A FRACTIONAL PROPOSAL FOR ARCHITECTURE

e.j. milani

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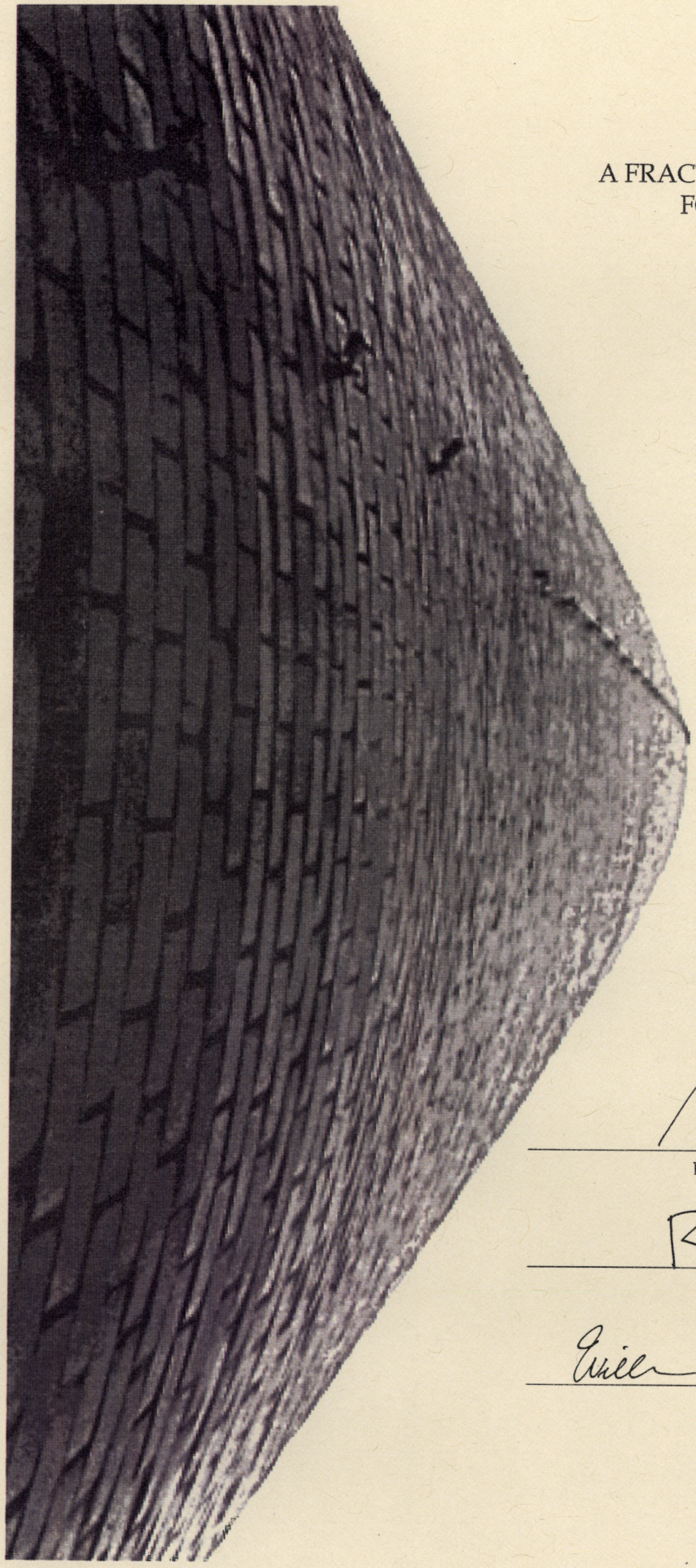

A FRACTIONAL PROPOSAL FOR ARCHITECTURE

by
ERNEST J. MILANI JR.

This thesis is submitted to the faculty of Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of :

MASTER
OF
ARCHITECTURE
[1994]

D. EUGENE EGGER, Chairman

RONALD DANIEL

WILLIAM GALLOWAY

Blacksburg, Virginia
December 1994

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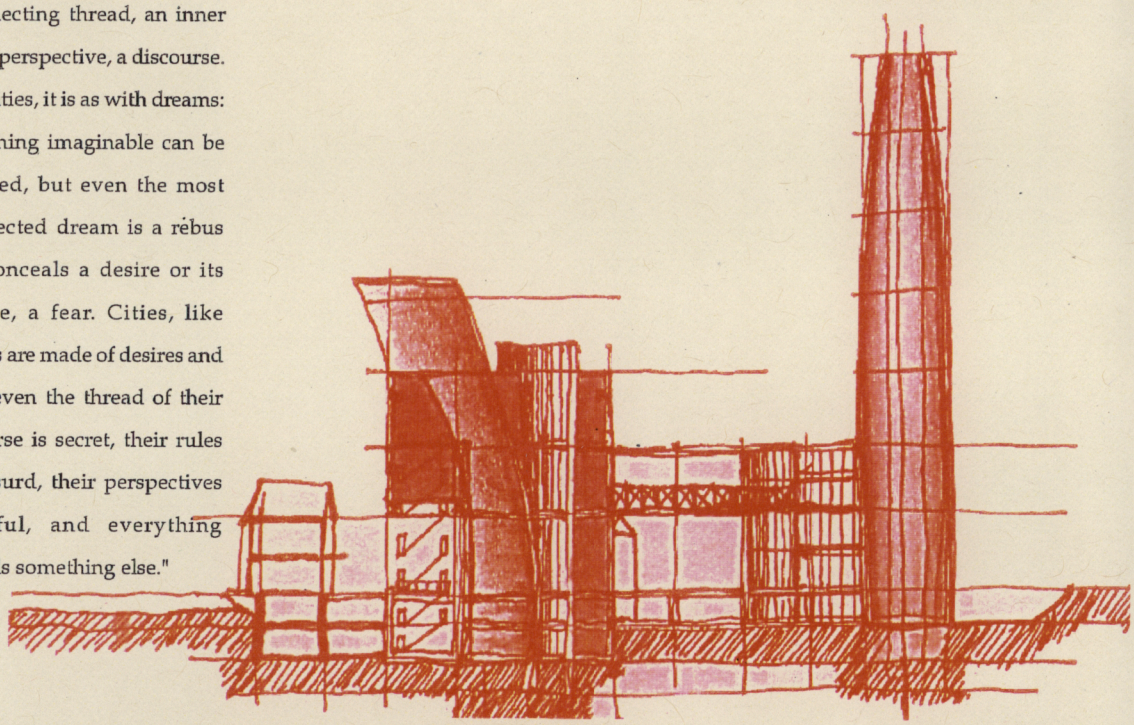
ABSTRACT:

"It has neither name nor place. I shall repeat the reason why I was describing it to you: from the number of imaginable cities we must exclude those whose elements are assembled without a connecting thread, an inner rule, a perspective, a discourse. With cities, it is as with dreams: everything imaginable can be dreamed, but even the most unexpected dream is a rebus that conceals a desire or its reverse, a fear. Cities, like dreams are made of desires and fears, even the thread of their discourse is secret, their rules are absurd, their perspectives deceitful, and everything conceals something else."



"Cities also believe they are the work of the mind or of chance, but neither the one nor the other suffices to hold up their walls. You take delight not in a city's seven or seventy wonders, but in the answer it gives to a question of yours."

INVISIBLE CITIES
ITALO CALVINO

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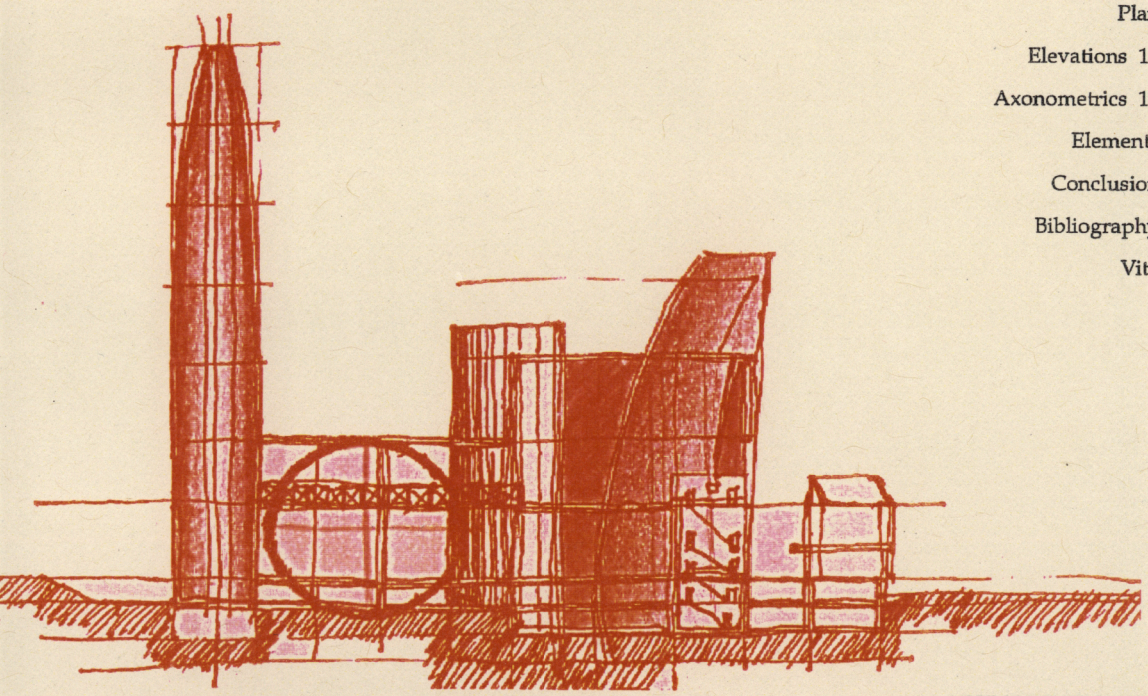
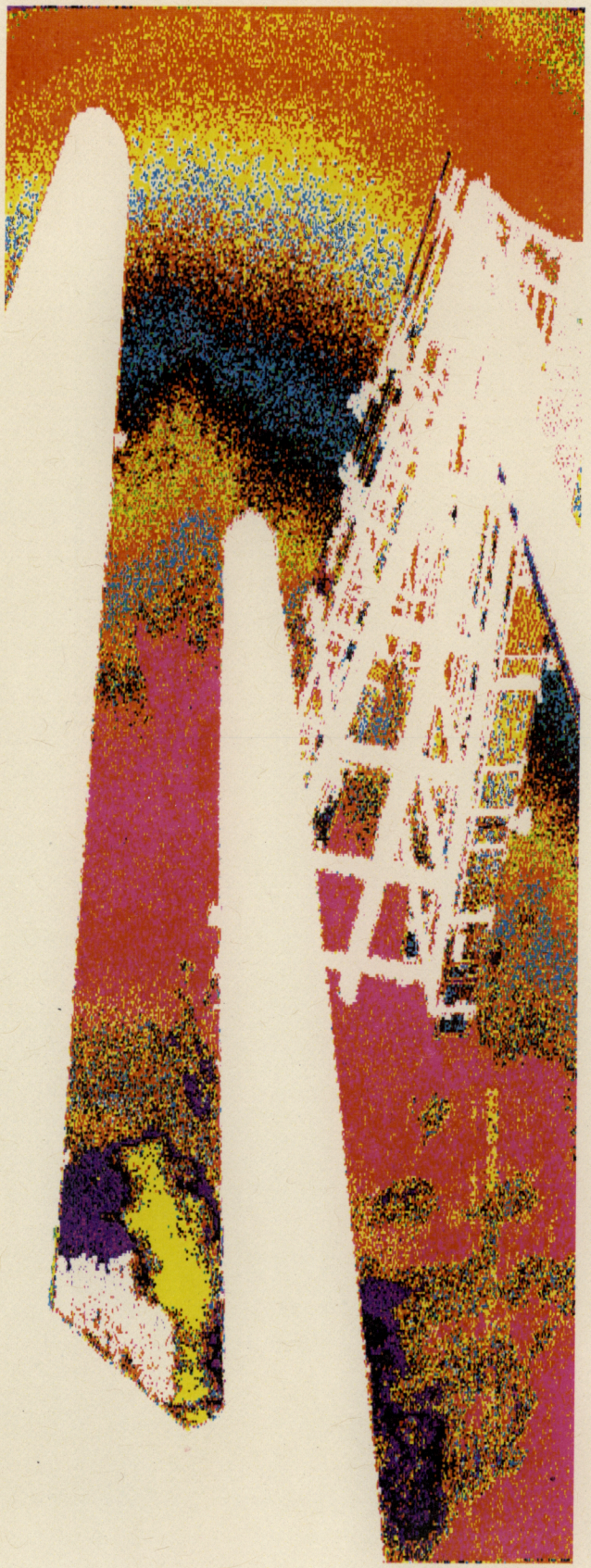


ACKNOWLEDGMENTS:

I would like to dedicate this work to: my professors and friends at Virginia Tech for allowing me to learn from them, Brooks for pushing me to the end of this project, and my parents and surrounding family for their patience and support, without them none of this would have been possible.

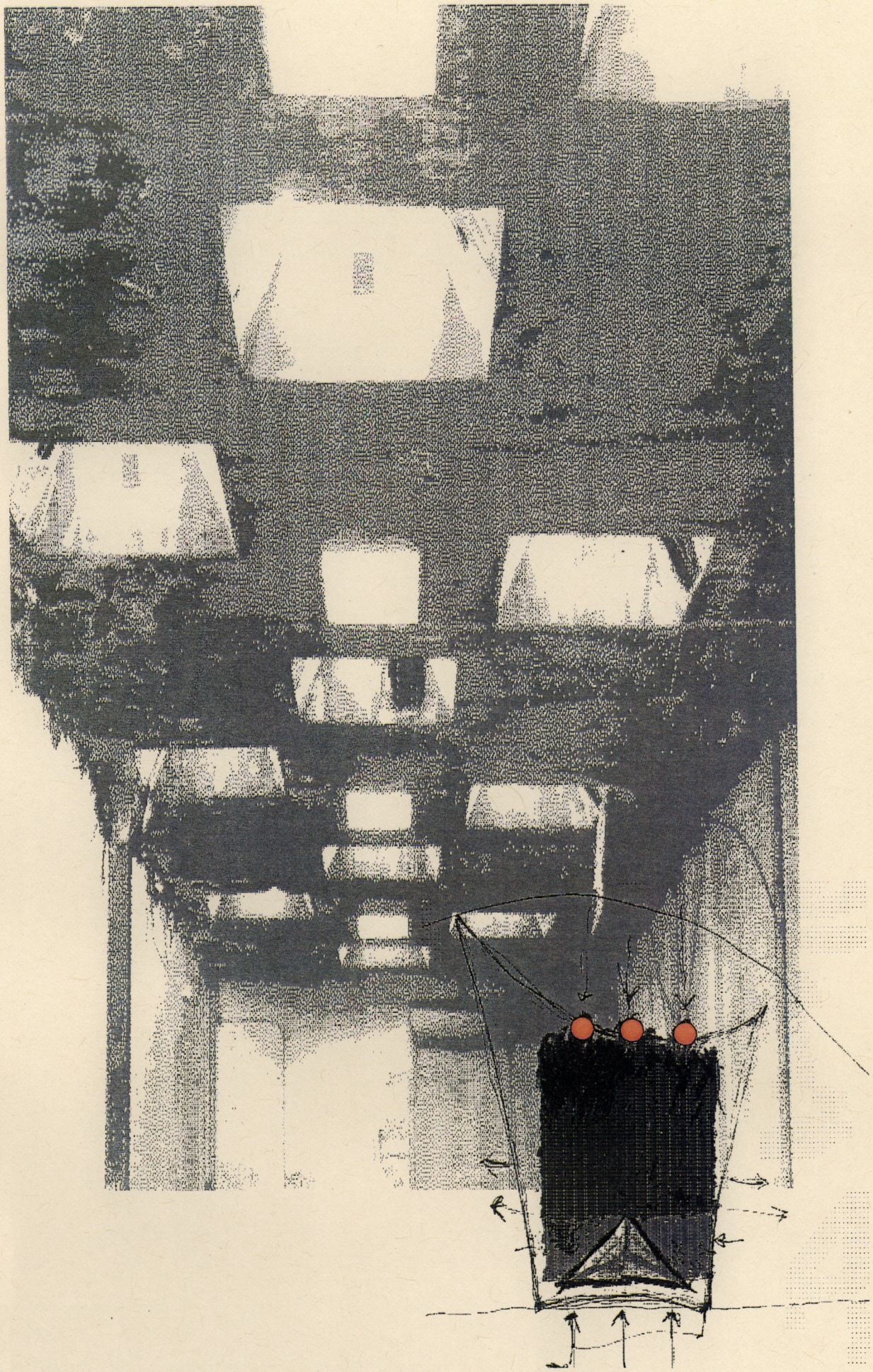


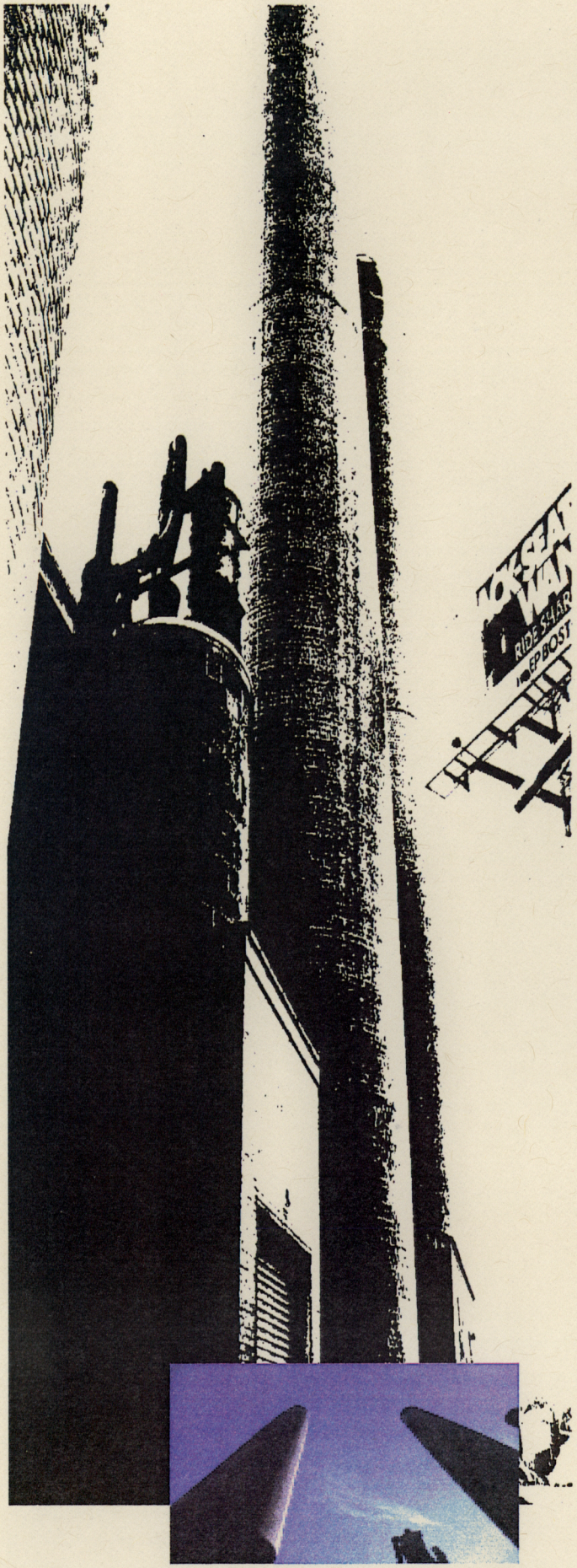
INTRODUCTION:

In his book Sources of Modern Eclecticism, Dimitri Porphyrios writes about architects and their approach to ordering the buildings which they have designed. He explains that in the early 1900's the Modernists made an attempt to order their buildings with a strict system that encompassed all of its elements. This gave a similar character to constructional, ethical, and aesthetic design and defined an understandable ordering system. He called this type *Homotopia*, meaning a homogenous or uniform structure throughout. In contradiction to this, he labels disorder as *Heterotopia*, which was a situation where elements were laid, placed, or assigned sites that were so different from each other that it was impossible to define, or visualize a common thread. Porphyrios cited many of Alvar Altos' buildings to describe the order of *Heterotopia*, which is solely by association.

Where viewing an urban environment one receives the impression that it is *Heterotopic* but, after studying it, the order becomes more evident. The streets are constructed in a hierarchical fashion, from major highways to alleys based on the volume of traffic. The districts are organized, more or less, in a radial pattern growing out from the central business districts to suburbia. The order can also be found in the rules and regulations of construction and zoning. Although urban environments appear to be organized by association it is obvious that they actually reside somewhere between Porphyrios' two worlds of *Homotopic* and *Heterotopic* order.

When defining space within an urban context it is necessary to follow this guideline of an ordered disorder allowing the new space to adapt and homogenize within its surroundings yet change and evolve into something unique in and of itself.

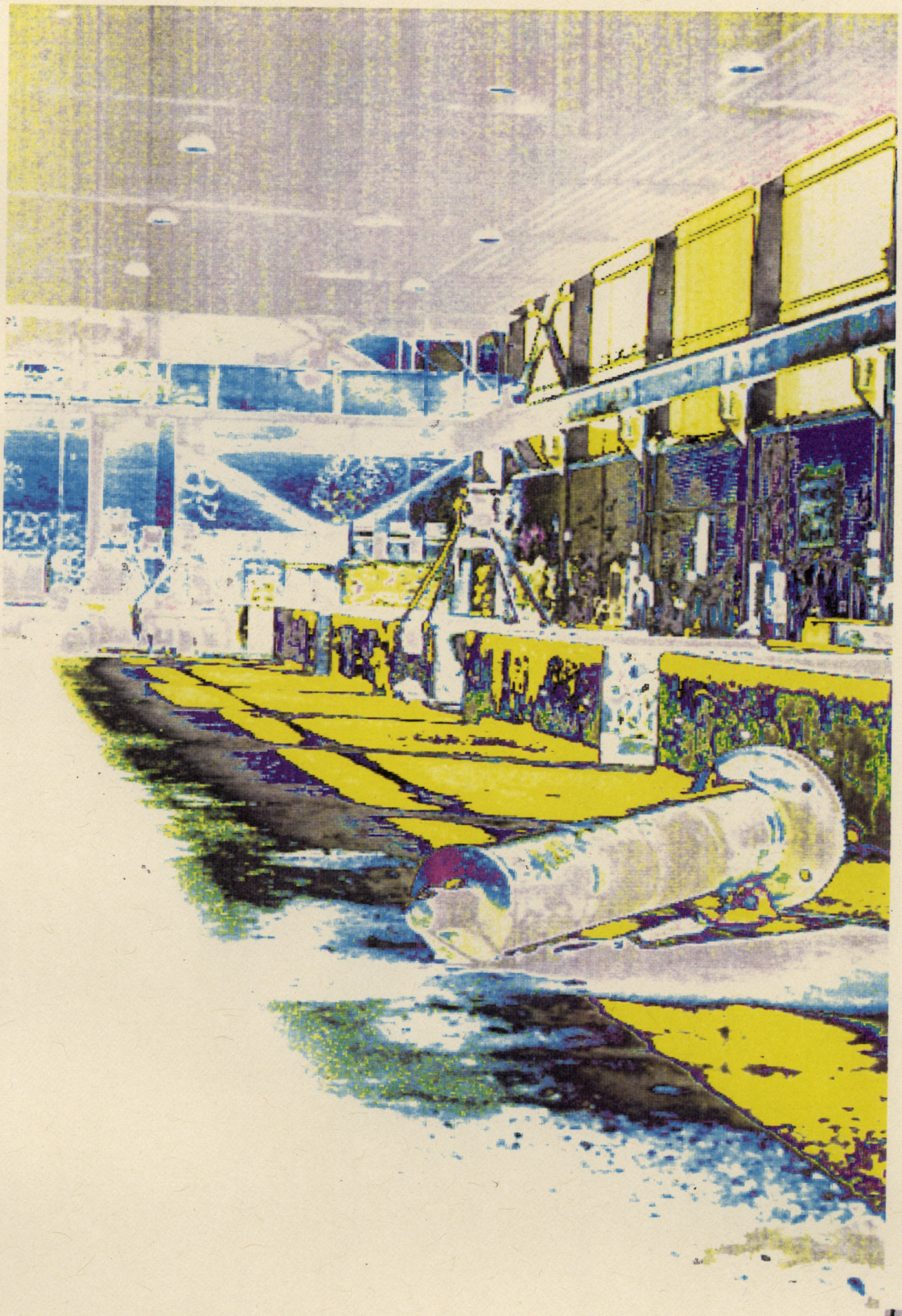


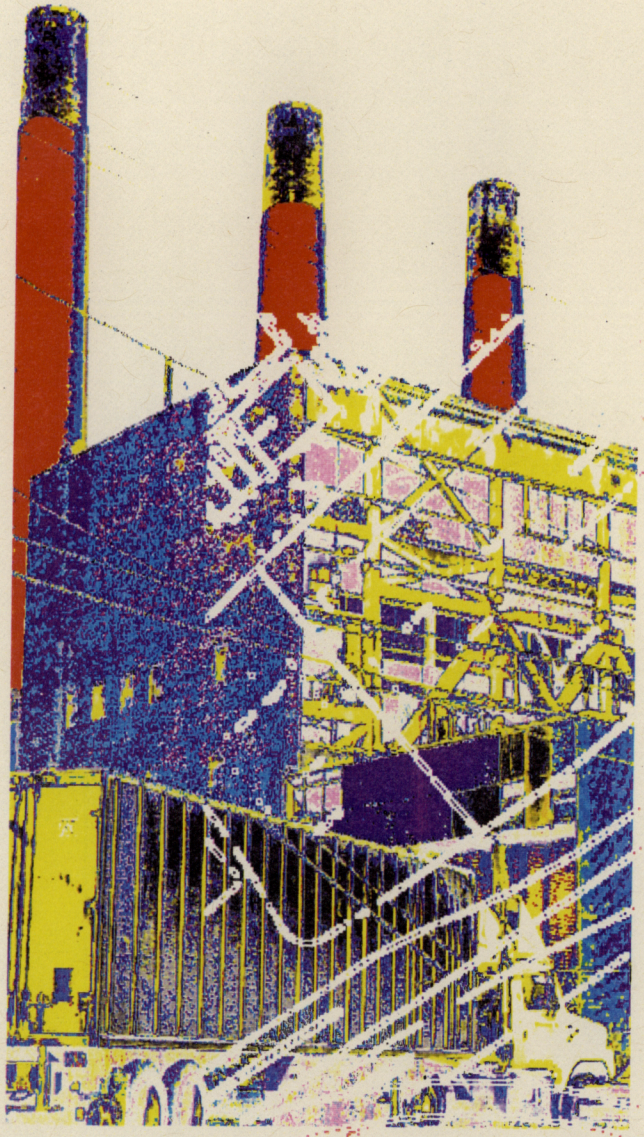


This project is about redefining an old unused factory into a school for creative teaching and learning. Igor Stravinsky states in his book The Poetics of Music, that he cannot begin creation without some sort of framework to work within, for without it the possibilities are overwhelming to the point of complete confusion. While studying a photograph taken at the site the staring point was revealed. The photo showed a straight wall of the factory in opposition to a curved cylindrical tube of its adjacent smoke stack, simplified in diagram to a line and a curve.

At first this diagram seems to live in the world of *Heterotopia* but after some investigation the relationship of the line to the curve becomes more evident. The line is static, rigid, and repetitive. It is of the *Homotopic* world and visually more easily understood. The curve, on the other hand, is active, dynamic, and in constant change. It is difficult for the eye to remain focused in one place without returning back to the line for a reference. The line acts as a grounding point for the curves activity and represents the old structural order in which to begin from. The curve progresses to something new, a change, or a view to the future.

This project finds its order through this diagram of line and curve. The diagram points out the idea of change from static to active, it reveals a tension between the line and curve and progression from old to new. In this case the line is the structural organization of the old factory and the curve is the change to a school for creative teaching and learning. A new order is created using the elements, rules, and guidelines found in the existing site to form a structure, as Stravinsky puts it, to work within.





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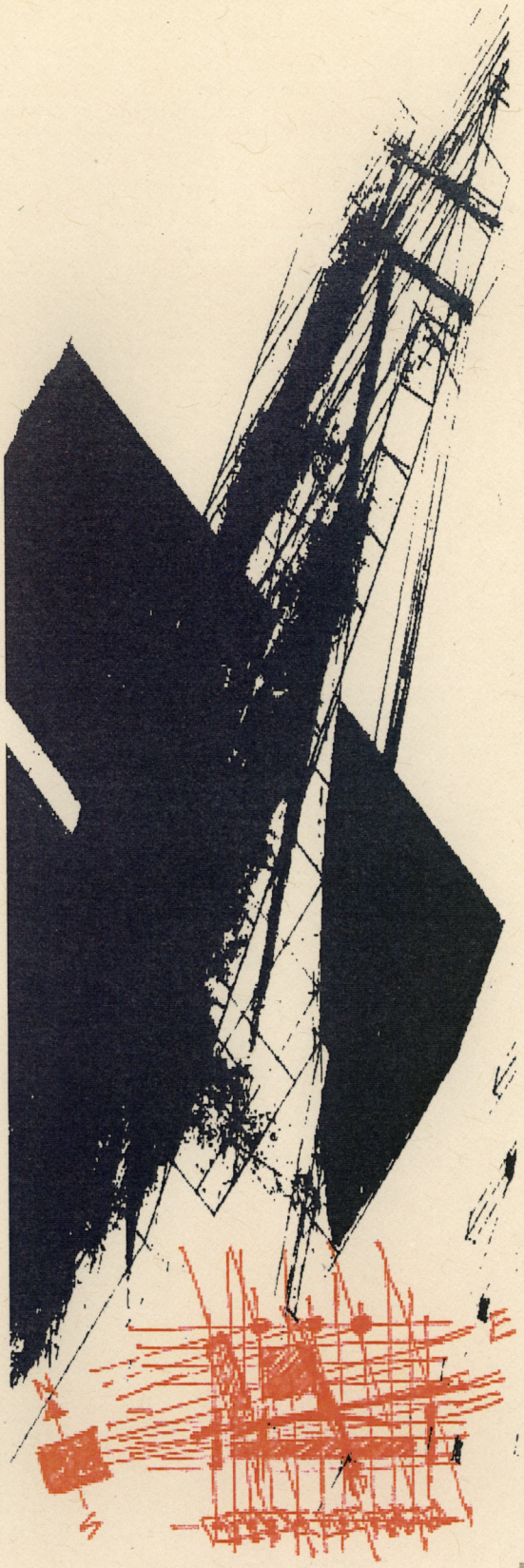
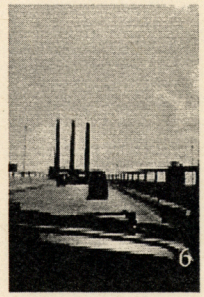
THE SITE:

The plant in Roxbury Massachusetts is situated adjacent to a major access route to Boston. Just south of the city proper, the highway straightens and heads directly toward the building. Three tall chimneys mark the site from a mile away. They command attention, as the road heads straight into them, then suddenly veers southeast. Two edges of the site are bound by an entrance ramp that curves around the building and an adjacent prison structure. The semicircular entrance ramp contains the plant and the prison with South Bay Avenue making their southern boundary.

The existing building is divided into three sections. The first is a large drive-through area where vehicles once entered to unload their contents into a large pit. The wall bordering South Bay Avenue is 35' high by 240' long, and has no openings. The two end walls have large doors and a single pedestrian entrance. The ceiling is five feet thick and contains a series of sky lights which puncture it rhythmically. The edges of the skylight openings are bevelled, widening to the outside, to allow more light to penetrate through to the floor.

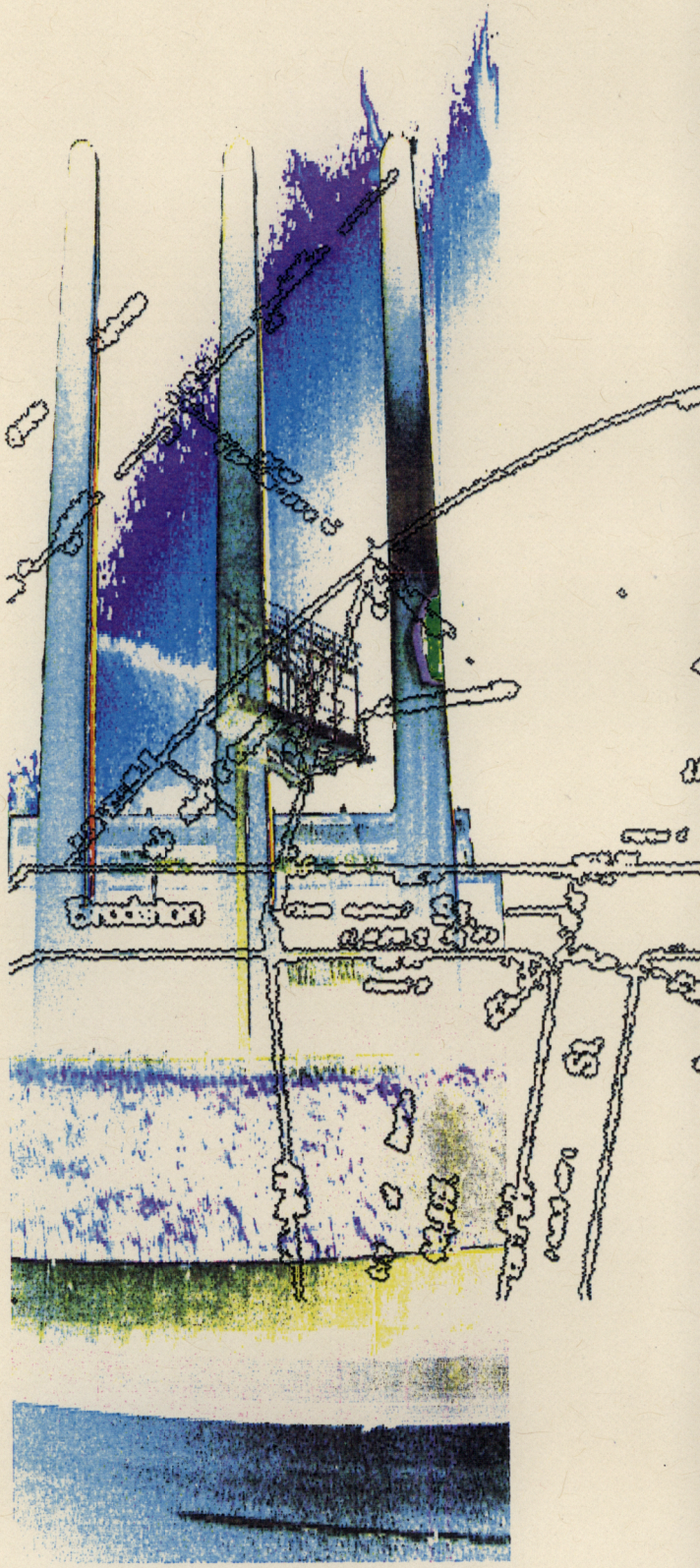


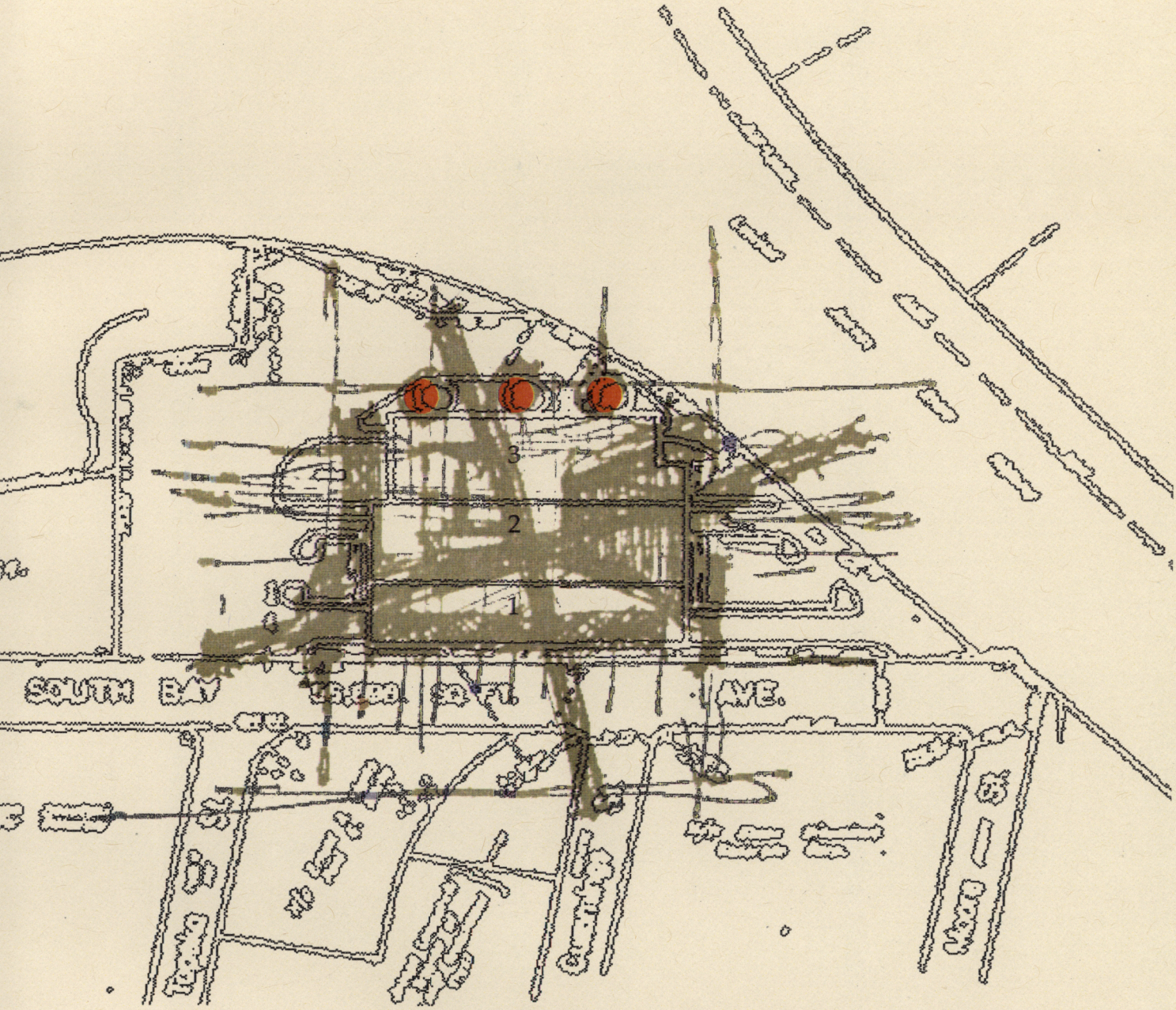


The second major space is a tall rectangular structure parallel to the entrance room. Its main purpose is to house the pit and the three cranes suspended above it. The pit is a long narrow rectangular space that is about 30' deep from the truck platform. It is made of concrete clad in rusted steel. Across from the truck opening the pit wall continues 60' up to the top level. The cranes are along the ceiling on two tracks. They run parallel with the length of the building and span the entire space.

The dividing wall, between the first and second spaces, is open at the bottom to give trucks dumping access. The top half is a cross braced truss system heavily fortified to support the three cranes. This truss had corrugated 4'x8' sheets of reinforced glass that ran the length of the building on the north and south facades of the top level allowing diffused light into the work space.

The third section of the building houses the furnaces and generating facilities. A row of columns makes up the joining wall between the second and third spaces to allow the machinery to be placed freely. In the middle of the third space is another row of columns, supporting the sawtooth roof of skylights above. Outside, adjacent to the end wall stand the three smoke stacks, massive in size.

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2
1
SOUTH BAY
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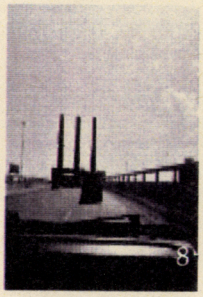
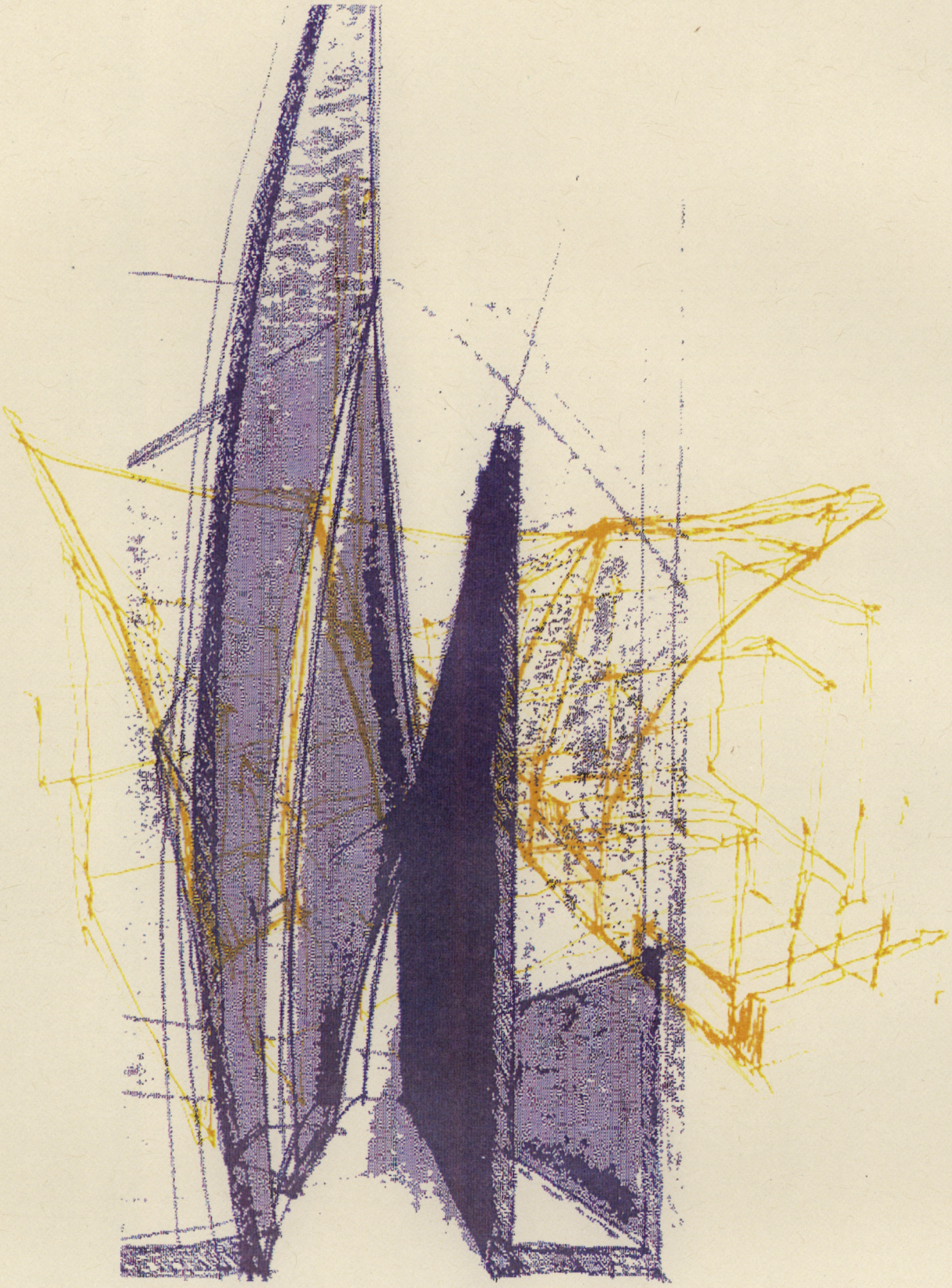
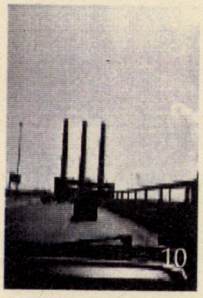
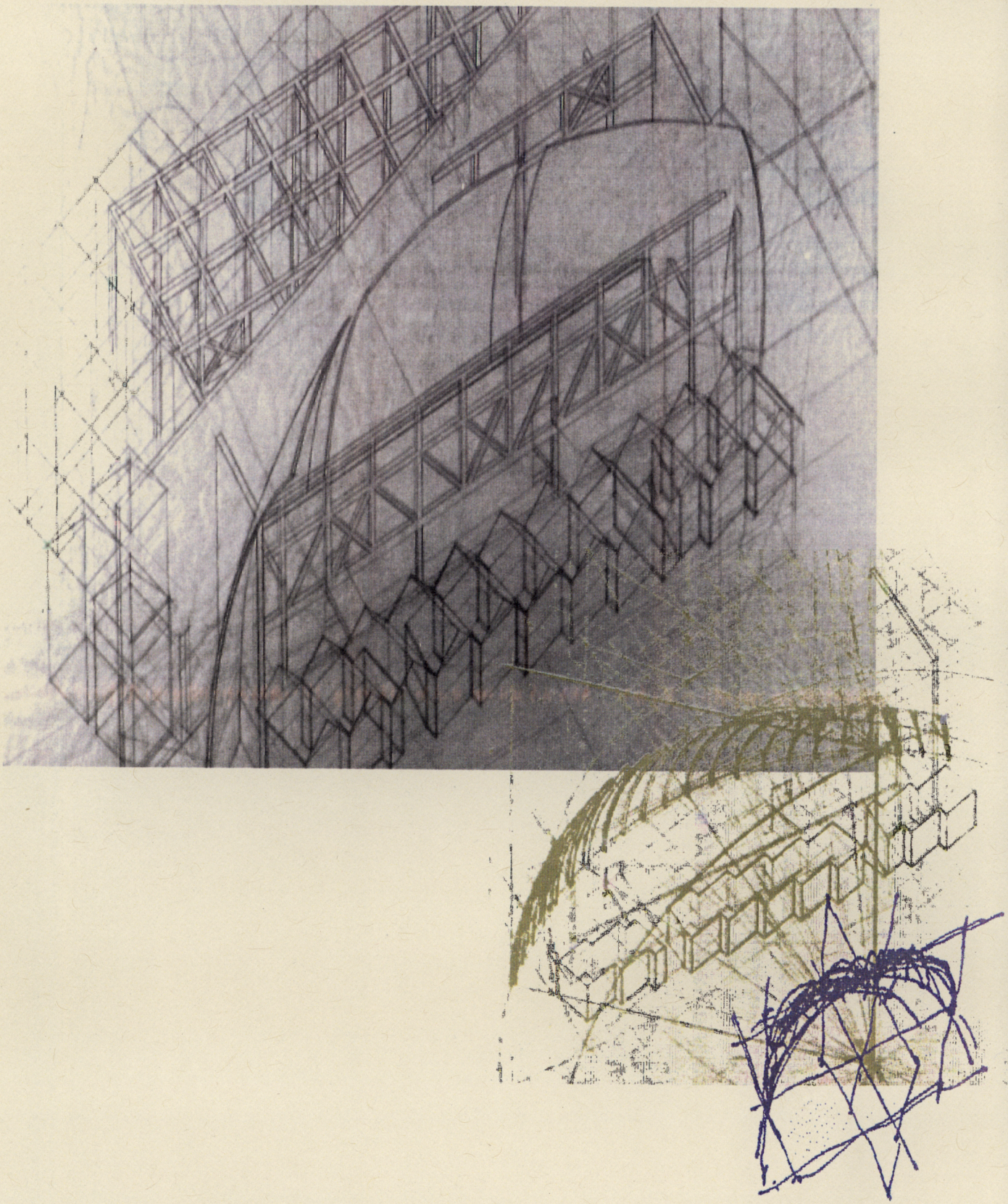




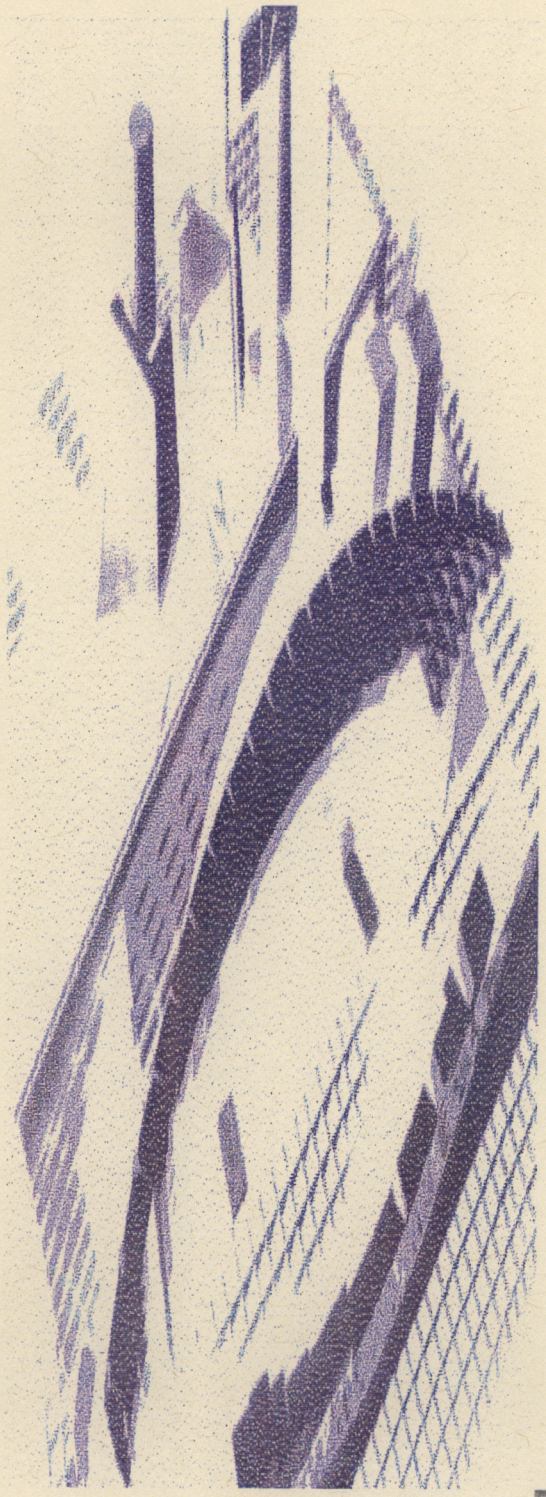
THE SCHOOL:

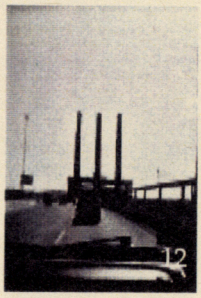
The proposed program is for a school of creative teaching and learning where the objective is to educate by exploration, experimentation and assessment. This is a similar method to that researched by Theodore Sizer in his book Horace's School. Today teaching is predominantly composed of divulging information to the students, testing them, then grading on the level of retention. This approach leads students to acquire the same knowledge and disregards their intrinsic value of uniqueness. The intention of this school is to cultivate curiosity and exploration within the student, by coaxing them to find new ways to understand material. Rather than requiring them to learn certain facts about a subject, inspire them to diverge and find out what can be learned in relation to themselves. This then initiates an exchange of knowledge between the students and teachers causing an accumulation of personalized facts. Through assessment of these facts the group can evaluate the information and collectively define new ways of understanding. These new ways of understanding make it easier for the students to learn by instigating more interest and in turn more exploration.

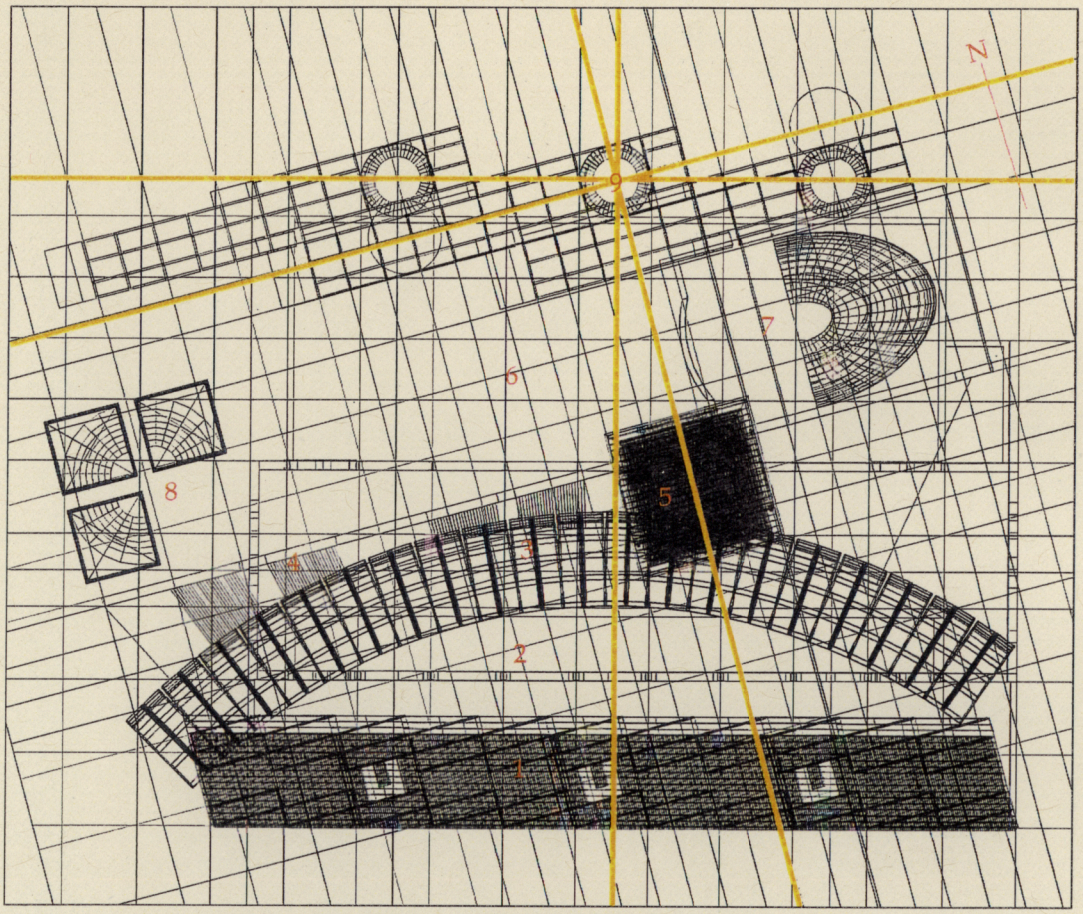




For the first few years students are required to follow a core curriculum that would expose them to a classical group of studies: math, english, science, music, art, history, philosophy, and languages. The core is organized by the faculty but, as the students progress in years, they can begin to adjust their class schedules to incorporate additional subjects in which they excel, and cut back in areas in which they are less effective. With the guidance of their advisors the students are able to continually modify their curriculum incorporating an additional year where classes are specifically chosen to enhance their personal abilities. Graduation should not be contingent on taking a required number of courses and passing all the standard tests but, on an acceptable level of knowledge in the areas in which they have geared themselves. They present this to their faculty, as well as their peers, and completion is decided by their advisors.







1. classrooms

2. pit

3. arch wall

4. stair

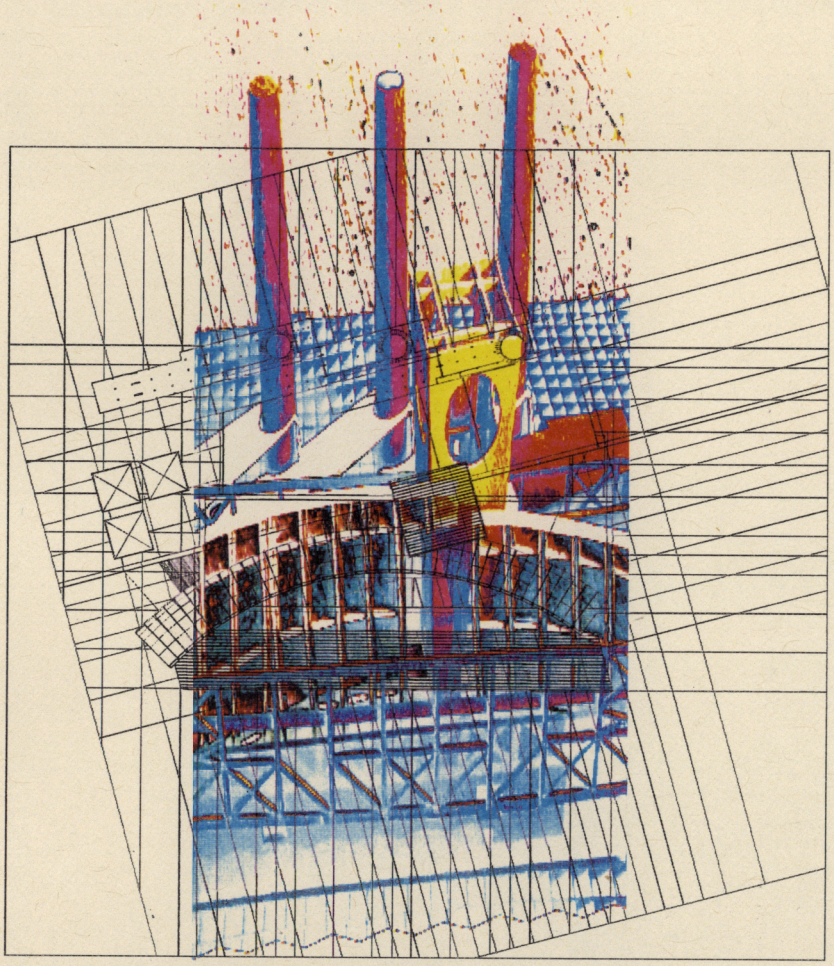
5. library tower

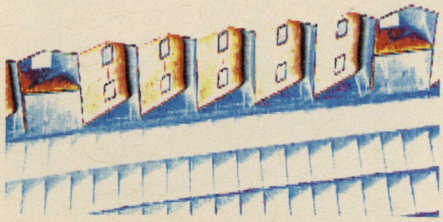
6. plaza

7. theater

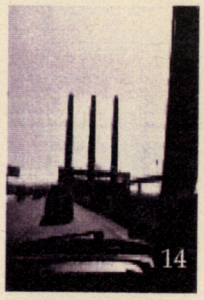
8. lecture rooms

9. lab spaces

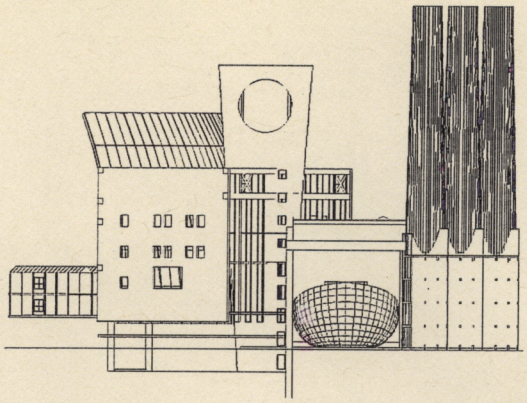




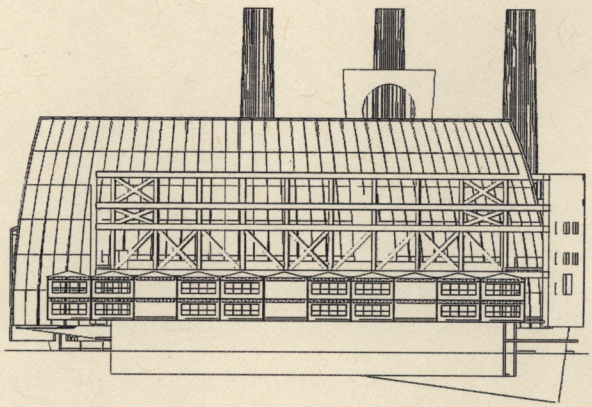
The school is divided into three sections as is the factory. The first is the classrooms and drive through entrance area. The second is a separation space containing the exhibition area and dividing the entrance from the third space which contains structures dedicated to work/study. The grid of the old factory has been rotated to reside on the North/South, East/West axis generating a new order to govern the locations of the new structures and organizing the traffic patterns through the site.



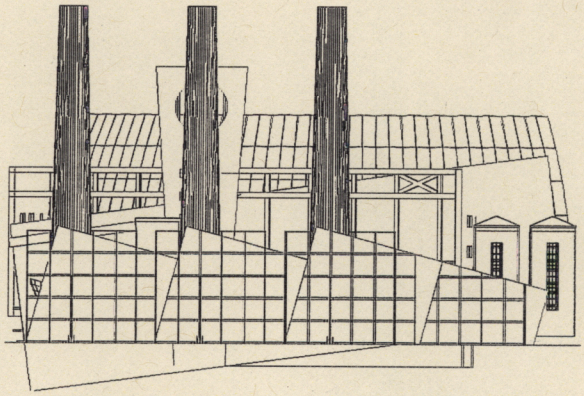
West



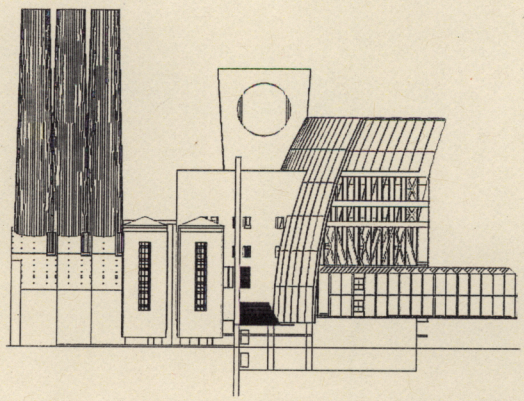
North



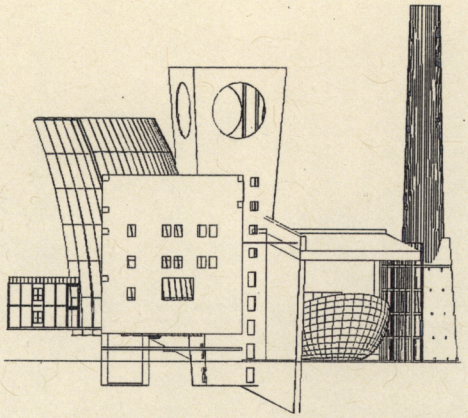
South



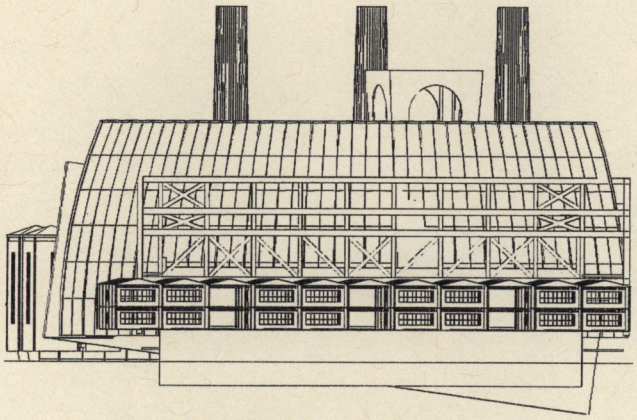
East



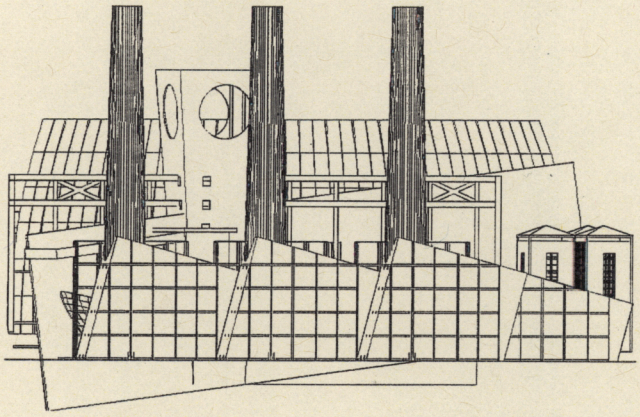
ELEVATIONS



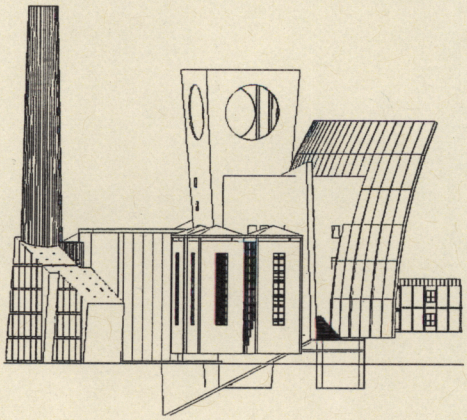
North West



North East

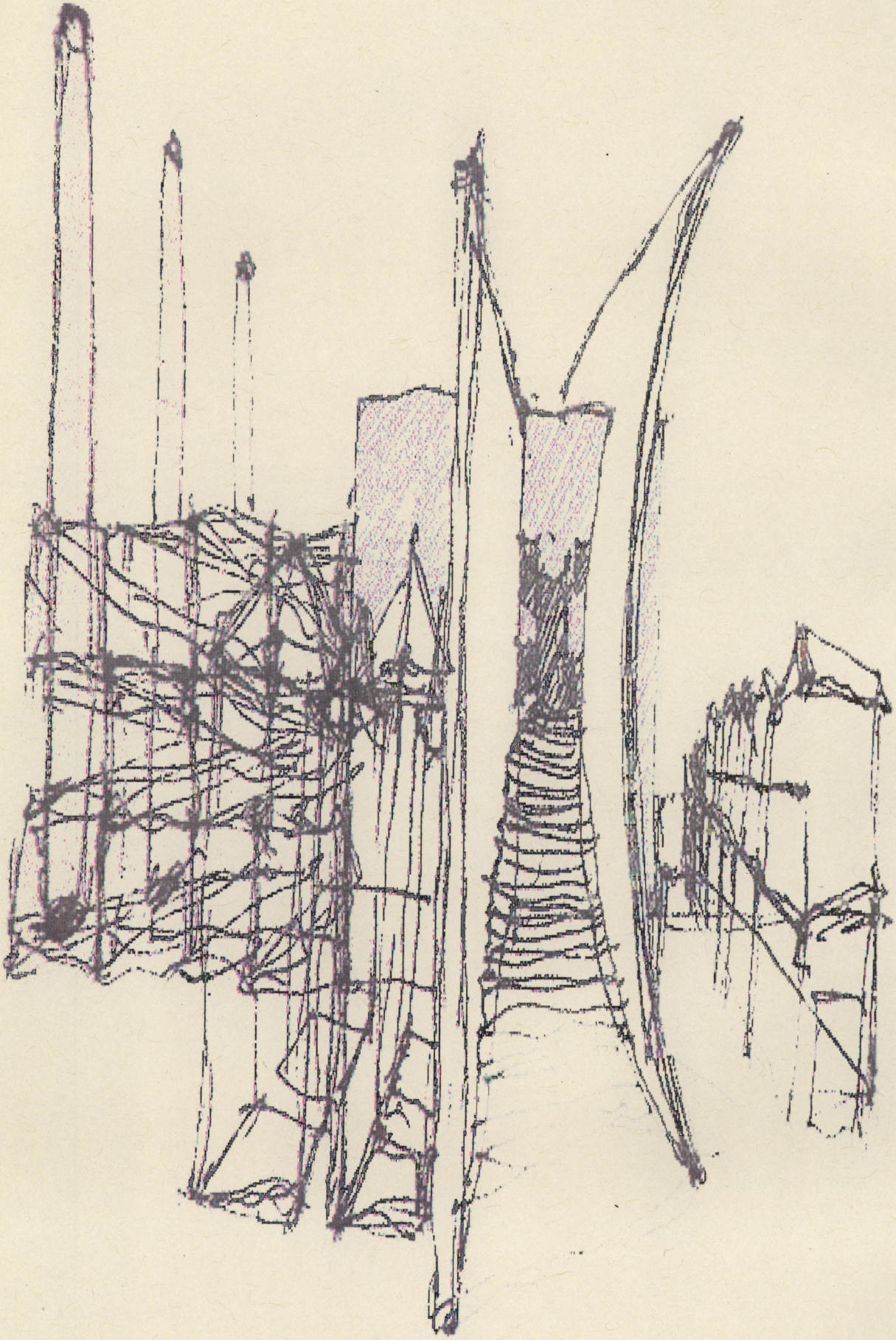


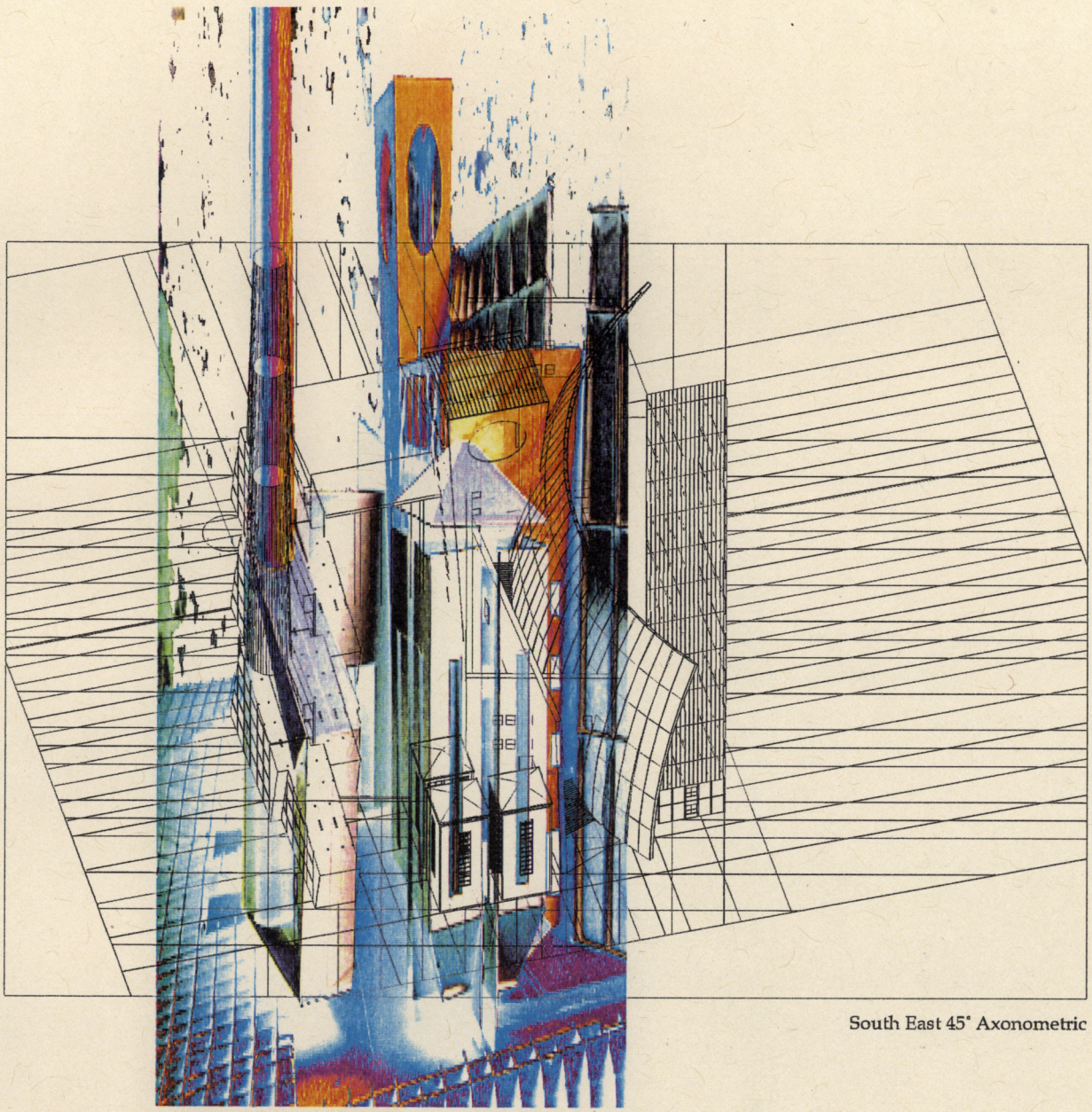
South West



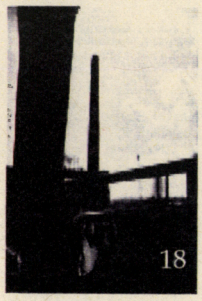
South East

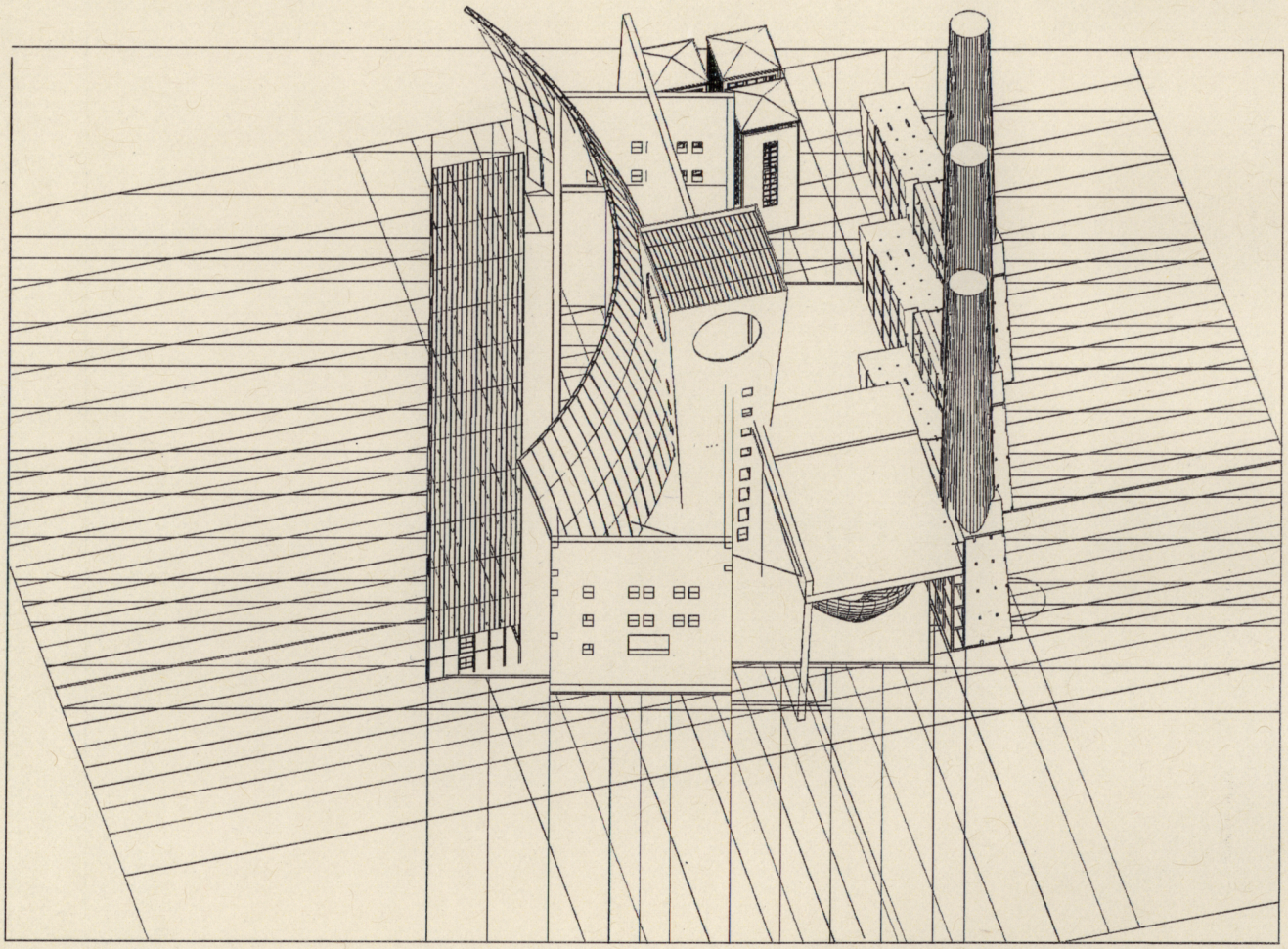
ELEVATIONS



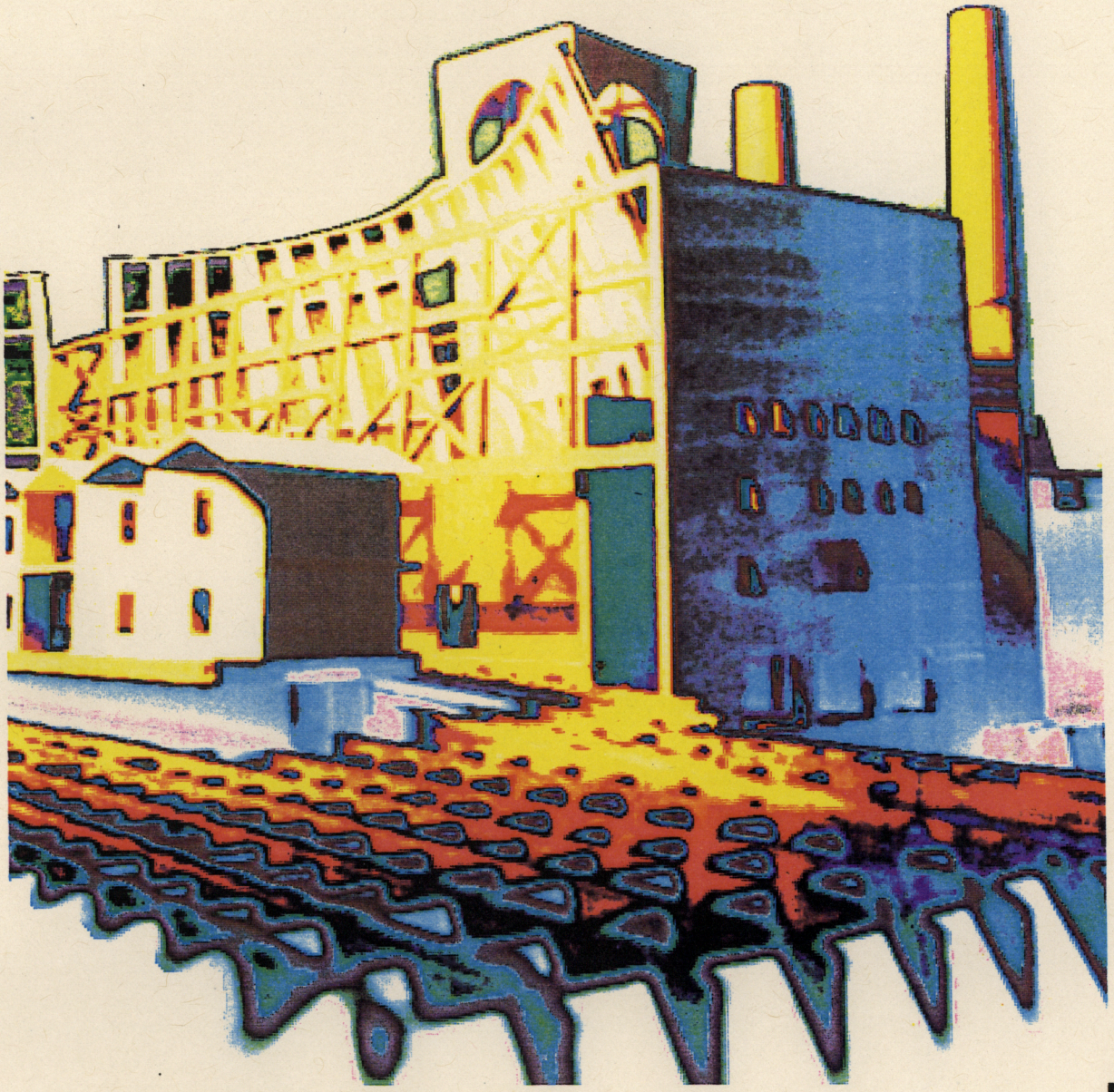


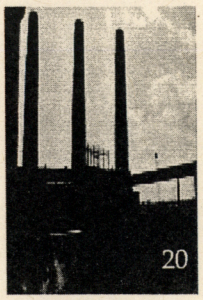
South East 45° Axonometric

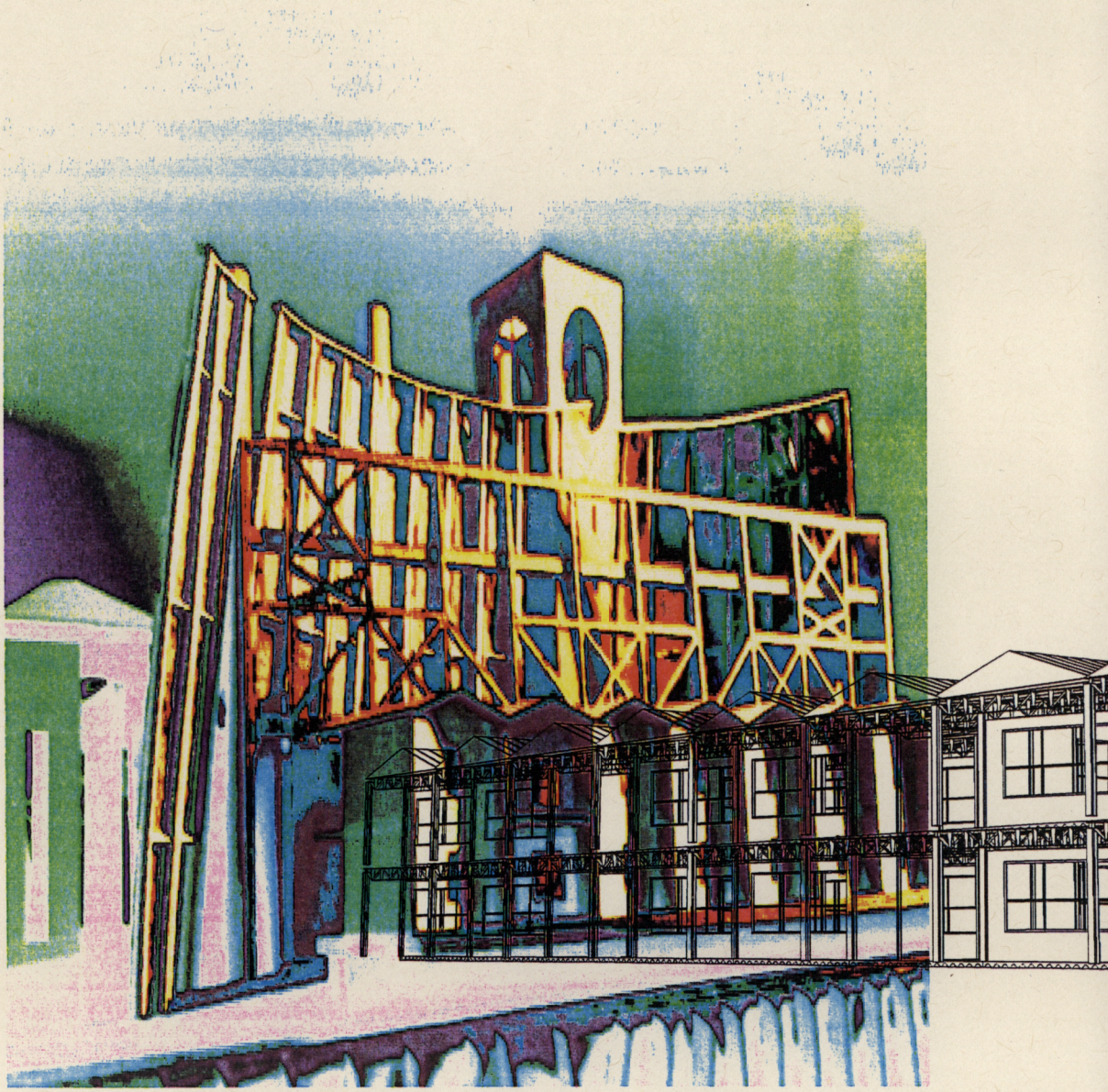


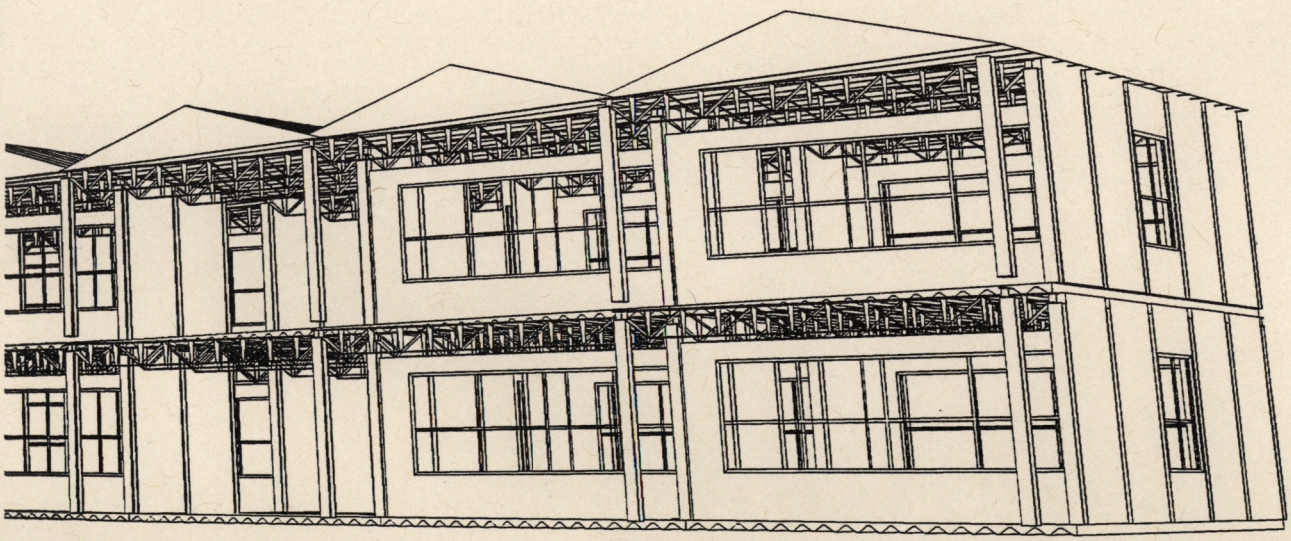


North West 45° Axonometric

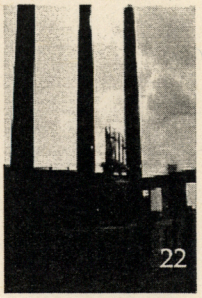


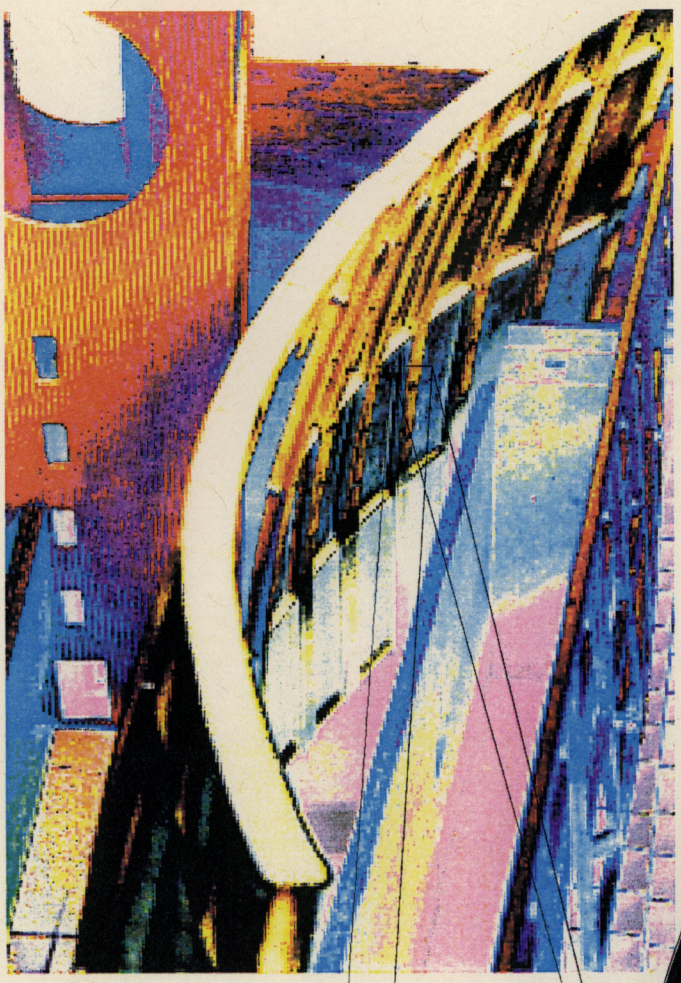


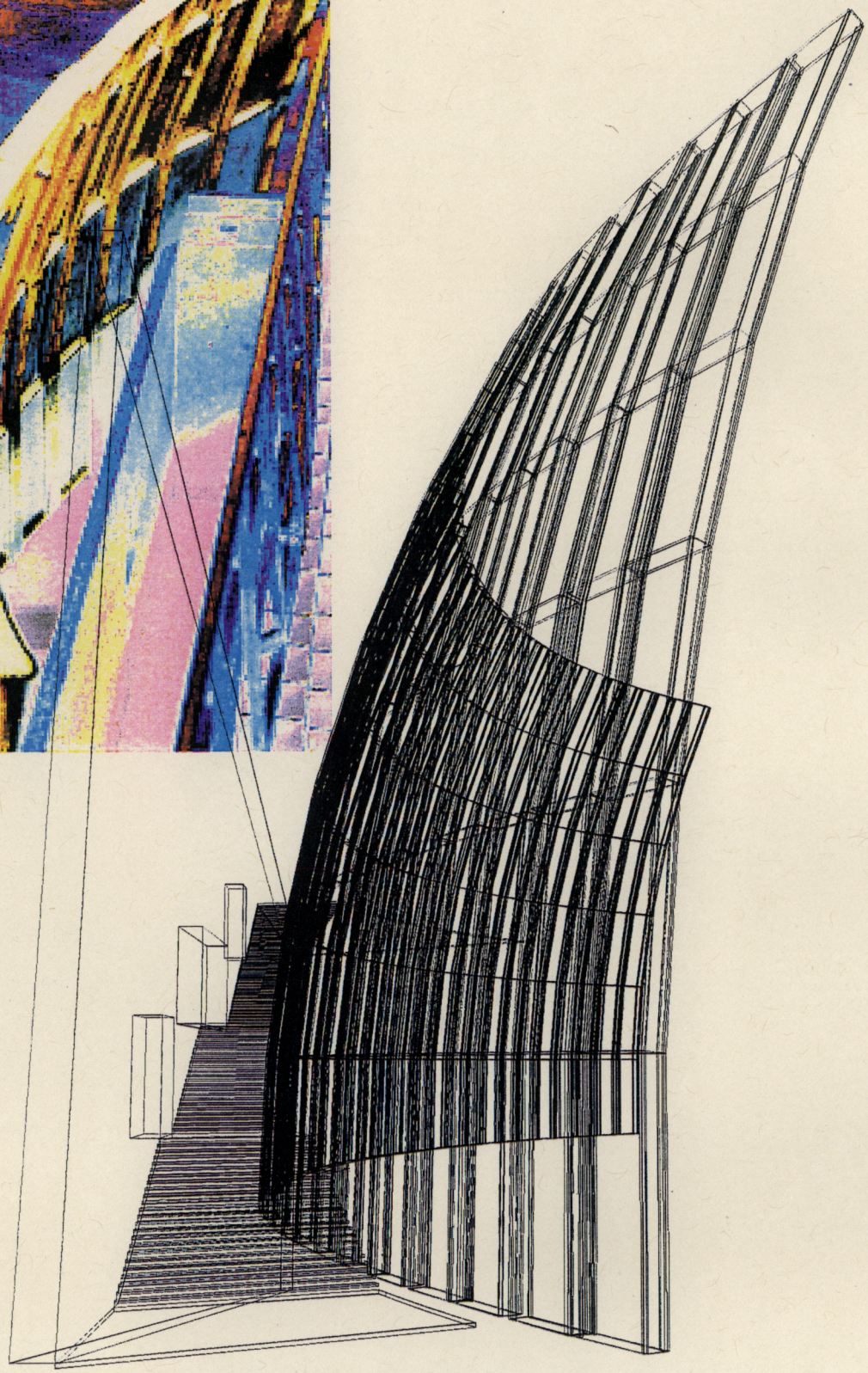




The classrooms are a place of transition for the students. They are based on the traditional idea of a home room so the students have a chance to become acclimated to the new environment of the school after being in the outside world. The buildings act as a border to the site defining the southern edge and they are arranged on both grid systems to emphasize the new and old methods of education.

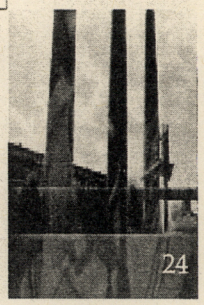




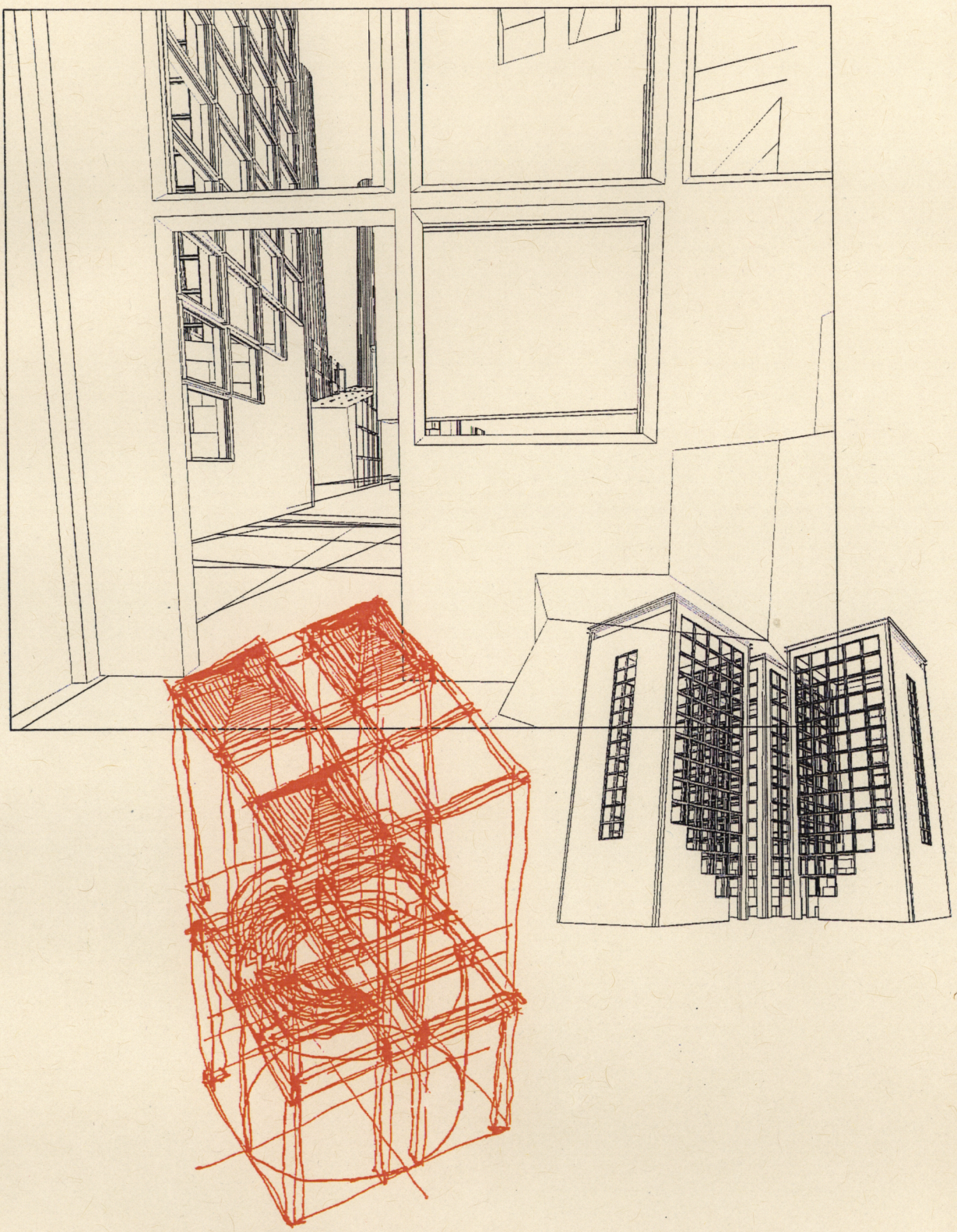


Stemming from the curve and line diagram the curved wall is a portion of a sphere that has been cropped by limitations on the site. It encloses a gallery space behind the wall of the pit and reflects light indirectly into this space. Teaming up with another straight wall the curve and line mark the East/West traffic through the building and separate the old world of the classrooms from the new one of the work study environment.

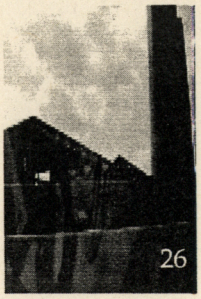
The bell tower/library is fashioned after the bevelled sky lights in the entrance room of the old factory except it has been inverted and stretched into a tall tower. It acts as a visual node of orientation for the students and is centered on the crossing point of the North/South, East/West pedestrian traffic routes. The bell tower/library is intended to be a vault for the books of higher knowledge and a spike to hold the motion and rotation of change in place in this new environment.

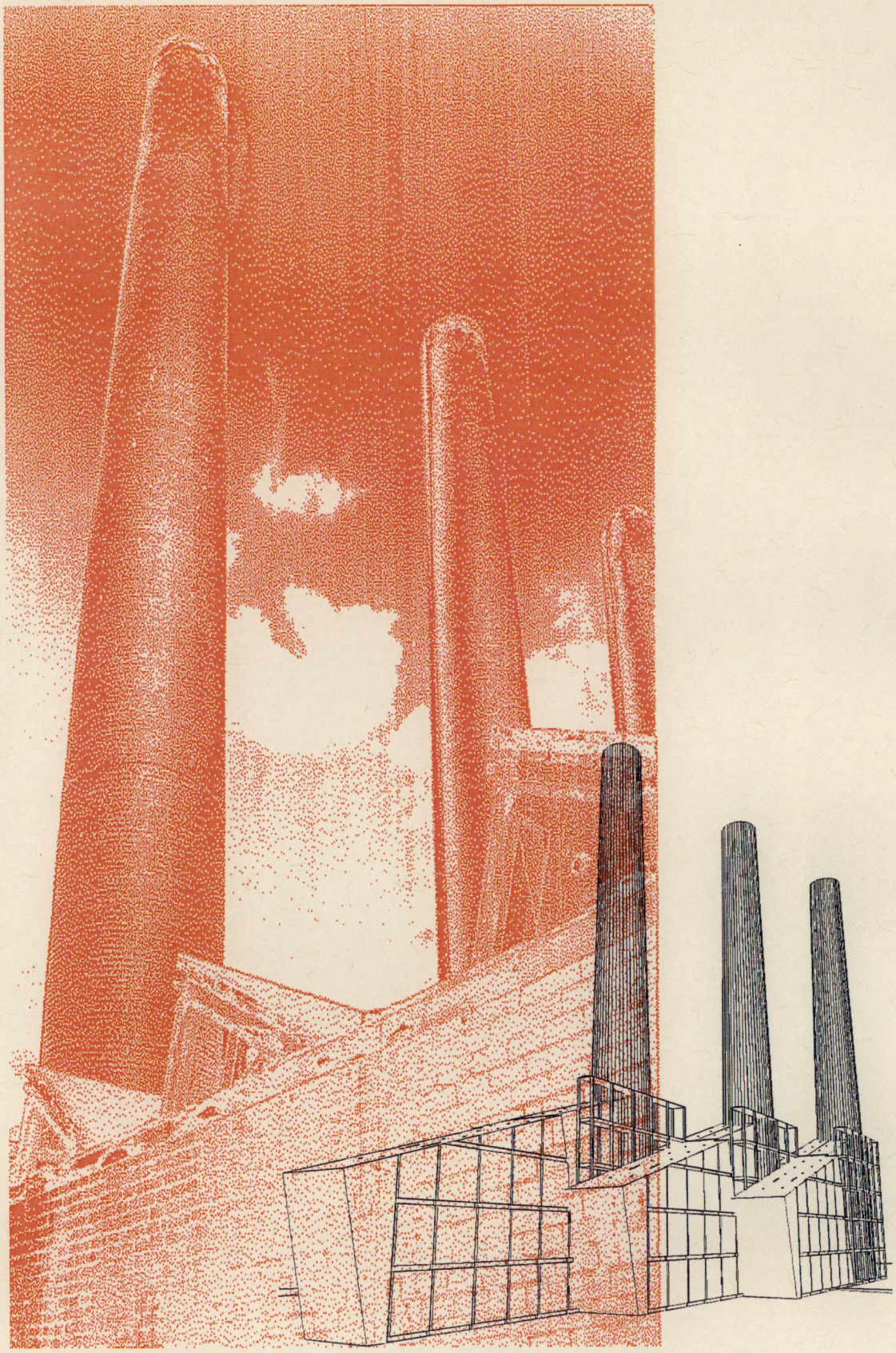


The theater's shape is generated from a sphere carved by the rectangular shape of the fly loft and stage area. The intention is to create a stage and seating with the highest diversity possible. It attempts to be both a gallery and thrust stage format using a steeply curved seating area that wraps around a floor space which can be stepped for floor seating or raised up to stage level as an extension. The fly loft back stage area is double sided with prosceniums on both sides to accommodate the theater and the outdoor plaza beyond.



The lecture rooms are at the opposite end of the plaza from the theater. They are three identical elements rotated to make up a cube. The seating is steeply curved like the theaters to give the appearance of a sphere within the cube. It is emphasized by transparent adjacent walls so one can see the continuation of the curve from inside and solid exterior walls to continue the overall form. Underground below the cube is one large open space to be used as a 'black box' experimental theater.

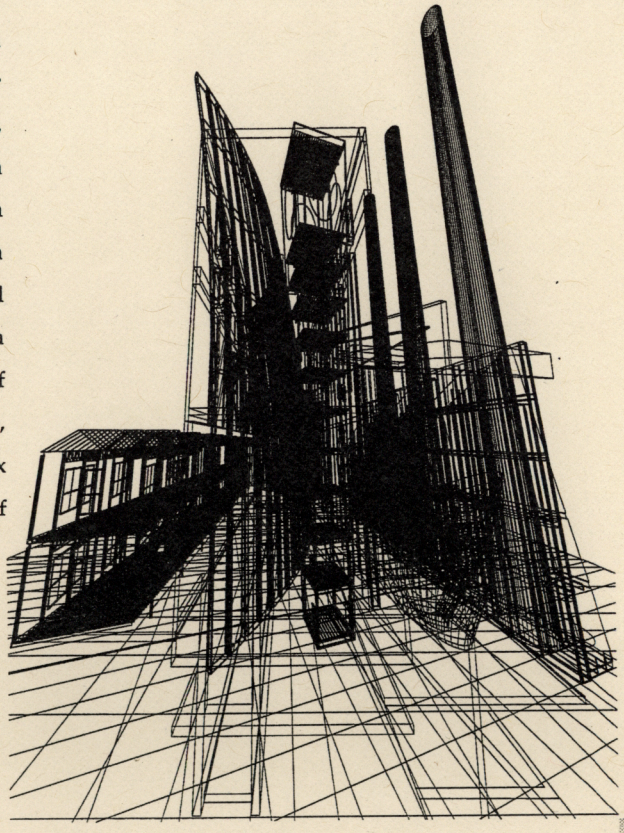


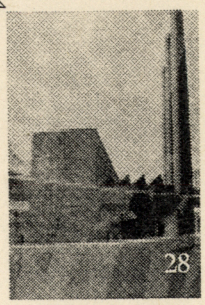


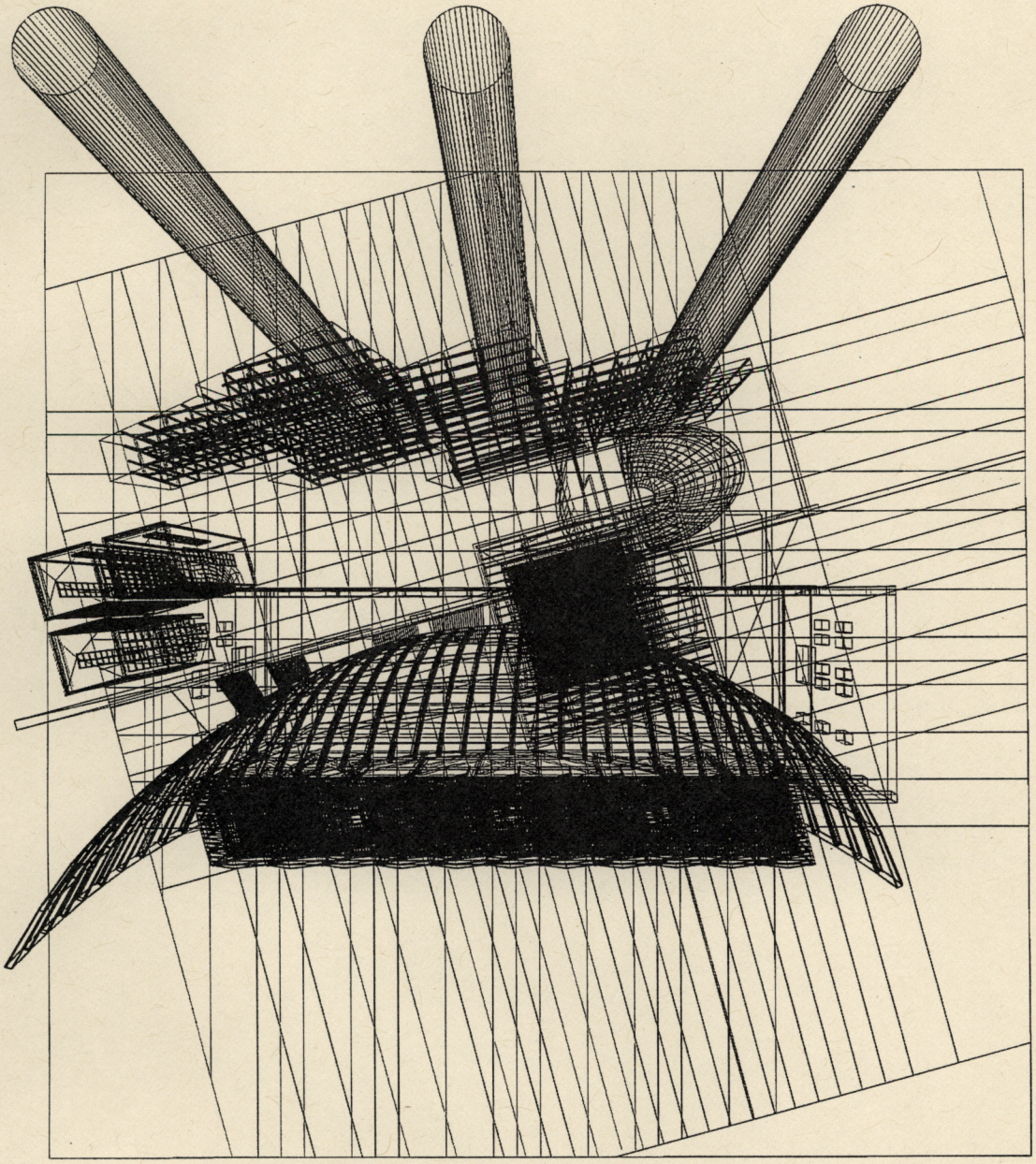
Three laboratory buildings are constructed around the chimneys creating a new boundary for the northern edge of the site. Reflecting the former shape of the sawtooth roof of the factory, the lab spaces are rectangles rotated in elevation and staggered in plan to follow the new grid organization. Intended to house technical labs and personal work spaces for each student the floor plans are left open to allow the highest level of diversity and adaptability.

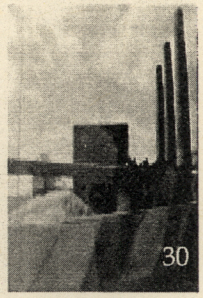
CONCLUSION:

This project integrates a new structure, and definition of a school for creative teaching and learning with the existing site of South Bay Waste To Energy Plant. It serves as an example for other cities to use facilities as a stepping stone to revitalize degenerating environments. This project reveals a divergent thought process of exploration or opening up and searching for new possibilities as solutions to current problems. In this case the plant previously generated electric power from the combustion of garbage, now metaphorically, as a school it uses learning and exploration as a form of energy. Using elements, materials and ideas from the site this project gives the opportunity to create a new image for an old facility. It keeps the general integrity and structure of the old building alive as a memory and it promotes the use of new styles of education. Combining the studies of site, school, scale, and form, the project introduces a design of a complex group of structures which represent the architecture of a school.









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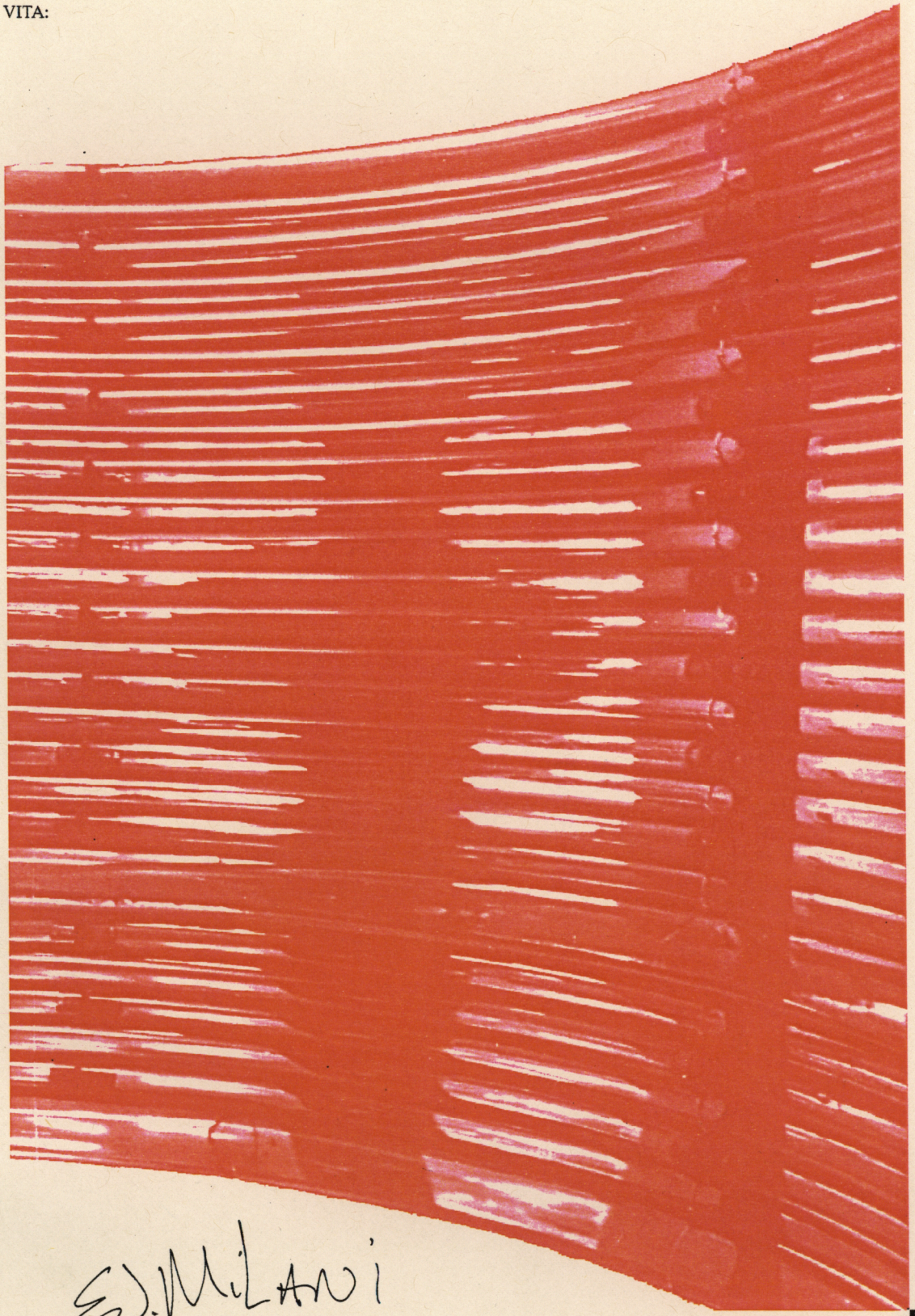
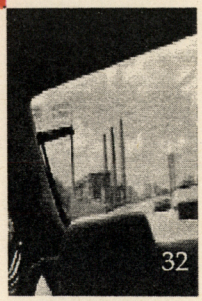
E.J. MILANI