



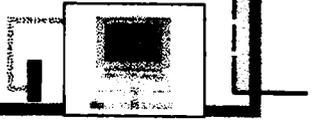
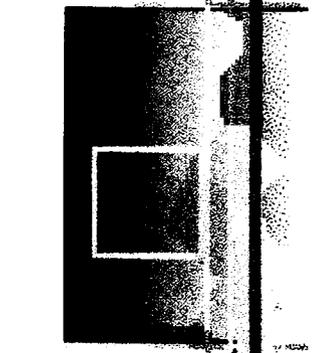
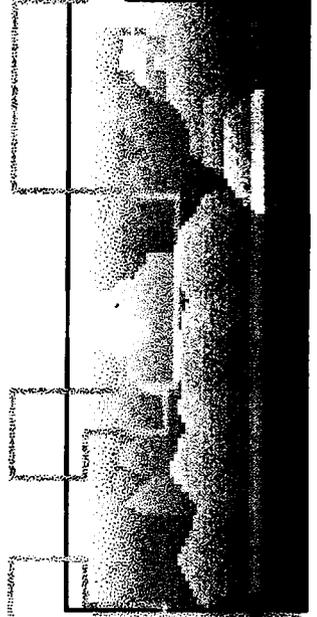
**The Communication and Balance of
Boundaries: human and machine.**

by
Brandy Bedell

**A Thesis
in
Architecture**

**Submitted to the Architecture Faculty of the College of Ar-
chitecture of Texas Tech University in Partial Fulfillment for
the Degree of
MASTERS IN ARCHITECTURE**

**Dr. Joseph Bilello,
Advisor and
Research Schematics Instructor**



preface

Humans historically have been a part of a system which involved a part of life and another part which aids the human in his/her life. Existence would be virtually impossible without both sides of the system. With advances in technology, humans can also advance to a higher level, and we simultaneously become a function of ourselves. The boundaries between the two systems are definite, but it is only with the balance and communication between such opposing *and* similar natures that the epistemological evolution can take place.



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abstract

Thesis statement:

Architecture can play a part in the balance and communication of boundaries between human and technological systems vital to the advancement of humankind.

Facility: Scope of project:

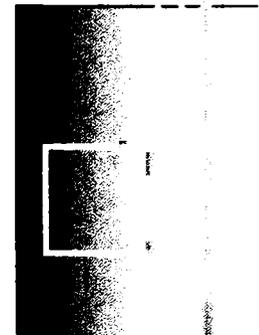
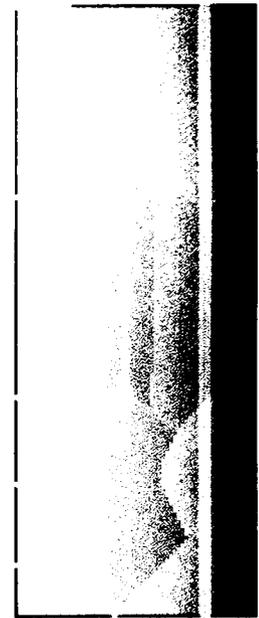
The Project is Dell Computer Headquarters. The office will be about 150,000 ft.² and will serve as one of the sales offices of the company. The Office will employ around 1500 workers who will have 24 hour access and a variety of choices about how work can be conducted.

Context:

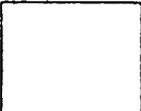
The context is the forefront of the information age. Possibilities and changes are

just being discovered involving liberation and collaboration between humans and technology. Ways of carrying out work are being transformed as the human-machine system balances.

The site is located in Round Rock, Texas, and contains physical boundaries which are converging. Two cities are merging together as well as the city of Round Rock and a once rural farming area. The site also contains a definite physical boundary manifested in a canyon.



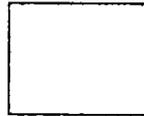
thory



At the same pace mankind masters nature, man seems to become enslaved to other men or to his own infamy. Even the pure light of science seems unable to shine but on a dark background of ignorance. All our invention and progress seem to result in endowing material forces with intellectual life, and in stultifying human life into a material force.

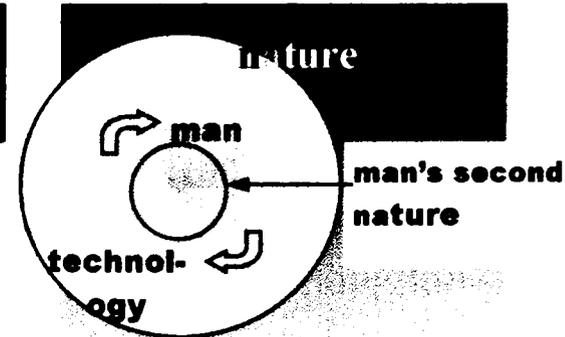
Karl Marx, Speech at the Anniversary of the *People's Paper*, April 1856.

theory



The Digital Revolution of this era is rapidly becoming a co-evolution at the human-machine interface.¹ This dynamic interplay of humans and technology correlates with the advancement of mankind,² as well as an anxiety concerning the coupling of the two areas. Presently, we take technology so much for granted that it is like the air we breathe, and there appears to be a steady increase in the acceleration towards the communion of life and the machine.³ The concern about this cybernetic marriage is the possibility that the system will become unbalanced. The fear of the machine becoming the dominant side has been a theme throughout humanity's technological history. The idea that the carriage could make its

user unable to walk is the basis of the fear that excessive reliance on today's technology could also deplete necessary human qualities. Thus, in cybernetic terms, it is the perfect balance and communication of boundaries between the two systems that becomes vital.⁴ The human's need for an appropriate technology is as important as his or her need for basic ecological human factors. These two systems or boundaries are not separate but one as they aid each other in achieving optimal performance. In this context, it is inherent that the environment through architecture represent this balance and communication between boundaries of these co-existent forces.



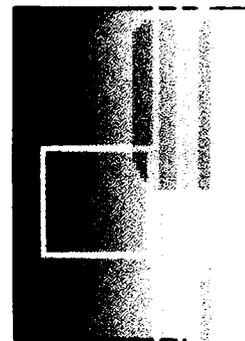
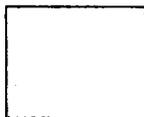
“we cannot command nature except by obeying her.”
Francis Bacon

theory

the idea of boundaries in cybernetics.

The idea of boundaries in cybernetics is based on thermodynamics. The boundary in thermodynamics is what determines an open or closed system. When mass crosses the boundary of what is being looked at in the equation, then the system is open, but if mass is not considered as crossing the boundary, the system is closed.⁵ Entropy is another idea carried over from thermodynamics to cybernetics. Entropy in a closed system is increasing which means that the system is constantly winding down. This contrasts with the first law of thermodynamics which states that energy is neither destroyed or created.⁶ Cybernetics draws analogies from the 1st and 2nd laws of thermo-

dynamics. The tension between the two, stability and degradation, can be applied to machines and bodies. It is the balancing of dual and opposing forces as well as the exchange and communication of the forces that allow the two polarities to exist simultaneously. Norbert Wiener, a theorist and pioneer of cybernetics after World War II, said, "cybernetics is about analogical relations and therefore the constructs are not merely rhetorical figures, but systems that generate the only kind of significance available to us as perceiving, finite beings with no access to unmediated reality."⁷ The harmony of expression and functionalism as well as as the communication between the two, can be reinforced by the built environment as well as applied to it since the built environment is simultaneously a functional and expressive response of humans.



theory

issue

Architecture should play a part in the balance and communication between boundaries of humans and technology. This and is significant to the advancement of humanity. Without the constant interaction between the two, the system becomes closed, unable to advance further.

figure 1

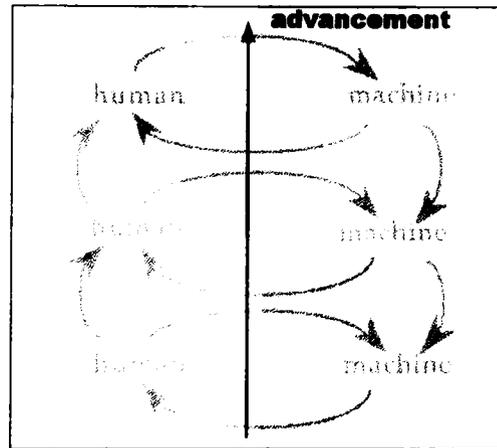
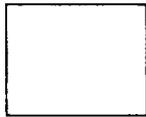


figure 2

theory



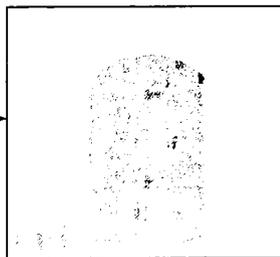
goal # 1

Architecture should represent part of the **gap** between humanity's perceived world, (world beyond human control) and the controlled technological world.

Performance Requirement #1

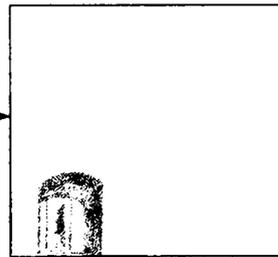
Scale should be used as a representation of the two worlds.

figure 3

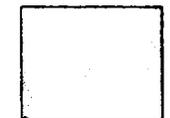
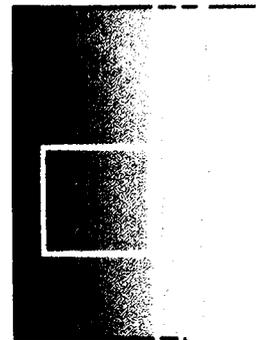
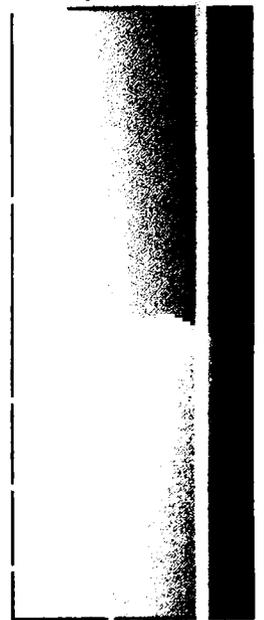


Large scale should be used to represent the perceived world beyond human control

figure 4



Human scale should be used to represent the world in human control



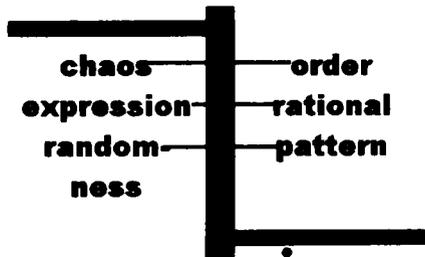
theory

balance

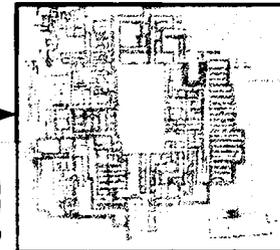
the "hallmark of the expert is the ability to operate at the edge of chaos without falling into chaos nor receding to immutability."

Performance Requirement #2

Organization patterns should be used to represent the balance of the two worlds.



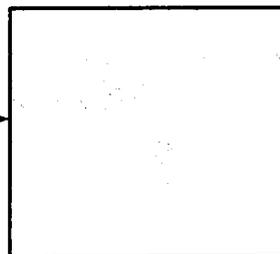
Random patterns representative of perceived world



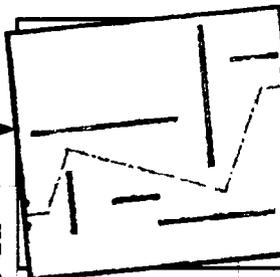
Organized patterns representative of controlled world

Performance Requirement #3

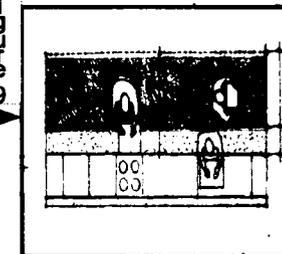
Human qualities should be used to balance the technological environment.



visual stimulation through colors and views



Mental stimulation through variety rather than rigidity of space



Physical stimulation through activity areas.

"noise in a system can cause it to reorganize at a higher level of complexity."

theory

"technology has radically altered the nature of the 'landscapes' in which we operate."¹⁰

goal # 2

Architecture should represent the **relationship** between boundaries of open systems.

Performance Requirement #1

Use analogies as representations of the communication. (Analogy is this communication in itself with one meaning embedded within another)



FIGURE 10



FIGURE 12



FIGURE 14

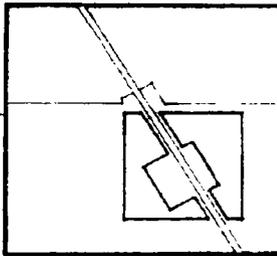


FIGURE 11

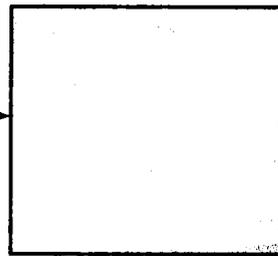


FIGURE 13

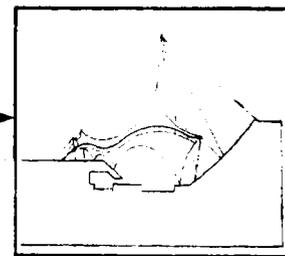


FIGURE 15

Spaces carved out of one another where the boundary between the two communicates and is accentuated

Varieties of colored light could be used to accentuate the boundaries and represent humans' technological interpretation of the perceived world

Representation of energy, through analogy, of the communication of systems. (Visually energetic forms simulating inertia.)

theory

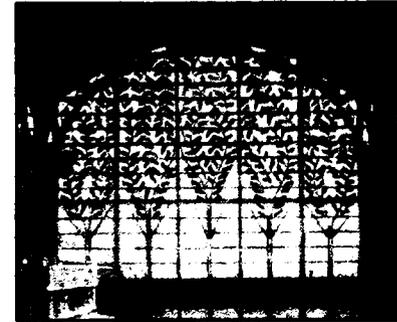
the idea of an analogy

The idea of analogy in cybernetics is a "powerful conceptual mode that constitutes meaning through relation."¹¹ The idea of meaning is important and acknowledgeable only to the human while the relation connects him/her to the machine, communicates between boundaries, and in doing so creates meaning. Thus, both sides are balanced through communication. The analogy also represents the theory in cybernetics of materialization and dematerialization and presence and absence.¹² This type of role-reversal suggests that the boundaries of one system may be present, but the boundaries may contain a representation of the other system.



This happens because of the dissolution between boundaries during communication. Because the "behavior of man is inseparably confounded with the mechanical portions of his environment,"¹³ the built environment can accentuate this paradox of tension and communication. Architecture in itself constitutes an analogy of humans' expression/meaning and functional responses of the mechanical realm. The use of analogy in the built world can become an expression of the two different but inseparable worlds.

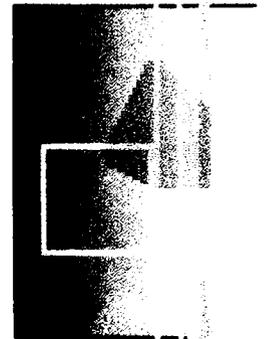
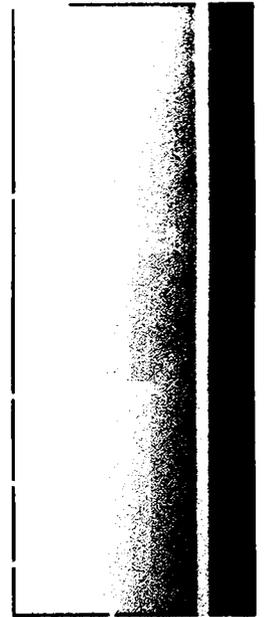
human technology
in an analogy
of the tree, but the
tree is



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theory case study



balance and communication of boundaries through an analogy of structure

human qualities as metaphors within a technological design firm

Vitra International Birsfelden, Switzerland Frank O. Gehry and associates

Vitra International is a furniture company located in Switzerland. The company wanted its new facility to acknowledge the essence of real life. A theme driving the design solutions was interaction. They believed this interaction was representative of a quality of living. This was in-

tegrated into the design through open bridges and links which represented connectivity. Interior areas were purposely connected to the exterior through views.

Another analogy was the concept of dichotomies becoming interactive expressions of the rational and the expressive, outgoing and internal. This idea was represented in the form of the building through a contrast between the expressive forms of the communal areas and the ra-

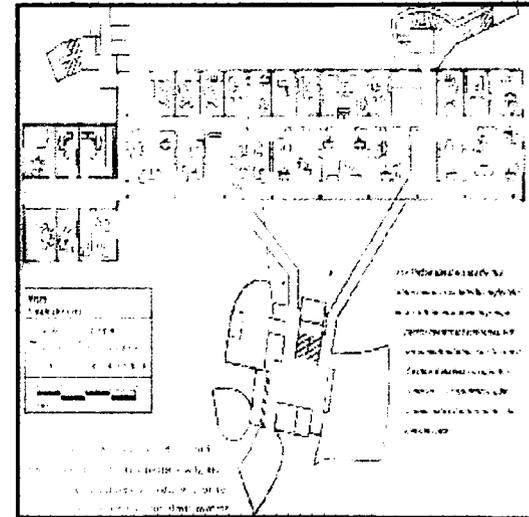
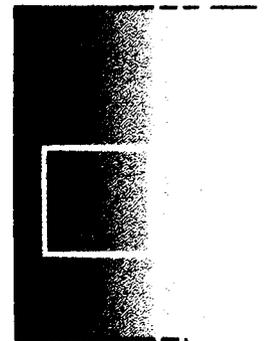
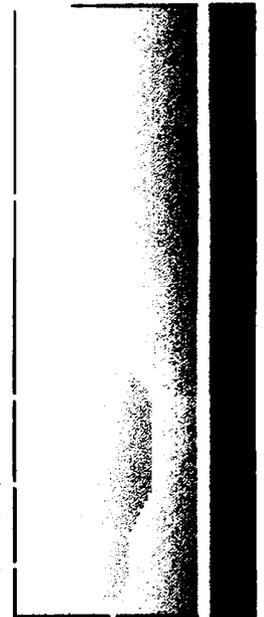


FIGURE 18



theory



tional forms of the open-plan. The office also represented this dichotomy between rational and expressive (machine and man) by suggesting that the rational constructs of a building could also replicate a variety of moods and a complex personality. This was also accomplished through expressive forms and a variety of brilliant colors. The company also represented the idea of communication between the balance of the two by allowing "alterations in the balance between open and cellular space." A goal of the facility was to present a "domestic informality" which was representative of family:



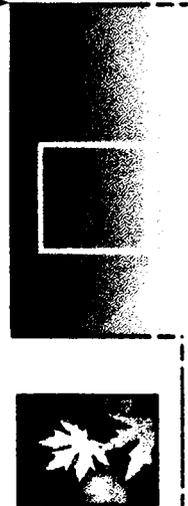
Another example of supporting integration and the human subject.¹⁴



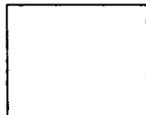
FIGURE 19



FIGURE 20



theory case study



balance and communication of boundaries through an analogy of structure.

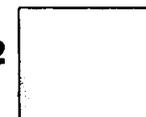
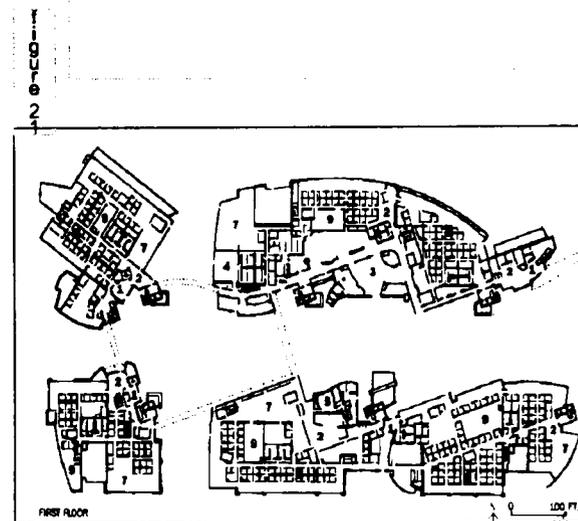
human qualities as metaphors within a technological design firm.

**Research Development
Headquarters: Silicon
Graphics, Mountain View,
Camona**

Studio Architecture

The research headquarters of Silicon Graphics is located in Silicon Valley. This location is also associated with an image of technological advancement. Though it is a highly innovative area, the architecture has represented purely machine-like attributes of the environment. Mass produced structures and seas of parking lots pervade the

area representing the dominance and influence of human's technology. Identification of the businesses has become a problem because of the mass-produced common-denominator. The buildings say nothing of the company and certainly nothing of the humans who work inside. The goal of the new headquarters was to create an environment that was "congenial and inspiring for its employees." A small scale was used for all of the four campus buildings. This was used to represent neighborhoods. A belief that smaller



theory



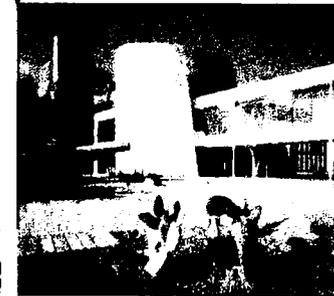
spaces and forms were more energetic was also a factor involving scale. These small neighborhoods were created to represent variety by taking on distinct personalities (representative of the human.) There was also a communication between private and communal space. The hard-walled private offices were placed in the center of the office plan so the majority of the workers in the communal areas could enjoy views to the exterior. This was another scheme to connect the worker with an expressive outer world and a rational internal world. Natural light enters the spaces through clerestories, and the walls of the private offices do not meet the ceiling (disintegration of boundaries) so the light can enter in. Pathways



are used to connect the workers of the different neighborhoods, and wild colors are used to create an air of fun that contrasts with the gray/beige colors of the computer workstations. Outdoor terraces are also used to connect the outside to the inside. Parking is located below the structure in order for the complex to have a sense of density and connection without a separating sea of parking lot. The driving force of the design was the desire of the company to represent the human side of this technological world through organization within and analogy throughout. A culture was to be represented through the design which expressed liberation and which encouraged exploration.¹⁵

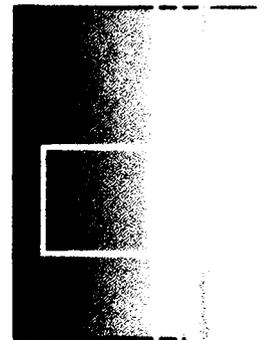
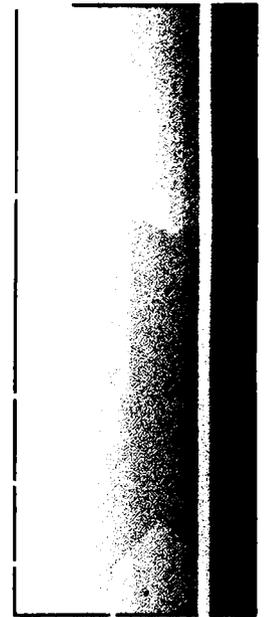


OUTER 22



OUTER 23

converging boundaries



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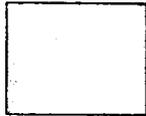
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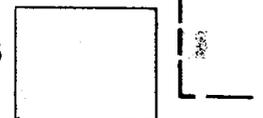
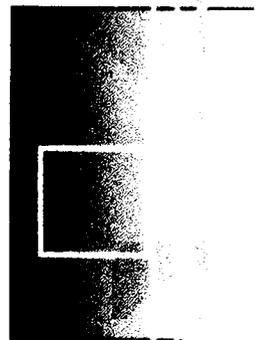
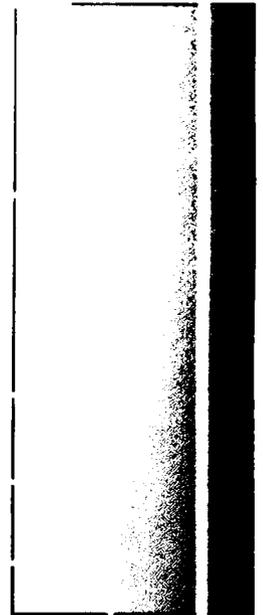
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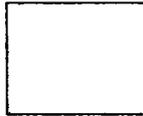
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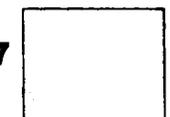
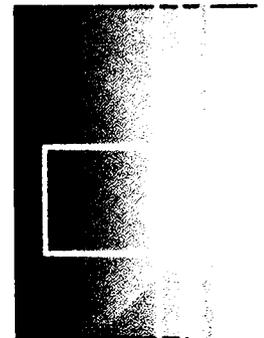
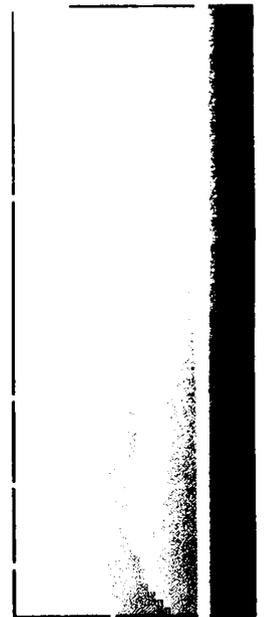
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f a c

l i t y



**offices
are not in-
formation
factories;
they are
exten-
sions of
the mind**



facility mis on

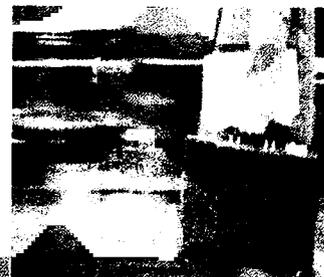


Over the years, the idea of working has changed drastically and technology has been the primary cause for a paradigm shift in the reality of working.² This shift has meant a freedom and a resource of information that seems almost unbelievable, but this shift has also raised many questions. Like a man's crutch, technology is important in aiding humanity, but the question becomes, can the crutch be leaned on so much, that one is unable to walk because of it. Tech-



nology is a wonderful aid as long as there is a balance between humanity's tool and the human factor itself. The facility becomes a technological and expressive response similar to the cybernetic tension of humans and machines or expressive and functional. The facility as workplace should become a mechanism that interprets this cybernetic balance, and in turn discovers a new, more productive way of working.

The Reality of Working



figures 1-3



facility



issue # 1

The “hardware” and “software” of workplace design.³ *Facility as a setting for converging boundaries.*

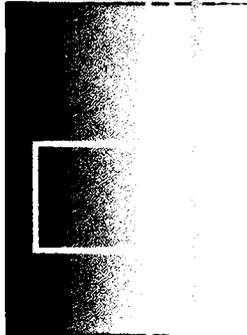
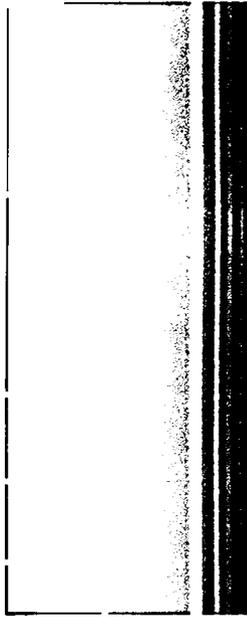
As humans become inherently merged with their technological creations, the workplace can symbolize the balance of boundaries and the two sides of humanity. The workplace can become a mediator between the inherent natural qualities/amenities (“soft”ware) and the technological nature (“hard”ware) of

humans. Because the workplace has been driven so long primarily by technology, the balance has been forfeited. Whether it is constantly working with a machine or working as a machine through workplace organization, many natural qualities have been neglected. Therefore, the workplace can be a setting for these converging boundaries both naturally and technologically.

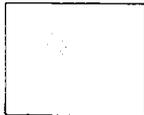
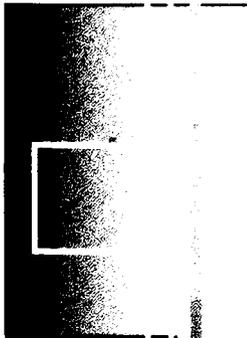
men working in mechanistic organization



figure 4



facility



Goal #1

The facility should become a mediator between outside and inside boundaries.

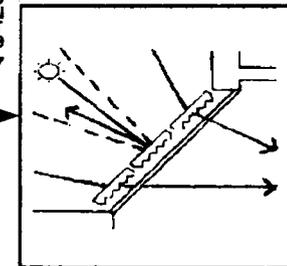
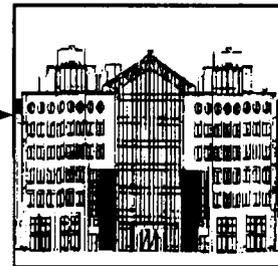
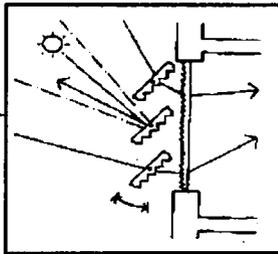
indirect natural light for computer illumination

atrium to funnel light throughout

clerestories

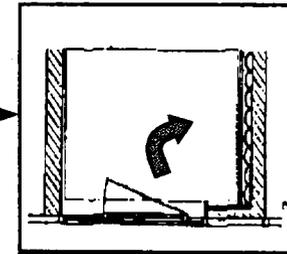
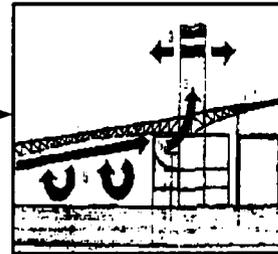
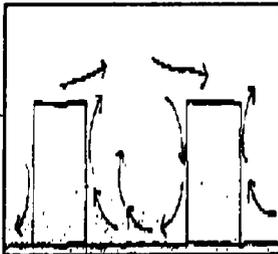
Performance Requirement #1

Natural light should be the source of more than 50% of the illumination.



Performance Requirement #2

Fresh air from outside the building should permeate the interior.



breezeways

convection

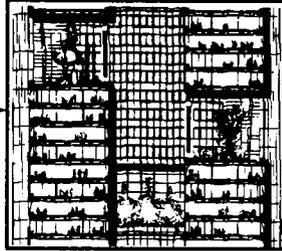
open windows

facility

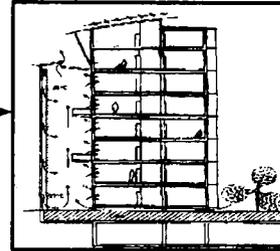


Performance Requirement #3

Green plants and flora should be integrated between inside and outside spaces.



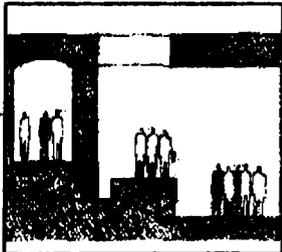
green spaces used throughout building at all levels



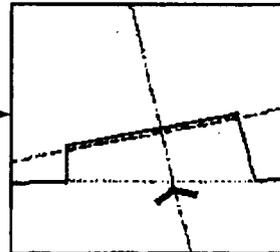
exterior connections should be accessed at all levels.

Performance Requirement #4

Outside spaces should help in the connectivity of the different possible segments of the complex.



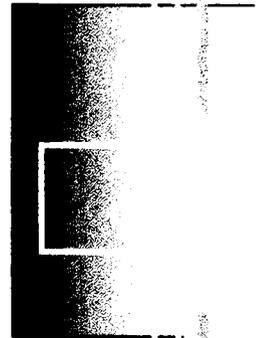
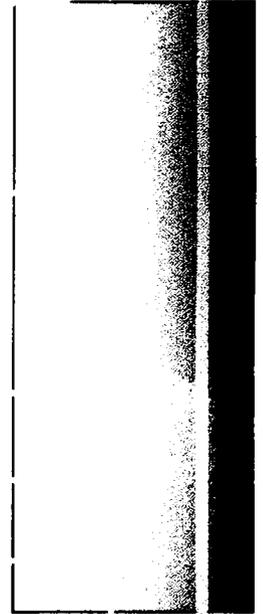
outside open pathways used to connect different portions of the complex



forms of the facility should represent the definite convergence

between outside and inside as one enters.

FIGURE 15



facility

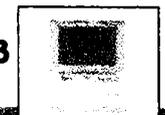
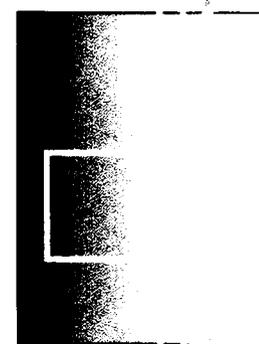
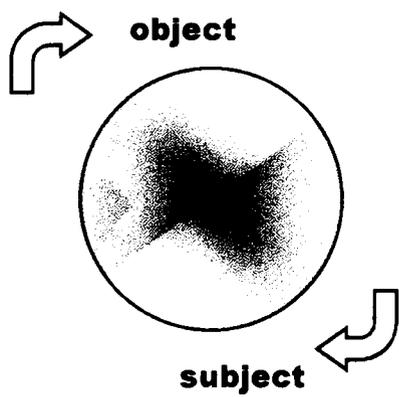


Issue # 2

Role Reversal in Converging Boundaries.

In cybernetics, there is a belief that in a human-machine system, there is a role reversal between the two.⁴ This role reversal consists of object to subject relationships. Many times the machine is the object subjected to the human's will, but there are also times when the human becomes subjected to the effects and changes the machine brings into existence. Since the workplace is the setting for this human-

machine interface, this role reversal can be applied to the facility at a larger scale.



facility



facility as subject

The facility should represent the subjective form of the system through its subjectivity to nature.

Goal #1

The building should use technologies and design responses that respond to nature emphasizing the subjective role of the human-machine system.

Performance Requirement #1

The facility should use environmentally responsive ways of cooling temperatures.

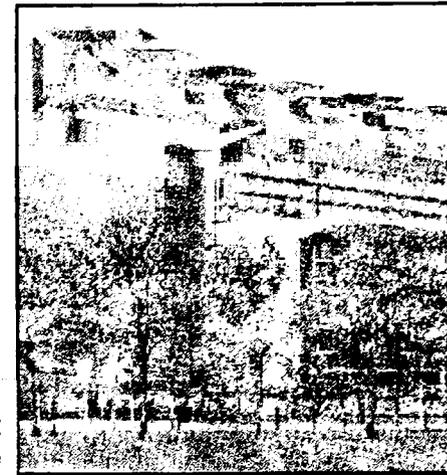
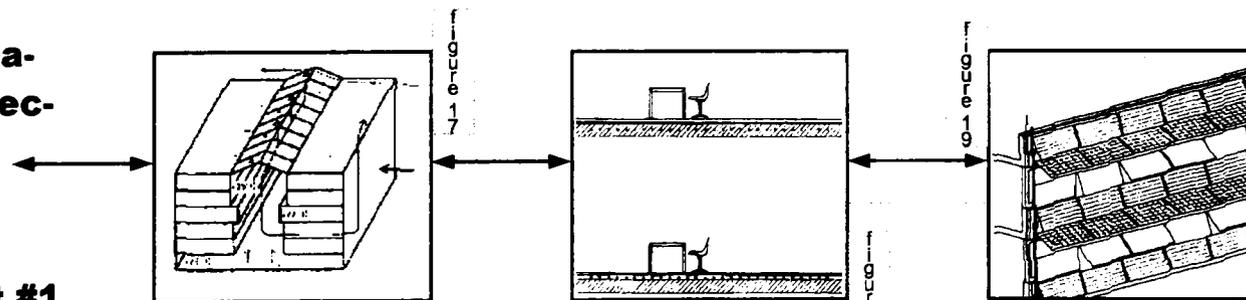


figure 16

Convection Towers pull air through the building



convection used to pull air through the building

water-cooled ceilings to circulate and cool the air

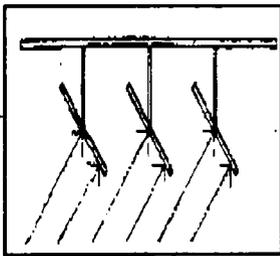
sunscreens or plants used to retard heat-gain into the building

facility



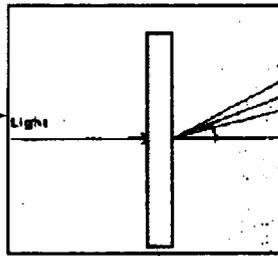
Performance Requirement #2

Use the building skin in response to nature.



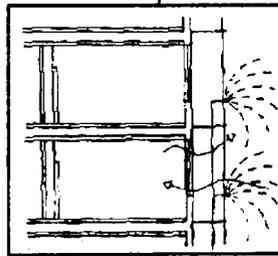
Use solar louvers (adjustable and permanent) to maximize natural light with minimal glare or heat-gain

figure 20



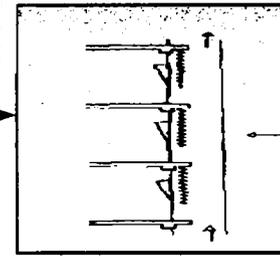
Use tinted glass to minimize heat gain

figure 21



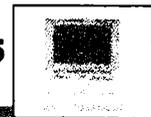
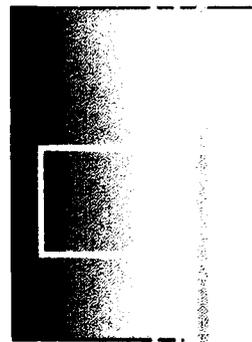
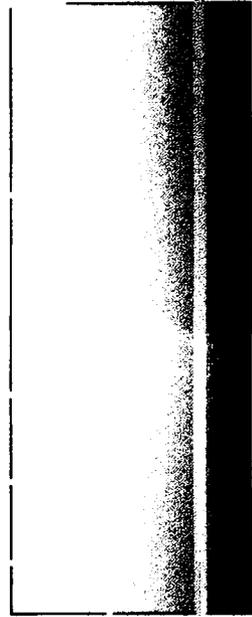
use direct water cooling on the exterior skin

figure 22

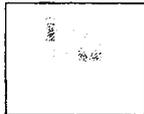


Use buffer zones within the skin to minimize heat-gain. Such as a second-skin facade.

figure 23



facility

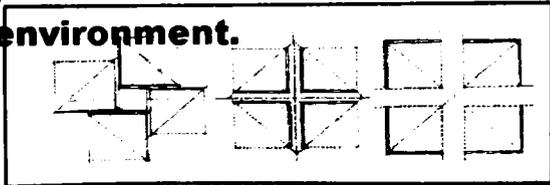


Facility as Object

The facility also represents the object which is humans' technological response to nature. The facility then subjects the human to changes. As a determinant of human behavior, the facility should optimize areas of flexibility rather than rigid boundaries with no regard to human integration.

Goal # 2

The facility should be flexible emphasizing the human subject in a machine dominated environment.



transformable space/ dissolution of boundaries



FIGURE 25

rigid space: Larkin Building Buffalo, New York

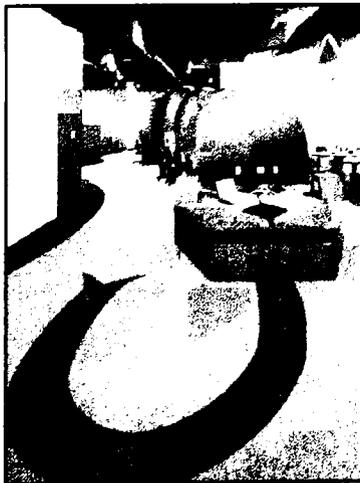
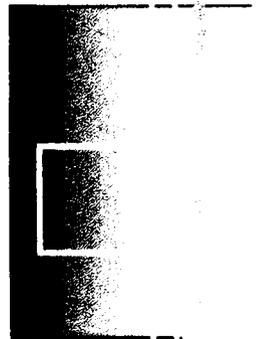
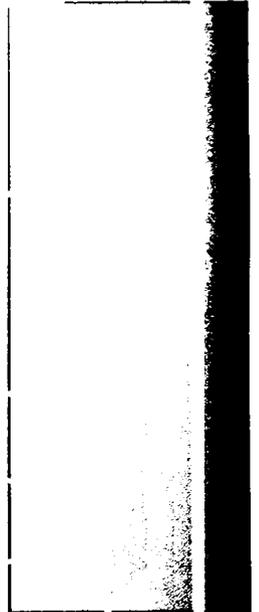
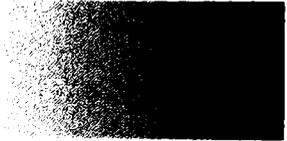


FIGURE 26

flexible space: Chiat/Day Advertising Dallas, Texas.

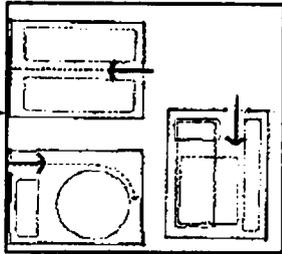


facility

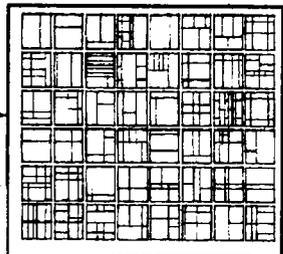


Performance Requirement #1

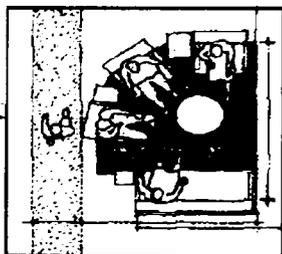
Facility should exercise spatial flexibility.



offer combinations and varieties of ways to carry out work

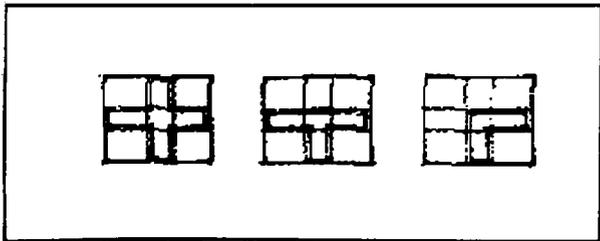


Spaces should be easily reconfigured and adjustable: modular

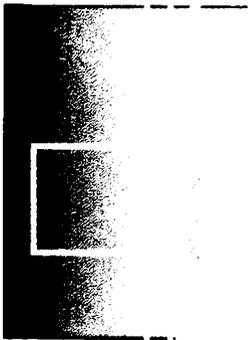
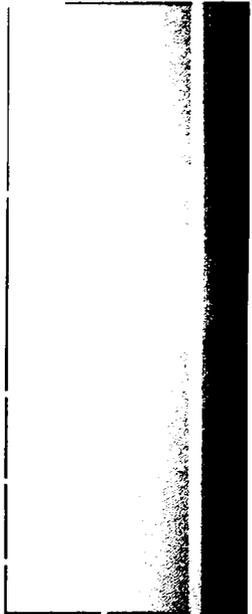


Spaces should represent flexibility through a domestic image rather than the "corporate" image of the past

Figure 27



transformable space/ dissolution of boundaries



facility



**adjustable
louvers: hu-
man control
of light and
privacy**

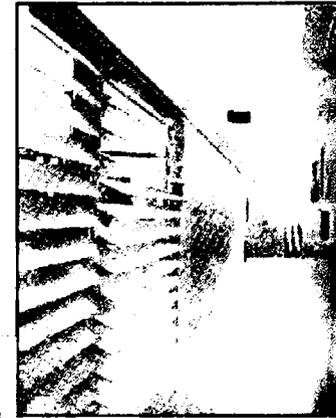


FIGURE 31

Performance Requirement #2

The facility should exercise environmental flexibility at the human scale.

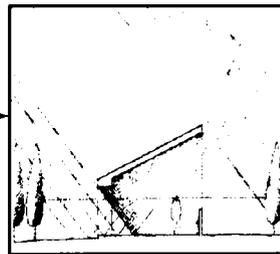


FIGURE 32

**Lighting
should be ad-
justable
through lou-
vers, curtains
or controls
available to
the user**

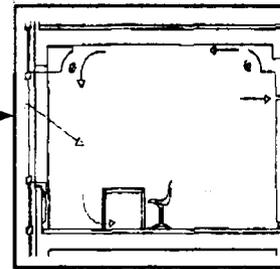


FIGURE 33

**Air should be
adjustable
through the
use of controls
or the ability
to open or
close fenestra-
tion**

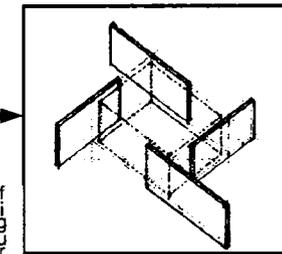
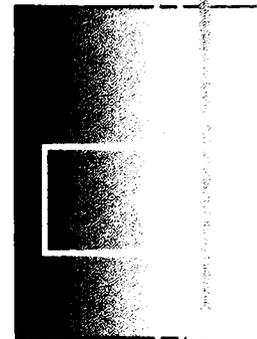
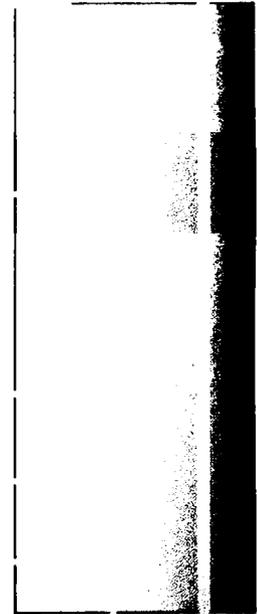


FIGURE 34

**Privacy and
visibility
should be con-
trolled by the
user through
adjustable par-
titions or orga-
nization pat-
terns**



facility case study



Flexible Space Chiat-Day New York, New York

Geatano Pesce/Pesce, Ltd. Chiat-Day is an advertising firm in New York. It has had a reputation of innovative organizational and working patterns. The firm believes in "resource architecture" which is a fusion between architecture and liberating technology. The structure of the New York office is not about rigidity, but about people working together in the most efficient way possible. This mindset results in a flexible architecture which they have renamed as "team architecture." This ap-

proach calls for communal spaces, and a use of the office based on need rather than requirement. The firm believes that any business including their own relies primarily on teamwork. Employees build their own work spaces within the office which is one-half open space. Activity areas are named according to themes and are used as cells or team-rooms. Studies are also available for people who need to work alone. Bright colors are used for visual stimulation in a continued attempt to allow the facility to affect the employees in a positive way. Instead of dominating, the facility subjects the workers to a flexible control.⁵

**flexible plan: Chiat/Day
New York.**

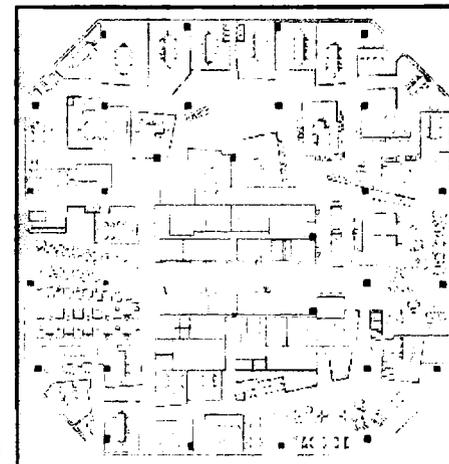
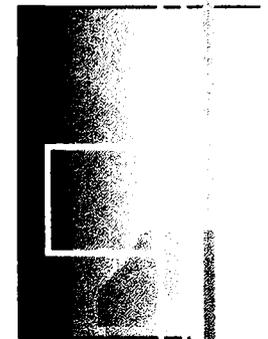
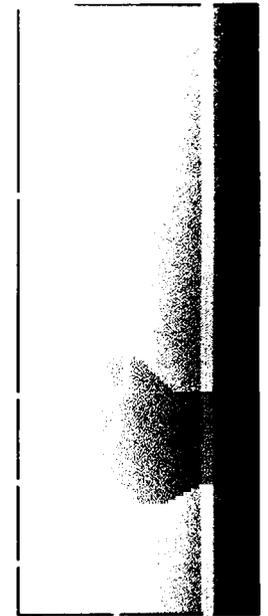


FIGURE 5



facility case study

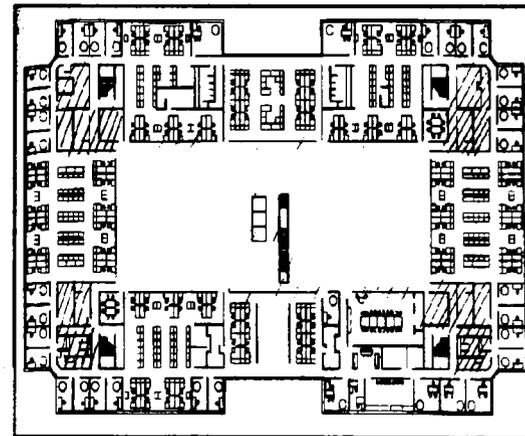
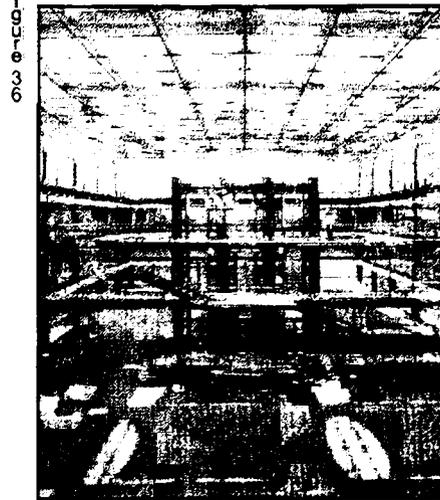


IBM United Kingdom: flexible space issues.

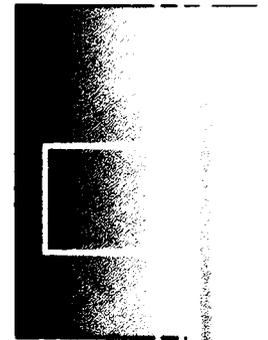
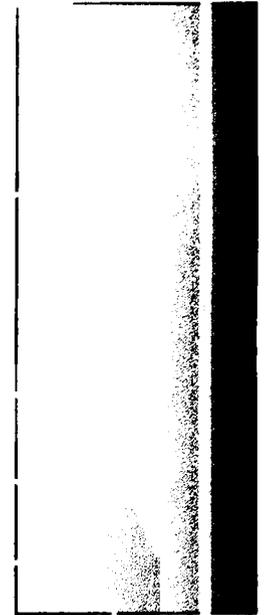
In 1989, IBM began to look for ways to create a campaign of downsizing, higher efficiency, and better time management. In an effort to cut waste, techniques were looked at considering the offices "were on average two-thirds empty."⁶ With this realization, and possibilities of new technologies, IBM was "one of the first attempts to conceptualize the office as a club."⁷ Employees came to the office in irregular patterns to catch up on work and news in the office. Shared work spaces were established which consisted a problem of privacy, and though the

office was intended for flexibility, the rigid nature of the organization discouraged it. Differences in emphasis and ways of working were emerging within a very dictated environment. The space and arrangement did not reflect the new working trends, or "express the excitement and novelty of the project as first conceived." IBM's principles of intensifying space-use" were an "aesthetic disgrace"⁸ dealing only with the functional aspects of the environment and disregarding the expressive.

open circulation space
IBM, United Kingdom



Rigid plan, open and cellular office space



facility case study

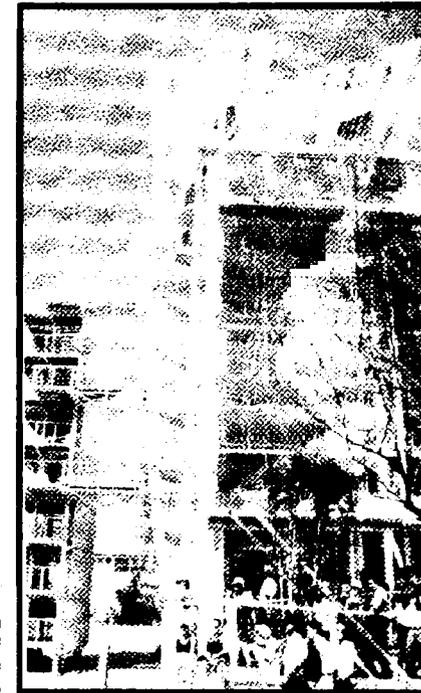


The British Pavilion, Seville, Spain

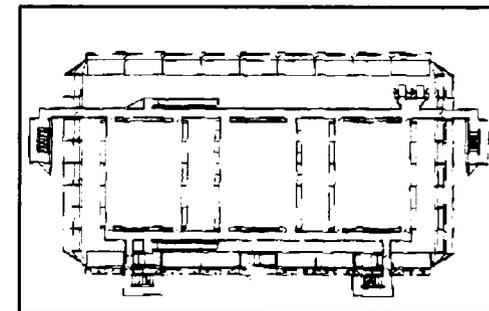
Nicholas Grimshaw

The British Pavilion by Nicholas Grimshaw consists of a unity between “high tech” and ecological concerns. The structure is like a giant “erector set” displaying technologies through a context of fast-pace and rapid change. The philosophy represented through the pavilion is that there is no separation between technology and architecture. The entrance represents this technology, but also communicates to the human boundary with a thin film of water to cool indoor and outdoor spaces. The water is

pumped back up by electricity produced by solar cells on the roof. Sunscreens which undulate are also on the roof to block the sun. Heat transfer is delayed on the West with thick walls. Within the skim of the building, these walls also contain water to store heat until outside temperature tanks become lower and then the heat is transferred and the water reverses positions. Expression and functionalism communicate through the building’s expressive technology. The Pavilion balances its reliance on technology by establishing a technology that is visually powerful crossing boundaries and allowing the technology to play two roles.⁹

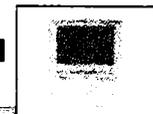
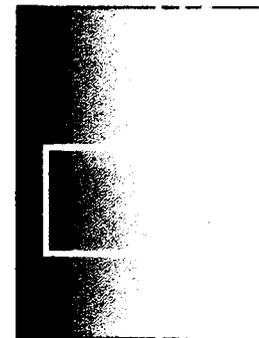


100638



plan, british pavilion

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activity space



arrival / orienting

Arrival to the employees should be a pleasant experience rather than an oppressive one. To be consistent with the theme of the new workplace, arrival should be an extension of the attitude of liberation and freedom of choice within.

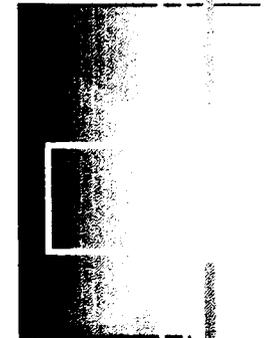
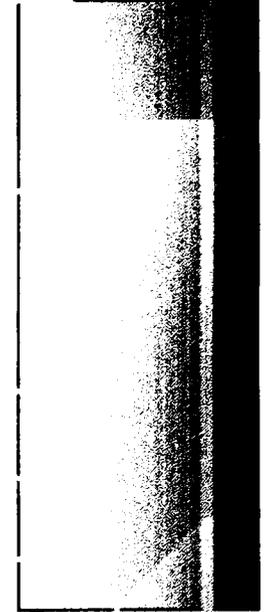
spatial quality

entrance:
The space should represent the anchor or balancing point between boundaries throughout the building. The entrance should use different scales to represent the transition from the natural world to the technological. Larger scales would represent the larger, inevitable world that is beyond human control, while the smaller scales would represent the controlled human world.

occupancy: ¹⁰
300
area:
5,000 ft.²
technological amenities:
scanning devices used for security
personal/communal:
arrival as an independent experience



adjacency diagram



activity spa

2

informing

informing employees is a vital part of organizational structure. Information can be sent over the Internet, but centers of information establish attitudes of community. It is important that this type of communication is clear throughout the workplace because many employees will not be present for the typical work-week and must be kept up-to-date of important information. Workers will be informed of meetings, group contests, high sales, rewards, and other activities.



spatial quality

information centers: Centers should be located throughout the complex that serve the purpose of informing the employees of new news in the office. These centers should be displayed in such a way that they are not ignored by the employees. Size, orientation, elevation should be factors in making the centers visible and noticeable.

occupancy:¹¹

5

area:
50 ft.²

technological amenities:

center could have electronic visuals, lights, or sounds.

personal/communal:

individual as well as groups will use the centers in an effort to find information.



activity spa

3



working

As technology advances and becomes more prevalent in the workplace, it seems that the old ways of working do not work well with the new possibilities of technology. Thus, the technology made by humans, is now altering human behavior and work-patterns. These work-patterns work with technology, but also work to establish areas where human qualities are discovered and put to use for good in the workplace. This ethic recognizes a variety of possibilities in which humans can work instead of treating the human workforce as only an extension of the lifeless machine.

spatial quality

office landscape:

The office landscape will have many different layers. There should be space for the individual worker, and spaces for collaborative teamwork, as well as spaces for periodic breaks. The office area should also provide a variety of different ways of working as an individual or as a team. The space should be a representation of the new work ethic and not representative of the cold corporations of the past. Colors, light, and other amenities should bring a life into the office that has not been prevalent for many years.¹²

occupancy:¹³

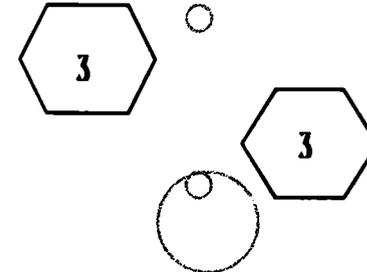
500 people per level

area:

30,000 ft.² per level

technological amenities:

space should have adequate plugins to support a variety of arrangements for the individual or group. In a group setting there should be at least opportunity for eight people to be plugged-in at the same time.



personal/communal:

individual as well as groups will use the working environment in different sizes and varieties of arrangements.

activity spa

4

relaxing/ relieving

Part of the new work ethic is to move away from the cold and rigid ways of the past. This means that management does not have to look over the employees' shoulders every minute. Relaxing and relieving stress is not separate from the workplace, but an integral part of its success. These added features allow more opportunities for employees to personalize the way they work while the company benefits as well.



spatial quality

The Office Club:¹⁴

This space should represent a club like setting where there are many activities to choose from. This space will have areas to work out, small cafes to talk and dine, as well as other activity rooms that may change periodically. This space should also help establish the "chance" social encounter, and should encourage mental as well as physical stimulation. This space represents a boundary between technological and human qualities and should be represented architecturally through orientation and placement.

occupancy:¹⁵

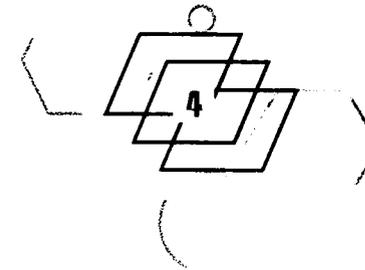
500

area:

5000 ft.²

technological amenities:

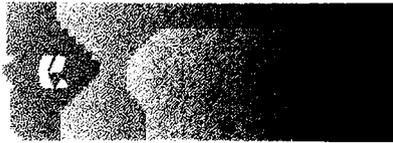
places to plug-in technological equipment throughout in the case someone wants to eat at the cafe and work on something from a laptop, etc. Reflectors should also be a part of the space so wireless equipment can also be used.



personal/communal:

individual spaces for relaxing/relieving as well as spaces for social groups and interaction should be integrated into the space.

activity spa



5



formal meeting

The office spaces will have many group meeting places for collaboration as the need arises. In the office, however, it will be necessary to have formal meeting places for even larger groups of employees called by management for the discussion of new additions or implementations. These formal meeting areas will also be used for the formal group training centers of new employees.

spatial quality

Conference room/ training center:

This space will be another space like the club area where a large number of people will be together trying to listen/discuss topics of the workplace. Since it is a more formal meeting place, the space should represent the seriousness and image of the workplace and its ethic. This is the meeting place where a community of the workplace is felt or established and perhaps even a sense of pride of the organization.

occupancy:¹⁶

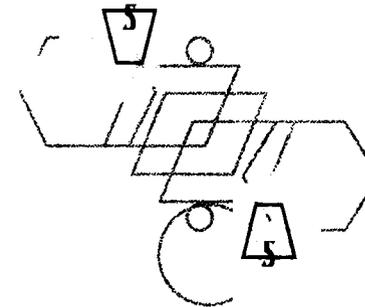
50 per room

area:

900 ft.²

technological amenities:

should be equipped for video-conferencing and for group meetings via the laptop computer. For the use as a training center, plugins for primary, secondary, and tertiary communication lines must be available.



personal/communal:

completely group oriented. This space begins the process of new employees working as a group or in a team.



activity spa

6

thinking contemplating privacy

Because much of the office space is oriented for teamwork, there is very little privacy for the individual either to have a discussion or just to be alone. Since this is also a vital human quality, it is necessary to have areas that give this privacy when it is needed

spatial quality

cells¹⁷ - privacy spaces
Privacy spaces should be located throughout the building for the use of the individual. The spaces could be private offices/team offices where reservations are made for the use of the room, or just-in-time offices used on a first-come first-served basis. Other private areas could be phone booths throughout the building or possibly outside links for individual contemplation. The spaces should have a scale and image fitting for an individual level of use

occupancy:¹⁸

5

area:

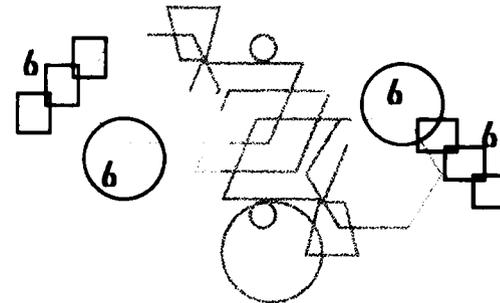
100 ft.² per space (about 20 spaces per level)

technological amenities:

places to plug-in and phone provided.

personal/communal:

used for the individual, but can be used for private conversations.



activity spa

7



circulation/ support

Circulation should be an activity that enriches the activities of the office. These areas should support conversation and foster social encounters.¹⁹

spatial quality

The circulation areas should represent the theme of the workplace: communication between boundaries. These areas are perfect metaphors for this communication since they "communicate" between levels. The connection should be visible and open with a great sense of connecting communities. Stairs or escalators should be used rather than elevators that discourage conversation. Restrooms should also be located near these areas and support similar qualities.

occupancy:²⁰

50

area:

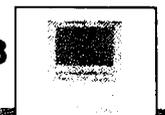
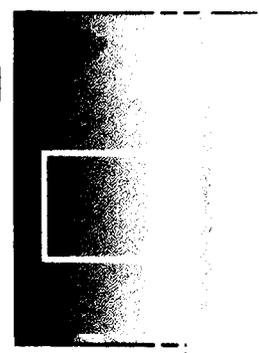
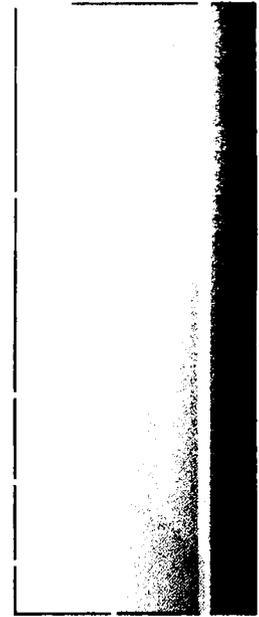
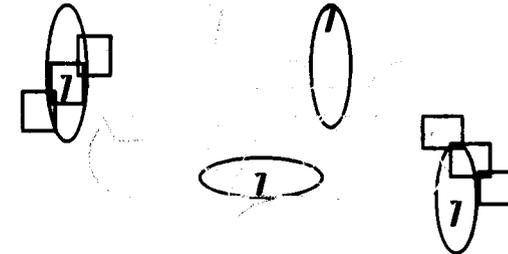
6000 ft.²

technological amenities:

escalators and elevators

personal/communal:

space represents the connection between communities within the workplace and fosters interaction in-between



activity spa

8

storing/ sharing

Storage throughout the complex will be very important in the use of shared workspaces. Storage will be integrated throughout the office landscape. There should be specific areas, however that store/house community amenities.



spatial quality

Storage/work center:
Located in close proximity to the offices, there should be a storage and work center. This area should be for miscellaneous storage for computer/work-related supplies as well as a work-center where employees can make copies, fax, or create and bind a document. This area can house more expensive technological devices that employees share rather than have personally.²¹

occupancy:²²

15

area:

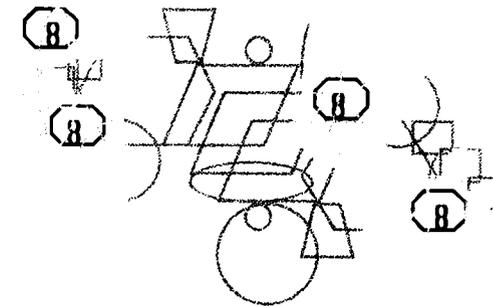
200 ft.² per space (4 per level)

technological amenities:

center could have technological devices that are shared by the employees.

personal/communal:

individuals or teams will be using the work areas together. It will be a communication space



activity space

9



Mechanical support

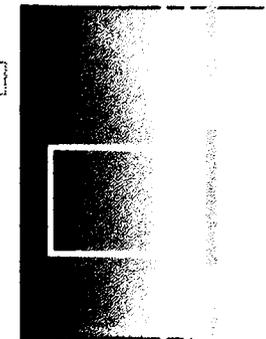
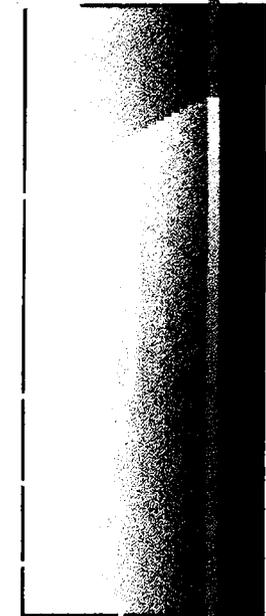
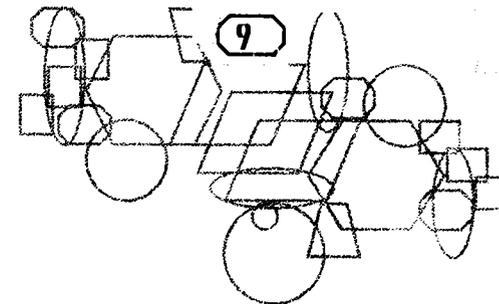
The mechanical areas of the complex do not house human activity, but it houses the "heart" of the facility. Without the space as a source of energy, the entire complex could not function. With this in mind, this source room illustrates the analogy of humans and their reliance on the technology they have created. It is also analogous with the human heart supporting many nerves/connectors for the function of the being. This illustrates the metaphor and balance of the boundaries between humans and technology.

spatial quality

Mechanical Systems:

The mechanical systems of the building such as HVAC, will be located outside. The building, however, will have a mechanical room that will serve as a the computer main-frame or server for the building. The space will be the source for communications either by phone or by computer. This space should not be accessible directly to the outside of the building due to security reasons, and it should not receive excessive amounts of daylight due to the heat already produced by the mechanical equipment.²³

occupancy:²⁴
5 people plus machinery
area:
200 ft.²
technological amenities:
security and extra cooling devices
personal/communal:
individuals will only use for maintenance.



summary s p a

The total usable square footage is 120,100 ft.².

The multi-use work space is divided in half. Even though 500 employees at 120ft.² per person would need 60,000 ft.², the space will be shared at a ratio of 2:1, cutting the space in half.

The Circulation is also considered a usable space in this office and is figured into the support space (#7). The circulation supports the theory of converging boundaries and interaction between people. Therefore, the circulation space is vital for the efficient use of a team-oriented office.

The total usable square footage (120,100) multiplied by the factor 1.2 for the structure will equal 144,120 ft.² for the gross square footage.

information derived from Francis Duffy and Kenneth Powell, The New Office (London: Conran Octopus, 1997).

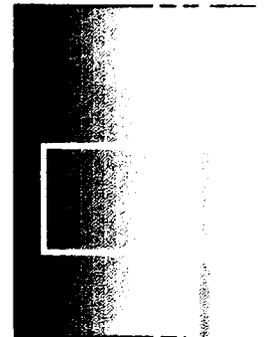
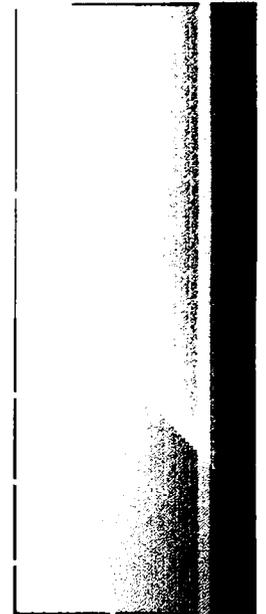
and Dodge Construction Cost Information System, McGraw-Hill Information System Company, 1986.

	space	# of users	ft ² / person	usable ft ²	quantity	total
1	entry/ lobby	300	17	5000	1	5000
2	information center	5	10	50	2	100
3	multi-use work space	500	120	<u>60,000</u> 2= 30,000	3	90,000
4	Office Club	500	10	5000	1	5000
5	Conference	50	18	900	6	5400
6	Private spaces	5	20	100	60	6000
7	support spaces/ toilet areas	50	40	2000	3	6000
8	storage/work center	15	13	200	12	2400
9	mechanical support	5 + machinery	40 - machinery	200	1	200

facility references



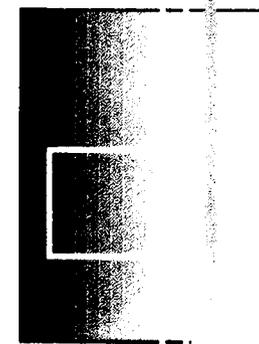
1. Marilyn Zelinsky, New Workplaces for New Workstyles (New York: McGraw-Hill, 1998), 31.
2. Ibid., 31
3. Francis Duffy and Kenneth Powell, The New Office (London: Conran Octopus, 1997).
4. Peter A. Hancock and Mark H. Chignell, "On Human Factors," in Global Perspectives on the Ecology of Human-Machine Systems, vol. 1, ed. John Flach et al. (New Jersey: Lawrence Erlbaum Associates, Publishers, 1995).
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6. Ibid., 190.
7. Ibid., 190.
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10. Duffy, 189
11. James A. Rappaport, Robert F. Cushman, and Karen Daroff, eds., Office Planning and Design Desk Reference (New York: John Wiley and Sons, Inc., 1992)
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facility references



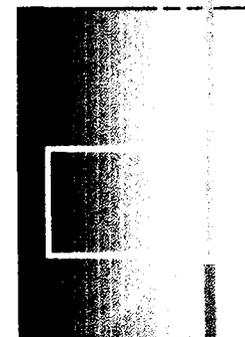
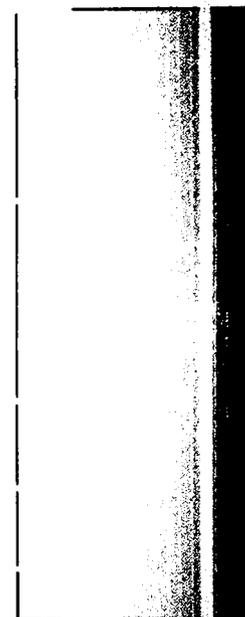
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21. Kelly Mathaney, Human Resources, Dell Computer Company, interview by author, Round Rock, Texas, 25 and 26 of September 1998.
22. Kelly Mathaney, Human Resources, Dell Computer Company, interview by author, Round Rock, Texas, 25 and 26 of September 1998.
23. John Moman, R. Gill and Associates, Project Manager of Dell Computer Headquarters, interviewed by author, Round Rock, Texas, 25 September, 1998.



facility list of figures



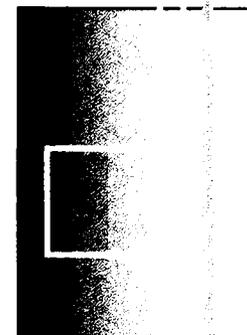
- 1-3. Microsoft Publisher 1997, *Picture Files of Working*.
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6. *Atrium*. Ibid.,170.
7. *Cleresories*. Ibid., 150.
8. *Breezeways*. Ibid.,76.
9. *Convection*. Ibid., 89.
10. *Open Windows*. Ibid., 138.
11. *Green Spaces Throughout Building*. Ibid.,91.
12. *Exterior Connections*. Ibid., 235.
13. *Open Circulation*. Francis D.K. Ching, Architecture Form, Space, and Order, Second Edition, (New York: Van Nostrand Reinhold, 1996), 269.
14. *Outside/Inside Forms Conversing*. Ibid., 238.
15. *Converging Boundaries*. Ibid., 260.
16. *Convection Towers*. Duffy, 88.
17. *Convection Diagram*. Daniels, 173.
18. *Water-chilled Ceilings*. Ibid., 231.
19. *Sunscreens*. Ibid., 159.



facility list of figures



20. ***Sun Louvers.*** Ibid., 147.
21. ***Tinted Glass.*** Ibid., 143.
22. ***Buffer Zones Within Skin.*** Ibid., 159.
23. ***Water Chilled Exterior.*** Ibid., 235.
24. ***Example of Transformation.*** Ching, 321.
25. ***Larkin Building.*** Duffy, 25.
26. ***Chlat/Day Dallas.*** Zelinsky, 107.
27. ***Example of Transformation.*** Ching, 321.
28. ***Combinations of Work Situations.*** Ching, 239.
29. ***Modular Space.*** Ibid., 304.
30. ***Domestic Workspace.*** Ching, 239.
31. ***Adjustable Louvers.*** Duffy, 100.
32. ***Adjustable Lighting.*** Ching, 172.
33. ***Adjustable Air.*** Daniels, 130.
34. ***Adjustable Partitions.*** Ching, 169.
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context



**It's a foolish
thing for a
society to
cling to old
ideas in new
times as it is
for a grown
man to
squeeze into
the clothes
of his youth.**

Thomas Jefferson



context



The Brave New World

The dawning of this new technological era has inevitably created a paradigm shift in the way humans live and work. It is not only the technology that has created this shift, but a change in the way humans respond to this new context. The technological quest in the past has been obscured with humans' love for their own product, and their willingness to give technology *carte blanche* and automatic approval with little regard to effects on themselves.¹ For years humans have handed over the care-taking role of the human-machine system to the machine represented in machine-like structures, machine-like organizations, and even machine-like approaches to living. This pursuit has aided this schizophrenic



society in a feeling of numbness, of muted life, and insignificance.² The search for significance and individualism has only lead to isolation, and the reliance on technology as the caretaker has only led to an imbalance between man and machine creating a closed system unable to advance. It is with this background, that the contextual approaches to technology are presently being reconsidered. It has been discovered that not only the technology of humans is need for their advancement, but technology in the context of an appropriate use involving the human. It is this appropriate context that is necessary for a cybernetic balance within the current technological state.



1-0-0-0



context



"I only Work Here" The changing context of the Workplace.

For years, the workplace has been under the dominance of the machine. Organization of workers has been based on the premise of mass-production. Set times, set ways of working, sitting, resting, dressing, etc. all constitute the lack of human control in the environment, and the disregard for many aspects of life.³ Workers became the adaptable and submissive subject in the machine-oriented environment.

Presently, technology has created a new context requiring a human response. New possibilities within this shift release many of the dominating factors



of the workplace through a concentration on the human being. Relationships and communication are being established between employees as well as employees and machines. Unlike the rigidity and definition of the boundary between humans and machines of previous workplaces, this alternative way of working merges the boundaries between the two, optimizing many new possibilities. The new workplace uses technology as an appropriate and vital tool, but has changed its contextual response to keep the system balanced. Rather than the pursuit of the individual through isolation, the new workplace "merges the power of the individual with groups and communities" to foster advancement.⁴

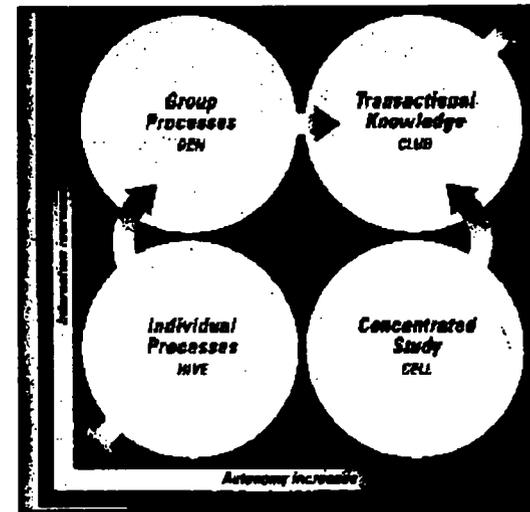


diagram of work processes based on individual and group

1-6-82



context



Submissive employees of the past are replaced with employees who are in control of the way they work. This approach to working "acknowledges diversity as a human quality and uses it as a resource."⁵ The passive the human in the human-n system is replaced with elements which engage action and a sense of involvement. The human in this new context is recognized and is strengthened through physical and emotional stimulation leveling the simultaneous reliance on technology. Thus, the new workplace balances the humanization of nature with a naturalization of humans⁶ through a qualitative use of strengths, reliance and life-giving/enhancing foci.



1
9
6
3

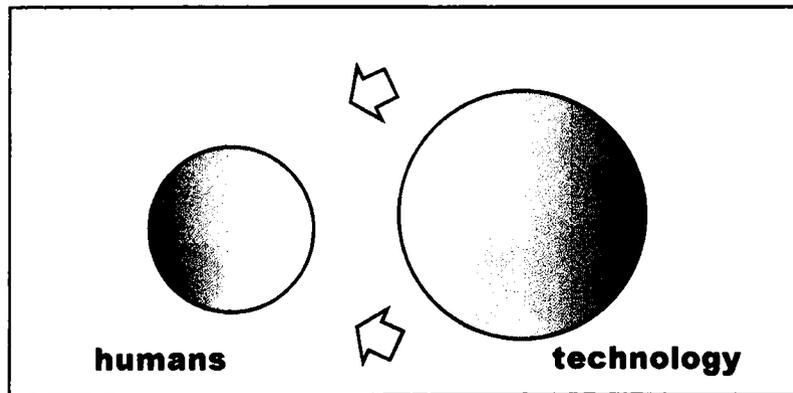
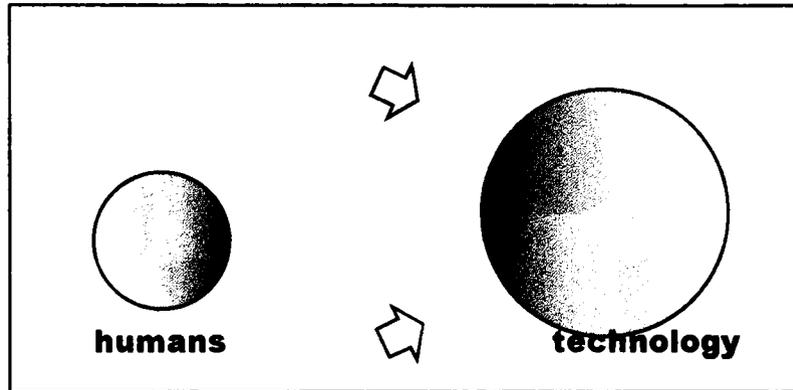


context



issue

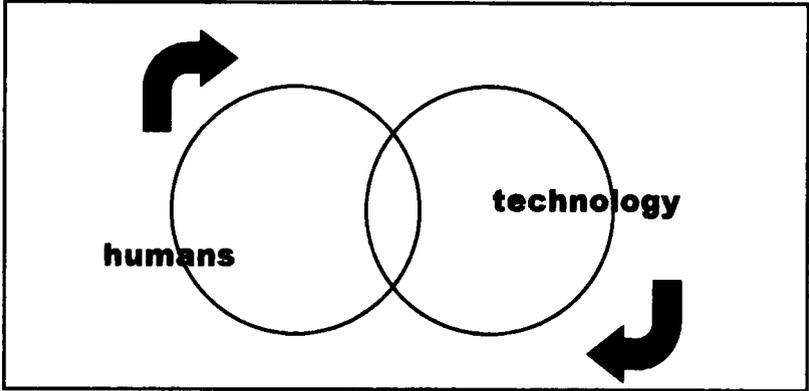
Because the workplace has primarily focused on technology and the machine in the past, there has been a split in the boundaries between the cybernetic system. Human psychological and cultural factors have been neglected while technology became increasingly separate and dominate simultaneously. Without the balance, the system is closed. In order to relinquish this balance, emphasis on human factors must be kept in the forefront. This creates a new context consisting of new technologies and more importantly new ways of using them.



context



With emphasis on the human in the workplace, the balance can be reestablished. In essence, the humanization of nature merged with the naturalization of humans including a sense of control and acknowledgement of life.



context

informatics

a term in cybernetics describing the technologies of information as well as the biological, social, linguistic, and cultural changes that initiate, accompany, and complicate their development.⁷



context



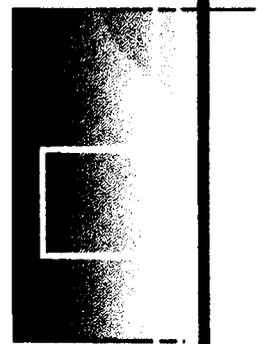
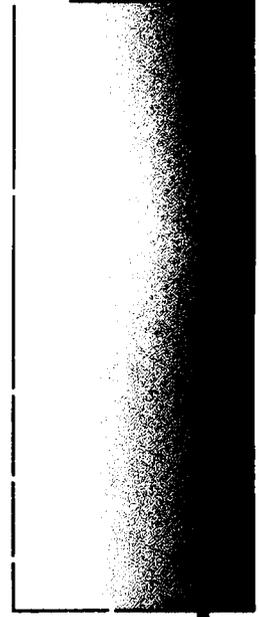
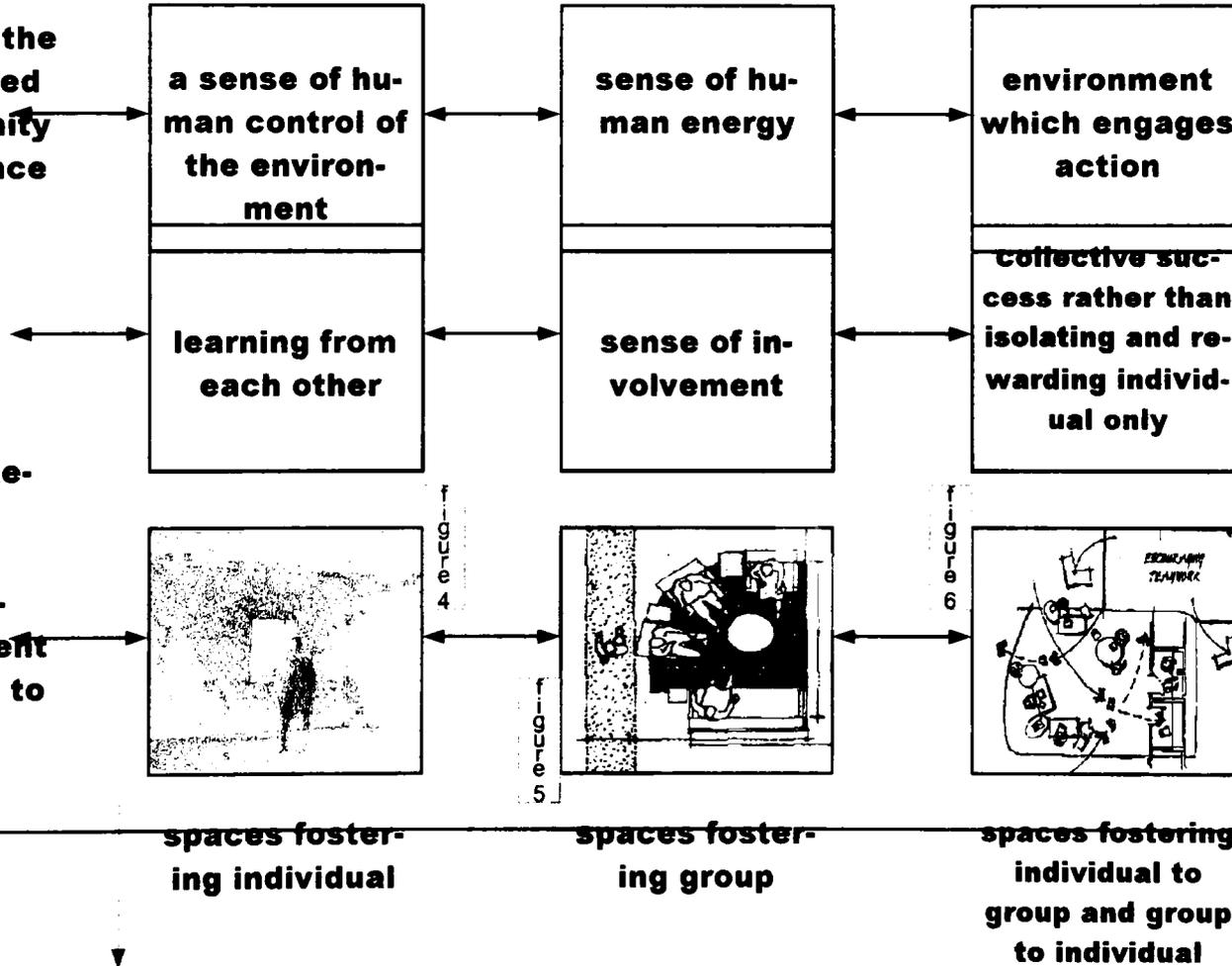
goal # 1

Within the new context, use the power of the individual merged with the strength of community to reinforce the human balance in the workplace.

Human Emphasis:

Architectural Performance Requirement #1

Use space to foster and reinforce human acknowledgement and involvement in response to the new context.



context



goal # 2

the possibilities of a synergistic workplace.

The effects of a new context within the workplace relies on the synergistic successes of the systems within (particularly human-human/nature and human to technology.) This concept involves several driving forces within this new context working together to complete an entire new system driving the workplace. This approach is needed in order to balance and complete the cycle towards advancement. With the system balanced between humans and technology, the capacity to move forward and look into the future is extended; the definition of a learning organization.

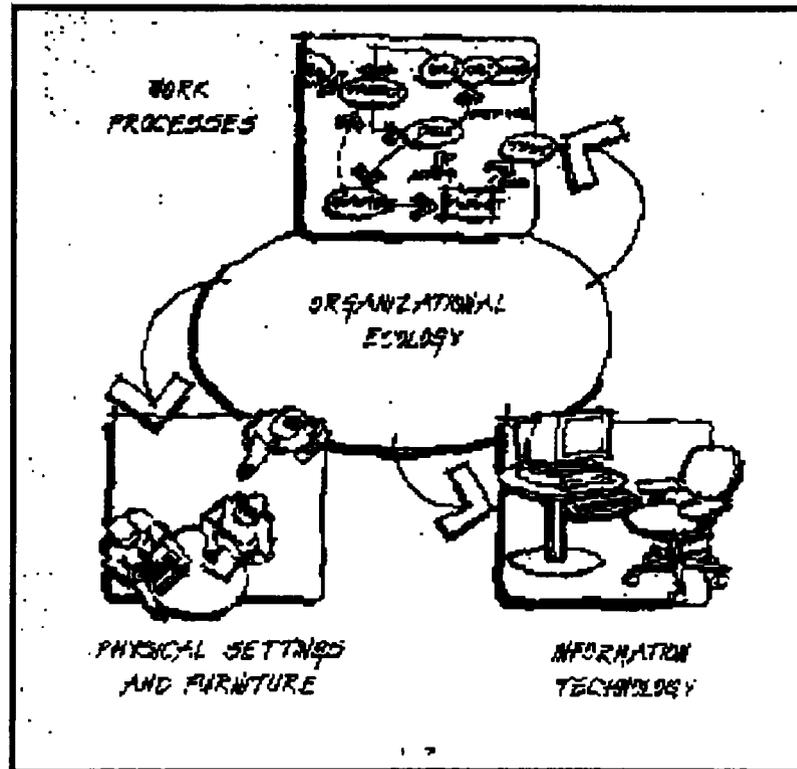


diagram of the "total workplace"



context



the synergistic workplace

how

when

where

why

**interactive
office
environment**

**immediacy-
immediately**

**convenience:
where it is
most
appropriate**

**paradigm shift in
communication
and balance be-
tween humans
and technology**



context



the synergistic workplace

how: interactive office
information sharing-giving

individual-concentrated

collaborative-plural

removal of hierarchy

as a learning organization, employees learn about themselves of the company would die.

exploration

freedom/choices

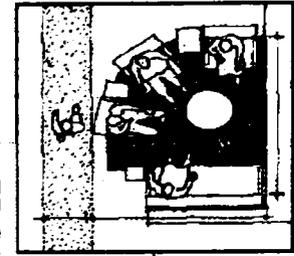
architectural implications

Performance Requirement #1

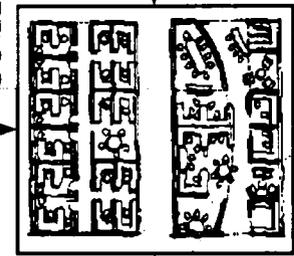
Spaces should encourage teamwork and provide choices to allow the employee to work within his/her best environment.

Performance Requirement #2

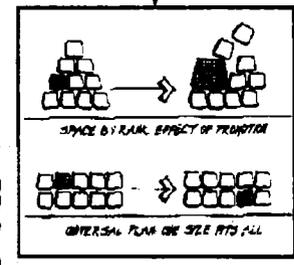
Space should be non-hierarchical and should promote interaction.



spaces which encourage teamwork



hierarchical vs. team organization



hierarchical vs. team organization

cybernetic term⁸

randomness | pattern



context



the synergistic workplace

when: immediately

instant solutions demand instantaneous working environment

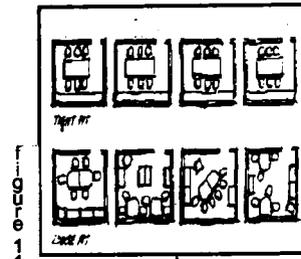
instant solutions mean a removal of hierarchy and red tape

change must be accommodated quickly

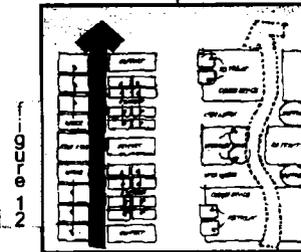
architectural implications

Performance Requirement #3

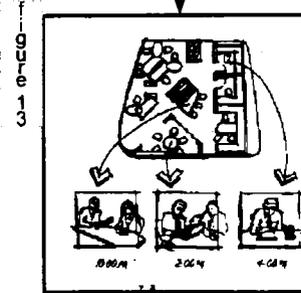
Space should define limits of structure that is also flexible. (Permeable Boundaries).



tight-fit vs. loose-fit design



rigid vs. permeable circulation boundaries



spaces that allow workers to use them at different times

cybernetic term⁹

context



the synergistic workplace

where: where it is appropriate
eliminating/converging boundaries
where people work

workplace mobility- work becomes home and home becomes work

through technology workers come in one to five days a week.

workspaces are shared/reserved

space decreases - cost goes down

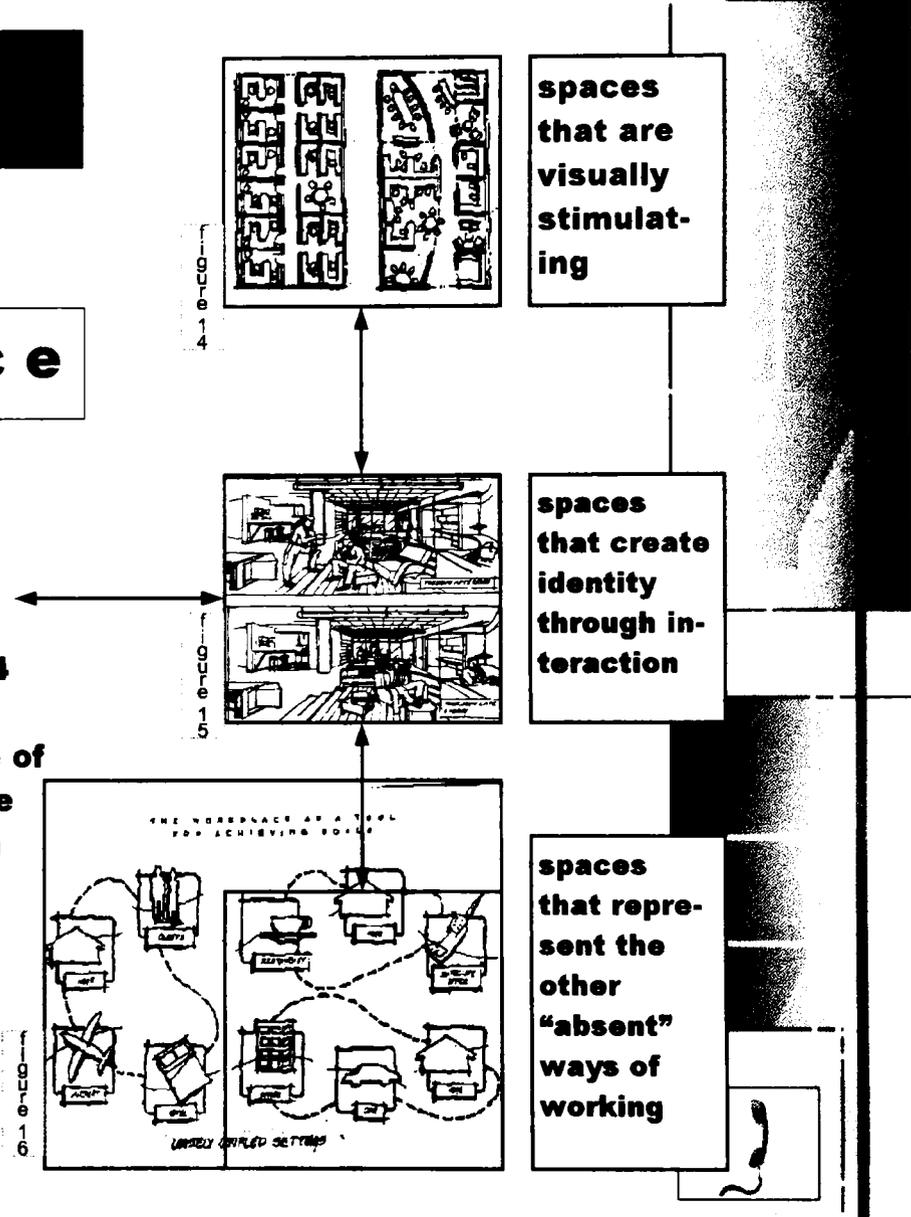
time is spent out of the office with client.

cybernetic term¹⁰

architectural implications

Performance Requirement #4

Space should create a sense of identity (presence) within the converging boundaries and a shared environment.



presence | absence



context site analysis

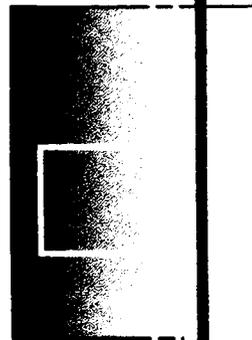
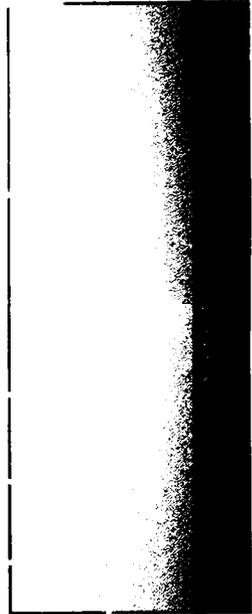
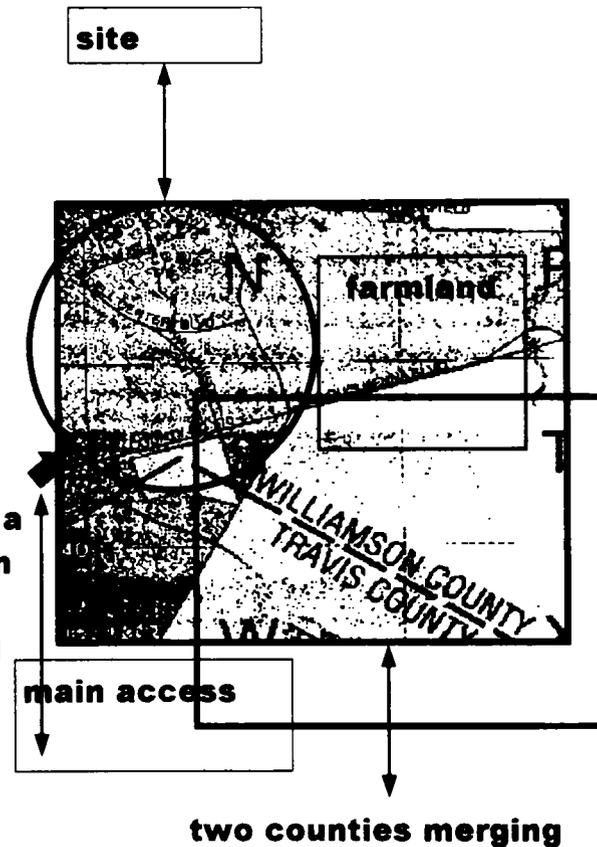


Converging boundaries in the built and natural world.

The site in Round Rock, Texas represents an area where many boundaries are converging at different scales. The communication with the cities of Austin and Round Rock represents an area where two boundaries are becoming closer. The site also communicates between two boundaries because it is on the dividing line between Travis and Williamson counties. Boundaries at the city scale are also defined because the site is an area where the city of Round Rock is extending East into a rural area which used to be farm land. Thus, the balance between rural and urban contexts should be es-



tablished. A divider between these two worlds is physically manifested in a canyon. The canyon separates the site from much of the new development that includes a Wal-Mart and several other eating/shopping establishments. This definite boundary is an analogy of the idea of boundaries and makes the idea of balance more dramatic because the boundary is a drop-off. A communication with the newly built area across the canyon should be made as well as a balance at that distinct boundary. The third boundary communication and balance is that of human's technological world and the rural (natural) elements of the site. Because the only transportation to work for the employees is by car, the site



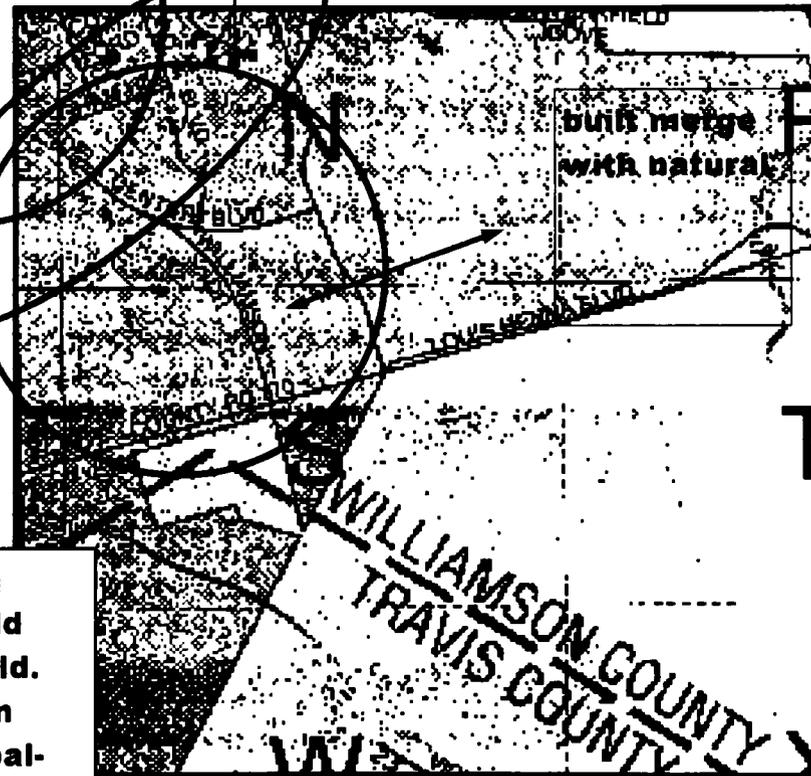
context

must balance the idea of the car with the natural amenities of the site. Parking should be established in a way that the natural environment is not covered by a sea of parking lot, but is integrated into the site for the convenience and safety of the employee. The site also has three roads that converge which also illustrate the idea of boundaries. These roads as boundaries divide the site in three portions. These divisions should communicate rather than separate the area.

canyon merging newly built world and natural world. Site becomes an analogy of the balance between the two.

streets converging

built merge with natural



context case study



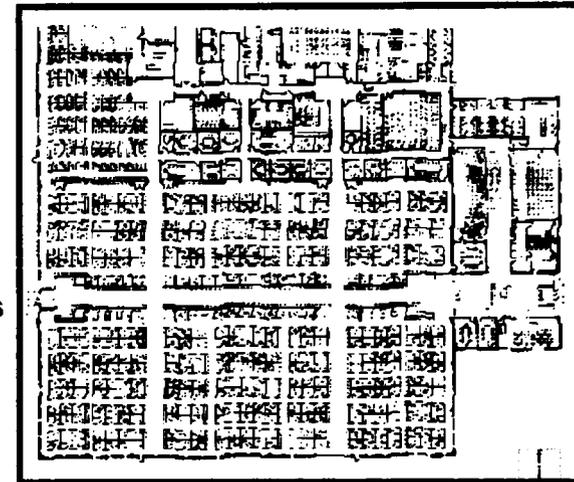
IBM Cranford, New Jersey

Shared office space.

IBM's Cranford office in New Jersey is open 24 hours a day, but it is rare that all the desks are full at any given time because every employee works when it is best for him/her. In, 1983 the company's stocks fell significantly and something had to be changed regarding the way the company was running. The company was far too hierarchical for the context of changing technology, and it took far too long to get anything done or approved in the ever increasing fast-paced arena. Therefore, the office took a non-hierarchical approach to its organization, and one of its



goals was to keep the employees out of the office the majority of the time in order to put more emphasis on the customer. The answer became: cut all real estate in half. The office appears austere, but it is used only for employees once or twice a week. It houses 222 non-dedicated desks and the cost was only \$10 a square foot. This type of change was one of the first responses to a changing context. IBM's example dealt primarily with the issue of absence. Balanced with the idea of presence, the boundaries would be balanced in a cybernetic environment.¹¹



11-0-7



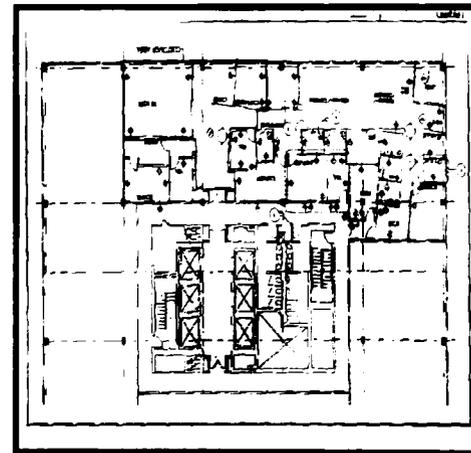
context case study

Tandem Computers: Cincinnati, Ohio Responding to a context of change

Tandem Computer company knew that a response to technological advances was necessary. The company realized that the once oppressive nature of technology and mechanistic organization had to be balanced with the possibilities of technology which liberated. Real estate was costing the company in dollars and productivity, so new changes were set into motion after Tandem researched the possibilities of the "office of the future." Tandem realized that spaces could be shared, and a non-territorial, non-hierarchical office form

could be implemented, but the company also realized that this could not be the only model. Even though many workers could work this way, evidence from their research showed that other employees needed the workplace in order to get their jobs done properly. These employees needed a desk and a sense of ownership. Therefore, the group that was typically out of the office 70% of the time were called "runners," and three runners typically shared one desk. The "sitters" were those in the office the majority of the time who would receive a dedicated workstation at a ration of 1:1. Within one envelope, a variety of multi-task spaces blended with multi-use patterns blurred the line between space and activity.¹²

private cubicles (cockpit offices) at Tandem merged with activity area for multi-use pat-



plan showing the convergence of private and communal areas.

context references



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2. Ibid., 25.
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4. Edwin Schlossberg, Interactive Excellence (New York: The Ballantine Publishing Group, 1998).
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7. Katherine Hayles, "Virtual Bodies and Flickering Signifiers." (3/15) [cited 16 September 1998]; <http://englishwww.humnet.ucla.edu/Individuals/Hayles/Flick.htm>; Internet.
8. Ibid., (2/15).
9. Ibid., (2/15).
10. Ibid., (2/15).
11. Zelinsky, 80.
12. Ibid., 219.



context list of figures



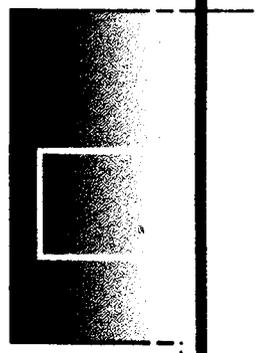
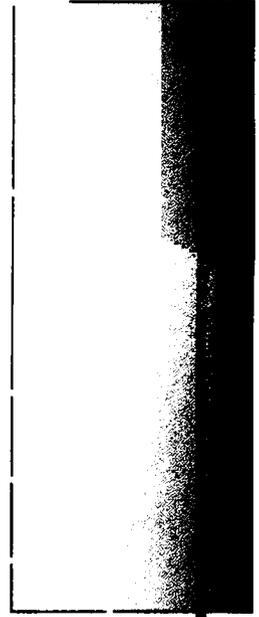
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3. *Mural of Converging Boundaries.* Charles Linn, "Ceasar Pelli's New Passenger Airport in Washington, D.C, Eases the Life of the World-Weary Traveler," Architectural Record, October 1997, 94.
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9. *Hierarchical to Team.* Becker, 40.
10. *Hierarchical to Team.* Ibid., 34.
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12. *Rigid/Permeable Circulation.* Ibid., 80.
13. *Space Used at Different Times.* Ibid.,73.
14. *Visually Stimulating Space.* Ibid., 40.
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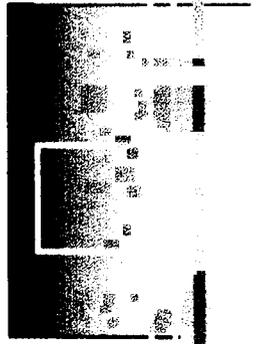
context list of figures



- 16. Representing "absent" Ways of Working. Ibid., 110.**
- 17. IBM Cranford Plan. Zelinsky, 80.**
- 18. Tandem cock-pit office. Ibid., 218.**
- 19. Tandem Plan. Ibid., 219.**



product pro



65

product

process

schematics

fall 1998

figure 1
parti 1

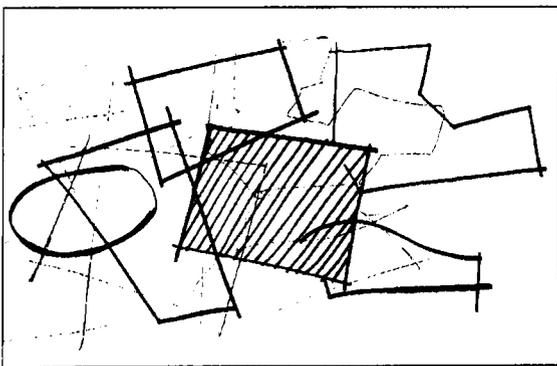
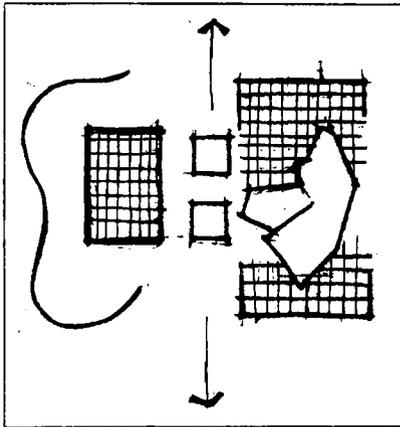


figure 3
parti 2

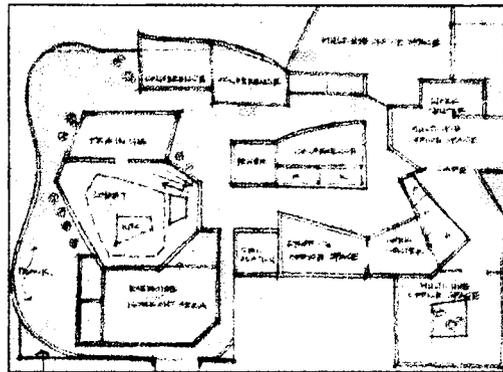


figure 2 - parti 1

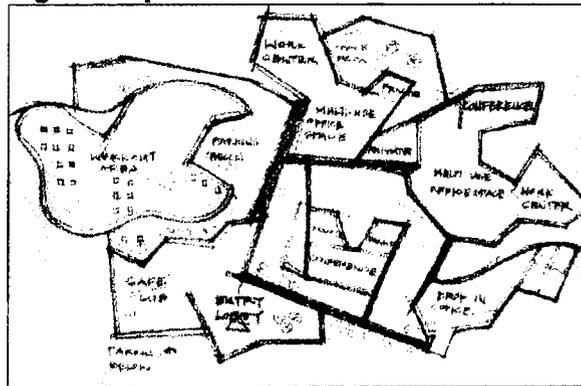


figure 4
parti 4

parti 1- fall 1998

This first parti diagram and schematic plan represented randomness surrounding pattern and pattern surrounding randomness. This was meant to suggest that one dwells within the other, and the fine line between the two is represented in the diagram by the central point where the two converge, and chaos becomes order or visa versa. The schematic plan of the diagram suggested a parking structure below the main lobby (on the left), where entry would involve rising from the ground level. The circulation was colored tan and was to be on the exterior of the structures.

parti 2- 1998

The second parti diagram was a representation of what appeared to be chaos. This was used to suggest that even in what appears to be random, there is some order, and pattern.

product process

parti 3- fall 1998

In the schematic plan, the tan represents outdoor circulation that surrounds a common meeting place where employees would check-in and then disperse to their choice of work environments. The left side of the complex would be primarily public, with social functions such as the gym and cafe, while the right gradually changed into a more private work environment.

The third parti diagram represented a gradual transformation of order to chaos and suggested that the two are interchangeable. This diagram became a space metaphor for Norbert Wiener's ideas about human-machine systems where humans were considered the more random/chaotic beings because of emotions and their psyche while the machine was the ordered and patterned piece of the system. Wiener suggested that it was where the two boundaries met that one side could instruct the other and the two dichotomies of the system could be interchangeable.

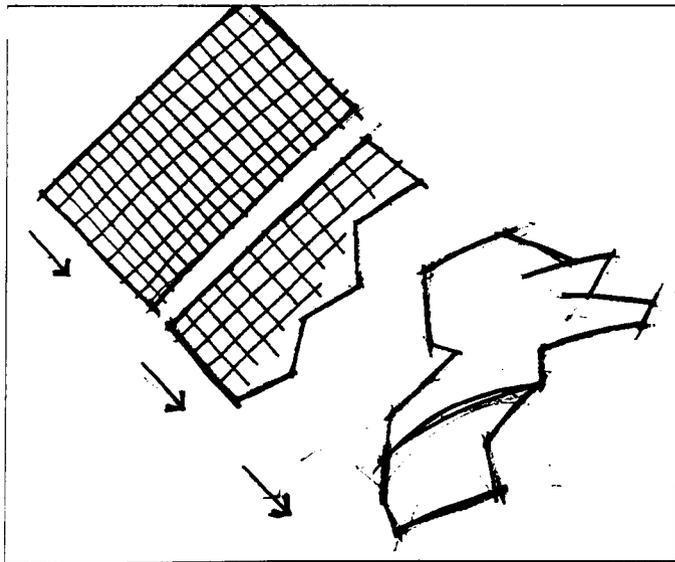


figure 5
parti 3

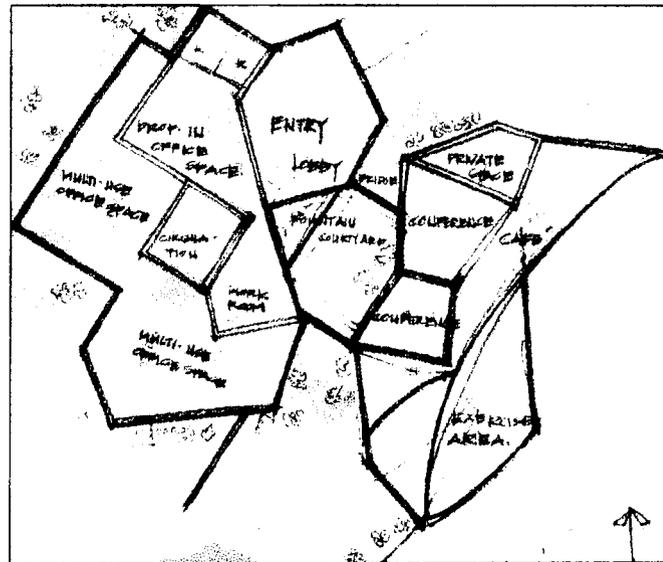


figure 6
parti 3

product projects



Schematics- fall 1998, continued

The schematic elevations from the fall semester were designed as an analogy of the machine. Scheme 1 represents thoughts about how a machine would look which housed the living. It contrasts the earth on which it is sitting, but at the same time, it also appears to be growing from the earth. This became a space metaphor of the idea that though technology contrasts nature, technology can only be created through what was available through nature. Scheme 2 described a central point representing balance between the two worlds. Spaces carved from the building represented the presence and absence of the virtual world and the human-machine system.

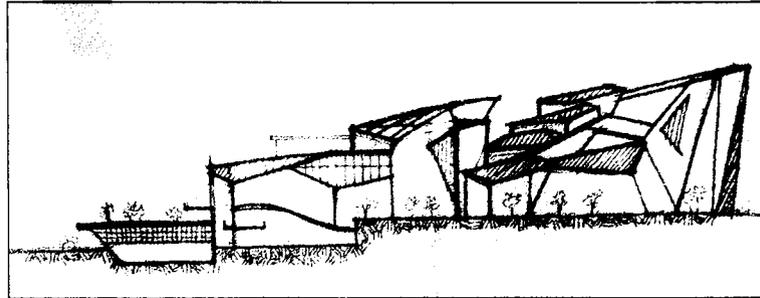


figure 7 - scheme 1



figure 8 - scheme 1

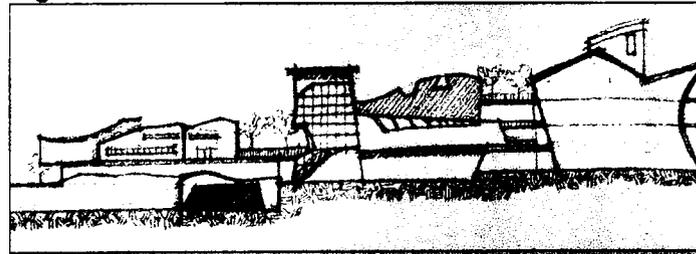


figure 9 - scheme 2

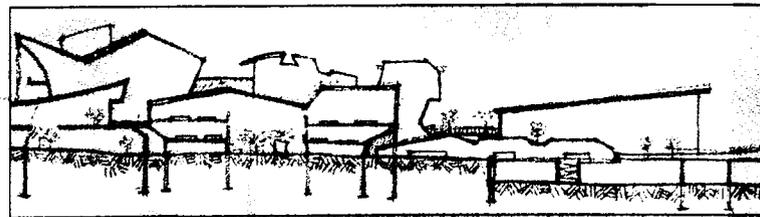
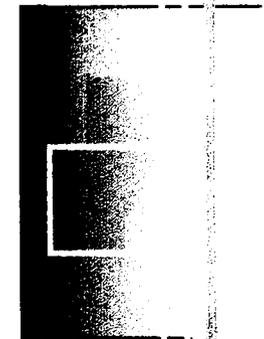
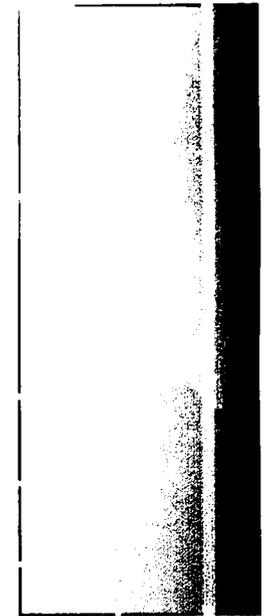


figure 10 - scheme 2



product process

design
spring 1999

functional issues
addressed

The formal design studies from the fall semester represented a very theoretical approach to the design. The metaphors through space were consistent with the theoretical portion of the program, but many functional issues were not addressed. The beginning of the spring semester brought about the first discussions on these issues such as access, entry, security, the actual working environments, the activity and public areas, as well as transition areas (circulation) which were heavily emphasized in the program. Scheme one represents the study of progression of public to private areas with the idea of transition or circulation spaces in between which also would serve as support and communication spaces between workers.

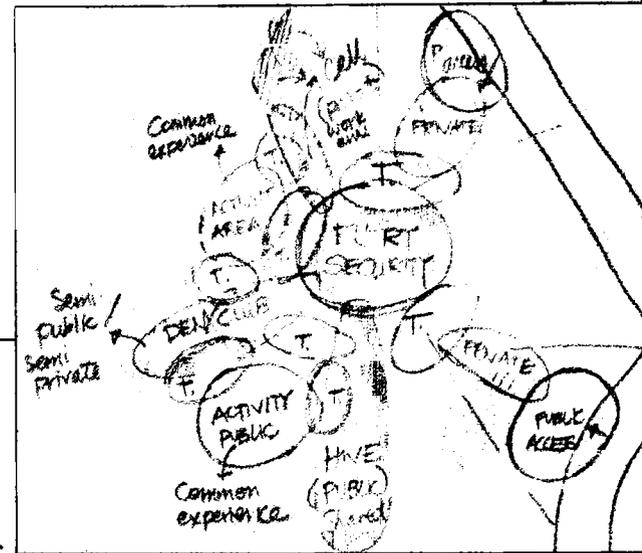


figure 11
adjacency diagram

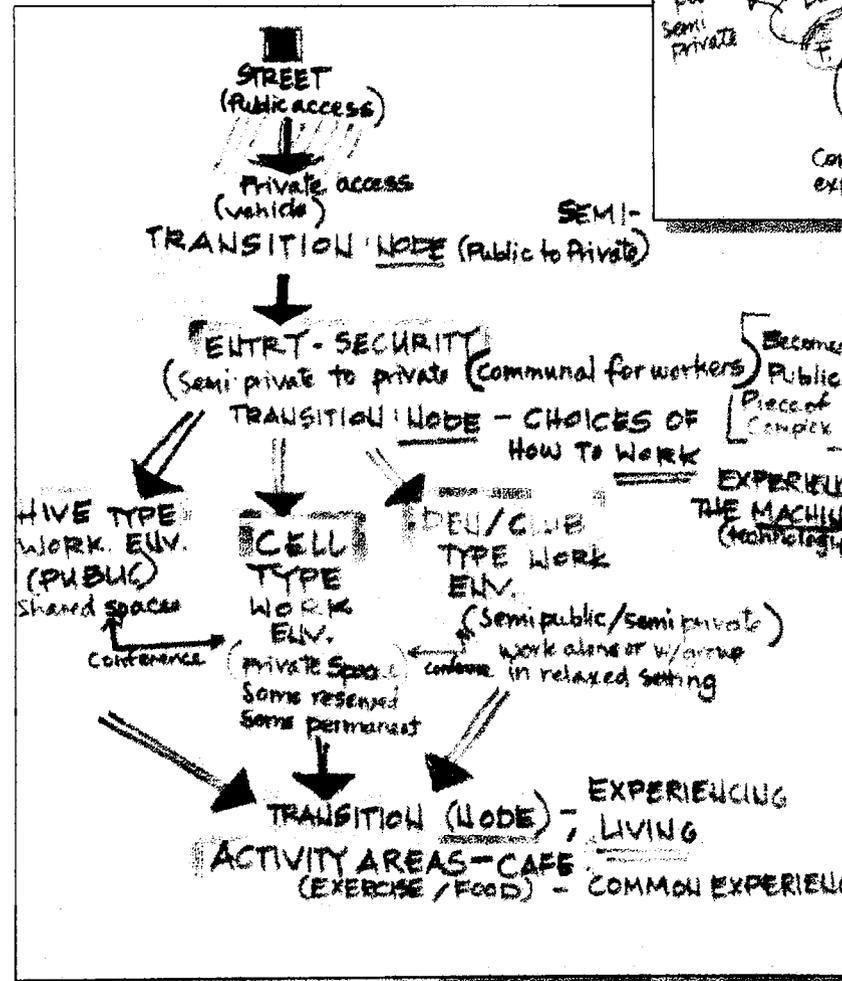


figure 12- progression of spaces

Square Footage

The next phase was to determine the size and the square footage of the complex. First, a basic drawing was done establishing simple scaled boxes for the amount of space assigned to certain areas of the complex. The spaces were color coded representing the previous notation of entry, public, private, and circulation areas. This square footage diagram then was used as a basis for other diagrams which began introducing the ideas of order/chaos, random/pattern, and large public areas transforming into smaller private areas.

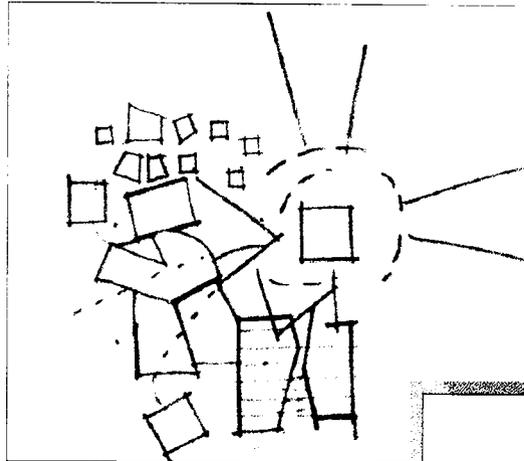


figure 13- group to individual

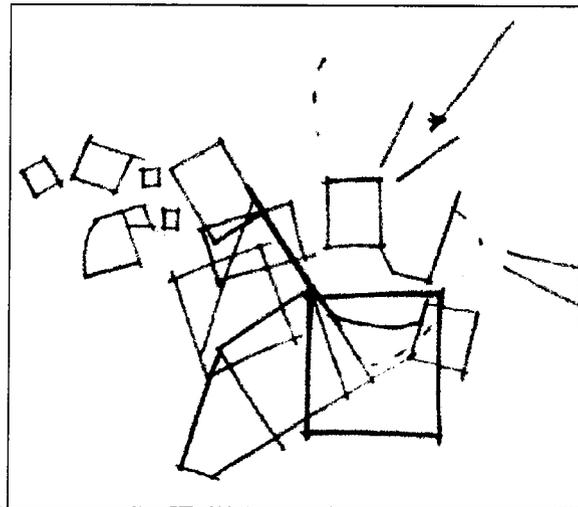


figure 15- group to individual

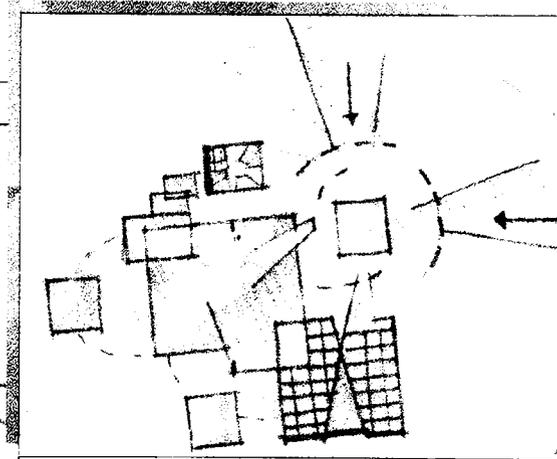
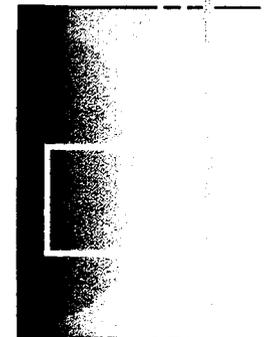
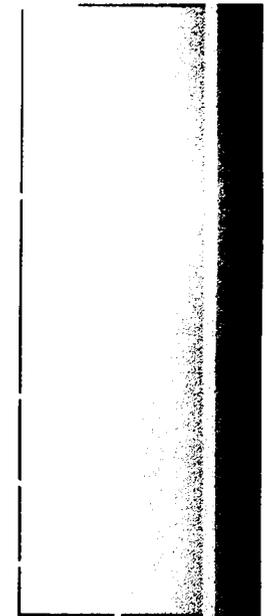


figure 14- approximate square footage



product pro

analogy

A topic in the program became a controversial issue: Does randomness or chaos exist, or is it pattern at a higher level? It was suggested that randomness, as humans experience it, is only the appearance of chaos. However, life and nature are still far superior to the machine. The ability to reason, deduce, and still harbor emotions, is a great complexity and at times a chaotic synthesis. The ultimate and eternal forces of life are present without exact reason, but perhaps, at a scale that is not visible, there is a higher pattern and order after all.

Because of this, the analogy of this leaf pattern was chosen. Parallel to the theory, the image invoked the idea that nature many times appears chaotic



figure 16- Microsoft Publisher 1997



figure 17- Microsoft Publisher 1997

and disordered at one scale, but when it is examined closer, there is a pattern within the randomness. This was also coherent with Wiener's description of the importance of analogy in a system because one message enclosed within another

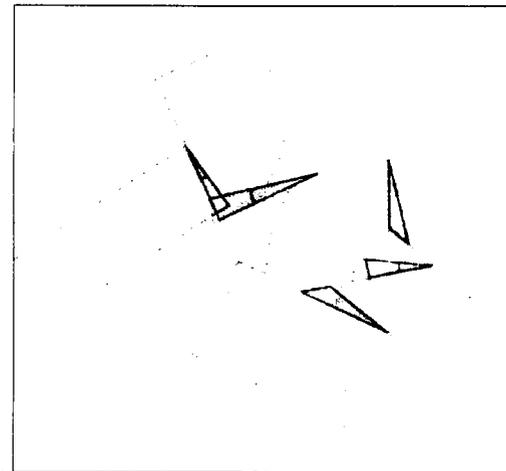


figure 18- abstract leaf pattern & grid

created a meaning greater than the two separate meanings.

product process

synthesis of parts

A new wave of formal studies were done representing a synthesis of everything up to that point. The ideas of randomness/pattern were represented through the grid that had been created with the leaf pattern. Solid and void patterns were used to represent presence and absence. Private and public spaces were integrated among central points, and forms were shifted to fit with the forces and patterns of the site. Many aspects of these schemes were synthesized into the final design such as a solid and void curve and the first thoughts of an outdoor ampi-theater.



figure 19- spatial diagram using leaf grid

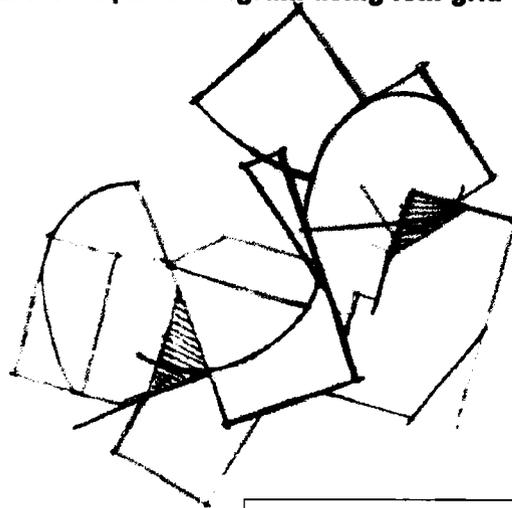
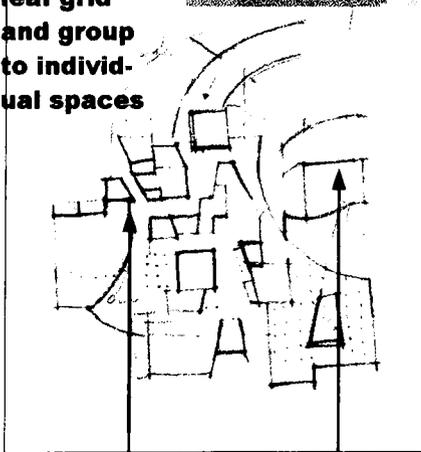


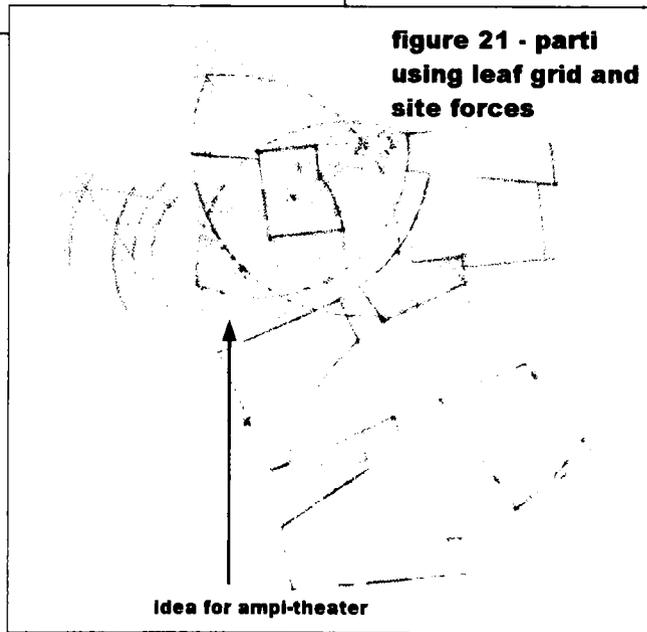
figure 20 parti using leaf grid and group to individual spaces



solid-void curve

central entrance space

figure 21 - parti using leaf grid and site forces



idea for ampi-theater

u c t p r o

workstations



figure 22 - Francis Duffy and Kenneth Powell, The New Office (London: Conran Octopus, 1997) 24.

individual

Another important segment of the design process was the study of a variety of workstations that would support the various public/private scenarios of the employees. Studying different workstation designs influenced interior spaces as well as exterior design decisions. The materials and tectonics of many of the workstations represented the machine side of the system while some were examples of creative and vibrant environments sensitive to the needs of the human. For individual work areas. Views and fenestration also became more private and personal compared to the large, continuous openings of the communal areas. Work areas with sliding panels and partition enclosures also integrated into the private areas of the design.

figure 23- Francis Duffy and Kenneth Powell, The New Office (London: Conran Octopus, 1997) 38.



ures also integrated into the private areas of the design.

uct pro

group work

Group work stations and meeting areas also influenced the design. Many of the group areas used fluid and flowing forms, but there was also a contrast between some. Some work areas were serene and formal representing the machine, while some were chaotic and vibrant.

figure 24- Francis Duffy and Kenneth Powell, The New Office (London: Conran Octopus, 1997) 42.

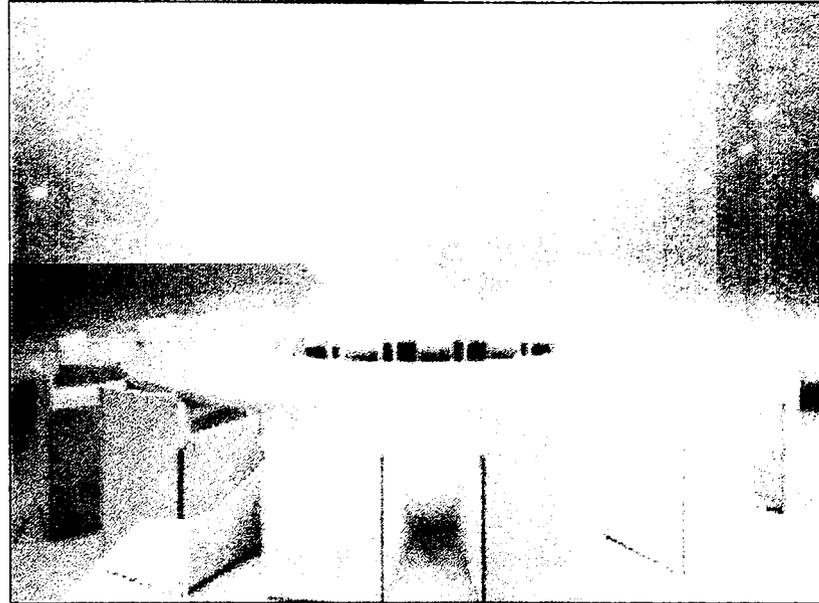


figure 25- Francis Duffy and Kenneth Powell, The New Office (London: Conran Octopus, 1997) 14.

uct pro

exterior work

Another idea for workstations was exterior working conditions. This influenced the design in that another choice for working conditions was added. An exterior working environment would contain outdoor centers where portable computers could be plugged-in. Wireless technology is now just beginning in the interiors of offices spaces where reflectors are placed throughout the working environment as a source of energy. This gives interior spaces even more flexibility because the computers do not have to be rigidly connected. Perhaps in the future, this technology could also be used on the exterior of the building where the reflectors, powered by solar energy, in-turn distributed power to the computers.

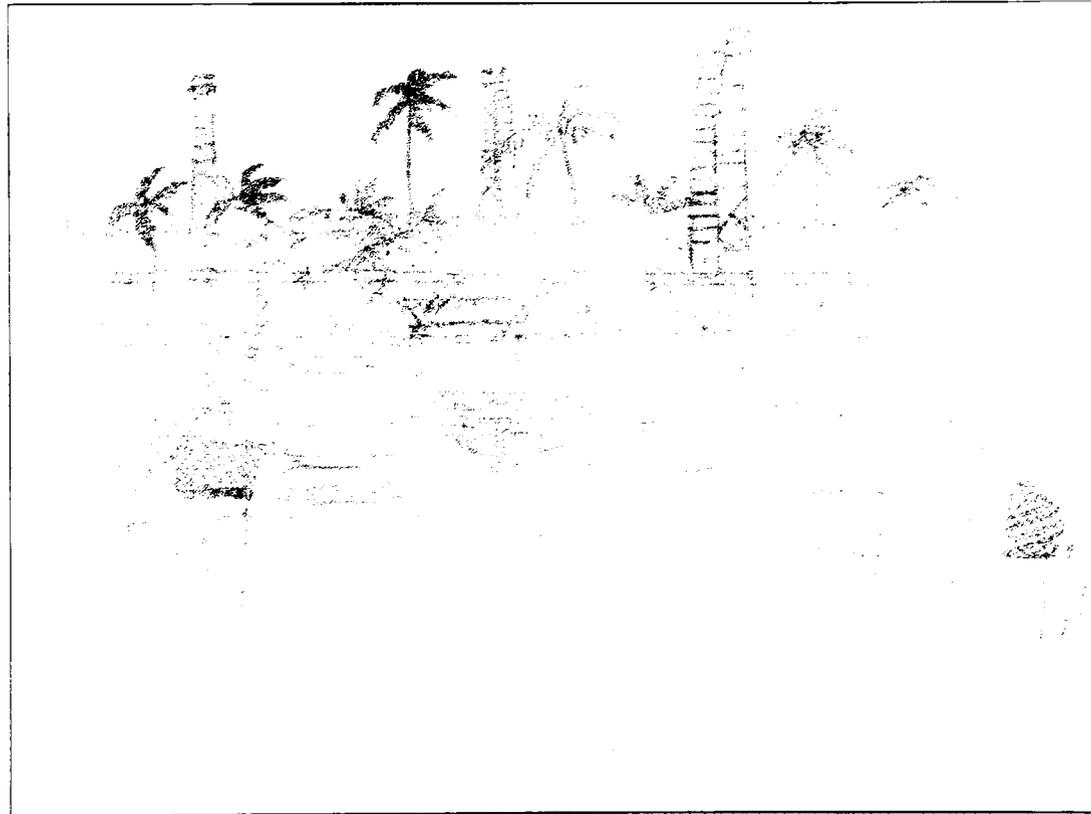


figure 26- Francis Duffy and Kenneth Powell, The New Office (London: Conran Octopus, 1997) 42.

uct pro

After various worksettings, had been studied, it became apparent that the most important function of these workstations was the ability to move from a group setting to an individual setting fluidly. These sketches represent a variety of work settings which would enable the worker to choose where and how he/she would work. The idea of screens above and throughout the work environment came from the "screen saver" of the future. Where screens could be used for synthetic images that could also be used to change and enhance the environment.

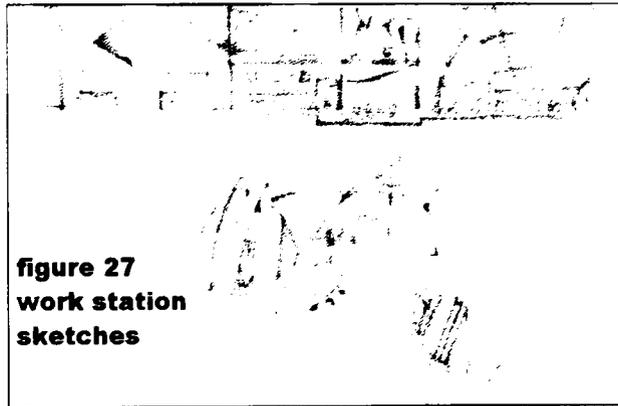


figure 27
work station
sketches

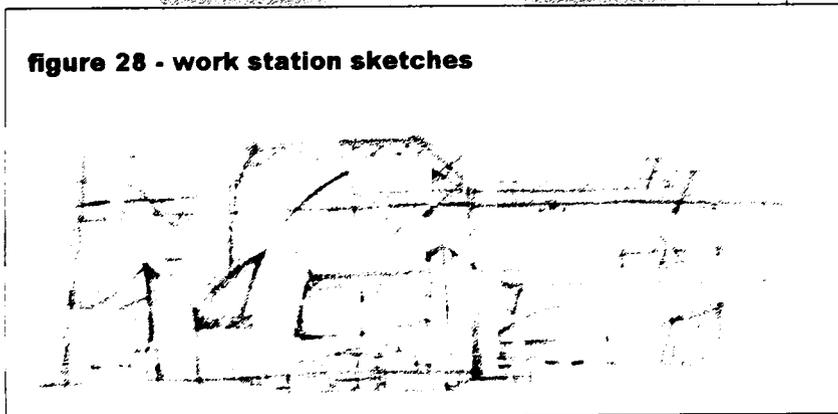


figure 28 - work station sketches

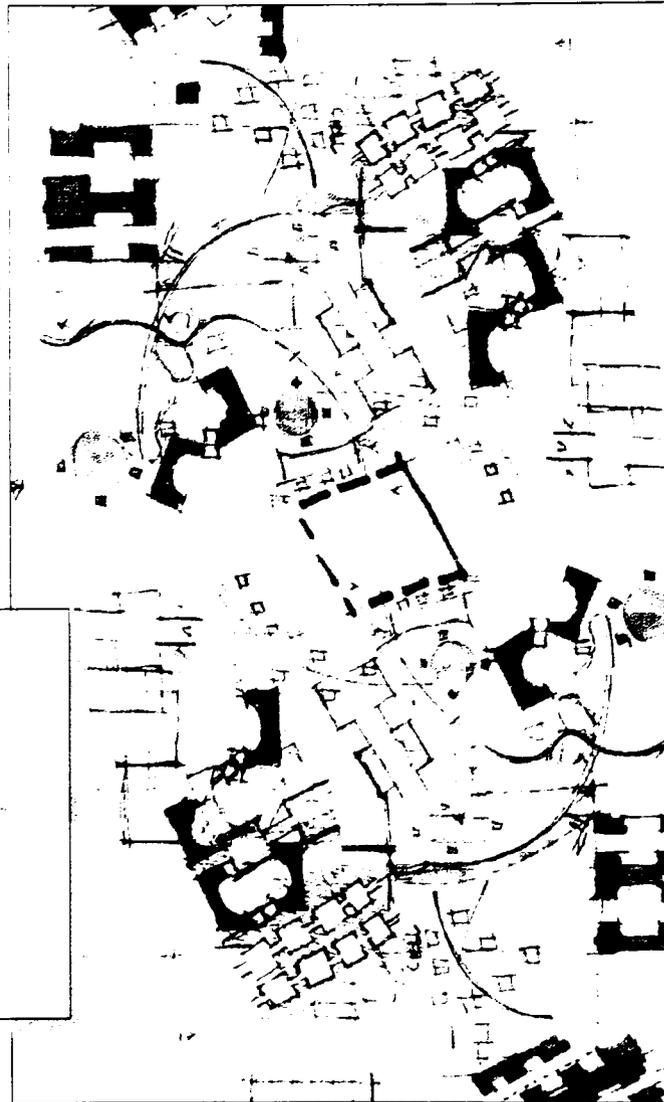


figure 29- work station plan

product process

site and context

As the final stages of the design approached, the site and context became less important than it originally was perceived. According to the thesis, nature was the presiding force which surrounds the human-machine system, or any other system. Therefore, architecture represented the boundary between the natural world and the technological world. The contours of the site were used to form the shape of the building to mimic the site. The goal was to create the image of the building emerging from the site (or nature) as something new: an abstract of nature, separate and distinguishable from its surroundings, yet acknowledging that it is created from them. This was also coherent to the analogy of the leaf pattern in which much of the form was derived. The building also represented that abstraction of a pattern found in nature.

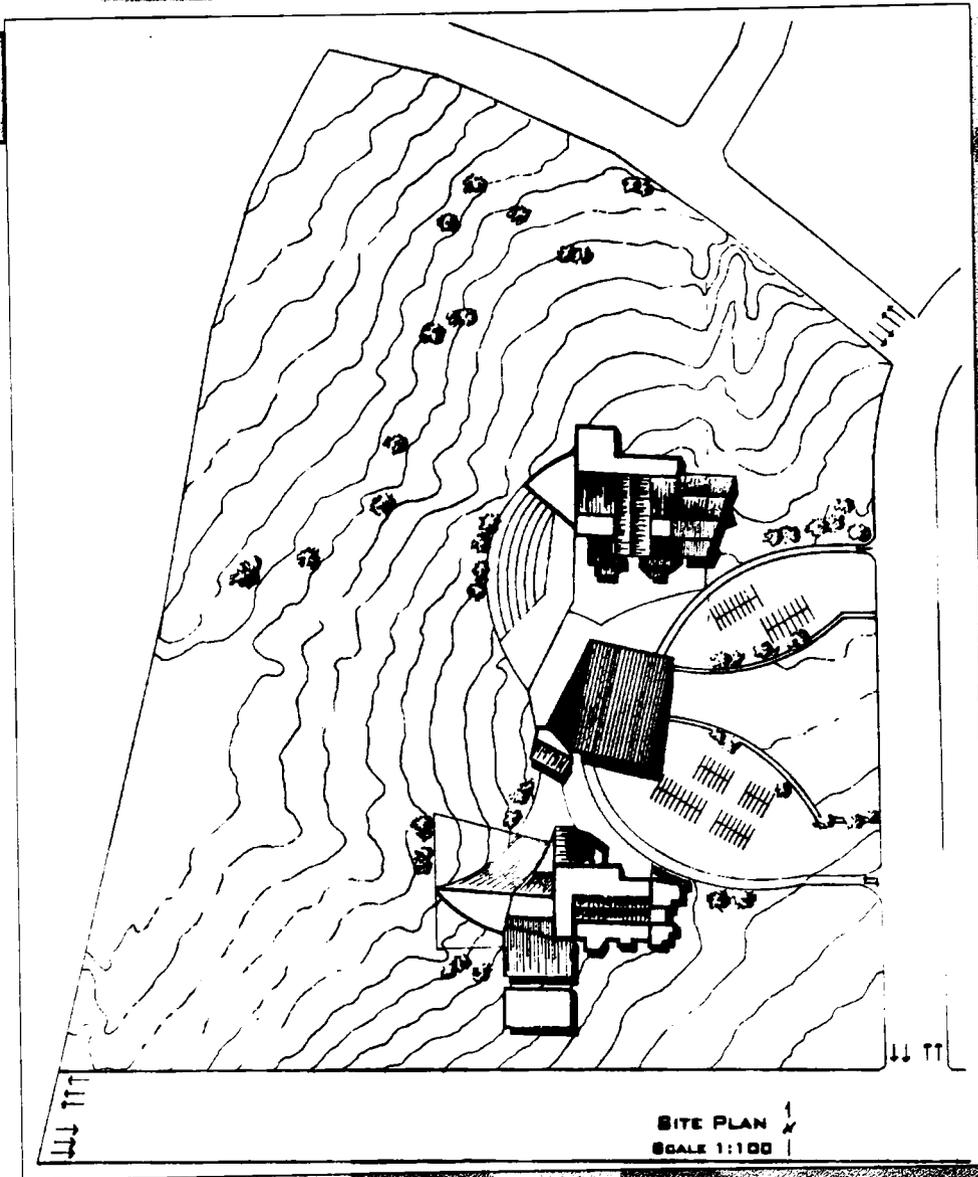


figure 30 - site plan

product process

figure 31 - ground level plan

solution of form

The West side of the building which connects the convex curve of the amphi-theater and the concave curve of the pathway and open work space, was one solution in spatial form to the idea of presence and absence. Presence and absence related to the human-machine system, according to Wiener. This suggestion meant that when one part of the system was inadequate, the other part would take over, thus giving the definition to the "open-system." The convex and concave curves represents that idea using the circulation core as the central point where one curve becomes the other curve. The idea of converging boundaries carries through to the east side parking and plaza area which dynamically point to the central building. This emphasizes the building where entry and security check-in occurs. The sub-grade parking is one solution to the security issue of this type of complex. It was designed primarily for workers who choose to work late at night because here, the security could be refined to a smaller, more protected area.

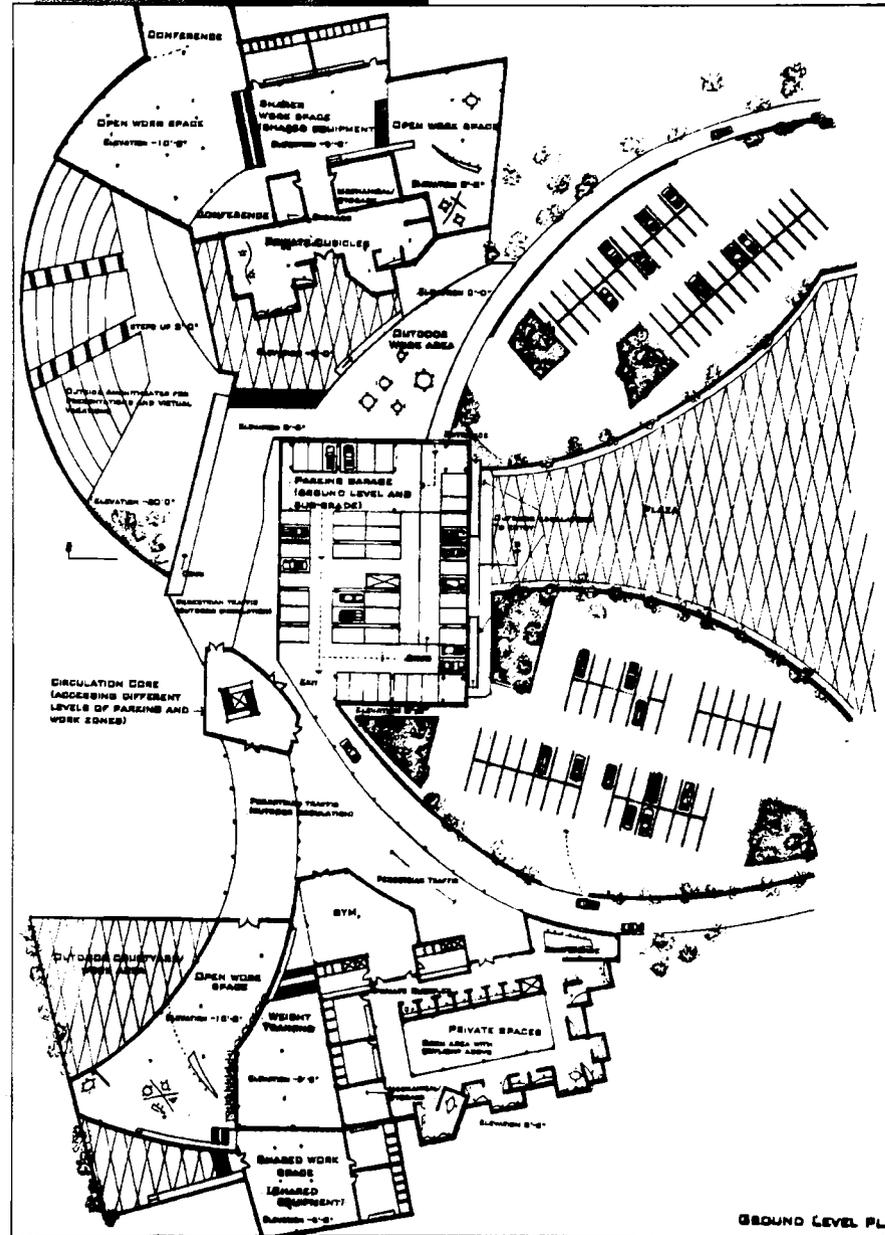
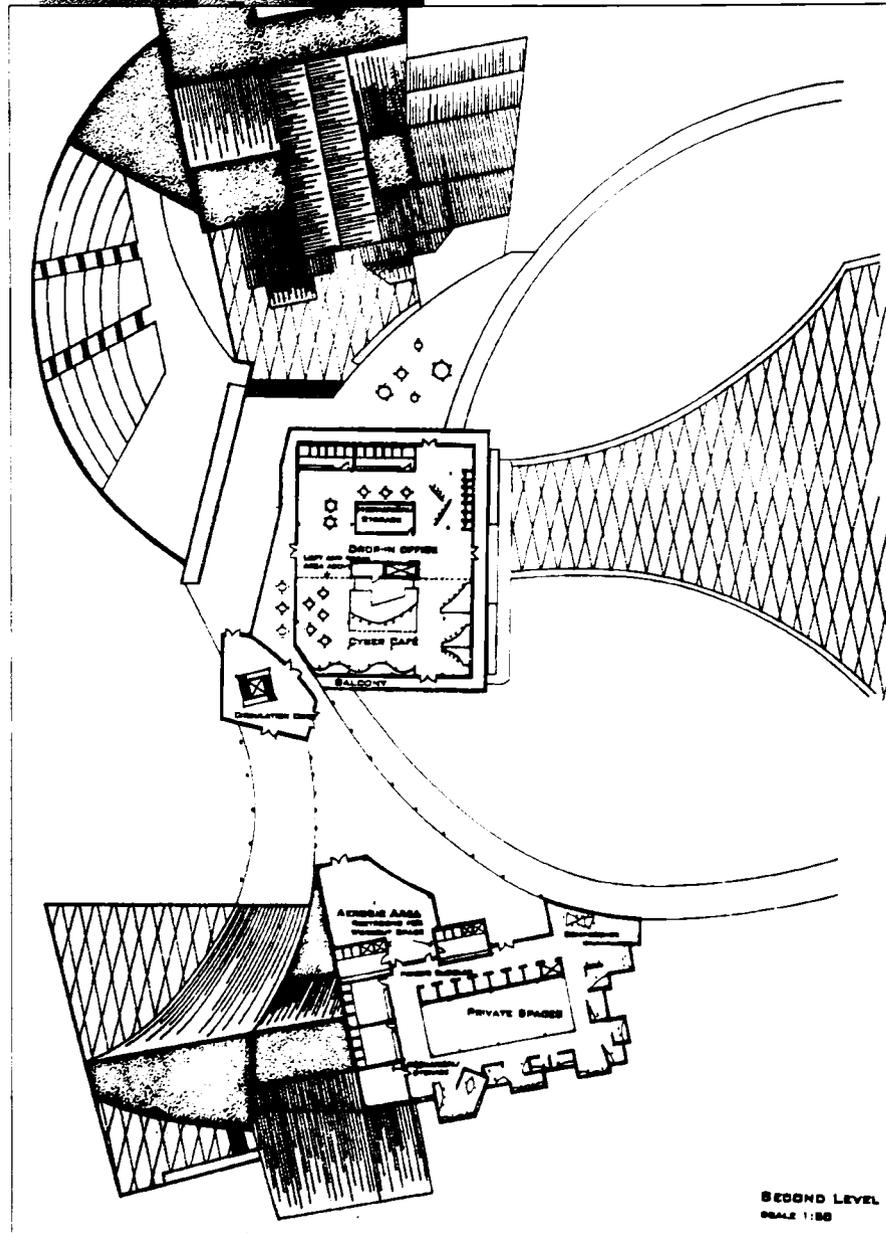


figure 32 - second level plan

second level

The second level plan represents one of the boundaries between the work areas and the activity areas. The first level is primarily the work environment, and the second level is for more social activity separate or continuous from the ground "work" level. The amphi-theater which is shown on the North-west portion of the plan, begins at grade level and drops 10 feet. It is also representative of a social gathering area. The theater could be used for outdoor breaks, lunches, presentations, or virtual breaks. The lobby area and main entrance in the central building is also a communal space. Upon arrival, via exterior escalators, the lobby area has a check-n center where visitors and employees must badge-in. It is also the cafe for workers to take a break or eat lunch. There would be computers and plug-ins to access e-mail or quickly check on a project. The Southern portion of the complex is the upper level of the private spaces as well as the aerobic area of the gym.



product process

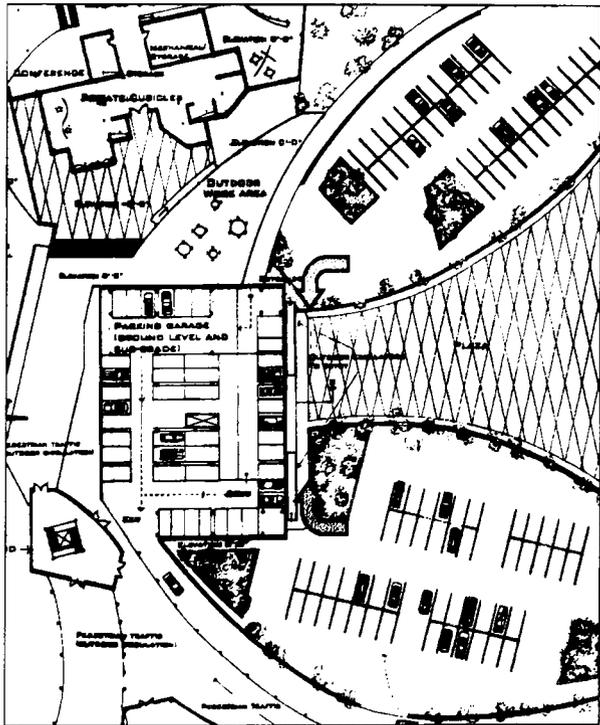


figure 33- close-up, ground level parking

Ground Level

- ⇒ outdoor parking, or
- ⇒ covered parking for safety
- ⇒ entry begins at the escalators

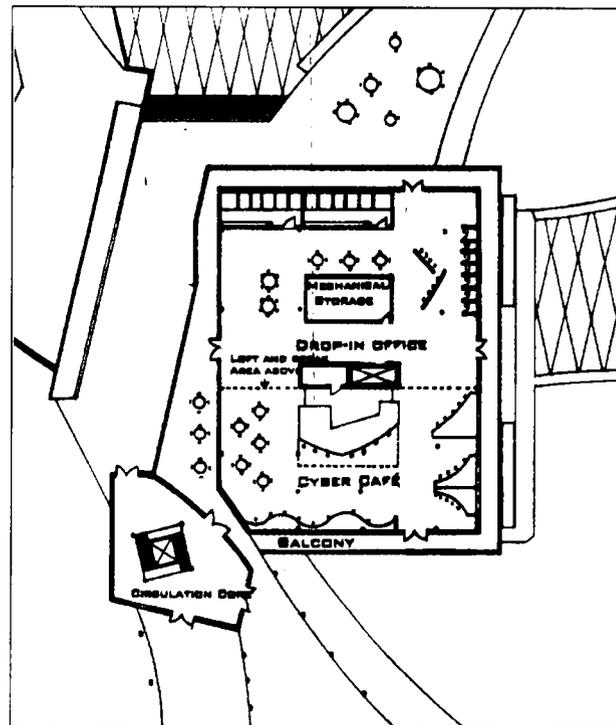


figure 34- close-up, second level, central building

Second Level

- ⇒ Entry level and
- ⇒ Check-in area
- ⇒ Drop-in office and
- ⇒ cafe

product pro

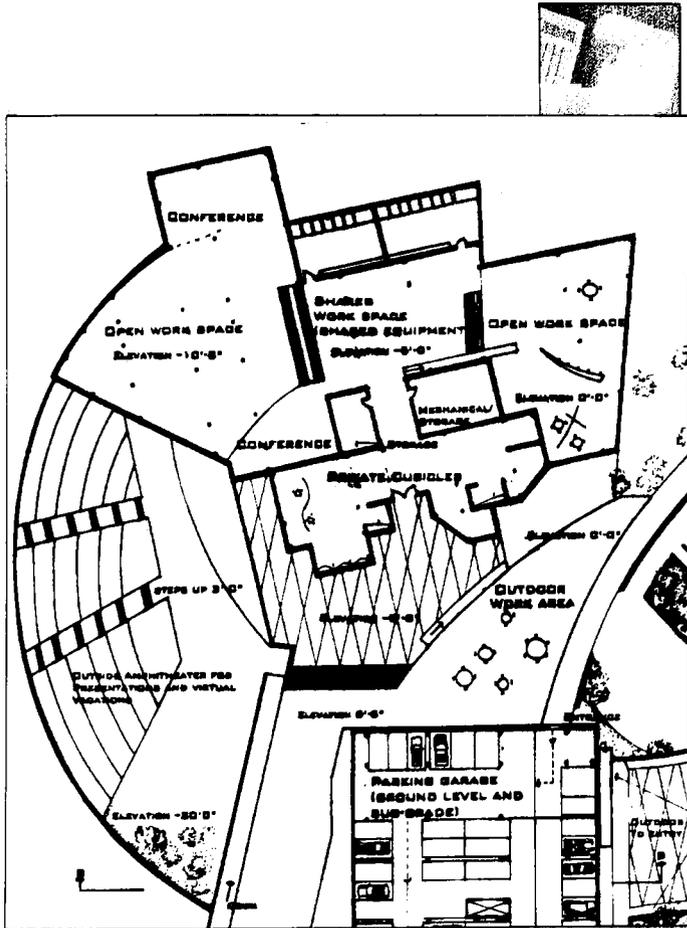


figure 35- Northern work area

North work area

- ⇒ outside amphi-theater
- ⇒ individual, shared, and group work spaces

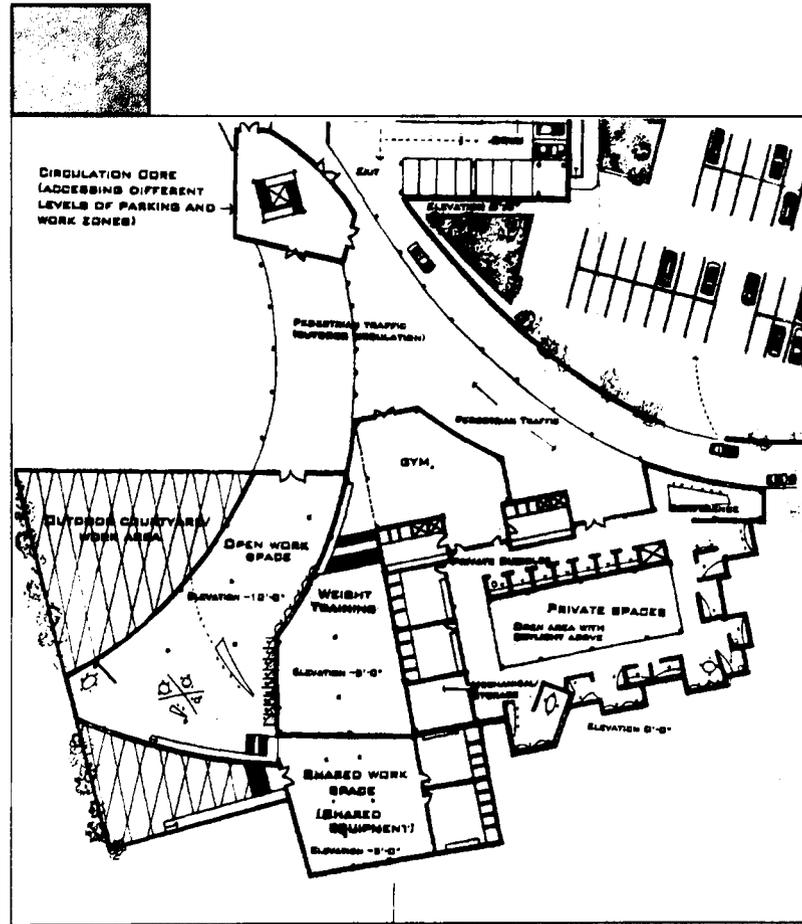


figure 36- Southern work area

South work area

- ⇒ SouthEast: Individual and shared work spaces
- ⇒ SouthWest: group work area

product process



arrival

Entry became a concern as the project progressed. Before parking was added on the exterior, arrival would take place above or below grade in the center of the parking garage below the central building. Although this could be one entry point (especially for those entering late at night), An entrance needed to be distinguished on the exterior of the complex, and arrival needed to be better defined. Parking was added on the east side of the central building after exiting the access road. Paths were defined from these parking areas which followed the curving forms of the plan. Arrival would involve an ascent by escalators to the second level and entry point of the main building. Security became a second issue with more parking and another entrance. The red squares show where security check-points would be upon arrival at the complex.

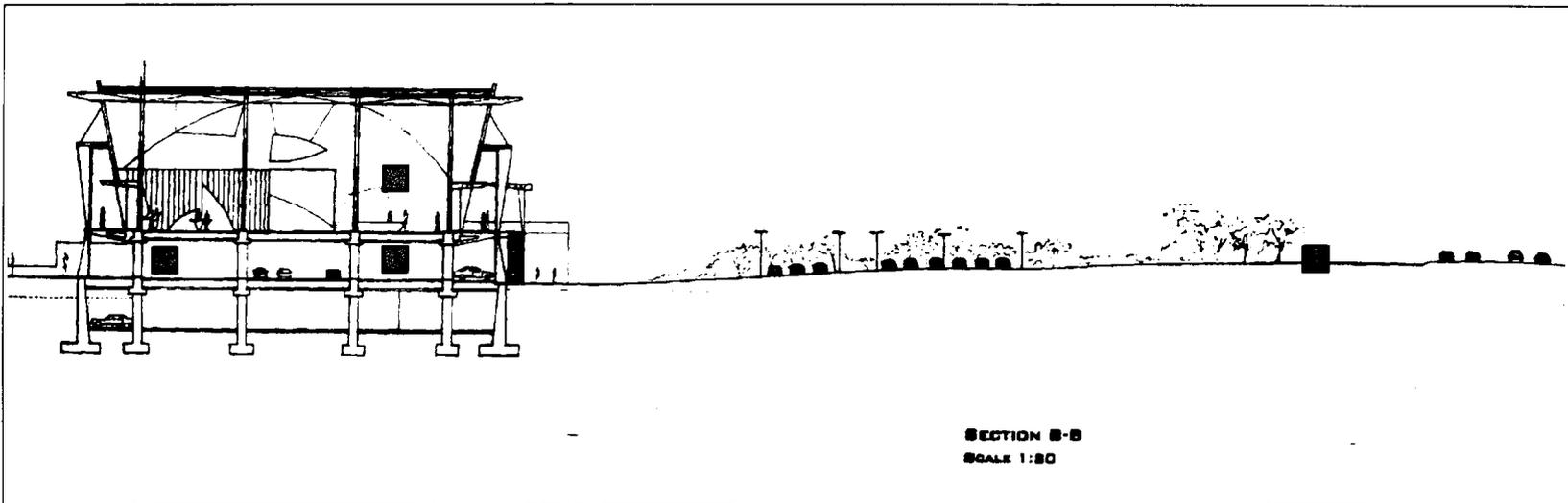


figure 37- section B-B, transverse

product process

central building

Upon entry and check-in, workers would arrive in the central building. Co-workers could meet here to discuss what needed to get accomplished on their projects before the day began. This area would also be an important information center via screens reporting what was happening in the complex that day. This would be an important tool to the workers who had been out-of-town or working at home for the last few days. Forms and shapes in this central building would be coherent with the details, curves, angles, and materials which occurred on the exterior of the building.

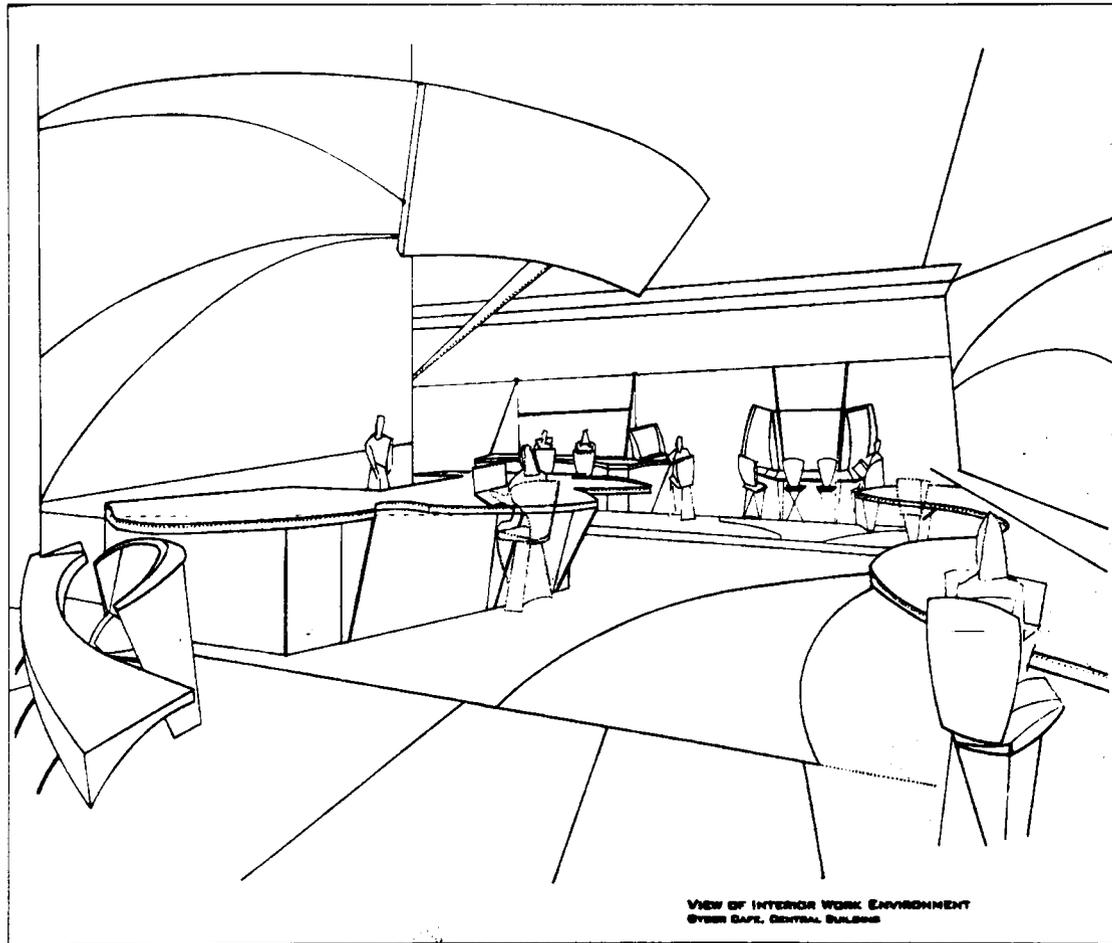


figure 38- view of central building and cafe area

After entering, checking-in, gathering information, and passing through the central building, the workers will be on the west side of the cafe and on the main circulation path. This path is an exterior north and south link which connects the central building with the various work environments whether they be exterior, interior, public or private. This central circulation allows quick and efficient access to the many work areas enabling the employees to move efficiently from one work scenario to the next.

Primary circulation

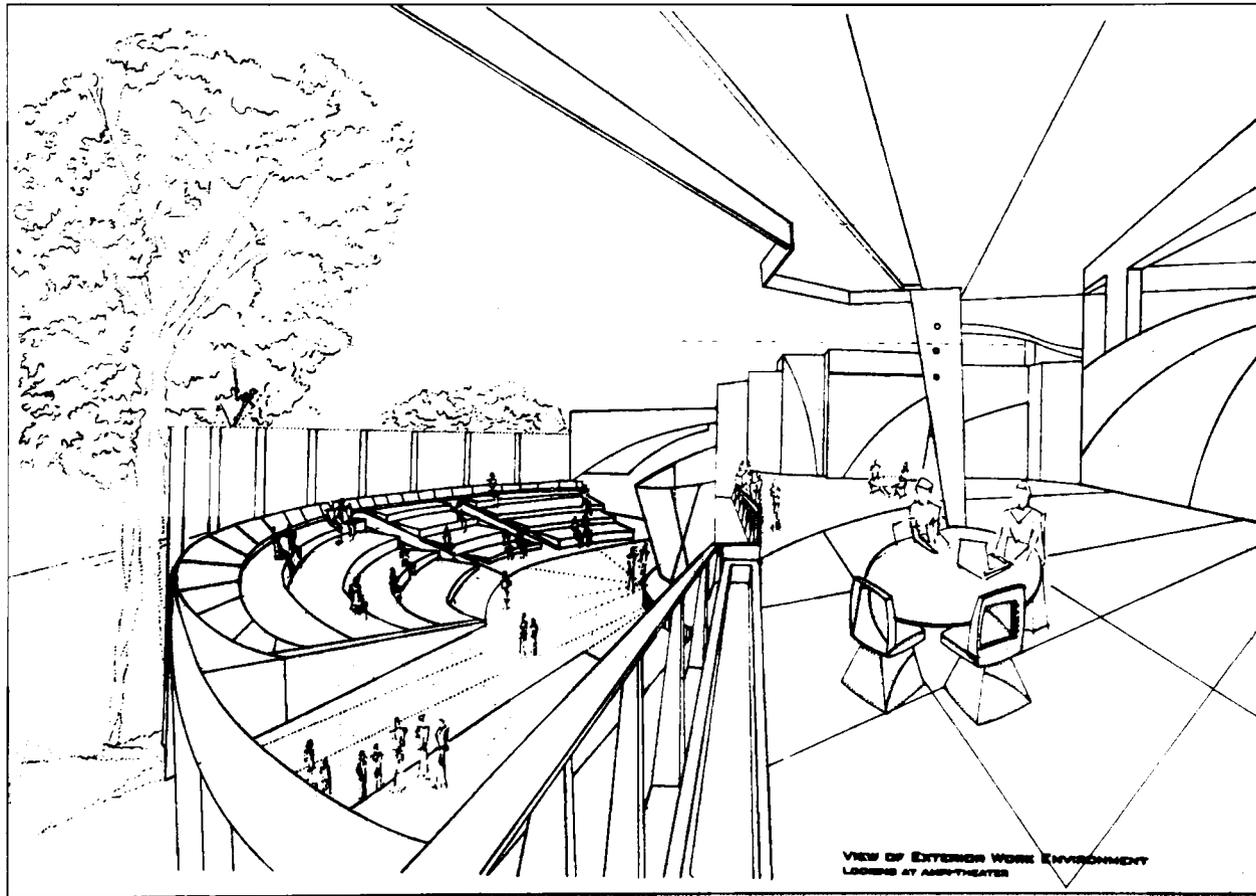


figure 39- view of exterior work environment and circulation path

product process

The interior work environment would also be a continuous transformation of group to private work. To represent the various conditions, enclosure should also represent the various levels of public and private spaces. Totally private spaces for the individual or group would be a total enclosure of planes, while a semi-private condition or space could be planes or parts of planes giving only a certain level of privacy. This type of enclosure creates a greater level of connection to the even less private group work environments and open communal areas.

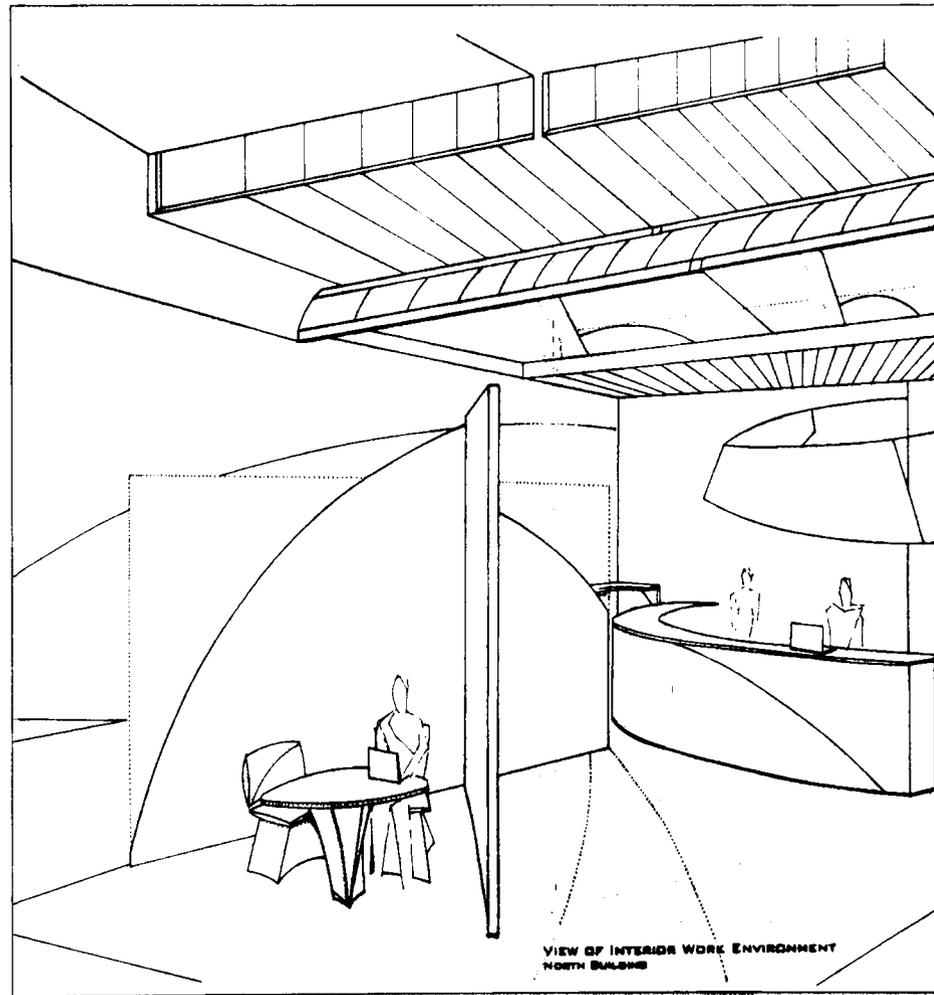


figure 40- view of interior work environment, northern work area

product program

structure

The structural system of the entire complex is a point-load system where the columns are exposed the majority of the time in an open space. The columns are spaced on a grid based on a multiple of five feet. The columns, other than the parking structure, are steel tubes. The mechanical concept was a hot and chilled water system. The boiler and chiller would be located south of the complex, and lines carrying the hot and chilled water supply and return would run below grade. Shafts in each of the buildings of the complex would bring the hot or chilled water above grade. Fan and coil units would be located throughout distributing air in all directions.

mechanical

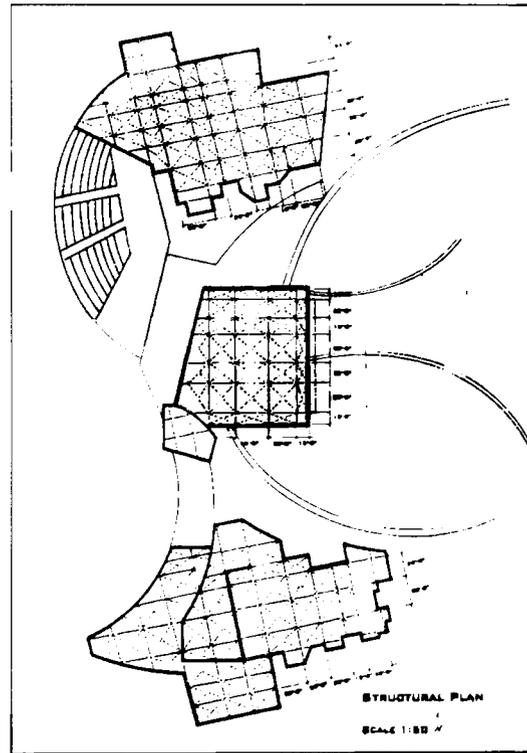


figure 41- structural plan

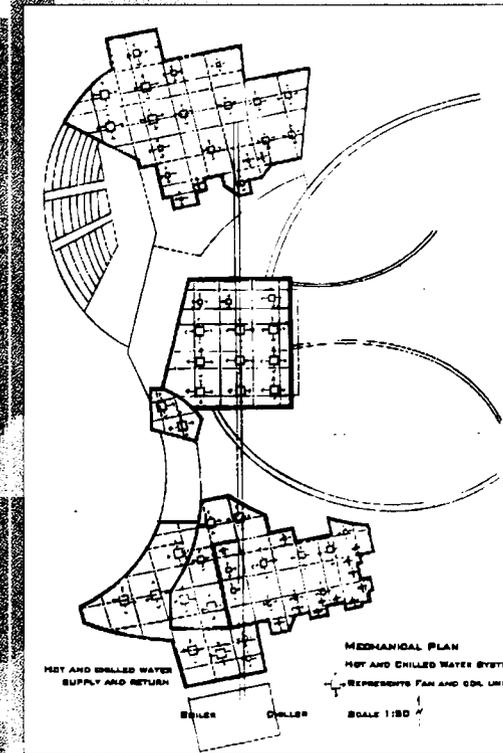


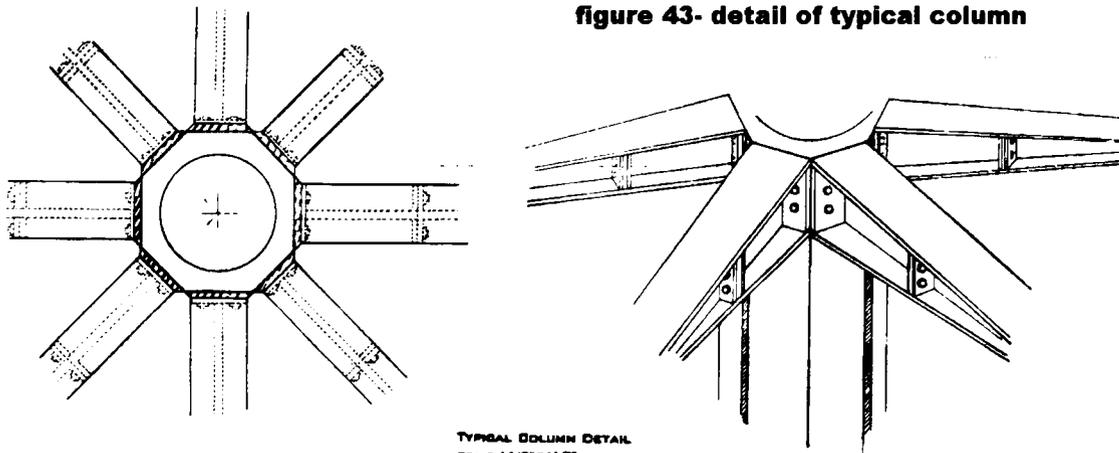
figure 42- mechanical plan

product process



The wall section describes the point load structure of the main building intersecting with the point load structure of the parking structure. This is where steel and concrete would meet representing another boundary. The exterior material would a sandwich panel made of steel studs, rigid insulation, and aluminum cladding. The the cladding would be bolted to the studs. The the cladding would be bolted to the studs. The column detail describes the distribution of loads down to the column by the use of steel branches bolted to the column. This type of structure is coherent with the metaphor of converging boundaries demonstrated in the form of the complex.

figure 43- detail of typical column



TYPICAL COLUMN DETAIL
SCALE 1/8"=1'-0"

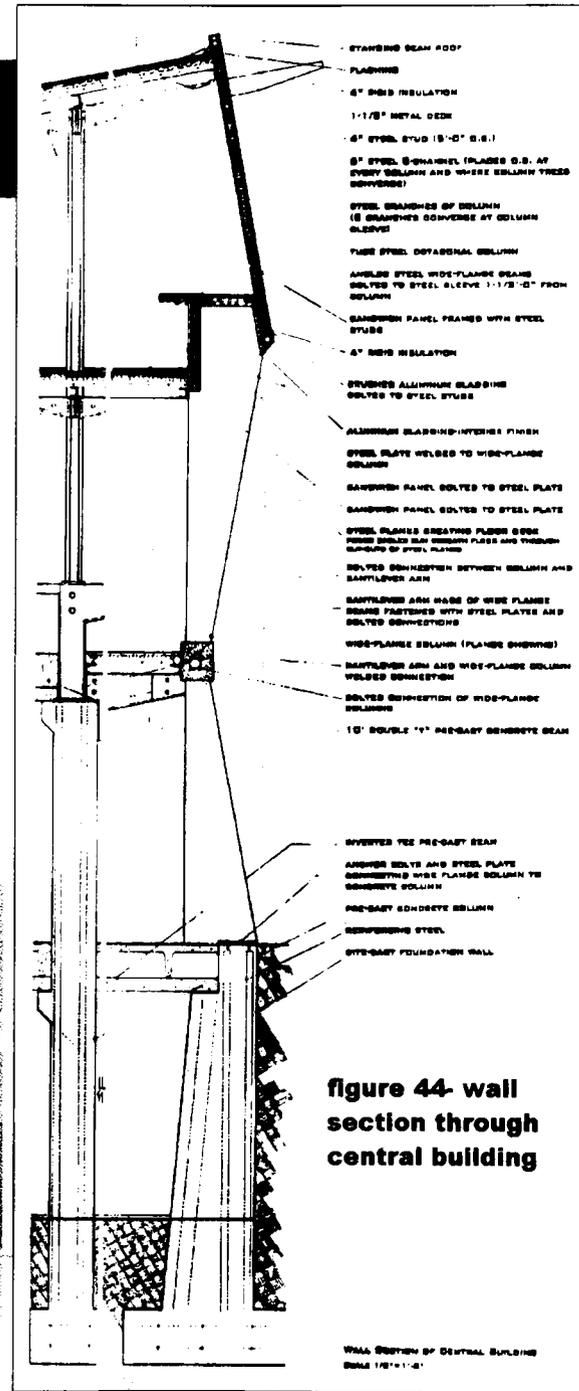


figure 44- wall section through central building

WALL SECTION OF CENTRAL BUILDING
SCALE 1/8"=1'-0"

product process

Wall Section: Central Building

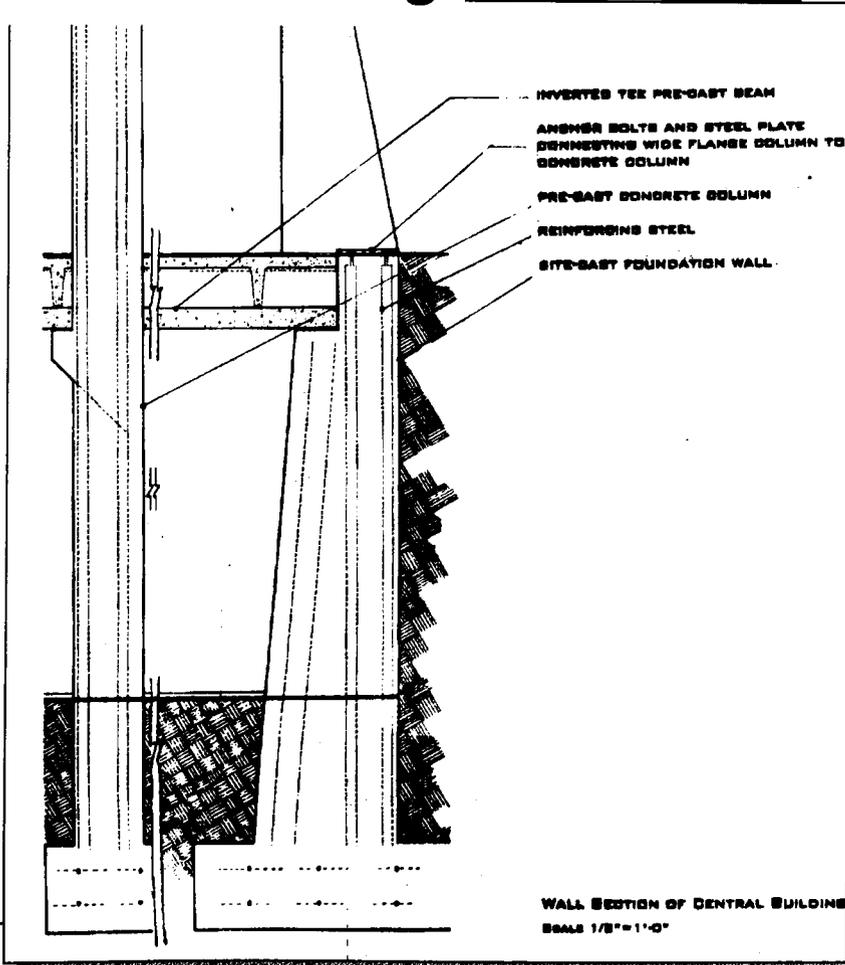
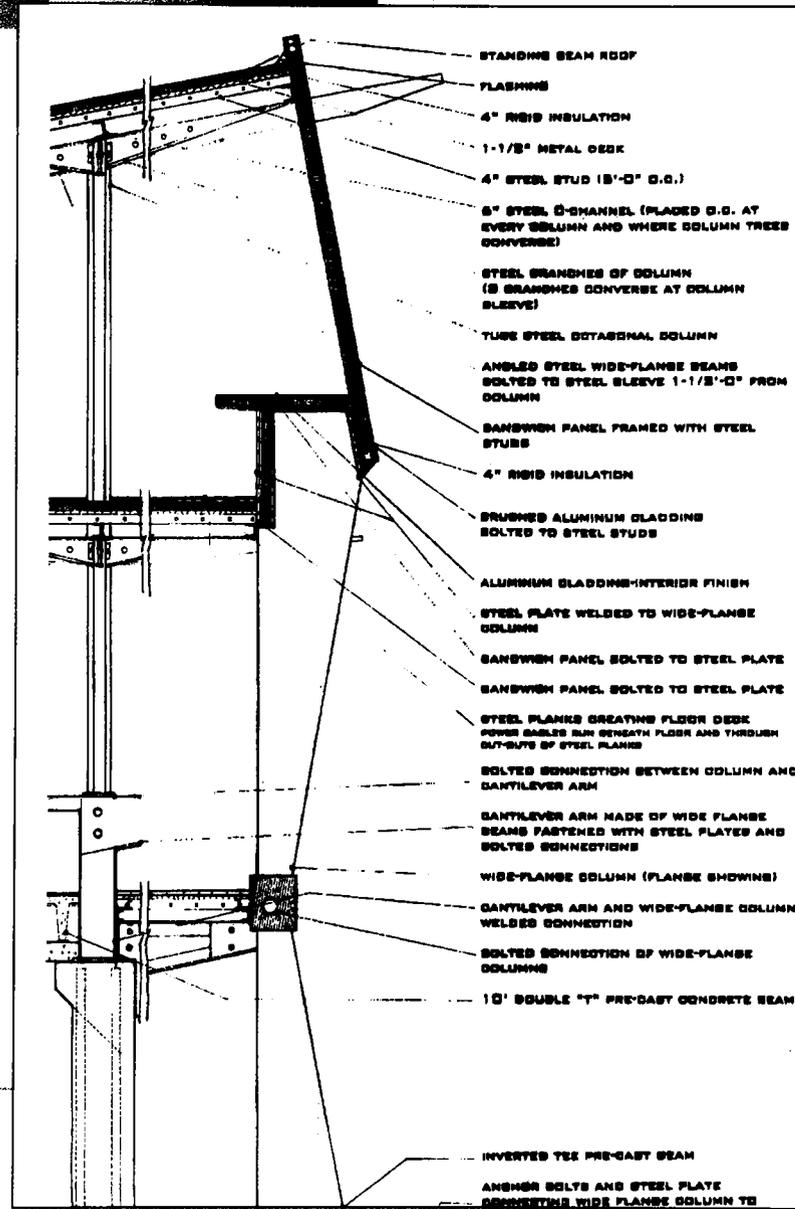


figure 45-parking structure (sub-grade) and ground level

figure 46- ground, second, and loft levels



product pro

figure 47- Arrival from the North

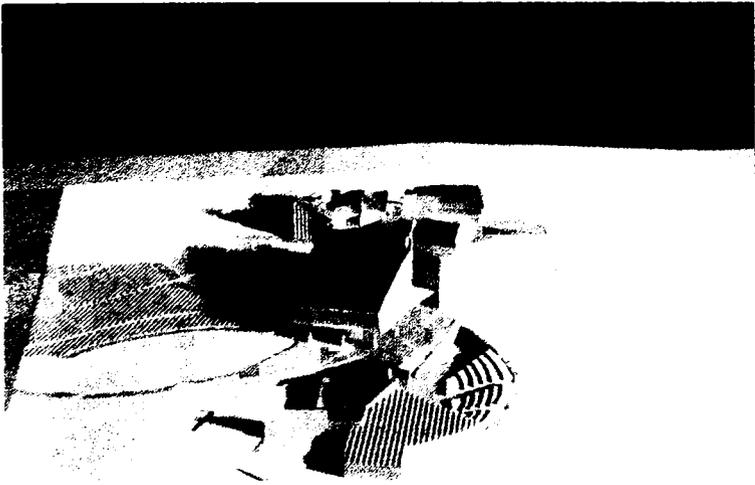


figure 48- View of circulation path from central building, and northern and southern work areas

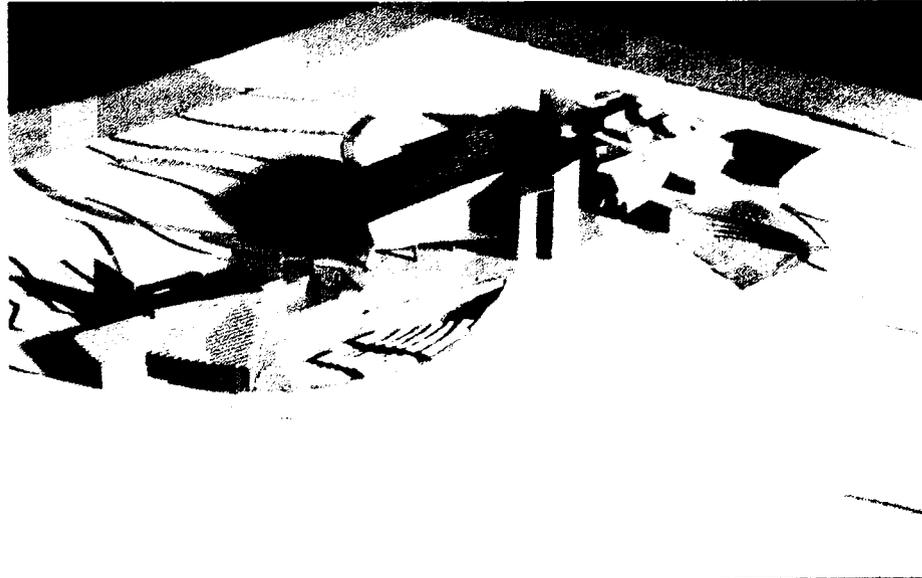
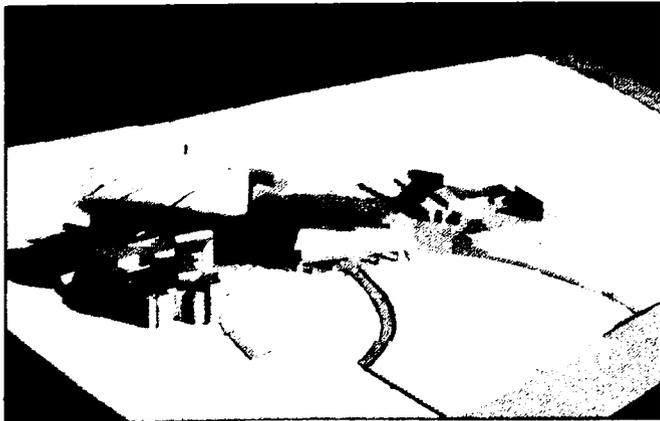


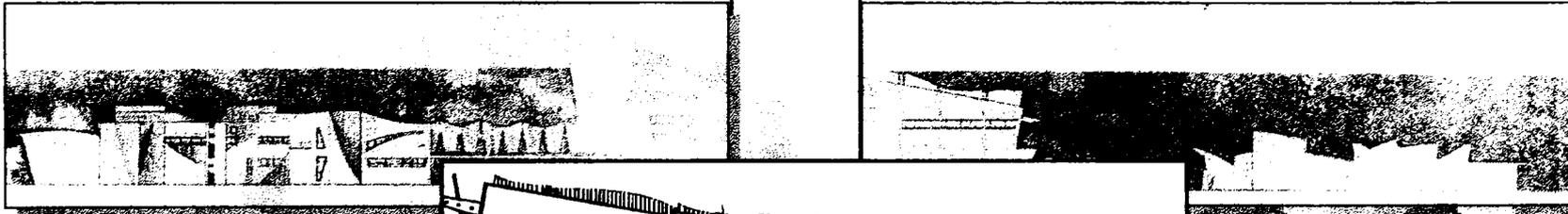
figure 49- view from the Southeast



product process



figure 50- East Elevation



- ⇒ **escalated entry**
- ⇒ **security check upon entrance**
- ⇒ **colorful/technological environment**

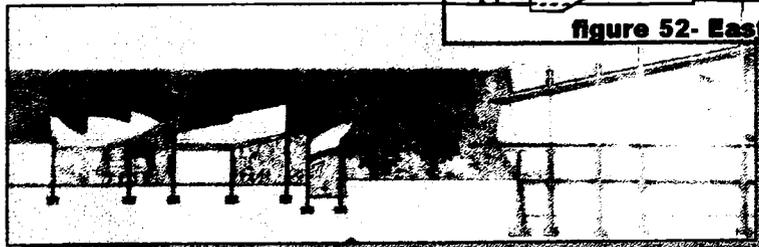
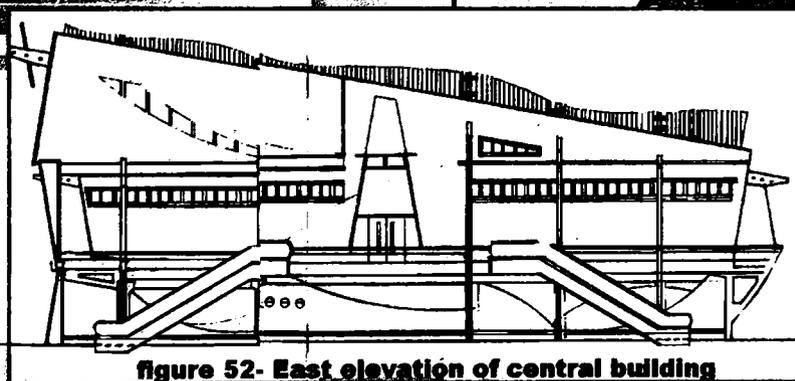
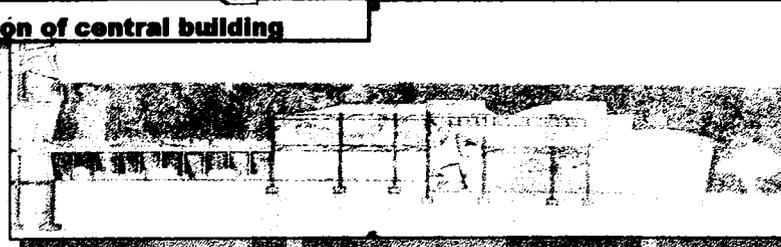


figure 51- Section A-A, looking East



product

process

conclusion

As the world encounters an ever-increasing dependency on technology, it is exciting to realize the possibilities in many fields. The possibility of being so interconnected that work, education, and even entertainment could be realized from anywhere, anytime it was desired is very exciting. Breaking away from the past and many hierarchical structures within the work environment is becoming an increasing trend. "Loose" versus "tight-fit" designs mimic the flexibility of the changing environment, but these designs also raise many questions. The concern that with the fall of a hierarchical administrative structure in the workplace, there will be a fall in efficiency as well. Like the theory of this thesis, it is a very fine-line be-

tween chaos and order. Working on the edge of chaos and managing random patterns within the workplace could become a success or a failure. The variables that can cause the tip in either direction depend on other influences other than just the design of a building. The workplace involves a much more complicated system and structure that deals with those who work there with each other. Therefore, for a company to truly become a workplace of the future, designs must also take place at the administrative level. The structure of the actual building would then replicate the structure, organization, and beliefs about working particular to each company. Another concern about the workplace is the possibility of extinction. With increasing and easily accessible technology,

product process



the workplace could become a structure of the past. With the flexible patterns of technology and the virtual world, the workplace could become a place so flexible that it transforms into another building type with other agendas when it is not being used at specific times. Without a structured time for the entire workforce to be present, there are many possibilities for other uses.

The balance between the technological world and natural world is certainly a challenge for companies who want to use their technology to create a better life for those who work there. This reliance means independence as well as dependence which describes the dichotomy of the sys-

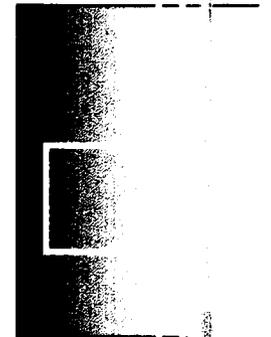
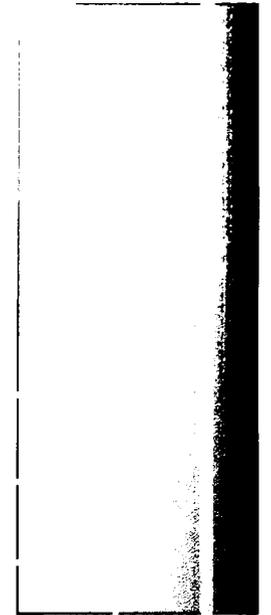
tem. Knowing the boundaries is complicated, but vital. The companies who take the challenge and walk on the edge between the two are the ones who will truly know the benefits of the balance between humans and machines.

product list

figures



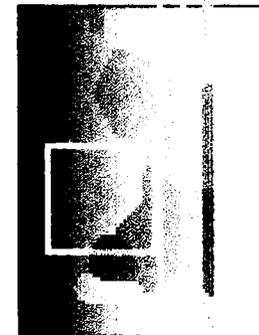
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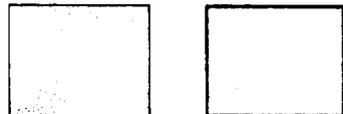
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