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Hyper-Geographic Office:
How the Clouds Activate Public Space

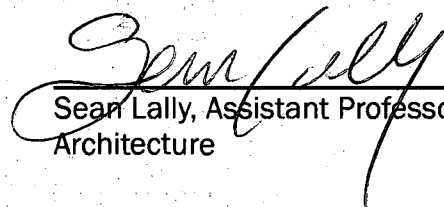
by

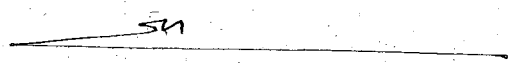
Brian Daniel Shepherdson


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Master of Architecture

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ABSTRACT

Hyper-Geographic Office: How the Clouds Activate Public Space

by

Brian Daniel Shepherdson

The new workplace is not bound by geography, it *is* geography.

In any place, there are overlapping geographic fields of varying intensity – design for the new office should consist of the agitation and deformation of these fields.

This thesis investigates the architectural implications of patterns of working that are emerging due to the dematerialized but expanding presence of computing technology, or "The Techno-Cloud" - which has rendered the traditional architectural, urban, and social boundaries of the office obsolete.

This thesis proposes a methodology for the re-design of the office tower – a strategy for upsetting its enclosed, controlled geography to create a Hyper-Geography of active, overlapping fields of climate and use. In the Hyper-Geographic Office, nomadic workers are part of this ecology, tuning their environment through movement.

If the office *is* geography, then its Architecture is the control and augmentation of climatic performance.

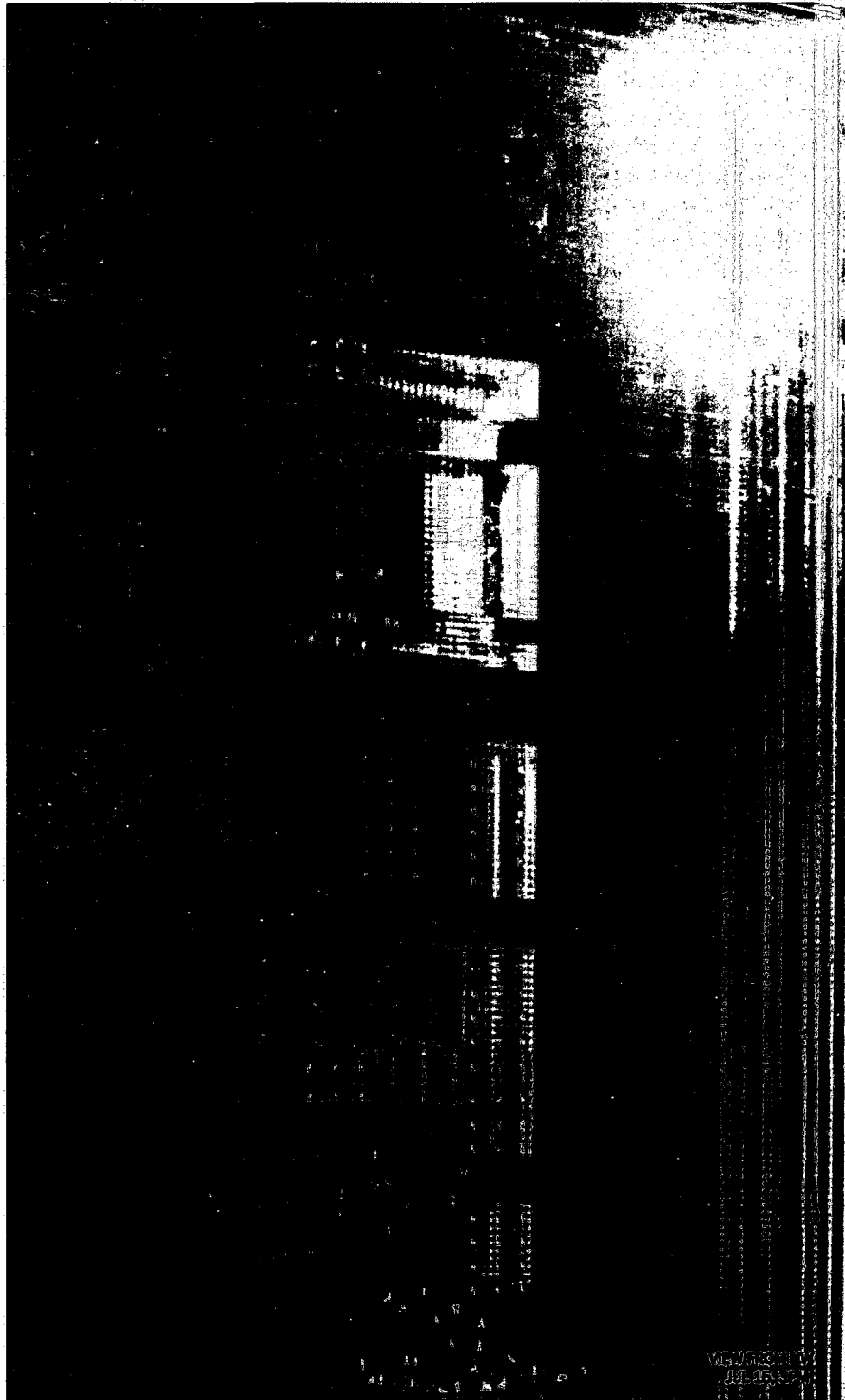
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Introduction

In any place there are overlapping geographic fields of varying intensity – design for the new office should consist of the agitation and deformation of these fields. This is what is meant by hyper-geography. This thesis investigates the architectural implications of the patterns of working that are now possible due to the dematerialized but expanding presence of communication and computing technology – the Techno-Cloud. Geographic qualities (those that cannot be outsourced to the Techno-Cloud) will be the materials that make up the new office, and architects will specialize in their amplification and tuning.

For a large and growing group of workers in developed countries, the new reality is that working is centered on digital production and digital communication. This means that the importance of physical presence for doing business is diminishing, and mobility is increasing. The Techno-Cloud is the only piece of infrastructure that is required to access the workplace, social networks, and entertainment. It is now the workers' responsibility to define where the workplace begins and ends, and this renders the traditional social and architectural boundaries of the office obsolete.

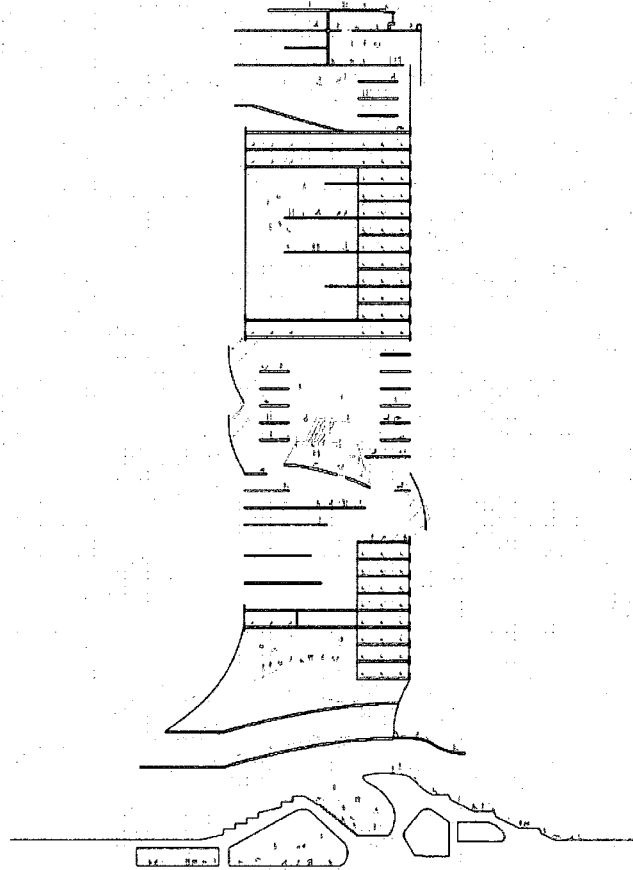


Atmosphere rendered as solid

What is the role of architecture in this new individualistic working environment? This thesis proposes that architects construct spaces that provide hyper-geography – spaces with heightened levels of analog social and climatic conditions. These qualities cannot be digitized, so they will be the primary variables for architectural tuning for architecture that operates within the Techno-Cloud. This thesis will demonstrate this tuning process through a re-design of an existing high-rise office tower, converting it from a model of anti-geography into a model of hyper-geography.



12 transverse sections through the Hyper-Geographic tower, showing deformations in climate.



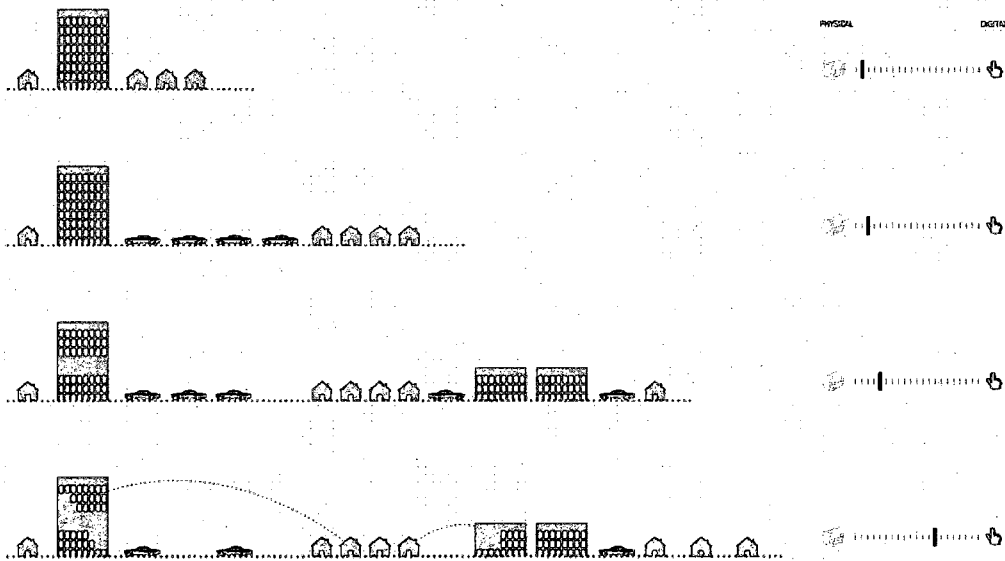
transverse section through the Hyper-Geographic tower, deformations in climate. hidden

Post-Geography: The Rise of the Generic in Office Architecture

At its most basic level, an office exists in order to get work done efficiently. With an office environment, a company provides a support infrastructure to help its employees do business. Over the past few decades, technological development and the shift toward an information-based economy have led to new realities resulting in the rise of the Generic in Office Architecture. First, office location became irrelevant, then office differentiation became unnecessary, and finally the office building itself became redundant. This section explains how this happened.

The concept of the office tower is based on the importance of location, but, in a trend that began at least 50 years ago, the gravitational pull of the city's central business district has been waning. Business' increased reliance on telecommunication technically made the suburbs or countryside a feasible site for an office, but equally important was the widespread deployment of multi-lane highway systems. For a significant portion of businesses, the real estate savings of officing in a non-urban location began to outweigh the advantages of working in a central business district.

FROM PHYSICAL TO DIGITAL
urban development since 1950 - the setup for operation on the tower



These issues, coupled with the fact that most of the white-collar workforce had abandoned the density of the city for picket fences and country clubs, meant that the importance of office location had drastically decreased. Meanwhile, metropolitan areas found an increase in traffic congestion, which only served to reinforce the new suburban commercial districts. After all, air-conditioning makes every room feel the same, so why drive downtown anymore?

But the Rise of the Generic was caused more by the rise of computing than by decentralization. Businesses have traditionally expended significant amounts of resources in order to provide their employees with the specific infrastructure needed to do their job most effectively. This secondary

infrastructure has shrunk substantially in recent years. Storage has been digitized; communication (written, visual, and oral) has been digitized; even space has been digitized in the form of virtual desktops and meeting rooms. Specialized equipment that once distinguished different businesses has been replaced with specialized software programs. The result of this digitization is that the interior environments of most offices have become architecturally indistinguishable from each other.

Reiser + Umemoto, in the Atlas of Novel Tectonics, describe this relationship between specialized office infrastructure and the environment in different terms:

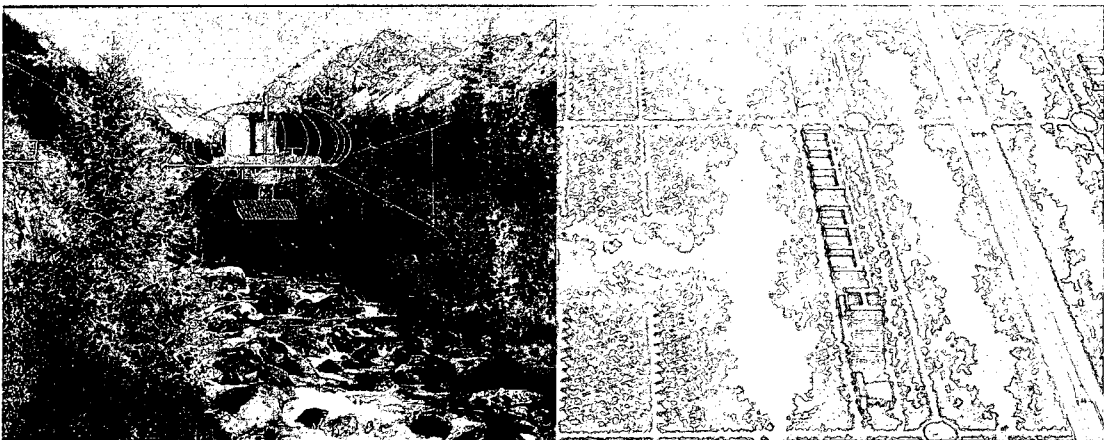
Paraphernalia and function, in taking up space,
simultaneously force the workplace to represent what
it does. With the dematerialization of function,
hardware shrinks, and the fit between program and
space becomes looser.

Businesses demand that their software fit their needs like a glove, and the primary demand of the office environment is that it allows the workers to compute in comfort. The comfort zone has been thoroughly determined by HVAC

engineers, and commercial developers know that the only design preferences that all office tenants share is the equal and generous distribution of air, light, electricity, and communication systems.

The promise of future reconfiguration means that, from a real estate investor's point of view, the equal and generous distribution of these atmospheric qualities makes up the ideal office building. Individual tenant companies may have more specialized needs, but given the over-arching importance of the digital in the contemporary office, it is easy to understand why differentiation within the office building type has become largely unnecessary.

This lack of spatial differentiation, however, has led to the commodification of space itself. Without distinguishing qualities, the value of space is determined primarily by its quantity. Even the quality of location is less relevant than square footage.



Future Systems, Bubble: 1983

Ludwig Hilberseimer, commercial area,
from *The New City* (1944)

For many workers, the workplace has become so abstract that it can literally be anywhere and everywhere. For teleworkers, the office building itself has become redundant. Because a computer and an internet connection are all that these workers require to do their job, the office of the teleworker is approaching the state of being atmospherically ambient.

This is the endgame of the Generic in office architecture, and the teleworker is already there. Because of technological and cultural development, office space has become so undifferentiated and abstract as to exist only in action. Work is no longer a place; it is something that is done. When the worker is done working, her environment ceases to be her office and continues as her bedroom, backyard, or bar. Short of a world (or universe) meta-design, Architecture has nothing more to provide in service of the Generic.

There is, however, evidence that Architecture and architects have something to offer the office worker in terms of augmenting and tuning those qualities which cannot be digitized. As the Atlas of Novel Tectonics points out, there exists an "opportunity for for an entirely different ambient space – one that may very well have functions that, by having nothing to do with the business at hand, actually augment it."

This thesis holds that those functions can be categorized as "geographic".

An investigation of telecommuting yields some important clues as to how those qualities should be deployed.



Hans Hollein,
Mobile Office, 1969

Telecommuting: A New Business Organization Model

The office has become an atmospheric latency. The existence of the Techno-Cloud means that the office is both ubiquitous and dematerialized. The workplace has infiltrated even the most intimate of domestic spaces.

Differentiation between home and office, no longer accomplished by material or spatial separation, has become the responsibility of the worker. This renders the traditional social and architectural boundaries of the office obsolete.

Even if it means that work follows them around, a growing percentage of the white collar workforce is giving up their personal desk at the company office and assuming responsibility for finding their own office. Both the management and the managed see teleworking as a positive development. Workers enjoy spending less time and money commuting, the more flexible working hours, and the ability to independently control their own working environment. Business owners see telecommuting as a way to cut down on overhead costs. Companies spend less on providing, maintaining, and conditioning space and equipment for telecommuters than for traditional workers.

ONE HUNDRED NINTH CONGRESS
Congress of the United States
House of Representatives
 COMMITTEE ON GOVERNMENT REFORM
 2167 RAYBURN HOUSE OFFICE BUILDING
 WASHINGTON, DC 20515-8143

Majority (207) 202-5534
 President (207) 225-2876
 Minority (207) 225-4351
 TV (207) 225-4887
<http://reform.house.gov>

**“Telecommuting:
 A 21st Century Solution to Traffic Jams and Terrorism.”**

Subcommittee on the Federal Workforce and Agency Organization
 Chairman Jon C. Porter

July 18, 2006

I would like to thank everyone for being here today.

With an increase in traffic congestion, fuel prices, time away from one’s family, and terrorist and pandemic threats, the time is ripe for the Subcommittee to examine the federal government’s use of telecommuting. Years ago, many of us used to watch with awe when a member of the Enterprise crew from Star Trek would “beam up,” thus, allowing them to travel instantly from one location to another. Imagine how life would change if you could be literally anywhere at once?

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INDEPENDENT

The case for teleworking is not merely anecdotal, however. While it is true that there are some jobs that simply cannot be performed from a remote location, studies show that companies that offer telecommuting options have higher job satisfaction ratings and a lower rate of employee turnover, while employee performance either improves or stays the same. These studies imply that telecommuting will not be a passing phase. Results bear out the theory, and a

new business organization model is asserting itself. Architects, on the other hand, haven't yet addressed this new reality. As a starting point, architects should study the habits of the new user – the laptop nomad.

The behavior of laptop nomads, given their newfound freedom, can give us clues as to how to design for their even greater well-being. Naturally, many telecommuters work from their home office or their kitchen table. More interestingly, however, telecommuters often exercise their independence by seeking out social environments as places to work. While the Techno-Cloud replaces the most of the infrastructure that the traditional office provided, there is no substitute for support that workers get from being in physical proximity with other workers. Libraries and coffee shops, while not primarily designed for or geared toward teleworkers, have adapted to either encourage or discourage their use as group working areas.

Oftentimes, independent telecommuters enjoy coworking with the same group of people. Jelly groups are a type of informal organization that telecommuters have formed for just that reason. These groups meet at intervals and provide the attendees with social support. Networking, idea sparking, and camaraderie are some of the benefits cited by those that take part in Jelly groups. These groups can be found in public places like bars or coffee shops, and sometimes in the homes of their organizers.

In cities with a critical mass of telecommuters looking for coworking options, spaces catered specifically toward co-working have sprung up. The fact that independent workers actually pay for space in these environments after leaving company-sponsored offices validates the claim on the independentshall.org front page, "we all know that we're happier and more productive together than alone."

Typically these fee-based coworking spaces are established in urban areas, and they usually move into buildings that were first designed for other uses. Independents Hall in Philadelphia and The Hat Factory in San Francisco occupy post-industrial loft space, while Caroline Collective in Houston resides in an office complex that the Collective renovated for its use. The organizers of these spaces negotiate rates with the users based on time spent, storage needed, and services used. This ensures that each worker maintains the freedom to fine-tune the geographic quality of analog social interaction.

The Techno-Cloud, by definition, doesn't provide any analog interaction, and the role of the coworking space is to supplement the interaction level as needed. Rather than having been instructed to work there, each coworker joins the group with similar self-directed intentions. This makes the geographic quality of analog social interaction higher than that which could be found in a typical company office; in this way coworking groups have tapped into the power hyper-

geography. Telecommuters at coworking centers can gather a more concentrated dose of social friction than they could find anywhere else. The tunable hyper-geography found in these coworking environments, while important, is only the tip of the iceberg.

The coworking spaces that exist as of this writing are not taking full advantage of the possibilities engendered by the techno-cloud. While tunable analog social interaction is a big step in a productive direction, and while the idea of linking multiple coworking communities into a network is getting closer to the new technological potential, these spaces ignore the other major component of an office environment that cannot be outsourced to the techno-cloud – the geographic quality of climate.

Like social interaction, climate control has long been a central factor in the design of office environments. With the coworking center, the geographic quality of analog social interaction has been revisited and redeployed in an arrangement that can help the independent worker to be "happier and more productive," but designers' stance toward the issue of office climate has not been significantly re-examined since Reyner Banham's Architecture of the Well-Tempered Environment. Perhaps a fresh look into issues of weather mediation in light of the phenomenon of coworking will yield a performative space which can augment the business at hand.

Hyper-Geography: The Office Tower Reinhabited by Independents

Weather mediation in current office building design is has two main components. One is a hermetically sealed building envelope which excludes the exterior environment from the abstract neutrality of the interior. The other component is the HVAC system, which is scaled to provide adequate capacity to maintain comfortable conditions for the generic office user. In humid environments like Houston's, this model of conditioning is typical across most building types. This means that the weather plan of Houston is marked by sharp contrast between interior, dehumidified, homogenized environments and the exterior weather conditions. The building type that relies most on this sharp division is the office tower. By strategically upsetting this artificial, anti-geographic stasis, the office tower can be converted to a hyper-geography of climate, use, sensation, and social interaction.

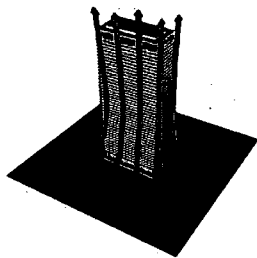
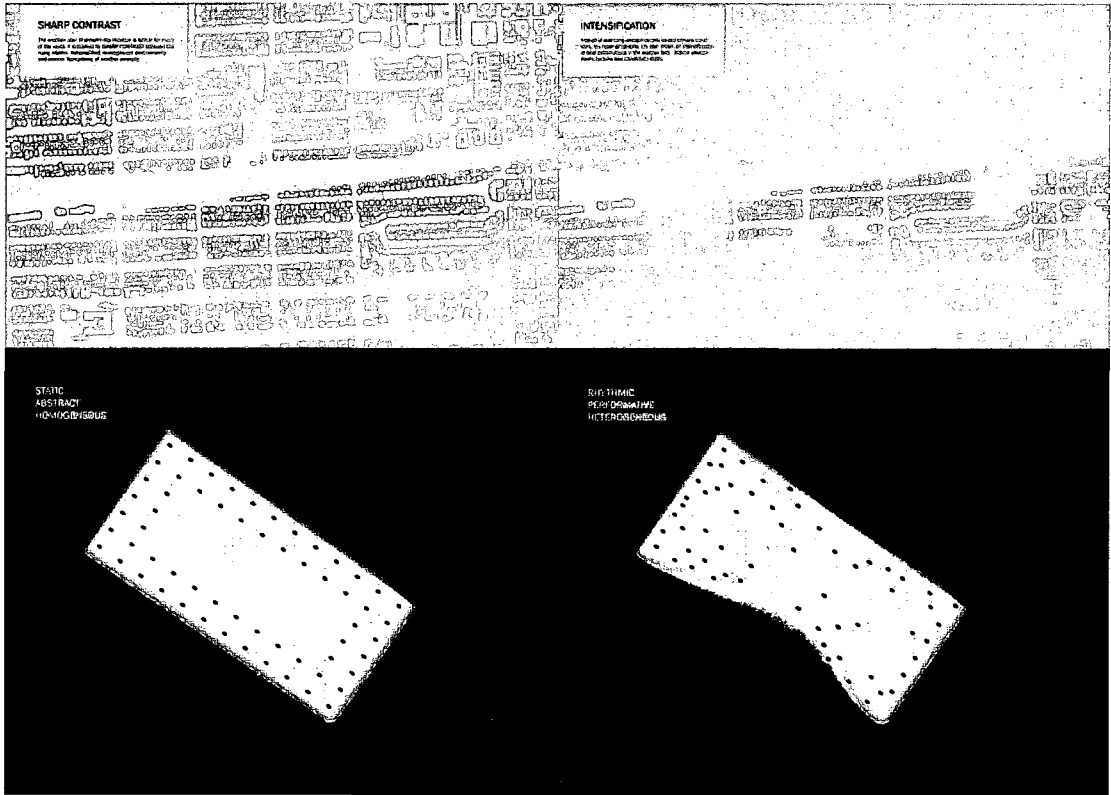
Vertical repetition of "well-tempered environments" resting on identical generic floor plates leads to quite drastic deformations of the weather patterns at the edge of the building envelope. The sides of the building are heated differentially by the sun, creating rising heat swells and large areas of shade. All

of this reinforces the need for high-powered HVAC systems and hermetically sealed construction in order to keep the conditioned air separated from the unpredictable weather systems outside.

This thesis proposes a methodology for the redesign of the office tower – a strategy for upsetting its enclosed and controlled geography to create a hyper-geography of active fields of publicity, sound, temperature, humidity, scent, and use. Because the infrastructure that has driven the office design of the past is now being housed in the techno-cloud, architects have the opportunity and responsibility to propose a new architecture to serve and augment the new way of working that has emerged.

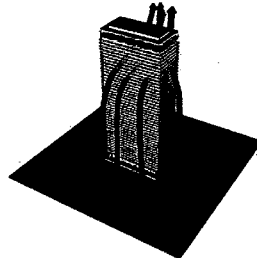
I've chosen a particularly anti-geographic tower as the prototype for this conversion strategy - the ExxonMobil Building in downtown Houston.





HERMETICALLY SEALED:
THE WELL-TEMPERED ENVIRONMENT

THERMAL CURRENTS -
CREATED AND DIVERTED

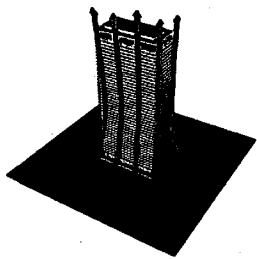
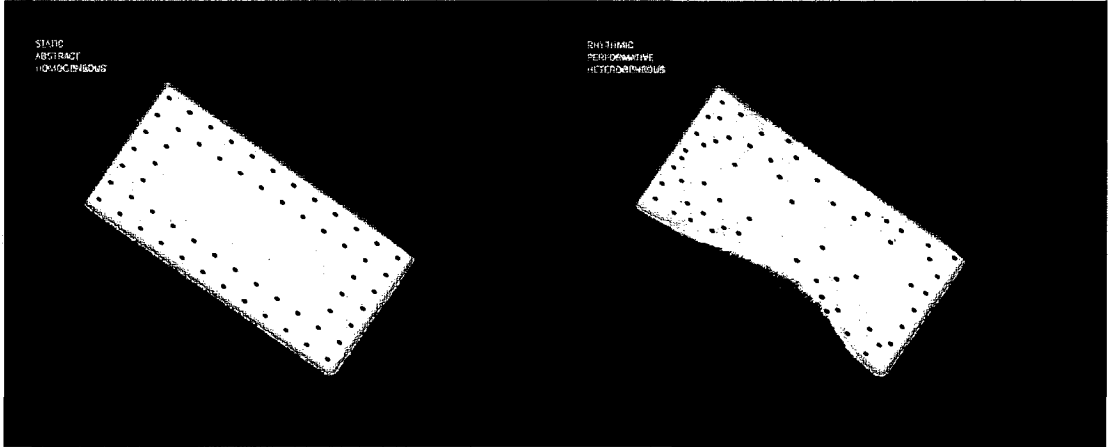
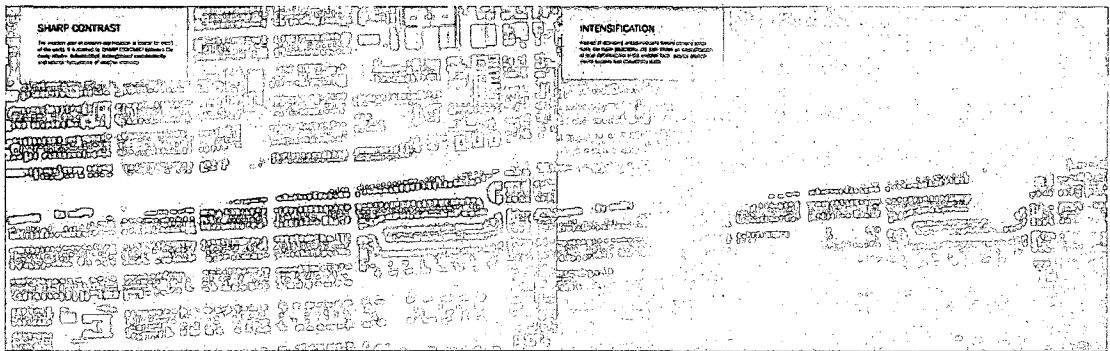


STRATEGICALLY PERFORATED:
THE AGITATED FIELD

THERMAL CURRENTS -
CREATED AND HARNESSSED

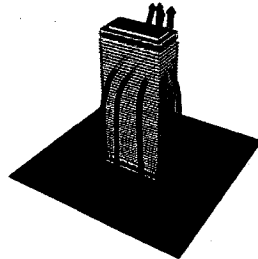
ANTI-GEOGRAPHIC

HYPER-GEOGRAPHIC



**HERMETICALLY SEALED:
THE WELL-TEMPERED ENVIRONMENT**

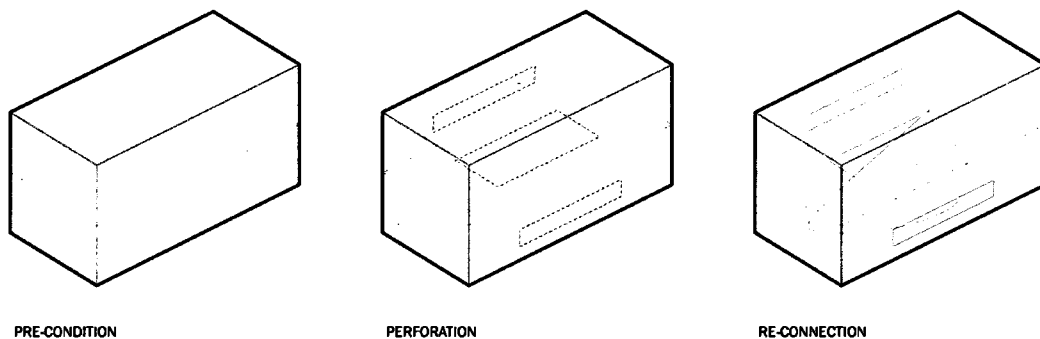
**THERMAL CURRENTS -
CREATED AND DIVERTED**



**STRATEGICALLY PERFORATED:
THE AGITATED FIELD**

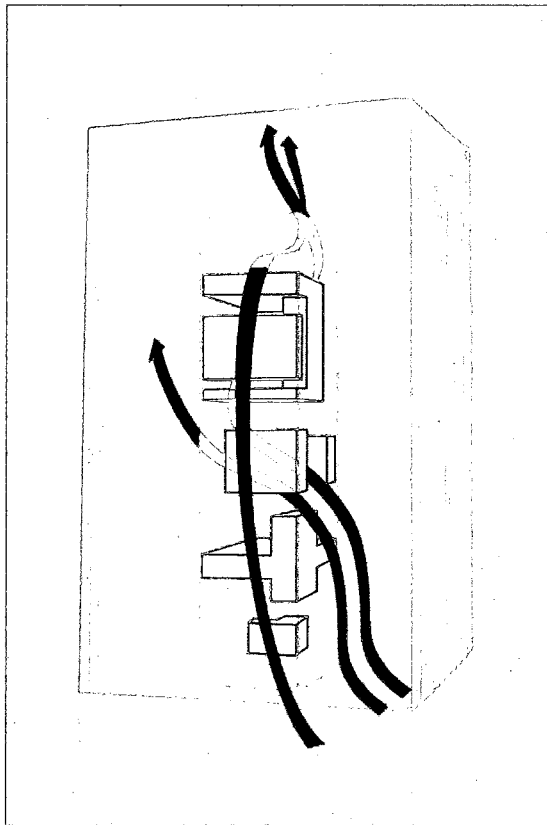
**THERMAL CURRENTS -
CREATED AND HARNESSSED**

Typical for office buildings built in the post-war period, the ExxonMobil building addresses its climatic issues primarily through mechanical systems engineering. However, the architects also formalized the battle with the exterior environment as the main visual distinction in an otherwise neutral design. Architectural Record, in October of 1963, called its signature horizontal sun screen system a "design against sun and glare". These screens are a calcification, an emblem, of the oppositional approach that architects have taken toward the tuning of geography, but through strategic perforation and re-connection this building could come to be the prototype for conversion to the hyper-geographic – the new natural habitat for the laptop nomad.

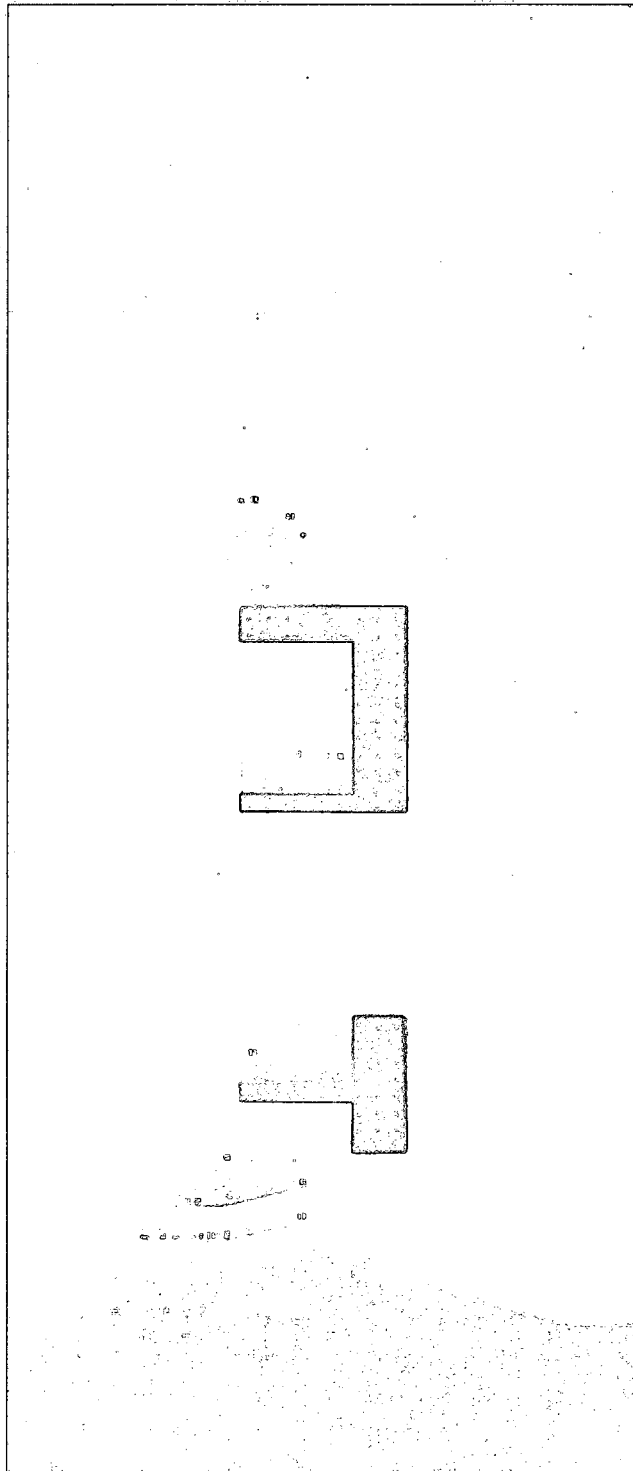


The method for upsetting the building's stasis is simple: perforation and reconnection. Perforation by way of glazing and sun screen removal allows the entry of geographic qualities, and reconnection with sloping floors allows the users to meander and find the optimal place that suits their climatic and social

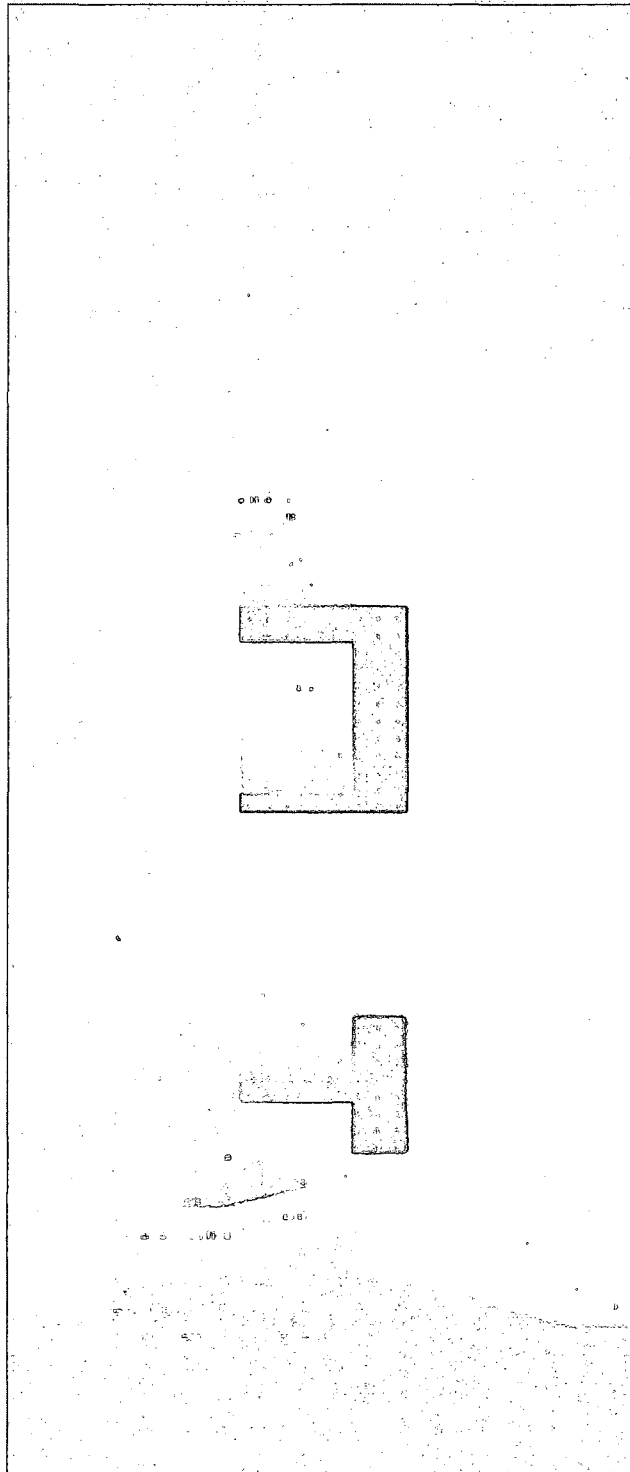
needs. This design harnesses the thermal air currents that occur on the south and west, selectively perforating parts the building envelope and floor plates to create a diverse ecology for the worker to explore. Moving through the building is no longer solely accomplished by elevator. Some traditional office modules are left intact that read as remnants of the old building, but their role is also performative. By directing flows and and creating shade with their broad flat sides, they create semi-stable weather patterns in the hyper-geographic office.



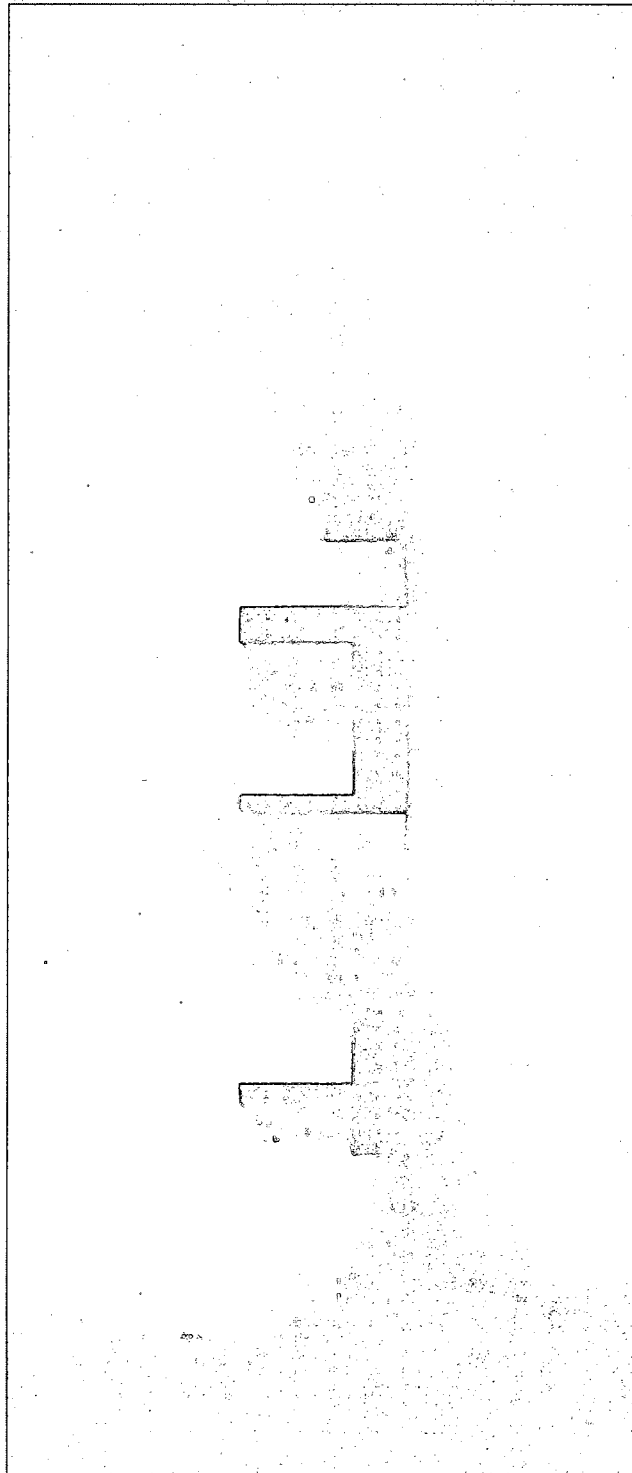
Remnants of the building are rendered as solid, directing rising thermal currents.



North-South Building Section, July 15, 3pm – see appendix for legend

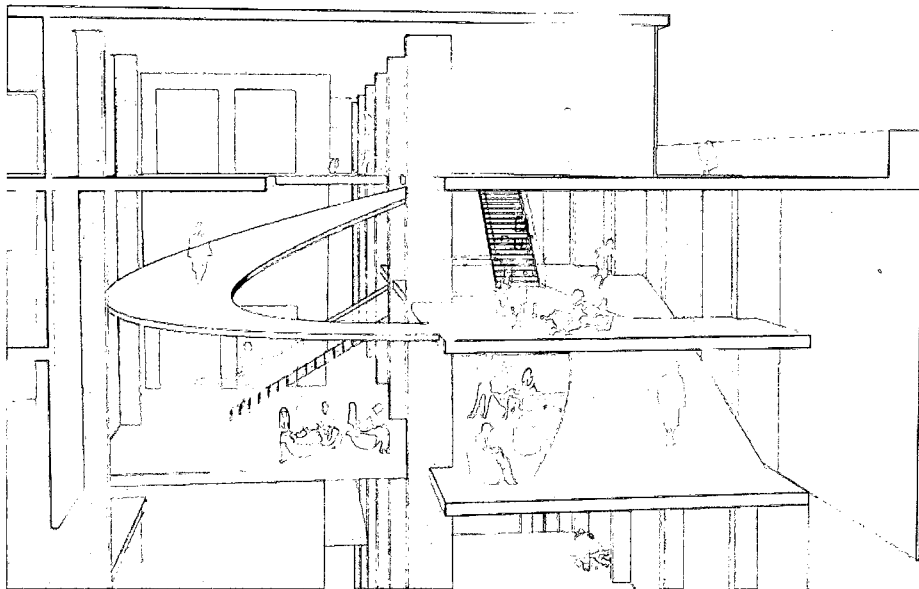


North-South Building Section, April 15, 3pm – see appendix for legend



North-South Building Section, January 15, 3pm – see appendix for legend

Heat flows are channeled and naturally accumulate at the top of the building, making the more enclosed areas of the upper floors totally inhospitable in the heat of summer, but quite comfortable in the wintertime. In the old ExxonMobil building, the upper floors were reserved for the oil men to make deals in the "Petroleum Club", but in the hyper-geographic version, these elevations would be used as a sort of seasonal sauna at 600 feet.



Seasonal sauna in the former Petroleum Club

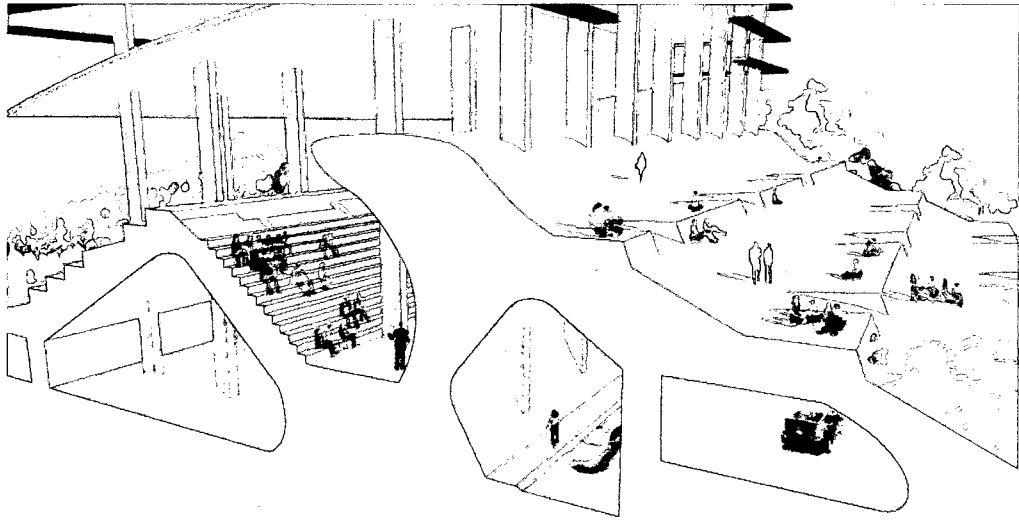
Down at 225 feet on the south side of the building, the intake that provides the sauna with air powers another air exchange, this one on the cooler north side of the tower. Drawn across pools of water, this cooler air creates an oasis at the lower levels, making this area more attractive during the summer. Sweeping planes that connect horizontal strata allow workers to calibrate their environment through movement. This kind of communal working environment that has not yet been achieved with co-working centers of today.



Workers tune their environment through movement.

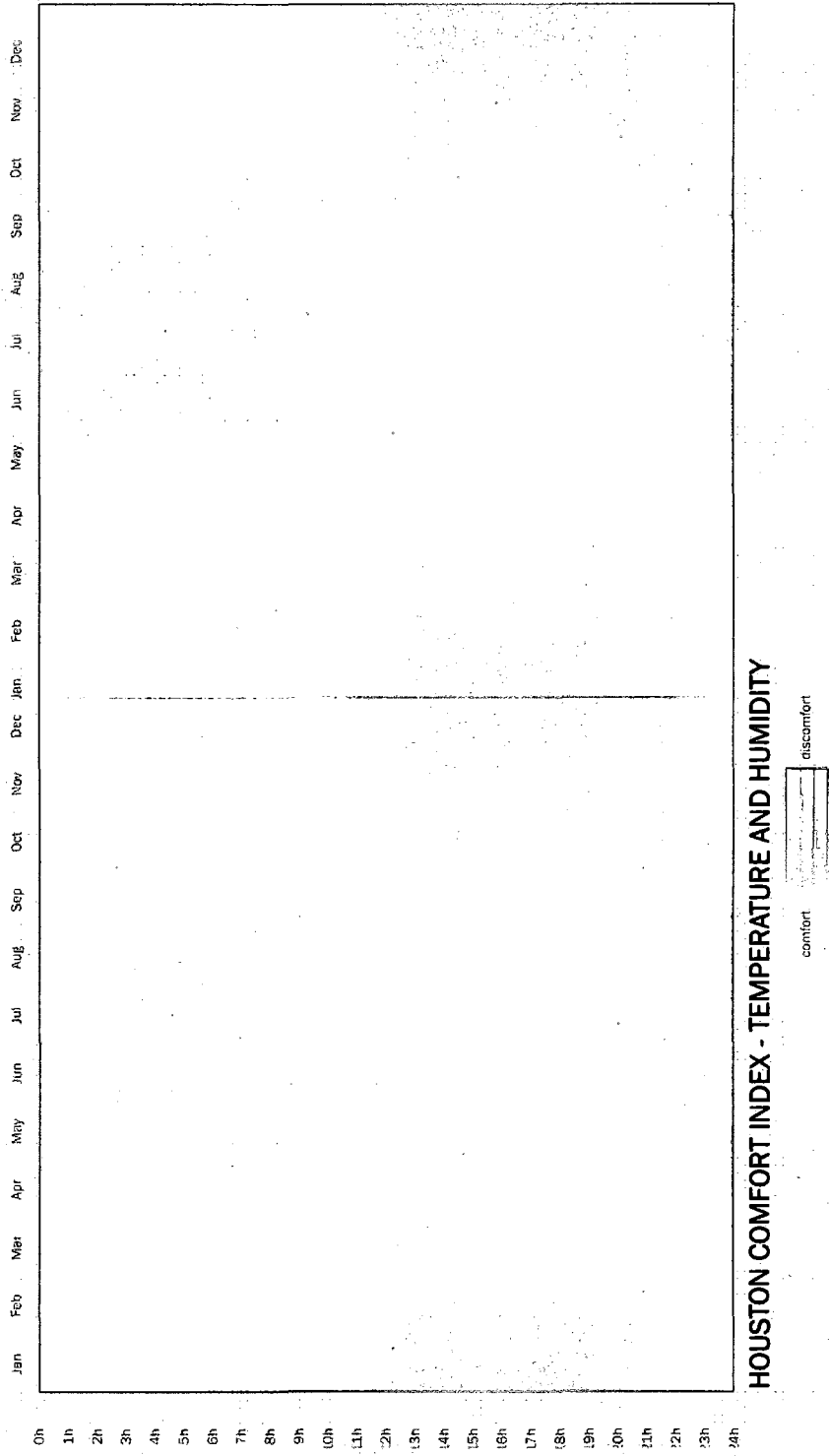
Certain areas of a design like this would be extremely variable, habitable only by night or at certain times of the year. Other areas would be less dependent on daily or yearly cycles and would be populated by those telecommuters with

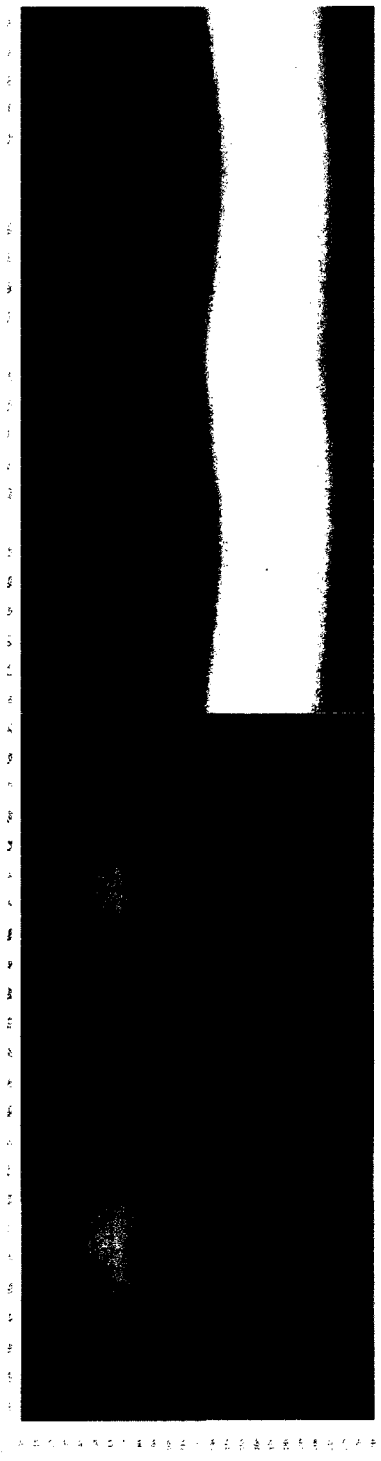
less of a nomadic disposition. New office Architecture should allow for both types of use, and anything in between. The Hyper-Geographic Office builds within the infrastructure of the Techno-Cloud, allowing the workers to tune the geographic elements of their environment through movement.



the new "office park"

Appendix





HOUSTON COMFORT INDEX - TEMPERATURE

comfort **discomfort**

HOUSTON COMFORT INDEX - HUMIDITY

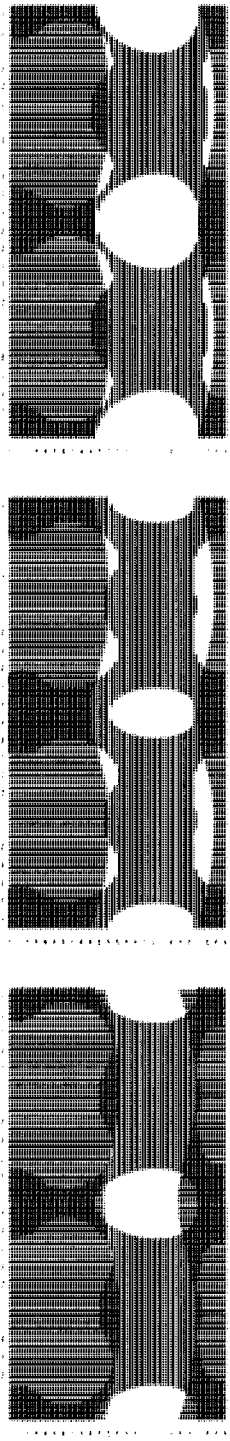
comfort **discomfort**

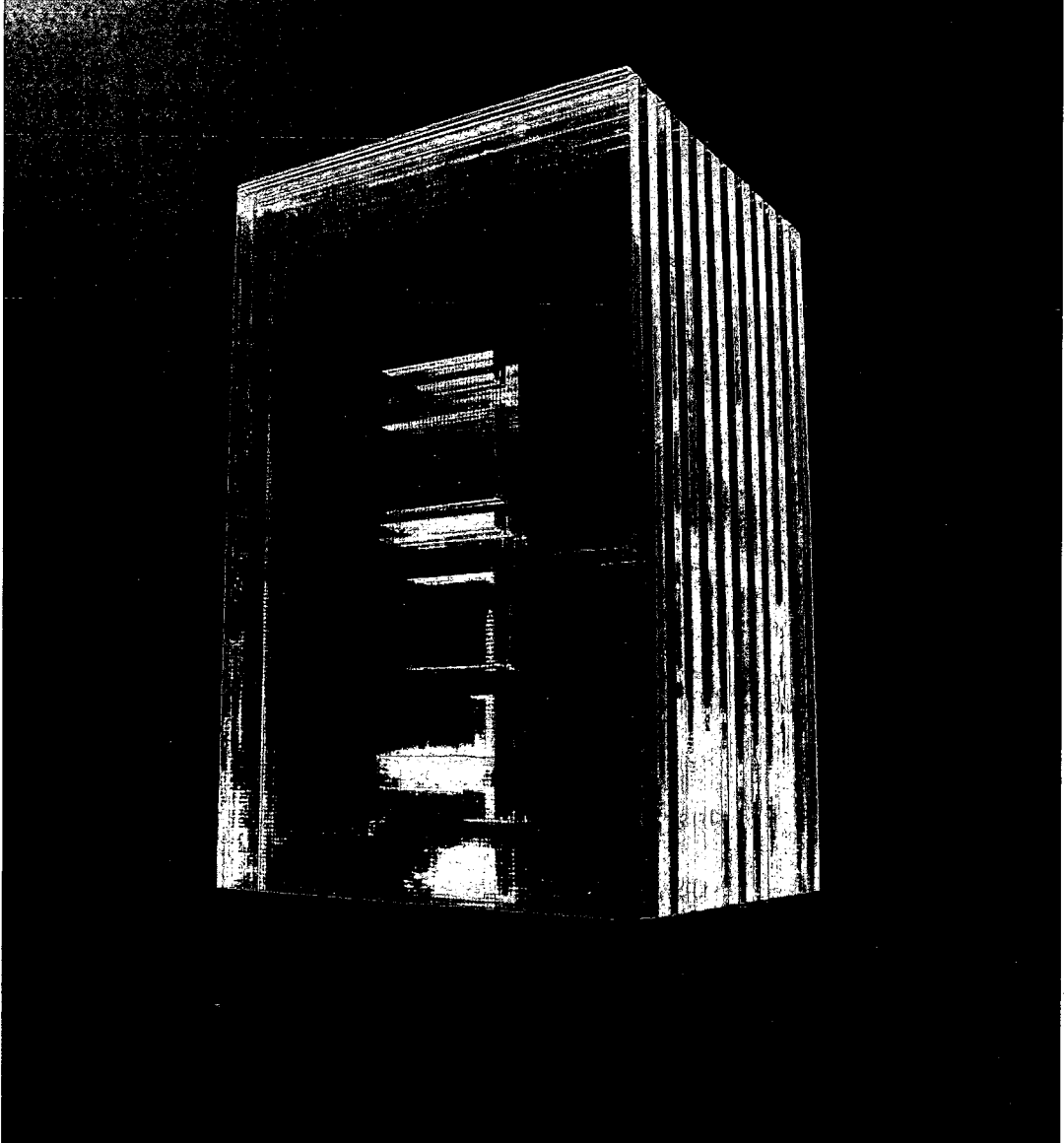
HOUSTON COMFORT INDEX - LOCAL AGITATION

STANDARD CONDITIONS
Houston Comfort Index (Temp/RH) **discomfort**

LIGHT BREEZE CONDITIONS
Houston Comfort Index (Temp/RH) **discomfort**

BRIGHT SUN CONDITIONS
Houston Comfort Index (Temp/RH) **discomfort**





the Hyper-Geographic Office building atmosphere rendered as solid

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_r=1&oref=slogin](http://www.nytimes.com/2008/02/20/business/businessspecial2/20cowork.html?_r=1&oref=slogin)

<http://coworking.pbwiki.com/>

http://blogs.chron.com/techblog/archives/2008/02/coworking_works_well_with_ot_hers.html

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