has within the space in which sensorial inputs are continually competing for our attention and for their primacy in defining our knowledge of the space. Additionally, each student had to provide a single paragraph of prose that describes the series or sequence of thermal experiences that you're extracting from this space.

It's essential that each student understood that what was important in this exercise was the exploration of how these new tools allow us to engage this specific aspect of the world that would otherwise be invisible. Rather than treating this as

a purely analytical exercise, students were asked to engage this technique as a design exercise. Each student was asked to extract data the thermal images which are by their nature a field of data points, and rather than re-represent this data they were tasked with interpreting it.

In the end, the students walked away from the workshop with a more nuanced understanding of how we as architects can describe the spaces around us but also that that act of description is in of itself analytical and subjective. Architects are producing a reality, and it is an authored reality. What tools we use and how we use them effects that authorship. While the workshop was a success from the standpoint of testing this technique and its integration into a design space, the actual representations lacked a deep engagement with time. Further development of the exercise will necessitate a definite attitude towards time.

#### INCORPORATING TIME: THE ANIMATED DIPTYCH

To address this lack of attitude towards time, a new series, entitled *Thermally Active Narratives*, build animated diptychs that while retaining the structure of two plates, sharing information back and forth, more successfully engages time as an essential variable in the documentation and design of energy systems. [Figure 1] A single space was documented over a prolonged period to capture the changes in direct solar gain and ambient temperature. This example here shows the thermal lag of a concrete floor and the intermittent exposure of that slab to the sunlight. The relative consistency of this thermal world is juxtaposed against the more varied visual world, while the diptych pulls these worlds apart and then recombines them through viewing. A representation that is more closely akin to the experience of the space.

These spaces are intentionally non-descript from an architecture with a capital 'A' perspective because in this new world what was once considered mundane may be observed as a complex and deep thermodynamic world with new criteria for evaluation, exportation, and dissemination. These spaces reconsidered through the lens of these tools offer insights into the world that already exists physically, a world based in thermodynamic flows which are traditionally underserved in architecture education and design. By focusing on these spaces, the potential of energy in design is not confused or diluted by form but can conceptualize otherwise experiential flat space to something thermodynamically profound.

#### ENDNOTES

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