RICE UNIVERSITY

Hang in there...

by

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A THESIS SUBMITTED
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE

Master of Architecture

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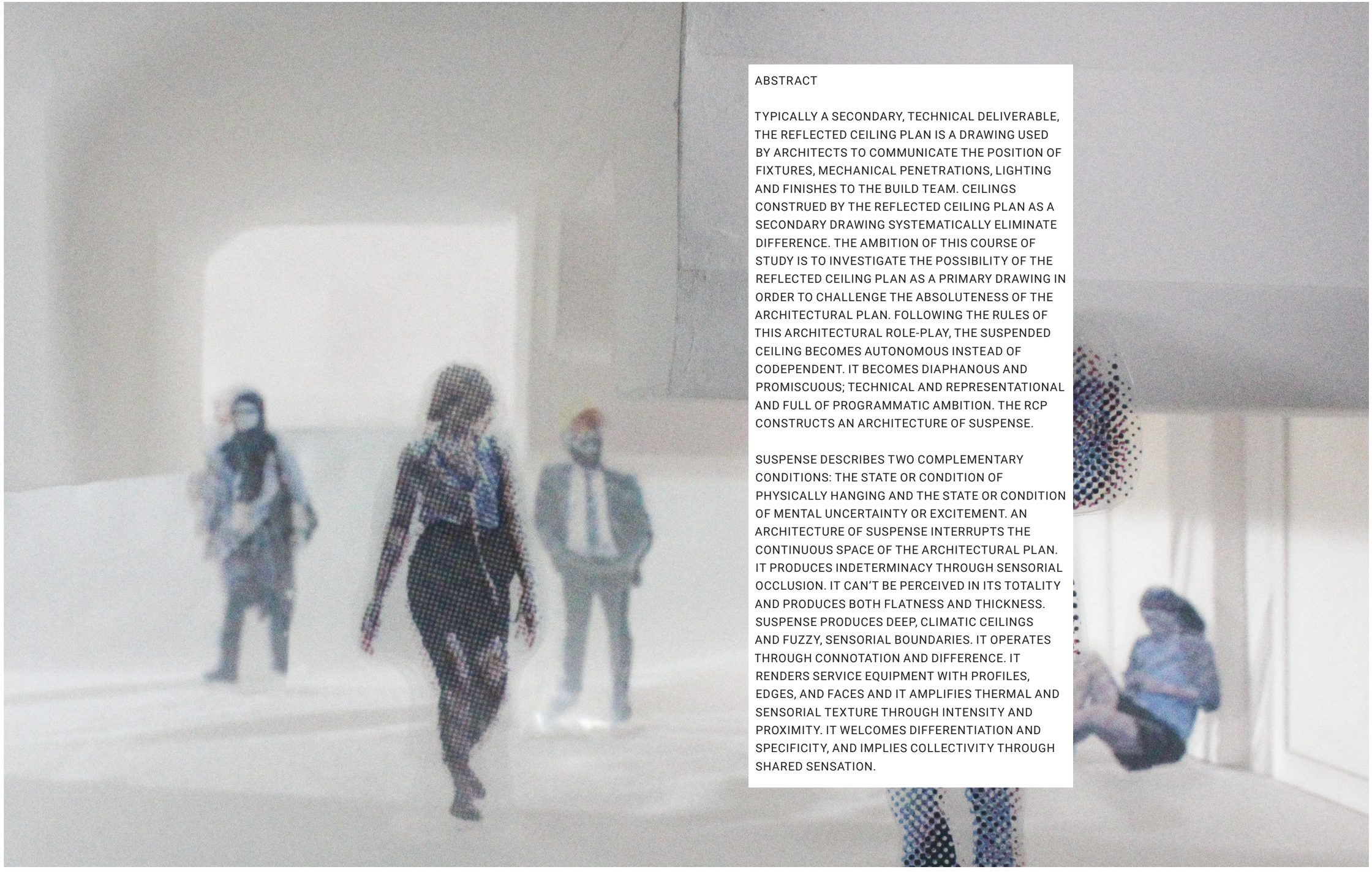
Hang in
there...



ABSTRACT

TYPICALLY A SECONDARY, TECHNICAL DELIVERABLE, THE REFLECTED CEILING PLAN IS A DRAWING USED BY ARCHITECTS TO COMMUNICATE THE POSITION OF FIXTURES, MECHANICAL PENETRATIONS, LIGHTING AND FINISHES TO THE BUILD TEAM. CEILINGS CONSTRUED BY THE REFLECTED CEILING PLAN AS A SECONDARY DRAWING SYSTEMATICALLY ELIMINATE DIFFERENCE. THE AMBITION OF THIS COURSE OF STUDY IS TO INVESTIGATE THE POSSIBILITY OF THE REFLECTED CEILING PLAN AS A PRIMARY DRAWING IN ORDER TO CHALLENGE THE ABSOLUTENESS OF THE ARCHITECTURAL PLAN. FOLLOWING THE RULES OF THIS ARCHITECTURAL ROLE-PLAY, THE SUSPENDED CEILING BECOMES AUTONOMOUS INSTEAD OF CODEPENDENT. IT BECOMES DIAPHANOUS AND PROMISCUOUS; TECHNICAL AND REPRESENTATIONAL AND FULL OF PROGRAMMATIC AMBITION. THE RCP CONSTRUCTS AN ARCHITECTURE OF SUSPENSE.

SUSPENSE DESCRIBES TWO COMPLEMENTARY CONDITIONS: THE STATE OR CONDITION OF PHYSICALLY HANGING AND THE STATE OR CONDITION OF MENTAL UNCERTAINTY OR EXCITEMENT. AN ARCHITECTURE OF SUSPENSE INTERRUPTS THE CONTINUOUS SPACE OF THE ARCHITECTURAL PLAN. IT PRODUCES INDETERMINACY THROUGH SENSORIAL OCCLUSION. IT CAN’T BE PERCEIVED IN ITS TOTALITY AND PRODUCES BOTH FLATNESS AND THICKNESS. SUSPENSE PRODUCES DEEP, CLIMATIC CEILINGS AND FUZZY, SENSORIAL BOUNDARIES. IT OPERATES THROUGH CONNOTATION AND DIFFERENCE. IT RENDERS SERVICE EQUIPMENT WITH PROFILES, EDGES, AND FACES AND IT AMPLIFIES THERMAL AND SENSORIAL TEXTURE THROUGH INTENSITY AND PROXIMITY. IT WELCOMES DIFFERENTIATION AND SPECIFICITY, AND IMPLIES COLLECTIVITY THROUGH SHARED SENSATION.

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TO SCOTT COLMAN, AND SARAH WHITING FOR YOUR INTELLECTUAL GENEROSITY AND FOR INCUBATING GOOD IDEAS AT EARLY STAGES,

AND TO TIFFANY XU FOR BEING MY SOUNDING BOARD, KEEPING ME FROM GETTING STUCK, AND FOR HER SPECIAL CARE WITH THE MODEL BEFORE PENCILS DOWN.

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Notes

by **Evio Isaac**

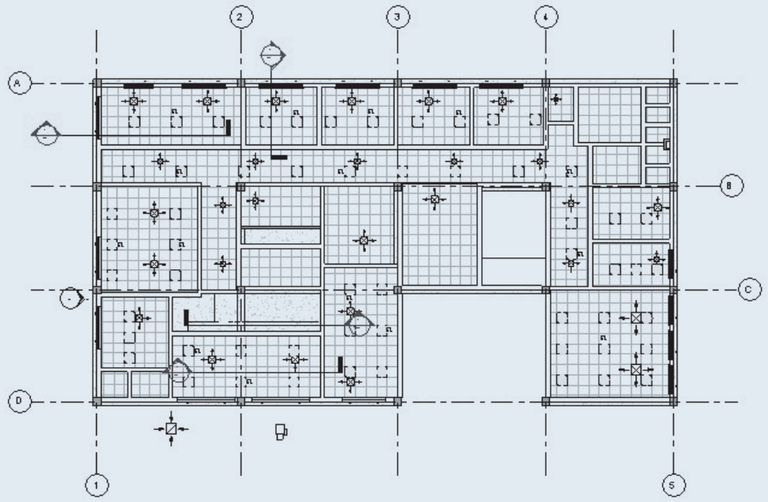
What follows is a primer. It does not attempt to be exhaustive or authoritative. It is the comprehensive resolution of a single instantiation of an architecture of suspense. Hang in there... is not a scientific methodology (it is at most pseudo-scientific). It constructs a vocabulary that designers can use to discuss the coordination of material and immaterial forms to produce affect and sensation. For example, the following imagination of suspense uses a language of banded profiles, and soft geometries, but other explorations of suspense might use a different formal approach, take on other programmatic desires or create different material or climatic resolutions.

Suspense has to do with what belongs to the ceiling. It resolves technical and formal systems with synthetic operations and it finds delight in the forms and weathers beyond flatness and comfort. Suspense has to do with subjectivity. The open plan is a managerial tool. The typical suspended ceiling is the accomplice of the open plan. Together, they serve the agenda of concealed powers systematically eliminating difference (in temperature, in behavior, etc.). Suspense subverts the suspended ceiling system to address the multiplicity and complexity of a new office imaginary. Suspense is an inclusive methodology.

SUSPENDED CEILING, TYP.

REFLECTED CEILING PLAN, TYP.

“The modular repetition of tiles of 600 x 600mm within an aluminum grid repeats to fill up the required space. Its repetition forms an apparent ceiling above our heads, its material quality giving the appearance of being part of the built fabric even though it is, in fact, separate from the structure of the building...

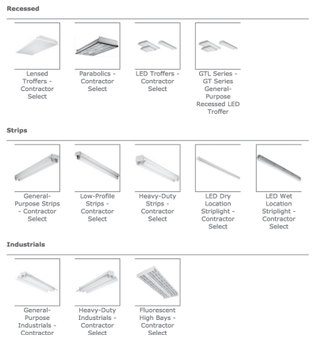


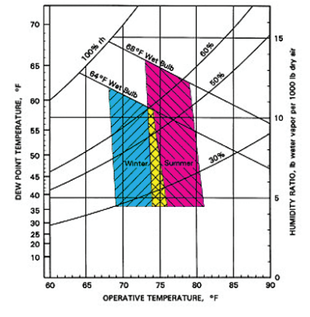
...Unlike the Venturian image of architecture, where the billboard-facade (the sign) is expressed as a distinct element against the body of the building (the signified), here we see the sign and the signified, the image of the building and the building itself, coinciding as the same entity.”

Sam Jacob, *Making It Real*

Introduction

Reflecting on the Suspended Ceiling





“Did the plan without qualities create men without qualities?”

Rem Koolhaas,

Typical Plan

The story of the suspended ceiling unfolds a sequence of dimensional and climatic standards outside of intentional systems of preference. It is the story of architectural agency deferred to indices and product catalogs. Because of its ability to complement the architectural plan, and an ecosystem of modular, off-the-shelf attachments, the suspended ceiling has become a ubiquitous feature in the contemporary office interior. In these settings, suspended ceilings are banal, but not benign. They reproduce the actual ceiling, occluding and organizing servicing equipment in a differential space of unknown depth or breadth, space that would otherwise need to be resolved architecturally. Though they are capable of producing affect with fixtures and equipment, suspended ceilings are not entrusted with programmatic ambition. Instead, suspended ceilings service the open plan. They comfort the modernist “universal subject” by reenacting ideal climatic conditions for efficient labor. Likewise, ceilings are part of a system of control and observation. Despite how furniture and moveable partitions are placed, and rearranged , the suspended ceiling projects a managerial grid which organizes labor and allows oversight.

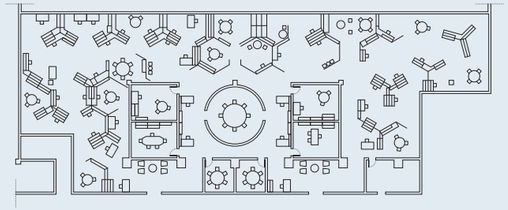
The narrative of the suspended ceiling illustrates a problem of a plan-dependent office culture and prompts an appraisal of the reflected ceiling plan as an act of resistance.

[OFFICE] CULTURE OF THE PLAN

ACTION OFFICE 2 (1970)
Herman Miller
Type: Island/Tight

Stationary: 9,845 sf (85%)
Ambulatory: 1,605 sf (15%)

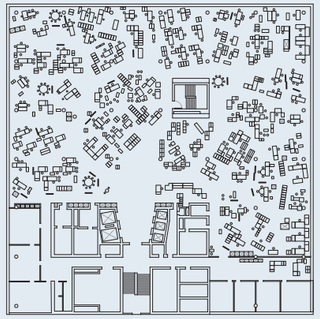
Collective: 83%
Individual: 17%



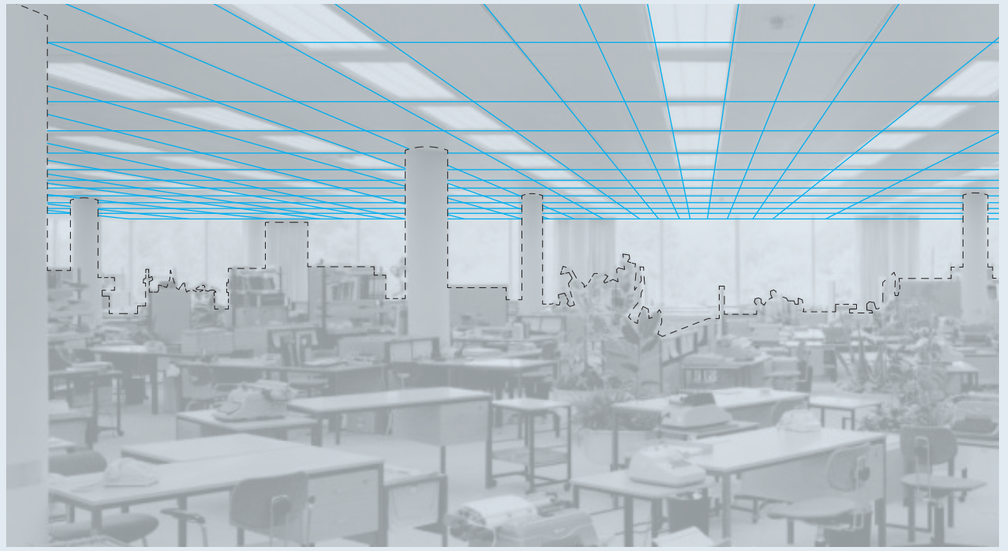
OSHAM OFFICE (1965)
Walter Henn
Type: Island/Loose

Stationary: 23,785 sf (67%)
Ambulatory: 11,765 sf (33%)

Collective: 90%
Individual: 10%



MANAGERIAL GRIDS



Typically a secondary, technical deliverable, the reflected ceiling plan is a drawing used by architects to communicate the position of fixtures, mechanical penetrations, lighting and finishes to the build team. Ceilings construed by the reflected ceiling plan as a secondary drawing systematically eliminate difference.

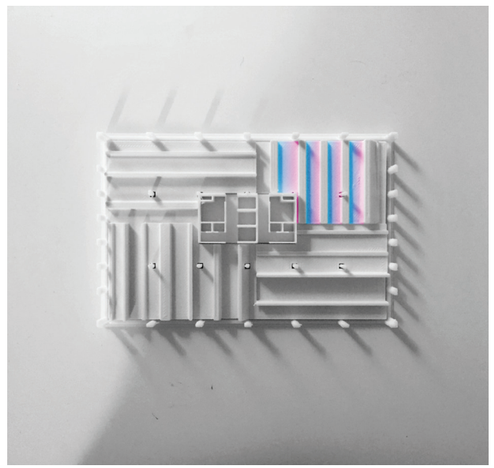
The ambition of this course of study is to investigate the possibility of the reflected ceiling plan as a primary drawing in order to challenge the absoluteness of the architectural plan. Following the rules of this architectural role-play, the suspended ceiling becomes autonomous instead of codependent. It becomes diaphanous and promiscuous; technical and representational and full of programmatic ambition. The RCP constructs an architecture of suspense.

Suspense describes two complementary conditions: the state or condition of physically hanging and the state or condition of mental uncertainty or excitement. An architecture of suspense interrupts the continuous space of the architectural plan. It produces indeterminacy through sensorial occlusion. It can't be perceived in its totality and produces both flatness and thickness.

Suspense produces deep, climatic ceilings and fuzzy, sensorial boundaries. It operates through connotation and difference. It renders service equipment with profiles, edges, and faces and it amplifies thermal and sensorial texture through intensity and proximity. It welcomes differentiation and specificity, and implies collectivity through shared sensation.

"Architecture can expand its affective range - and therefore its consequence - by hooking up with more cultural players."

Sylvia Lavin, *Kissing Architecture*



"Our thermal receptors are change-seeking. Make architecture that puts them and us on alert; away from thermal monotony, thermal indifference; toward thermal texture."

Abalos+Seintkiewicz, *Essays on Thermodynamics*

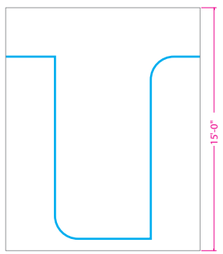
Terms

Definitions and Sensations

These definitions and sensations lay out a set of formal and sensorial properties that describe suspense. The terms: profile, suspense, poche, envelope, folds, edges, and faces have to do with spatial qualities and set up a formal order.

The sensations: coolness, warmth, visual blurring, olfactory blurring, aural blurring, and luminosity have to do with the performance of systems enclosed in the ceiling. Attempting to assign a loose envelope to them, explicates their potential to operate in ways that are both spatial and programmatic. They are elements that have dimension and duration.

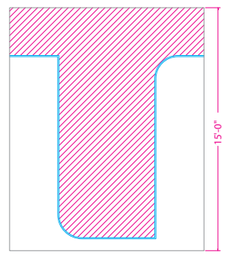
The details of fuzzy boundaries and the RCPs record the language of suspense and attempt to register formal qualities and sensations to describe an experience.



PROFILE

(n.) variable geometries which interrupt an undifferentiated condition.

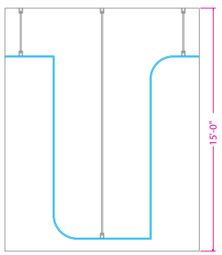
Profiles increase proximity to interior architecture and produce a planimetric equivalence between space for service and space for the body. Internal weathers become imminent and specific.



POCHE

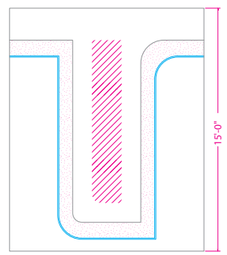
(n.) the differential space between the slab and the ceiling, including is complementary affects.

Poche can be sensorial, formal or/and technical.



SUSPENSE

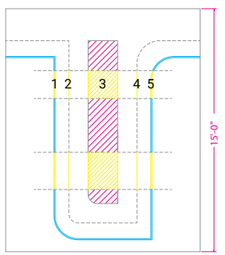
(n.) the state or condition of hanging (from the slab above) and the condition of mental uncertainty or excitement.



ENVELOPE

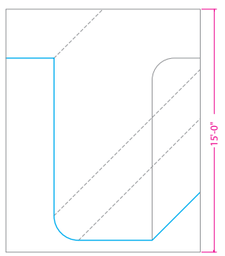
(n.) ceiling, the physical or sensorial boundaries negotiated by the body, the exterior of the interior of an office environment.

A technical surface that mediates spatial negotiations between climates, bodies and equipment.



FOLDS

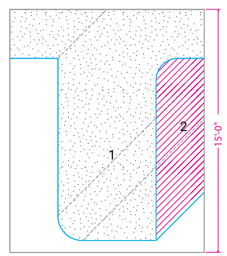
(n.) geometry which doubles itself, capable of amplifying affect by increasing the surface area of service systems and material enclosures.



EDGES

(n.) seams or joints which contour programmatic boundaries.

Edges are coordinated to produce continuous or segmented spaces. A hard edge might signify the end of one area and a soft edge might allow space to continue.



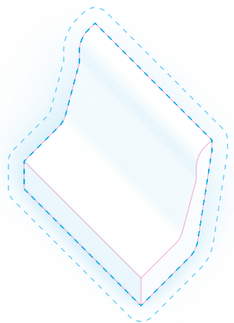
FACES

(n.) formal boundaries that inflect circulation.

Faces present the thickness of the ceiling profile. Depending on their altitude, faces can be denotative or connotative boundary conditions.

“Architecture has more surface and more kinds of surface than anything else: outside, inside, soft, hard, there’s a surface for everyone.”

Sylvia Lavin, *Kissing Architecture*



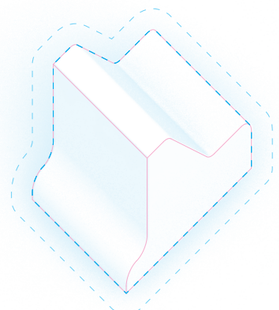
THERMAL ENVELOPE (COOL-COOL)

A zone of noticeably cool air produced by lowering the altitude of the ceiling and enclosed servicing systems. Coolness might connote ambulatory zones.

Partition Type A (see details)

“So long as meteorology presents itself as a natural science and nothing else, it can pass in silence over the question of the weather’s possible author.”

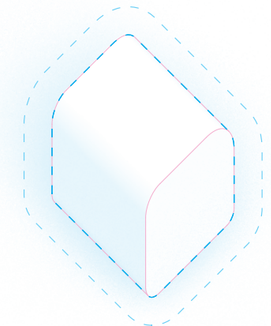
Peter Sloterdijk, *Terror in the Air*



THERMAL ENVELOPE (COOL-HOT)

An envelope of cool air in a differential thermal zone. Pockets of warm and cool air perform as a sensorial enfilade.

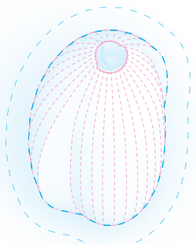
Partition Type B (see details)



THERMAL ENVELOPE (HOT-COLD)

A small pocket of warm air from an enclosed radiant heating panel. Warm air is used to signify a threshold between ambulatory and stationary zones.

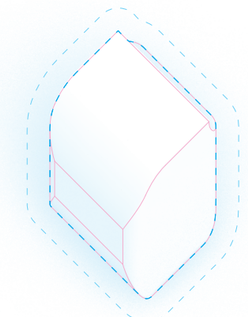
Partition Type B (see details)



FLUORESCENT FALLOUT

Higher luminosity fallout from fluorescent task lighting fixtures produce flexible zones of activity.

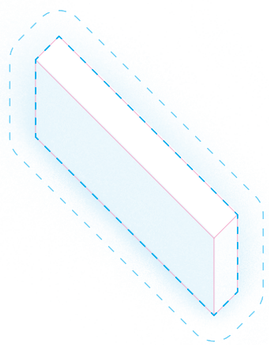
Partition Type D (see details)



AUDITORY ENVELOPE

A small sensorial offset produced by pink noise monitors enclosed in thick folds in the ceiling.

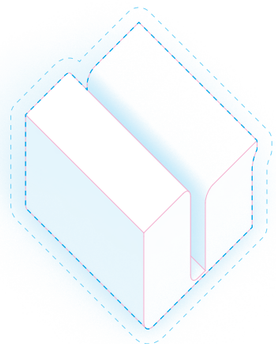
Partition Type F (see details)



OLFACTORY BOUNDARY

A soft boundary between adjacent zones created by the return air equipment. Lowering the altitude of return air systems instrumentalizes this equipment by partially occluding smell.

Partition Type E (see details)



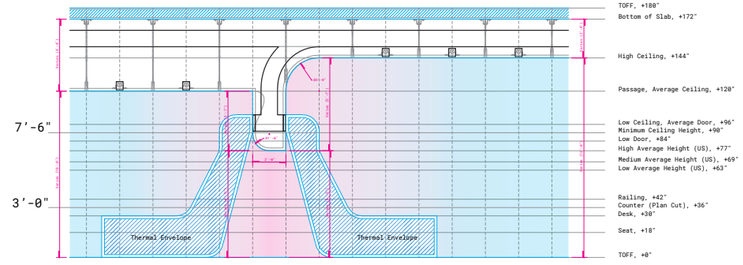
PERCEPTUAL BOUNDARY

The deepest type of ceiling fold obscures vision producing perceptual thickness between adjacent spaces. Perceptual boundaries also act as surfaces which receive projections of the image of work and the images of the existing building.

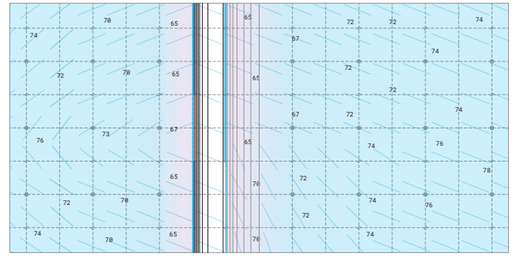
Partition Type C (see details)

Details

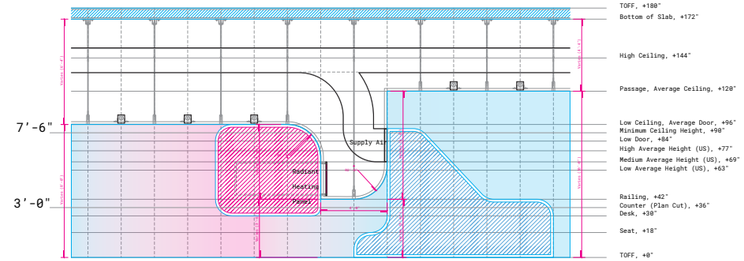
Partition Schedule



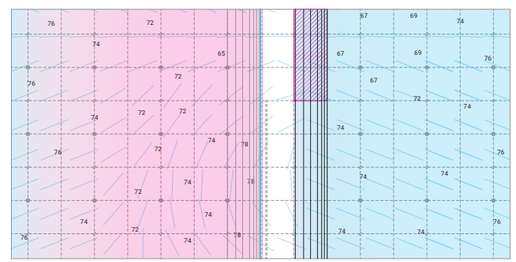
A Section Detail
Thermal Envelope (Cool), Typ.



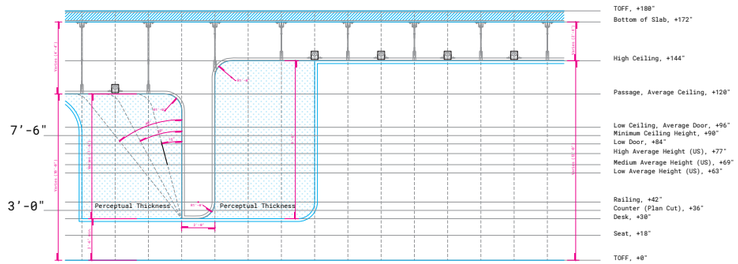
A Plan Detail
Thermal Envelope (Cool), Typ.



B Section Detail
Thermal Envelope (Differential), Typ.



B Plan Detail
Thermal Envelope (Differential), Typ.



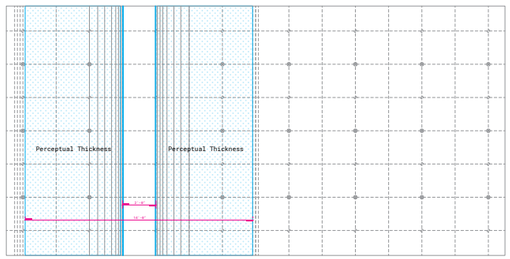
C_1 Section Detail

Blur Boundary (Dot Moire), Typ.

C_2 Same as C1 but with 15° inclineBlur Boundary (Line Moire), Typ.

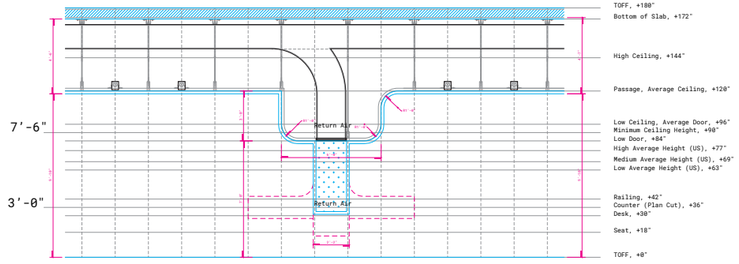
C_3 Same as C1 but with 30° inclineBlur Boundary (Dot Moire), Typ.

C_4 Same as C1 but with 40° inclineBlur Boundary (Angled Moire), Typ.



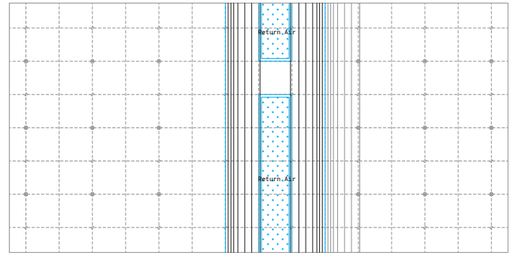
C Plan Detail

Blur Boundary (Moire), Typ.



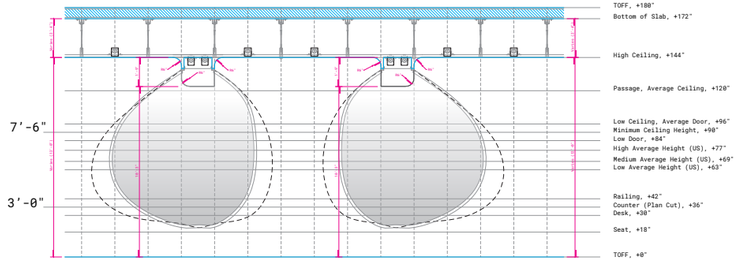
E Section Detail

Olfactory Partition, Typ.



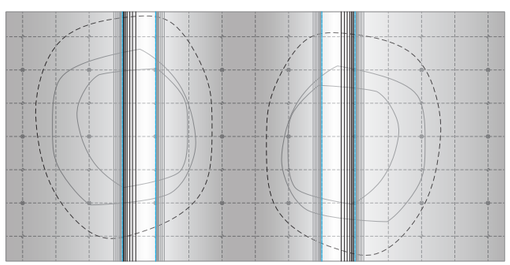
E Plan Detail

Olfactory Partition, Typ.



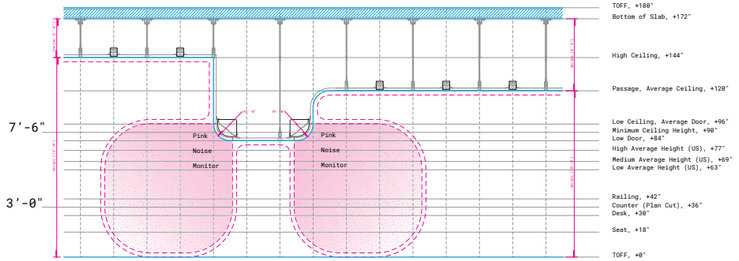
D Section Detail

Task Lighting Interval Boundary, Typ.



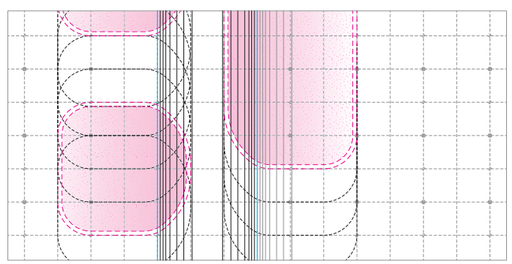
D Plan Detail

Task Lighting Interval Boundary, Typ.



F Section Detail

Auditory Envelope, Typ.

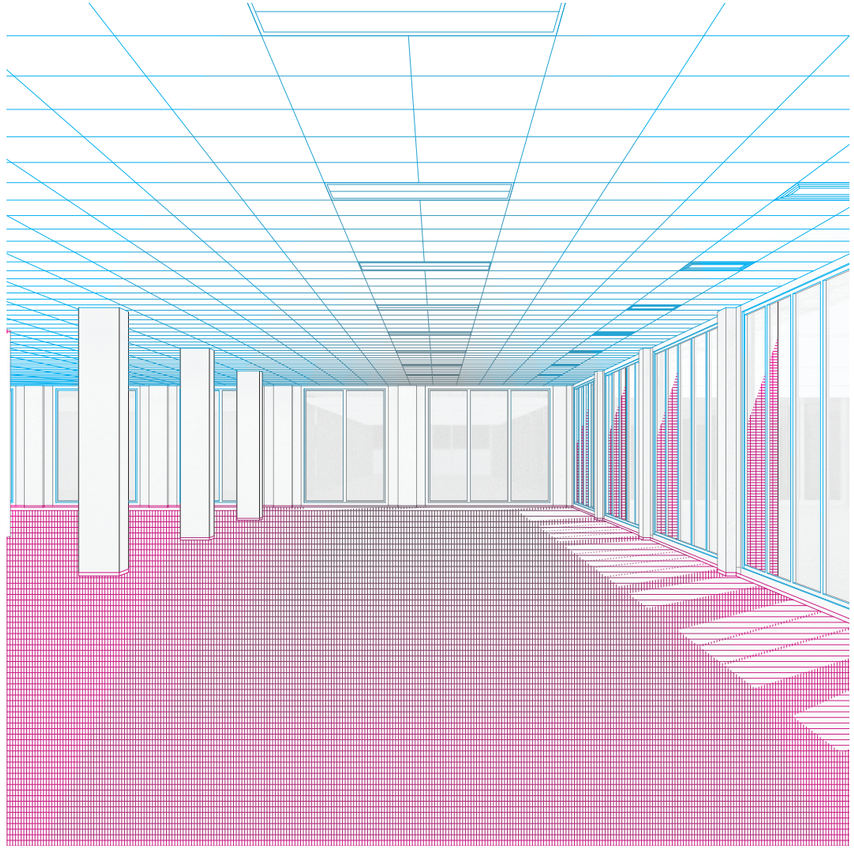


F Plan Detail

Auditory Envelope, Typ.

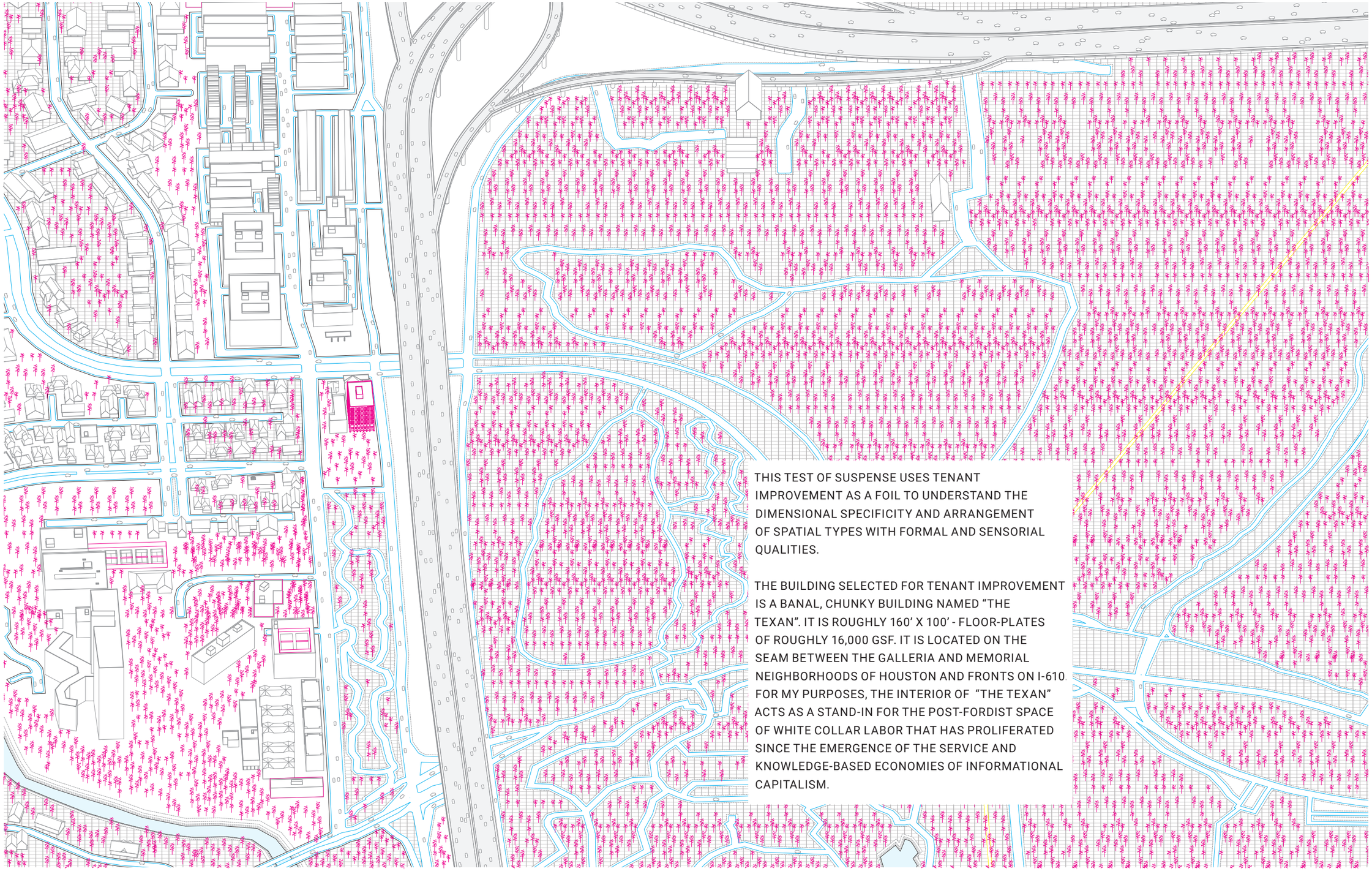
Site

Existing Conditions



The site of this inquiry is the interior of the generic office building. The mode of intervention is the socialization spaces, and climates negotiated by an architecture of suspense. Choosing the generic office as the primary site (and the tenant improvement as a methodology) purposefully sidesteps the normative conventions which typically construe the image of an architectural project at the outset (elevations, sections, perspectives). Instead, plans, and elevations are treated as ready-mades. The proposed tenant improvement operates on surfaces and fixtures allocated above the floor and below the slab. This thesis inaugurates an architecture of suspense to discuss and articulate the politics of interior enclosure and climate as a measure of addressing the emergence of multivalent subjectivities.

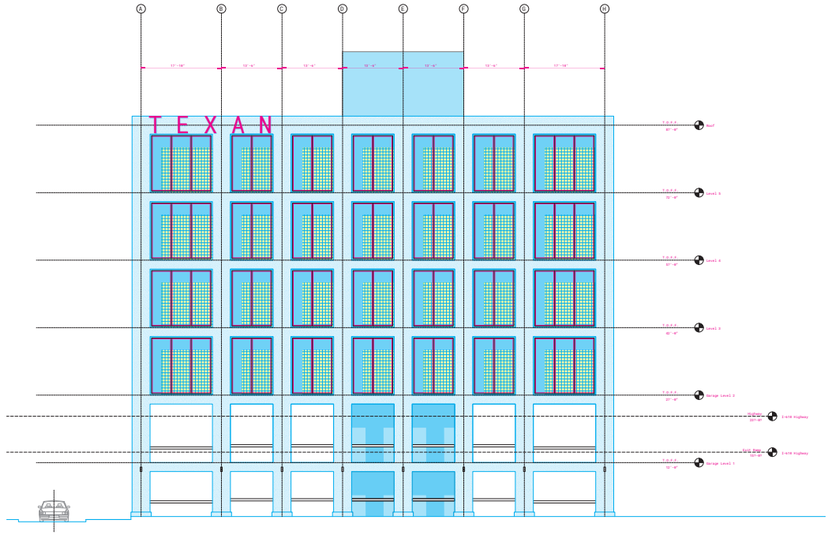
Normally, the architectural plan assumes it is the progenitor, and as such, our understanding of architectural partition remains more or less geological. Objects, occupants and program act in compression on the slab below. Furniture becomes sediment, and people become sedentary. The plan is a managerial tool that produces an architecture of habit. The suspended ceiling and services act in tension and operate meteorologically. An architecture of suspense identifies the potency of a ceiling pregnant with program and form; suspense acts to critique the undifferentiated condition of the open plan office type and the jurisdiction of the universal subject of modernism.



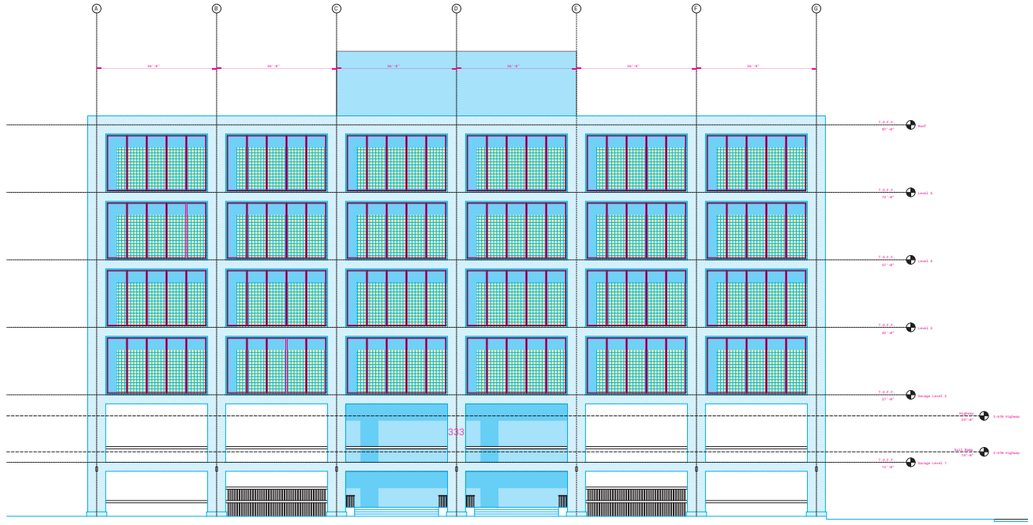
THIS TEST OF SUSPENSE USES TENANT IMPROVEMENT AS A FOIL TO UNDERSTAND THE DIMENSIONAL SPECIFICITY AND ARRANGEMENT OF SPATIAL TYPES WITH FORMAL AND SENSORIAL QUALITIES.

THE BUILDING SELECTED FOR TENANT IMPROVEMENT IS A BANAL, CHUNKY BUILDING NAMED “THE TEXAN”. IT IS ROUGHLY 160’ X 100’ - FLOOR-PLATES OF ROUGHLY 16,000 GSF. IT IS LOCATED ON THE SEAM BETWEEN THE GALLERIA AND MEMORIAL NEIGHBORHOODS OF HOUSTON AND FRONTS ON I-610. FOR MY PURPOSES, THE INTERIOR OF “THE TEXAN” ACTS AS A STAND-IN FOR THE POST-FORDIST SPACE OF WHITE COLLAR LABOR THAT HAS PROLIFERATED SINCE THE EMERGENCE OF THE SERVICE AND KNOWLEDGE-BASED ECONOMIES OF INFORMATIONAL CAPITALISM.

NORTH ELEVATION

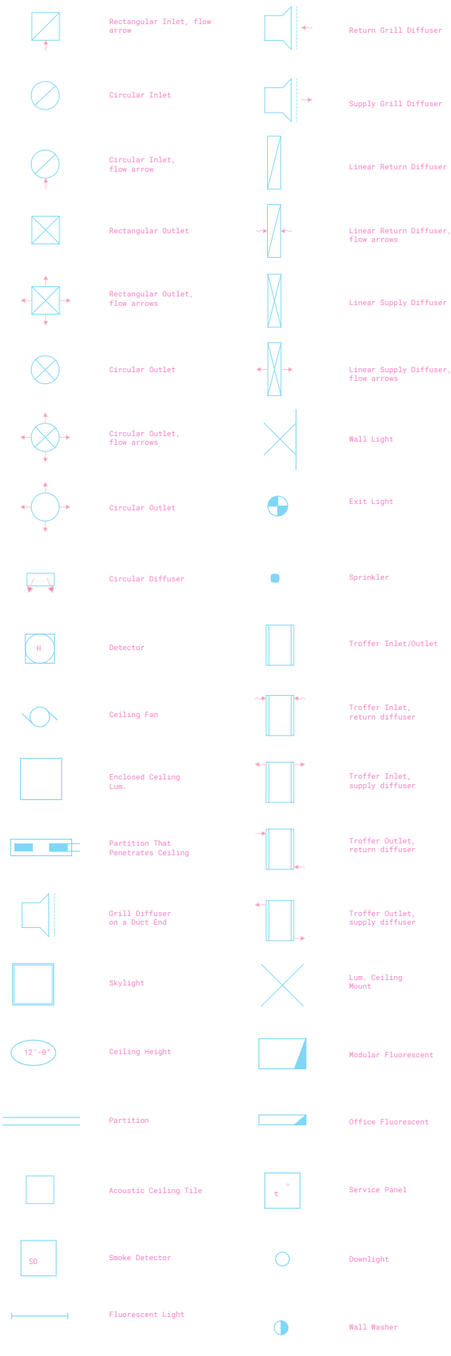


EAST ELEVATION



Application

An Architecture of Suspense



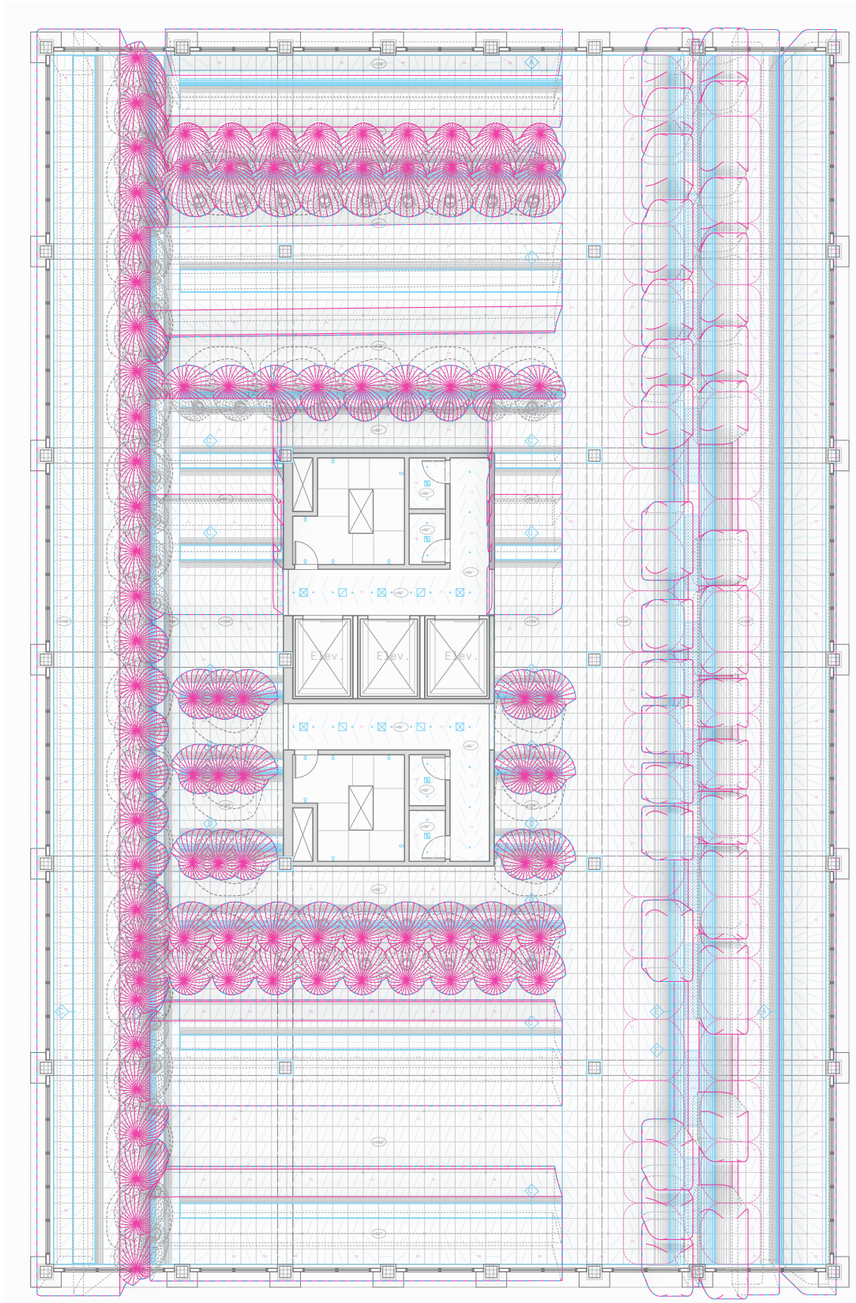
When we speak about light fixtures, ducts, diffusers, pipes, fittings, rods, sockets, cables, meters, insulation, clips, sprinklers, valves, sensors and vents, we do so in technical terms. We use acronyms and jargon to describe flow rates, thermal properties, brightness, and efficiency and when we assess them qualitatively, we talk about a subjective ("universal") understanding of comfort and flexibility. These generic elements are assembled, adhered, bolted, and screwed together becoming vast performative bodies. Increasingly, these systems become sensorial and corporeal and we tend to and optimize them with great care. Despite the great diversity and complexity these bodies promise, they have, since 1961, been rendered mute by suspended ceilings. These banal surfaces conceal and organize space cheaply and expediently that would otherwise need to be resolved architecturally.

In buildings which require heavy servicing, and the devotion of countless specialists, and technicians, the suspended ceiling acts to (perhaps intentionally) eliminate difference. In exchange, we receive an undifferentiated architecture of uniform ceilings and a predictable forecast of interior weather in service of what is construed to be a universal, modernist subject. For that reason, mechanical systems meet technical benchmarks but are otherwise concealed such that the potency and politics of their devices, surfaces, and the constituencies served are all but neutralized.

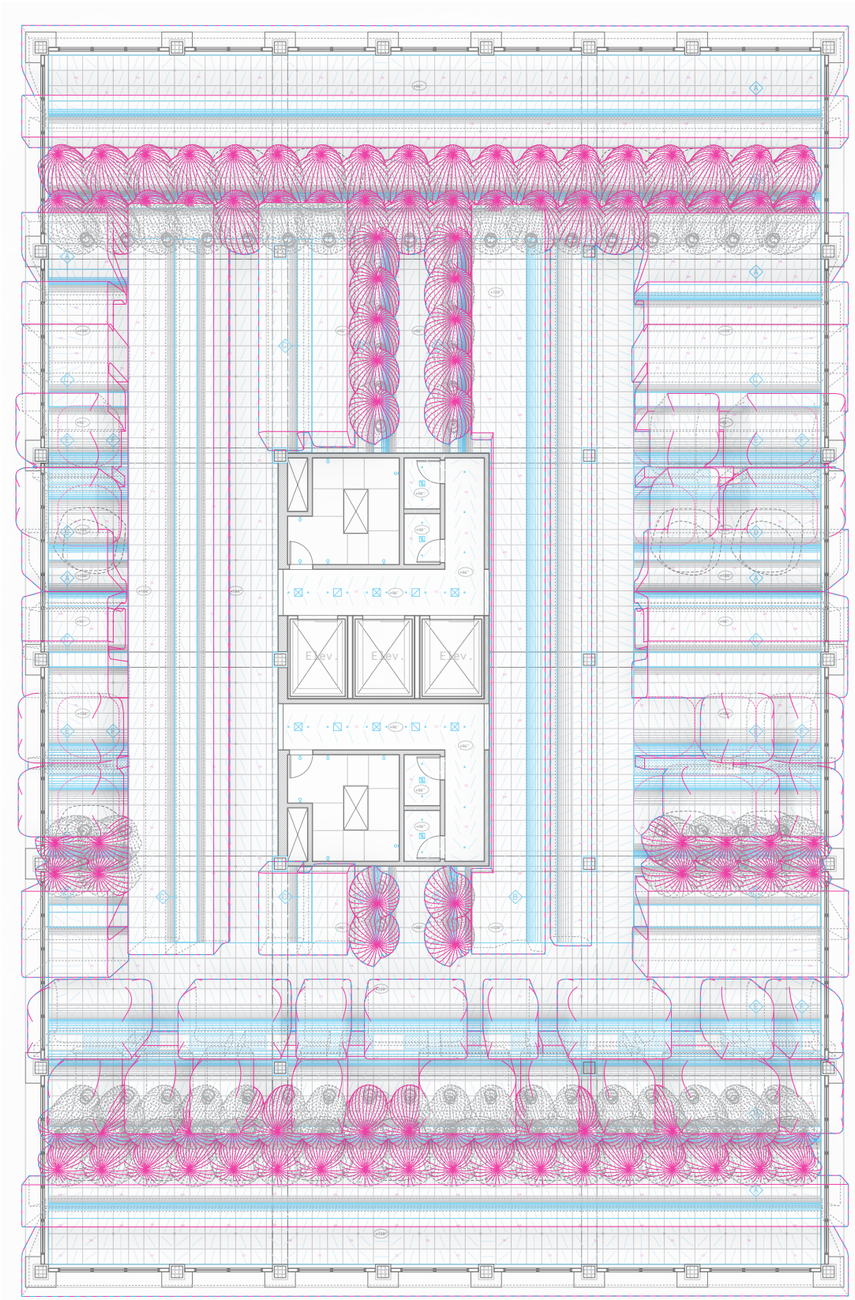
If instead, we imagine mechanical systems and their enclosure as a political body with a formal resolution, and programmatic ambitions, we might reevaluate these systems and mediating surfaces and find they afford the necessary disciplinary space to speculate about and pursue disruptive social forms, and spatial organizations that welcome differentiation and specificity. Systems which normally serve the agenda of a concealed power (to borrow from Reyner Banham's Well Tempered Environment), might instead begin to manifest ruptures in its concealment or in its structure. In this way, energetic and technical efficiencies might find parity with social and political ambitions.

Ultimately, shifting the way that we think about the politics of mechanical plenums (mechanical services and suspended ceilings), calls for a reassessment of the drawings that we use to represent them and the way that we resolve them architecturally.

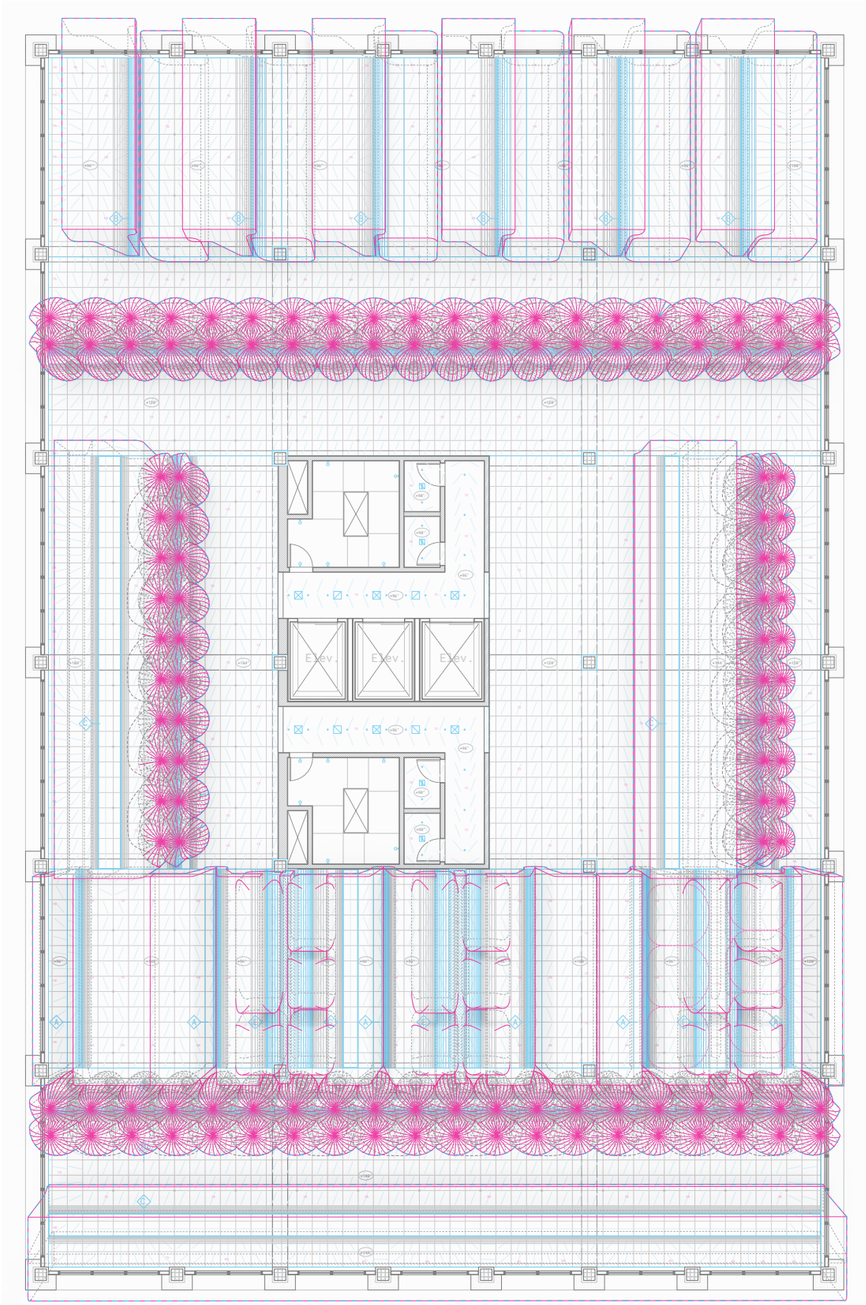
RCP +, TYPE 1



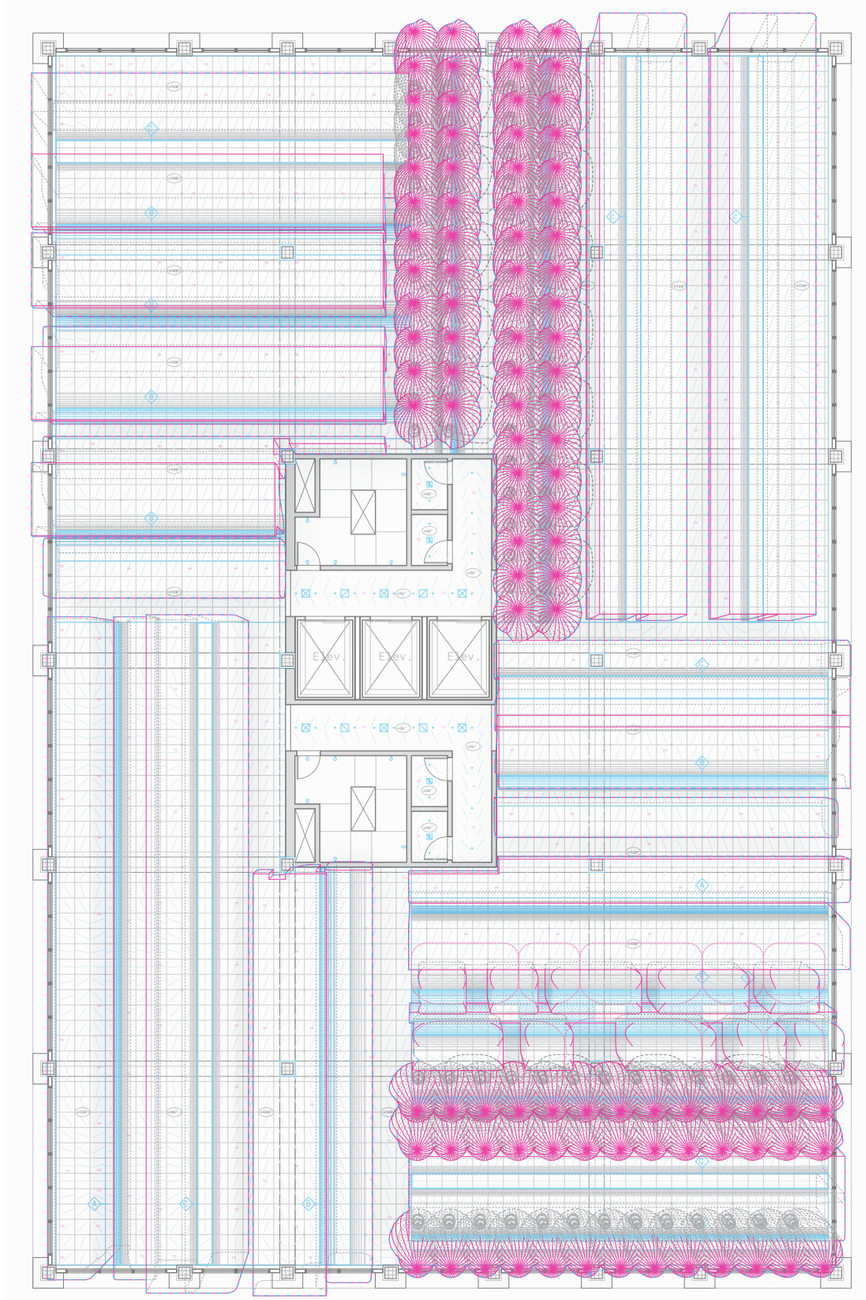
RCP +, TYPE 2



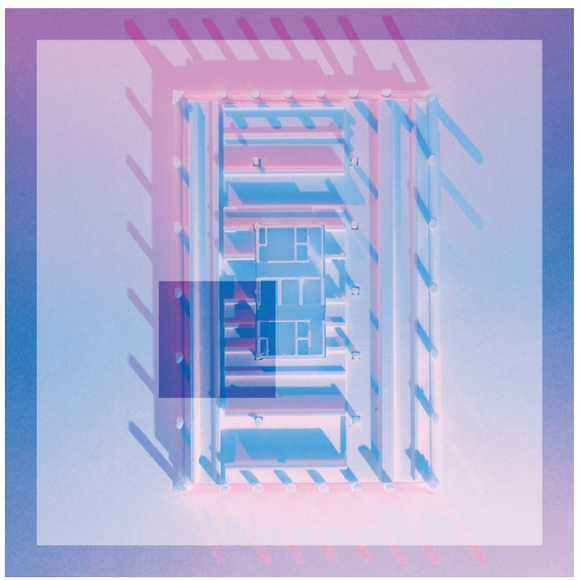
RCP +, TYPE 3

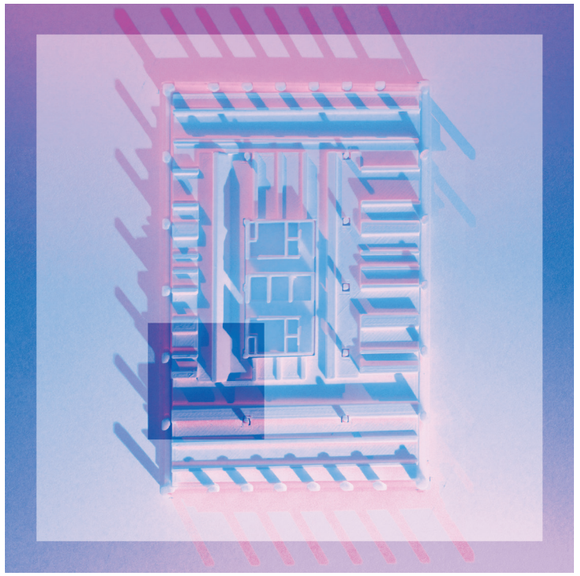


RCP +, TYPE 4

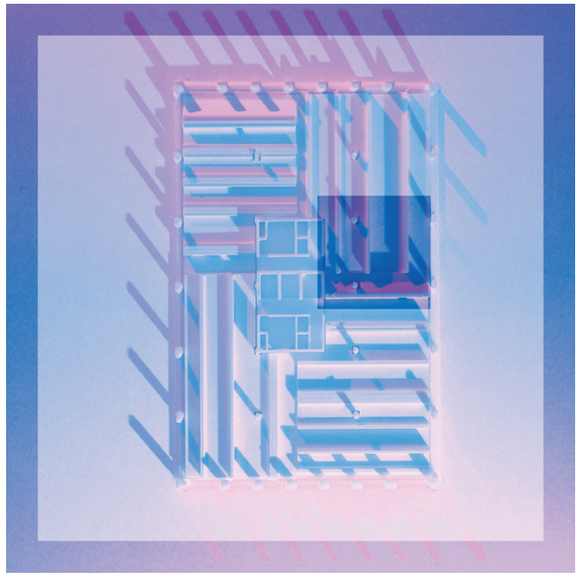


CEILING STUDY MODELS
Types 1 + 2

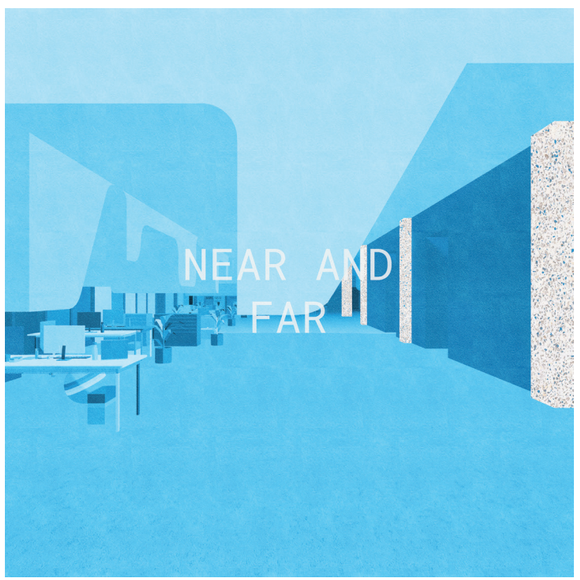




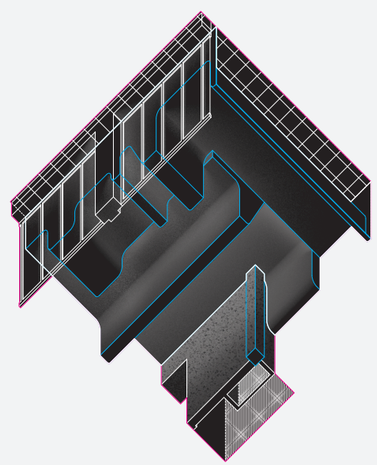
CEILING STUDY MODELS
Types 3 + 4

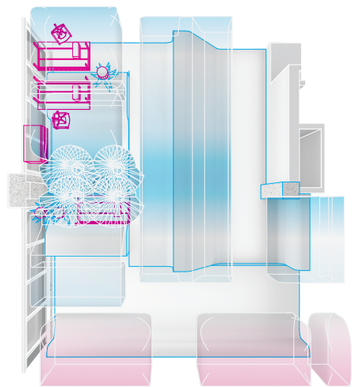


EPISODE 1, NEAR AND FAR
Proximate Privacy



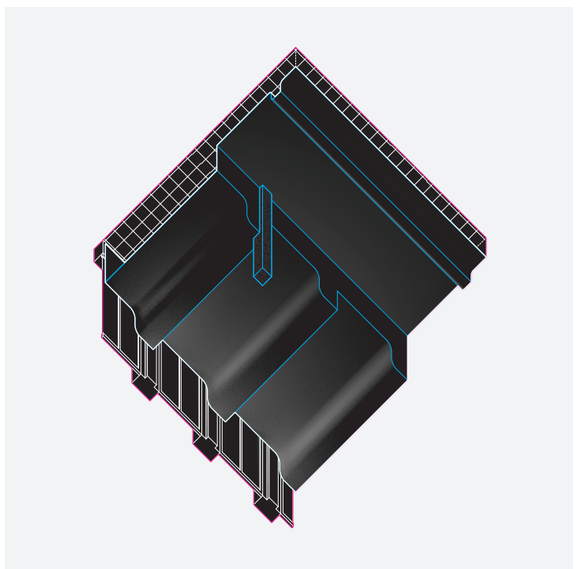
ENTER THE UNMISTAKABLE SMELL OF THE WORKPLACE. THREE DIFFERENT COLOGNES AND TWO PERFUMES, ONE OF THEM IDENTIFIABLE. THE SCENT OF WARM COPIES AND INSTANT COFFEE. TORSOS AND LEGS MOVE BACK AND FORTH. HEADS AND SHOULDERS ARE SILHOUETTES ON A WHITE SCREEN ILLUMINATED BY AFTERNOON SUNLIGHT THROUGH FULL HEIGHT WINDOWS. TRACES OF WORK ARE ALL AROUND BUT PARTIALLY OBSCURED. THE PERSON YOU'VE COME TO SEE IS SEVEN FEET AWAY, BUT YOU'LL WALK FIFTY TO REACH THEIR DESK. THE SOUND OF A FAX ON YOUR LEFT IS BACKED BY THE MARCH OF STEADY TYPING. OVER THE SOUND OF YOUR FOOTSTEPS, YOU MAKE OUT A SALES CALL.

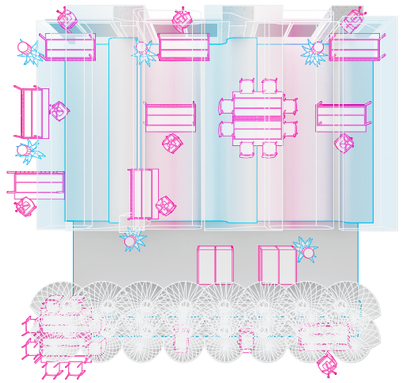




EPISODE 2, HOT AND COLD
Differential Thermal Environments

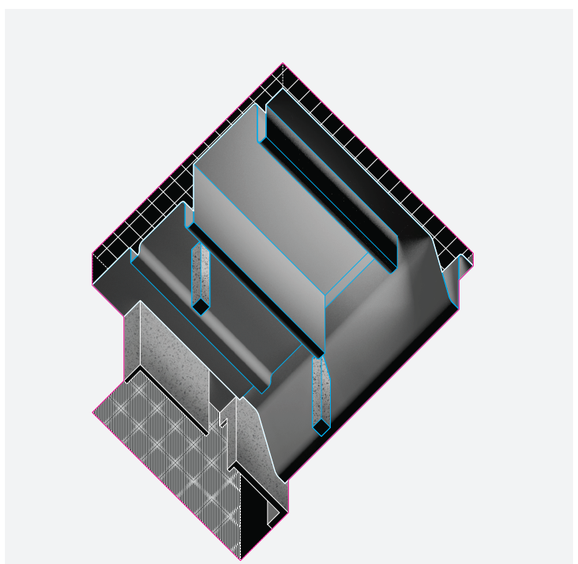
THE CEILING IS HIGH HALF OF THE TIME. PEOPLE EITHER WORK IN TWO LARGE GROUPS OR AT INDIVIDUAL DESKS. WALKING FEELS LIKE MOVING THROUGH EIGHT ROOMS BUT THERE ARE NO DOORS OR WALLS. THERE ARE FOUR THERMAL GRADIENTS. WORK MOVES BETWEEN HOT AND COLD. WATCH FOUR PEOPLE WORK IN HEAVY SWEATERS BECAUSE THEY LIKE TO FEEL WARM IN COLD SPACE LIKE OPENING A WINDOW IN WINTER WITH THE HEAT ON. YOU SIT CLOSE TO THE LOW, FLAT PART OF THE CEILING AT A 90 DEGREE ANGLE. LOOKING OUT OF A NORTH-FACING WINDOW, WARMTH FALLS ACROSS YOUR BODY FROM LEFT TO RIGHT.

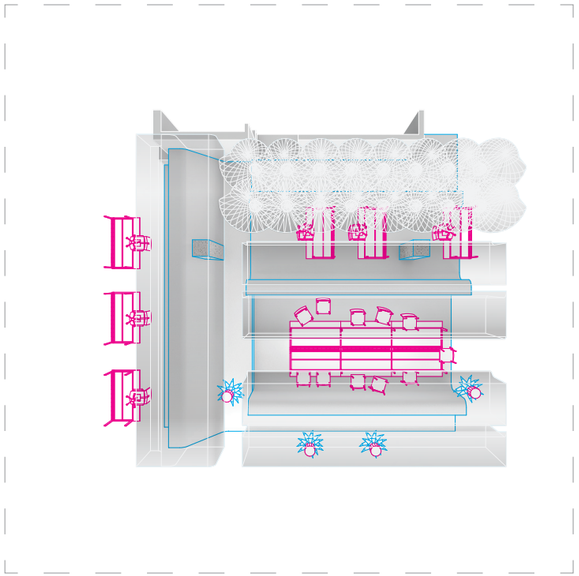




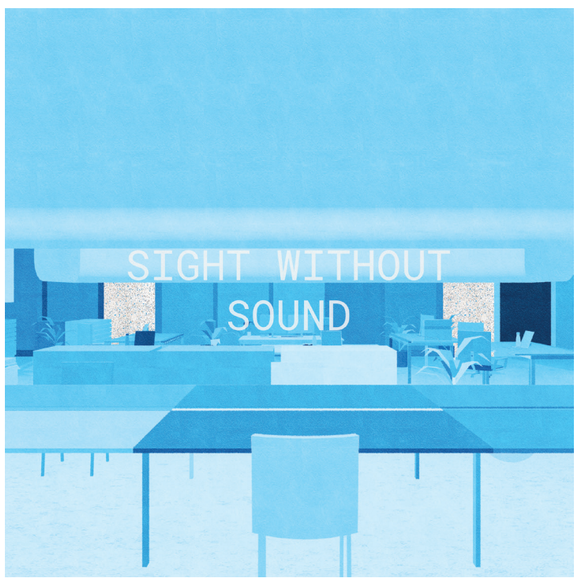
EPISODE 3, OPEN AND CLOSED
Loosely Bound Program

SEVEN PEOPLE NOISELESSLY PREPARE SIX TABLES FOR A CONFERENCE. BEYOND THEM, THERE ARE EIGHT OFFICE PLANTS AND THREE BAYS OF FIVE WINDOWS. WHEN THEY SPEAK, THEIR VOICES ARE MUFFLED, BUT THE PRESENTATION ON THE CEILING IS CLEARLY VISIBLE. BEHIND THE FOLD, FOUR PEOPLE RESEARCH INFORMATION ABOUT NEW INLAND PORTS IN TENNESSEE AND GEORGIA. THE PRESENTATION APPEARS BEHIND THEM IN REVERSE. DISTRACTED, THEY TURN TO WATCH.

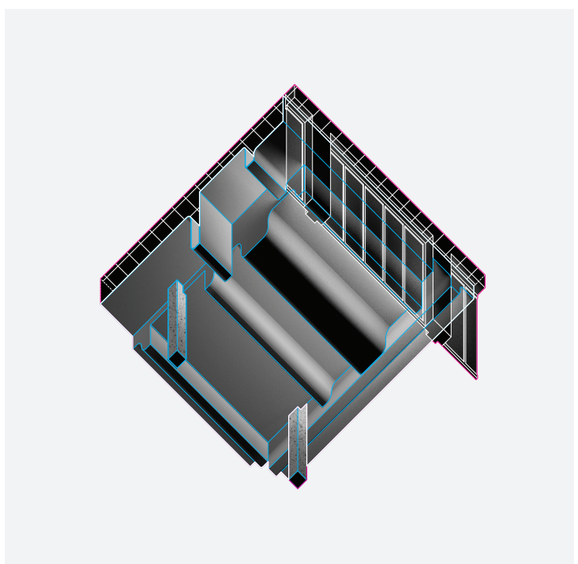


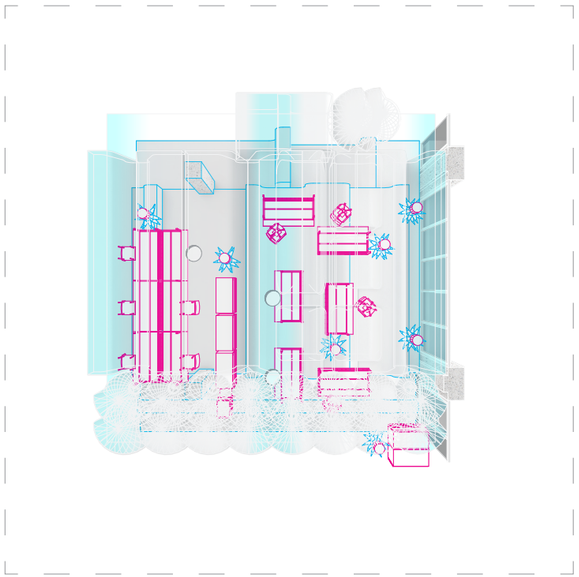


EPISODE 4, SIGHT WITHOUT SOUND
Multiple Sensorial Occlusion



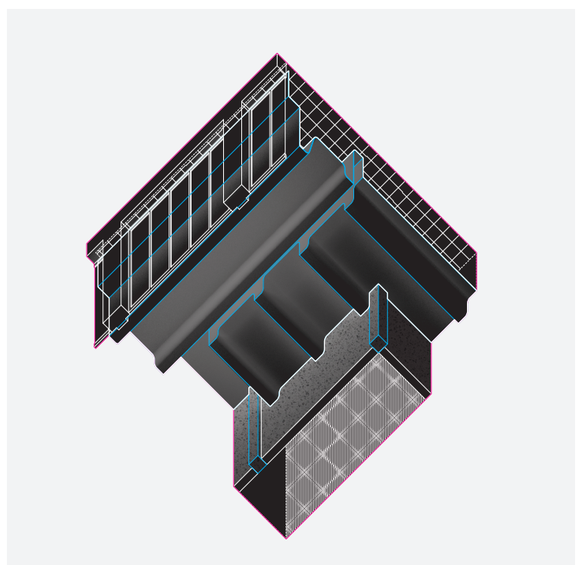
FIFTEEN DESKS IN A ROW. SOMEONE RETURNS FROM THE MICROWAVE WITH A GLASS TUPPERWARE AND OPENS IT. YOU CAN SEE WHAT THEY BROUGHT, BUT YOU CAN'T SMELL IT. IT LOOKS GOOD. DESKS ARE SEPARATED BY GAPS PRODUCED BY RETURN AIR DUCTS AND SPEAKERS. BEHIND YOU, A PARENT TAKES A CALL ABOUT THEIR CHILD. THEY STEP INTO A CLOUD OF PINK NOISE UNDER A LOW FOLD IN THE CEILING. IN THE SPACE OF INTERFERENCE, THEIR VOICE DISAPPEARS. UNDER THE HIGH CEILING, WALKING TOWARD AN EAST-FACING WINDOW, YOU PASS THE SMELL OF CHICKEN OVER RICE. THE DISTANCE OF DIFFUSION IS THE SIZE OF THE ROOM.

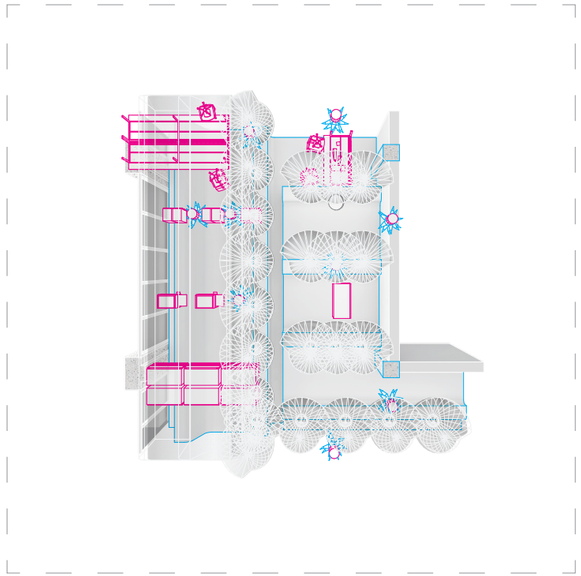




EPISODE 5, GUIDING LIGHT
Fluorescent Fallout and Task Zones

AT THREE PM, SUNLIGHT FROM THE WEST PROJECTS SIX ROOMS ONTO A FOLD IN THE CEILING. ROOMS HAVE FOUR LINES AND ARE SEPARATED FROM EACH OTHER BY A THICK, DARK BAND, A PROJECTION OF THE EXTERIOR WALL. DEPENDING ON THE TIME OF YEAR, THESE ROOMS EXIST FOR ABOUT FOUR HOURS EACH DAY. A HIGH CEILING IS A HALLWAY THAT RUNS THE LENGTH OF THE BUILDING. ACROSS IT, THE CEILING DIPS EIGHT TIMES ALONG THE LENGTH OF A WALL. THERE ARE EIGHT AREAS WITH BRIGHT TASK LIGHTING AND EIGHT DIMMER AREAS IN BETWEEN. I PREFER THE DIM AREAS BUT SOMETIMES I USE A DESK LIGHT.





"NEAR AND FAR"
Proximate Privacy

"HOT AND COLD"

Differential Thermal Environments

Day-old Banana
Effective Radius: 1'-0"
Diffusion Rate: 1:15.00

Slow Walk (Sneakers)
Length: 0:30.0
Volume: 35 Decibels

Tuna Sandwich
Effective Radius: 3'-6"
Diffusion Rate: 3:30.00

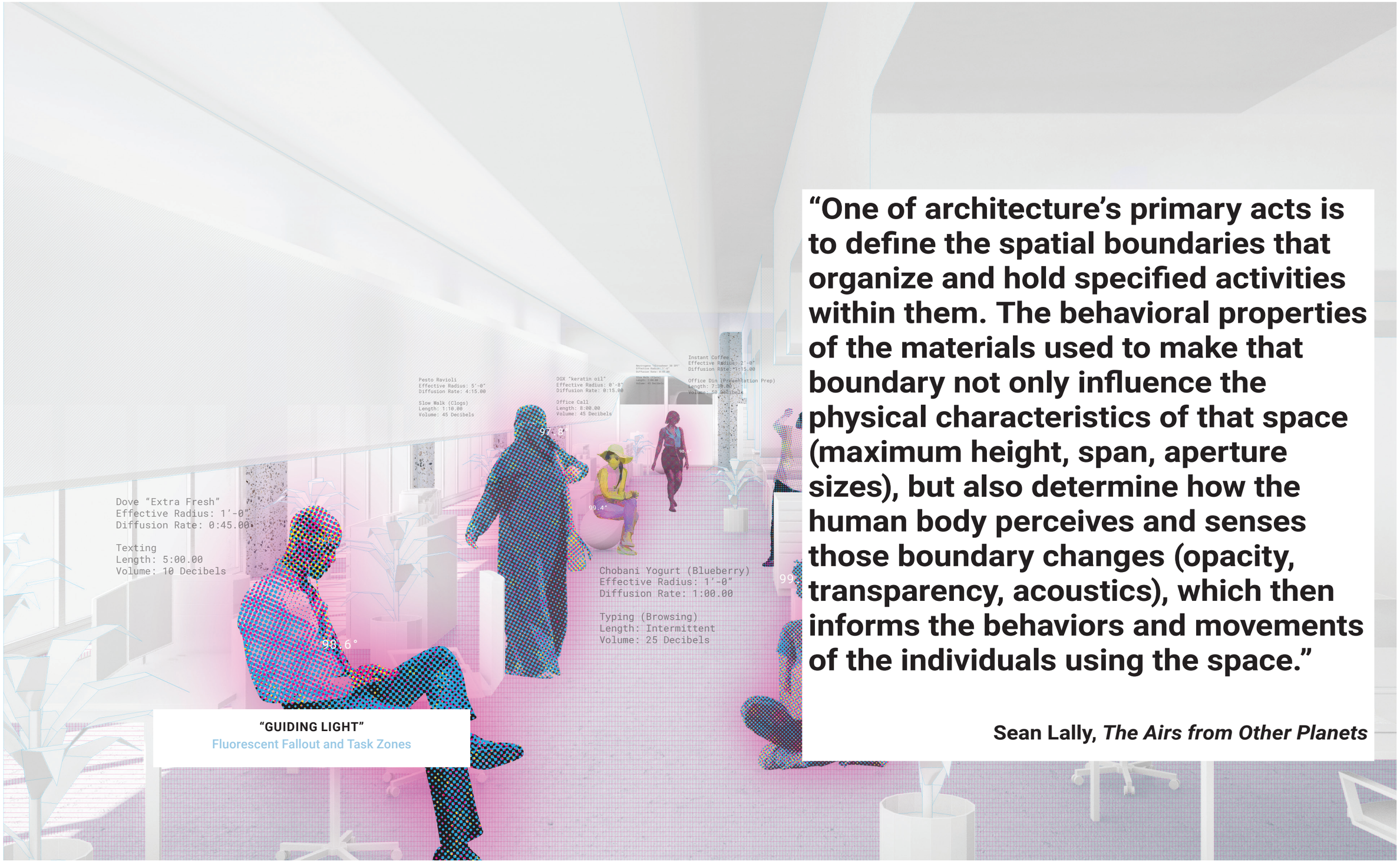
Covert Texting
Length: Intermittent
Volume: 15 Decibels

“OPEN AND CLOSED”

Loosely Bound Program

"SIGHT WITHOUT SOUND"

Multiple Sensorial Occlusion



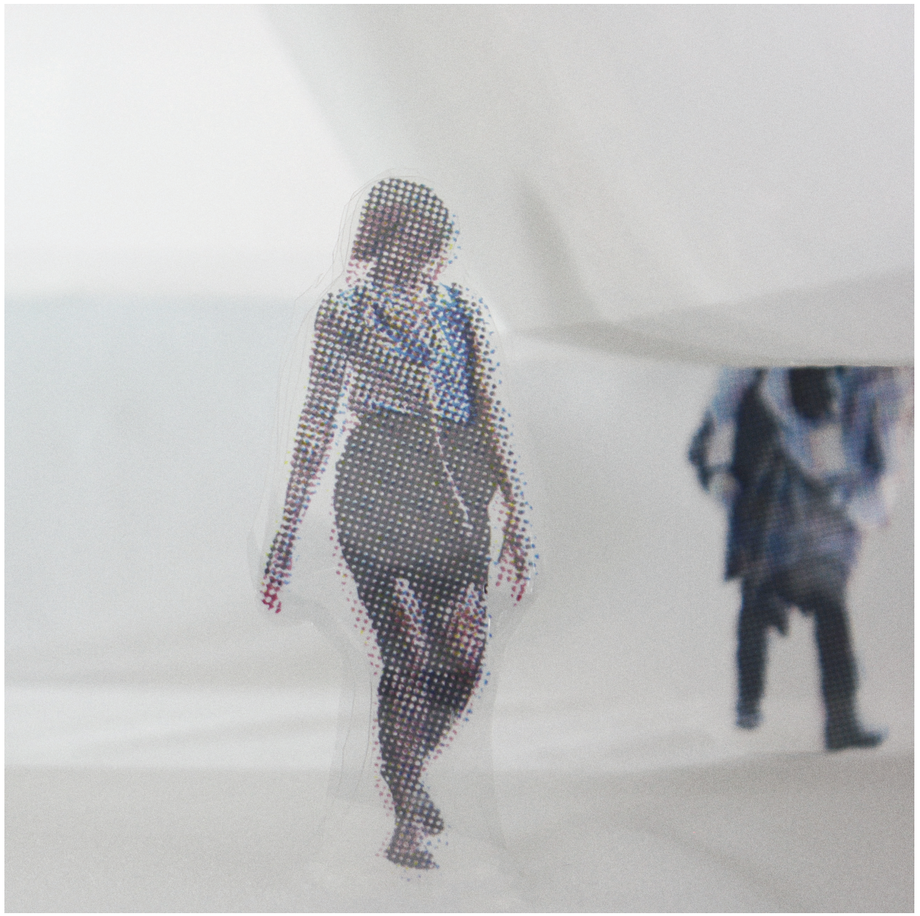
"GUIDING LIGHT"
Fluorescent Fallout and Task Zones

"One of architecture's primary acts is to define the spatial boundaries that organize and hold specified activities within them. The behavioral properties of the materials used to make that boundary not only influence the physical characteristics of that space (maximum height, span, aperture sizes), but also determine how the human body perceives and senses those boundary changes (opacity, transparency, acoustics), which then informs the behaviors and movements of the individuals using the space."

Sean Lally, *The Airs from Other Planets*

MODEL PHOTO
Wormseye View
Model Scale: 3/8”=1’

MODEL PHOTO
Elevation/Section
Model Scale: 3/8”=1’



MODEL PHOTO
Perspective
Model Scale: 3/8”=1’

MODEL PHOTO
Perspective
Model Scale: 3/8”=1’

MODEL PHOTO
Perspective
Model Scale: 3/8”=1’

“Inside the unobstructed space of the daylight factory it was possible to reduce men and raw materials to measurable parameters in order to prevent congestion and, especially, worker insubordination. Here we can see clearly the relationship between the abstraction of the open floor and the logic of labor power. Unlike Aristotle’s and Arendt’s definitions of labor as a biological process of reproduction restricted to the private realm of the house, labor power is no longer restricted to one sphere of the human condition, but rather represents its totality.”

Pier Vittorio Aureli, *The Dom-ino Problem*

Conversation

“Suspend your disbelief”

A CONVERSATION WITH: IÑAQUI CARNICERO,
MICHELLE CHANG, SCOTT COLMAN, RETO GEISER,
CARLOS JIMENEZ, THOMAS KELLEY,
AJAY MANTHRIPRAGADA, PIERGIANNA MAZZOCCA,
BRYONY ROBERTS, SARAH WHITING, RON WITTE

Ajay Manthripragada (AM): You made the claim that the site of the project was the RCP, which is a disciplinarily unique representational tool that is difficult in a way, meaning it requires a certain expertise to comprehend, right? It seems that the section is really the tool here and I’m struggling to understand how the RCP was the site of investigation. It certainly is there in terms of its representation, I’m wondering how you link it back to the framework of the actual site.

Evio Isaac (EI): I think the site is two-fold. It’s both this specific building, which is how I developed a kind of dimension to the project, and to the RCP. I think the project operates both through the RCP and through the section but I see the RCP as the generative drawing and the section as a secondary drawing, a drawing which is deferring to the RCP in terms of which drawings are trying to produce a kind of spatial quality.

AM: Could you point out how, how the RCP becomes the generator?

EI: Sure. I started by looking at the relationship between the core and the shell, and the RCP takes over the space between those two extents, and in each of scenarios, I used a generic plan type whether its banded or concentric to demonstrate the power of the RCP as a generative drawing, which is to say that in the space of the office, if you give the plan precedence, its difficult to change the way that the office is used, despite how furniture might be arranged. But when you use the RCP, you get to deal with elements that normally operate in the background. I think that the RCP is better at coordinating elements that are hard to describe, or things that don’t necessarily have physical boundaries. Using the RCP, which has an abstract quality, enables you to manipulate and coordinate these difficult-to-perceive elements.

AM: I think that’s a good answer. Another way to think about it that the RCP as a reflection of the plan literally is conventionally understood as secondary to the plan and you are reversing that model. It might have useful to also correlate those with the plans that result from the RCP as opposed to the other way around.

Bryony Roberts (BR): I appreciate the humor in, and the playfulness, and the narrative invention and the quality of the drawings a lot. I want to know a lot more about how this works, technically. So can you explain what the pink things are on the plan, and then also how exactly these different sections isolate sound and smell from other parts of the space.

EI: The pink things are a representation of the different sensorial envelopes I’m trying to coordinate with the RCP.

BR: So are they material or are they immaterial?

EI: They’re immaterial. The pink things specifically are fallout from light. These fatter bands are representations of a ceiling fold that has a translucent quality that increase the perceptual depth between two adjacent spaces. These bubbles here are a representation of the clouds of pink noise I was attempting to describe in the episodes as the boundary created by a speaker that is playing pink noise such that people can occlude themselves from office din.

BR: Is pink noise different from white noise?

EI: It’s a little different. Its at a different frequency. I spent a good amount of time this semester listening to pink, brown and white noises. There’s an app called “Noisli” that I recommend. This is not a plug for the app, but it did help me understand what those different frequencies of noise do in space.

Sarah Whiting (SW): It seems that the thesis is more about that then it is about the RCP in that its a way of...how do you both represent, and design with the immaterial. And them I'm trying to figure out - I think it's really beautiful and I also really like the presentation, the verbal and, it makes me very happy, we get good verbal presentations and beautiful writing, you know how to make me happy - so I get a little lost in the numbers. You have seven definitions, seven sensations, four types, five episodes, and I'm left wondering, are these meant to be ways of designing that can be manipulated so that this floor can change? Or are you offering different versions of the Texan through immaterial design, and the results thereof? In which case, am I supposed to look at the four types or the five scenarios, so I'm a little bit lost in the...are we looking at a form of immaterial design and a version of that that we are supposed to then take away and do our own versions of?

El: I'll try to answer and then if it needs clarification, maybe I'll take another stab at it...I'll start by saying that I think it's important to clarify that the RCP is the central drawing. I think these are the focal point in terms of how I'm thinking about design. I think the RCP is a good way, in the fictional space of the Texan, there are two layers operating at once. One which is immaterial and one which is formal, and I think the RCP is a good way of registering those two modes of operating together in space because those immaterial and material things are coming from the ceiling. So I think that's an explanation of the RCP to clarify how I'm thinking about it. And then...

SW: Are you offering us variations of a type of approach? Is it a kit of parts?

El: I see it as a kit of parts. I know it seems massive the way that I've represented it, but I think one of the things I like most about the suspended ceiling, one of its virtues, is that it is expedient and it is relatively inexpensive to deploy rapidly. I think typically that deployment has come at a cost to how we think about that system formally, and performatively. So this is a kind of way of trying to understand what elements immaterial and material make up that system, and how they can be deployed in a way that gives architects more agency when we deploy them more than just choosing a 2'x2' square of acoustical tile for the ceiling.

Reto Geiser (RG): One thing that I find striking is that you haven't really talked about office furniture. To me it seems that is very much related to the question of plan versus reflected ceiling plan, and the plan seems to only work with all the kind of crutches that the furniture provides - alcoves, cubicles, acoustic panelings that come with it - and in a way you are sort of replacing that function that in many cases office furniture nowadays is taking care of. You're liberating the floor also from many of the functions that it has to take on acoustically. You've essentially taken Herman Miller out of business to some degree.

El: Well, yeah. I spent a lot of time looking at Action Office and a good bit of time looking at the Osham office, and Bürolandschaft, and I would say this project is not against the open plan, but its about saying that the open plan has a kind of itinerary that normally managed by these crutches. I'm saying that the open plan is an exciting playground for the ceiling to be operating as the thing that is managing the itinerary of these spaces rather than the furniture.

Carlos Jimenez (CJ): You know what's interesting Evio, is that I was reminded as you presented that Lacaton and Vassal have been rescuing these rather banal buildings around Paris you know when they look very much like a proud, chunky Texan in Paris. Suddenly, they developed this technique by which they expand the domain of that banality by adding balconies which become highly individualized by each tenant. And what I find fascinating in your scheme though is that you've given us an opportunity to consider that this projects could have an excavation in the interior by liberating the reflected ceiling plan to create all kinds of topographies and sections which become quite fascinating. I'm thinking that if these are five episodes, I can imagine twenty more episodes or a hundred more, in the same way that those balconies retain a kind of generic quality to them but also highly diverse depending on the tenant, and I was looking at this marvelous moment here where suddenly the ceiling drops down to give some intimacy as I sit next to my computer or I suddenly create this sort of undulation within the interior and its just fascinating how these buildings that appear to be so rigorously planned can give this new dimension in the same way that Lacaton and Vassal discovered this formula to avoid having them removed or torn down. So it would be costly but much less so than demolishing the building for sure.

AM: So you were given a way out when it was suggested that this wasn't an RCP project, but then you double down on saying it was an RCP project and so I'm going to be a stickler because you didn't define RCP. I mean, there are a lot of beautiful drawings, compelling drawings, including the RCPs, which are not RCPs they're perspectives. Those are not RCPs in the way that the convention would define them. And so there is an interest here in reinventing representation which has to be part of your thesis in the way that you present it. You're not actually following the standards, you're saying the standards are not sufficient in some ways, but to rethink them would enable this type of project and I think there is something really interesting there which maybe you can elaborate on? Would you call these RCPs, because I wouldn't, I would call them perspectives.

El: I would call them RCP perspectives.

AM: RCPerspectives.

Thomas Kelley (TK): But see, I would double down on that, the hybridization technique. To Sarah's point about all the numbers, I'm also very distracted. Around every corner I'm intrigued, and I think the beauty of really engaging the RCP is its quite literally a collapsed drawing that involves a lot of information. Maybe Reto can't see, but you have a lot of furniture over here so I think you fulfill that aspect, but I wonder if you could have compressed everything. I think you're setting it up for this vellum print where quite literally you could have had a series of layers that would have, maybe in a very analog way, animated the RCP so that we could describe the perspective, composite the plan and really talk about the furniture organization and maybe hybridize all the types into one plan so that its not one episode or another it could be all of them all of the time. And then also, I think you could have confronted what I think is often times missed here is that the lines of the grid both from the precedent and the suspended ceiling model that you're pushing on. All of your episodes play with these rectilinear layouts that just kind of reinforce the existing grid system of the building. It seems like when you're tackling energies you would want to push back on the rigidity that the structure informs. I think you're getting at that once you start drawing these pink bursts but they're also too regular.

El: I will say there is a second layer in this drawing but the vellum is unfortunately reading really opaque. I think that's a good way of framing the project.

TK: But then you could also investigate all the ways the the RCP has engaged over time.

Michelle Chang (MC): I wonder if the conversation of the RCP is purely technique, a technique through which you are trying to achieve a more broad end, basically to get to the affect. That the way in which you engage narrative, just to change the conversation a little bit, having to do with office culture, and even this kind of representation which is really hard to see, where you really start to objectify the parameters of what the people are doing. And so I wonder how much of it really is at this point about the RCP versus what that was allowing you to do.

BR: Yeah, I wanted to push you on that because you had some words in your presentation, resistance, and collectivity, which are very potent, and I don't yet see how that manifesting. What I do see is that you're playing with the trope of the open, flexible office, that you know is very trendy and people being able to work at certain tables and their own table or whatever, and the complaints that people have about that with there not being any boundaries for acoustics or smell or anything else. So it seems like you're sort of defining zones of individuality or edges between people within an otherwise undifferentiated plan condition. So, can you just speak more about what this resistant collectivity is like.

EI: I thought a lot about what kinds of things in office spaces produce collectives. I think in the open plan, we rely heavily on vision in order to construct what it means to be part of an office and this project, and the elements that I'm trying to coordinate are a way of trying to understand what sorts of sensations also establish collectivity other than just being able to see everyone around you and deciding that the extents of your vision are the people that make up a collective. Things like smell and sound and smaller spatial enclosure are things that are softer or fuzzier than introducing an element like a wall, which would be something that lives on the plan. Immaterial things are powerful elements in terms of how you construct who makes up a collective.

Ron Witte (RW): I think that's why Reto's question is an interesting one because it's not so much that there's furniture missing at least that's not how I read it.

RG: That's not what I was saying.

RW: Don't worry, I'm on your side. So, what I find interesting in Reto's question is if you push Reto's question into the context of your project then for example, a cubicle is an RCP with a hole in it. So what I find interesting in that question is, that's a curious provocation.

EI: I don't know about that...

RW: You're in a room but it has no top, that's all. So there's a kind of a cheap way to use the cubicle in the project in that most of what you're describing over here, cubicles already do: I don't see someone, but I smell their rice with chicken. Do you see what I mean. Or, I can see their toupee, but I don't know who it belongs to. But you're project is in the other direction. I don't find that so interesting. I think the introduction of something as normative as those furniture systems provokes outputs in your world that are interesting. You don't have holes in your ceiling. You only have deformations, so that completely different from mole world. That would be interesting to me to see the argument played through that in some way. To go back to some other comments, that's one point, to reinforce the value of what Reto said. The thing that I find interesting, and its kind of coming through in the way we're collectively talking about it is, it's a questions. You're using certain techniques, and they're visible on the drawings, as techniques for architectural production, and you're using other techniques, visual and graphic techniques, as techniques to represent architectural conclusion. I'm trying to understand the difference, or how you see the relationship between those two because, if I feel a little cynical, I think it's kind of fast, and loose in how you're going between those two. You wanted us to see this as the outcome, but it's in fact a production technique, an instrument that an architect uses, not an instrument that someone walking into the space just encounters. So, I'm trying to understand a little bit how you're using representational techniques in those two ways, how they're related or not related?

EI: I'm trying to understand your question by rephrasing it. You're trying to understand the connection between production and conclusion through representation. Just wanted to make sure. The link between the two for me is in the clipping of the RCP, which is what I'm calling a core sample or an "episode". I think that's the link between the worlds of production and conclusion. So, by taking a slice of this thing and entering it through literary means, and different forms of architectural representation is how I'm linking production and conclusion.

Scott Colman (SC): I wonder if in the RCP itself there's an answer to that question, which is to say, while it is a kind of drawing that we've had for a very long time, I'm not sure that our felicity in reading them is anywhere near as developed as the felicity of reading a plan. In fact, you're falling into perspective, or some of the other representation that's accompanied it is in some sense beginning to teach us how to read an RCP or taking up the kind of gap that we have between that drawing and our capacity to read it. To respond to Ron's first point, I think there's an interesting aspect to the thesis which relates to the furniture, which Reto brought up, which is to say, in the Texan as it now stands, we design buildings like that and then Knoll came along and put homogeneous furniture into those spaces. And now, we're in an office culture where to differentiate the open plan, there's a whole bunch of Google lounges and coffee bars and ping pong tables, and all that kind of stuff. But it's all happening in the furniture, and in a sense, the effort to produce contingency, and the kinds of things that contingency produce in the workplace are being taken up in furniture as opposed to the fact that actually, the homogeneity began in architecture and then went into furniture.

RW: Same subject, my subject. I'm coming back to it because you gave me a chance to think, Scott. Left side of the wall, lots of vector graphics, lines. Right side of the wall, lots of tones, gradients. Matters? In other words, this is sort of conclusive over here, and this is the instrument of production. I find it kind of fascinating that you have to sandwich these two because you cannot represent this just through perspective. You actually have to overlay it with the phenomena of sound and smell and whatever else. So does it matter that the production of it for an architect in the discipline is vector based and the output of it in terms of experience or story, narrative, is raster based or gradient, or tone based.

MC: Can I ask you a question before he answers?

RW: Sure.

MC: Why do you think that this is production and this is effect or conclusion? Is it because of where it is on the wall? Just curious.

RW: I might be misreading it, but that's the way I read it. I won't swear to it on a bible. Actually, I probably would swear to it on a bible because that's the way I want to read it, but it doesn't mean that it's the right way to read it, but I probably wouldn't swear to it. Do you want me to not take this as conclusion, over here? In which case is this an instrument of production?

EI: This is a conclusion, but I think it's more recursive than to say, "This is production and this is conclusion."

RW: All projects do that, that I like a whole lot. If we're not recursive, we're harming our own productivity. But I am intrigued by the fact that the tools of production are vector, the tools of measurement of output are non-vector. I realize I'm erasing some details.

BR: Well, I also yearn for a form of representation that would actually be vector based that shows us how you're strategy actually impacts the way that people use the space because it does seem to be the goal, that you're changing office culture, the way people would understand their own envelope, and then a kind of collective envelope. So much of that is about what space you're allowed to use, how you move, who you interact with, how your sound travels, that kind of thing. And there is also a kind of economic dimension to this, which is missing, which is that a lot of this argument about shared space, a kind of flexible space is way of saving money, is a way of packing more people into less space. It kind of sucks if you're a worker. So what is sort of missing is the political angle of it. Are you doing this to kind of save the worker from the cheaper costs of construction, or are you trying to create other intersections of people in space? Showing us actually not only in collages but also in drawings of occupation, how does this impact the office culture, the way people work?

CJ: What I enjoy very much about the project was you telling the story of these scenarios. Because in fact, what I was reading more closely was "proximate privacy", "differential thermal environments", "loosely bound program", "multiple sensorial occlusion", and "fluorescent fallout and task zones", and I could go on forever. Unlike the image that you used in your presentation of The Apartment, where Jack Lemmon is thinking about despair, and if you know the film, you know what happens to him, you've given us some sense of optimism that this interior choreography of the reflected ceiling

plan, really reflects the activities that could meander through this entire free floor plan. So the tyranny of the reflected ceiling plan is provoked here to be free. You only gave us five scenarios, but I could keep going, projecting your own imagination. And the obsession that you have by introducing a presentation that is very, very carefully choreographed to give us an indication that later here dissolves into the life of the building, its quite impressive as a choreography as well. I think it kind of answers a little bit what you are looking for, for me.

BR: I think its a very vague way of approaching it.

EI: Making the jump from the plan to the RCP is a way of thinking about management as a way of thinking about office culture. I think the plan is a very instructive drawing, and not a benign drawing at all, that deals with the management of people, that seeks to predict what will happen in that space. Thinking about the RCP as a form of resistance to that means using the RCP to think about the management of immaterial qualities of this office and think less about the management of people.

BR: But you are managing people. That's the thing I think you need to take a much stronger stance on. Of course this is about managing people, I mean you're telling them where they can have a phone conversation, where their food can be smelled, or not smelled, where they can see other people, and I think actually showing us this social world that you really are designing, and claiming that, is the missing next drawing, which you can still make.

RW: But he wrote it.

BR: No, I mean I really enjoyed those narrative descriptions...

TK: That's where he came closest though.

BR: Yes.

CJ: But do you think that the typical office of today necessitates these types of spaces. I mean, people talk irreverently in front of each other, or they show their food. I have been to office spaces like that, so I'm just wondering if you're trying to create a kind of potential for these places? That's why I thought this was so fascinating to me that if I am more private than my neighbor, I would choose that space, or maybe I would choose the other one so on and so forth, so I think that its again the breaking of the tyranny of what the reflected ceiling plan imposes on that image of Jack Lemmon in that endless field of cubicles reflected in the ceiling, no escape from it. And I find that this is what we should be looking at more closely because I think everyone will find their public space, their private space, and I find that very stimulating, and the fact that I wish this model was turned upside down. Maybe we should be under it.

EI: I've had some trauma of hanging models so...

CJ: I never asked, what are those things there?

EI: These are models of the ceilings, the complete ceilings, but I occluded the majority of the model and chose to show windows into each scenario. You can peel back the transparency to get a sense of the spatial qualities.

MC: In thinking about the conversation about the cubicle, I wonder if one of the political effects is a sort of transition between the hegemony of vision, and the repetition of a standardized element like the cubicle erases difference, to a sort of hegemony of auditory, and other sensorial effects, so there is a different kind of erasure that is happening of difference, but it's just not through vision. So, the addition of pink noise erases individuality, the insertion of these kinds of screens also erases a kind of difference, a kind of individuality, and I wonder if that's the political stance, or if it's just a different mode? Does that make sense? There's a kind of erasure of individuality through the cubicle: repetition of a singular part, so you just become anonymous. In a weird way, there is an erasure of individuality when you erase people's smells, it's just through a different sense. Instead of through vision and repetition, it's through the ceiling. That's not necessarily negative, but I think that's the politics of the project in a way.

RW: I think that's very interesting. That makes me raise another question that's very broad. This project exists between two worlds. There's a tyranny of the collective: Crown Hall. There's a tyranny of individuation: the cubicle. This project exists in this kind of soft individuo-collectivity. I'm wondering if we should assume that is not tyrannical? How do we know that just because it's a little softer, it's not tyrannical like the collective, or tyrannical like the cubicle? I don't have an answer, I think it would be a very interesting question to think about for a couple of hours, but that's where we are here. How do we know it's a liberatory project?

SW: Well that's it, it's the same thing, I forget who mentioned the Google complex, I mean of allowing for every possible comfort level so that no one leaves the complex and they just keep working. I think the same way that we first read the Google complex as totally liberating, and individualized, and then we realized it was just a control mechanism to make these kids work harder, and all the time. But that's very, very hard to escape in an office environment and I guess maybe the questioning is where do you put yourself in that discussion or do you see any possibility of responding to that?

EI: It's a hard question. I hadn't even used the word tyrannical in my head to describe my project before. I think I'm a pretty optimistic guy, so I think I would call it hopeful.

Iñaqi Carnicero (IC): It makes sense not answering that because, in a way you said that your project was about suspense, and I think the whole project doesn't want to give us one very defined or particular solution. In that way, I think it's very successful that you are trying to represent through your beautiful drawings, the intangible, the qualities that we're talking about, and you like to talk about the smells, the noise, the acoustics, things that we don't see, and all the time I'm thinking I'm trying to read where are the technical solutions? Where is the section? Where can I see if it's really successful in dividing the space when you are seated or creating partitions when you are standing up? How do those shapes define a different organization in the plan, different than the partitions? In that sense, then the partitions I would remove all of the partitions from the plan. I think the project is still in-progress, but it's okay because I think you are more interested in the poetics of it than in giving us one particular section, that I'm missing all the time, I can't find a section. And I assume, do you like writing?

EI: Yes, I do.

IC: Yeah, I can tell, you are more interested in that aspect but I really would recommend that you go into this renderings that you created and try to draw the sections, and try to find the poetry through the sections and through the plans of the buildings that you start designing from now on because you can find the same poetry there as in those texts or beautiful renderings.

TK: I think this wall gets the closest to what maybe that continuous section might produce when we composite the episodes and the multiple parts and pieces. It reminds me of a more sculpted view one has of the Inland Steel Building but from outside looking onto it. You can actually make out the cavity of the suspended ceiling and how it compresses the office space, and you really register that mechanical space as having a lot of effect on the way that people inhabit the building. I feel like for maybe your experiment to show another virtue, it would be interesting to study that in comparison to the other floors of the Texan as well without this intervention.

SC: A lot of people want to pin you down. Are you a functionalist or are you a rationalist? Does that bend in the ceiling mean something specific with respect to temperature and light and occupation there or is there some loose relationship between atmospheres and occupation and form? In a way, you haven't said, "I'm one or the other." I wonder if that as a strategy is productive or not productive in the end. And maybe it's not as productive perhaps in an academic environment where we're trying to test what it is your intention versus consequence, and give you feedback. But I wonder in the real world how that plays out? Whether in fact that is not actually a strategy given the pitfalls in the 20th century of both of those positions.

CJ: But, you know, for instance, the Google example, or the Apple, they eat from Dean and Deluca or they have a certain mode of behaving, and dressing, and I just keep reading the narratives because there's even one funny one where someone is typing and there's a fax machine is ringing. In other words, it's a place that suddenly makes hanging there in this office floor replete with possibilities of use that have not yet been explored and I think that to me I found very optimistic in the sense that, what if we occupied buildings through that possibility? And I think that these drawings are fascinating because they suggest in fact what is operating here is that everybody has been left out of their cubicles to find there sensorial space where they might produce better but they might still leave at 5pm but they're just hanging there for the day and they have a great time, as the title says.

RW: Scott, I would try and answer your question by combining your comment with Thomas' comment and Bryony's comment. What I mean by that is, Thomas said something, and I don't know if anyone else heard it, but you were saying that there was a necessity to suspend disbelief, and I think that's true. And I think in a way that fundamental to a thesis, that at some moment you put subjects out and you kind of suspend certain subject matters as ways of undermining that project to allow other subject matters to move forward more significantly. That's a really important thing. However, to come back around to Bryony's comment about the economies of this thing, like why do people shove all those people into those spaces, it's money. It's not so much that those go away, it's that they're tamped down a bit, and they pop into play in certain ways that allow this to have a kind of resonance with the broader spectrum of architectural constructs: economies, structural systems, whatever they might be. I think it would be interesting for some of that to come through. These are sort of raw extractions, these stories, are raw extractions, that don't necessarily to that. They're pretty good as stories and they get me on board, but they don't push back into those tamped down subjects in that way, and if they did, I think this would unravel very quickly. Like for example, acoustics. If you're really trying to push acoustic levels down, you need mass, you're talking about a kind of hung ceiling, it is not massive, so it doesn't really work. I'm going to suspend that and just say there is something else in play here, but I think it would be really fantastic if some of those issues started to gurgle up into the system a little bit, because that's what's going to make you compelling, really, really compelling when you walk out of here. I'm trying to avoid saying, "Its the real world," I'm trying to say how do you have the momentum you need to take this a be effective and actually make a better workplace.

MC: I think also in that comment is whether an objective mode of production is more productive in a thesis. It's almost more of a meta-question that you're asking, than a more heuristic or a more non-objective model of architectural production. How do we start to measure whether you are successful or not? And a lot of that is embedded with I think the conversation surrounding the RCP, the sort of common evidence that the shared language that we have in the discipline as a way to measure that, when you start to use other modes of production, how are we able to assess that? That's where it becomes a bit more non-objective, and I wonder if that is a different model, rather than something that is more rational as a proof that it becomes more about a kind of simulation. It becomes a different model that one would have to use as a proof of concept. This in a way, to me, is like a simulation of an architecture. Through the narrative, and through sort of immersing us in many different modes, you're creating an environment where as an objective model would be we read the drawing, we understand disciplinarily how this works, and so that's the proof.

IC: The interesting thing about that Ron's comment is that that's going to give you more tools to respond not only through the use of this continuous white surface, that is still very abstract, but if you start looking into the technical aspects - acoustics, temperature, lighting - maybe you discover that it would be interesting to design through a catalog of existing bulbs or lamps or things, and then you discover that those elements can be the ingredients to create these atmospheres that you want to create, that it's not going to be any more through this immaculate, white, continuous surface, but through different densities of lamps or heaters or whatever. So the catalog of possibilities for you is going to be bigger, and I think you're going to find other possible solutions.

BR: Yeah, I think you can do both, and I think a strong architectural project inspires that sort of crazy imagination in us of another world, you know it gives us a kind of poetic, absurd provocation, but then, we can see how it can become real. It doesn't have to become all aspects of reality but what are the materials? How would people be distributed in the space? You start to step into that realm so we see that it can do both.

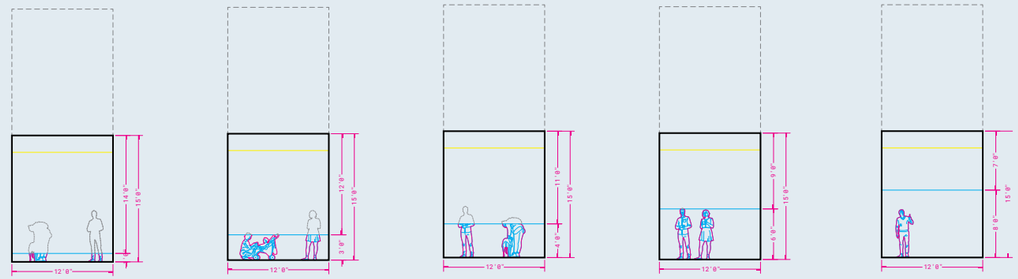
Piergianna Mazzocca (PM): Actually, I find your project extremely successful in many ways, especially because it separates your project form a disciplinary objective way of thinking and talking about architecture, and I find that very alluring, because what a better way to produce a thesis than the one that you have chosen, in which you break tradition and are constantly provoking us to understand the terms that you have imposed. I think that is extremely valuable, and I think that is the whole purpose of doing a thesis. So, for me, congratulations.

SC: Thank you Evio.

Appendix A:

Precedents

Ceiling Surveys



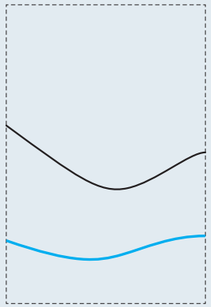
Qualities of suspense exist in works throughout the course of architectural history but have not been identified as such. By cropping and abstracting these projects, properties of suspense become more clear. Some of the traits that became valuable were: the proximity of the ceiling to the body, the ability of the ceiling to produce pressure in the space below, the willingness of the ceiling to transmit sensation and the programmatic intensity (or ambition) of the ceiling.

Proximity and pressure speak to the immediacy and intimacy of the architecture. Does the body encounter surfaces as they descend? Does proximity change the way that enclosed fixtures are experienced? Ceilings which are uniformly high alienate occupants from the services that suspended ceilings enclose. As buildings become more heavily serviced, plenum space increases in breadth and depth but as the architectural resolution of heavy servicing is a single light line, changes are imperceptible. The space between the ceiling and the top of the finished floor above all but disappears.

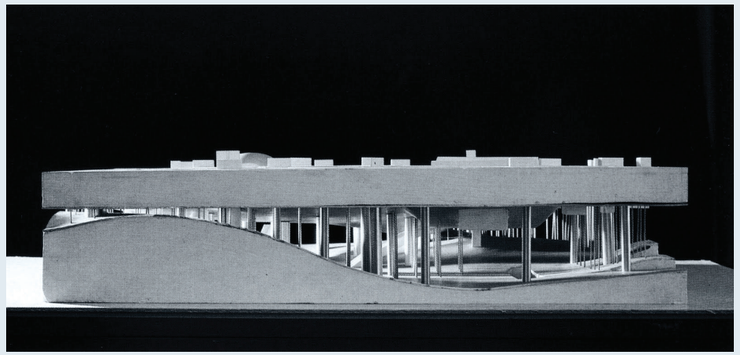
Willingness has to do with the degree to which a surface resolves its double enclosure. Ceilings are diaphanous envelopes. They enclose occupants in space (inside buildings), and they enclose fixtures and systems in a space below the slab. Occupants and objects produce sensorial offsets. The ceiling has to be permissive in order to register, allow or even provoke relationships between occupant and object groups.

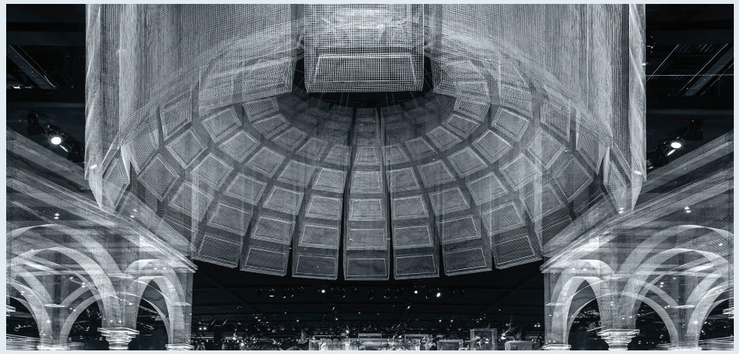
Programmatic intensity (and ambition) implicates the connotative value of the ceiling. It is common for ceilings to reflect the program generated by the plan, but less common for the ceiling to take on a programmatic agenda of its own. Suspense looks for spatial or performative itineraries in the qualities of the ceiling.

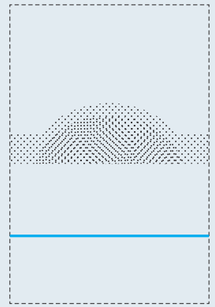
Suspense also has a relationship to abstract material properties: opacity, luminosity, and density. Opacity produces formal legibility and spatial vagueness. Translucency produces systemic and spatial clarity. Luminosity renders edges, and shades the curvature of soft geometry. Lightness and darkness affect the perception of depth and proximity. Luminosity is also a way of conjuring a fuzzy boundary between adjacent zones. Density describes the perception of materials as light or heavy. Hard geometries have a tendency toward thickness, and heaviness. Rounded or soft geometries can appear full, or can seem thin.



Agadir Convention Centre
OMA

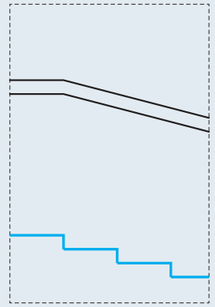




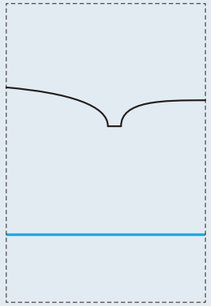


Archetype
Edoardo Tresoldi

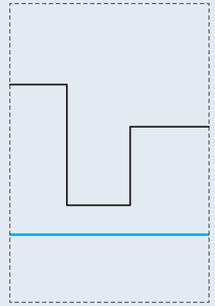
IBM Building
Norman Foster



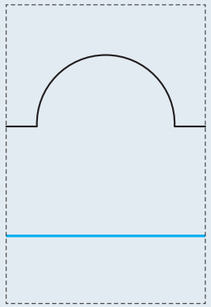
Media Line
Hans Hollein

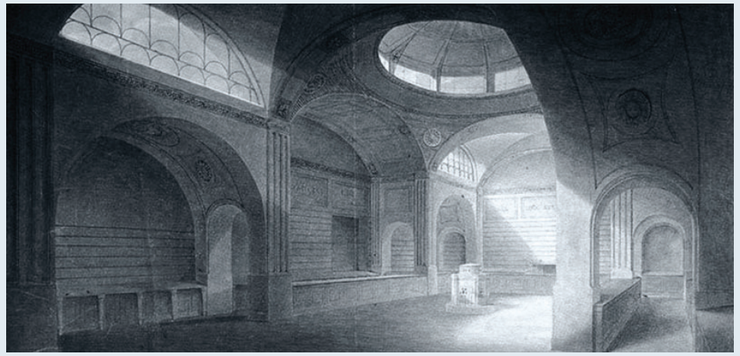


Vault House
Johnston Marklee



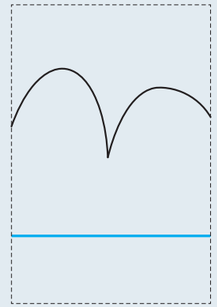
Wall Cloud
Sasaki Architects





Bank of England

John Soane



Bar Nou

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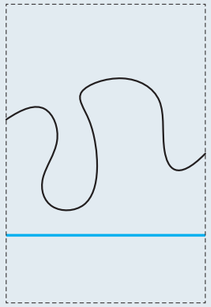
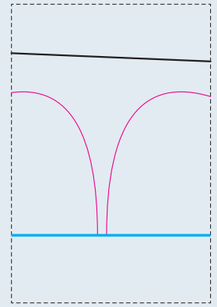


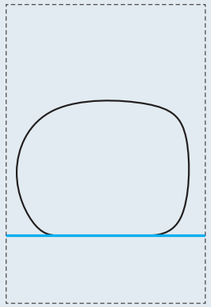
Pavilion Martell

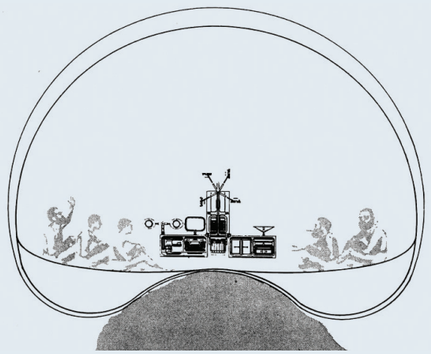
Selgas Cano



Tama Library

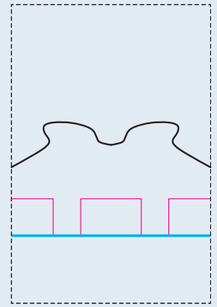
Toyo Ito





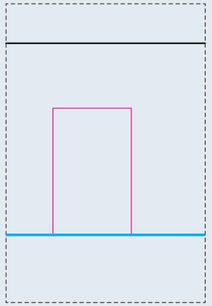
Un-house

Reyner Banham



Emirates Airlines 777-300ER

Boeing Commercial



BBC North London

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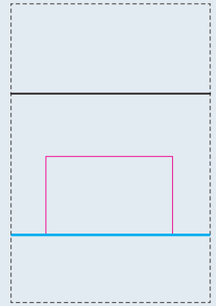
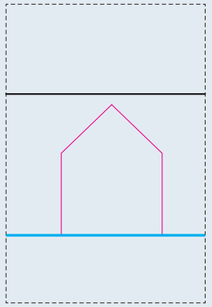


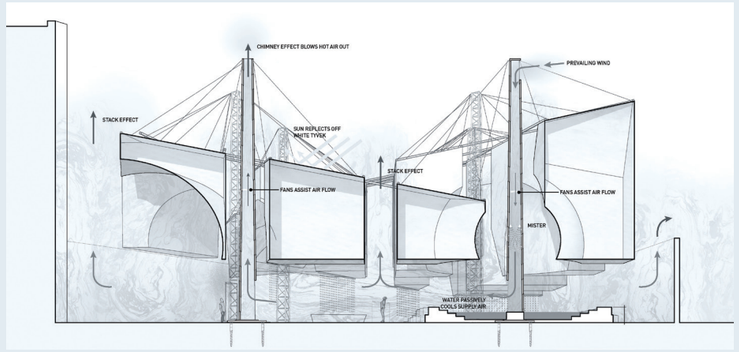
Briefcase House

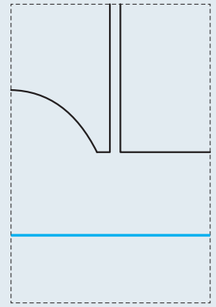
Jimenez Lai



The Together Hostel

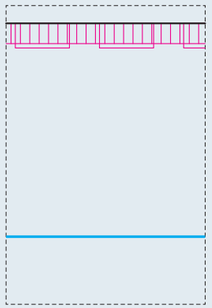
Cau Pu





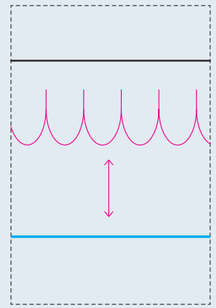
Underberg

LAMAS



UN Chamber of Trusteeship

Finn Juhl



Cineroleum

Assemble

Appendix B: Resources

Source Dossier

Appendix B is a messy, abridged textbook that clips primary and secondary resources and reassembles them. The text is a collage that is meant to be read continuously. There are moments of confluence in the text where chunks of contiguous knowledge rub neatly against each other and there are moments of awkward adjacency. None of the texts quoted are explicitly or intentionally about suspense, but have been repurposed and reframed. In their realignment, a fuzzy conception of suspense emerges.

Keep in mind, this text is preliminary and provisional. Nonetheless, the sequence of excerpts, which beg to be added to and refined, represent the formulation of a disciplinary critique.

POLITICS OF THE ENVELOPE I, ALEJANDRO ZAERO-POLO

* *Architects' traditional role as visionaries (and ideologists) has become redundant as the sheer speed of change overtakes their capacity to represent politics ideologically.*

* *The attempts to politicize architecture have emerged from the hypothesis that architecture is a "social construct," a cultural fabrication, and an embodiment of political concepts. But architecture is as much a physical construct as it is a social or political one, and to understand architecture as a mere representation of the political is as problematic as it is to declare architecture entirely ruled by the inexorable laws of physics, economics, buildability, climatology, and ergonomics.*

* *The building envelope is possibly the oldest and most primitive architectural element. It materializes the separation inside and outside, natural and artificial; it demarcates private from public and land ownership; when it becomes facade, the envelope also operates as a representational device, in addition to its crucial environmental and territorial roles. The building envelope is the border, the frontier, the edge, the enclosure, and the joint: it is loaded with political content.*

* *The plan of the building organizes the power structure and protocols, while the section organizes the social strata and the building's relationships with the ground.*

* *Facialization organizes systems of binary opposition operating on different levels and functions as their dynamic point of contact: power structures configure private and public, inside and outside through the envelope. As a homeostatic membrane, it is a crucial component of the organization of power regimes in the building.*

* *A more permeable definition of the envelope will produce a more fluid relationship between private and public; the facade ratio of a residential block determines the environment's degree of artificiality; a gradual delimitation between the natural and the artificial in the facade of an office building could help to improve energy efficiency and minimize its carbon footprint; a more ambiguous appearance may allow for the reprogramming of the building's identity.*

* *Once cornices, corners, and windows are no longer technically necessary, and the private and public are tangled in an increasingly complex relationship, the hierarchies of interface become more complex: the envelope has become a field where identity, security, and environmental performances intersect.*

* *My interest in envelopes as political devices is that they constitute the element that confines an atmosphere and regulates the flow of energy and matter in and out of that system.*

POLITICS OF THE ENVELOPE II, ALEJANDRO ZAERO-POLO

* *As an urban type, te flat-vertical envelope determines both the structure and representation of the social fabric. It not only delimits interior and exterior, but also determines the limits between open public and private spaces. The flat vertical building envelope is often deployed as a border that both forms a threshold between public and private space and constructs the building's faciality.*

* *Yet, isn't it consistency, rather than difference, that contemporary global communities need to build across coexisting cultures? The future of multiculturalism and diversification in the post-9/11 age is open for consideration, and there are reasons to believe that the politics of the globalized world will be moving toward the enforcement of sameness rather than difference as the fractious nature of multicultural societies becomes more and more apparent.*

A HOME IS NOT A HOUSE, REYNER BANHAM

* *Services are a topic on which architectural practice has alternated capriciously between the brazen and the coy - there was the grand old Let-it-dangle period, when every ceiling was a mess of gaily painted entrails, as in the council chambers of the UN building, and there have been fits of pudicity when even the most innocent anatomical details have been hurriedly veiled with a suspended ceiling.*

* *The first is that mechanical services are too new to have been absorbed into the proverbial wisdom of the profession: none of the great slogans - Form Follows Function, accusez la structure, Firmness Commodity and Delight, Truth to Materials, Wenig ist Mehr- is much use in coping with the mechanical invasion.*

* *Man started with two basic ways of controlling environment: one by avoiding the issue and hiding under a rock, tree, tent or roof (this led ultimately to architecture as we know it) and the other by actually interfering with the local meteorology, usually by means of a camp-fire, which, in a more polished form, might lead to the kind of situation now under discussion.*

* *The 'house' is little more than a service core set in infinite space, or alternatively, a detached porch looking out in all directions at the Great Out There.*

CUBICLE, SWEET CUBICLE, S. ALEXANDER HASLEM AND CRAIG KNIGHT

* *White-collar workers everywhere are familiar with the open-plan offi ce— a sterile space intended to accommodate, or "warehouse," large numbers of employees at clusters of desks separated by flimsy partitions that offer a bare modicum of privacy.*

* *The open-plan setup enables supervisors to subtly monitor what their subordinates are doing.*

* *Anyone who has had to walk past his boss's desk to get to (or leave) his own or whose computer is positioned in such a way that she knows her manager could appear at any moment and, peering over her shoulder, see exactly what she is doing will find it interesting to learn that the designers of open plan workplaces borrowed from a concept called the Panopticon.*

* *The relation between lack of workspace control and sick building symptoms holds true even in "employee-friendly" enriched environments like that of a U.K.-based travel company, according to research by Chris Baldry, a management professor at the University of Stirling in Scotland. On the surface, the work environment looked engaging—brightly colored workspaces were festooned with plastic palm trees. But a Panopticon-style zone called Mission Control allowed managers to clandestinely monitor employees at all times, and workers continually complained of physical ailments such as dry coughs.*

* *Factors other than the design and trappings of a workspace, such as acoustics, can also affect employee performance.*

* *The researchers speculate that extraneous speech may disrupt working memory and prompt stress responses and recommend high cubicle walls and sound-absorbing wall materials to address the problem."*

* *Survey responses indicated that when workers felt they had a say in the physical aspects of their workspace, the negative effects of noise and other distractions were reduced.*

* *We think that when people feel uncomfortable in their surroundings they are less engaged—not only with the space but with the work they perform in that space. Arranging offices in ways that ignore employees' preferences and individuality can undermine production and focus, even if well-meaning planners intend the opposite. When employees get to surround themselves with personally meaningful objects at work, the efficiency gurus, enrichment experts and plastic palm-tree peddlers can all stay home.*

LABOR AND ARCHITECTURE, PIER VITTORIO AURELI

* *Increased productivity also implied increased consumption; most of the products of work were meant not to last, but to fulfill the immediate needs of the labor force. This condition promoted consumption as the ultimate goal of production and progressively blurred the line between work and labor.*

* *For Frampton, Arendt's distinction between work and labor is already contained in the ambivalence of the term architecture, which designates both "the art or science of constructing edifices for human use and the action or process of building." The first definition addresses architecture as a work that finds its raison d'etre in the creation of a lasting human world, while the second definition sees architecture as a process "comparable to the never ending process of biological labor."*

* *Increasingly buildings come to be designed in response to the mechanics of their erection or, alternatively processal elements such as tower cranes, elevators, escalators, stairs, refuse chutes, gangways, service cores, and automobiles determine the configuration of built form to a far greater extent than the hierarchic and more public criteria of place (Frampton).*

* *For both Arendt and Frampton the problem with labor is that it concerns the human "necessity of subsisting," thus animal laborans cannot produce a world, only life - that is, existence for the sake of one's reproduction. But what happens when, in late capitalism, labor pervades all human faculties and goes beyond the mere necessity of subsisting?*

* *Labor power exists only as the potential embodied in the generic faculties of human nature.*

* *Even those realms that Arendt viewed as antithetical to the sphere of labor, such as political action or thinking, are absorbed by labor power; language, cooperation, and social exchange become crucial forms of production.*

* *The spatial indeterminacy of a free space - a space emptied of obstruction and ready to accommodate any situation - is a radical manifestation of how labor power - as the invisible dynamics of life - has been exploited by capitalism. If labor power is characterized by man's ability to adapt to any situation, and therefore by the total unpredictability of man's actions and reactions, the only corresponding spatial form in such unstable conditions is space ready to use and occupy according to any foreseen and unforeseen situation.*

* *From J.N.L. Durand's grid plans to Albert Kahn's factory plans, from Le Corbusier's Maison Dom-ino and Plan Libre to Ludwig Mies van der Rohe's idea of universal space, modern architecture can be understood as the approximation of a space increasingly freed from obstacles and in which the impact of the structure in plan is minimized in order to create space ready for any type of organization. Such flexibility becomes even more radical when "production" is no longer understood as the production of goods but as the production of immaterial facts such as services and information.*

* *As Francesco Marullo notes, 'The more Labor is reduced to its most generic form, devoid of any specific duty, the more the apparatus of fixed capital is obliged to embody the barest form of possibility: a typical Plan or a simple, flexible, reproducible layout able to restrain and make productive any form of human subjectivity.' This principle can be seen at work in the whole landscape of industrial architecture, from the space of the factory to that of the office.*

* *For this reason, flexible space has become a desired quality for any urban typology. The idea of "free space" open to any possible variation, adjustment, or change seems to bring the very nature of labor to the fore of architectural space.*

* *North Staffordshire would no longer produce material goods, but rather science and information in the form of applied research. In Price's project, the institution of the research university would no longer be seen as the ivory tower of higher education, but as a production center in which students would not be supported by grants but hired as wage earners.*

* *In post-Fordism, material production was increasingly outsourced to developing countries, where the cost of labor was lower, and the production of services, information, and knowledge became the main focus of advanced economies such as the US, Europe, and Japan.*

* *Price refused to illustrate the Fun Palace as a finished building. Instead, he presented it as a diagram, a building made in the form of an abstract and simple structure whose content would be defined by the conditions of its use.*

* *For this reason Price and Littlewood insisted that the programmatic aspects of the Fun Palace had to remain as open as possible to coincide with the unpredictable nature of human subjectivity.*

LIFE ABSTRACTED: NOTES ON THE FLOOR PLAN, PIER VITTORIO AURELI

* *...we don't see or experience the plans of the spaces within which we move.*

* *The drawn plan is thus not just an abstraction of architecture but a 'concrete abstraction,' since together with other forms of architectural notation, the plan translates many determinations—money, measures, code, gender, class, rituals, beliefs, ideologies, environmental conditions, etc.— into a specific spatial layout. With its conventions of scale, measure, and view, the plan acts—much like money—as a 'general equivalent' within which a multitude of determinations coalesce into a measurable 'universal' datum.*

* *We can understand the social as such to be the locus of reification, for in order to function, any social order relies on the reification of features that pertain to the life of its subjects.*

* *Rituals, sets of actions performed according to a more or less prescribed order, provide an orientation and continuity upon which patterns of behavior can be both established and preserved.*

* *As such, the origin of the architectural plan can be interpreted both as a ritualistic interpretation of space and an abstraction that gives geometric accuracy to space.*

* *As a concrete abstraction, the plan is an instrument to impose a normative power onto space and reduce it to a legible geometric figure.*

* *Thus if we consider then that the power to produce new abstractions is not just an imposition but also a faculty of the human species, the architectural plan does not only describe the way in which governmental powers capture and domesticate life, but is also a direct testimony of abstraction as the way the human mind inherently makes sense of the world. As such, the power to abstract can also be a way to resist any act of normative power as inevitable and irreversible.*

* *The Forma Urbis Romae demonstrates how within the tracing of the plan seemingly opposite processes such as abstraction and the ritualization of life are not mutually exclusive.*

* *Each aspect of the monk's daily life was therefore translated into a typical space: dormitory (sleeping), refectory (eating), library (studying), workshops (working), etc.*

* *This means that the plan was not meant to be the blueprint for a specific project, but rather a diagram (completed with an extensive text and legend on its back) to help the abbot to define the disposition of the different spaces and their use.*

* *The result is an architectural plan for the management of life, within which everything was measured in terms of space but also in terms of time, which was obsessively defined by clocks and the sound of bells*

* *In this way, the drawing shifts attention from the physical structures themselves to their functional and spatial organization. The St. Gall plan shows the potential effect of abstraction on form and thus anticipates what would become one of the fundamental tendencies of modernity: the becoming-diagram of architecture.*

* *In contrast to this definition, Michel Foucault, Gilles Deleuze, and Félix Guattari conceived of the diagram as a machine that directly produces effects of power.*

* *The monastery thus became a model for modern institutions in which the floor plan becomes the sine qua non of architecture, such as the hospital, prison, factory, school, and above all, housing.*

* *Economy thus implies the translation of life into a typical spatial arrangement—a plan—and it is in this way that the form of the house is the most tangible manifestation of economic relations.*

* *Interestingly, at the moment housing becomes a proper architectural project, the floor plan is understood as an increasingly essential datum for its production.*

* *Within the development of housing, subdividing the house into rooms becomes the most pressing task for the architect, and it is within the plan that spatial relationships become most immediately legible and thus susceptible to be addressed by the strategic deployment of openings and partitions.*

* *As Robin Evans noted in "Rookeries and Model Dwellings," Roberts' "architecture of reform" is essentially about specifying movements and distinguishing spaces. The plans carefully orchestrate movement from room to room while ensuring no room would become mere passages to others like enfilades.*

* *Before the Renaissance, empty space was considered a vacuum, a lacuna which, precisely because of its intangibility and incommensurability, could not be grasped. Yet with the proliferation of techniques to accurately measure space that flourished in the late middle ages, empty space was no longer an incommensurable reality, external to the world of physical objects, but a datum that could be used to measure the objects it contains. Within this space the floor plan is thus not just the projection of the horizontal section, but the projection of all the parameters that materially define the space in which we dwell.*

* *Yet it is precisely because the plan is always imagined and constructed in this way that it can be re-assembled to anticipate alternative forms of life, different from the ones that have been enforced through the deployment of specific plans.*

* *As argued by Robin Evans, "If anything is described by an architectural plan, it is the nature of human relationships, since the elements whose trace record—walls, doors, windows, and stairs—are employed first to divide and then selectively to re-unite inhabited space."*

* *...the plan demystifies the naturalization of power relations since it shows how they have always been deliberately constructed by the formation of habit and perception.*

* *...we should view them [plans] as where both reification and the "power to abstract"—two essential ways to construct space—can be reclaimed from the way they have become commodified.*

SUCCESSIVE ARCHITECTURE, PRESTON SCOTT COHEN

* *Likewise, computation is a testament to technological, as opposed to aesthetic, innovation, and thus can be used to give architecture a status comparable to that of other technologically conscious mediums of the avant-garde. This association with art is also one of the means by which contemporary architects have found their way into the institutions of cultural discourse and legitimation.*

* *Rem Koolhaas's idea of "bigness" accounts for piles of space so unwieldy that their envelopes cannot rationally contain them - the timeless values that are allegedly maintained by the historicist facades are a conceit that barely conceals the impermanence and perpetual tumult of the interior.*

* *One of the most vexing questions for multistory buildings is the status of the ground floor, because it belongs both to the horizontal seriality of the city and the vertical succession of the individual building.*

* *Architects can treat one-story buildings either as constituents of the horizontally formless urban morphology or can reconceive them according to the characteristics of vertical succession that belong to the architectural medium.*

* *A field of one-story buildings, however, can be authored only in fragments, the accumulation of which, urban sprawl, is unauthored.*

* *A tall, rectilinear building can be compared to the frames of a film in which almost nothing happens. In the succession of its floor plans, the number of elevators may decrease from bottom to top or the secondary partitions might change from an office to a hotel layout, but the variation throughout would rarely reach even the minimal narrative or transfigurative development expected of a film. The analogy is perhaps better made between the plans of the tall building and another genre, surveillance video, since both are non-narrative, in that their primary definitive features remain fixed except for incidental movements.*

THE DOM-INO PROBLEM, PIER VITTORIO AURELI

* *Above all, Dom-ino was, for Le Corbusier, not the design of a building but the design of an economic process that, starting from the architecture of domestic space, would involve the redesign of the entirety of the city. For this reason the Dom-ino idea can be understood as the ultimate example of how economy has conquered architectural form.*

* *Architecture became form devoid of any reference outside itself at the moment it was fully conquered by the forces of industrialization. In other words, the autonomy of architecture as the possibility of a self-referential sign became evident only when the reification of architecture as a productive and economic apparatus was completed.*

* *As a machine for living, architecture no longer represents values or ideologies, but is an apparatus that frames possibilities for life to occur. In its simplest form architecture becomes the act of framing spaces to be inhabited. Life as such, life as bios , cannot be represented, only enacted by specific spatial conditions that trigger uses and appropriations of space.*

* *When we talk about spaces of production we think of the traditional workplaces of the industrial age: workshops, offices, and factories. Yet, in the last 30 years advances in communication technologies have made the workplace ubiquitous. Day by day we witness the rise of workplaces such as high-tech campuses, where the dissolution of spatial and temporal boundaries produced by post-Fordist modes of production is compensated for by the increasing "domesticity" of the work environment.*

* *The city itself becomes a gigantic house. Given this condition, domestic space is no longer conceived as just the symbol of kinship and family bonds, but as an infrastructure devoted to the reproduction of life. The house becomes housing. While the noun house emphasizes the symbolic dimension of the domestic realm, the term housing focuses on the functioning of the house: the process of maintaining life and making it productive.*

* *The daylight factory consisted of fireproofed structures whose spacious interiors were maximized by longer spans and the considerable reduction of supports. This allowed for flexible, well-lit interiors in which the floor - the artificial reconstruction of the ground - became the primary form of architecture. Potentially extendable ad infinitum, the open floor creates an even, spatial condition in which men,machines, and goods all occupy the same horizontal datum. In the history of capitalism, the daylight factory translated into architectural terms a fundamental principle of a money economy: the equivalence of all things determined by the abstraction of exchange value. Inside the unobstructed space of the daylight factory it was possible to reduce men and raw materials to measurable parameters in order to prevent congestion and, especially, worker insubordination. Here we can see clearly the relationship between the abstraction of the open floor and the logic of labor power. Unlike Aristotle's and Arendt's definitions of labor as a biological process of reproduction restricted to the private realm of the house, labor power is no longer restricted to one sphere of the human condition, but rather represents its totality.*

** In order to contain and put to work this faculty, architecture must approximate the generic character of labor power as an infinite range of not yet realized potentialities. The architectural form able to enact this condition with the greatest efficiency was the "free plan" of the daylight factory. The logic of the free plan as a flexible space that allows for a multiplicity of spatial arrangements is gradually extended to other spaces, from offices to housing. In other words, the application of reinforced concrete in the daylight factory was a prelude to a general transformation of the city into an extended factory, in which all of the premises of the city are integrated with the same spatial logic.*

** Yet it is remarkable that Dom-ino is presented as a frame in which the plan is potentially absent, because historically the plan is the original locus of economy as oikonomia, as house management. By partitioning space in clearly defined compounds, the plan directs movements and consolidates habits. In its apparent functional language of spaces such as bedroom, living room, corridor, and kitchen, the plan establishes gender roles, defines hierarchies, enacts the control of inhabitants, and consolidates the mastery of the house owner, or dominus. Here we see the relationship between the house (domus) and its purpose, which is to consolidate a dominion - the possibility of a private property - for the goal of the house is to create a friction- less space in which private property can develop and prosper.*

** It is within this ambit that its radical abstraction, its potential emptiness, points to a form of life beyond the mastery of domestic space. The tabula rasa interior de facto negates domesticity by negating the plan and thus the interior economy. There is no question that this subversive aspect of Dom-ino will be suppressed in the development of modern architecture.*

** The blankness of the Dom-ino plan, its potential to destroy any preexisting domestic economy, was turned into the fundamental spatial properties of capitalist development: flexibility and adaptability.*

GO FIGURE, RON WITTE

** Conjunctions: Good figures are made of three conjunctions: Floor-Program, Ceiling-Technology, and Wall-Form. Program, technology, and form constitute architecture's "deep" systems. Floors, ceilings, and walls comprise architecture's "shallow" systems. Floor-Program: Floors hold program. They are ultrathin managerial planes, like spreadsheets made of linoleum. Floors control the organizations (square footages, paths, classifications) that make program work. Ceiling-Technology: Ceilings are thick, as deep as the distance from their lower surface to the bottom of the infinitely thin floor above them. Ceilings are technological repositories for structure, mechanical systems, lighting, and fire sprinklers (each infused with stresses, pressures, recesses, etc., the activations that compel thickness).*

** Compounded by their three-way interplay, Floor-Program/Ceiling-Technology/Wall-Form alignments construct figural legibilities ranging from the explicit to the nonexistent through the use of superposition, offset, tangency, distance, and inflection.*

** Ceilings can be merged with form (Nervi), walls can absorb program (built-ins or service zones located within poche), and floors can be infused with technologies (data distribution, air handling, cantilevers).*

** Superficiality utilizes only architecture's outermost layer - finish - to create sameness or difference among the skins that cloak floor, ceiling, and wall systems. Through control over material sameness, lighting sameness, thermal sameness, sound same- ness, etc., superficiality forges relationships that effortlessly supersede architecture's deep systems.*

** No longer satisfied with technology, program, or form, today's figure is always a product of double and triple loyalties to the Vitruvian triumvirate. Program and form team up to make a compound figure, obliging technology's acceleration to service this figure's eccentric requirements.*

** Good figures are pregnant. Bad figures compel recognition. Good figures summon prospects.*

TYPICAL PLAN, REM KOOLHAAS

** Typical Plan is an American invention. It is zero-degree architecture, architecture stripped of all traces of uniqueness and specificity. It belongs to the New World.*

** Just as The Man Without Qualities haunts European literature, 'the plan without qualities' is the great quest of American building.*

** The ambition of Typical Plan is to create new territories for the smooth unfolding of new processes, in this case, ideal accommodation for business.*

** The architects of Typical Plan understood the secret of business: the office building represents the first totally abstract program-it does not demand a particular architecture, its only function is to let its occupants exist.*

** Raymond Hood, one of inventors, defined the typical plan with tautological bravura: "The plan is of primary importance, because on the floor are performed all the activities of the human occupants."*

** Typical Plan is minimalism for the masses; already latent in the first brutally utilitarian explorations,by the end of the era of Typical Plan, i.e., the sixties, the utilitarian is refined as a sensuous science of coordination-column grids, facade modules, ceiling tiles, lighting fixtures, partitions electrical outlets, flooring, furniture, color schemes, air-conditioning grills-that transcends the practical to emerge in a rarified existential domain of pure objectivity.*

** Ingenious architectural arrangements of miniature, very understandable labyrinths organize the traffic between the exalted and the impure zones of Typical Plan. These spaces- restrooms, urinals, pantries, service stairs, trucking bays-are the sanctuaries for all those primitive aspects upon whose exclusion the correct unfolding of business depends.*

** Typical Plan actually has hidden affinities with other arts: the positioning of the cores on the floor has a suprematist tension; it is the equivalent of atonal music, seriality, concrete poetry, art brut; it is architecture as mantra.*

** Did the plan without qualities create men without qualities? Was the space of Typical Plan the incubator of the man in the gray flannel suit? Suddenly, the graph blamed the graph paper for its lack of character.*

TYPICAL PLAN, FRANCISCO MARULLO

** The typical plan should thus be understood as a technology more than a typology, or as an apparatus for sheltering human activities in a simple way. It is neutral; it doesn't acknowledge any difference between good and evil because it just doesn't care.*

** The wall ensured the highest flexibility of programme and the least leeway in its architecture by indifferently sequencing different situations of a spatial, social, historical or geopolitical character : it was "a script, effortlessly blurring divisions between tragedy, comedy, melodrama."*

** Leonidov's typical plan, in fact, embodied the purest demonstration of what Koolhaas wanted to achieve with architecture: "a project that could [be] pure programme and almost no form, [and) that could indifferently coexist with whatever other type of architecture"...*

** Of course, screenplays have their own logic and work in a particular way, being composed by both the conventional forms of a written language and, indirectly, the potential forms of a visual language - something which is not literally "there" and can be completed only beyond the script itself by way of a reader's agency or through the making of tl1e movie. As typical plans, scripts are both precise and approximative, including an intentional emptiness that induces a desire for form, a tendency to become something else. In this sense, the screenplay always speaks the language of a structure- in-movement, or, as Pasolini described in those years, "a structure endowed with the will to become another structure", one that engenders new ways of envisioning, organizing and even contesting reality via the imagination of a director and the actor's performance. For Koolhaas, the openness of a screenplay and the emptiness of a typical plan were one and the same, for the potential of both lay in the living content that filled their frames as well as in the way they both provided the possibility of opposing, refusing or critiquing the scheme itself through their autonomous repetition.*

KISSING ARCHITECTURE, SYLVIA LAVIN

** Architecture can expand its affective range - and therefore its consequence - by hooking up with more cultural players. And now is the time to do it, because the mutual attraction between architecture and other forms of visual practice has never been more intense and varied.*

** Architecture's most kissable aspect is its surface. Space is hard to get a hold on. Structure has historically been inadequately pliant. Geometry - well, who really wants to kiss a square? Architecture has more surface and more kinds of surface than anything else: outside, inside, soft, hard, there's a surface for everyone.*

** [In reference to Pipilotti Rist and MoMA] Kissing in this sense is expansive and can involve not only one material against another but one medium against other mediums, color against brilliance, and other combinations of things that produce perceptually momentary singularities on the verge of dissolution.*

** Projected images break the planes of a building into parts that never come together again to compose an envelope. While it is possible to see a building's cladding through translucent images, the also add matter to a building envelope, thickening it rather than dematerializing it with luminosity.*

** Understanding Rist and Aitken as superarchitects, as producers of works that not only superimpose themselves onto architecture but that intensity architectural effects, offers a way to understand the seductive contact between architecture and not-architecture as a means of mingling on medium with another so that neither loses its specificity.*

** Rist's installation diagrams a doubling of architectural medium: the manufacturing of a superarchitecture produced specifically by the collision and superimposition of the architectural surface with the projected image, a collision that resulted in neither autonomy nor mastery, but surplus, extra, and a surprising, not quite uncanny but just unexpected, added value.*

** But when he [Paul Rudolph] abandoned 'real' architecture to focus on the interior, he discovered the pleasures and possibilities of the kiss: kissing takes two. It is only when and if the interior is understood as not-architecture that it can stand in relation to architecture as if a kiss.*

** When contact between surfaces is deployed to conjure an interior ambience that is not architecture, but just millimeters shy of architecture proper, the psychological intimate and physiological momentary nature of the interior surprises a stolid and solid architecture as if with a kiss.*

** If the interior ceases to be understood as simply the natural consequence of an envelope or if the exterior is no longer understood to be the passive result of the building mass, interiors and exteriors can assume enough identity of their own that their reimplantation in building constitutes the electric move from one to two.*

** Cohen chose to keep "Lightfall" in, but the very fact that it was possible for him to consider removing it underscores that his design was not conceived in the manner of Alberti, who defined good design as one in which no part can be added or taken away without destroying the 'beautiful music.' The Tel Aviv Museum of Art makes its effect precisely by being made of different elements - in this case most notably inside and interior - that only make music in the friction of their imperfect coincidence.*

** By developing a multiple personality order, the building is able to receive a kiss from its own interior.*

** The need to isolate the interior while leaving more or less everything else intact meant that DS+R's "site" was the eighteen-inch gap surrounding the outer surface of the interior: the outside of the inside.*

THE AIR FROM OTHER PLANETS, SEAN LALLY

** One of architecture's primary acts is to define the spatial boundaries that organize and hold specified activities within them. The behavioral properties of the materials used to make that boundary not only influence the physical characteristics of that space (maximum height, span, aperture sizes), but also determine how the human body perceives and senses those boundary changes (opacity, transparency, acoustics), which then informs the behaviors and movements of the individuals using the space.*

** Architecture has often existed in an uneasy balance, both needing to demonstrate its particular expertise to outside professions while simultaneously exhibiting its ability to speculate upon new forms in untested directions that inspire these very same outside communities. Too much of the former and architecture appears to be nothing more than a service industry; too much of the latter and the architect could be dismissed as a science fiction stage set designer.*

** Just as iron was originally seen as only a cost-effective, more fire-resistant replacement for wood, but then became the means to produce new buildings of vast interior spaces and heights, architecture is now in the position to associate energy with opportunities beyond simply reproducing ideal weather conditions within the interior of buildings cheaply and efficiently.*

** Mediation is a long-running trajectory in the architectural profession, and although it certainly intensifies with the advent of air-conditioning, it did not originate in the twentieth century. Mediation is an act that by its nature selects and rejects variables within the environmental context, picking and choosing which qualities can be used for the benefit of the activities occurring on the other side of the mediating surface and which need to be rejected and protected against.*

** Being able to amplify energy to control a spatial boundary or provide a resource so an activity can occur makes that type of energy a material, one that the architect can design with. Amplification is the act of working the various forms of energy available into materials that can build architecture.*

** Material energies are the stimuli and information within our surrounding context that the human body can perceive.*

** The introduction of material energies into architecture not only opens up opportunities in terms of what materials we build with, but also allows reinterpretations of the activities and events we design for.*

** Comfort Control: Psychrometric Chart. Attempts to standardize an ideal comfort level have led to the control of humidity, temperature, light levels, and acoustic energies for simply replicating ideal exterior climates on the interiors of predefined geometric architectural forms.*

** The boundaries and edges created to give architecture shape operate in an interaction between the material thus deployed and the body's ability to perceive it. How the body perceives that boundary-creating material dictates the type of influence it has on defining and maintaining space.*

** Shape conveys the edges and boundaries of a system. This might be through a form of representation on paper or through a physical edge that can be experienced in person. Shape not only transmits to an audience the existence of these boundaries, but also provides a medium on which one can place value, whether aesthetic or monetary."*

MAKE IT REAL: ARCHITECTURE AS ENACTMENT, SAM JACOB

** [About greek triglyphs] Under them are stone guttae that reenact the wooden pegs that would have been needed to stabilise a timber post-and-beam structure, but here they are rhetorical. In these examples, we see one construction technology re-enacted in another, creating paradoxes where the image of one intersects with the other's substance.*

** Thus the Great Workroom, where desk after clerical desk typed out corporate correspondence, is the manifestation of a particular idea of the corporation as a bureaucratic entity. It makes the idea of the organization real by spatializing and materializing it. Architecture's built form, then, is simultaneously both the ida and the reality.*

** Intentionally or not, architecture is the physical manifestation of societal will, an enactment of the intentions of government, policy, capital, social convention and so on. It articulates this social, political and economic vision into the environmental frame within which society operates - the spaces in which we live. In the most direct sense, architecture permits and prevents the ways in which we use space. It defines what is acceptable and what is not.*

** Perhaps the most ubiquitous and banal of contemporary architectural elements is the suspended ceiling. Patented by Donald Brown in 1961, it has since crept into almost every environment that requires heavy servicing. It provides a solution to a problem - what to do with the mess of services required to deliver reasonable levels of environmental comfort - that would otherwise need to be architecturally resolved.*

** The suspended ceiling is thus a practical device designed to cover space as cheaply and quickly as possible, without having to resolve any real architectural issues of how one material meets another.*

** The modular repetition of tiles of 600 x 600mm within an aluminum grid repeats to fill up the required space. Its repetition forms an apparent ceiling above our heads, its material quality giving the appearance of being part of the built fabric even though it is, in fact, separate from the structure of the building.*

** Unlike other decorative elements, the suspended ceiling is designed to look like a real ceiling.*

** Along with it appears the suspended ceiling's ubiquity and its seamlessness within any given environment help to convince us of its ceilingness.*

** Unlike the Venturian image of architecture, where the billboard-facade (the sign) is expressed as a distinct element against the body of the building (the signified), here we see the sign and the signified, the image of the building and the building itself, coinciding as the same entity.*

THERMAL DELIGHT IN ARCHITECTURE, LISA HESCHONG

** Thermal information is never neutral; it always reflects what is directly happening to the body.*

** Our nervous system is much more attuned to noticing change in the environment than to noticing steady states.*

** There is an extra delight in the delicious comfort of a balmy spring day as I walk beneath a row of trees and sense the alternating warmth and the coolness of the sun and shade.*

** Since our thermal sensors are not distance receptors, that is, they cannot warn us that a place will be cold before it starts to chill our body, we have to rely on other senses to give us advance clues...Such clues can become so strongly associated with a sense of coolness or warmth that they can occasionally substitute for the thermal experience itself.*

THE ARCHITECTURE OF THE WELL-TEMPERED ENVIRONMENT, REYNER BANHAM

** Mechanical services and even some non-mechanical environmental devices such as partially reflective glass or acoustic surfaces, have largely passed out of the control of architects into the hands of specialist consultants who now comprise a whole range of parallel professions.*

** For all but the last dozen decades or so, mankind has only disposed of one convincing method for achieving these environmental improves;to erect massive and apparently permanent structures...Partial solutions to these problems have always been offered by alternative methods such as wearing a coat in the rain; getting in a tent out in the sun, or gathering around a camp-fire in the cool of the evening.*

** Against this [massive/permanent structures], societies who do not build substantial structures tend to group their activities around some central focus - a water hole, a shade tree, a fire, a great teacher - and inhabit a space whose external boundaries are vague, adjustable according to functional need, and rarely regular.*

** It was this revolution [air-conditioning] that first posed the problem of alternatives to structure as the prime controller of the environment, and introduced the regenerative mode as a serious rival to the Conservative and Selective modes, rather than their modest hand-maiden.*

** Yet the phrase 'Man-made weather' is an admirable one, not only describing the end product of the air-conditioning process, but because it also underlines the extent to which Carrier's mastery of the caft turned upon direct observation of the nature and performance of air as a component of outdoor weather.*

** One should add immediately that ceilings have been suspended almost as long as there has been architecture, but whereas the traditional reason for suspending a ceiling was to close up the top of a room volume, the sense in which the word is employed nowadays in trade literature and office-conversation, implies opening up the top of the room volume to admit environmental power over its entire area. Paradoxically, this opening-up is commonly considered as a way of concealing the fact that the upper part of the room volume is occupied by ducts, conduits and service adits generally.*

** The fact that these concealments take place normally within the formal rules of an aesthetic (the International Style) conspicuously given to honest exhibition of structures and services will suggest that the story of the emergence of the suspended ceiling as we know it now must be somewhat confused, both in its narrative sequence and in the intentions of those involved.*

** However, the acoustical tile brought with it another kind of architectural consequence that is still effective today, almost forty years after its appearance. Unlike plaster, which may be spread over a ceiling of any dimension and shape, acoustic tile compes in discrete rectangular units, answering to a limited range of standard dimensions. It thus defines the effective module of the ceiling, encourages the use of other components of the same module and rectangular format in order to avoid the wasteful cutting of tiles; it also fixes the pattern of hangers and ribs which will support the tiles, and thus constrains the the disposition of whatever else is to go above the visible ceiling.*

** Sets of standard dimensions are thus created outside any intentional systems of preference or modular co-ordination, and affect other buildings in which acoustic tile is not employed. Thus the dimensional grid of the 'Schools Construction System Development' (SSCD) building-system developed by Ezra Ehrenkrantz and his team at Stanford University in the early 1960's ostensibly rests upon the need to accommodate standard fluorescent tubes within the cells of the underside of the deeply trussed roof structure which contains all the environmental equipment needed to service the rooms below. But the sizes of those tubes had been conditioned by the ceiling grids that accommodated earlier models, and so on - a history of accidentally determined sequences of dimensional standards reaching back into the early thirties.*

BEYOND THERMAL MONOTONY, SALMAAN CRAIG
ESSAYS ON THERMODYNAMICS

* *Our skin is an extraordinary sense organ. Evolution has programmed it to register the subtlest of signals from a myriad of stimuli. Our reward, or our punishment, is a sensation of pleasure, or pain. Just ask our cousins, the Macaques of Japan, who live in the frozen mountain-scape of Nagano.*

* *For them, the local hot springs are both a source of thermal pleasure and a way to enforce social hierarchy.*

* *Our thermal receptors are change-seeking. Make architecture that puts them and us on alert; away from thermal monotony, thermal indifference; toward thermal texture.*

11. PERVERSION: EQUILIBRIUM-GROTESQUENESS
ESSAYS ON THERMODYNAMICS

* *Thermodynamic equilibrium, however, immediately encounters the traces of its rejected counterpart in grotesqueness. The air-driven organization soon engenders its opponent via the remembrance of a grotto in the air. Archetype of centrifugal-centripetal self-centeredness, the Post-Gravitational Archaic engenders its own ground-like condition: stagnancy, fogginess, darkness, false humidity, waterfalls, and the all-too-ideal weather conditions of its chimneys, corners, undergrounds, catacombs, and branching courtyards, finally reflecting the fact that the equilibrium is nothing but a new form of the perverse.*

THP_THERMODYNAMIC PROTOTYPE
ESSAYS ON THERMODYNAMICS

* *THP is a spatial, structural and thermodynamic organization composed of nine concatenated and environmentally differentiated spaces. Those spaces are conceived to syncretically resolve three different organizations (spatial, tectonic and thermodynamic), minimizing the material used and maximizing the versatility of its behavior or performance.*

* *The geometry and topology of the rooms (and their thermal traps that establish differences in open adjacent spaces by combining static and dynamic areas), together with the most basic thermal devices (Trombe wall, heat exchanger, Stirling engine, absorption refrigerator...), and the choice and modeling of materials using simultaneously tectonic and thermodynamic parameters, all in relation with climatic factors and the resources provided by natural materials - earth, water, sun, and air - serve to configure a construction that extrapolates thermodynamic differences and, with them, the diversity of the spatial experience.*

FORM AND FUNCTION FOLLOW CLIMATE, PHILIPPE RAHM

* *Does scientific progress transform architects' field of knowledge?*
Yes. For example, reinforced concrete and steel have totally transformed our conception of space.These new materials allowed a spatial arrangement determined by closed, juxtaposed rooms, linked by a corridor, to be replaced by Le Corbusier's or Mies van der Rohe's free plan, by fluid space. I believe that knowledge of the physical, electromagnetic and chemical dimensions of space will modify the nature of contemporary architecture in the same way.

* *In the classical tradition, in the work of Vitruvius or Alberti, the emergence of form seems to be linked with harmony and symmetry and their relation to the human body. Then, in Modern architecture, form becomes the expression of function. It is the body that deforms space, the length of an arm that determines the size of a kitchen.*

* *So what you mean by performance in architectural terms is control of the interior climate?*
Yes. The primary role of the architect is to modify or adapt a climate to human needs: to raise the temperature when it is cold, the measure of light when it is dark. The very essence of architecture is therefore to create an environment that differs from the exterior environment, be this in terms of temperature, humidity, air or sound. The notion of climate or atmosphere is thus fundamental to architecture. I think that ultimately the mass is secondary to the void. Paradoxically, the history of architecture did not assign this status to it.

* *Control of the climate is consequently architecture's principal task?*
Yes. There's no other choice. But I wouldn't use the term "control", with its modern, normative connotations. I would rather say, that design of the atmosphere is now the domain of architecture. And the new ecological norms accentuate that. Today,interior space is insulated to the point where one can practically heat a house with the flick of a lighter. But this gives rise to new problems such as oxygen renewal, evacuation of the humidity that ensues from respiration, or adjustment of temperatures to 22°, 19° or 16°Celsius,depending on what a space Philippe Rahm architectes,Digestible Gulf is to be used for. One can see that the exigencies of sustainable development are causing an increasingly dramatic and fundamental shift in architecture, from the tectonic to the climatic, the visible to the invisible dimensions.

TOWARDS A METEOROLOGICAL ARCHITECTURE, PHILIPPE RAHM

* *But over and above that goal, beyond such socially responsible and ecological objectives, might not climate be a new architectural language, a language for architecture rethought with meteorology in mind? Might it be possible to imagine climatic phenomena such as convection, conduction or evaporation for example as new tools for architectural composition? Could vapour, heat or light become the new bricks of contemporary construction?*

* *Slipping from the solid to the void, from the visible to the invisible, from metric composition to thermal composition, architecture as meteorology opens up additional, more sensual, more variable dimensions in which limits fade away and solids evaporate. The task is no longer to build images and functions but to open up climates and interpretations. At the large scale, meteorological architecture explores the atmospheric and poetic potential of new construction techniques for ventilation, heating, dual-flow air renewal and insulation. At the microscopic level, it plumbs novel domains of perception through skin contact, smell and hormones.*

TERROR IN THE AIR, PETER SLOTERDIJK

* *With the passing of the 20th century, the theory of homo sapiens qua pupils of the air ultimately also acquires pragmatic contours. We begin to understand that man is not only what he eats, but what he breathes and that in which he is immersed. Cultures are collective conditions of immersion in air and sign systems.*

* *With the transition from the 20th century to the 21st, the subject of the cultural sciences thus becomes: making the air conditions explicit. These sciences practice pneumatology with an empirical disposition. For the now, this program can only be carried out by reconstruction and accumulation, because the 'thing itself,' the universe of influenced climata, of designed atmospheres, of modified airs and of adjusted, measured, legalized environments, has-with the very far-reaching advances in the explication of natural scientific, technical, military, legislative legal, architectonic and artistic spheres-gained an almost unbeatable head start over the attempt to formulate concepts in cultural theory. As a result, the soundest approach for cultural theory to take would seem to be, in a first phase of self-confirmation, to orient itself with respect to the most highly-developed forms of scientific atmospheric description, that is meteorology and climatology, after which it could then devote itself to exploring climatic and air phenomena that are more apposite to culture and closer to persons.*

* *So long as meteorology presents itself as a natural science and nothing else, it can pass in silence over the question of the weather's possible author.*

** These several factors-namely: the atmosphere (gaseous envelope), the hydrosphere (water world), the biosphere (plant and animal worlds), the cryosphere (the ice region), the pedosphere (solid land)-together, under the influence of the sun's radiation, comprise extremely complex patterns of energy exchange, representable in terms that are entirely natural scientific and devoid of all reference to any intelligence that allegedly either had a prior plan or intervened subsequently.*

** The modern weather report can therefore present itself as a discipline of regional ontology in which one speaks of causes, but not of instigators. It speaks of that which happens just by itself and according to its own conditions, of how it happens, and of that which, in the best of cases, gets "reflected" as objective quality data in a subjective medium.*

** Nevertheless, modern meteorology is allied to a progressive subjectivization of the weather- in many senses: for one, because it increasingly relates climatic 'givens' to the opinions, calculations, and reactions of populations, in relation to whose own projects the atmospheric environment becomes less and less indifferent; second, because the objective climate, both regional and global, must increasingly described as the result of the life-styles of modern industrial societies. Both of these aspects, which set the, weather in relation to people of the modern age-qua clients and co-causers of the weather-are objectively interrelated.*

** Life as we know it is contingent on the fact that, thanks to its atmospheric filter, the earth's surface lives thirty-three degrees beyond its means. If people are, to quote Herder once again, pupils of the air, then the clouds are their tutors. Life is a side effect of having been climatically spoiled.*

** Long before the macroclimatological understanding of these consequences took on a scientific shape and attracted public notice, modern cultural participants drew on their powers of climate judgment for more regional and smaller scale phenomena-climate control in houses and apartments,which man-made hearths first transformed into convivial islands of warmth; the chilling effect of the cellar, allowing food and beverages to be cooled; the miasmatic air quality in public spaces near cemeteries, slaughtering yards and cloacas; the precarious atmospheric conditions of numerous workplaces such as weaving mills, mines and quarries where organic and mineral dust led to serious lung disease.*

** Air-design is the technological response to the phenomenological insight that human being-in-the-world is always and without exception present as a modification of 'being-in-the-air.' Since there is always something in the air, advances in atmosphere explication throw up the idea that, by way of precaution, we might put something in it ourselves.*

** Air design aims at directly modifying the mood of airspace users-it serves the indirectly manifest purpose of enticing a space's passers-by with pleasant, smell-induced impressions of a situation, contributing to heightened product acceptance and willingness to buy.*

THE AGENCY OF THE PLAN, STAN ALLEN

** I would say instead that the plan is a detailed mental construct, provisionally captured in an available medium.*

** But unlike a musical score, the architectural plan literally traces out the form of the work it describes. Like a sculptor's maquette or a painter's cartoon, it is a scalar reduction of the work in question: an incomplete, condensed, and miniaturized instance of the final building. Despite what Loos might say, formal qualities are deeply embedded in plan, and the nature of a plan is grasped bodily as much as it is apprehended Intellectually.*

** The power of the plan is precisely this double condition: at once a token of the building to come, (a kind of souvenir in reverse), and an abstract instruction set waiting to be acted upon.*

** Scale and narrative belong to section. Profile and figure are foregrounded in elevation, and structure in section.*

** The plan is a synthetic instrument in which all of these qualities are implicit but not depicted literally.*

** To draw a plan is to engage in an active effort of imagination and projection.*

** It shares something with the map; the map is a geometric approximation of the vastness and intricacy of the territory; it is always reductive and always selective. The plan functions in reverse. The territory exists before it is mapped; but the plan is a device to imagine something that does not yet exist. The abstraction of the plan is scaled up in both measure and complexity.*

** The plan is a 'generator' in the sense that it produces a whole series of architectural consequences beyond the literal reproduction of its own internal formal relationships.*

** The plan in turn allows the architect to imagine detailed scenarios of occupation and inhabitation. Programmatic relationships and areas are fixed in plan, which is why plans remain the preferred documents for clients, cost consultants and code compliance. But beyond this bureaucratic instrumentality, the plan inscribes social relationships and projects situations. As Robin Evans has written, 'If anything is described by an architectural plan, it is the nature of human relationships, since the elements whose trace it records-walls, doors, windows, and stairs-are employed first to divide and then selectively to re-unite inhabited space.' Like a map, the plan is an infinite collection of potential itineraries to be traced out through the spaces and passages described in its spatial field.*

** Unlike the god-like overview of the map, the plan is a cut, a horizontal section at a specified distance from each floor level. This has two immediate consequences. On the one hand, the plan reveals the materiality, the thickness and density of the built fabric. The massiveness of a masonry pier or the slenderness of a steel column are immediately evident in plan. The architectonic and spatial difference, for example between the Mies' cruciform column and the round concrete columns of early Le Corbusier is a fundamental plan condition, described in the plan-as-section-cut.*

** The plan uniquely enables the complex choreography of solid and void-structure and space-that is fundamental to making architecture.*

** The plan is fundamentally projective; it is addressed to the future, fundamentally optimistic, and forward-looking.*

** The free plan, for example, is a set of working design precepts with generalizable application; the plan drawing signals that these principles are at work, and that the building belongs to a larger set. Yet the plan also details the specifics of the individual building, the intricacies of space, structure and movement that belong to the experience of a particular building. No plan exists in a vacuum. It gestures at and defers to agreed-upon rules and protocols, conventions that belong to the discipline at large and to its unfolding history. Any plan is a kind of shorthand, and requires knowing readers versed in the conventions and history; it is no accident that we refer to the ability to 'read' plans, just as we would refer to reading music. The plan always reaches beyond itself, and gains power from the way in which it functions within a larger field to re-articulate known material.*

PIPELESS DREAMS, MARK WIGLEY
IS THIS NOT A PIPE?

** A complex, interconnected net of tubes supports each space, from the largest waste pipes to the finest wires. Yet these tubes are rarely allowed to enter the space. They are asked to bring things in or take things away but are meant to remain outside. A pipe can enter a room if concealed.*

** Suspended ceilings and elevators floors smoothly evict much of the ever denser spaghetti of ductwork by simply reducing the perceived dimension of the room. Pipes must always be close to us yet are unseen and unheard.*

** No evidence of flow is allowed. No rustle, gurgle, whoosh, hum, shudder, click, or thud.*

** Yet the same suspension of the body in a space that is defined by valves, filters, diffusers, pumps, sensors, and switches occurs whenever air is simply brought through one vent and drawn out through another. Any room is part of a pipe or the intersection of a number of pipes. Space has become an effect of an intricate choreography of valves."*

KIKUTAKE'S METABOLIC ARCHITECTURE: ANTICIPATING THE PROGRESS OF TECHNOLOGY, C-LAB IS THIS NOT A PIPE?

** HVAC systems, lighting, graphical signs and partition equipment had allowed buildings to be controllable and flexible with indifference to the particular contours of the interior. Kikutake realized that there was too much reliance on technologies to determine the layout of spaces, making it increasingly easy for designers and users alike to ignore the power to structure the experience of the space. This rendered the space homogeneous, compromising the distinct purpose end potential of each device, in effect shortening the life span and ultimately the relevance of those buildings.*

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