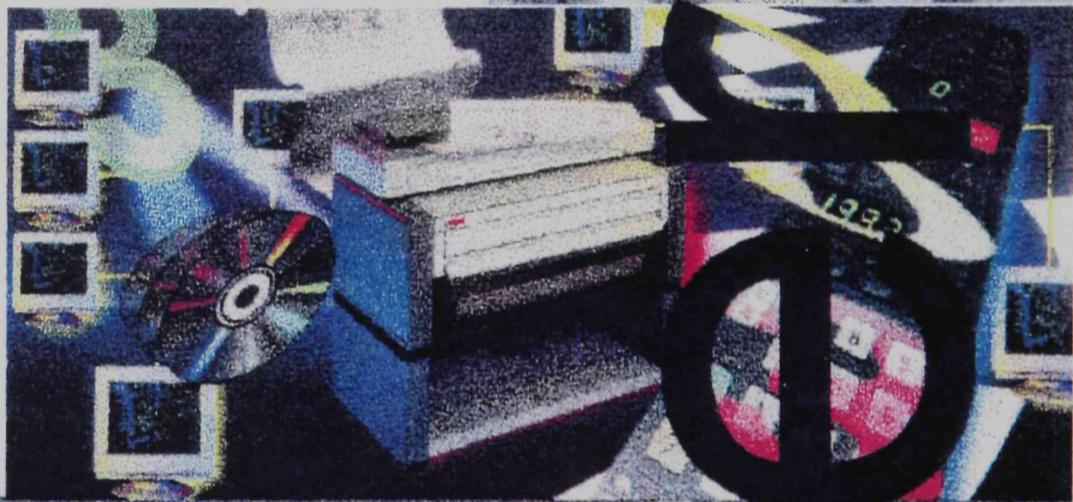
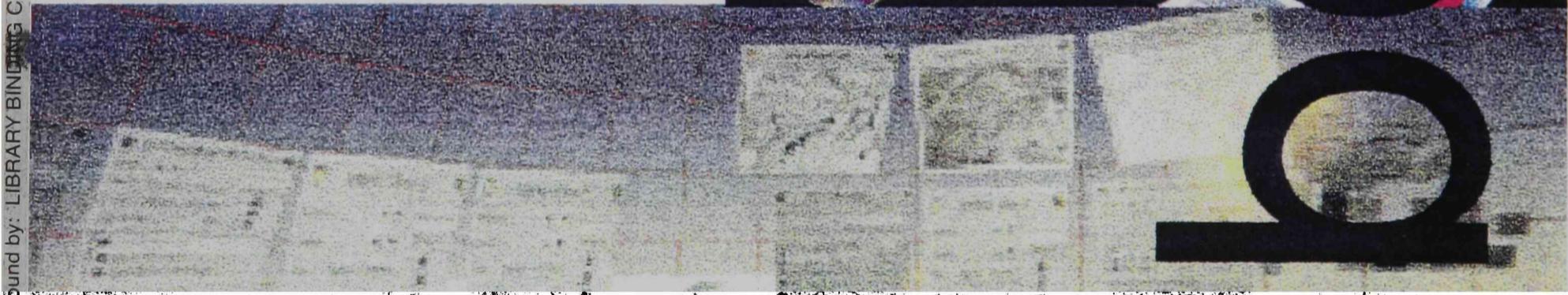


Q
U
O
O

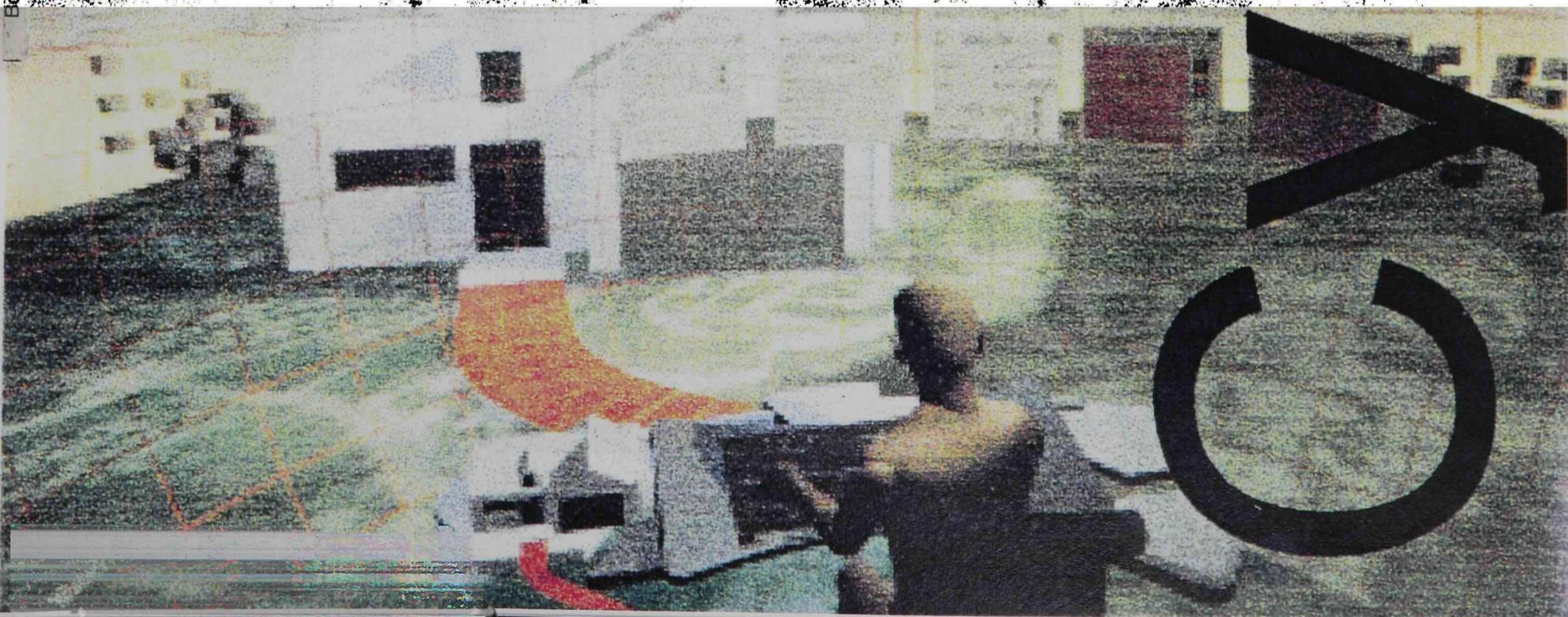
Theory
of
Office Futures



Q
U
O
O



Q
U
O
O



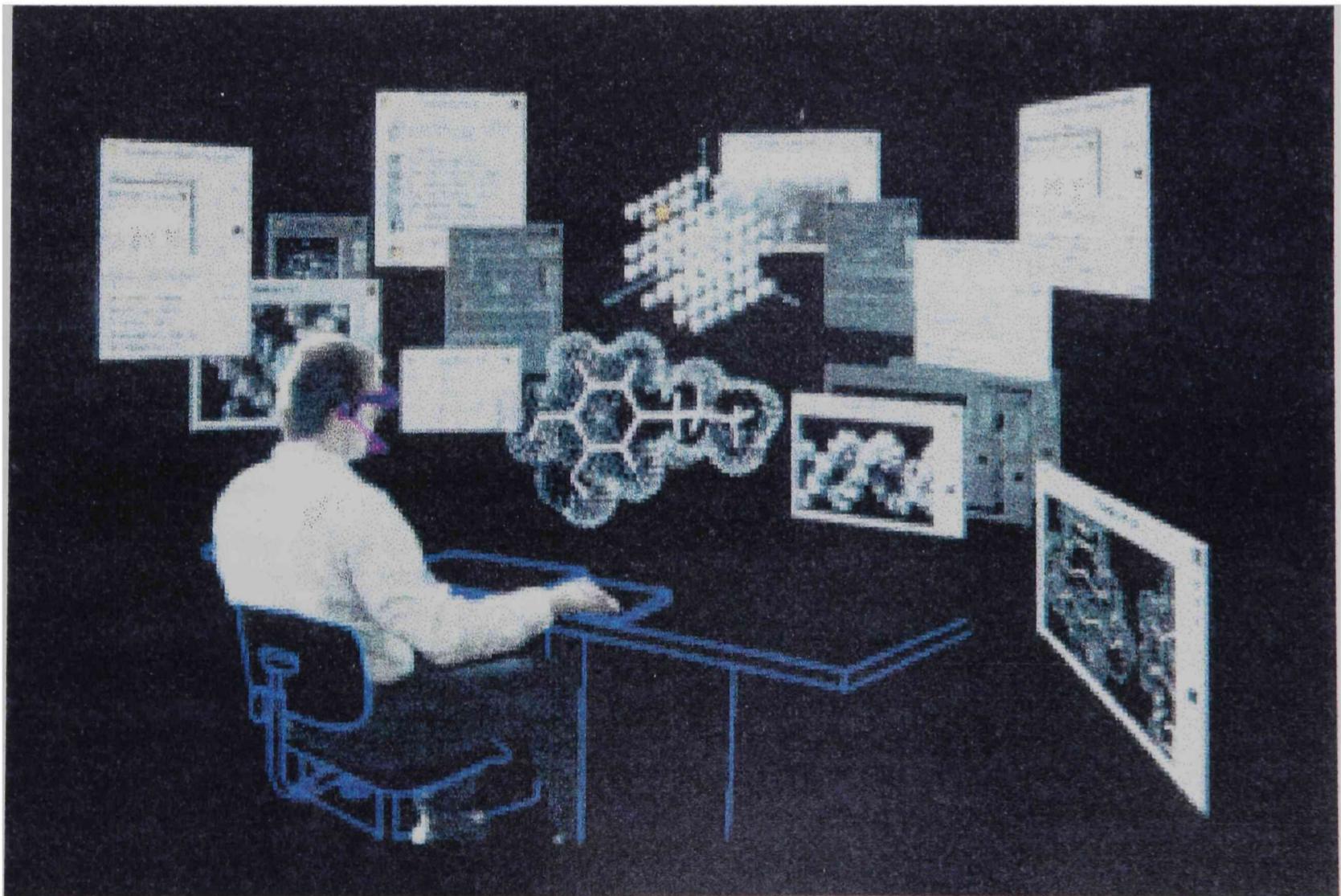
Q
U
O
O

Bound by: LIBRARY BINDING COMPANY, 2900 Franklin, Waco, TX 76700

ARCH
AC
808.2
T3

TABLE OF CONTENTS

		PAGE
PART I	PREFACE	
10*16 no. 30	The Rush of Technology	1-4
	Abstract	5
PART II	ARCHITECTURAL ISSUES	
	Architectural Issues and Responses	6-13
PART IV	FACILITY ISSUES	
	Epistemology	14
	Case Studies	15-18
	List of Activities and Spaces	19-21
	Space Adjacency and Separation Matrix	22
	Activity/Space Analysis	23-27
PART V	CONTEXTUAL ISSUES	
	Contextual Issues and Responses	28-31
PART VI	SUMMARY OF SPACES	
	Tabulation of spaces and number of users	32



THE RUSH OF TECHNOLOGY

Authors: Impoco, Jim

Citation: U.S. News & World Report, May 3, 1993 v114 n17 p62(3)

Telephones, televisions and computers are merging to provide consumer and companies with a vast array of new services. Seven executives who will manage this revolution explain its drama and dimensions

The melding of the telephone, television and personal computer today has unleashed a dynamic digital revolution that promises to radically alter the way people live, work and play around the world. What new products and services can we expect from this technological upheaval? How big a market, exactly, are we talking about? For a glimpse of what may possibly lie ahead and a sense of how to get there, U.S. News's Jim Impoco recently contacted seven titans of technology. What follows, in their own words, is a striking forecast of the digital future that awaits us.

WILLIAM GATES CHAIRMAN, MICROSOFT CORP.

Gates, the leader of America's most dominant software enterprise, believes companies will become more democratic as workers gain greater access to information.

Today, a lot of electronic devices perform a few specialized functions. But imagine a single wallet-size device from which you could activate all of your other devices - your tablet-size or desktop personal computer, appliances in your house, whatever large-screen display you have in your home. I envision a wallet PC that allows interchange and communications between all these other devices.

We're talking with, even on conference calls. During the call, we'll be able to read documents quickly, call upon experts or access remote systems to run an analysis.

BARRY DILLER CHAIRMAN, QVC NETWORK INC.

The catalyst behind a 24-hour home-shopping cable network, Diller hopes to change America's purchasing patterns by creating an electronic marketplace.

QVC is one of the few companies - if not the only company - that's already in the interactivity business in a big way, and on a very profitable basis. We are continuing to invest in our own infrastructure so that in the next couple of years we can lay out as many different home-shopping forms as the imagination is capable of. Some will sell you different lines of apparel, electronics, health and fitness, lifestyle and gardening products. The categories are as wide as the \$1 trillion we now spend in various forms of retailing.

QVC is right at the curve point between what exists and what could exist

in terms of multimedia program opportunities. There are a lot of players with lots of big eyes who want to play a role in this telecommunications future. It resembles a gold rush, but no one knows where the gold is. QVC plays a role in what is now the primitive world of interactive communications - and it's possible that we may be able to lay out more services than the next guy.

ROBERT ALLEN CHAIRMAN, AT&T

Allen, who presides over a mammoth telecommunications infrastructure, has helped invigorate AT&T by preparing it for the multimedia future.

Before this decade is out, business people will take it for granted that they have a choice of communicating electronically with handwriting, data, images or video as easily and as often as they do with voice today. Every day, multimedia communication will take no more effort than making a phone call.

Office and mobile communications systems will respond to voice commands, whether to send a jotted memo, research a customer's questions or set up a business lunch. Many of us will become accustomed to seeing the people we're talking with, even on conference calls. During the call, we'll be able to read documents quickly, call upon experts or access remote systems to run an analysis.

JOHN MALONE CEO, TELE-COMMUNICATIONS INC.

The driving force behind the nation's largest cable provider, Malone predicts the new generation of TV technology will provide viewers with more choices and control.

We anticipate cable's next generation of residential equipment will be the most powerful computing device in the average home, by far. It will make possible new forms of distance education; high-resolution TV displays; video-phone; high-speed computer networking; interactive armchair shopping; an enormous range of sports, news and entertainment choices, and, eventually, movies on demand and other programming. It will give consumers more choice in their television service. And it will change the very definition of television.

The new technology will give families control over their television rather than the other way around. They will be able to order up personalized educational, shopping, informational and entertainment choices through easy-to-use, on-screen gateway and guide devices. Daily chores, such as banking, shopping and becoming informed, will be easier and take less time. Many will be able to "cable commute," contacting their offices through the broad-band infrastructure that we are building now.

JACK KUEHLER VICE CHAIRMAN OF THE BOARD, IBM

This top technology executive at Big Blue asserts that the digital revolution will generate significant job gains and an improved standard of living for many Americans.

We're on the threshold of a new era that will change our lives as dramatically as electricity, telephones and phonographs changed the lives of our grandparents. Digital technology is rapidly merging the telephone, television and stereo with the computer.... We'll communicate more productively, conduct business more efficiently, educate our children more effectively and entertain ourselves more pleasurably. And in the process, we'll create new industries and new opportunities for employment and prosperity.

CRAIG McCAW CHAIRMAN

McCaw, the wireless telephone entrepreneur who recently sold a chunk of his company to AT&T, believes that cellular phone growth will boost U.S. productivity.

It is not healthy for people to jam themselves into traffic for hours at a time, only to wedge themselves into a small office, where they will sit and talk on the phone. The overstressed office is now a place to transmit, receive, store and manipulate messages. This can be done from any location, and a wireless environment will allow people personal freedom and enhanced productivity. While the telephone was a tremendous advancement, now those telephone wires are the leash that chokes us.

There are now 11 million cellular customers in the United States, and we are adding them at the rate of about 9,700 a day. Even though the base is growing dramatically, the growth rate still seems to be in excess of about 30 percent. We have not even begun to see the future of data over the cellular network.

Regulatory policies that tilt to favor one technology or class of service over another are wrong. Today, competing wireless service providers have very different regulatory obligations and requirements. All wireless service providers should be subject to some common-carrier obligation, including the provision of nondiscriminatory service in a foreign-ownership arrangement.

GEORGE FISHER CHAIRMAN, MOTOROLA INC.

Fisher, head of an electronics and semiconductor powerhouse, has pushed Motorola to the forefront of the new mobile communications.

The mobile or portable office of the future will improve the lives of consumers and businesspeople alike. With the convergence of wireless communications and digital computing, it won't be long until you can sit at the beach with your personal communicator and take part in a video conference anywhere in the world. You will be able to send and receive faxes and interact with the participants, all with the clarity and quality of digital transmission.

In the United States alone, about 48 million workers, or more than 40 percent of the work force, are on the move. They don't spend much time sitting at their desks. They vary from the worker who spends the entire day outside the office - a police officer or a courier, for example - to workers who spend a few days a week in someone else's office.

This is an ideal setting for the marriage of portable computing and communications. Today, there are about 200,000 wireless data users.... We estimate, that by the year 2000, the market will explode to more than 26 million users, and two thirds of the applications will be mobile office and personal communications.

By the year 2010, telecommunications could be a \$3 trillion market in equipment and services. The wireless portion of that would be about \$600 billion, with plenty of momentum to grow well beyond 20 percent of the total.

ABSTRACT

Every since the early 20th century the image of corporate America manifested itself in huge facilities in which workers would migrate to and from in the morning and afternoon. The earliest form of these facilities took shape as "Sky Scrapers in Chicago. As urban flight progressed these facilities evolved into a campus like design. Such is the case with Union Carbide in Danbury Connecticut and the Compaq Computer Corp. in Houston Texas. In a new age of computers and electronic media technological advances will allow future corporate facilities to manifest themselves within a suburban, possibly even rural, environment and allow employees to maintain an effective level of productivity. The basic corporate structure will remain the same. What has changed is the fact that different divisions of the corporation no longer need to be adjacent to each other. Huge corporate facilities that we are familiar with can now be separated throughout different parts of the globe as smaller, **satellite facilities**. It is the desire of Cybercorp Computer Technologies to build a satellite office for its system hardware division in Lubbock Tx. Systems is primarily an electrical engineering office environment with approximately 79 employees whom will require 23362 sqft. The ideal setting for the intelligent office is in a community environment, therefore a suburban setting would be the best choice. "More people in one piece of geography, doing productive work, with more disposable income- that's a natural magnet for retail, entertainment, food , and other kinds of personal services."² Lubbock Tx. has been the chosen site. With a population of close to 190,000, Lubbock has no big metropolis to be a suburb of. However, it's relative smallness will serve the program's purposes. Another reason for this selection is that the cost of living in Lubbock is one of the lowest in the state. Lubbock is located in southwest Texas. The fact that Reese A.F.B. will be closing down in the near future will cause the people of Lubbock to become even more receptive to new business. Texas Tech University is an added bonus in the fact that it turns out graduates in a myriad of professional fields. This would create an excellent reservoir for human resources.

THESIS STATEMENT

The future of Corporate facilities will evolve into intelligent office buildings with flexible foundations for unique and emerging models of conventional technologies and opportune physical, and ergonomic environments that provide spaces conducive to a team-work situation.

SUPPORTING STATEMENT

The electronic revolution has revealed the ill effects of corporate dispersal and increasing isolation of its worker. Enclosed private offices, the results of company hierarchy are now deemed obsolete. A much wider variety of space types must be considered in the construction of new offices. Accommodations for team based organizations must now be provided. Personal office space is still needed of course, but with a link between it and a common area. These common areas can be laboratories, media studios, or conference areas. Some consequences that have resulted from these new changes are the social links that have occurred in past workplaces. Advances in technology have allowed the individual worker to maintain significantly more sovereignty than in the past. As a result the worker may fall out of touch with the rest of the group. When designing it is important to maintain a spatial link through face to face contact. The physical structure must accommodate compatible software packages and a full range of hardware. It must also be able to accommodate immediate electronic enhancements and upgrades. The intelligent office building must provide an appropriate physical and environmental setting for this hardware (structure, enclosure, plenum space). It must also address crucial environmental conditions such as spatial quality, physical safety and security. Thermal, air, acoustic, and visual quality must also be observed.

² "Hype vs. Reality The Changing Workplace," Progressive Architecture,
March 1994.

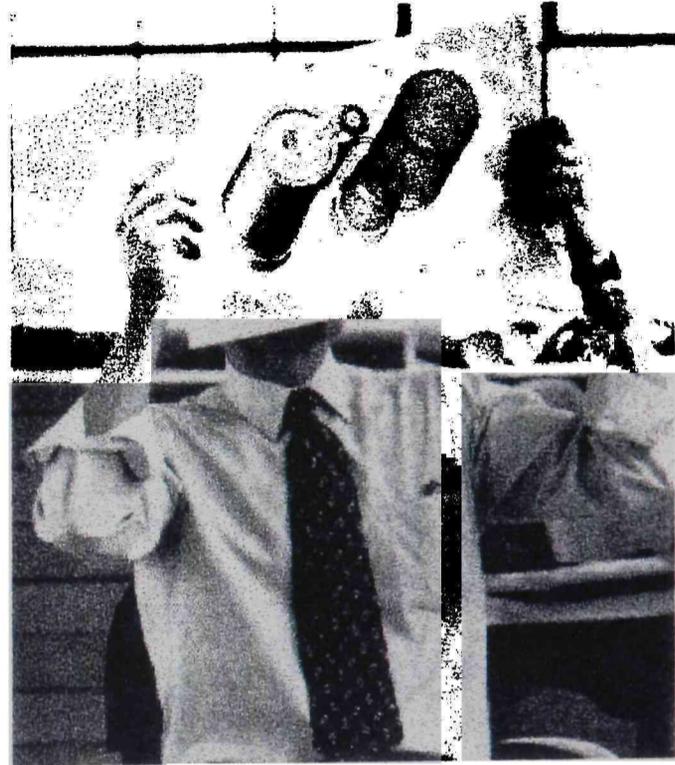
THE BIG PICTURE

In the age of the Information Super highway, Americans are changing the way they work and communicate. These changes are thus causing corporate businesses to reconfigure their places of work. These new practices offer new opportunities in architecture for the visionaries willing to rise to the challenge.

"the lack of a bigger picture hinders architects from taking the advantage of mind-boggling opportunities inherent in the way work and business are being reconfigured, and the implications of those changes for the makeup of our communities and the evolution of our cities."¹

ISSUE

New Technology will change the information sector. This will affect workers in all fields. these changes are affecting the structures of organizations, the format of the work force, and creating new kinds of workplaces. The integration of the television, telephone, and personal computer has conceived a technological revolution that will alter the way people will live, work, and play in all parts of the world. We can now access vast amounts of information from work and home through on-line services resulting in an *Information Highway*. With complex network systems the office is now better equipped to mount a coordinated effort in problem solving. Through high speed modems, effective, remote communications and business transactions are now possible. The future promises the completion of the Information Superhighway. So what is next?²



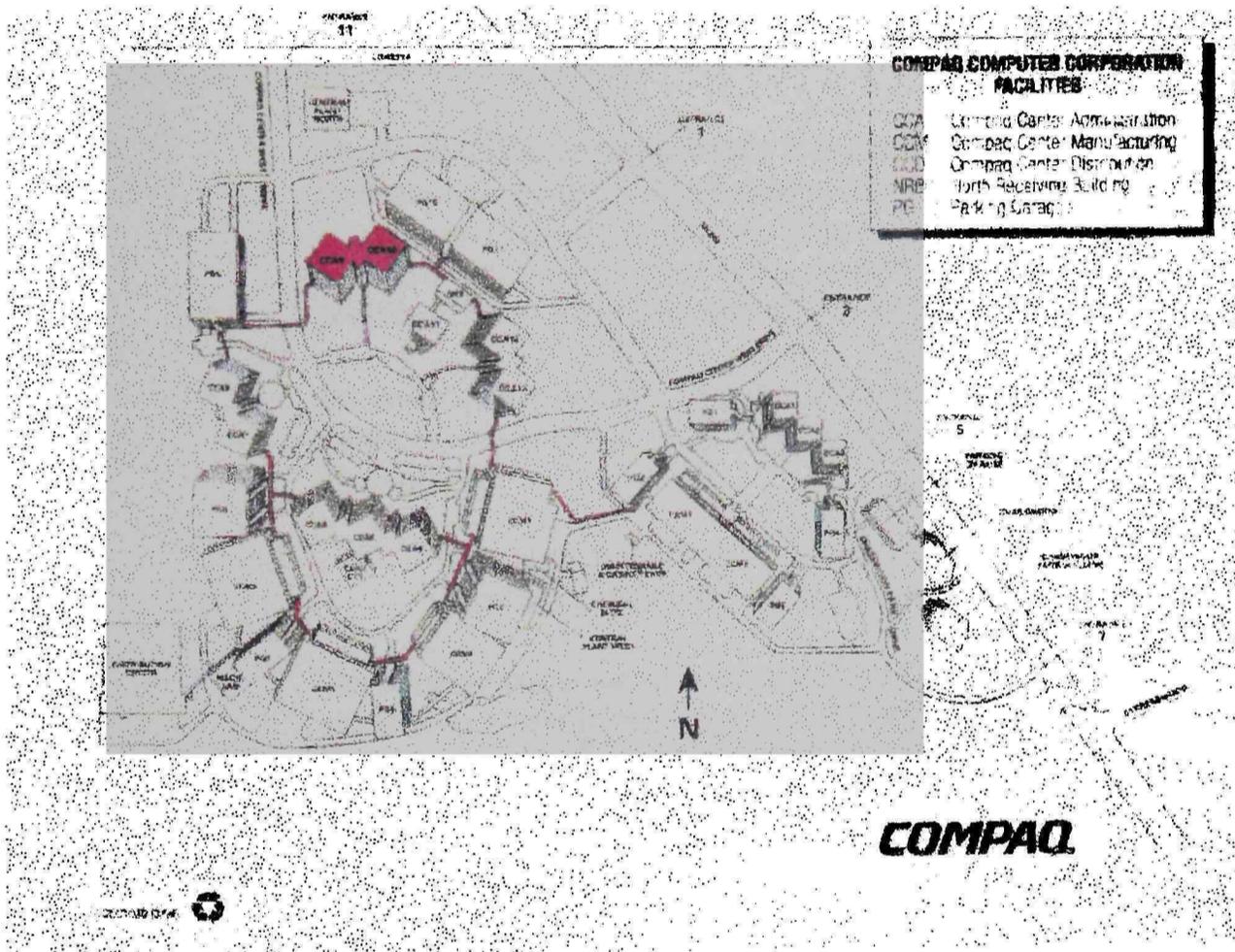
¹ "Hype vs. Reality The Changing Workplace," *Progressive Architecture*, March 1994.

² "Technology Titans Sound Off On The Digital Future," *U.S. News & World Report*, May 3, 1993

"I see the democratization of communication. The ability to bring information directly to people allows decisions to be made at more levels"²

A whole new category of software called groupware is beginning to emerge. It offers a whole new teamwork approach that integrates e-mail, personal productivity and scheduling software, and database systems.

RESPONSE "with the state of the art communications available to business, the accounting department no longer needs to be located next to the advertising department."³ With the elimination of the need for a physical link to the rest of the corporation, the new satellite office for Cybercorp can be designed as a smaller self sustaining building.



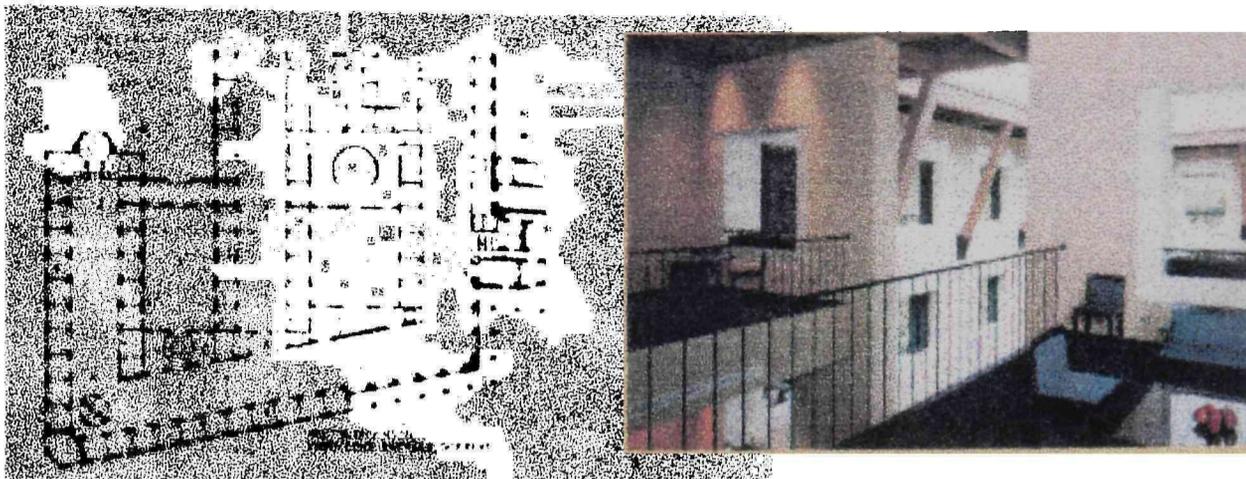
This map of the Compaq campus in Houston Tx. illustrates how the separate buildings are physical linked by enclosed bridges. In theory these same building could be linked by electronic means.

ISSUE: Enclosed private offices, the result of company hierarchy are now deemed obsolete. A more democratic approach is being taken in the design of office floor plans.

"Along with the benefits of the electronic revolution, enlightened corporations recognize ill

³ Kleeman, Walter B. Jr. *Interior design of the Electronic Office.* Von Nostrand Rienhold, New York, 1991.

*effects in it's dispersal and increasing isolation of workers."*⁴



RESPONSE

To avoid these consequences it is necessary to integrate a team-work based philosophy into the spacial design of an office facility. This would create a sense of unity and common purpose among the office staff. For the most part, an open office plan will used in the design of Cybercorp's new facility. This will create a phsycology that will elliminate the feeling of hierarchy in the office

ISSUE:

An unfortunate result of the changing work place is the break down of the casual communication loop. This loop is crucial to the informal learning process in the work place.

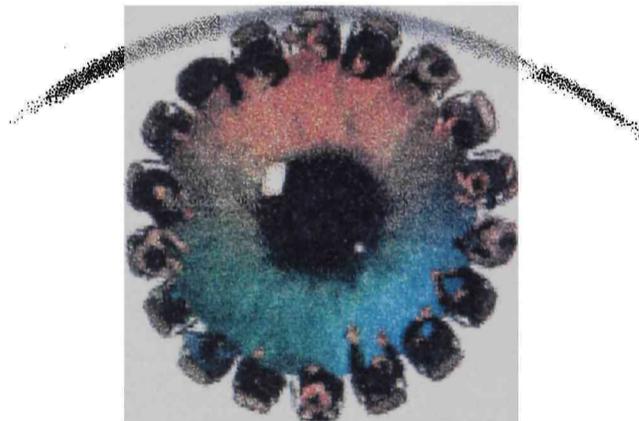
*"the loss of work-related social networks, [and] some psychic distancing from the organization."*⁴

RESPONSE

This occurs because of less time spent in a group situation within the office and more time spent in the field and at home. Groups are now linked through electronic means rather than spatial.

When designing a spatial link will be maintained. A much wider variety of spaces are necessary in order to design for the team based organizations.

The need of personnel office space is still a concern. However a common area will now be integrated in order to link these personnel spaces together. These common areas may manifest themselves as conference areas, lounges, laboratories, etc.



ISSUE:

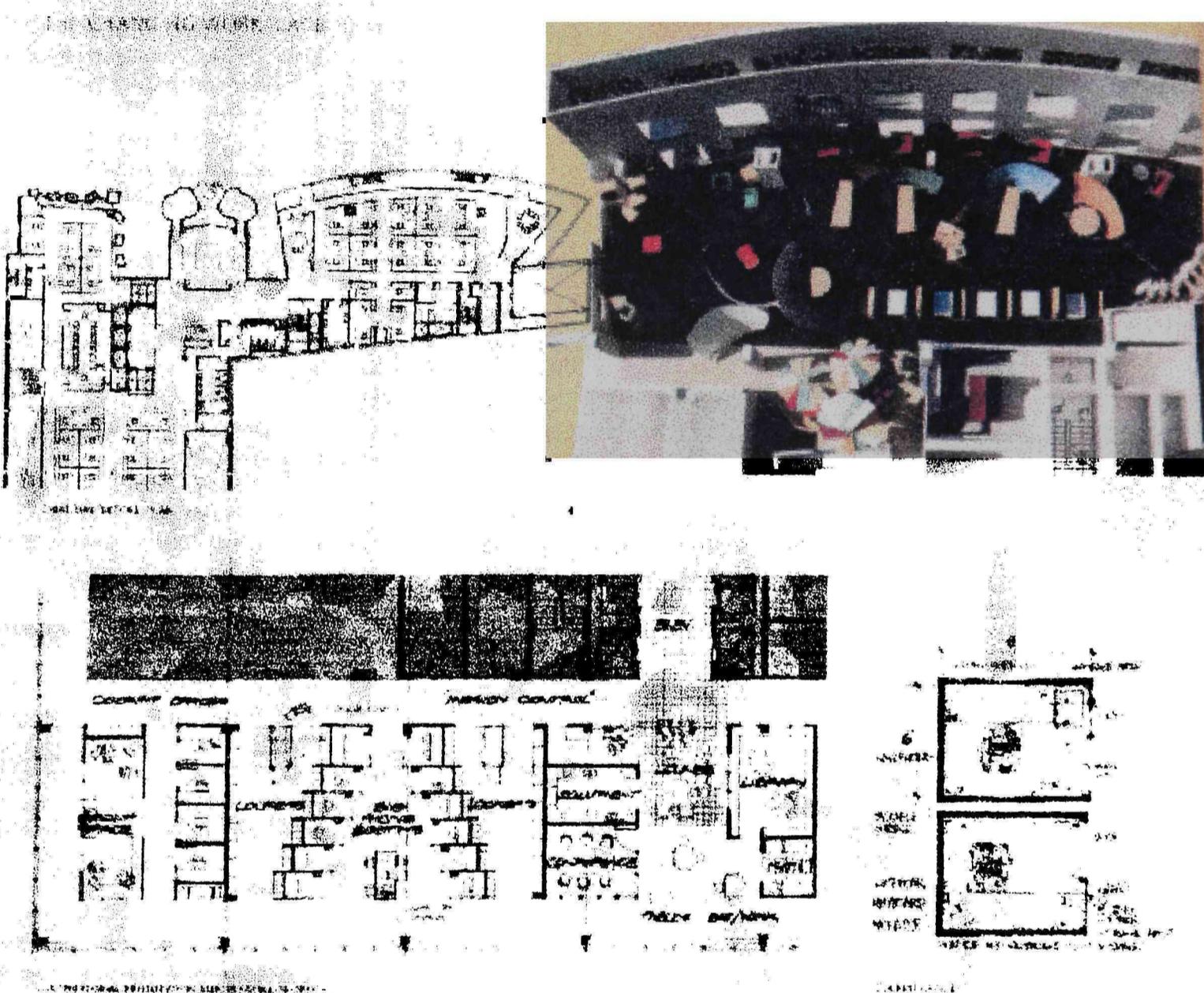
Many of today's work facilities are located in the suburbs. In the future,

⁴ "Hype vs. Reality The Changing Workplace," Progressive Architecture, March 1994.

construction for suburban work facilities will continue. However, these facilities will be reoriented to fit smaller floor plans designed by smaller organizations. These smaller pieces of a larger organization will be known as satellite offices.

RESPONSE

With smaller facilities comes the elimination of huge parking structures that often seem additive in the design of an office complex. Designing at a smaller scale also allows for emphasis to be placed on the creation of personal/quality space rather than structural and mechanical details.



ISSUE:

This new organization of satellite office will be located much closer to home for a great number of its staff. Therefore, much of America's work force will no longer be commuting. The daytime population of a community will increase and people will remain in one geography. This will allow the individual to become more in touch with the immediate community thus increasing civic activity.

RESPONSE

Designing within a suburban/community, or even rural environment requires a different design process. Emphasis is placed on responding to the natural

environment rather than the built context. In the Lubbock location the satellite office will be responsive to the two playa lakes on the south and north sides of the site. The south playa will provide an excellent view while the north playa will provide an excellent background for the office structure.

ISSUE:

Although the U.S. has been the leader in developing and packaging high tech products and media, the buildings that house the technologies have not advanced significantly. Intelligent office space provides conditions that facilitate the constant change in technology in the appropriate organizational and physical environment in order to enhance worker performance.

RESPONSE

Considerations for the coexistence of electronic, telecommunications, and mechanical equipment, and human ergonomics must be made. Electronic equipment has a proclivity to be sensitive to the environment. Elements such as dust and temperature may have an adverse effect on printers, fax machines, network servers etc. Special spaces, away from high traffic areas will be allocated for this equipment.

First, The intelligent office building must accommodate a compatible package of recent technologies, resolving the full range of hardware for managing external signal propagation: external power; telephone systems; internal signal propagation; computers (capacity, speed, and networking); peripheral "inputters, " processors, and outputters"; environmental management systems; building management systems, including diagnostics and maintenance systems, including diagnostics and maintenance automation; and command centers.

Second, the intelligent office building must provide appropriate physical and environmental settings for this hardware. This involves structure; enclosure-walls, windows, roofs, and basement; building geometry, including massing, orientation, horizontal and vertical plenum space, and overall spatial organization; major conditioning services such as heating, ventilation, and air conditioning, as well as power, lighting, and fire protection; and interior elements such as ceiling, partition, floor, and furniture systems.

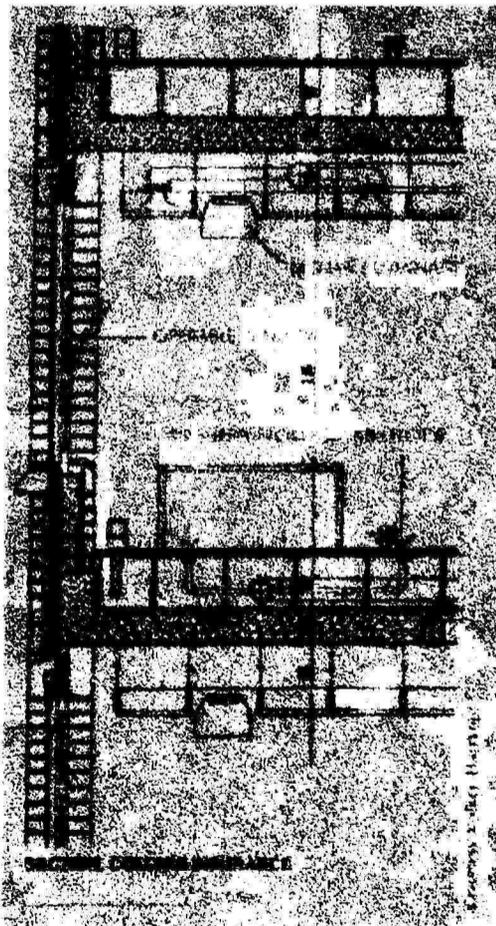
Third, the intelligent office building must address crucial environmental conditions such as spatial quality, including physical safety and security; thermal quality; air quality acoustic quality; visual quality; and building integrity versus rapid degradation. The "high-tech" building must provide the appropriate setting to accommodate immediate electronic enhancements, as well as future technologies and the anticipated level of long-term user requirements.⁵

⁵"The Intelligent Office," Progressive Architecture, December, 1991.

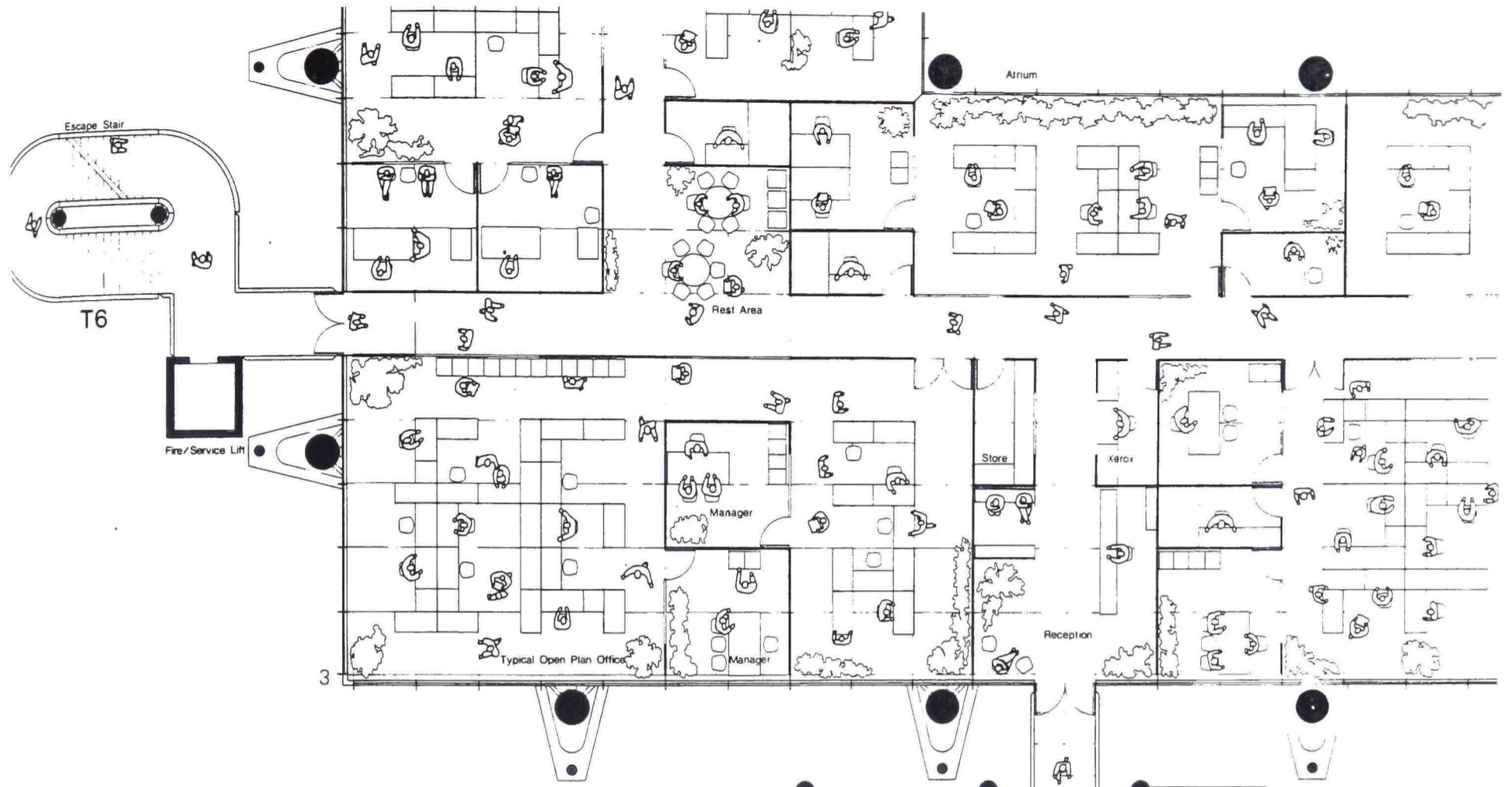
One of the issues involved in the design of the future is the worker's need for a variety of computers and the network that each terminal is linked to. At AT&T's Remote Work Center in Oakland California, the primary concern was to provide sufficient space for the wiring and conduit for the different terminals used there. Architect James Burlage, of the San Francisco office of the Architects collaborative, states "the solution in this case was a deeper than normal ceiling plenum to provide both the needed space and flexibility to accommodate changes in the system."⁶



The colonia Insurance Co. headquarters started with the survey of the employee's aspirations of a computerized office. Their concerns focused around indoor environmental quality such as the amount of air, light, and heat in their personal space. Increases in floor to ceiling heights allowed for more plenum space. A hung ceiling was used for acoustics, ambient heating and lighting, and a raised floor for individual fresh air supply and wire conduits. Movable air diffusers were incorporated in the floor for furniture flexibility.

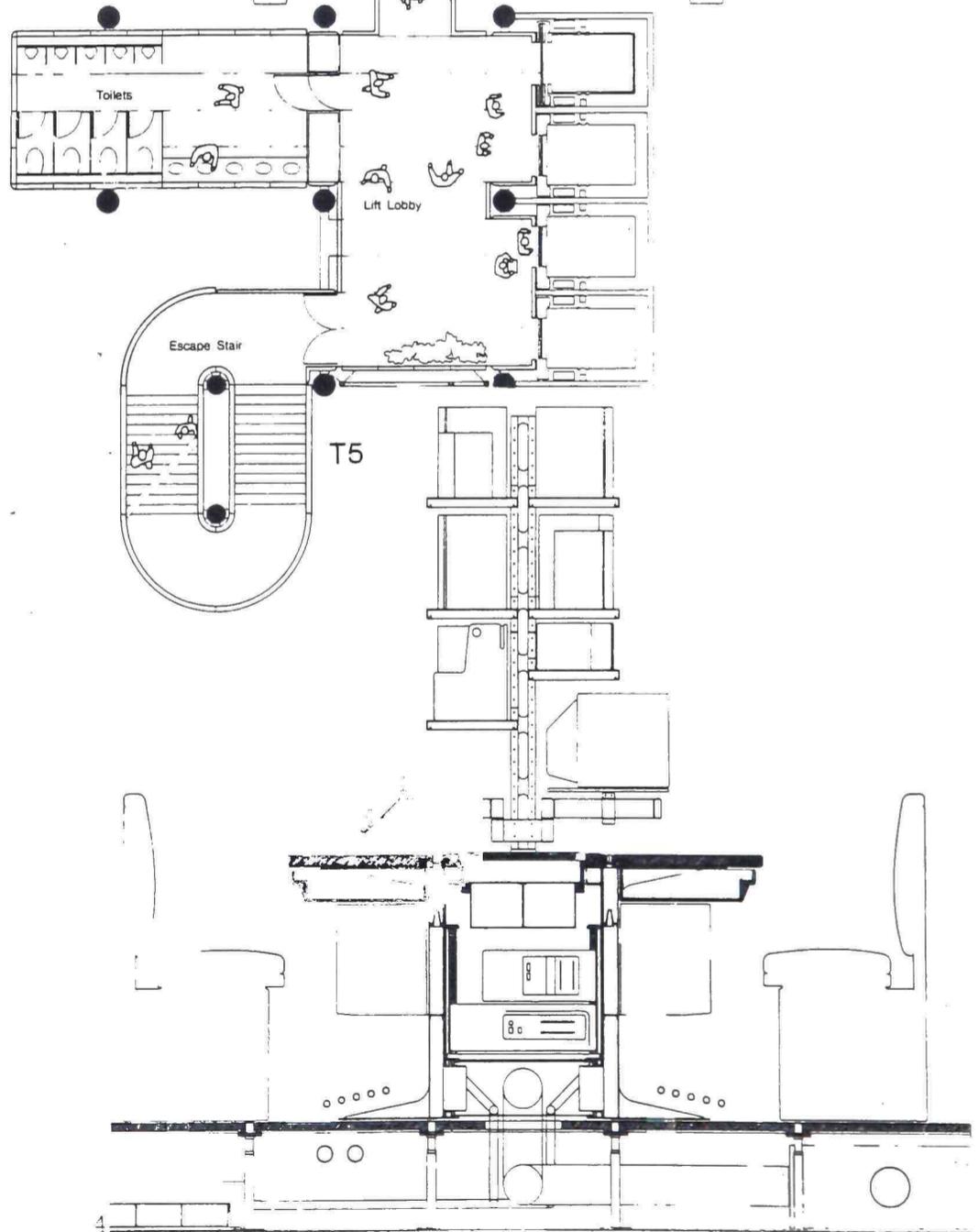


⁶ "Building in an Electronic Age," *Progressive Architecture*, May, 1989.

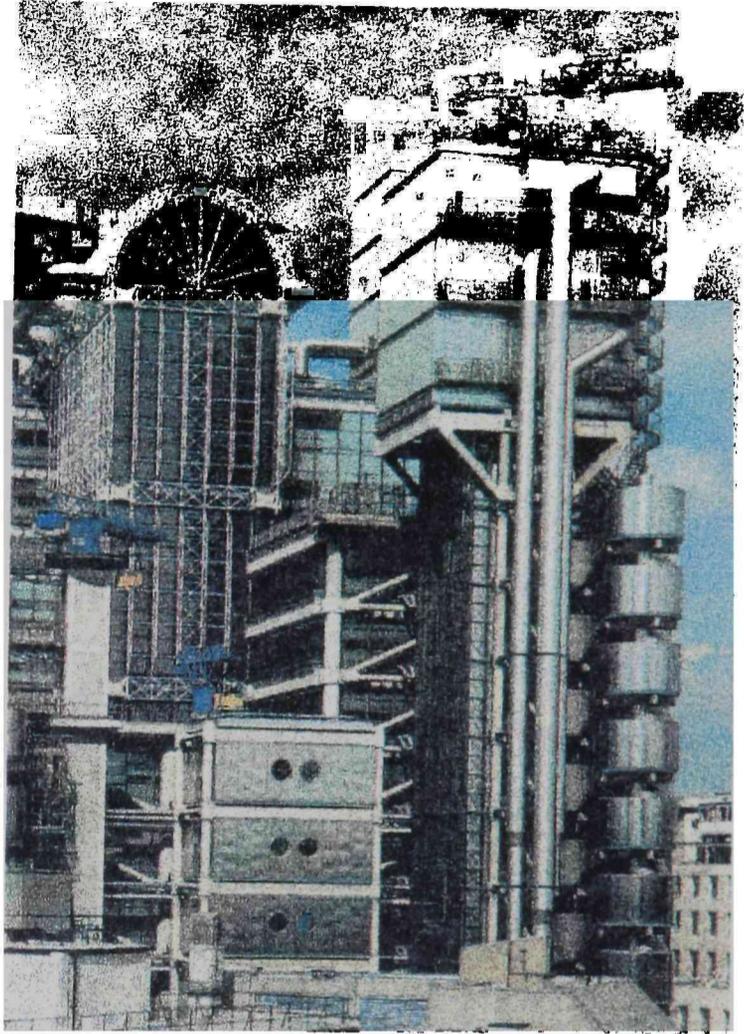


3, part plan of typical office floor. Tenants facing inwards are offered a restricted range of finishes to preserve a consistent appearance in the atrium.
 4, section through a box showing the 'technology slice' containing electrical and communication runs, air outlets and computer modems.

The engineering expressionism that was developed in the Lloyd's of London building was designed to provide accessibility and expandability of service systems and to accommodate changes in technology. The exposed service cores, with each sub-system (mechanical, supply and return, electrical, telecommunication, and transportation), independently run on the exterior of the building, create the building's aesthetics, as well as allow for future flexibility. These exterior cores are similar to the cores used in Japan and Germany, though, in this case, they are far more expandable, and expressive.



“One of the reasons that Lloyd’s chose the Omniplatz idea is that this is Lloyd’s fourth building in 50 years, and they are tired of moving. The intention is that it alone should serve them for the next 50 years. To do that it must be able to adapt and its components must be able to be updated on different time scales. The basic structure will last 50 years; the air-conditioning plant at best 15; the communications network perhaps five. As for the layout of the boxes, or the partitions on the upper floors, they are already being rearranged as syndicates expand or amalgamate.”⁷



Lloyd's

⁷ “The Omniplatz,” *International Architect*, January 1989.

EPISTEMOLOGY

Office buildings have changed our cities, and office work has revolutionized our society. Manhattan or Chicago or the City of London are evidence of the enormous impact the office has had upon our lives. Yet the history of the office building as a reflection of changing office organizations has scarcely been discussed. More attention needs to be given to the development of the office as a social system.

In the efforts to find new ideas to maximize the amount of leasable space in a building, we have neglected to understand the theory in which buildings relate to office organizations.

"Why, for instance, do highly paid stock brokers work three or four to a shared office while partners in an accounting firm work in a single room? Is it technology, social structure, or simply tradition which explains such habits?"¹

Although the study of the office has never, really, been recognized in the pages of history, it could, in fact, be a significant key to understanding past and modern societies. A closer look at the way office space is organized may create a clearer picture on a large portion of the economy that may otherwise be difficult to see.

It is obviously that buildings have changed in many ways during the past century. Each generation of new enterprise seems to have had its own organizational and technological problems to solve. What factors have prompted the change. Three questions are important to understanding this change.

"What were the prevailing social ideas about relationships in office organizations and indeed, in society at large?"

To what extent does the form of office buildings and office interiors reveal changes in office technology and office organization?"

To what degree are the form of office buildings and their interior arrangements dependent upon available construction materials and methods as well as existing real estate practice?"

What is the most powerful agent of change in office design which relates directly to building users, or external factors such as building technology and real estate prices, which relate to users through the medium of agents who are not directly under their control and who intervene only intermittently in their organizational lives?"²

Francis Duffy refers to two factors that are important to the above influences on office design. The first two being internal factors and the second two being external factors. The relationship between these two factors is important in revealing the way in which technology, organization, building construction, or real estate practice has influenced the office form.

¹ Duffy, Francis 1981. "Changing Offices." *The Architects' Journal* (UK) 174:5

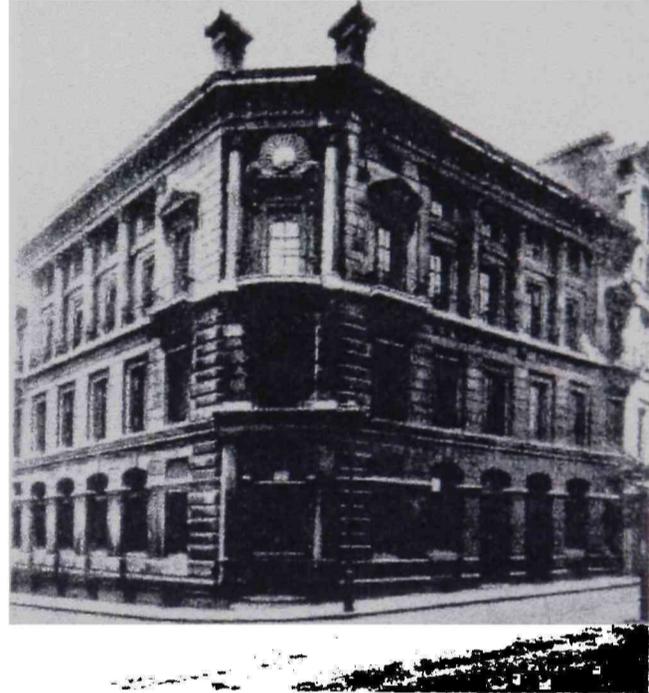
² ----- 1981 "Nine to Five," *The Architects' Journal* (UK) 174:5

SUNLIFE INS. CO.

In 1849, the Sun Life Assurance Company moved to the world's largest insurance office designed by architect C.R. Cockerell. The Sun building housed organizational groups, known a "small household"¹, of six to ten clerks in a plan not unlike a large house with its layout of rooms and extravagant detailing. The office staff posses skills that were a rare commodity. As a result, they enjoyed a sense of high status. In order to keep the staff functioning as a group their offices were linked together through a series of great rooms.

RESPONSE:

In Cybercorp's new satellite building the staff will enjoy the same kind of status. Extravagant detailing may no longer be appropriate, but linkage through a common place is a quality that will be integrated into the Cybercorp facility.

**THE LARKIN BLDG.**

The Larkin building in Buffalo New York in 1904. Frank Lloyd Wright designed this building for a mail order company. Its organization was reflective of the new kinds of enterprise that emerged at the end of the eighteenth century. For successful operation this organization depended on three conditions; the economies of scale for vast purchasing, excellent communications for ordering distribution, and a large, well trained, cheap labor forced. The Larkin building housed hundreds of employees



Their work was fairly routine so they were placed low in

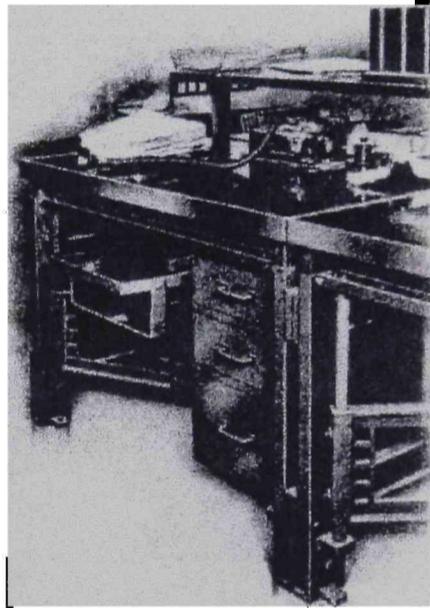
¹ Cohen, Elains and Aaron. Planning the Electronic. McGraw-Hill, New York, p. 4, 1983.

status. The clerks sat in fixed seats that pivoted from their desks. The space planning rigid. The corporate owner was a dominate figure in this time. The sexes were strictly segregated and corporate slogans cladded the walls. The Larkin building is a single vast space emphasizing corporate unity under the strict eye of the office supervisor. The Larkin building was an example of a hierarchic design. Today, the democratic approach is much more effective when designing office space. The sexes are no longer segregated. In fact women and men enjoy an equal, and close working environment.

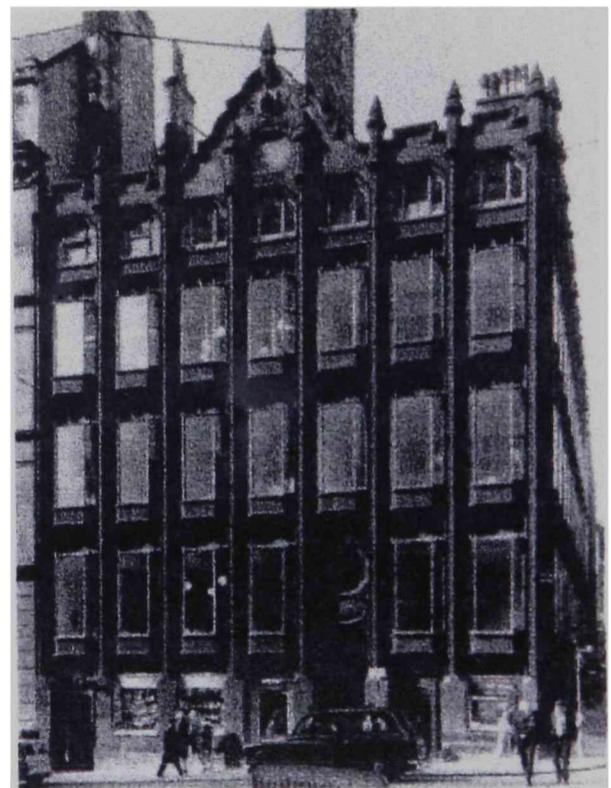
RESPONSE:

As opposed to the Larkin building, Cybercorp's new office will be designed with a democratic. The open office will create and atmosphere that stimulates equality. Men and women both will work in an environment where common areas such as conference areas, printing stations and break areas will provide opportunities for informal learning.

Special space-saving furniture developed for the Larkin building and manufactured by Steelcase Inc.

**THE ORIEL CHAMBERS BUILDING**

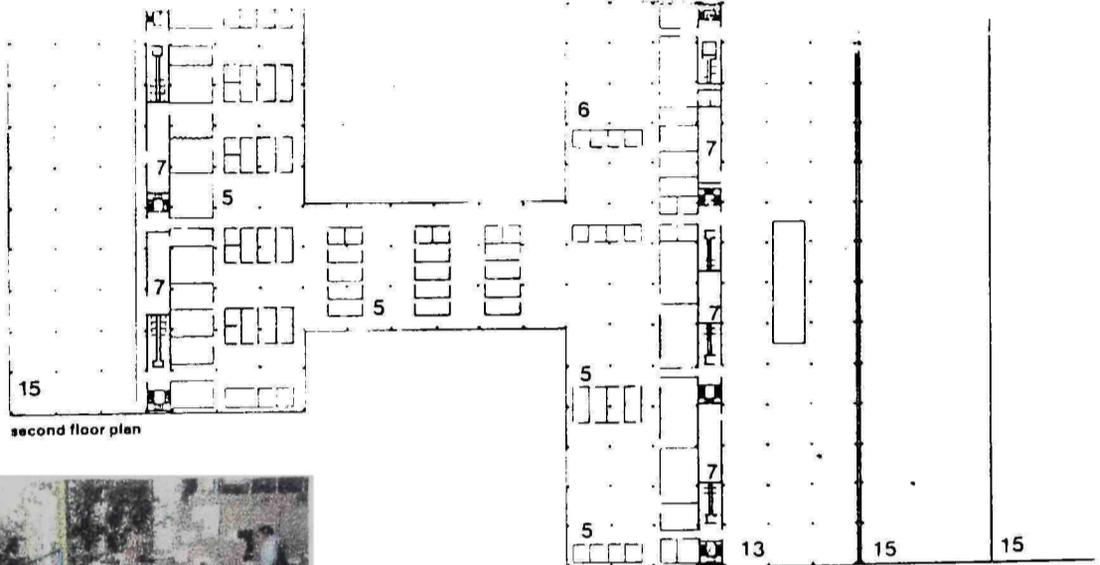
The Oriel chambers building is an early example of skyscraper design that came into existence during this time. The skyscraper is a result from real estate developers efforts to maximize their investments by building upwards. In essence, the skyscraper is a massive honeycomb of tiny office cells. One floor plan was developed and repeated upward with little change. There was also a core space that was usually located in the center of the building. This core space spanned from bottom to top. In it were the elevator shafts and mechanical plenum space.

**RESPONSE:**

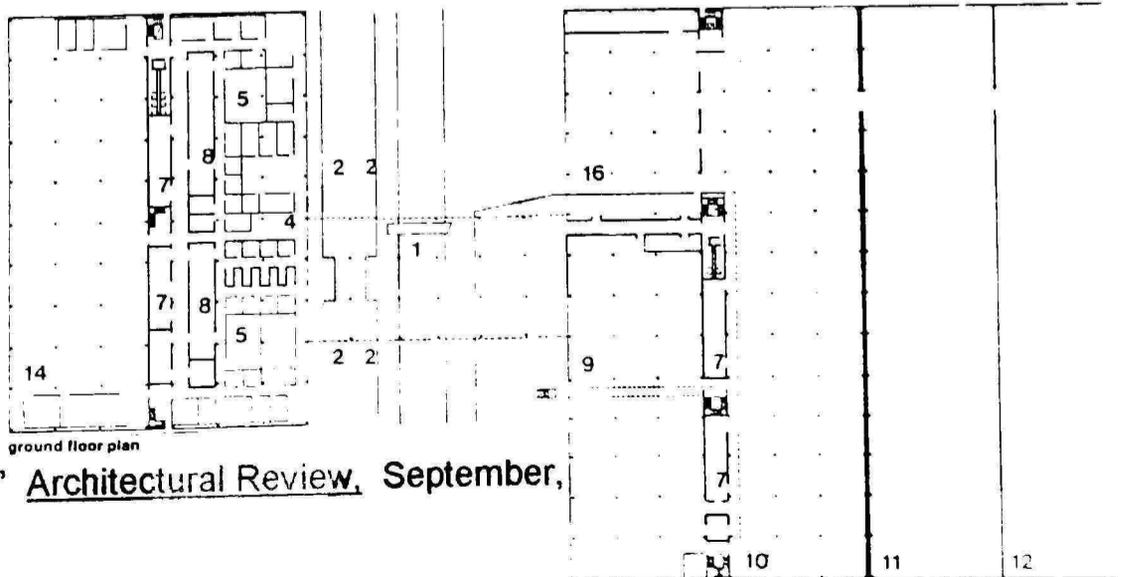
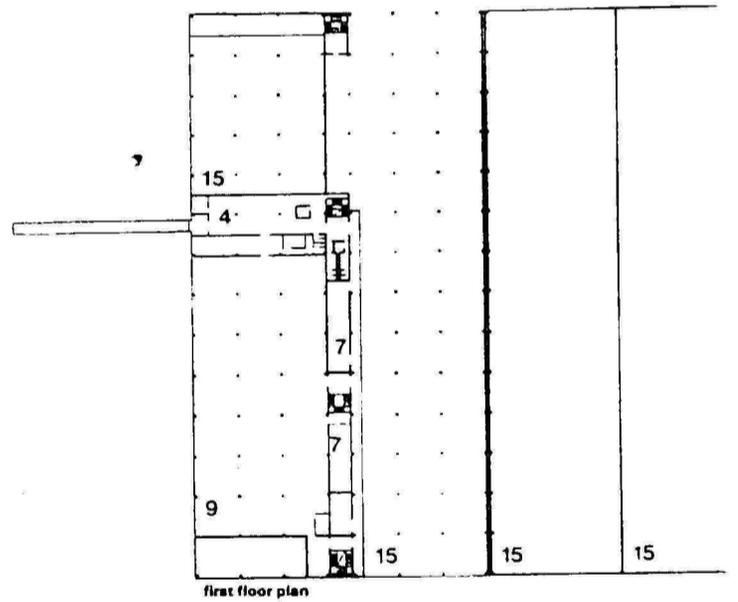
The vertical core space will still be incorporated in Cybercorp's satellite office. However, new technologies call for horizontal plenum space.

TECHNICAL PARK

"The brief from IBM has been translated into the concept of a technical park to give form to new patterns of social and technological standards, and which recognizes shifts from hierarchical to more democratic social patterns in the work place. The master plan identifies strategic movement patterns and building zones, keeping open the maximum range of building options for the future. The first phase is for a wide variety of activities flexible for change, choice and growth, both now and in the future. Under one roof are grouped computer machine halls, word processing centers, education spaces, open administration areas, managers offices, workshops, cleaning and repair centers, small parts stores, vna warehouses, loading docks, restaurant and reception facilities."²



- key
- | | |
|-----------------------------|----------------------|
| 1, entrance bridge | 9, small parts store |
| 2, visitors' parking, taxis | 10, storage support |
| 4, reception | 11, warehouse 1 |
| 5, offices | 12, warehouse 2 |
| 6, restaurant | 13, workshops |
| 7, core zone | 14, computer hall |
| 8, back-up plant | 15, void |
| | 16, truck door |



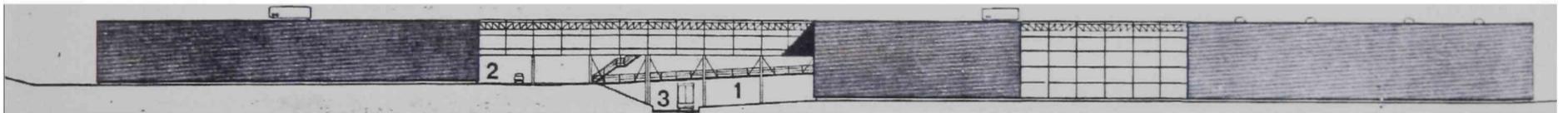
² "Technical Park, Greenford, Middlesex," *Architectural Review*, September, 1980.

RESPONSE:

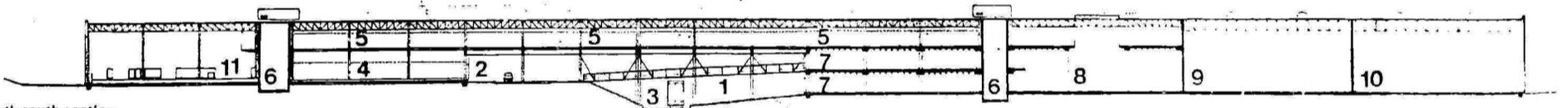
Technical Park is an excellent example of modern, democratic design. It utilizes the open office space plan in order to achieve a socially and technologically advanced work environment. An industrial type image was used in the design of Technical Park. Foster Associates thought this was appropriate in order to reflect the high tech image associated with IBM. This industrial concept will apply to Cybercorp's new facility on the basis of size and business type. Exposed structure and ductwork will be emphasized in the way Technical park and Lloyd's of London have done



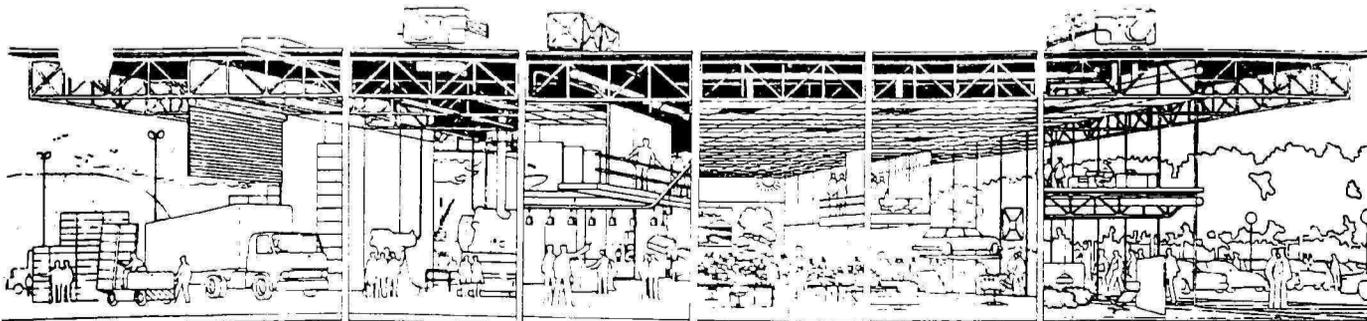
- key
- | | |
|-----------------------------|-----------------------|
| 1, entrance bridge | 7, small parts store |
| 2, visitors' parking, taxis | 8, truck docks |
| 3, truck route | 9, warehouse 1 |
| 4, reception | 10, warehouse 2 |
| 5, offices | 11, computer hall |
| 6, core zone | 12, Grand Union Canal |
| | 13, Central Line |



st elevation



th-south section



LIST OF ACTIVITIES AND SPACES

FUNCTION	ACTIVITY	SPACE
SYSTEMS ENGINEERING	ENGINEERING	LAB/OPEN OFFICE ENVIRONMENT
	ENGINEERING ADMIN.	MANAGER'S OFFICE, SECRETARY SPACE
	CONFERENCING	CONFERENCE SPACE
	STORING	STORAGE & SERVER SPACE
	PRINTING & COPYING	PRINTROOM
SECONDARY ACTIVITIES	TIDYING UP	RESTROOMS
	BREAK TIME	BREAKROOM
PRODUCTION & PLANNING	PRODUCTION & PLANNING	PERIMETER OFFICE SPACE
	PROD. PL. ADMIN	MANAGER'S OFFICE, SECRETARY SPACE
	CONFERENCING	CONFERENCE SPACE
	STORING	STORAGE & SERVER SPACE
	PRINTING & COPYING	PRINTROOM
SECONDARY ACTIVITIES	TIDYING UP	RESTROOMS
	BREAK TIME	BREAKROOM
QUALITY CONTROL	CONTROLLING QUALITY	PERIMETER OFFICE SPACE
	Q.C. ADMIN.	MANAGER'S OFFICE, SECRETARY SPACE
	CONFERENCING	CONFERENCE SPACE
	STORING	STORAGE & SERVER SPACE
	PRINTING & COPYING	PRINTROOM
SECONDARY ACTIVITIES	TIDYING UP	RESTROOMS
	BREAK TIME	BREAKROOM
TRAFFIC & DISTRIBUTION	FREIGHT TRANSPORTATION	OPEN OFFICE SPACE
	MONITORING FREIGHT RATES &	CENTRALIZED RECORDS SPACE

	REGULATIONS	WAREHOUSE SPACE (SMALL)
	CONFERENCING	CONFERENCE SPACE
	STORING	STORAGE & SERVER SPACE
	PRINTING & COPYING	PRINTROOM
<i>SECONDARY ACTIVITIES</i>	TIDYING UP	RESTROOMS
	BREAK TIME	BREAKROOM
<i>MATERIALS MANAGEMENT</i>	INVENTORY CONTROL	OPEN OFFICE SPACE
	TOOLS & PARTS CONTROL	WARE HOUSE SPACE (SMALL)
	CONFERENCING	CONFERENCE SPACE
	STORING	STORAGE & SERVER SPACE
	PRINTING & COPYING	PRINTROOM
<i>SECONDARY ACTIVITIES</i>	TIDYING UP	RESTROOMS
	BREAK TIME	BREAKROOM
<i>SAFETY</i>	ADMINISTRATION OF SAFETY PROGRAMS MONITORING OF OSHA REGULATIONS	OPEN OFFICE SPACE
	CONFERENCING	CONFERENCE SPACE
	STORING	STORAGE & SERVER SPACE
	PRINTING & COPYING	PRINTROOM
<i>SECONDARY ACTIVITIES</i>	TIDYING UP	RESTROOMS
	BREAK TIME	BREAKROOM
<i>TECHNICAL SUPPORT</i>	ELECTRONIC SERVICE AND SUPPORT FOR ENTIRE FACILITY	OPEN OFFICE SPACE WORK SHOP SPACE
<i>SECONDARY ACTIVITIES</i>	TIDYING UP	RESTROOMS
	BREAK TIME	BREAKROOM
<i>DIRECTORS OFFICE</i>	MANAGEMENT OF SYSTEMS HARDWARE FACILITY	PRIVATE OFFICE, SECRETARY SPACE
<i>SECONDARY ACTIVITIES</i>	TIDYING UP	RESTROOMS

	BREAK TIME	BREAKROOM
<i>MAIL SERVICE</i>	DELIVERY IF INCOMING & OUTGOING MAIL	MAIL ROOM
<i>SECONDARY ACTIVITIES</i>	TIDYING UP	RESTROOMS
	BREAK TIME	BREAKROOM
<i>CENTRAL RECEPTION</i>	PROVIDING INFORMATION & SECURITY WAITING	CENTRAL RECEPTION DESK LOBBY
	FORMAL CONFERENCING	FORMAL CONFERENCE ROOM
<i>SECONDARY ACTIVITIES</i>	TIDYING UP	RESTROOMS
<i>BUILDING SERVICES</i>	CUSTODIAL SERVICES	WORKSHOP SPACE
	JANITORIAL SERVICES	STORAGE SPACE (WITH SINK)
<i>SECONDARY ACTIVITIES</i>	TIDYING UP	RESTROOMS
	BREAK TIME	BREAKROOM
<i>PAYROLL</i>	PAYROLL PROCESSING	OPEN OFFICE SPACE
	RECORD KEEPING	CENTRALIZED RECORDS SPACE.
<i>SECONDARY ACTIVITIES</i>	TIDYING UP	RESTROOMS
	BREAK TIME	BREAKROOM

ACTIVITY/SPACE ANALYSIS

- ACTIVITY:** Systems Engineering (development and testing of Cybercorp's systems hardware)
- ISSUES:** The staff in this area will need a lab/office environment. Industrial type space will be needed for development of sensitive and sophisticated computer hardware. Each member of the engineering staff will need his or her own personal workspace. However these work spaces must be conducive to group cooperation. For the protection of trade secretes certain security measures must be taken.
- RESPONSES:** An open office/lab space will be used to maximize usable square footage. A raised floor system will be used so that electrical lines, phone lines, printer & network cables will not be exposed or limited to the walls. Work stations containing a layout space for measuring & testing as well as space for a personal computer will be provide to each staff member. These workstations will take on a perimeter format in the office space in order to give the employees more opportunities for face to face contact. 6075 sqft has been allocated for these functions. Two controlled entrances with scanner locks will be provided for security measures.
- ACTIVITY:** Systems engineering printing and copying
- ISSUES:** Systems engineering will require its own printing and copying machines because of the size and quantity of prints. Flat files will need to be located near the print copy center for convenience. This equipment will need to be located in a place in the room where it can be accessed equally by all of the engineering staff. 435 sqft has been allocated for this purpose.
- RESPONSES:** The printer machines and the copy machines, as well as the flat files will be located and a focal point within the perimeter of workstations so that everyone can enjoy equal access to them. With the addition of a cutting and pasting table, the print/copy machines and the flat files will act as an island or common space within the office perimeter.
- ACTIVITY:** Storing for Systems Engineering.
- ISSUES:** The systems engineering dept. must have storage area for office supplies and the engineering network server. This are will not be accessed frequently so location is not that crucial.
- RESPONSES:** 25 sqft. will allocated for the storage of office supplies and the network server. The network server needs a clean place where it will remain relatively undisturbed. Therefore it is necessary to locate the storage area in a place where there is little traffic. This will also provide a situation where the server can be serviced with little disturbance to the engineering group.
- ACTIVITY:** Production and Planning.
- ISSUES:** The management staff in production and planning is in charge of the management and project administration in systems engineering. The

management staff will need individual offices for one on one discussion with different members of the engineering staff. A shared secretary will also be a part of the management team. The secretary's duties will involve filing, typing, answering phone calls, and records keeping.

RESPONSES:

Each member of the management staff will have an office consisting of 135 sqft. These offices will be arranged, in a perimeter, around the shared secretary's space so that equal access can be maintained. 100 sqft will be allocated for the secretary's personal space. 200 additional sqft will be added to the secretary space for file cabinets, printing machines and copy machines. Production and planning will be located adjacent to systems engineering for convenience.

ACTIVITY:

Production and Planning Storage

ISSUES:

The storage of office supplies is an area that is not frequently used compared to the area use for the copy machine. Therefore its location is not extremely crucial. However, this same area will contain the network server for production and planning.

RESPONSES:

25 sqft. will allocated for the storage of office supplies and the network server. The network server needs a clean place where it will remain relatively undisturbed. Therefore it is necessary to locate the storage area in a place where there is little traffic. This will also provide a situation where the server can be serviced with little disturbance to the production and planning group.

ACTIVITY:

Conferencing for Engineering and Production and Planning.

ISSUES:

Conferencing for P&P and engineering will take place in this area so adjacency to both of these departments would be advantageous. The conference area must also be conducive to teamwork communication so the typical boardroom layout would not be appropriate.

RESPONSES:

The conference area will act as a linkage point between P&P and Engineering. It will take on a square shape rather linear shape. A hierarchical formation of people occurs when a conference room takes on a linear shape such as a rectangle.

ACTIVITY:

Rest room activities for Engineering P&P, and Quality Control

ISSUES:

Rest rooms will be provided for Engineering and P&P, and Quality Control. The location must be in a convenient place for all three departments. Considerations must be made for handicapped accessibility.

RESPONSES:

The rest rooms will be located near or adjacent to the conference room in order to be centrally located. The men's rest rooms have 2 w/cs and two urinals, one of each will be handicapped accessible. The women's rest room will have three w/cs one of which will be handicapped accessible. Both rest rooms will have one sink. A 50 sqft minimum is required for each handicapped w/c. 500 sqft has been allocated for both restrooms.

ACTIVITY:

freight transportation and freight monitoring.

ISSUES:

The Traffic and Distribution dept. staff consists of clerks and warehouse workers. Invoices and requisition forms are filled out and filed. A warehouse/holding

space for incoming parts and outgoing systems hardware must be provided. High traffic and noise will occur in this area.

RESPONSES:

An open office plan will be use for the staff of 10 in Traffic and Distribution. 100 sqft will allocated to each of them . 1000 sqft of warehouse space has been provided for warehouse space. A docking bay with roll-up doors will be provided for a receiving area. 8 sqft has also been provided for a centralized records area. 25 sqft will be provide for office supplies and a centralized storage. Due to high traffic and noise this dept. need will be located away from the directors office and Systems Engineering, possibly on the opposite side of the building.

ACTIVITY:

Materials Management

ISSUES:

M.M. is in charge of inventory, tools, & parts control. A distribution counter will be need for the issuance of parts and tools to systems engineering. A warehouse area will also be needed for the storage of parts and tools. A relationship will need to be made between M.M., Engineering and Traffic and Distribution.

RESPONSES:

M.M. will be located in between Engineering and Traffic and Distribution in order to create a sound and traffic buffer and convenient access. 769 sqft has been allocated to M.M.'s warehouse space. 1000 sqft has been provided for office space which will be open office space. A distribution counter will be located within this office for the issuance of parts and tools to Engineering. A 8 sqft area will be allocated for a centralized records area.

ACTIVITY:

Mail Service

ISSUES:

A staff of 2 clerical employees will be responsible or the incoming & outgoing mail for Cybercorp's satellite office building. Space for receiving, sorting, packing, and shipping will need to be provided.

RESPONSES:

200 sqft. will be provided for the mail room staff. The shipping and receiving area for the mail room will be shared with that of Traffic and Distribution. Therefore, the two depts. will need to be located adjacent to each other.

ACTIVITY:

Building Services

ISSUES:

Building Services consists of three staff members who are in responsible for building maintenance and janitorial service. This dept. needs to be located behind the scenes, away from visitors and clients. Appropriate space must be allocated for cleaning supplies and tool storage. A small desk area will also be provided.

RESPONSES:

B.S. will be located adjacent to Traffic and Distribution, on the opposite side of the building from the director's office. 380 sqft will be provided to B.S. for storage of cleaning supplies tools and a janitor's sink.

ACTIVITY:

Rest room activities for Traffic and Distribution, Materials Management, Mail Room, and Building Services.

ISSUES:

Due to the fact that the Mail Room, T.&D., Building Services and M.M. will be located adjacent to one another, they will be sharing rest room facilities. The men's and women's rest rooms need to be provided with the proportional number w/cs, sinks and urinals for these depts.

- RESPONSES:** The rest rooms will be located adjacent to both materials management and traffic and distribution for equal access. The men's room will be equipped with one handicapped accessible w/c, one sink, and one urinal. The women's with one w/c, one handicapped w/c and one sink. A 50 sqft minimum is required for each handicapped w/c. 400 sqft has been allocated for both restrooms.
- ACTIVITY:** Management of Cybercorp's systems hardware satellite office.
- ISSUES:** This activity involves the facility director and the director's assistant. A direct relationship the Payroll Office and Production and Planning must be maintained. However no direct relationship needs to maintained with the rest of the facility.
- RESPONSES:** 200 sqft will be provided for the director and 135 for the director's assistant. The directors suite will be located adjacent to the payroll office and the production and planning dept.
- ACTIVITY:** Payroll Processing
- ISSUES:** A staff of 2 will be in charge of payroll. The accountant in the payroll office will have a direct relationship with the building's director. The accountant's assistant will perform any clerical duties involved with the Payroll office.
- RESPONSES:** 200 sqft has been provide for the payroll dept. An open office area has been planned for the accountant and the assistant. For convenience, the payroll office will be located adjacent to the director's suite.
- ACTIVITY:** formal conferencing
- ISSUES:** Any conferencing with the director will occur in the formal conference area. This includes conferences with Production and Planning and any executive level visitors to the facility.
- RESPONSES:** The formal conference area will be located adjacent to the director's office. 200 sqft. will be provided for formal presentation and board room conferencing purposes.
- ACTIVITY:** Central Receiving
- ISSUES:** Central Reception is responsible for information to visitors, security, and directing phone calls. This dept. should be located at a focal point in the facility. I must also provide a quality of life image for the facility.
- RESPONSES:** The central reception desk will be located at the front of the building. 2000 sqft. will provided to this area quality of life purposes and a waiting area.
- ACTIVITY:** rest room activities for Central Reception.
- ISSUES:** Rest rooms for the central reception staff of 3 people as well as any visitors in the waiting area must be provided.
- RESPONSES:** The men's rest room will be equipped with on handicapped accessible w/c, one handicapped accessible urinal and one regular urinal. The women's rest room will be equipped with one handicapped w/c and one regular w/c. Each rest room

will have one sink. These rest rooms will be located adjacent to central reception. A 50 sqft minimum is required for each handicapped w/c. 600 sqft has been allocated for both restrooms.

ACTIVITY:

break taking

ISSUES:

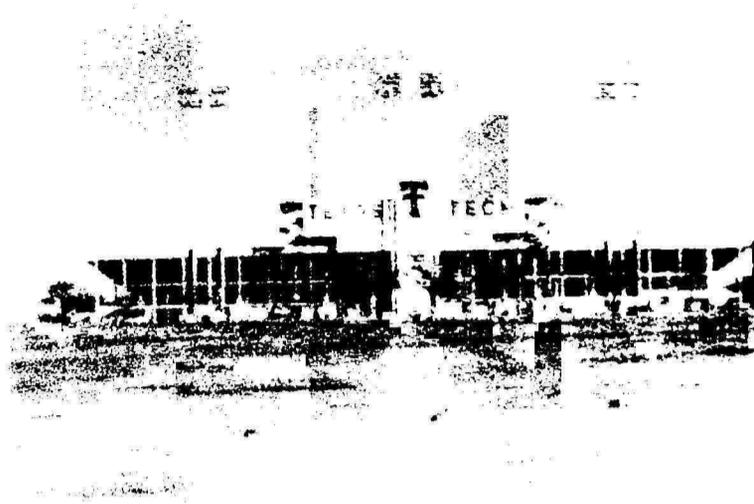
Lounge space for the entire Cybercorp systems hardware facility ,must be provided. This area must be as equally accessible to the entire facility as possible. A kitchen area must be provided. The lounge area must provide a serene atmosphere for relaxation and conversation during break time and lunch.

RESPONSES:

For a central location the break room will be located behind and out of sight of central reception. 1580 sqft will be provided for tables, chairs, sofas, and kitchen space which will be equipped with a sink, counter space and cabinets as well as refrigerator and coke machine space. Sofas, and coffee tables will be arranged in a nook fashion in order to enhance conversation. Natural and soft lighting will be used to create a serene atmosphere.

CULTURAL CONTEXT

Many cultural attractions are available in Lubbock. The local culture revolves, primarily around agriculture and Texas Tech University. Some of the best examples of Lubbock's culture can be experienced at the Lubbock International Cultural Center and the Ranching and Heritage Center. The R&H Center is a unique collection of different houses, building, and other artifacts that have been brought from different parts of west Texas. The Southwest genre is primary form of art that can be found in Lubbock. This among other art forms can be found in the Godbold Cultural Center and the Southwest Collection, which is currently under construction. Texas Tech also plays a great role in defining Lubbock's culture. Different Sporting Events such as football, base ball, and basketball bring the community, consisting largely of Tech graduates, together. They also do a great deal to stimulate the local economy. Cultural Diversity has resulted from Texas Tech's presence in the city. Every year student's from different parts of Texas, the United States and the world.



RESPONSE:

This cultural diversity will allow for a wide range of design opportunities as opposed to a strictly defined culture that would only allow a limited range of design response.

PSYCHOLOGICAL CONTEXT

Lubbock is known for it's typical west Texas/Conservative attitude. Unlike the flamboyance that might be seen in New York or Los Angeles, the past attitude here has been one of no frills. The people here pride

themselves on a secure economy, community, and a low cost of living. All of these qualities are good to have in a city. However, this] does have it's consequences. Until recently, fewer chances where being taken to improve the quality of life in Lubbock the. This was evident in the recent ballot for a new multi-purpose arena which would improved the quality of life and introduced new commerce. However with the future closing of Reese A.F.B. the people of Lubbock will be more receptive to new business and architecture. This has been demonstrated through the construction of the new science spectrum known as "The Omnimax". This new 3-D theater brings culture and the world's mysteries to you in a high-tech industrial setting.



RESPONSE:

These recent events will provide opportunities to introduce new forms of Architecture into a city that is not known for it's vision concerning architecture.

BUILT CONTEXT

The site is located on Lubbock's Southwest side, in a newer development called King's Park. Directly to the north and cross the playa lake is the neighborhood portion of King's Park. To the west is the southwest branch for Lubbock National Bank. Across the street and to the south east is Western National Bank. In Close proximity are various fast food and formal dinning restaurants such as McDonald's and CattleBaron's. United Supermarket is located a block away in King's Gate Center.

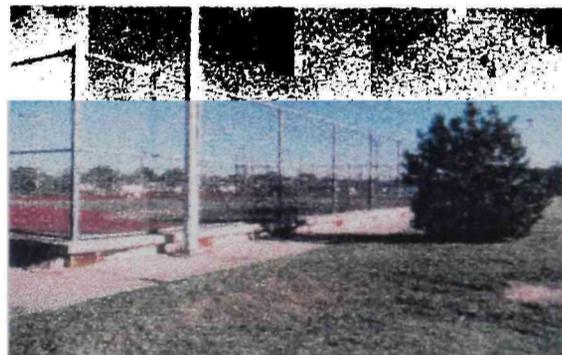


Lake Ridge golf course is located 5 block's to the east. There are many medical practitioners such as the Went's Dental Center that are located near the proposed site. The convenience and closeness of these facilities provides an optimum setting for Cybercorp's new office facility. It is very likely that every employee would live no more than 15 minutes from work. This is due to the fact that the surrounding neighborhoods such as King's Park consist of middle to upper middle income housing, well suited to the types of employees working in this division of Cybercorp.

RESPONSE:
 Various forms of Architecture are common in this area. From this we can determine that we have a certain amount of flexibility when designing. This area is also the newest example of development in Lubbock. This reiterates the opportunity to introduce newer forms of architecture to Lubbock.

NATURAL CONTEXT

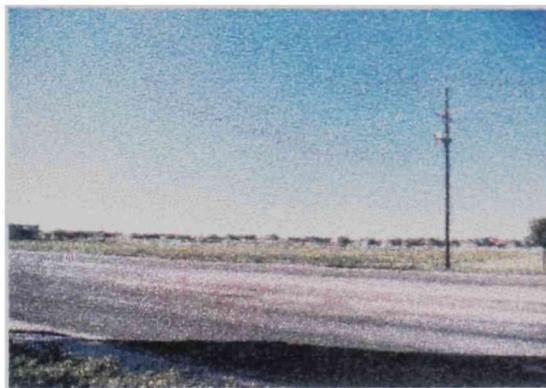
Lubbock is located in the south plains of west Texas. It is 3250 feet above sea level. Even though there is very little air pollution, blowing dust does occur on the average of 60 days out of the year. This happens during the Fall and Spring seasons. The only sever weather that Lubbock has experienced takes the form of intense winds that would create an extremely rare tornado situation. The average annual temperature is 67.4°F
 The total average annual precipitation



is 17.4 inches making Lubbock a semi-arid region. The site in King's Park is a previously cleared, leveled, and surveyed lot with two playa lakes on its north and south sides.

RESPONSE:

The temperate climate and seismic stability allows for flexibility in design and building materials. The two playa lakes provide for excellent landscaping and scenic opportunities.



THE OMINIMAX

One of the successful and most significant attempts to introduce new forms of architecture into Lubbock manifests itself in the latest in theater technology. Involving the audience with the film is the idea behind the Ominimax. New perspectives generated through the latest 70mm multi-image projection and sound system provide more dramatic and exiting viewing sensations. Architect and Associate professor Michael G. Peters focused on the new architectural opportunities provided in building the science spectrum. An industrial image was used in order to venerate the technological advances involved in the Ominimax.



SUMMARY OF SPACES

		Sqft per		
A) DIRECTOR	1	X 200	=	200
B) MANAGEMENT & PROFESSIONALS	46	X 135	=	6145
C) CLERICAL PERSONNEL	27	X 100	=	2700
				<u>9045</u>
D) SPECIAL AREAS (WAREHOUSE)			=	1769
E) CONFERENCE SPACE	(46 ÷ 4)	X 20	=	230
				<u>(# of mgmt & pros.) x 20sqft</u>
				4
F) ADDED FORMAL CONFERENCE SPACE			=	200
				<u>11244</u>
G) COMPUTER HARDWARE (PRINT/COPY)	11244	X .04	=	450
H) BUILDING SERVICES (3 employees)	11244	X .035	=	394
I) RECORDS	2	X 8 sqft	=	16
J) STORAGE	3	X 25 sqft	=	75
K) CENTRAL RECEPTION				2000
L) RESTROOMS				<u>1500</u>
				15679
TOTAL NET AREA				15679
TOTAL GROSS AREA		15679 X 1.49		23361.71 sqft

PARKING SPACES

BUILDING POPULATION 77 X 1.09 = 83.93 PARKING SPACES X 325 SQFT = 27277.25 Sqft
(minimum of 4 spaces must be accessible)

The above guidelines were obtained from Planning the New Corporate Headquarters by Bryant Putman Gould., Federal Accessibility Standards, & Architectural Rules of Thumb

A THEORY OF OFFICE FUTURES
PROGRAMMING FOR
CYBERCORP'S SATELLITE
OFFICE BUILDING
IN LUBBOCK
TEXAS

by

Scott W. Reed

A THESIS

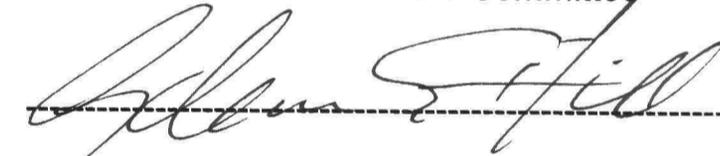
IN

ARCHITECTURE

Submitted to the Architecture Faculty
of the College of Architecture
of Texas Tech University in
Partial Fulfillment
for the Degree of

BACHELOR OF ARCHITECTURE

Chairman of the Committee



Programming Instructor (ARCH 4395): Prof. Robert D. Perl
Design Critic (ARCH 4631): Prof. Michael Peters
Thesis advisor (ARCH 4631): Prof. Glenn Hill

Accepted

Dean, College of Architecture

December, 1995'

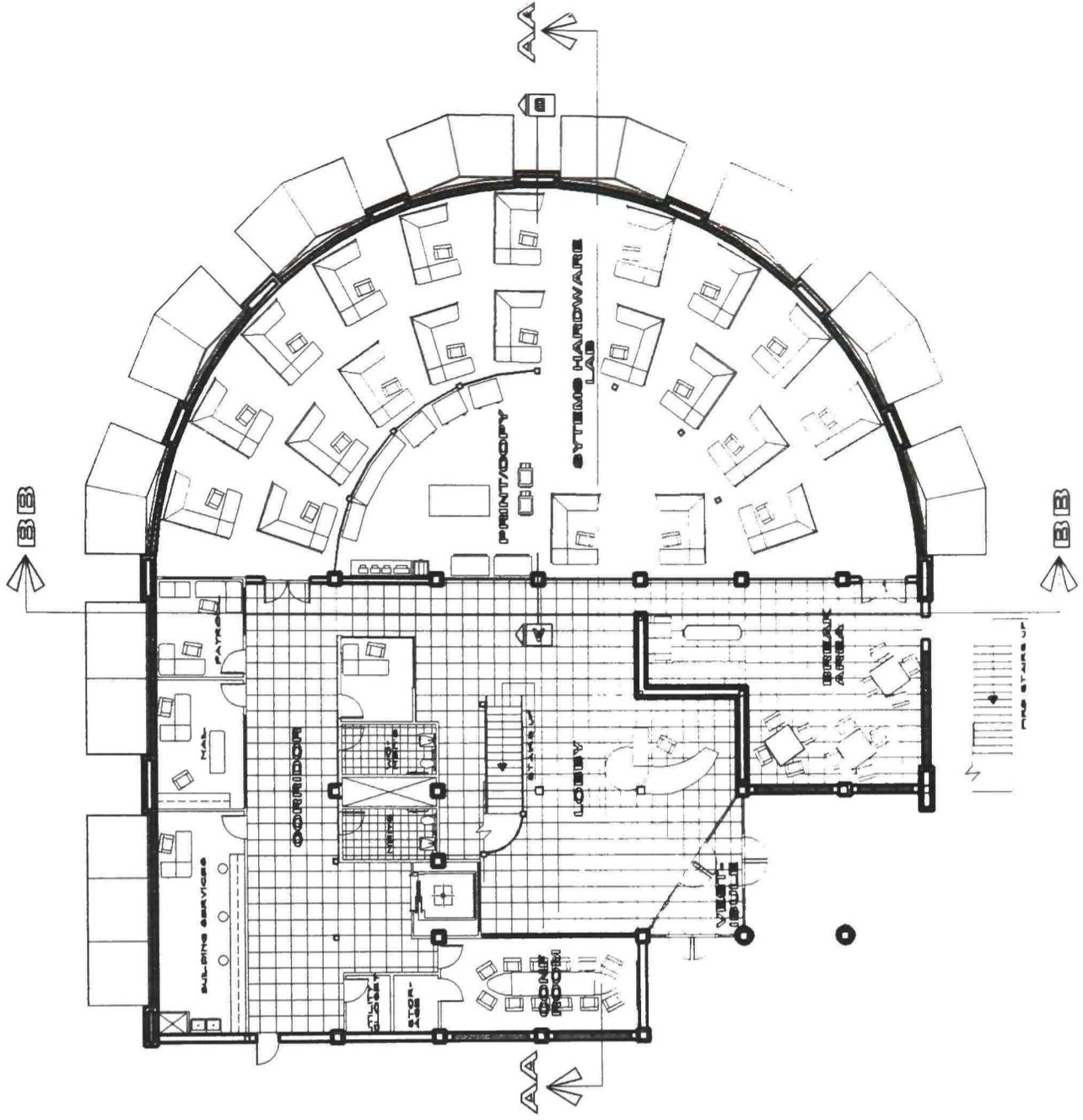
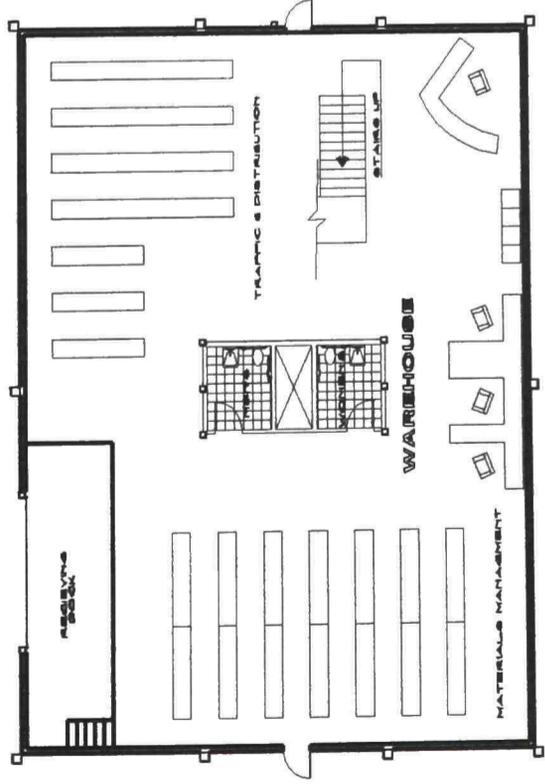
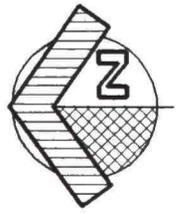
PROJECT STATEMENT

Every since the early 20th century the image of corporate America manifested itself in huge facilities in which workers would migrate to and from in the morning and afternoon. The earliest form of these facilities took shape as "Sky Scrapers in Chicago. As urban flight progressed these facilities evolved into a campus like design. Such is the case with Union Carbide in Danbury Connecticut and the Compaq Computer Corp. in Houston Texas. In a new age of computers and electronic media technological advances will allow future corporate facilities to manifest themselves within a suburban, possibly even rural, environment and allow employees to maintain an effective level of productivity. The basic corporate structure will remain the same. What has changed is the fact that different divisions of the corporation no longer need to be adjacent to each other. Huge corporate facilities that we are familiar with can now be separated throughout different parts of the globe as smaller, **satellite facilities**. It is the desire of Cybercorp Computer Technologies to build a satellite office for its system hardware division in Lubbock Tx. Systems is primarily an electrical engineering office environment with approximately 79 employees whom will require 23362 sqft. The ideal setting for the intelligent office is in a community environment, therefore a suburban setting would be the best choice. "More people in one piece of geography, doing productive work, with more disposable income- that's a natural magnet for retail, entertainment, food , and other kinds of personal services."² Lubbock Tx. has been the chosen site. With a population of close to 190,000, Lubbock has no big metropolis to be a suburb of. However, it's relative smallness will serve the program's purposes. Another reason for this selection is that the cost of living in Lubbock is one of the lowest in the state. Lubbock is located in southwest Texas. The fact that Reese A.F.B. will be closing down in the near future will cause the people of Lubbock to become even more receptive to new business. Texas Tech University is an added bonus in the fact that it turns out graduates in a myriad of professional fields. This would create an excellent reservoir for human resources.

The future of Corporate facilities will evolve into intelligent office buildings with flexible foundations for unique and emerging models of conventional technologies and opportune physical, and ergonomic environments that provide spaces conducive to a team-work situation.

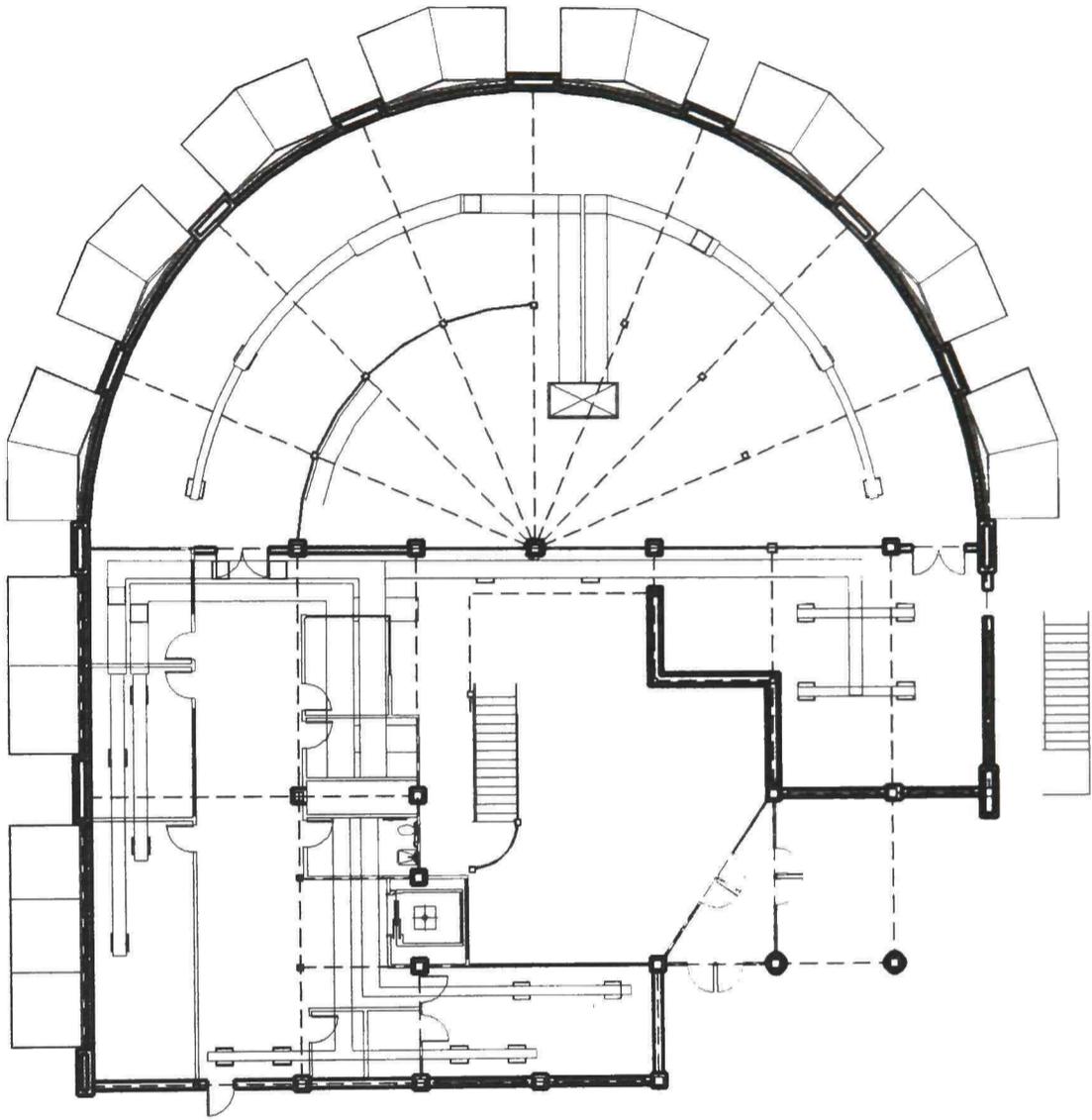
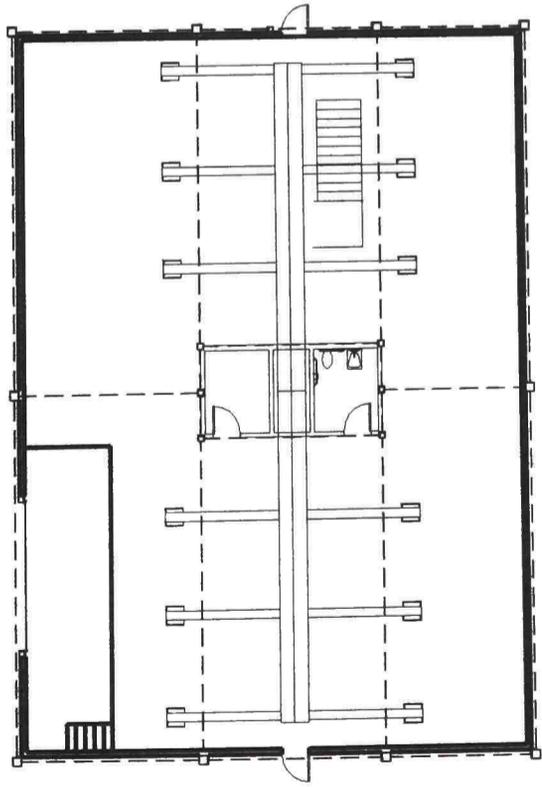
The electronic revolution has revealed the ill effects of corporate dispersal and increasing isolation of its worker. Enclosed private offices, the results of company hierarchy are now deemed obsolete. A much wider variety of space types must be considered in the construction of new offices. Accommodations for team based organizations must now be provided. Personal office space is still needed of course, but with a link between it and a common area. These common areas can be laboratories, media studios, or conference areas. Some consequences that have resulted from these new changes are the social links that have occurred in past workplaces. Advances in technology have allowed the individual worker to maintain significantly more sovereignty than in the past. As a result the worker may fall out of touch with the rest of the group. When designing it is important to maintain a spatial link through face to face contact. The physical structure must accommodate compatible software packages and a full range of hardware. It must also be able to accommodate immediate electronic enhancements and upgrades. The intelligent office building must provide an appropriate physical and environmental setting for this hardware (structure, enclosure, plenum space). It must also address crucial environmental conditions such as spatial quality, physical safety and security. Thermal, air, acoustic, and visual quality must also be observed.

² "Hype vs. Reality The Changing Workplace," Progressive Architecture, March 1994.



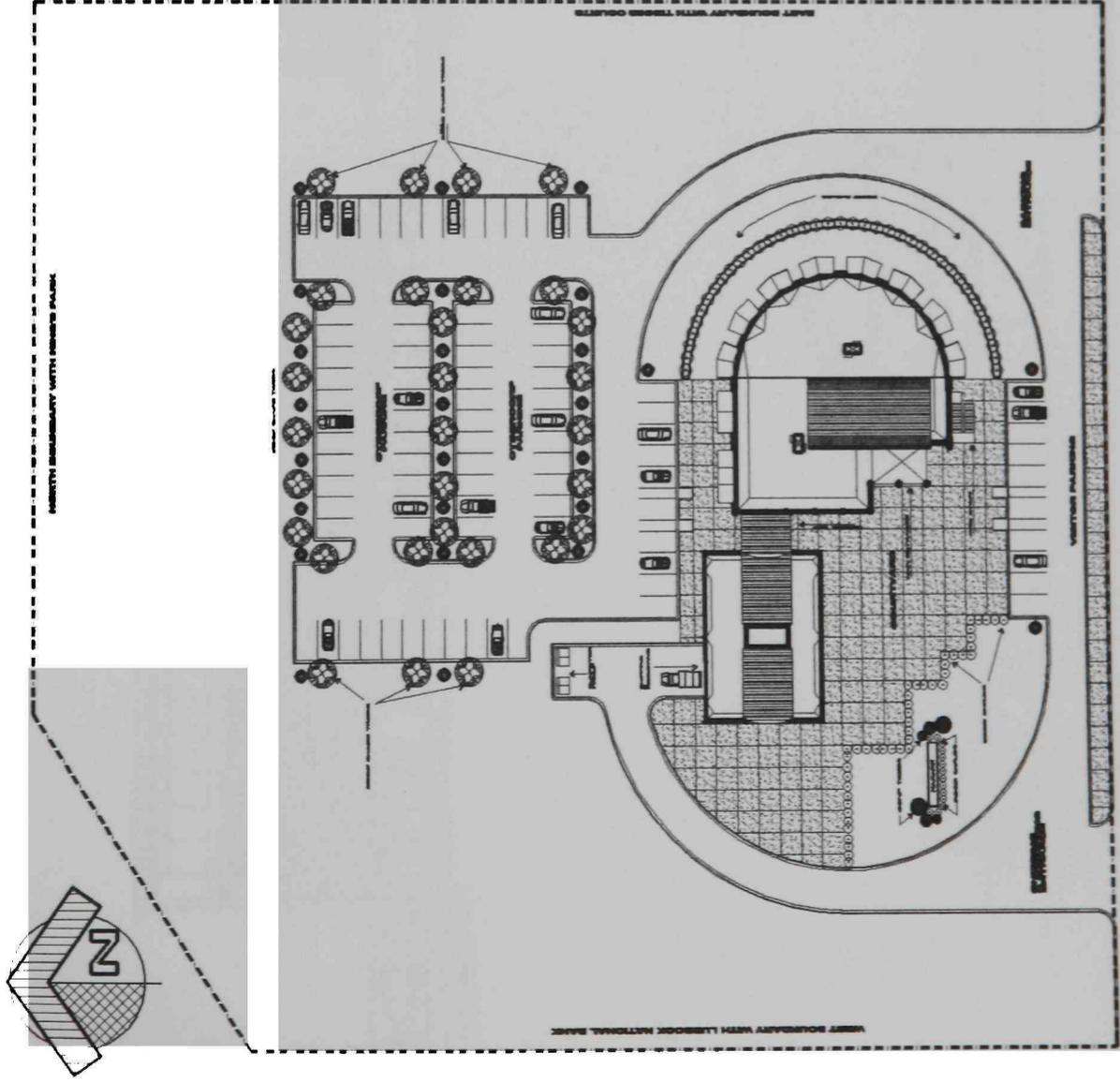
1ST FLOOR PLAN

SCALE 1/8"=1'-0"



HVAC/STRUCTURAL

SCALE 1/8"=1'-0"

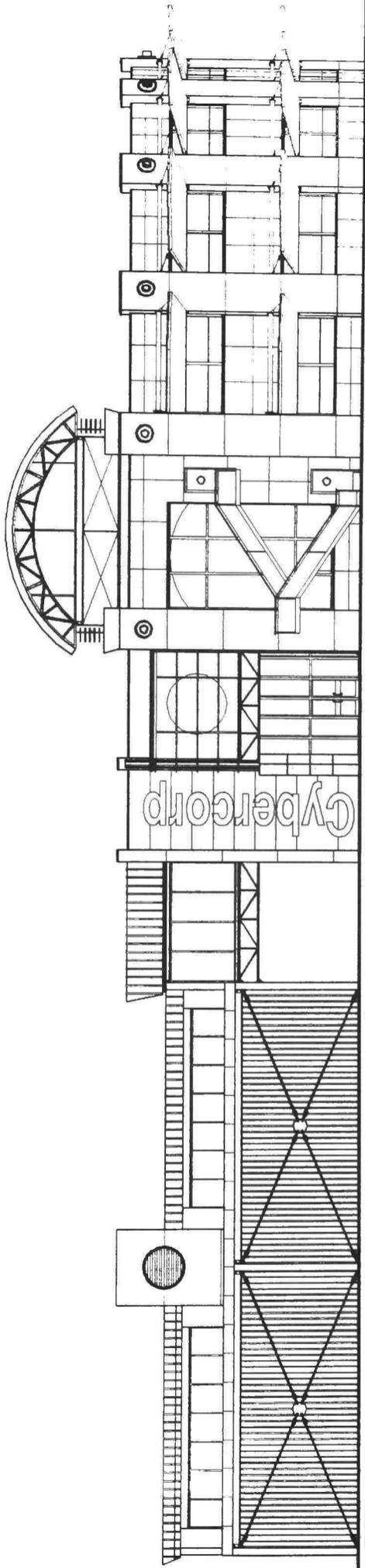


SITE

SCALE 1/32"=1'-0"

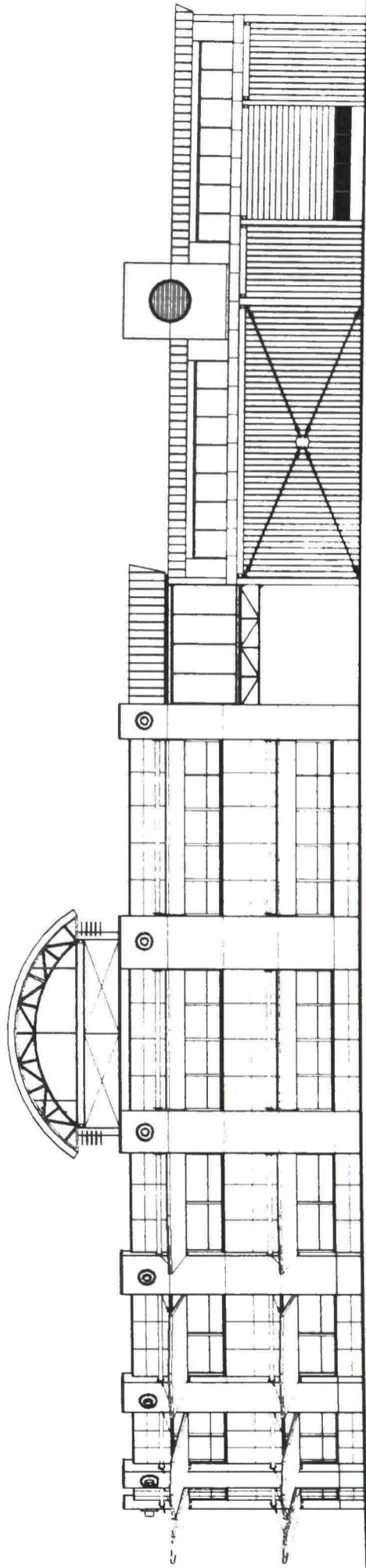
SITE LOCATION

SCALE 1/32"=1'-0"



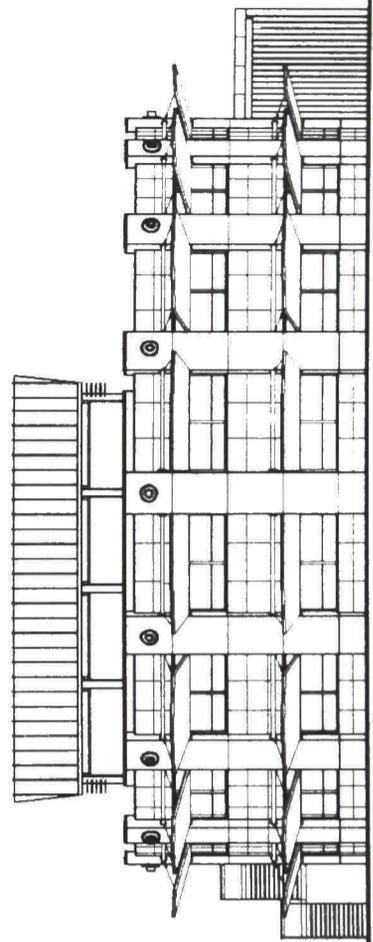
SOUTH ELEVATION

SCALE 1/8"=1'-0"

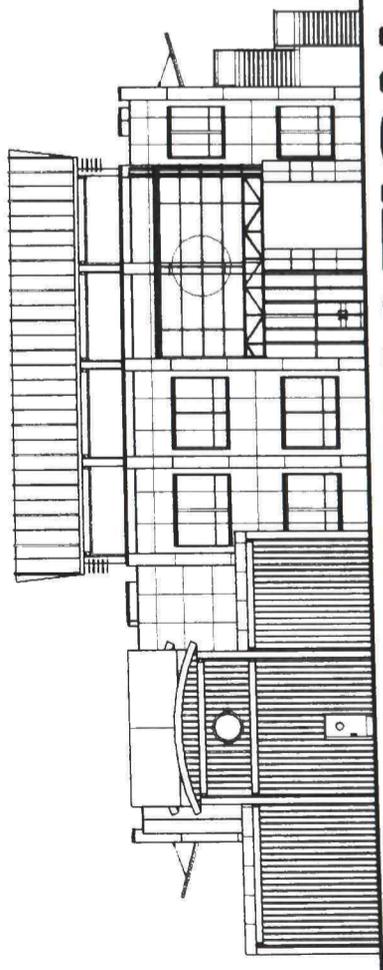


NORTH ELEVATION

SCALE 1/8"=1'-0"

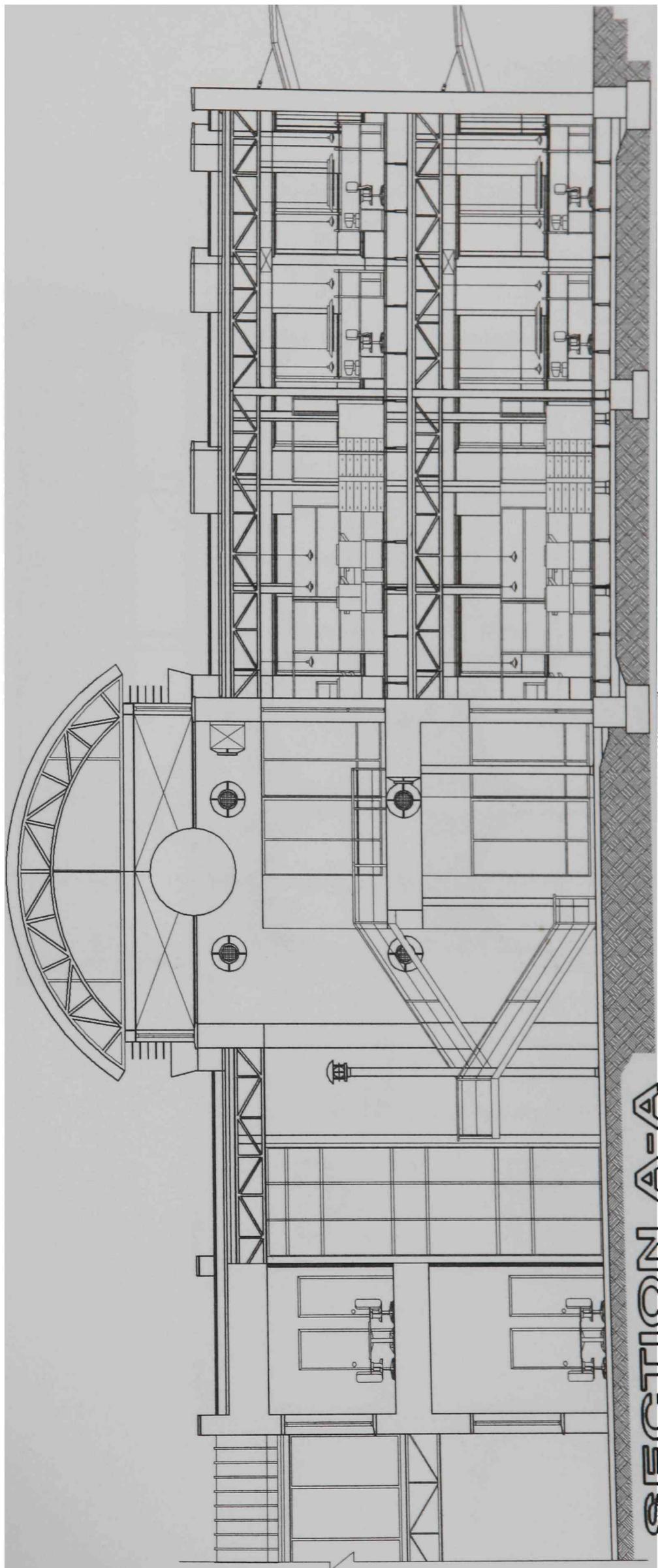


EAST ELEVATION



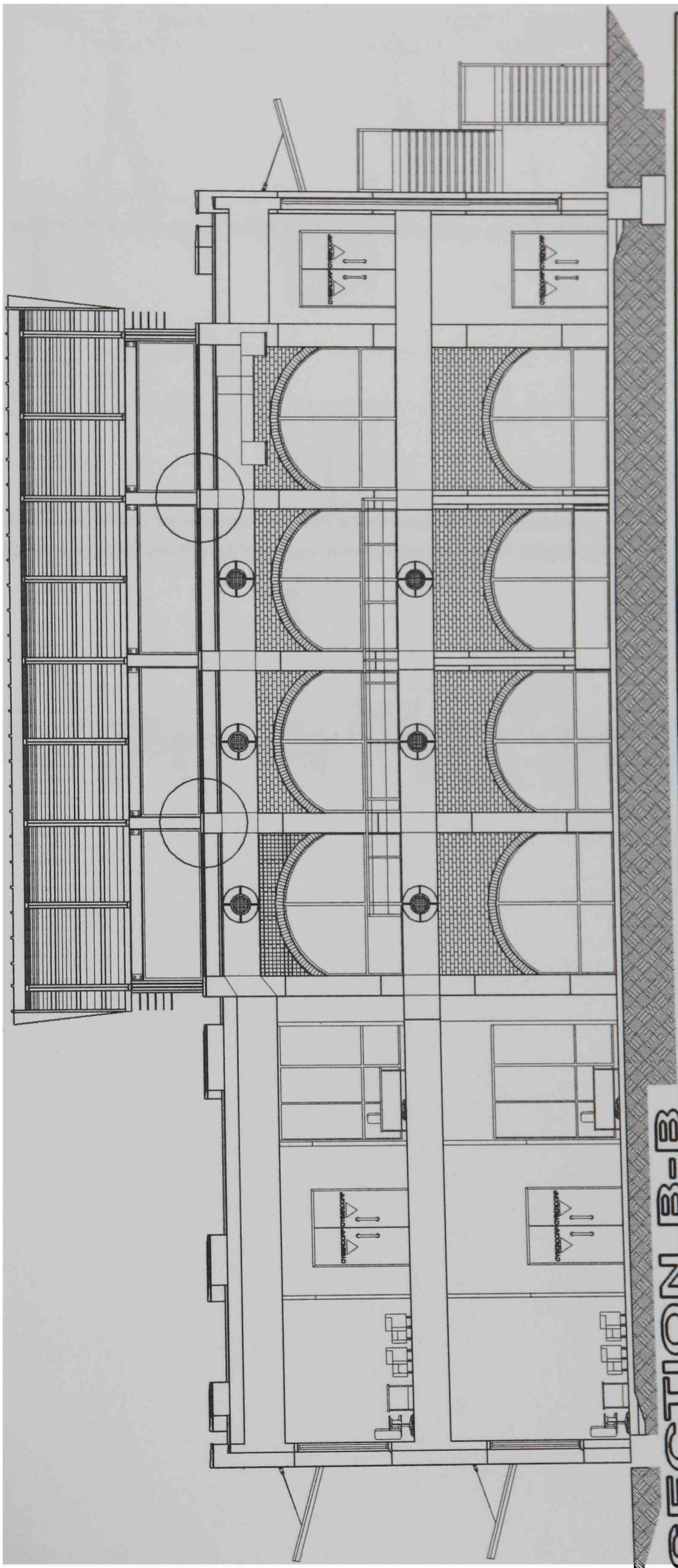
WEST ELEVATION

SCALE 1/8" = 1'-0"



SECTION A-A

SCALE 1/4"=1'-0"



SECTION B-B

SCALE 1/4"=1'-0"

