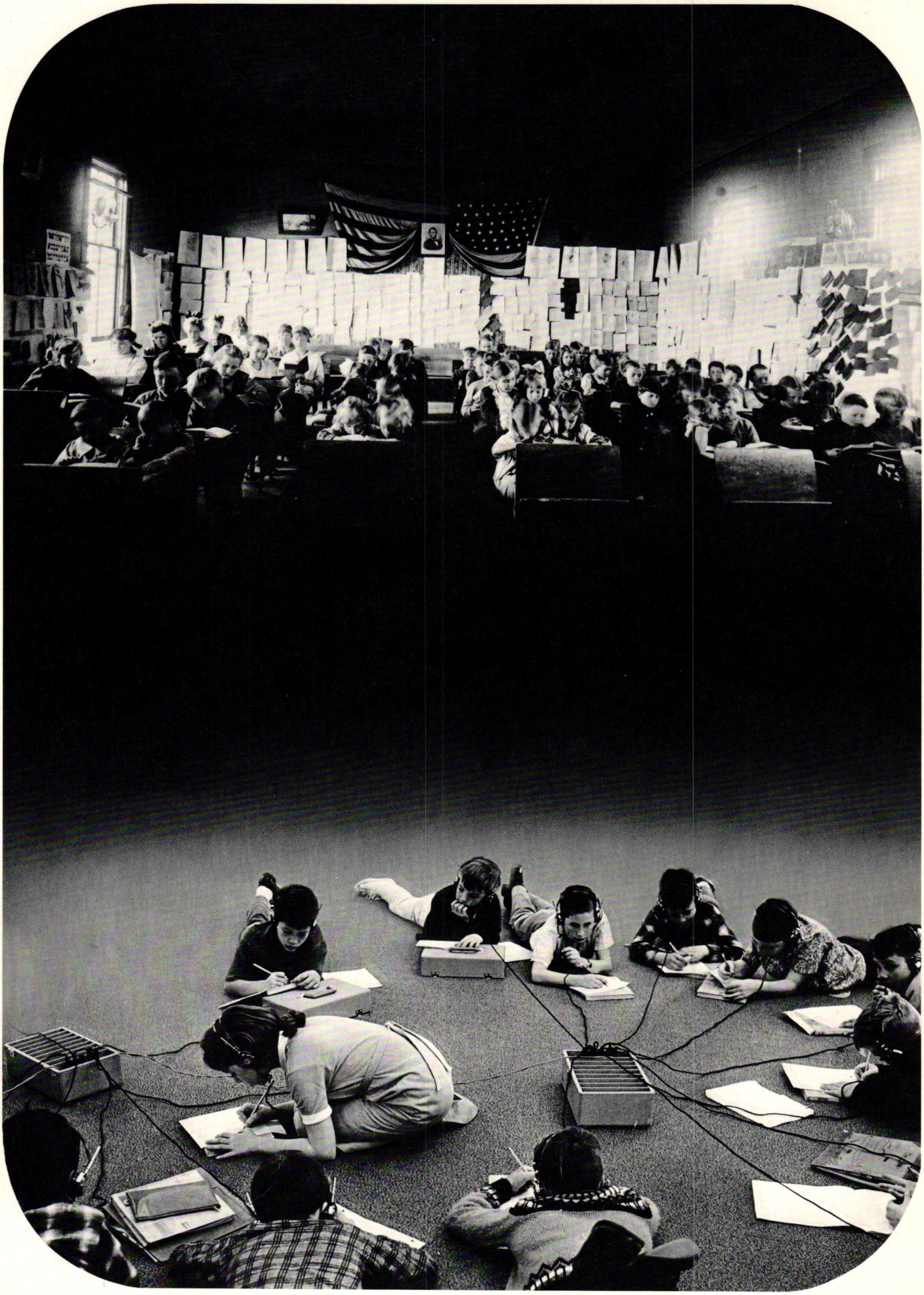

NEW
LEARNING
SPACES
& PLACES
DQ 90/91

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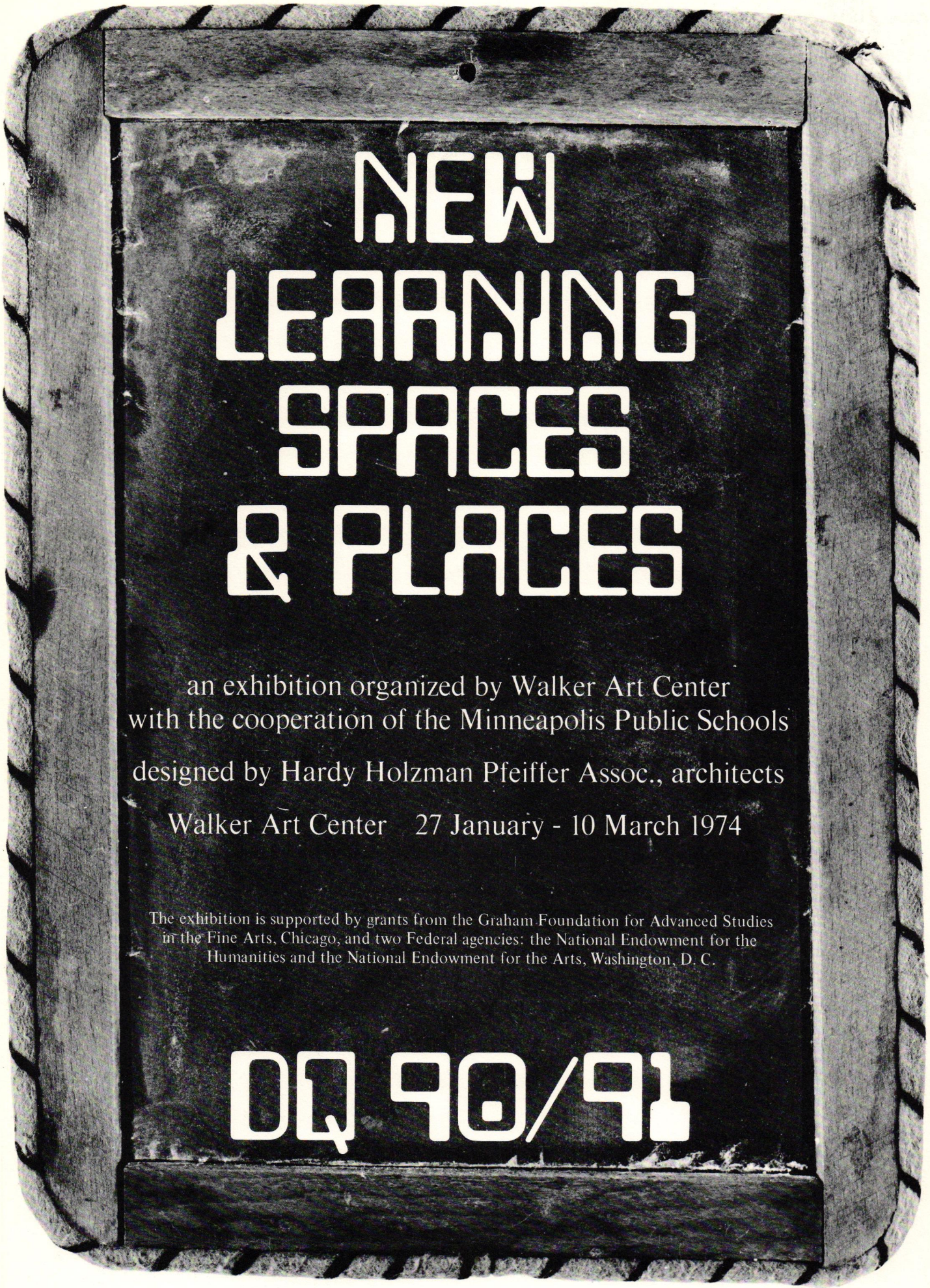

an exhibition organized by Walker Art Center
with the cooperation of the Minneapolis Public Schools

designed by Hardy Holzman Pfeiffer Assoc., architects

Walker Art Center 27 January - 10 March 1974

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DQ 90/91

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Newness is transitory, but the ideas expressed in *New Learning Spaces & Places* transcend the ordinary uses of contemporary technology, buildings and cultural institutions. The perceptive person will detect new relationships between things and ideas that had previously been dissimilar and unintegrated, permitting him or her—old or young—to seek out interest areas, perceive the wonder and excitement in the performing arts, to explore the magical intricacy of a computer, to see new uses for the media of print, the photograph, radio and television. All of this can be accomplished in the center of a civilization, in the city itself, where all forms attract toward the center.

The Minneapolis Public Schools are proud to be included in this effort to explore with a broad public these ideas, for we believe strongly in opening new or alternative patterns for learning, of making available more options and choices for the young and old, who are our clientele.

There has been in Minneapolis a constant search in recent years for ways by which students could escape the ordinary.

The organizational patterns have already adjusted in many instances and they meet both with success and failure as we try flexible scheduling, learning in community, free schools, open classrooms, schools without walls, each of them giving a name to attempts to make learning more individual, more creative, more meaningful, more excellent, liberating and humane.

The idea and the reality of entropy, that is, the inexorable movement of the universe and its parts to more and more disorganization, has its analogy and counterpart in our existing institutions and organizations. We always need then, new islands and patterns of reorganization to ensure ordered strength and new relationships to extend our future.

The movement in education in the 70s will in part be using new learning spaces and places to encourage all segments of our population to use the tools around them, both the familiar and the unknown, to enhance individual dignity in the process of learning and growth. This may be accomplished by both doing and observing, by apprenticeship and by actual performance, but all of it should extend and stretch the ordinary boundaries of places and spaces, and even of time.

Education as a continuum need not be thought of in a strict linear fashion either vertically, horizontally or up and down, but rather as an eternal journey along a Möbius strip, turning, changing, stretching to catch a glimpse of some future good—reaching outward, turning inward, for examination of society and self.

John B. Davis, Jr., Superintendent, Minneapolis Public Schools

Contents

INTRODUCTION

I would go all the way for openness. I don't know of any aspect of the political process that has benefited from being invisible. The school board meeting in Oakland is the only meeting in which you can have 400 people together who are not mad at anybody. The reason for this absence of hostility is that they have been a part of the process, and they've come to know that they are going to be heard. I think we get into trouble when we try to keep parts of it invisible. Why should we have it invisible? The schools belong to the community.

Marcus Foster, 1972
Interview—International Design Conference, Aspen

...there cannot be a perfect educational system, for each system must meet its social situation.

Paul Goodman, 1956
Growing Up Absurd

Context for Learning

Of the approximately 19,000,000 secondary students currently in U. S. schools, no more than three to five percent are enrolled in new programs—even the innovations of the 50s and 60s, such as flexible scheduling, team teaching and independent study have reached only a few.

Recent campus unrest, though catalyzed by the war in Southeast Asia, also exposed other areas of serious discontent among the student population, that have to be traced to the educational system. The system's general lack of relationship to the "real" world and the consequent frustration with curricula and the environments for learning, are problems not limited to students in institutions of higher learning. Similar conditions are even more apparent in our high schools, where the majority of young people continue to be victims of a rigid, authoritarian, closed system years behind societal change. Implicit in the exhibition *New Learning Spaces & Places* are a variety of complex problems related to the effects of environment on the learning process. Many potential resolutions are examined in the exhibition. A broad use of urban resources, an unbiased, fresh look at the architectural structures for learning, media applications to education and new technology exploration, are all attempts to make the learning experience more humane, more responsive to individual needs.

Of the approximately 19,000,000 secondary students currently in U.S. schools, no more than three to five percent are enrolled in new programs—even the innovations of the 50s and 60s, such as flexible scheduling, team teaching and independent study have reached only a few. Regiments of desks with a teacher at the front of a box-like room, contained in an egg-crate super-structure, still characterizes the predominant public school learning space. Both economics and unresolved, disparate philosophies account for the slow curricular and architectural upgrading of our schools, and as it can be shown that schools are almost always a direct reflection of their communities, these disparities take many forms across the country. The bookburning incident in Drake, North Dakota this past November is, though blatantly anachronistic, an exasperating reminder of how far we have to go.[1]

Hardy Holzman Pfeiffer Associates, the architects who designed this exhibition, approached the question of learning spaces on the premise that there is no ideal learning environment or utopian architectural solution to the problems of space and place. In addition, the architects and a group of 15 conferees who met last year for discussions preparatory to this exhibition (see Addenda) agreed that learning is a process of interaction between the learner and a system of resources—the total cultural context; consequently, it is not possible to examine the physical resources (classrooms, buildings, cities) of the learning environment without also considering the human and information resources that activate architectural spaces.

Educators' increasing concern for the individual has grown into a movement away from the teacher teaching to the learner learning. Concepts of shifting group sizes, of individuation, of genuine choice in our schools, are inherent in this evolving philosophy, as are new attitudes toward the learning environment—how it works, how it looks, and who should be involved in the design process. Many behavioral psychologists have studied the effects of physical surroundings on learning, among them, B.F. Skinner, Jean Piaget, and Robert Sommer, whose writings are cited in this catalogue. A broad conclusion can be drawn from such studies: learning spaces must reflect and assist the curriculum, and as the curriculum takes new forms, the environment must allow for change and for varied means of learning.

Since the mid-19th century, schools have been the primary learning spaces. James Coleman, in an article entitled, "The Children Have Outgrown the Schools," in *Psychology Today*, February 1972, describes our childrens' environment as "action poor," through the accelerated removal of young people from participation in the necessary functions of society; and "information rich," through the

proliferation of communications techniques and total availability of the media. Control of the dissemination of knowledge, formerly held by the schools, is now in the hands of the larger community. Therefore, Coleman continues, the essential goals of our schools must change if they are to remain viable institutions. Schools should take on a different set of responsibilities: 1) helping students to make sense of the information rich environment by teaching ways and means of handling information and, 2) structuring the school environment to develop awareness in young people–a sense of self and one's relationship to others.

One way to make the process of learning "action rich" is to move our isolated children out of the school buildings into the community. This cannot be accomplished with an occasional field trip to a museum or to the zoo. To be effective, this process means actually locating elements or aspects of school in the community. A proposal to implement such a program, Boston's "The City as Educator" project, is described in the Addenda to the catalogue. Philadelphia's Parkway Program, referred to in DQ 80 and DQ 86/87, uses the city as a campus, with a broad spectrum of people as its teachers. Aside from community based programs, other possibilities for expanding ways of learning include: year/round school with optional entrance time sequences, travel or work/study programs, nomadic campuses, magnet centers, school/community mixes. A number of such innovative programs, in diverse physical surroundings, are illustrated in the exhibition.

The metaphorical and literal spine of the exhibition is a "wall" that represents a store of factual information–the effective core of learning. A collection of books, data, objects, historic and current–materials that have been, and will continue to be, a part of the learning experience.

A group of self-contained environments that invite participation and interaction between the learner (museum visitor) and a learning resource are located outside the "wall." These elements have in common a give and take aspect not present in book, film or television learning–all essentially passive activities. The "action rich" elements include: a video time/space work involving the audience, that is an eloquent example of the vast learning potential inherent in the electronic media; videotapes made by students and community groups indicating broad applications for this inexpensive, easily manipulated learning tool. Several computer-based learning systems are included: PLATO, a versatile instructional system, individualized to provide immediate feedback for student responses in a broad range of subjects; a cybernetic toy called the TURTLE, that responds to typed commands by drawing images that demonstrate mathematical principles; and gaming simulations. A learning resources bank, programmed by Minneapolis high school students, will give each visitor to the exhibition a list of area learning resources where individual interests can be pursued. Finally, a new photographic technique is demonstrated with a group of holograms–three dimensional pictures made with a laser light beam.

Area high school students, enlisted through Minneapolis's Urban Arts Program, will act as "teachers" in the exhibition. Visitors will be able to operate the equipment related to each of the learning systems with the assistance of these students. Backgrounded in the technical manipulation of computers and video equipment, they will explain the electronic tools and their potential as learning aids to the visiting "learners."

Housings for the gaming areas are constructed with parts available from a standard building catalogue. Grain bins, sewer culverts, fiberglass forms for pouring concrete, portable sound-proof rooms, here used in unexpected ways, are all improvisations on the available. The architects, in taking an uninhibited look around, have brought together, creatively and inexpensively, a few unexpected solutions to the problem of housing educational programs. This ad-hoc method suggests innumerable applications outside the museum context.

The framework for the "wall" and participatory elements is a series of photographs of learning environments (described in detail in a later section) that allow for a variety of learning experiences, for social interaction, for individual activities. The schools, a library, a children's museum, and a new town represent a broad cross-section of ideas that include the remodeling of old buildings, pneumatic domes, community/school complexes, along with several inventive single purpose structures. These learning spaces have in common what designer Robert Propst calls an ability to change with grace, the means to try out new ideas. The architecture of these environments is not limited to a single style, design theory or to the dictates of a teaching doctrine. They represent many points of view and, in some cases, special circumstances. This is, of course, the message.

The photographs form a continuous enclosure for the exhibition, along with a series of quotations about learning. The quotations, taken from many sources, from Plato through Margaret Mead, demonstrate that the means of education have always been in contention.

This exhibition deals with the context of learning. It is not a model for a classroom, nor in any sense a prototype learning space or an exhibition about the hardware for learning. Rather, we are concerned with the concept and process of learning as life-long experience. In its present form, education lags behind societal change, despite the volumes of progressive, creative learning theory in our libraries. In a way, current educational practice perpetuates existing institutions. This dead center image can be changed. Participation of a broader, better informed segment of society in the planning and implementation of learning could lead to a demand for programs and surroundings worthy of our children.

Mildred S. Friedman

1. In mid-November, Drake North Dakota's school board confiscated and then burned 32 copies of Kurt Vonnegut's *Slaughterhouse-Five,* assigned to high school sophomores as supplementary reading. When civil libertarians from outside the town rose in protest, most of Drake's adult population couldn't understand what all the fuss was about.

Architecture as Environment

Since the exhibition must by its very nature deal with images acting as symbols for real events and ideas, we have made no attempt to construct an "ideal" school in the galleries of the Walker Art Center.

It is our conviction that the nature of education is changing, and architecture, because it irrevocably affects the life it contains, can make a constructive contribution to new learning processes. Architects and citizens share a public responsibility to insure that formal education remains an opportunity, and not a penance. Without question, the vast holdings of education cannot be wished away because of admitted inadequacies. The vast quantities of human and material resources expended on education in this country (described in some detail in Data on the Learner) show evidence of our increasing commitment to learning.

The very nature of what education is intended to accomplish, where it takes place, and the means used to achieve its goals is no longer fixed. As a result, some contemporary teaching programs do not occur in school buildings at all, and in others the administrative formality of 30 fixed seats facing a blackboard is fast disappearing. Even so, changes in education are slow and do not necessarily represent a true measure of the transformation of contemporary society. Technological innovation proceeds at an accelerating pace, making products and skills quickly obsolete. Unlike the 19th century when it was possible to devote a lifetime to one particular craft, union leadership now acknowledges the need for retraining its membership in new job skills as many as two or three times in the course of their working lives. At the same time, increased mobility, an avalanche of TV viewing, and less doctrinaire standards have brought to high school and grade school students a sophistication and awareness greatly in advance of their years.

As a result, the school years are now the period in which new generations meet society, and the crunch of conflicting values between established behavior and new ideas can be heard across the land.

Although it is always claimed they are built *for* children, schools are in fact built *by* adults who pay for them, maintain them, and see them in quite a different light. Each of us is the product of some form of past education. Each of us qualifies as expert about our own school experience most likely gained in traditional classrooms, locker-laden corridors, or written exam papers—all of it confined in conventional buildings. It is often hard, therefore, to relate contemporary ideas about education to our own experience, and so school buildings tend to perpetuate the memories of preceding generations.

We nonetheless believe it is the public's responsibility to inquire after the future of education, and in doing so several questions come to mind:

1. Why do schools have so much in common with factories and jails?
2. Why are schools vandalized?
3. Is the rectilinear, enclosed classroom still a valuable all-purpose tool?
4. Can we improve the existing conditions of our present buildings?
5. As new programs develop, unknown to us today, will present buildings be able to adapt?
6. Why must an entire learning space have 120 foot candle level throughout its dimension and all its spaces be eight and one-half feet tall?
7. Why should there be specific rooms for physical education, science, and art each separate from the other?
8. Why must the majority of our schools be made of the same thing: bricks, plaster, and asphalt tile?

We suspect that although some answers to these questions lie in confusion about educational programs, some can also be found in misunderstandings about

the nature of architecture. Basically, it can offer two totally different languages.

Architecture as Monument is intended to mark a place in time. It may contain people, but assumes they can have no effect upon it, preferring to stand resolutely against the sky in changeless perfection.

Architecture as Environment accepts people as an element of its design. It is malleable and responsive to change, being comfortably reused in various ways. It assumes no perfection and celebrates the random diversity of the people it is built to serve.

We believe that commitment to the idea of *Architecture as Monument*–however gratifying to those who pay for it–is an inappropriate image for schools. We suggest that *Architecture as Environment* is in the long run not only better suited to the task, but a better investment of effort and resources as well.

Against this background of ideas, our work for this exhibition can be seen to be based upon three assumptions:

1. Formal education and the idea of school buildings are here to stay, but we do not intend through this exhibition to predict the future or to imply a single new direction which the public should relentlessly pursue. Instead, we believe the future is nothing more than the present being influenced by the past.
2. We suspect our pluralistic society will continue to proceed in all directions at once, offering multiple images of reality to many diverse communities of interest. As a result, education should offer a variety of possibilities for acquiring knowledge. It is America's diversity, not some melted residue at the bottom of a pot which forms our greatest resource.
3. Learning is a highly complex, personal process which results in knowledge, and this knowledge is acquired in two ways:
   a. Through facts
   b. Through experience.

Since the exhibition must by its very nature deal with images acting as symbols for real events and ideas, we have made no attempt to construct an "ideal" school in the galleries of the Walker Art Center. No matter how skillfully realized, such an approach would be an empty gesture without the learning experience itself. Instead we have chosen to structure this exhibition out of two dissimilar types of elements: one, the "wall" of facts, the other, nine experience places. All of this is contained by gallery walls, banded by graffiti, and fifteen billboards depicting new learning spaces appropriate to our subject.

The "wall" appropriately unites two gallery spaces by its presence and also separates places of experience from one another. It is comprised of elements that address the immutability of natural law, and the constancy of education; it's students, teachers, paraphernalia and places that are part of an ongoing process.

The "wall" contains the written language in books and exams. It also holds trophies, photographs of graduations, typical classroom fixtures, diplomas, globes, and charts: elements from all periods which are the traditional tools of education and will probably continue in use. In addition the "wall" shelters TV sets, since they are fast becoming a universal means of acquiring information, but it makes no distinction between past and present, preferring instead to record the timelessness of factual knowledge.

To symbolize the importance of experience and to dramatize the resources now available as educational tools, we have assembled nine experience places. Most of these offer some sense of enclosure and contain some technical "toy." Taken together they can be read as a metaphor of experience, of the "action rich" interrelationships possible among people and between people and things. These experiences are subject to constant change, both because of the different people involved and because of the changing nature of the experience itself. We do not intend this to be considered a hardware display, and the liberal use of technology in this portion of the exhibition is not intended to indicate belief that these resources are an end in themselves. In fact, the addition of television or computers to classroom activities provides no inherent change, if the use of these tools remains the same as chalk and blackboard. We include technology because we believe it can enhance and extend the learning experience beyond conventional boundaries, and because it can vastly amplify our senses, making available information which otherwise would be either unapparent or hard to interpret.

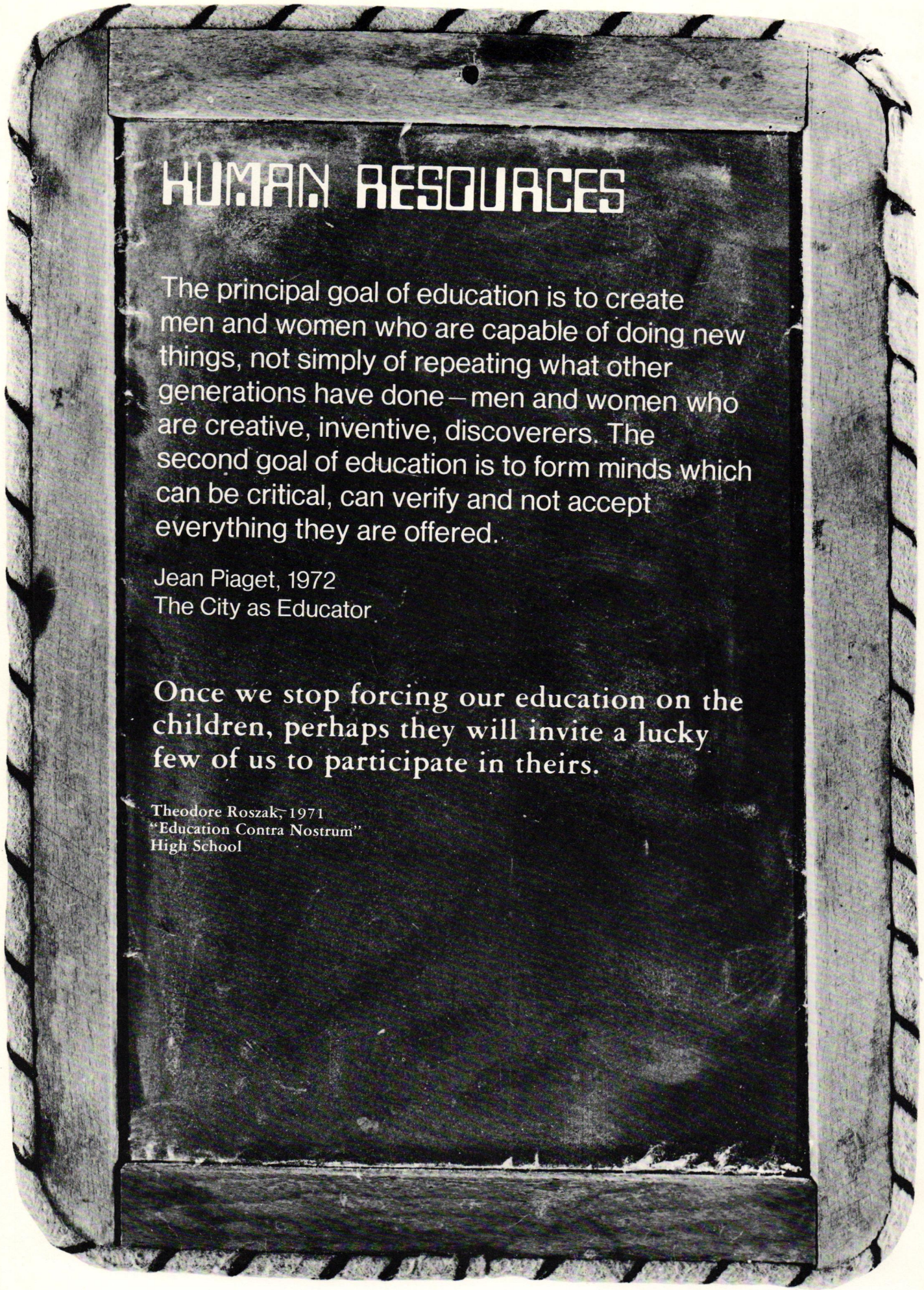
The "toys" are contained in enclosures made of various products of industry, products not normally associated with architecture. We have included such standard catalogue parts to show the diverse vocabulary available to architects, if they could be freed from preconceived ideas about *Architecture as Monument.* Although all these elements are commonplace, once taken out of context and placed together with deliberate intensity, they can form uncommon places and spaces. By inference we hope to stimulate curiosity about new ways to shape the environment and suggest five possibilities:

1. Spaces more responsive to change.
2. A greater variety of spaces.
3. Spaces costing far less than conventional construction.
4. Spaces more quickly erected.
5. Spaces devoid of institutional association.

In all this our intent is the promotion of change in the environment of education which can be quickly and easily achieved. We do not need to invent the elements of a new environment for learning. They are at hand.

Our final prejudice in assembling this exhibition lies in the conviction that the process of education need not be an onerous task. Despite all our collective opportunism, exploitation, and greed, the American experiment does still offer access to a great opportunity for personal advancement through self-government. We believe this can best be accompanied by a spirit of adventure and a full measure of humor.

Hardy Holzman Pfeiffer Associates


HUMAN RESOURCES
The principal goal of education is to create men and women who are capable of doing new things, not simply of repeating what other generations have done—men and women who are creative, inventive, discoverers. The second goal of education is to form minds which can be critical, can verify and not accept everything they are offered.
Jean Piaget, 1972
The City as Educator
Once we stop forcing our education on the children, perhaps they will invite a lucky few of us to participate in theirs.
Theodore Roszak, 1971
"Education Contra Nostrum"
High School

Observations on the Learner

. . . . . .many adolescents inhabit two worlds: the world outside the schoolhouse where they have more autonomy than any other generation, and the world inside, which is juvenile, oppressive, and allows students little voice in their own education.

In Bach's boys choir, in the 18th century, the boys stopped singing soprano because of voice change at an average age of 18. The average age of voice change today is just over 13 years.

The average age of menarche (the first appearance of the menses in girls) now begins at least two years and as many as five years earlier than in the past.

At the turn of the century, men stopped growing at about 26 years of age. Now, there is little if any growth after the age of 17 or 18.

Over one-fourth of today's high school age girls are married.

In addition to earlier biological maturity, today's youngsters are exposed at earlier ages to more information and accelerated experience.

They drive cars and motorcycles, they travel extensively, they initiate trends in dress, music, dance, and life-styles. Their increased buying power has made them one of the largest consumer groups in the country. In some states they may marry at 18 without parental consent and enter into binding contracts. With the 18-year-old vote, they now participate in decision-making that affects the life of the nation.

But little of this is recognized in our schools. Youth is no longer the same, and the world is no longer the same, but high schools are essentially unchanged from what they were at the beginning of the century. One finds the same eggcrate arrangement of classrooms, the same long echoing hallways, the same restrictions and surveillance of appearance and "conduct," the same over-all routines and academic programs.

As a result, many adolescents inhabit two worlds: the world outside the schoolhouse where they have more autonomy than any other generation—and the world inside, which is juvenile, oppressive, and allows students little voice in their own education. The dichotomy becomes absurd indeed, when the downward age trend of early experience suggests that VD may soon replace chicken pox as a childhood disease—while in many schools, students aren't free to decide to buy an ice cream cone with lunch.

The absence of choice open to youth includes, of course, the choice of going to school at all. But compulsory education, one of the most sacrosanct tenets of American democracy, is now being seriously questioned. Too many classrooms are loaded with students who are there only because of parental or societal pressure. The schools have been modeled after the jail, the church, and the factory. The result is that, for many, schooling is primarily a place of confinement. High school students are entitled to an education but should not be forced to acquire one.

Neither should young people, once in school, be forced to learn in ways that are prescribed for them. The rhetoric about education tailored to fit the individual has to be given meaning by providing alternative styles of learning. Students should have the power to select from these the modes they prefer; to decide for themselves the course of their own education.

Such alternatives might include: serving in the community; study away from school premises in the real world of hospitals, government offices, museums, industry, science laboratories, police stations, courthouses, and the like; getting paid for work, with the school's sanction and for school credit; teaching other kids; spending more time by themselves; working in groups rather than classes; working with a range of adults and kids of other ages.

If schools mean what they say about tailoring education to fit the individual, they must also respect the fact that each of us has his own unique body time. The differences among people in biological rhythms do not separate us merely into

"night people or day people." There are as many different rhythms as there are people. Moreover, one's attention, energy level, and ability to concentrate may vary rhythmically around the clock within one's own cycle.

When students in a schoolhouse or a classroom are treated as though they are all simultaneously in the same state of consciousness, with the same degree of energy or capacity for concentration, they are being denied, in a profound way, their individuality.

This doesn't mean that school systems should be designed deliberately for the nocturnal life-styles of many young people. But it does mean that within reasonable bounds schools might provide optional schedules–like Five O'Clock High in Las Vegas, Nevada, where, if they wish, students may start their school day when the sun goes down–or like the Gar-Field High School in Virginia, where students can choose from among 15 different entry points for starting the school year and devising any configuration of three-week school periods so long as they attend the legal minimum of 180 days per year.

Another notion that needs examination is that schooling is effective only if it is continuous. Why shouldn't schools be dropping in and dropping out places, with intervals for travel, work, and other educative experiences?

There is still another reality educators must come to terms with. That is, school is the place for socializing. Everyone regards school as serious business. And "serious business" is thought to consist of hard-core learning, not socializing. But for adolescents, socializing *is* hard-core learning. It is trying on self-images, connecting with one's peers, developing one's sexuality, and working out human relationships. Socializing is part of the process by which one acquires the equipment for growing up, and it is at least as important as algebra. Since school is so much of the scene for adolescents, it is of necessity the place where these roles must be practiced and played out.

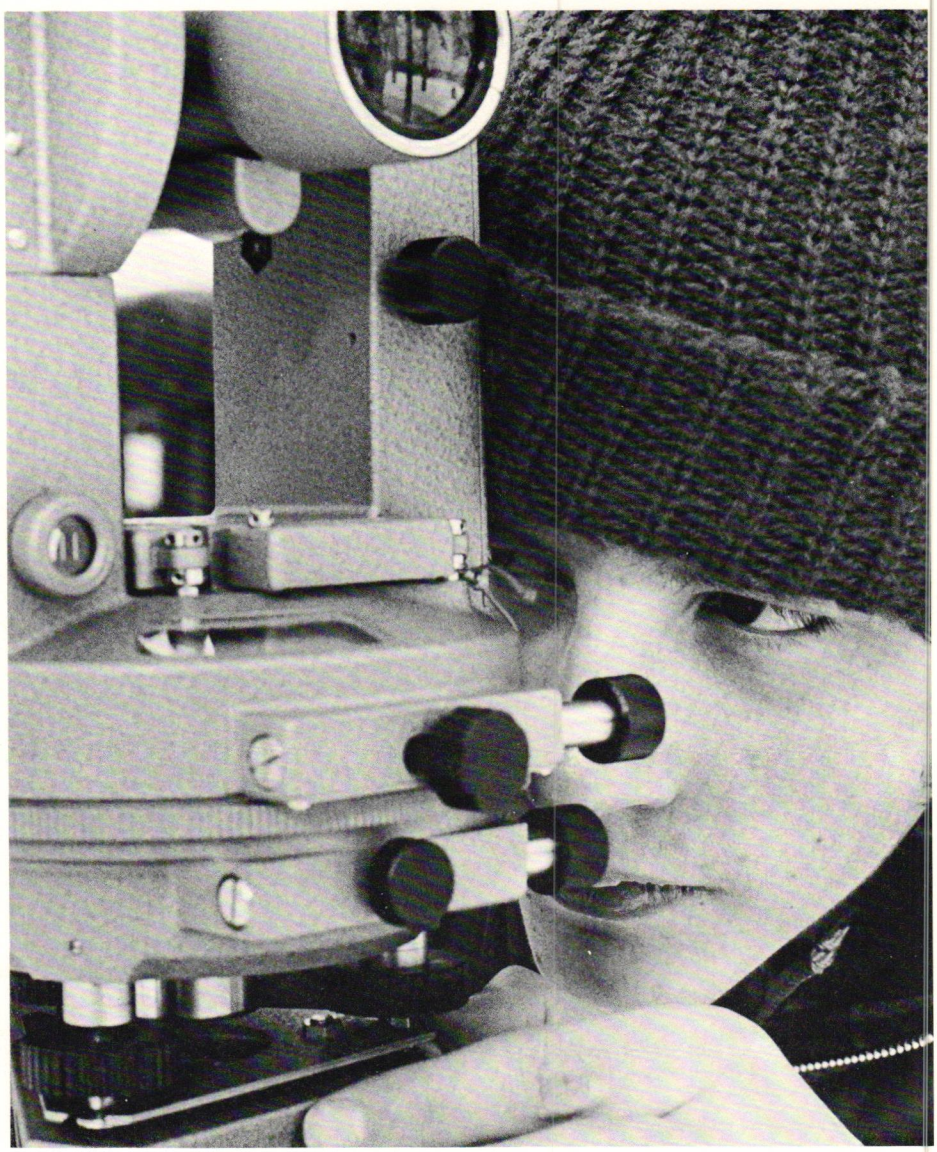
The institutional nature of the school building itself, however, gets in the way of human relationships. School spaces need to be designed as softer, more intimate settings, conducive to the informal talk of people in small groups, with furniture located and arranged to help ease the awkward beginnings of one-to-one conversation.

At the same time that schools must be planned as places for students to get in touch with each other, they must also be planned to allow students to get in touch with themselves, with private places where both students and teachers can be alone to work and to think.

When school buildings are at their best, monumentalism is out and humanism is in. The message of their architecture is that schools are for people. Of course, they are symbols too–of the hope that parents place in the future of their children and of community pride in the way it cares for its young.

Unhappily, that is where the schoolhouse often goes wrong. The symbolism overrides the human functions and twists the structure into a self-conscious monument. To put meaning back into the symbol, school buildings must above all serve the people in them. What are some of the qualities that can make them "people places?"

Human Scale: Physical settings must satisfy the need for a sense of identity. In a world that is too big, out of control, and lacking in meaning and social satisfaction, school buildings (or houses, or factories, or cities) need human scale. They need to answer the questions "Where do I belong? Where can I hide? Where can I find my girl? Where can I work, alone or with others?"



Manipulability: The school environment must allow itself to be manipulated by its users so that spaces can be changed, tools moved, lamps turned on and off, and so on. A facility that allows itself to be manipulated by its users gives its users a sense of possession.

Spatial Variation and Flexibility: A schoolhouse should provide options in the sizes and shapes of sub-spaces so people can comfortably gather in twos or fours, in groups of 10 or 20 or 100. Patterns of use should not be predetermined. The space should allow people to array themselves in relationships natural to communication for the work at hand.

Environmental Feedback: A school facility must allow its occupants to stamp their presence on it. Displays of student work help to build their sense of identity by reflecting who they are and how they're doing.

Access to Information and Tools: Service must be emphasized. Tools for learning must be easily available and invite "hands on" use.

Personal Territory: Everyone needs a sense of his own turf. Schools need to provide personal places to be alone and separate from group pressures, to work, to store and retrieve information and tools gathered for projects in progress.

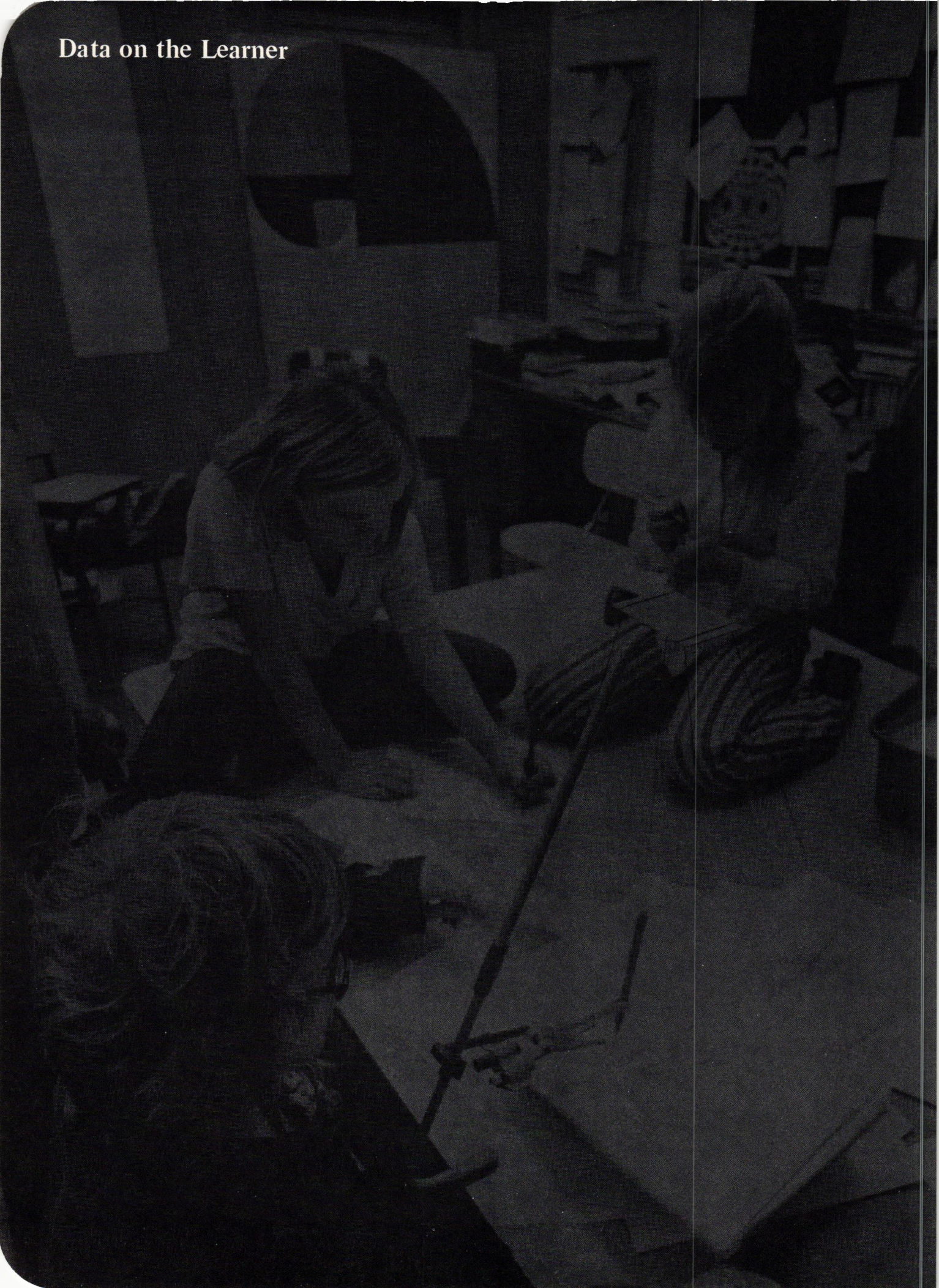
Optional Seating and Work Surfaces: Schools should acknowledge that people work in a variety of natural postures: sitting up straight, lounging, leaning, perching, standing. They should offer a variety of seating (including the floor) and work-surface heights to accommodate them.

Graceful Wear and Renewal: Furniture should be allowed to be worn, used up, and renewed. Furnishings bought for their qualities of permanence tend to be cold, unyielding, anti-people.

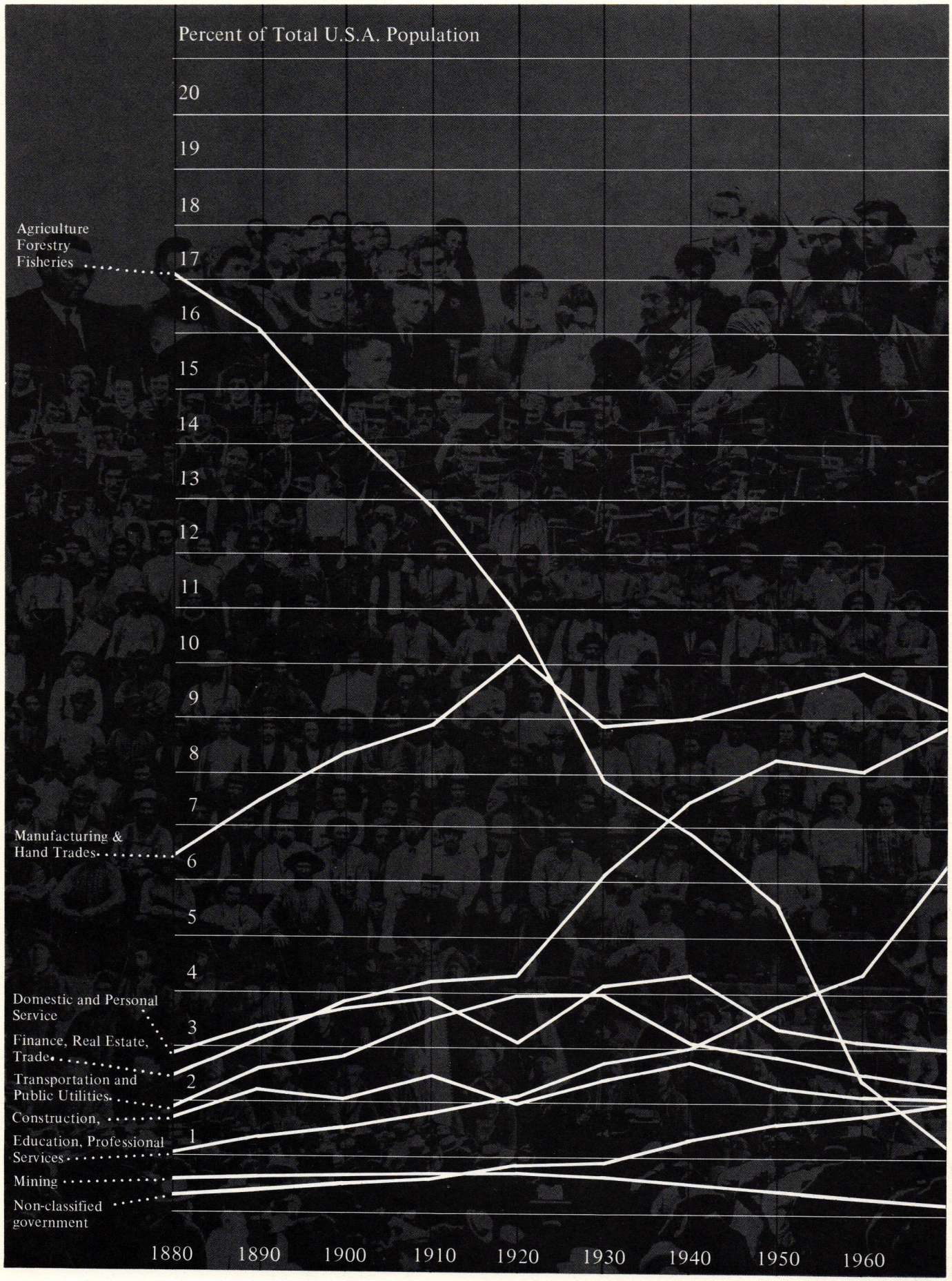
It is essential that our schoolhouses have all these qualities if education is to carry out its role in people-building, city-building, and society-building.

This article was extracted from "The Greening of the High School," a report of Educational Facilities Laboratories, Inc., by Ruth Weinstock.

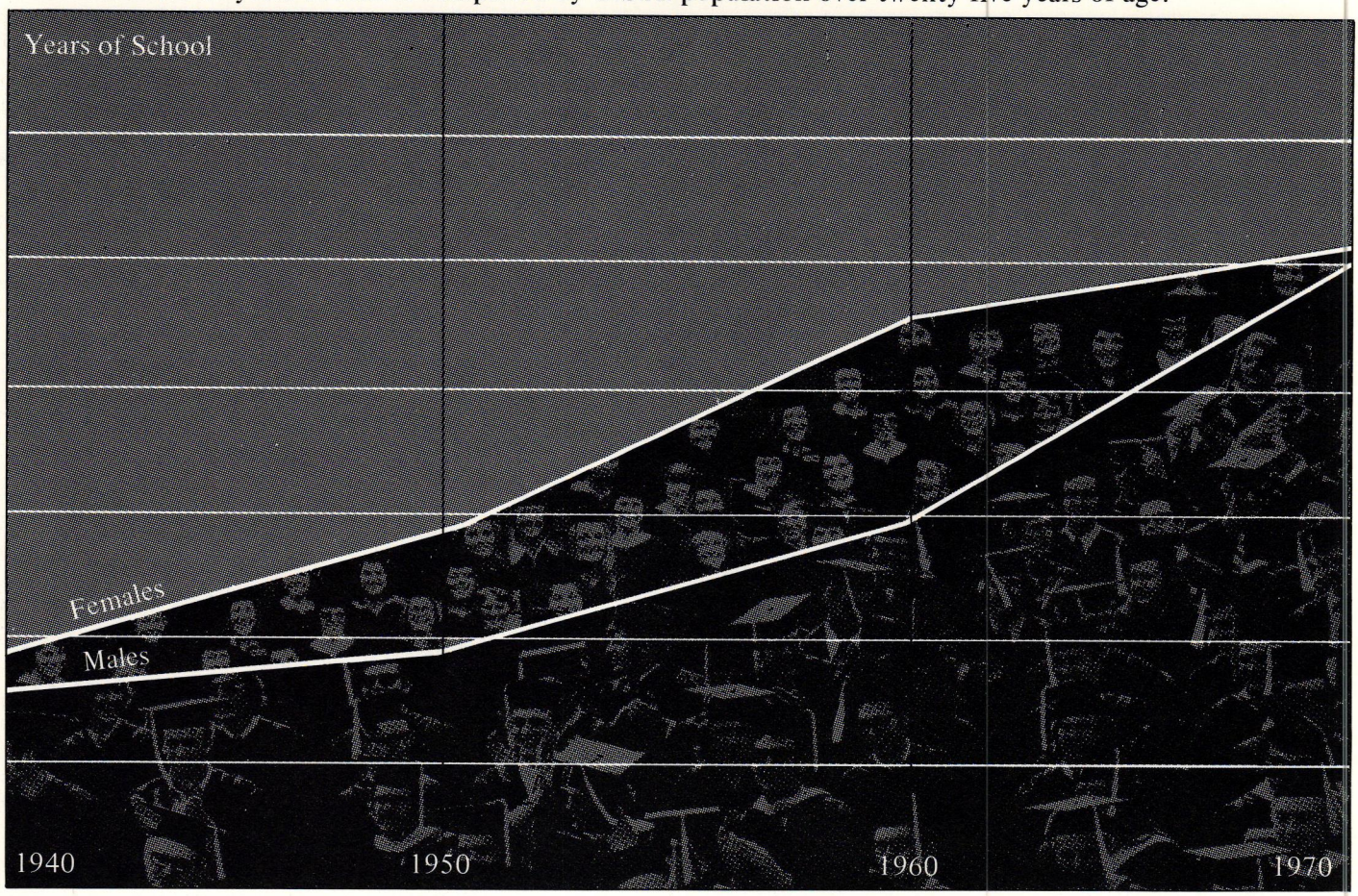
Data on the Learner



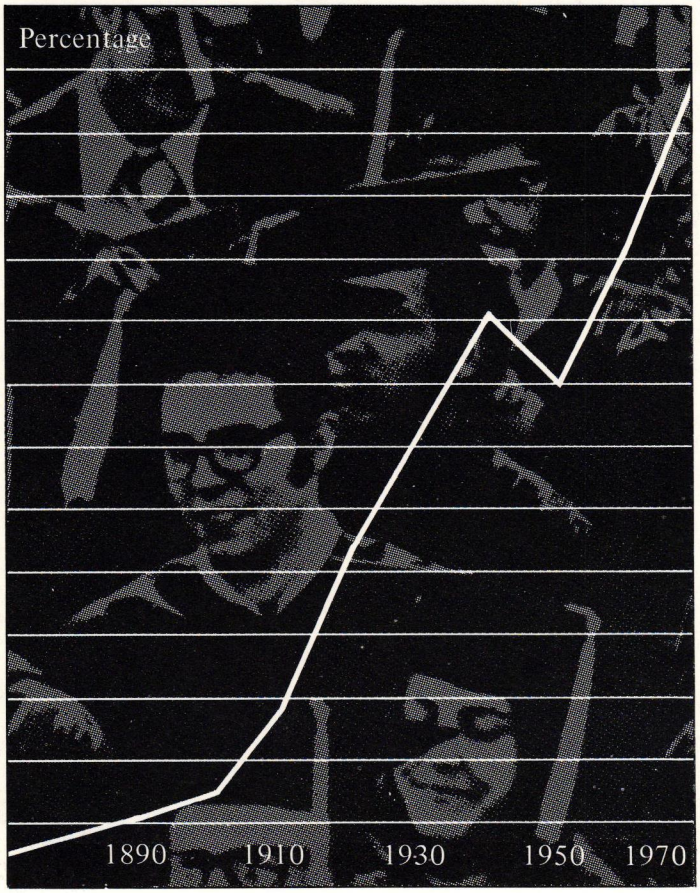
U.S.A. Occupational Fields



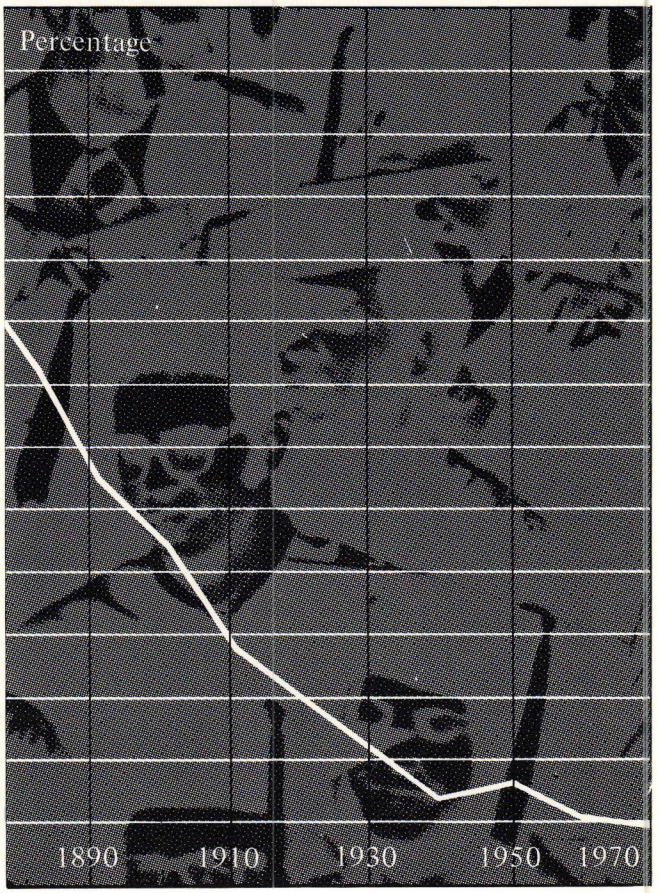
Median number of years of school completed by U.S.A. population over twenty-five years of age.



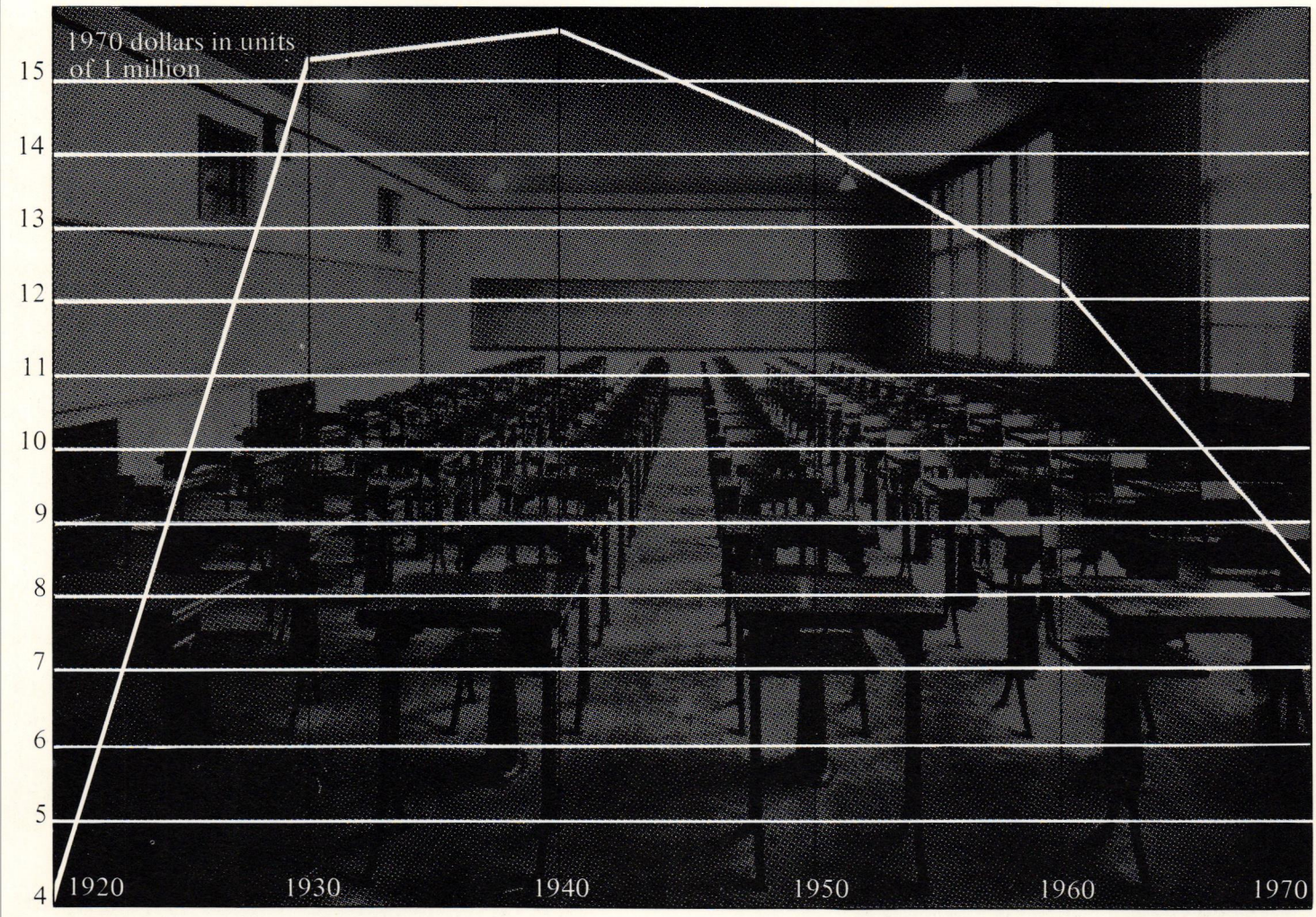
Percent Graduating from H. S. Each Year



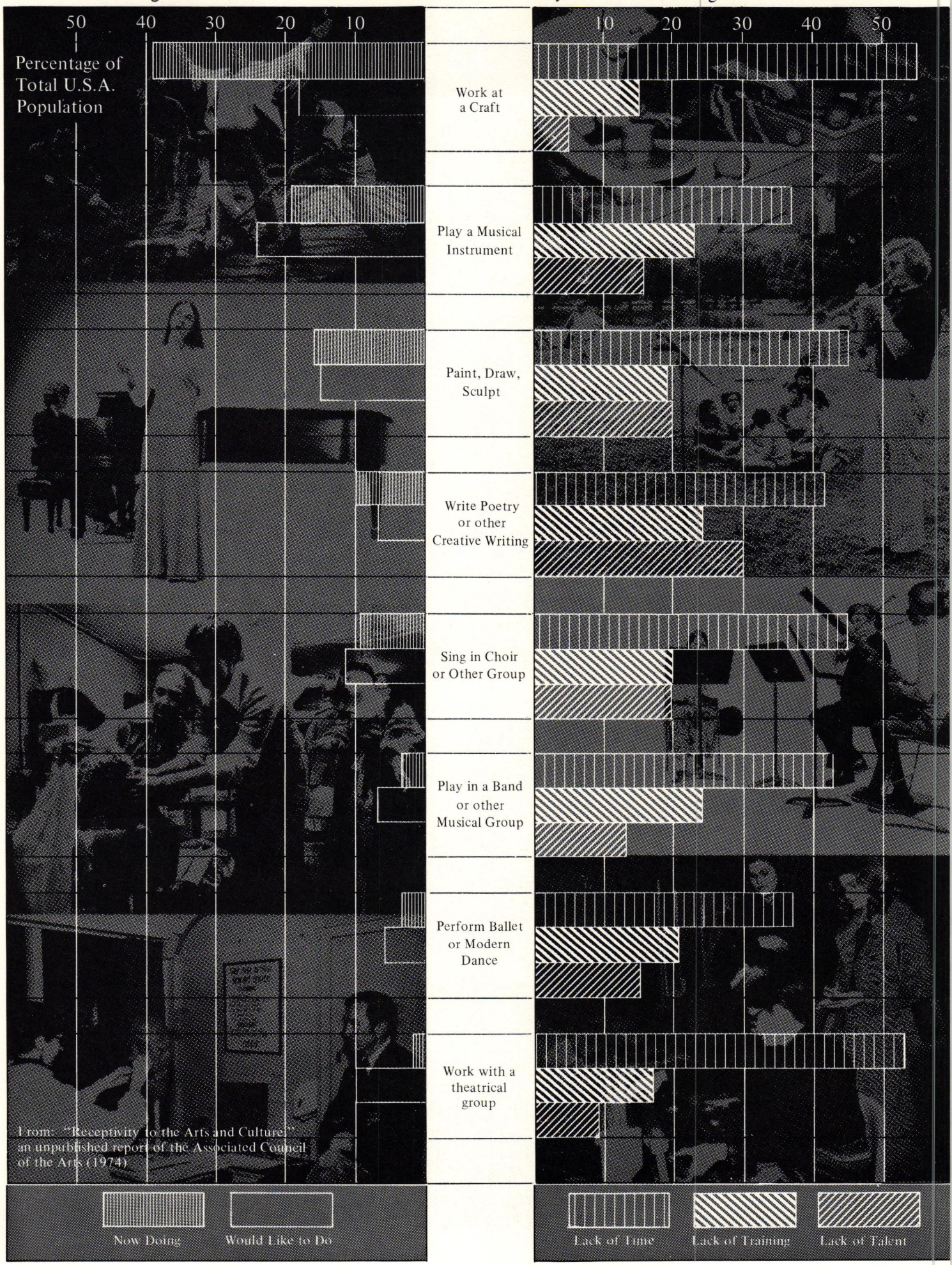
Percent of Illiteracy in U.S.A. Adult Population

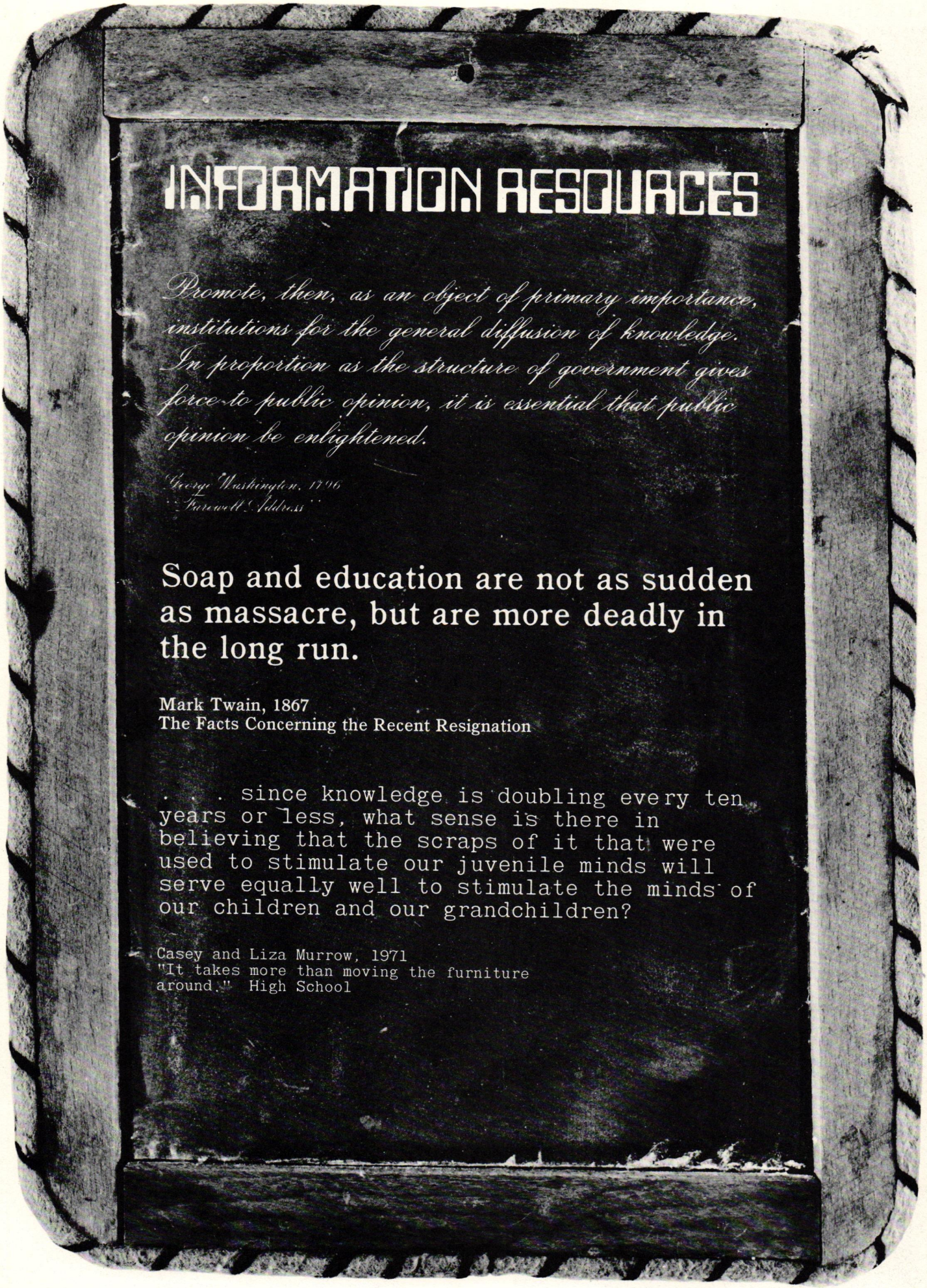


Building Maintenance Costs in Minneapolis Schools (dollar adjusted to 1970 value).



Per-pupil Costs of Education in Minneapolis (dollar adjusted to 1972 value).


What We Are Doing and What We Would Like To Do.
Why We Are Not Doing What We Would Like To Do.
50
40
30
20
10
Percentage of Total U.S.A. Population
Work at a Craft
Play a Musical Instrument
Paint, Draw, Sculpt
Write Poetry or other Creative Writing
Sing in Choir or Other Group
Play in a Band or other Musical Group
Perform Ballet or Modern Dance
Work with a theatrical group
From: "Receptivity to the Arts and Culture," an unpublished report of the Associated Council of the Arts (1974)
Now Doing
Would Like to Do
Lack of Time
Lack of Training
Lack of Talent


INFORMATION RESOURCES
Promote, then, as an object of primary importance, institutions for the general diffusion of knowledge. In proportion as the structure of government gives force to public opinion, it is essential that public opinion be enlightened.
George Washington, 1796
Farewell Address
Soap and education are not as sudden as massacre, but are more deadly in the long run.
Mark Twain, 1867
The Facts Concerning the Recent Resignation
. . . since knowledge is doubling every ten years or less, what sense is there in believing that the scraps of it that were used to stimulate our juvenile minds will serve equally well to stimulate the minds of our children and our grandchildren?
Casey and Liza Murrow, 1971
"It takes more than moving the furniture around." High School

Urban Guerrilla Learning

What we have now is a large circuit board in which the individual can randomly plug in, in a multiple-choice situation. The important part is that the choice be made consciously by the individual to control his future.

A primary question in understanding the necessity for "new learning spaces" could be: what is the essential difference between a 16-year old student and a 40-year old teacher? While it can be assumed that the teacher has more experience necessary in the making of value judgments, this experience often amounts to no more than calendar years of time spent dealing with problems.

Electronic technology has changed our methods of dealing with time and space. The basic difference is almost that of the difference between light and sound, the teacher representing sound and the student representing light. The teacher is a product of an age of learning through sound, and the student a product of the age of light. While the teacher may have more experience in teaching and understanding previous experiences, he has little understanding of the phenomena of experience involved in being 16 at a time when the "artificial intelligence technologies" have developed with extraordinary velocity.

The so-called generation gap is more accurately an information gap. Time must now be measured in terms of psychotechnical advances or more logically counted in generations of generative systems, as opposed to actual or calendar years. How many years would it take an unassisted individual to reach the same level of perception another individual could reach with the aid of a computer? Technical advances in the artificial intelligence field are the more accurate ways to gauge the maturing or aging process within the perceptive mind.

A large part of the 40-year old's experience, upon which he predicates his value judgments, amounts to prejudicial choices based on personal knowledge. It is true that the teacher has more experience in evaluating the cause and effect of certain kinds of information, but it is also true that his perception of new information is at a lower level than that of a student's. Learning is accelerated by lack of experience. The less experience you have in a given situation, the more likely you are to see more of what is going on. The more experience you have, the more likely you are to be selective about what you will allow into your frame of thought.

Teachers in the past few years have often expressed the point that they can't teach people anything, but that they can develop them to a state of self-learning. Considering that many adults do not understand the phenomenology of the "perception architecture" of the mind-workings of a 16-year old, it is unlikely they will be able to finesse that "architecture" to a constructive self-appreciating state. Teachers need to acquire an understanding of the anti-logical phenomenology that engages the perception of a 16-year old.

In technologies, current developments are invested with all previous experience, making the previous experience unnecessary and redundant. Those who are born into current technologies, develop from that technological point onwards. Therefore, it is conceivable that while a 40-year old teacher may be more mature in terms of "actual experience time," he is less mature than a 16-year old in terms of "technological development time." More simply put, the 16-year old is a product of this time and this generation with all its improved technologies, and the 40-year old is the product of a previous time with all its obsolescences. The 16-year old is born in a time of computer technology, videotapes, etc., and accepts them as part of the natural environment. The 40-year old calls such things new technology – strangers coming into town to upset the natural social order.

The teacher bases his judgments and conclusions on an order of logic developed by book-learning and the logic developed out of language. It is not surprising that in a society that did all its learning from books, language would become the primary arbiter of logic.

That which can be explained in language is considered logical and that which defies perception through language is presumed to be illogical.

A common view of most language theorists is that the more perfectly formed a sentence, the greater the degree of communication; the more pronounced the syntax, the more clear the transmission of ideas. However, any child of the media generation understands that emotion is the primary factor in the perception of language. Emotion interrupts the syntax in such a way as to invert its natural logic.

The "hardware generation" will watch a person on TV make a statement and judge the statement on the basis of how clearly the statement is formed in language. The "software generation" listens to the statement, collates it to the texture from which it is transmitted, to come up with an aggregate value. That is to say, if President Nixon says he is appalled at the price of meat, the "hardware generation" assumes that he is telling them that he is appalled at the price of meat. The "software generation" the TV generation, looks at the shirt he is wearing, the color of his tie, the texture of his face and comes up with the aggregation: this texture and that image and that form is saying, "I am appalled at the price of meat." What has been said for the TV generation lies somewhere in between the phenomenology of striped silk ties, blue serge suits and the price of meat.

When the "hardware generation" watches a show like *Let's Make a Deal,* it finds it gross and unsophisticated. The "software generation" sees it as a comparison shopping guide, a lecture in civics, a seminar in behavioral psychology and an illuminated gospel of the 20th century.

While the "hardware generation" requires a highly ordered environment, the "software generation" understands that too much order creates oblivion, and that the environment can only be perceived when parts of it have been activated.

By the time I was five, I had some concept about what the people of Egypt were like, a vague understanding of their culture and their lives. I was no child prodigy; I had not studied Egyptian history or culture; I had been to the movies and had seen Bud Abbott and Lou Costello in *The Mummy's Tomb.*

Of course, most people in education would by now realize the value of film as an educational aid in the classroom.

A more important realization is that people are more educated by films they see in movie houses than those they see in classrooms. The reason for this is quite simple: you don't go to a movie house to learn; you go to enjoy yourself. "Enjoy" is the key word. You don't go to a classroom to enjoy yourself; you go to learn. It's probably easier to learn while you're enjoying yourself, than it is to enjoy yourself while you're trying to learn.

The brain is more receptive to pleasure than to duty. Learning is like a social dose that has to be taken in order to fulfill one's duty to society. Pleasure is accepted by the brain as a fulfillment of one's duty to one's self.

Learning is mental behavior. It is not physical behavior. The brain shows no preference to information sources. The brain couldn't care less where its information is coming from.

The brain is an anti-intellectual organ. It intellectualizes merely as a preamble to perception. Perception allows the brain repose. Intellectualization forces the brain to work, and the brain only does this task of work so that it can obtain the repose of perception.

The square is intellectual. The circle is perceptual. Man has attempted to replace perception with intellect. We live in a square; we think in squares. We mistrust anyone who thinks in circles. (He is going around in circles, getting nowhere.) Our minds have been shaped to deal with flat space.

Our classrooms are squares. Our students and teachers are circles. The right form for a classroom would be the teacher in the center, rotating slowly clockwise, while the students would form a circle outside, rotating counterclockwise. Energy must come from the center of the circle and rotate around the periphery and be contained in such a way as to create a magnetic force.

World perception insists on being spherical. That is why we find ourselves passing the same place again and again. What we call revivals are just one more rotation of the circle. Progress is not made flatly, forwardly or upwardly. It is made spherically.

The square man (the intellectual) has to enter an encounter group in order to communicate, only to find out that once he leaves the group, he can't communicate because the world is full of squares who won't enter circles. The circle man (perceptual) has no problem. He is in an encounter group every minute of his life.

Flat is the alchemy of intellectual man's value system. The circle in intellectual man's mind has a lower intrinsic value than the square. Intellectual is a retrospective view. Perceptual is an all-at-once view.

Context then would seem to be a pivotal issue. Does the subject have to be in a classroom to learn? Academia insists on believing that it does. Of course, academics are willing to allow that learning goes on outside the classroom, but they do not consider outside learning as valuable as learning that goes on in the context of an educational institution.

This is a false notion, for the "architecture of perception" operates in complete absence of the necessity of context. The quality of an experience is not perceptibly changed by a different context. A new context may permit a different intellectualization, but it does not change one's gut reaction.

The context for learning, then, is the brain itself and whatever previous experiential developments the brain has been able to accumulate. This context is personal and as transportable or mobile as the individual.

Crucial to the understanding of this context is the subject's meta-psychology and his own phenomenal relationship to time and space: when he or she was born and to what state learning processes and environmental stimulation had developed in his or her childhood. This is not to imply that every generation is by nature smarter than the previous one. It merely means that the next generation enters a more "weeded information environment" than the previous one.

If the context is a rectangle or a floor plan, then what occurs in the rectangle is learning and what occurs outside is not. However, it is symptomatic of a bad

equation that one end of it should be top heavy, i.e., when we do not understand the difference between the activity inside or outside the rectangle, we make the rectangle the issue.

The context becomes the issue out of proportion to the subject and, as we are not clear on the nature of the subject, we build up the context in order to create a barrier between it and the learner. To enter the context, a difficult period of initiation is necessary. If the student is not learning well, we assume he has not been properly initiated.

Textbooks and paper act as evidence that we are learning. If there were no papers, we wouldn't know what we were doing. The information that is in books is edited information or digested information. I would describe it as "cooked" information. And the information available from computers I would describe as "raw," in that it hasn't been processed.

Also important to learning is a use of models. Previous to the artificial intelligence machines, most model-making relied on hardware and was a slow process. Now most model-making is developed through "software," and the generation between one model and the next is very short. Technical aids such as computers take us from one model to the next almost instantaneously.

We have now arrived at a state equivalent to demand-feeding model-making. As soon as the subject can absorb a model, he has the technical facility to immediately produce the next model on demand. The software machines have eliminated, in most cases, the laborious necessity for physical models. Hypothetical models may now be stored on computer tape.

It is said a picture is worth a thousand words. On a computer readout screen, a word is a picture.

Our perception no longer derives from human sources. Now perception comes from machines. We are what we think we are, based on how machines read out our own perceptions of ourselves. We look like the people on TV. We use the products on TV. We buy the ideas on TV.

At a time when programs about narcotics were banned and most TV cowboys were heavy drinkers, alcoholism was the country's main vice. When the media lifted the ban on drug programs, TV became the most effective point-of-purchase identification for the products of drug pushers. It can be proven that drug-oriented information on TV escalated the drug problem to its current national scale.

This is another example of the language logicians not understanding media logic. In language, to be able to openly discuss a problem is part way to solving that problem. In media, it is to make a superstar of the problem. In effect, it says, "This is the real high energy problem of the moment. You're not with it unless you're part of the problem." So the final readout is, "Look at all those heavies doing all that junk on TV. Sure they don't fit in and they've got problems, but I don't fit in either, and I've got problems. So why not get on the hip side." Everything on TV is for sale, right down to the newscaster's eyebrows.

We are constantly bombarded by instant aural reality. But we have only the world of print as a preparation for dealing with this aural reality. Television and computers have created a post-literary use of language. The TV generation realizes that the way to "listen" is to "look."

If we had stopped at radio, we might have had a "big brother" system. When we went on to TV, we avoided "big brother." TV confronts us with a surrogate warm body, electronic sensuality or video passion. "Big brother" was passionless.

Slogans on TV act as advertising for themselves, so, "Try it, you'll like it," becomes more famous than Alka Seltzer, the product it is supposed to be advertising. What's happening is this: people are buying more "try it you'll like it" than Alka Seltzer. That means, they're trying many more things than ever before in the hope that "they'll like it."

In a consumer society, we try to solve all our problems by consuming. We need a new building; get some more desks; order a few slide projectors. Consume. But by avoiding the issue, we have multiplied the problem by a factor of 10. Now the problem is not only teaching, it's real estate, maintenance and technological overhauling.

The educational system will change only at a time when it feels another institution is powerful enough to gain control of its budget, and by then it will be too late. For then, the educational system will appear to be changing merely for the sake of hanging on to its power. Its power-base, as we all know, is a large part of the American tax dollar, second or third only to the amount spent on military activities.

In the 60s, the great disenchantment with the educational system brought strife to campuses throughout the country. Though many of these appeared to be political in nature, I think it's fair to say that the political problems were merely a surrogate manifestation for the disenchantment of the American student with the educational system.

As riots have given way to more powerful disenchantments such as Watergate, a period of campus rest has returned to the American college. This period should be considered a time of remission, a time to "get it better." But we have yet to see the recognition of that fact, in the form of constructive reconstruction, by those who are in charge of the educational system. It stands to reason that the problems that caused disenchantment will erupt again at some future date if the system is allowed to continue along its present path.

In recent years, teaching and education have lost their Socratic ideals. Education has now become a major service industry, not unlike the insurance business. And the people who are in control of the industry play very heavily on the anxieties of America's middle-class, in much the same way insurance companies do when they tell them, "If you're not heavily insured, you don't care about your loved ones." Along with this is the problem of the over-educated or those who bought more insurance than they could use. The number of people with M.A. and Ph.D. degrees unemployed today is rising at an alarming rate, while skilled craftsmen, whose numbers are decreasing, are in great demand. This fact, in itself, is an indictment of the system's static character.

Most schools are not places of learning, they are more accurately described as places of schooling. Their essential function: to institutionalize the individual into socially accepted ways, in the same way people are institutionalized in other places, such as prisons, large corporations and government bureaucracies.

The problem with this form of schooling is that it cares not as much for what is learned as it does for creating institution-dependent subjects. The longer people stay in institutions, the greater difficulty they have adjusting in the outside world when they leave them. The student leaves his natural, symbiotic environment (the streets) to enter the schooling institution, which alienates him from his natural environment to the point where re-entry to the real world becomes painful and traumatic.

The problem with teaching a specific is that people learn that specific and nothing else. Teaching specialties contracts the learning process rather than expands it. Specifics project a defined goal and thereby deprive the learner of the riches of discovery. In a goal-less learning activity, all the terminals are open and we do things to find out why these things should be done.

Of course, it is necessary to have a goal in mind when we undertake a specific project, i.e., if one is making an automobile, it would seem that transportation is the goal. However, such linear goals are far too limiting to define the education of a human being.

The introduction of technological equipment into the classroom, as an alternate to creative teaching, will not work. It is side-stepping the basic problem of having to communicate. If one has to bring technological equipment into the classroom, doesn't it make more sense to take the classroom to the technological equipment? If educators have made the decision that machines can do it better than teachers, then let us get

rid of the teachers and get machines. A computer expert told me some years ago that a student learns approximately 25,000 facts in eight years of grade school, and that with proper use of computers, these facts could be learned in a year.

Machines only give the illusion of accuracy. They make it possible to disregard intuition. It is easier to be intuitive when one has the availability of market research. The notion of human failure is more prevalent than the idea of machine failure. People are willing to believe astrological charts that are done by computers while they disregard astrologers as romantic mystics. The net effect of an electronic world is to be post-logical and post-moral and post-ethical.

Post-logical because the logic is not a personal logic, but one developed by machine concensus. Logic is not a fair exchange for understanding. We must realize that the information environment has created its own ephemeral sense of logic, which has superceded previous conscious logic. The information environment has created "post-logical man," that is to say, a man who acts quite simply as a terminal in the network of information channels and responds unconsciously to an input, feedback circuit.

Post-moral because morality now is based not on personal choice, but on access to information. In a society that has the need to know everything, it can hardly be considered immoral to know about areas that were formerly taboo. Moral judgments are not based on religion or theological concerns, but on media evaluation of what is generally acceptable. It is not immoral to view pornography in a society that produces a bulk of pornographic software.

Post-ethics are no longer based on right or wrong. They are now based on the scanning capabilities of the soft machines. If you are electronically tuned in, you should be able to judge a book by its cover. Electronic "post-consciousness" destroys the notion of subtlety. The soft machines and the media are incapable of defining subtle changes, and present all of their information in hot, clear manifestations. Therefore, a subtle cover is meaningless, and an unsubtle cover tells it all.

What we are experiencing now could be called "urban guerrilla learning." The random urban environment has become the most pervasive teaching tool of our time. One only has to look at the graffiti on the New York subways to feel the impact of the environment's communication.

Information is the real weapon of post-industrial warfare. The fall-out of information is every bit as lethal as an atomic bomb. Wars are won and lost today in the media. Information has become a viable tool in international relations. The more information we have, the more difficult it is to get people to fight wars and vice versa.

An ultimate necessity is to understand the difference between information and knowledge. Knowledge is in the realm of understanding: something known, something understood based on previous experience. Information merely implies transmission. "To inform" is an act of transmission.

Information makes no reference to qualitative value. It is up to the receiver of the transmission to collate information with previous experience and to turn it into knowledge.

Information behaves in a similar manner to biology. When a cell is born, it must create a similar cell and continue the cell growth in a logarithmical pattern to assure the continuance of life. This same pattern is necessary in information. Information either grows and builds upon itself or it dies.

The best example of this is image-making. The more information is added, the more easily the image will exist. If information is cut off the image dies. The more we know, the more we need to know. We live in a day of cybernetics, in an environment which codes all possible behavior allowable within itself. The semiotics of any classroom or living room are no less readable than the traffic light with its red for stop and green for go.

Perception probably lies within the area of speedreading, the semiology of any given cybernetic reflex. If a person is standing at the side of a road while a car is coming along and he crosses the street without being hit, the mathematical logic of the situation would be that he has calculated the speed of the vehicle in relationship to the time it would take him to cross the road. A more accurate reading of the situation is that he has merely read the "language" of the space and acted upon it accordingly.

The saying, "Let's get back to basic values," is a non sequitur. It implies that our posture is forward, when the truth is that we have not been able to chart our position clearly enough to define what a basic value is. In the long run, "getting back to basics" reads out as "value envy."

Our basic values are expressed with constant prominence in the information environment which surrounds us all the time. Our basic values are evident in the *6 O'Clock Report,* or a program in Fortran, for the number of householders under 45 who own automobiles. They are evident in the office buildings we build, in the ice cream cones we eat, in the price of meat and the deposed Vice-President of the United States. Thou shalt not covet thy neighbors' values.

To those who say the machines are taking over, the answer is population zero. If we have human birth control as a national ideal, while machines are permitted to proliferate, then machines by the laws of mathematics will take over. But another way to approach it is to turn the machines off. That would mean all of those people in dialysis and oxygen tents would die.

We have developed our environment to the point where the choice to turn the machines off is no longer a viable one for us, for it would not be only the sick and disabled who would die. We could, of course, go back to the day when children worked in factories at the age of eight. If that is the peace of mind you are looking for, then turn the machines off.

The truth is, machines have earned their territorial right on this earth, as valuable supportive mechanisms. And, in the truest sense, man has made machines in his own image. Machines now more accurately represent mankind's intelligence than does man himself. Without machines man would never have come to the state of intelligence where he would even be considering the machine as his oppressor.

The point here is not to say that the future is an electronic utopia. The implied solution is not to say how education "got fixed." What is being said here is that things are changing, and one has to be aware of the change in order to know how to make choices. What is really important is to make people aware of the present, because if they are aware of the present they can deal better with the future.

It may be that schools today should follow the example of hospitals. Instead of trying to get more people in, they're trying to convince people to use the out-patient clinic.

It is difficult to believe that schools will ever go away, just as it is difficult to believe that most of the institutions we now have will go away. Yet, if we can believe that God is dead and art is dead, then it shouldn't be too difficult for us to believe that school is dead.

In intelligent circles, media is now understood. We have media analysts; we have President Nixon. I think we have unlaced the mythology of media. Marshall McLuhan did a fairly decent job of that. But what do you do once you understand media? How do you make media matter? The important thing is that differences are made by people, not by hardware. We should not think that technology is going to save us. If it is required that we be saved, I suspect that the only thing that is going to save us is ourselves.

What we have now is a large circuit board in which the individual can randomly plug in, in a multiple-choice situation. The important part is that the choice be made consciously by the individual to control his future. The choice of those who are being taught is at least as valuable as those who are teaching. One needs access to language in order to be able to talk and communicate. In our present society there seems to be no other way to get that other than to go to school.

There are machines that nourish us as human beings and develop our access to humanism in ways that were not possible when communication was on a one-to-one basis. Machines should no more be considered a part of machine-ism than all humans can be considered a part of humanism. The psychology of machines is an extension of the psychology of man.

Les Levine

Difference and Resemblance: Precis for Track/Trace, a video work by Frank Gillette

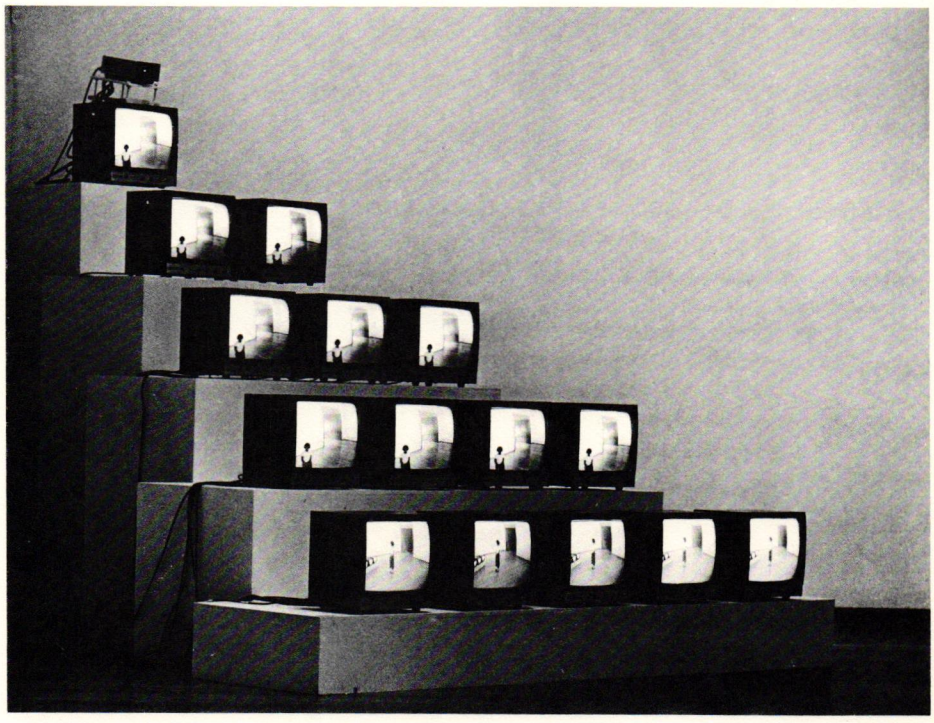
Three television cameras record and transmit the contents of the gallery to a matrix of 15 television monitors arranged in the face of a tetrahedron. A switching device changes images every 12 seconds. One monitor is mounted at the apex, two monitors are mounted on the second row, and so on to the last row of five monitors.

One of three television cameras picks-up the viewer and feeds his "live" real-time image to the single apex monitor. The image is delayed three seconds and then replayed on the second row. It is then delayed an additional three seconds (now a total of six seconds) and replayed on the third row. This cascade process continues until the last, or fifth row, displays the original image twelve seconds after its appearance on the top monitor. When the cycle is complete, these images (from the three alternating cameras) generate 36 variations in time and space. All 15 monitors feed back their contents simultaneously.

Several notions come to mind as afterthought to *Track/Trace.* First, there is a tacit presupposition at work regarding the effect of incrementally saturated imagery fedback upon the viewer from a field of 15 points. That skinbound biological identity, the self, experiences its "self" as "other" at five different periods in time, simultaneously; and from three different positions in space, sequentially. A sudden ingestion of an unfamiliar context for experiencing self independent of its usual subjective and dermal restraints. The viewer's immediate past becomes the process of contemplation–its own feedback. (Feedback is used here as the flow of discrete information from one location in the organism/environment circuit to another, indicating potential changes, or differences, in the influence of environment on behavior and experience.)

The kinetic interaction of the audience becomes the informational content; the viewer is witness to his own solitary performance and that of the other(s) as functions of his relationship with time. Flux and emanation regulate the sense of paradox followed by, and rhythmically interlaced with pattern; i.e., the juxtaposition of difference and resemblance.

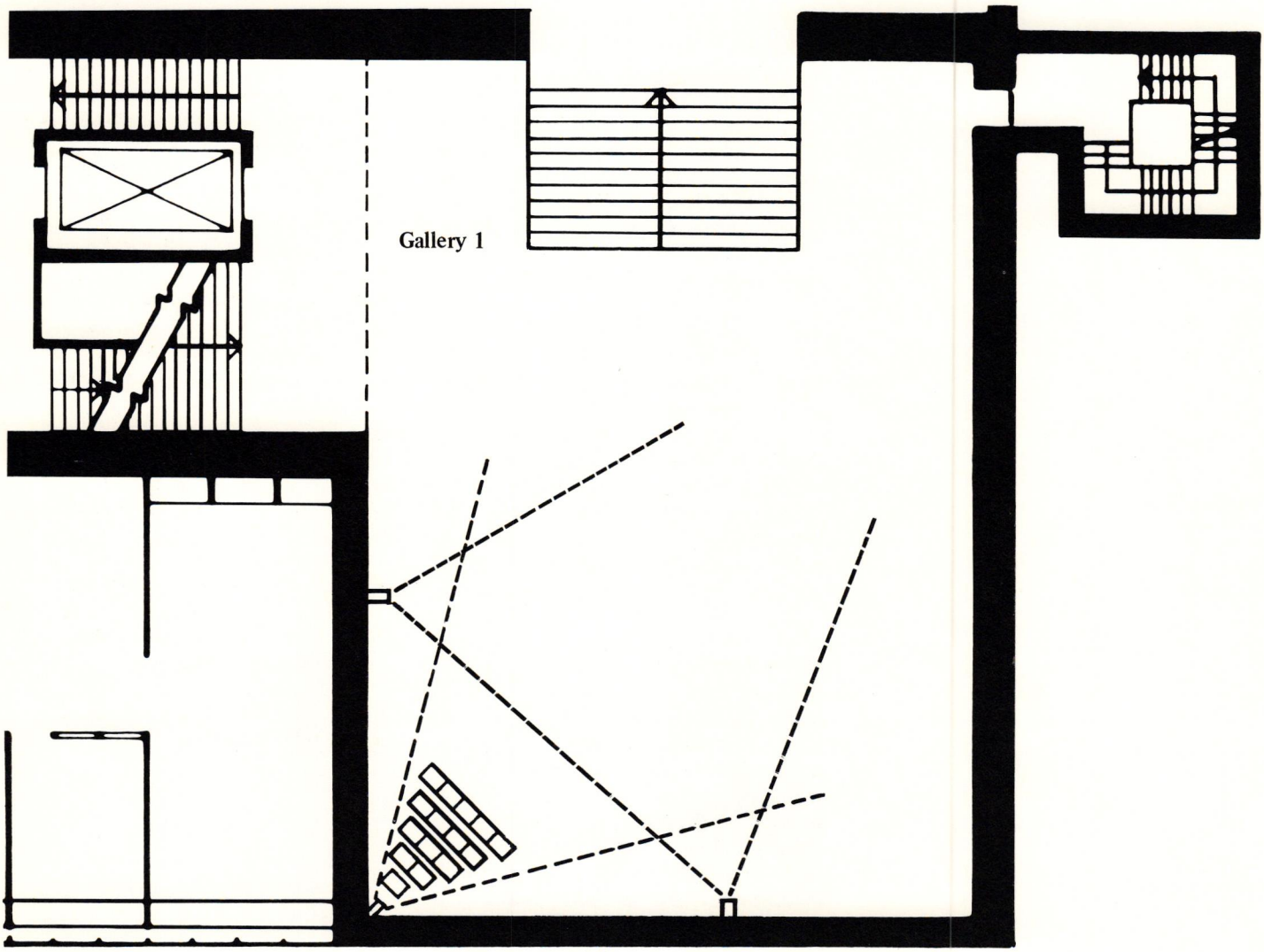
The viewer's specific locations in the time continuum increase as they are traced further and further into his past. As the event moves into the past it is magnified by repetition and then dissolved forever. At one level the five layers of feedback are distinct and not equivalent; at another level they operate within a phenomenological paradox as it informs and re-defines the same image through versions of itself until it disappears without trace. What distinguishes the two levels –as they



are experienced together–is the echelon of implicit instructions flowing from the matrix, and the resulting changes in the audience's behavior. This mimetic exchange between audience and matrix generates a symbolic and an analogical form which encodes the parallel activities into voluntary shifts of context. From the present, from position "a," to the past (first track), from position "b," back to the present, from position "c," to the past (second track), from position "a," and so on. 36 seconds are required for all of the variables to evolve one complete cycle.

An ethereal transference takes place as the viewer moves away from the matrix knowing that his past will remain through one more twelve second cycle. The subjective self and objectified "self" merge in the viewer's memory. Any subsequent encounter with the time-delay matrix is thus altered by yet another temporal process, the viewer's stabilized expectations encountering the familiar again while perceiving new patterns of difference. The distinctions governing the known and the unknown feedback upon each other in such a way as to rely on the constant flow of new information. For "reason, or the ratio of all we have already known," wrote William Blake, " is not the same that it shall be when we know more."

Frank Gillette



Learning with Computers: A Test Case

Minnesota is the first state to embark on a computer learning program in which all levels of education from an entire state are united in a common educational effort. The recently established Minnesota Educational Computer Consortium (MECC) represents elementary, secondary and vocational schools, the State Department of Education, community, state and private colleges, and the University of Minnesota. The first major effort of the Consortium will be the establishment of a statewide timesharing network to provide all school systems in the state direct access to computers through terminals located in the school buildings. In a timesharing system a central computer serves many users via phone lines connected to terminals in remote locations. When the MECC timesharing system is operational next September, all secondary students in the state will have computer access, provided their local school system will furnish the terminal. The *New Learning Spaces & Places* exhibition is timely because it illustrates many potential instructional uses of the computer when instructional computer capability is becoming available to students throughout the state.

Minnesota has considerable expertise on which to build as it moves ahead in the area of computers in education. For example, the Total Informational Educational Services (TIES) program which provides services to some thirty school districts in the metropolitan area is considered a national leader in the provision of computer services to elementary and secondary schools. The Minneapolis public school system was the first major city system in the country to install computer timesharing terminals in all secondary schools. The services provided by Mankato State College to secondary schools in the southwest part of the state is a unique example of the provision of computer service to rural schools.

To date, the major application of the computer to instruction has been in the area of problem solving, primarily in mathematics. Another application which is showing a rapid increase is that of simulation, in which the computer is used to simulate a real life experience. Another promising instructional use of computers is that of modeling, in which the student develops programs which simulate real life experiences. To a lesser extent computers are used in a manner similar to a teaching machine primarily through utilization of interactive drill and practice programs in mathematics. In the future we can anticipate increasing use of the computer in the drill and practice and tutorial modes in situations where it is cost effective. The computer is also used as an object of instruction where students learn about how it functions and about the impact of the computer on society. We can expect to see increasing applications of "computer literacy" in courses offered throughout the curriculum. The computer has great instructional potential as an efficient means of storing and retrieving information, as exemplified by the college course selection system. Another area in which we can see great potential is that of computer-managed instruction. The computer can perform many chores related to instruction. For example, in the Computer Generated Arithmetic Materials (CGAM) project the computer is used to produce diagnostic tests and work sheets in arithmetic and to monitor and report on student progress. Through the Comprehensive Achievement Monitoring (CAM) project a record of student progress toward meeting instructional objectives is monitored and reported.

In the future we can expect to see expanded use of the computer as a component that interacts with various other components of the instructional process. In the words of Leo Cherne, "The computer is incredibly fast, accurate, and stupid. Man is incredibly slow, inaccurate, and brilliant. The marriage of the two is a force beyond calculation."

Ross Taylor, Mathematics Consultant, Minneapolis Public Schools

Computer Games

Computer games to be demonstrated in *New Learning Spaces & Places* have been selected to acquaint the public with the kinds of computer-based materials now available to public school students in Minnesota. The games fall into three categories: simulations, plotting, and music programs. Visitors to the exhibition will play the games with assistance from high school students versed in computer gaming operations.

Simulations will include: 1) BUFLO–a resource management program dealing with the control of a buffalo herd's annual harvest of adult males and females; 2) CIVIL–a game about the U.S. Civil War in which a player allocates money for food, salaries, ammunition and makes decisions on battle strategies; and 3) POLUT–designed to study the effect of pollution on various types of bodies of water.

The Plotter makes possible the depiction on paper of charts, graphs, spirograph designs, and through the use of the plotter a student can even play a graphic game of pool.

Music programs involve designing a composition with a choice of instruments, key and chordal progression, or printing out a table of melodic probability for a group of musical compositions.

TURTLE Geometry

Operational components of the TURTLE, developed by Dr. Seymour Papert at the MIT Artificial Intelligence Laboratory and made by General Turtle Corporation, are the operator, a teletype machine, a computer, a large flat surface and the apparatus called and resembling a turtle. The TURTLE is a cybernetic toy capable of moving forward and backward and rotating about its central axis at the command of an operator; a pen, attached to the TURTLE, charts its journey. The operator instructs the TURTLE to move by typing commands in the computer language LOGO (developed expressly for the TURTLE) into the teletype machine. The commands, and the consequent journeys traced, range from very simple to extremely complex. Thus, all levels of mathematics and geometry can be learned and illustrated in an active, participatory and innovative manner.

As described by Caryl Rivers in the *Saturday Review of Education,* "With the TURTLE children can do things with mathematical concepts. An angle becomes something that can be used to make a TURTLE walk the way you want it to walk (just as an angle can be used to get a spaceship into orbit). The child wants to get the right angle so he can make the computer do what he wants–not because he wants a good grade or to make the teacher happy."

PLATO IV

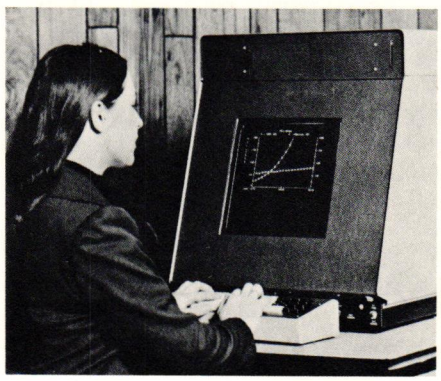
Demands are growing for more education over a larger fraction of the human life span and for more individual instruction tailored to the specific preparation and motivation of a given student. These expanding educational needs will be met in part by new learning tools such as PLATO IV, a computer-based teaching system, developed by Dr. D. L. Bitzer and the University of Illinois, Urbana, with assistance from the National Science Foundation and Control Data Corporation.

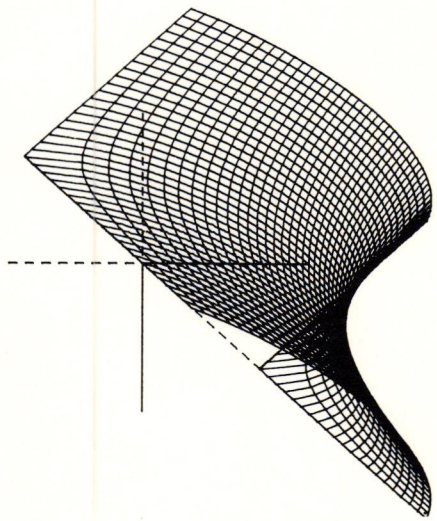
PLATO IV is an active participant in the learning process. Its capabilities dispel many of the traditional criticisms associated with learning with computers. It is not synonymous with programmed instruction; rather, it can facilitate unprogrammed instruction and student/teacher controlled learning by utilizing teaching strategies completely different from the basic tutorial logic of most programmed instruction. PLATO need not be previously programmed to respond to the learner; therefore, it does not narrowly channel and limit thinking. PLATO stimulates and allows for critical thinking, not merely drill work and the transfer of information.

The role of computer has become much more than that of scorekeeper, bookkeeper and guide to selected material. The student can proceed at his own pace and can exercise choices in the selection of teaching strategies. Lesson material can be written and edited at a student console while other consoles are in use, and teachers can adapt materials prepared elsewhere to the needs of their students.

PLATO's software system is highly flexible and although its capabilities are sophisticated, it can be programmed by an experienced author rather than by a special systems programmer. TUTOR is the programming language. It is based on English grammar and was designed for teachers with no previous computer experience.

PLATO has five components. The plasma display panel is eight and one-half inches square. It has 262,144 individual digitally addressable points under computer control and its writing speed is 180 characters per second, 60 lines per second. Its response time is .2 second to student input and it is capable of storing on its viewing surface either computer-generated or student-generated information without the need for auxiliary storage devices. A slide may be projected through the back of the plasma panel allowing superimposed slide images and graphic displays. It has a capacity for 256 color slides, randomly addressable by computer at a mean access time of .2 second. The keyset has standard typewriter characters plus some special function keys. An optional touch panel makes the plasma display addressable to touch and with the optional audio equipment, gives PLATO the potential to be a teaching tool for students who can not yet read.





Film in the Cities

Film in the Cities, a program of the St. Paul Council of Arts and Sciences, is an educational project for Twin Cities area junior and senior high school students. Students participating in the project explore the visual media–film, still photography, videotape.

Film in the Cities was designed by the St. Paul Council of Arts and Sciences in response to a request by the St. Paul public schools to provide an alternative educational experience for the educationally hard to reach student. The concept of expression through the non-verbal medium of film proved extremely successful for the initial student group.

Today, students of varied academic capabilities work together at Film in the Cities. The program has grown considerably in its four years of operation, but philosophically it has remained consistent, providing students with a comprehensive experience in developing the communicative and artistic potential of the visual media. Presently, 60 students are attending workshops at Film in the Cities–30 from the St. Paul public schools and 30 from the Minneapolis public schools Urban Arts Program. Students are bused to and from Film in the Cities and spend two hours each day, five days a week, working on film, photography and videotape projects. Each student spends a minimum of 12 weeks at Film in the Cities and receives school credit for his work. No grades are given–only "credit" and "no credit."

The rationale for intensive media education is simple. We live in a world which is becoming increasingly visually oriented. It is no longer enough to be able to communicate through the linear medium of print. Much of the information needed for survival in today's world comes to us visually, through the media of television, film and photography. In the near future, with the advent of cable television networks, cartridge television systems and low-cost film and video recording devices, two-way communication via visual media will become a reality. It is vital that students be equipped with the knowledge and skills necessary to utilize this communications potential–that they become masters, not slaves, of the media.

In addition to daily media workshops for secondary students, Film in the Cities conducts filmmaking and teaching workshops for Twin Cities area teachers. At times throughout the year, Film in the Cities also offers classes for interested adults; and, the ongoing services of a resident "Media Man," a specialist in media and media education, are available to schools and community organizations.

Rod Eaton, Director
Film in the Cities

Public Service Video

Public Service Video is a high school social studies class emphasizing communications and human relations through extensive community involvement. It is a student operated, public access video network offering videotape production and distribution to the public. The project is offered to students at New City School through the St. Paul Public School's Learning Center Program. (Students from St. Paul, Minneapolis and parochial schools have attended New City School and elected to work with PSV in summer programs.)

Public Service Video was established in 1972 by a grant from the Minnesota State Department of Education, Council on Quality Education. PSV is offered to high school students and community adults wishing to use video for political and social advocacy or public information. Two teachers and an aide are responsible for establishing community contacts, overseeing technical direction, and maintaining equipment for the program. 40 students and up to 100 community people each trimester (twelve weeks) have been involved in learning television production, project research, videotaping and editing, and distribution of the material. Videotape programs have been prepared in a broad number of community issues, including:

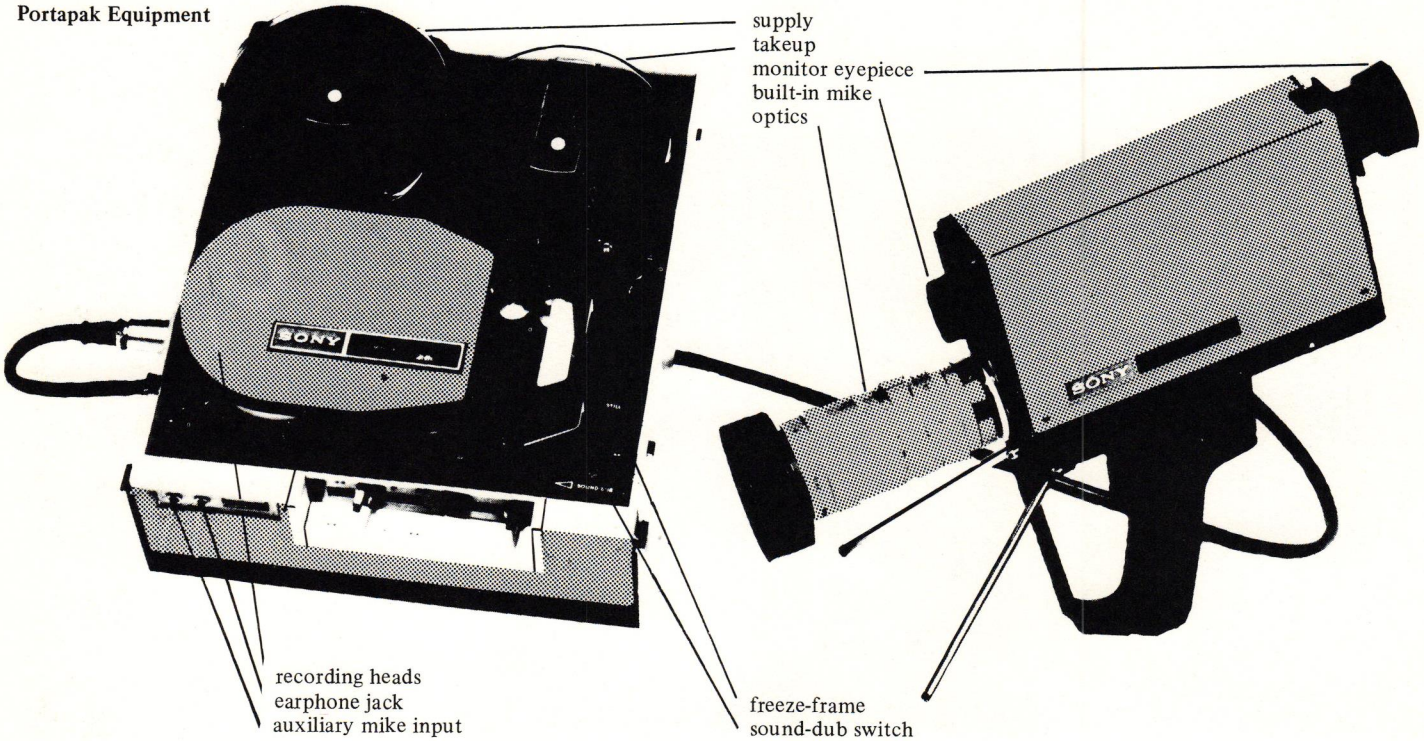
Juvenile Bill of Rights,
Shoplifting is a Crime,
"I Can See You Hearing Me," An Instructional Tape for the Deaf,
MiCultura: A Bilingual Day Care Program in St. Paul (in Spanish),
"Where Does the Buck Stop?" A study of decision-making in the schools,
Child Care for the Working Poor,
and "How's My Little Boy Doing?" A series of tapes evaluating the activities of individual students at the Westside Headstart Center in St. Paul.

The tapes have been shown by Public Service Video students and community people to city, state, county, and federal governmental agencies, neighborhood groups, high school classes, special education classes, and local teacher workshops. The program illustrates a special use of telecommunications for social studies and language arts education; but it is most effective as a human relations experience. It is a program that can and should be effectively replicated.

Public Service Video is committed to the belief that community people should be able to control their own information, that community people are valuable educational resources, and that students, instructors and the community can work together to produce an effective communications and political tool on videotape.

Joyce Klepp, Craig Thiesen,
Steve Sandell

Portapak Equipment



The Urban Classroom
A Film by Michael Schunk
in association with Kathleen Laughlin, John Drieman and John Hagelund, with narration by Dean Swanson

New Learning Spaces & Places has, as a primary purpose, the demonstration of various programs currently in operation that directly use the urban environment for learning. *The Urban Classroom,* a 16mm film made for the exhibition, is designed to document two programs that explore the city as a learning resource.

St. Paul's Open School class of twelve high school students is studying city problems. Northern States Power Company has proposed a controversial coal terminal to be located on an island in the Mississippi River in St. Paul. The class project–visit the site, talk with representatives of the power company, representatives of the Mayor's office and the Corps of Engineers. Combine this live information with in-class research and assess the environmental impact of the proposed coal handling terminal on the city of St. Paul.

Through Minneapolis's Urban Arts Program, a Southwest High School student is working to make the city more visible and understandable with Criteria, a multi-disciplinary consulting group including architects, planners, psychologists, biologists and photographers, that designs projects in education, government and city planning. As part of a program for Minneapolis's Committee on Urban Environment (C.U.E.) they are studying the uses of water in the city. The film follows the group to a water purification plant, a hydro-electric generator and to lock and dam facilities. Graphic displays describing water uses will be designed as a medium of information for public display in the city as a part of this project.

Other ways to use the city as a learning resource are discussed in the film, using the urban environment and members of the community as the core of a vital learning program that could be available to all of the city's students.

PHYSICAL RESOURCES

It takes all sorts of in and
outdoor schooling
To get adapted to my kind of fooling.

Robert Frost, 1962
It Takes All Sorts

Schools, above all other places, should be the center of feeling. There should be no judgment, no comparing one person with another. It should be a free place. I believe that if you have a classroom of thirty students, in which it is regarded that freedom reigns, you have thirty teachers.

Louis Kahn, 1972
Speech—International Design Conference, Aspen

Evolution of the Classroom

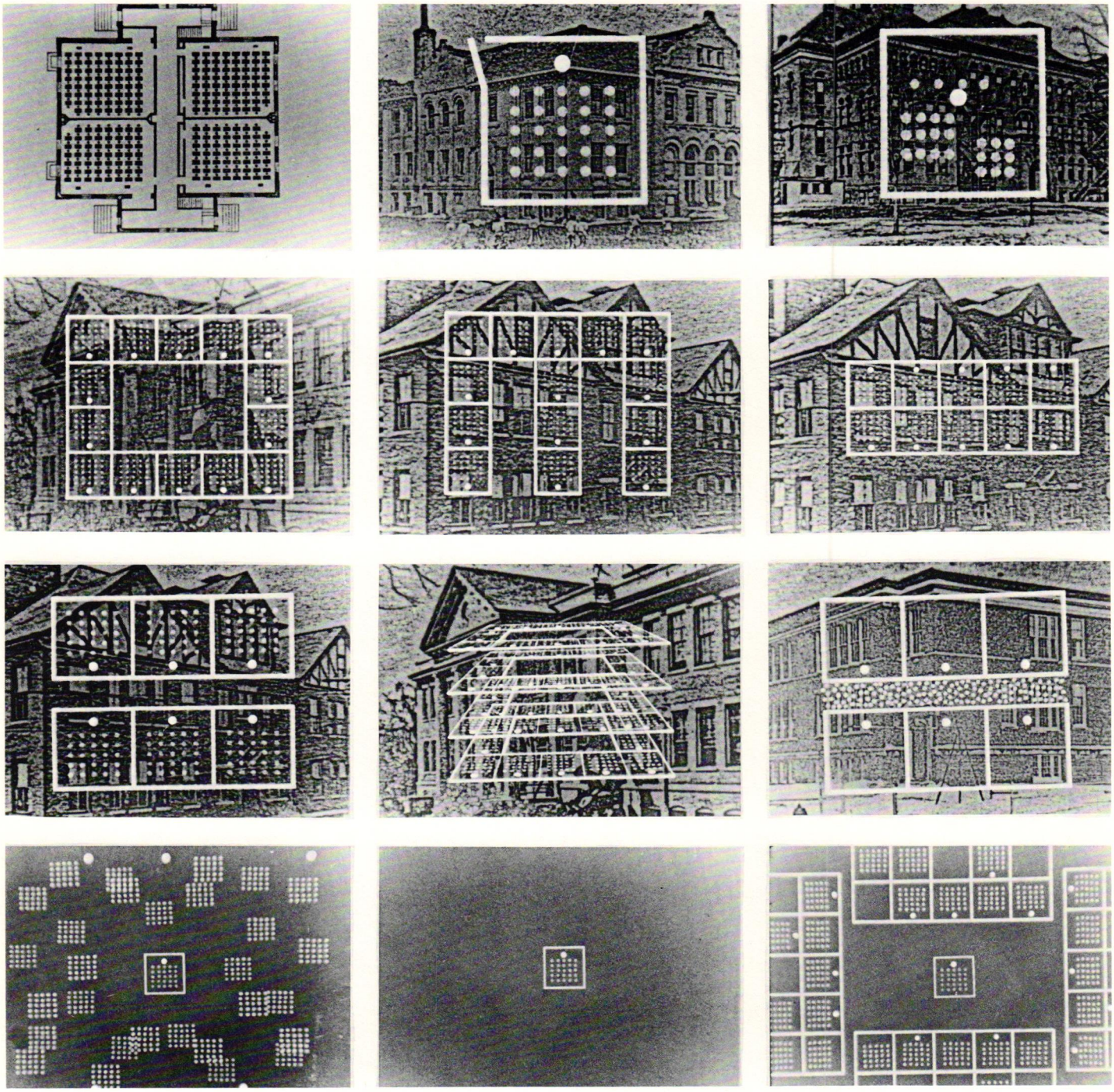
We have noted the movement away from the teacher teaching to the learner learning as a basis for curriculum planning in today's schools. This new attitude can operate with some success in any spatial arrangement. Even the typical rectangular classroom with its rows of desks might allow for the kind of growth implicit in this idea if the teacher at the front of those rows is able and willing to change.

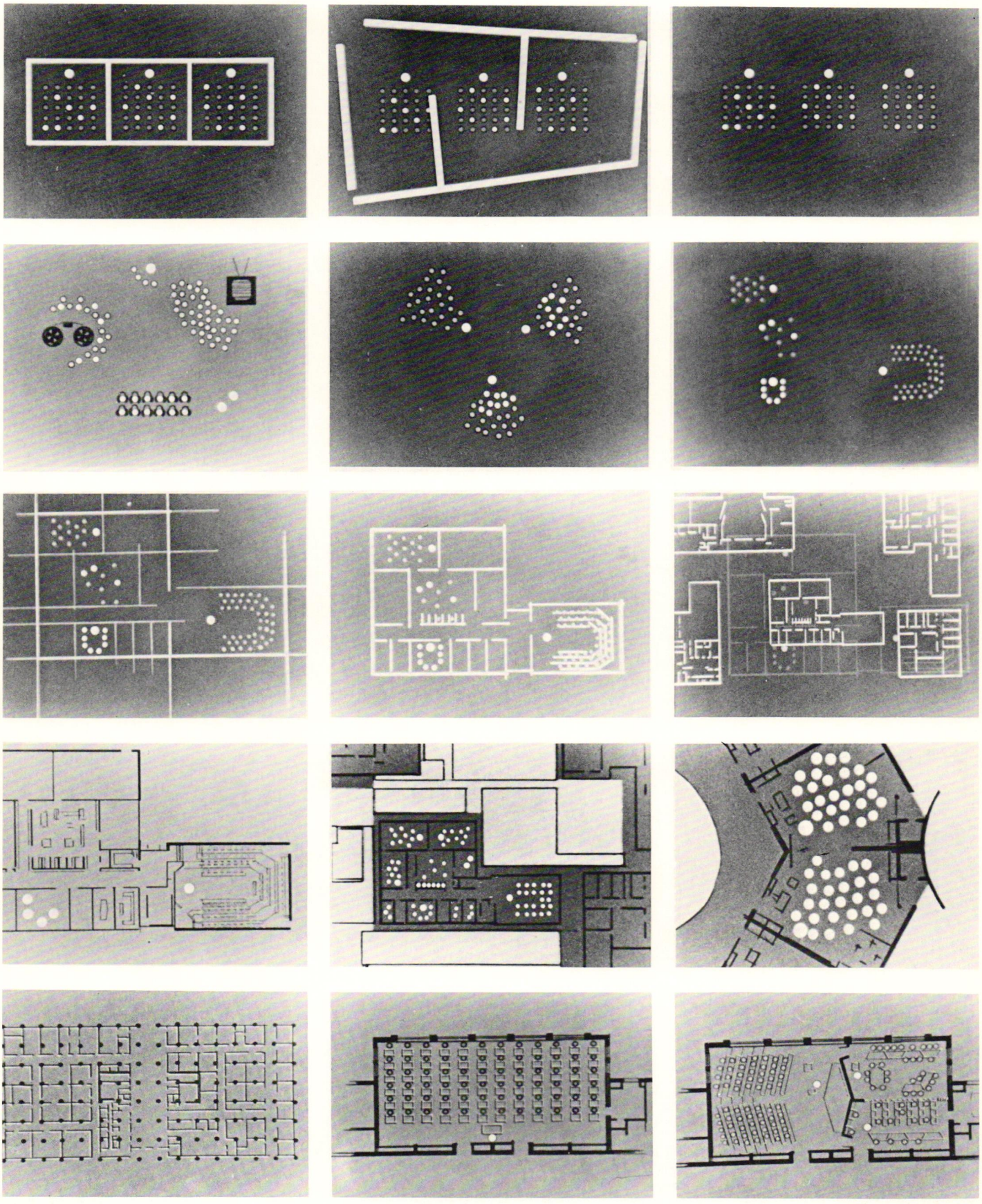
Other physical arrangements of teachers and students seen on these two pages demonstrate various ways in which the structure of the environment can positively enforce a flexible curriculum structure. The removal of the walls around the rectangle, clustering of groups in open space, ability to contract and expand group sizes are all demonstrated in these diagrams.

Behavioral information developed in the work of Piaget, Skinner, Mead and others, is reflected in the design of buildings and classrooms illustrated here and on the pages that follow.

Robert Sommer, in *Personal Space,* states, "At some future time the module may become the individual student in his study carrel equipped with a teaching machine, TV unit, and various information retrieval devices connected to a central computer." Yet, if we assume the continuing practice of devoting space exclusively to classroom teaching in the next 20 or 30 years, more attention should be paid to how our current classrooms work and how they can be modified to work better. Spatial freedom does not guarantee learning, but an expansive environment does encourage the development of an expansive mind.

Floor plan/diagrams from: *To Build a Schoolhouse,* a film by Educational Facilities Laboratories, Inc.





Mt. Healthy Elementary School
Columbus, Indiana

Architects: Hardy Holzman Pfeiffer Associates;
Client: Bartholomew County Consolidated School District

The concept of team teaching has as its basis the realization that each child differs from the next. He is an entity unique unto himself with his own rate of growth and pattern of learning. This pattern of learning can best be developed by a cooperative effort of two or more teachers with complementary strengths who work together regularly and purposefully to plan, to prepare, to present, and to evaluate learning experiences.

These learning experiences fall into three specific categories: large group instruction, small group discussion, and individual study. This format allows both students and teachers to develop their talents for themselves aided by others on a democratic give-and-take basis.

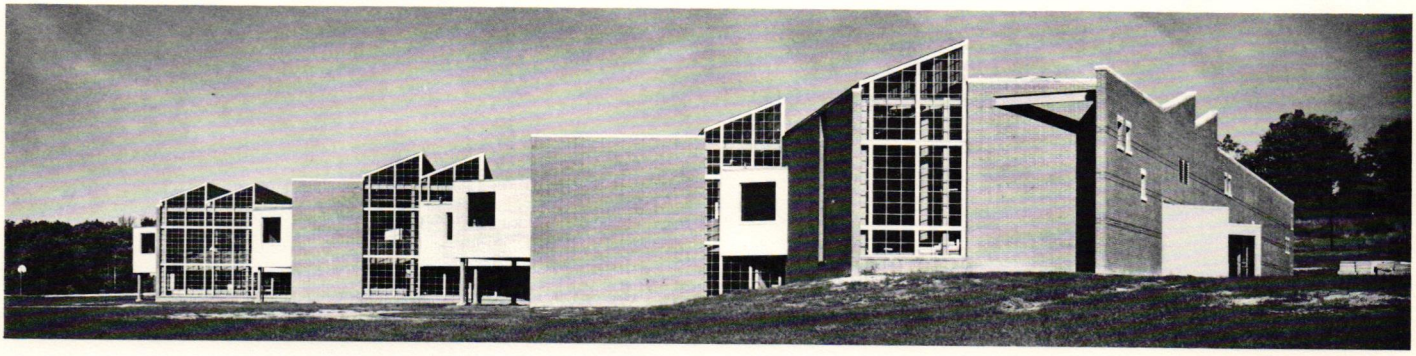
Team teaching is the basis for the architectural design of Mt. Healthy School. However, planning began not by removing walls between typical classrooms, but by consideration of types of activities the new school will house. The amount of openness and separation for activity was then carefully studied, and only those activities needing complete separation received enclosure.

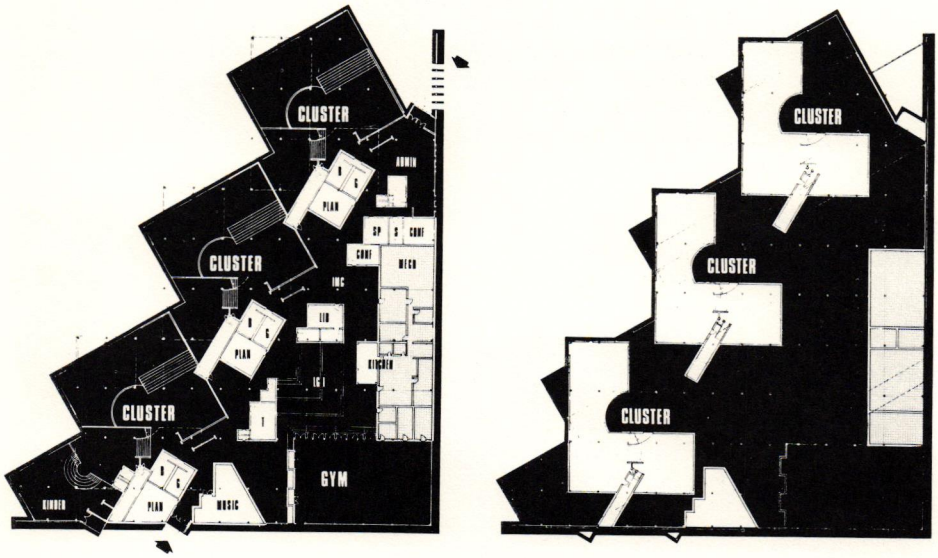
The classroom area of the school is divided into three clusters. These cluster areas correspond to standard academic divisions: Lower Primary (Kindergarten through Second Grade), Intermediate (Third and Fourth Grade), Upper Primary (Fifth and Sixth Grade), and Special Education classes. In this form of grouping, students are better able to take part in the learning situations which correspond to their own level of achievements. Each cluster has been designed to function almost as a one-room school house. The physical divisions between students are loosely defined and permit Large Group, Small Group, and Individual Instruction to proceed simultaneously. Different areas of the clusters have been architecturally delineated in a variety of ways: changes in floor level, a wide range of juxtaposed materials and finishes, natural and artificial light, fixed furniture arrangements, and movable teaching devices. At the heart of each cluster there is a small Instructional Materials Center (I.M.C.) which also serves as a Library Reference Area. This Mini-I.M.C. includes changing materials related to study programs, TV and computer outlets, as well as audio-visual devices. These Mini-I.M.Cs. are operated in conjunction with the Central I.M.C. and also share its programs. Each cluster also contains a Teacher Planning Area; a semi-enclosed space, it is home base for all teachers assigned to a given cluster. Team Teaching programs and activities are developed by the teachers in these areas.

It was held essential that the physical design of the school make it an educational tool which encourages children in the learning process. This idea was developed so that the three cluster areas have direct access to the Central I.M.C. and other activity areas. Students are therefore aware of the I.M.C. activities and are encouraged to pursue them. An open access spine connects the three clusters and also leads to the Gymnasium, Large Group Instruction, Central I.M.C., Art, Music, Administration and Service Areas. These large areas have an implied separation through the placement of small enclosed storage and work rooms. A compact, corridorless school results in which circulation space is devoted to educational purposes and activities. This gives a maximum ratio of usable educational area to gross building area, the greatest for a school building, to date, in Columbus.

As new ideas grow out of the continuing change in educational methods and values, the Mt. Healthy School will be adaptable to future needs because of its openness and its variety of enclosures. If necessary, further expansion of the present plan for the inclusion of 180 additional students can be accomplished by the construction of a fourth cluster. All other activity areas, services to the building, and mechanical systems have been designed for possible future additions.

Hardy Holzman Pfeiffer Associates





Lower level (left)
Upper level (right)

The cluster plan emphasizes the groupings of students into three independent areas. Level changes, shown in the top photo, serve to diminish the noise factor, often a problem in open plan schools; they also allow for more diversity in each space. By turning the axes of the clusters, the architects have created surprising, intimate areas where children can learn in small, comfortable groups.

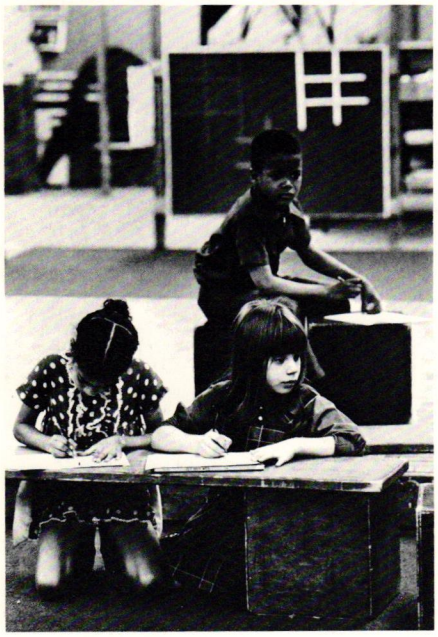
The Everywhere School
Hartford, Connecticut

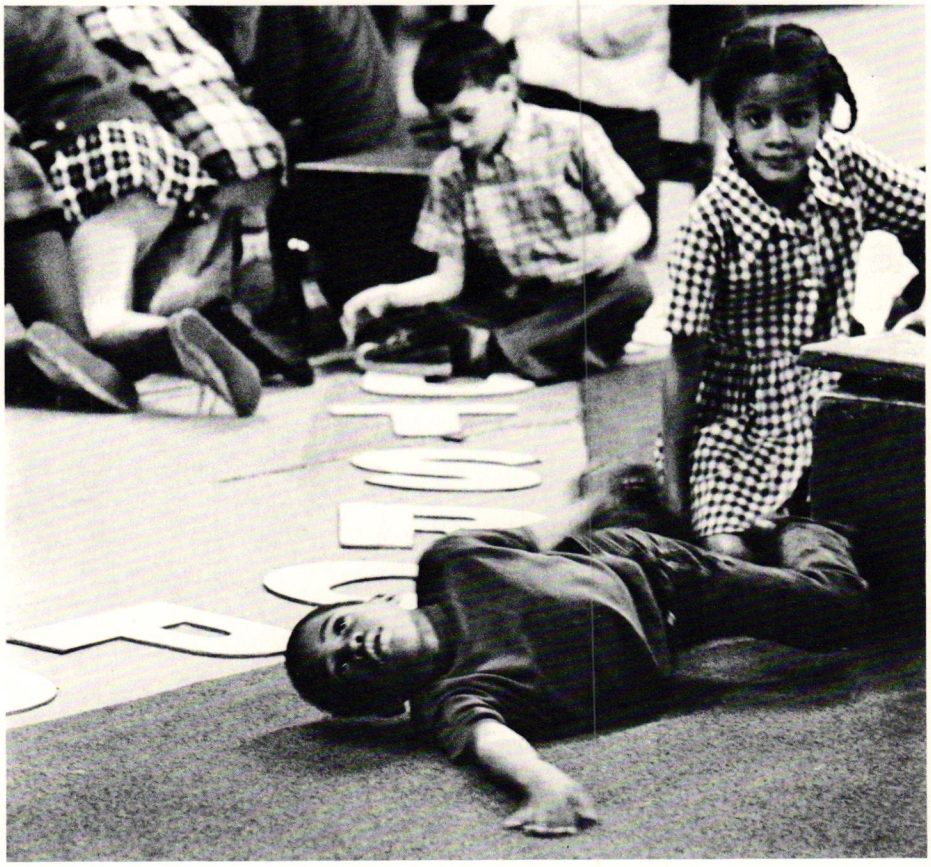
Architects: Huntington, Darbee & Dollard;
Client: South Arsenal Neighborhood Development Corporation

The Everywhere School was created as the primary catalytic force in the regeneration of a ghetto neighborhood. Its central idea was to get education out of the school and into the neighborhood where it might be fused with the life of the streets. Eighteen months in planning and three years in demonstration now bring it to the threshold of final execution. The original concept, generally conceived, has become what it is through numerous mutations brought about through the efforts, good and bad, of teachers, students, neighborhood people, educators and the general political life of the U.S.A., city, state and federal funding, regulations and traditions.

Hartford's South Arsenal urban renewal plan was developed with as much consideration for social change as for physical change. The plan's major concept is the "Everywhere School," a system of education that runs through the entire community, socially as well as physically, and involves the neighborhood in its daily operation. A community group called SAND (South Arsenal Neighborhood Development Corp.) and its architect, Jack Dollard, were responsible for the initiation of the school project.

The traditional school has been exploded into a series of teaching spaces and facilities now spread throughout the neighborhood. The library serves as a





Rehabilitated warehouse structures (right) house the primary school. Access to equipment and learning materials is open, and language teaching includes both French and Spanish (seen opposite).

community focal point; the auditorium becomes a community theater; the gym is a third focal point; and arts and industrial crafts are grouped into a fourth. These special facilities form a kind of neighborhood commons for the residents, while other educational spaces are strung together along the ground floor of highrise and lowrise buildings.

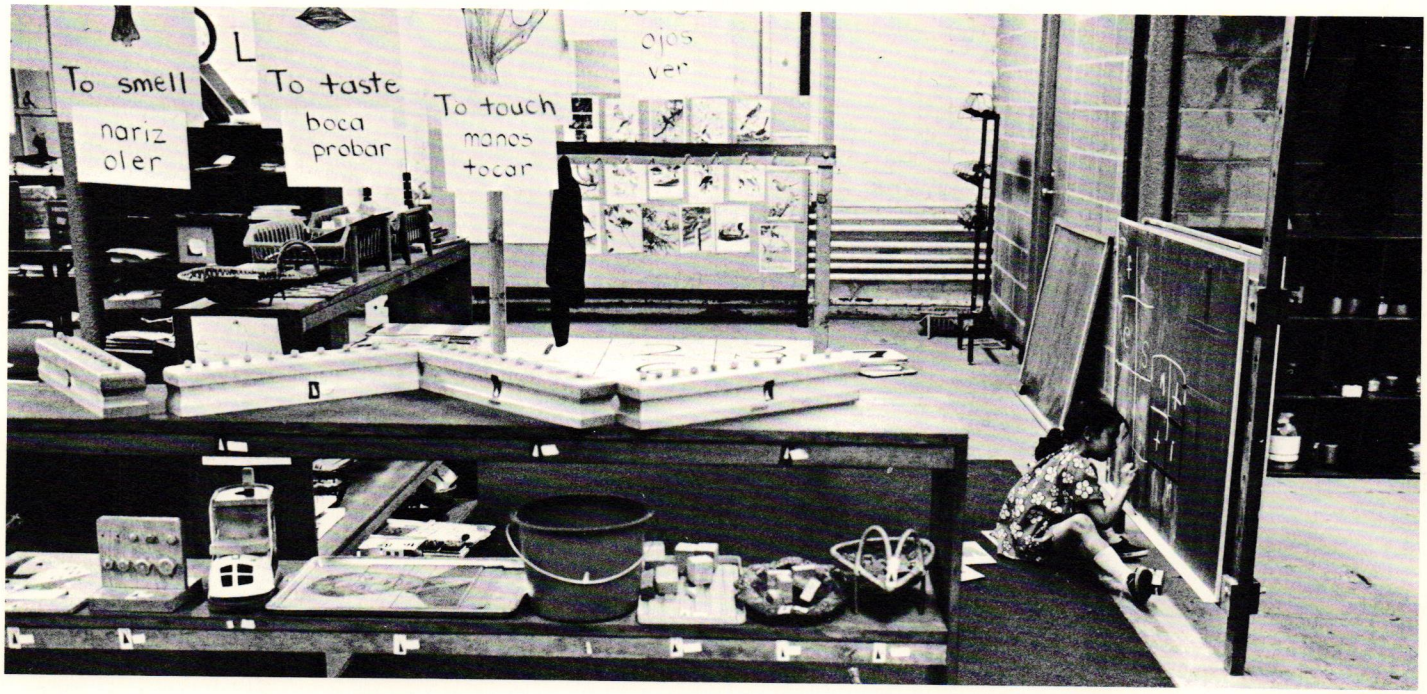
Because the housing is based on a 12 foot square module, the spaces in the meandering school are small bays, suited to a variety of small activities. Large pie shaped spaces every so often accommodate large group activities. There are also enclosed outdoor spaces.

The school goes through the third grade; older children go to school outside the immediate neighborhood.

Flexibility is a major goal of the Everywhere School. Teaching spaces and multi-instructional areas can expand and contract as needed. Special buildings are also adaptable; theater and arts spaces have been designed to serve many purposes. This possibility for change is in the best tradition of experimentation in the arts, while it is also in the newer tradition of citizen participation.

Residents are an integral part of the educational process. The community holds the power to petition for the removal of the master counselor (or principal, appointed by the Board of Education). An associate counselor is hired by the neighborhood. Local people are involved in teaching; teachers are asked to live in the area and aides from the neighborhood are involved in the classrooms.

The school serves as a framework for the redeveloped area. The innovative housing and community services all connect with the educational core. This brings education out of the school house, into the daily activities of the community's residents.



Human Resources Center
Pontiac, Michigan

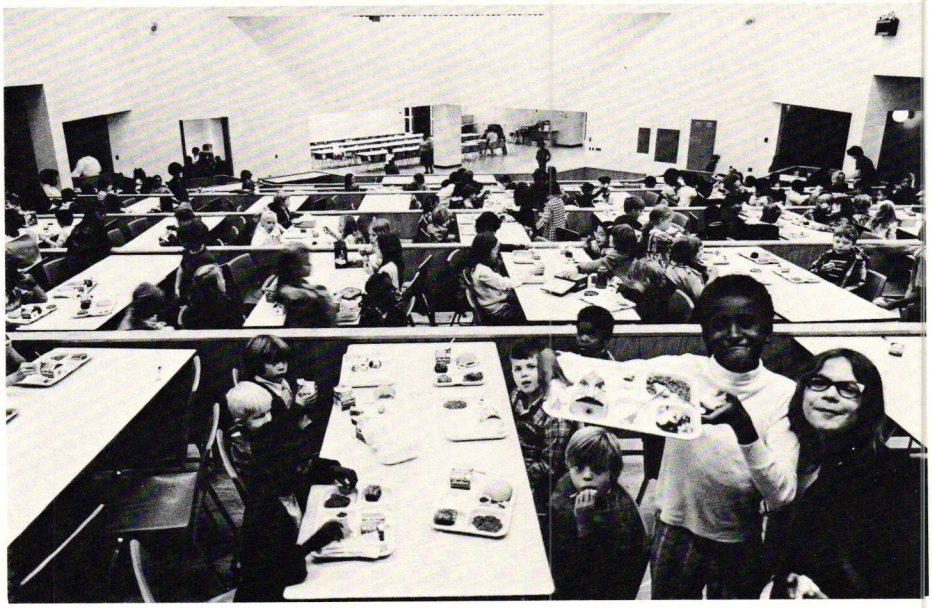
Architects: Urban Design Associates;
Client: City of Pontiac School District

The Human Resources Center in Pontiac, Michigan, is not the usual school. It is a community center, with education as one of its components. Located next door to City Hall in the center of the city, the HRC has a wide range of public appeal. Several of its programs are designed to serve the metropolitan area as a whole, but many others are neighborhood in scale.

Now in its third operational year, the HRC has theaters, libraries, food services, indoor and open-air recreation, a health center, educational spaces, ethnic centers, a co-op, and a day care center. It houses over 2,000 K-5 students, 24 social service agencies, and educational programs for 5,500 adults. These include field programs for three universities, facilities for a branch of the community college, and a large number of cultural and social programs, such as special programs for the elderly. All in all, the Center is the largest multi-usage interagency complex of its kind in the nation.

How did it come about? One key factor was the active participation of citizens in the planning and design of the Center, and their continuing role in its governance. Another was the determination of the Board of Education to achieve a more meaningful role for education in Pontiac.

Pontiac is a city with a recent history of conflict. At the beginning of the planning process for the HRC, the essential questions were: do the people of Pontiac want their children to grow up



A circulation core in the center of the building (above), encourages contact between various groups using the Center. The children's cafeteria-auditorium space (right, below) is accessible to adults and children at different times of the day. The resource center (right, top) is at the hub of the school learning area.

in this climate of social fragmentation and racial hostility? And if not, how can education join forces with other public agencies to help in bringing about change?

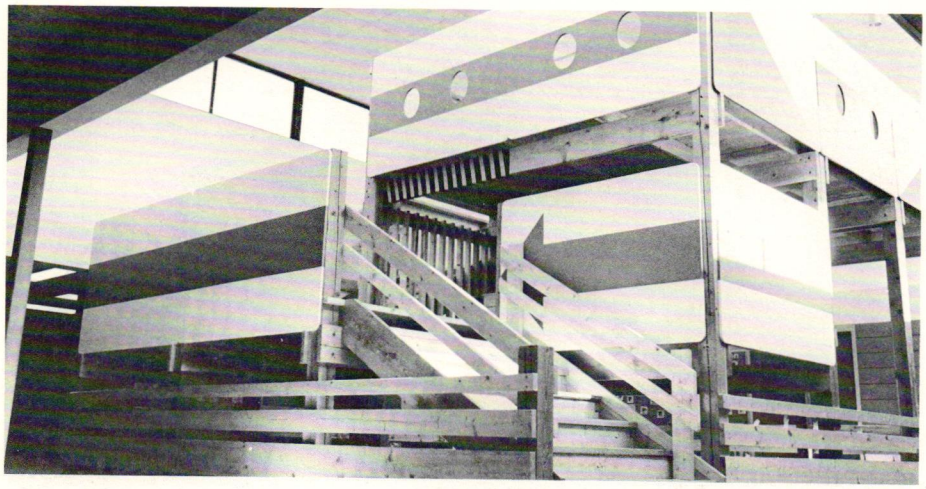
To find answers, a planning council of citizens and agencies was formed. Very early in the process a firm of architects/planners, Urban Design Associates, was appointed; and gradually the Center took shape, one idea catalyzing another. Of the total inventory of thirty-four usages called for by the council, thirty-two were incorporated in the final building.

An enclosed, skylit street passes through the complex. This street links the commercial and civic core of the city to the residential neighborhoods in the city's east quadrant. As it passes through the building it becomes a shopping street for social and cultural services. Along it are the libraries, the theaters, the offices of the social service agencies, a public restaurant, community lounges, and indoor recreation.

A similar street passes through the education component. Radiating from this street are four resource materials centers, and grouped around each of these are learning areas for children and adults. The facilities include workshops, studios, and seminar centers for paraprofessionals in education, health, and social services. Although much of the education for children is based on team teaching, the learning areas have been designed to meet the needs of every kind of learning, ranging from traditional classroom forms to individual projects and special education. And there are innumerable roles open to parents, particularly in bilingual studies.

The architecture of the Center is intentionally simple, even bland. The reason for this is that the life of the complex is people. Its aim is to release the creative expression of children and adults. The architecture therefore must not impose a set order or an institutional image. On the contrary, it must encourage innovation, dialogue, and change. Its essence is people: people doing things together.

David Lewis, AIA, AIP, Partner,
Urban Design Associates



An enclosed, skylit street, used by all ages, is shown above. A play structure for pre-schoolers (left) was built by high school students in the occupational training shop.

St. Paul Open School
St. Paul, Minnesota

Architect: Open School staff/parents/students with the guidance of John Baymiller;
Client: St. Paul Public Schools

The St. Paul Open School is a research demonstration project of the St. Paul public school system that attempts to combine in one total design many of the new patterns being tried in education at the present time. The project is based on the assumption that the task of improving education requires experimentation with various designs, especially those which show promise of providing an improved curriculum or are supported by a solid body of learning theory.

The Open School is located in a five story warehouse, leased by the school system. This found space dynamically expresses the feeling of possession by its users. Its interior arrangement changes continually in response to the needs and desires of the students. The rehabilitation of the warehouse, including painting, graphics, donating and collecting furniture, was done by parent and student volunteers working under the guidance of architect/advocate, John Baymiller.

The key elements of the Open School are (1) advisor-advisee relationships, (2) resource areas, (3) resource persons, (4) integrated learning, (5) curriculum choice, (6) the teacher as facilitator, (7) the community as classroom, (8) affective emphasis, (9) building of life skills, (10) cross-age grouping, (11) a heterogeneous student body, and (12) shared decision-making.

At the Open School, learning is considered to have occurred when there is actual change in the person, an effect the school believes does not necessarily follow from traditional assign-study-recite-test educational practice. The Open School philosophy is that learning occurs through experiencing and takes place best in conditions of intense personal involvement when interest and motivation are high. To this end, the school

Students start the day by checking the schedule posted in the school entryway (above). Regularly scheduled classes appear along with special events, programs, and out-of-school activities. The multi-leveled structure (right) is a constantly changing space for kids, animals and fish.

bases each student's program on his interests, with the school's role being to create an environment in which exciting and stimulating activities for the mind are provided in a supportive, nurturing, and safe climate. There are no required courses; students select courses and activities and design their own programs. The teacher's role is that of a facilitator who assists in arranging learning experiences, clears obstacles to learning, suggests possibilities, helps students with personal goals, and in general functions as a friendly guide.

Many persons other than teachers work with the students in the Open School. Parents assist as volunteers, persons from the community with special expertise prepare materials or teach under the direction of the professional staff, and paid aides provide a variety of services. Students themselves often serve as teachers. Learning takes place in many locations other than the school itself, with the Open School committed to being just that—open to the community, rather than turned inward. The student population of the school has been structured to reflect the diversity of the city's population, and the competencies which the school attempts to teach are those which are needed in daily life in the world outside the school. Reading is such a life-skill, which is obviously important to mastery and well-being, and the desire to read is a powerful drive of young children, who sense that reading unlocks many treasures and secrets of how to do things and how things are. The Open School attempts to harness such drives for learning and also to satisfy those primary drives which sometimes block learning, such as the child's need to feel good about himself, to feel protected and safe from harm, and to have adequate physical care and nourishment.

The St. Paul Open School is one of the most ambitious of the country's alternative schools, enrolling 500 students in a nongraded program covering the years kindergarten through twelfth grade. The school has chosen not to advance its fundamental educational changes gradually, but to initiate them at the outset, in the belief that few alternative schools which take a more timid approach ever succeed. Since it is a part of the public school system of St. Paul, the school serves a special function as a laboratory for the testing of new educational ideas.

Extracted from "Title III and Changing Educational Designs," *Quarterly,* Washington, D.C.: George Washington University, Spring, 1973.

Cooking in the kitchen (above, left) and reading under a geodesic dome (above). Division of the vast warehouse space is flexibly handled with dry-wall partitioning.

Clear Creek High School
Idaho Springs, Colorado

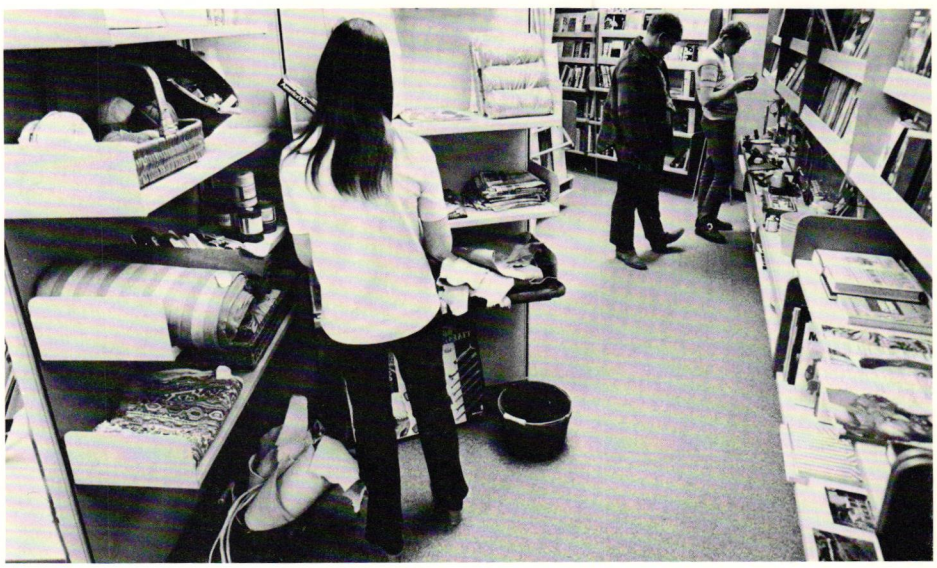
Architects: Nixon, Brown, Brokaw, Bowen;
Furnishings: Herman Miller Research Corporation;
Client: Clear Creek School Board

In 1962 the Clear Creek School Board was confronted with problems which have become typical in a high percentage of public school districts throughout the United States. The school's credibility was at a low point, its facilities limited and aging, and financial problems were becoming critical. These problems challenged the school board:

> We wanted to know what chance a community like ours has in creating a competitive educational opportunity. We were willing to try anything that was a departure from what we had, as long as we had a feeling that there was a reasonable chance of success.

After six years of thoughtful planning on the part of the Clear Creek community, the new high school was completed. The result is a school in which architecture asserts the worth of the individual student. Virtually all courses utilize lectures, small group discussions, laboratory or field work and individual study contracts. The facility provides open space or learning suites on three floors of the school where teams of teachers have their offices and conduct learning activities. The open space is modified by moveable panels which can be changed easily by either students or teachers as the program is varied. A circular

The stair passage (above) is an open area surrounded by panels for school materials and signing; it leads into an audio-visual study area. At the core of the plan and curriculum is the Resources General Store (right and opposite, top), as it gives students direct access to a large number of materials, books and tools. Situated in a bowl of the Rocky Mountains (shown opposite), the school has direct access to beautiful outdoor areas for study and athletic activities.



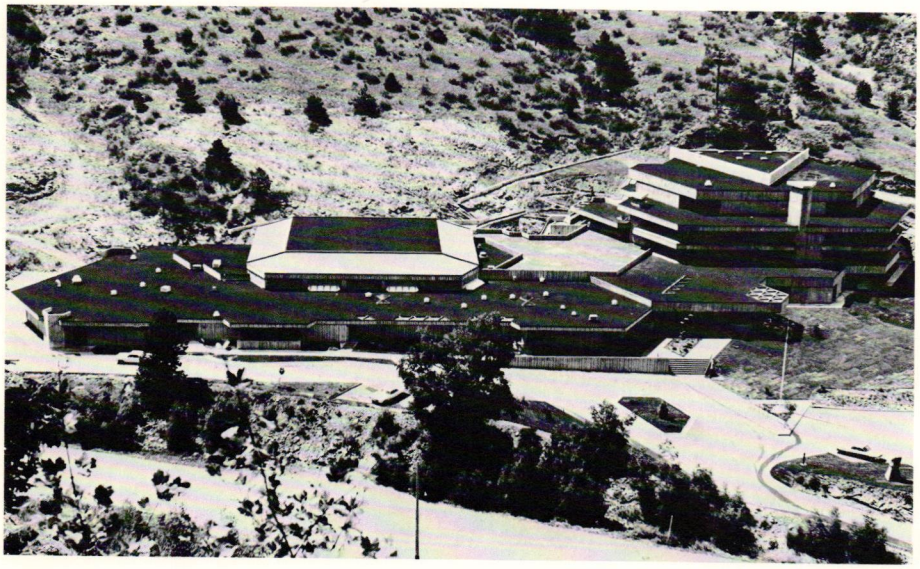
ramp winds through the floor levels of the large open interior space, making the academic areas visible to all student passers-by. A variety of furniture for sitting and non-sitting provides for the many postures natural to people engaged in different kinds of activities. A lockable, moveable unit containing a desk, shelving, pin-up and storage gives an area of personal territory to each student.

A central element in the plan is a Resources General Store that contains, in addition to the usual school supplies, a broad selection of resources for rent or sale which students use for projects carried out at school or at home. The store provides the information and the means for practical experiments in land use, shelter and ecological systems; the rural community provides the environment for practical employment of these tools.

Furnishings for Clear Creek were developed by Herman Miller Research Corporation in Ann Arbor, Michigan with the Clear Creek School Board, that financed a large amount of experimental equipment while Herman Miller covered the cost of research and development. Though there was certainly a risk involved in this process (settling for standard school equipment would have been easier and less expensive), the resulting facilities set a new standard for school equipment.

A second application of this experimental furnishings development technique was carried out by Herman Miller at Harlem Prep in New York City. A remodeled super-market, this urban high school's specific needs were worked out through trial and error in much the same way as those at Clear Creek. These two prototype projects acted as proving grounds for a number of radical new means of defining learning spaces.

Robert Propst, President
Herman Miller Research Corporation



Maryland Institute, College of Art
Baltimore, Maryland

Architects: Cochran, Stephenson & Donkervoet;
Client: Maryland Institute, College of Art

Founded in 1826 in Baltimore, Maryland, the Maryland Institute, College of Art has enjoyed a diverse history characterized by change and almost constant adaptation. Now a professional college of art and design, the Maryland Institute began as a mechanics institute dedicated to the promotion of Maryland manufactures and the education of tradesmen and mechanics, most of whom were educated primarily through apprenticeships. To fulfill these objectives, the institution sponsored annual exhibitions, courses of lectures, a drawing school and library.

Toward the end of the 19th century, the Maryland Institute began to specialize in the visual arts and an evening art school, initiated in 1851, still operates today. By 1907 two new buildings were erected and for fifty years the school continued with a small student body and partial accreditation.

Since 1961, enrollment has quadrupled, endowment increased six-fold, number of faculty and average faculty salary more than tripled, and the library collection increased from 5400 volumes to over 29,000. As a result of these changes and others, the college received full regional accreditation in

1966, and at the same time began to respond to demands for additional space.

An urban college, the Maryland Institute lacked adjacent open land necessary for new buildings and, as a result, what might have been a new building program became a program of purchase, restoration and remodeling. Today, eight of the college's nine buildings have been remodeled from other uses ranging from townhouses and stores to a former church school. Most dramatic is the Mount Royal Station, a massive Renaissance style railroad station built in 1896 and in 1966 ingeniously adapted by architects Cochran, Stephenson & Donkervoet to house the college's library, lecture hall, galleries, and cafeteria, plus offices, sculpture studios, and classrooms.

The exterior of the station has been left almost intact, in fact, the school has air rights over tracks still used by freight trains. Inside, the waiting room was ringed with a balcony to add needed floor space to the huge, vaulted interior. A number of interior spaces were enclosed for specific functions—offices, classrooms, studio areas and cafeteria. The structure's original character has been treated with respect by the architects and wherever possible they have preserved decorative columns, stamped metal ceilings, marble floors and ironwork.

This exemplary conversion of a fine old building is a model of urban preservation that could have counterparts in many American cities.

Sally Iliff, Public Information
Maryland Institute, College of Art

The library (left) and walkway between two library areas (above) show a sensitive use of glass walls to baffle noise without destroying arched openings. A sculpture studio (opposite) and Mount Royal Station's exterior (below), have retained their original character with only minor changes required for the school's program.

Minneapolis College of Art and Design
Minneapolis, Minnesota

Architect: Kenzo Tange;
Client: Minneapolis Society of Fine Arts

The curriculum concept upon which the Minneapolis College of Art and Design is predicated is the result of five years of evaluation and planning by College staff, faculty and students. With the role of the visual artist and the nature of the visual arts changing so rapidly, both curriculum and physical plant must be flexible enough to encompass the traditional arts, yet accommodate new concepts, new media and changing directions in future years.

The older College buildings are being remodeled and will house the Information Core (Media Center, Library and College Gallery) and all student services offices. A skyway will connect the new building to the older buildings, and symbolically, to the adjacent arts complex that includes The Minneapolis Institute of Arts and the Children's Theater Company building.

It became clear that a workshop environment and a modified tutorial system would best serve the College's essentially elective degree program. The traditional grading system, traditional departments, the concept of the major and specialized art categories, the fixed degree timetable, and the arbitrary division between fine art and design disciplines were eliminated. The program accommodates independent study programs within the degree program as well as certificate and part-time study programs.

Kenzo Tange's architectural realization of this curriculum concept is a 100,000 square foot rectangular-shaped four-story building in which factory-like areas and quiet studio and academic facilities are integrated in a unique and flexible design plan which can be expanded or modified as the educational program demands.

The Technical Laboratory Zone is the heart of the new building. Occupying the entire west side of the building on all four floors, it contains a heavy construction area for three-dimensional work (185 feet long, 30 feet high, 40 feet wide), a two-story visiting professor studio, special booths for plastic forming and toxic areas, spray painting, and a video area, video being a generic term for anything to do with reproduction of an image, i.e. graphic design, printmaking, video, film and photography, with all the requisite equipment and attendant facilities. (The two-story heavy construction area contains all the metal working, woodworking and welding machinery. A crane can move materials or objects all the way from the south end of this area to the visiting professor studio—a distance of some 256 feet. Another crane can bring large objects up to the Experimental Photography studio on the third and fourth levels via an outside overhead projection.) Running the length of the west facade on the outside of the building, a concrete platform enables students to work outside, weather permitting.

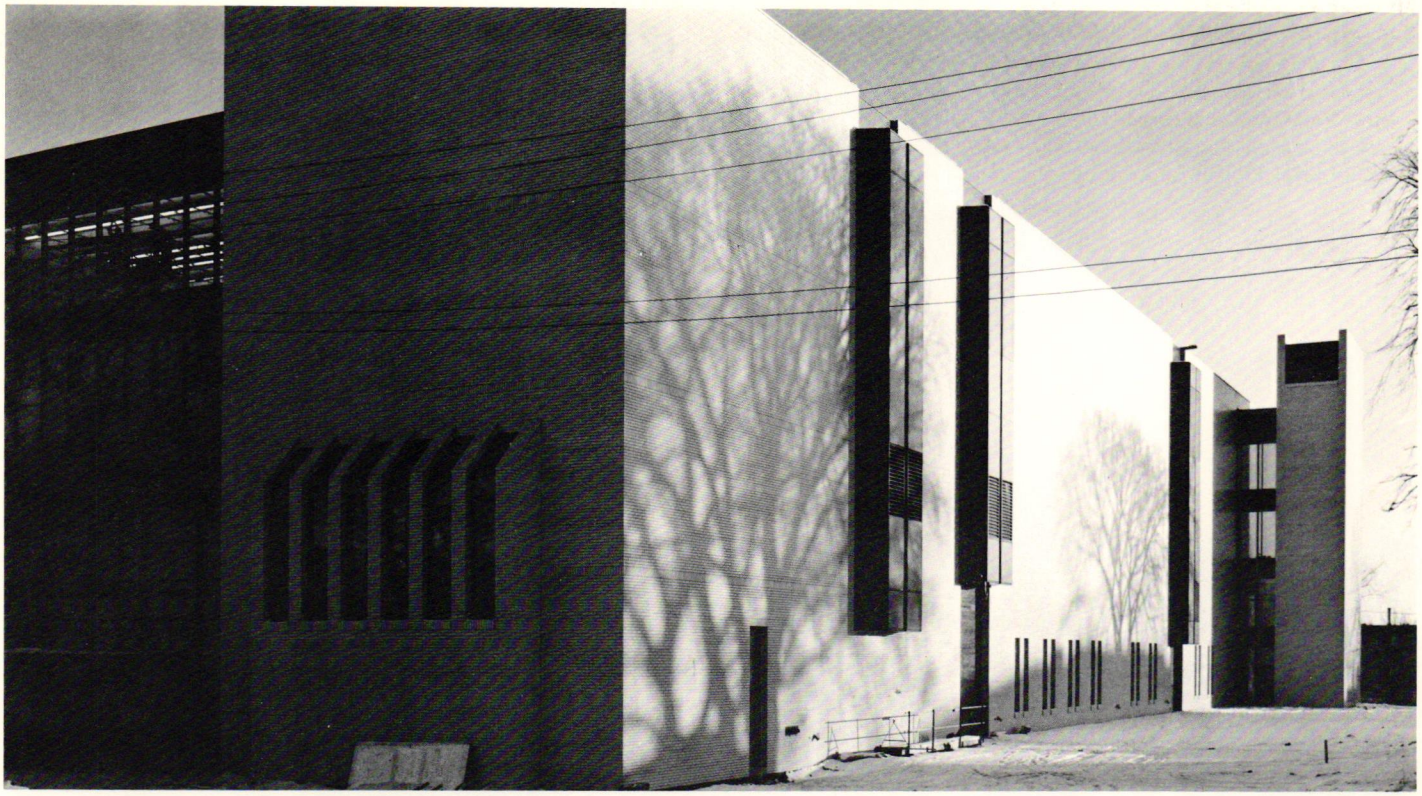
On the first and second floors, adjacent to the heavy construction area, a large (8,000 square feet) two-story area for sculpture and Basic Studies extends from the interior of the building all the way to its east side. Also on the first floor are two auditoria, one 50-seat facility for film screening and one 250-seat facility for lectures and other presentations.

The Student Work Zone, located in the center section of the building on four levels, is the largest allocation of space in the building, with expansive one-and two-story studio spaces for graphic design, fashion design, illustration, painting and drawing, immediately adjacent to work areas in the Technical Laboratory Zone, to informal lounge areas (there are five in the building), to faculty offices and lecture-critique rooms. These studios will contain mini-environments adaptable to the work space needs of each individual student.

The Lecture-Critique-Seminar Zone, located on the east side of the building, contains (on the second, third and fourth floors, respectively) a small component of administrative offices, faculty offices and six lecture-critique rooms, several of which are fully equipped with audio/visual capabilities. These lecture-critique rooms have no fixed seating and can be used for both studio critiques and liberal arts courses.

Extensive use of glass in skylights, curtain walls, and stairway railings, emphasizes both the spatial concept within the building and a sense of openness to people and ideas. On every level artists and designers can see and relate to each other's work.

Arnold Herstand, President
Minneapolis College of Art and Design



As yet unlandscaped, the new building will be connected to the old building and adjacent art complex by a second story skyway.

Looking through the interior of the new art school across one of the open lightwells (left), three levels are shown: a painting studio, below; graphic design studio, center; and basic design on the top level. Studio furnishings, designed by Massimo and Elena Vignelli, are flexible environments that can be modified to accomodate small groups or individual students.

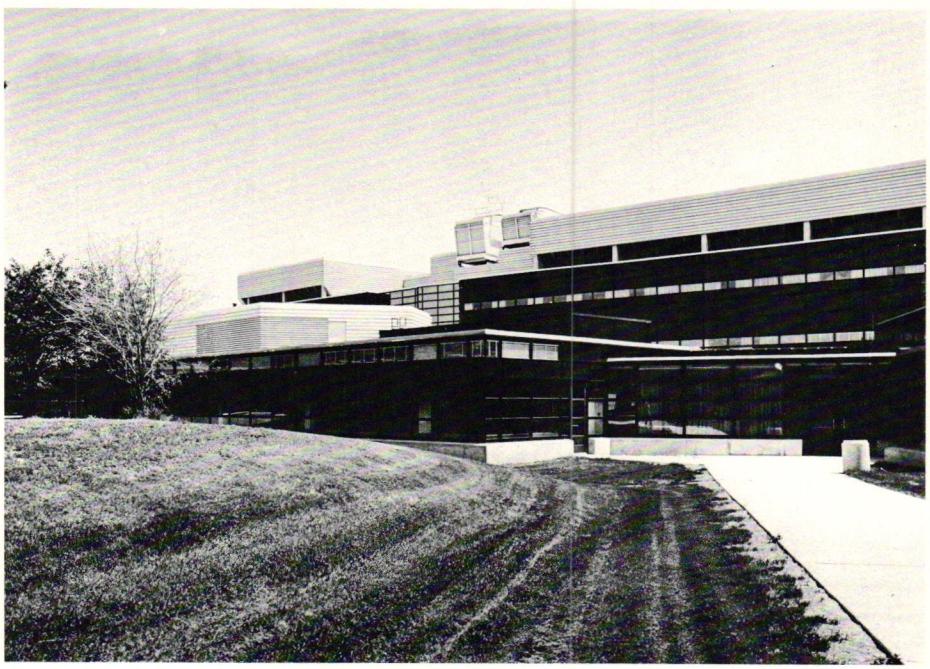
Sheridan College of Applied Arts and Technology
Oakville, Ontario, Canada

Architects: Marani, Rounthwaite & Dick;
Client: Sheridan College

The site of Sheridan College of Applied Arts and Technology is near the proposed new central district of a growing city, encircled by suburban housing. Rich natural growth in ravines on two sides, a watercourse, and two tree bordered lanes of farming origin are distinct features of the site. Since more building is required to gradually accommodate 6000–7000 students, a development plan was made to ensure that certain criteria could run through all designs: the maintenance of pedestrian dominance inside the building complex; the creation of variety in route and spatial effect; the possibility for all students to experience the work and aspirations of other students; to draw the community in because of the unique character of the things to be found within; to allow for change.

This first portion of what will eventually be a complete college is designed for the visual arts division. Courses in Graphics, Drawing and Painting, Photography, Fashion Design, and Animation, are offered.

Diversity made possible by the multi-leveled spaces of the college structure is illustrated in the library (above, right) and studio space (opposite). Exposed support systems and the industrial character of interior elements emphasize the informality of working areas. The student cafeteria is shown above.



The College requires several distinct types of spaces to accommodate all its needs. Studios, labs or workshops consist of single story, open, high areas with natural top light, and entirely exposed mechanical and structural systems. Mezzanines add extra useable space for special projects or for faculty. Classrooms and administration uses consist of two story (or more in future buildings) structures with low ceilings and more traditional uses of materials. Specialized functions–auditoria, cafeteria, gymnasia, will be designed as particular elements to suit their use. In the visual arts division, the library and faculty area fall into this category, with varying levels and variable arrangements for conference or study.

The educational plan is based on self-teaching principles. Students are encouraged to work independently on their own projects, with faculty available on an informal basis. Student work is displayed wherever possible and forms an important part of the design of the building.

Each student is provided with a "home base" in the studios where he does the major part of his work, with instructors of various disciplines available for consultation. All years and courses work together in the large open studios, with small demonstration rooms set apart for instructors to give particular directions to groups of students. Specialized service rooms have facilities necessary for particular courses, and standard classrooms are used for traditional teaching.

The EE-RLE Fairchild Building at MIT Cambridge, Massachusetts

Architect: Skidmore, Owings & Merrill;
Client: Massachusetts Institute of Technology

When thinking of environments for education, a new building in a new setting comes first to mind. Second, we envision a new building nestled among old, well remembered cloisters. The third and most typical educational environment comprises an addition to an existing system, a continuation of an established urban fabric.

The Massachusetts Institute of Technology in Cambridge, Massachusetts, is a prime example of an early educational megastructure. Initially MIT constructed almost 1,000,000 square feet of academic space, shaped within the Beaux Arts discipline. Greco-Roman forms housed laboratories and shops, classrooms and offices. To supply the exploding demand for scientists and engineers resulting from the Second World War, MIT sponsored a revolution in science and technology, gutting and remodeling the existing infrastructure, adding over 1,000,000 square feet of teaching and research space. The new space had to be linked to the old, and had to meet the more sophisticated demands in energy, environmental conditioning, electronic screening, flexible services and anonymous utility. Contrasted to these pragmatic goals are the search for individual recognition, nostalgic conflict between the past (the romantic era of constant discovery) and the new micro-world of computer-assisted group needs.

Many architects have tried to respond to these needs at MIT—Alvar Aalto, Eero Saarinen, Pietro Belluschi, Anderson and Beckwith, I. M. Pei, Eduardo Catalano, Gordon Bunshaft and others. Their lessons are in place. One new building addition and the recycling of an original building—express my input to MIT's education and the environment.

The new building, Electrical Engineering and Research Laboratory in Electronics, The EE-RLE Fairchild Building, reflects long and complex programming and planning efforts that involved students, faculty and research staff. The results you see here are the finished product. The solution displays two facets of architectural form: the anonymous, highly specialized technological space and the spaces in between—the staircase, the bridgeway, the classroom, the urban vista.

One of the objectives in this design was flexibility, so that in the future, architectural, structural or mechanical modifications could be made without undue cost. In a project where detailed forecasting of the occupants' needs is impossible, ease of growth and adaptability become key issues.

Previously, sections of the Electrical Engineering Department were to be found throughout the buildings of the Institute. These individual research and teaching groups found the normal and desirable discussions between people in different specialties extremely difficult—at a time when word-of-mouth is becoming the most effective way of exchanging new technical information. Communication had to be done instead through formal committee meetings which are much less effective. The even more valuable casual meetings and exchanges between people in the various groups almost ceased to exist.

The new building provides a strong stimulus for proceeding with a reorientation of undergraduate teaching. It is hoped that the design of the building will foster a type of classroom instruction that is more personalized. More noticeable, however, will be a change in the emphasis in laboratory instruction. The former cook-bookish group experiments in a classroom laboratory are yielding to a system of project labs in which the student conducts his own individual experiments.

These more individualized approaches to electrical engineering education are highly effective and are enthusiastically received by both students and staff. They require additional space for laboratories and conference rooms and, because of the additional teaching load, new staff offices for additional faculty. On the graduate level, the new building will create essential additional space for "homes" within the Department for full-time graduate students whose numbers are growing.

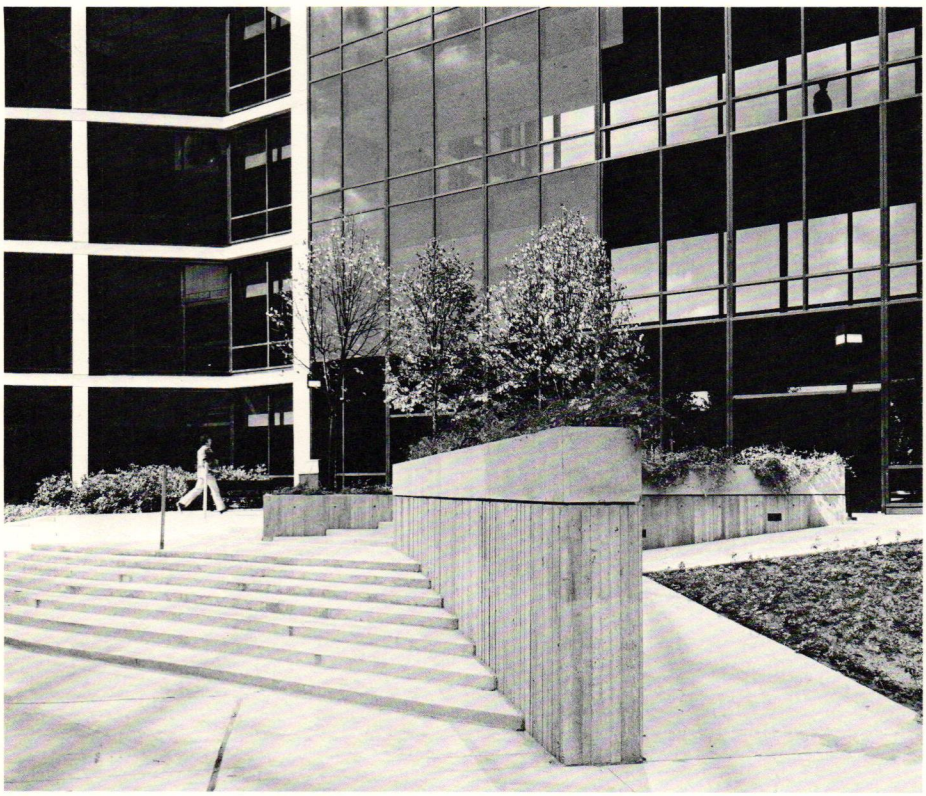
The Library was recylced from the old classical space, the MIT Dome, at one time believed technologically impossible to transform acoustically and visually into a functioning unit. New materials, new lighting systems and new air conditioning technology made this aging but romantic space viable. Recycling further permitted utilization of information transfer experimentation (project intrex) in library storage and referral techniques.

Each recycling reinforces the realization that technological change forces new demands on an old environment. Student skills and learning techniques, individual study and research, all compound the implosion within the aesthetic envelope. The challenge of the new tools–computer, TV, electron microscope, advanced math, semi-conductors, lasers–while most strange to the average human animal, are here not for the architect to understand but for students and faculty to use, thereby allowing all of us to grow.

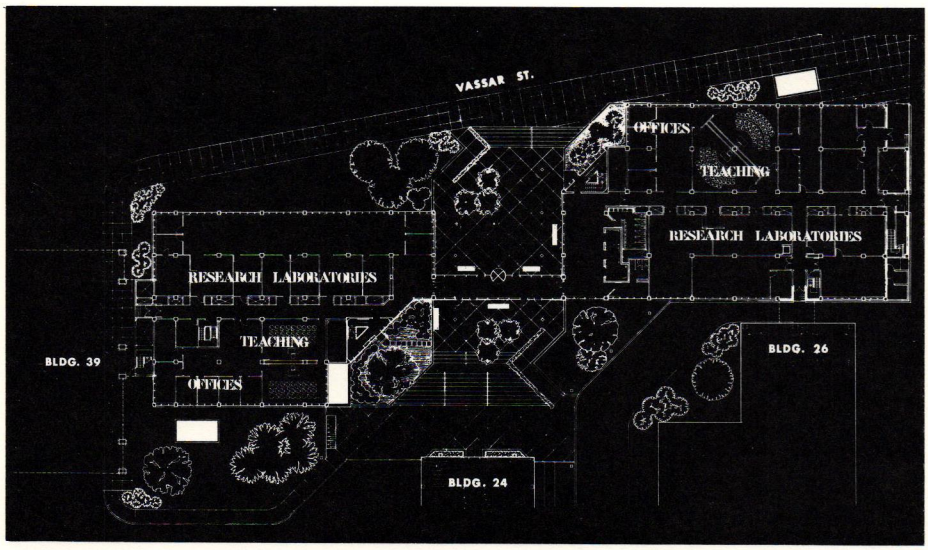
It seems to me that the Institute has always had two responsibilities: the search for new knowledge in science and technology, and the hope to build a modern university with total involvement in art and science.

Like all logical persons, the leadership at MIT, past and present–Dr. Stratton, Dr. Killian, Dr. Wiesner, Dr. Johnson–quest for new answers and ways to revise existing knowledge and space. For EE-RLE, many new forms were tried and discarded before the final solution was reached. Efficiency and benefit cost matrices were attempted to reinforce the past, the present or the future. Yet in many ways such a world as MIT represents the continuum of change, the domination of content over form. The conflict between aesthetics and utility, and the awareness of institutional and technological change control the concept of the environment as a working and educational tool.

Walter Netsch, Jr., FAIA, Partner, Skidmore, Owings & Merrill



Separation of highly technical laboratory spaces from open teaching areas nearby is shown in the plan (lower left). Public spaces, open to the surrounding urban environment, act as gathering areas for campus functions.



Students Union Housing, University of Alberta
Edmonton, Alberta, Canada

Architects: A. J. Diamond and Barton Myers in association with R. L. Wilkin;
Client: Students Union, University of Alberta

Adapting principles from the great, vaulted gallerias and arcades of the 19th century, the University of Alberta is bringing comfort and order to its fragmented campus. Its long-range building and consolidation plan points the way to a number of overdue changes in urban design for cold climates. The importance of the plan lies in its original design solutions, its relegation of the automobile to a secondary transportation role, its commitment to the conversion of the university from academic enclave to city neighborhood, and its threefold use of enclosed pedestrian space as access routes, shopping areas, and display halls.

In five to ten years, the University will accommodate 27,500 students—its present enrollment is 18,400. It will become a six-story campus at most, with land coverage increased from 15 to 34 per cent, green space extended and integrated by the reduction of surface parking, and the old, isolated buildings that were erected over the last 70 years tied into the new structure by means of pedestrian arcades.

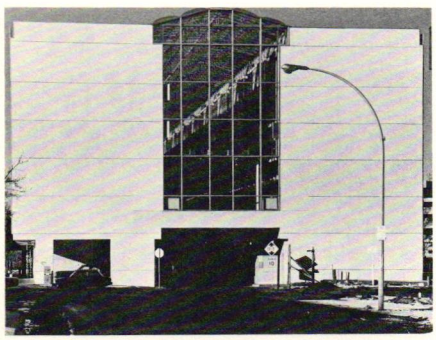
At that time, the University will be returned to its original owners—pedestrians—and cars will be channeled, via a new road system, to parking structures separate from but linked to the access routes. These routes will be drawn along the natural lines of pedestrian movement and covered with glazed, arched roofs that provide a controlled environment as well as a view to the sky. As new buildings are added along the arcades, eventually no service or classroom will be separated by more than a ten minute walk.

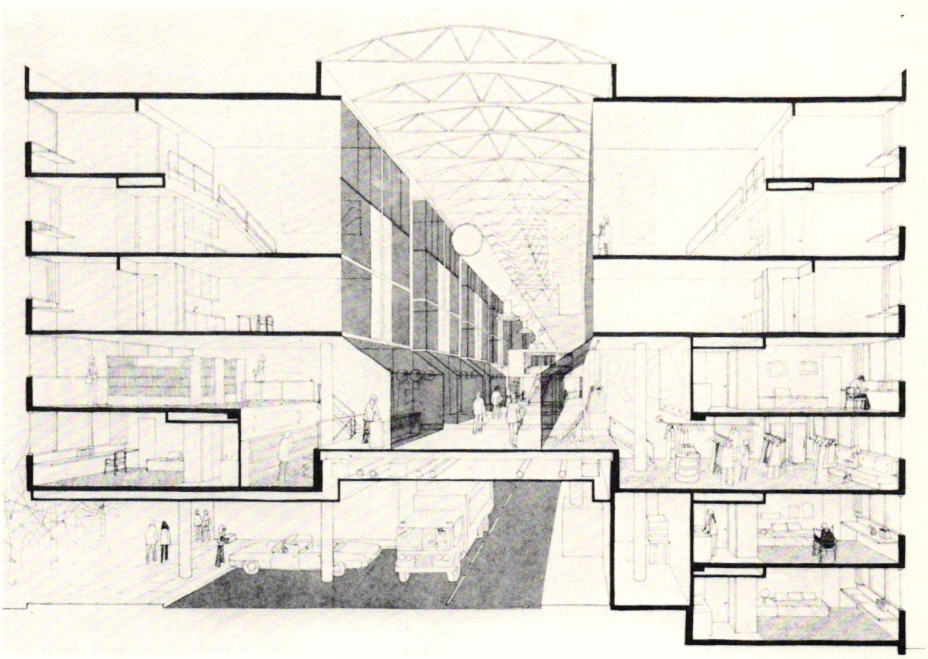
An innovative solution for student housing, now completed, is unique in that students are the sole clients. The student union is entirely responsible for all arrangements, financial and managerial. The Housing Union Building is appropriately nicknamed HUB, because of the community spirit it hopes to foster.

From the outside, HUB looks like an enormously long, low, box with a street disappearing into the box at both ends. It is 950 feet long and six stories on one side, seven on the other, to fit the slightly sloping site. The structure is actually in three separate sections: two long apartment buildings face onto an existing street which is covered at roof level with plexiglass. There is a walking concourse at the second level above grade.

Within this envelope, an economical and comfortable environment for campus living exists. Shops, restaurants and other commercial enterprises line both sides of the covered street and apartment windows look down onto the activity. Stairwells set at intervals give access to all apartments; unfortunately, for reasons of economy there are no elevators. *(Barrier free architecture, allowing access to the handicapped, should take priority over other requirements. Ed.)*

HUB, as part of the overall plan for the University of Alberta, is an example of mixed land use: housing is threaded through academic and service buildings, commercial activities are combined with academic and residential. The mall acts as a social and physical connector through which one can gain access to other buildings and in which resident and non-resident students, faculty and staff can meet; it provides needed student gathering space and community services; and it conserves land by being built over an existing street.





The building section (right) explains separation of pedestrian and vehicular traffic in the housing structure, as well as the integration of commercial activities with living spaces. A pedestrian mall (above) allows access to adjacent buildings and creates lively gathering areas for both resident and non-resident students.

Antioch College Branch Campus
Baltimore, Maryland

Architect: Rurik F. Ekstrom with Antioch students;
Interior Planning: Research and Design Institute;
Client: Antioch College

Antioch College's pneumatic bubble campus was designed to provide inexpensive classroom space over a one acre site in Columbia, Maryland. The campus, designed by 15 Antioch students under the supervision of architect Rurik F. Ekstrom, was an inflated vinyl skin supported by steel cables. It was planned to be relocatable and to leave its temporary site as found upon departure.

In an air-supported housing, interior space is completely open and consequently totally flexible–allowing for an infinite variation of interior enclosures. The Research and Design Institute worked with students in developing the interior components for the campus. They included: vans on wheels (used for interaction with the community), small geodesic domes for teaching enclosures, space dividing screens for partitioning space, ski-huts, cabanas and several industrial enclosures used for sound isolation. The dome was temperature controlled and could be landscaped inside, as parts of the vinyl skin rolled back for the entry of sunlight through a secondary transparent skin.

The Antioch experiment points the way toward innumerable learning applications for domed structures. Research is under way for the construction of domes that will be heated, cooled and lighted with our natural energy resources–sun and wind.

Ron Beckman's analysis of the dome as a learning experience follows.

White Paper on the Antioch Nomadic/Pneumatic Campus

Harold Gores, the President of Educational Facilities Laboratories, has called for educational space "like an acre of June" for many, many years. The best realization of that metaphor was the Antioch pneumatic campus which existed for one year, November 1972 to November 1973.

It still exists, however, as an idea. It never was intended to be more than the objectification of an idea. The Antioch College Bubble was "event architecture." The fact that it *could* happen, and the experience of that happening is a significant matter for education.

The accomplished fact of the Antioch Bubble meant that the city of Columbia, Maryland and the Rouse Company which is building that city, accepted as a serious concept, pneumatic educational space. It meant that Howard County officials who passed on the zoning and building code requirements accepted the idea as practicable, and it meant at the time of conception and design that the administration and faculty of Antioch College saw within the idea a practical educational application.

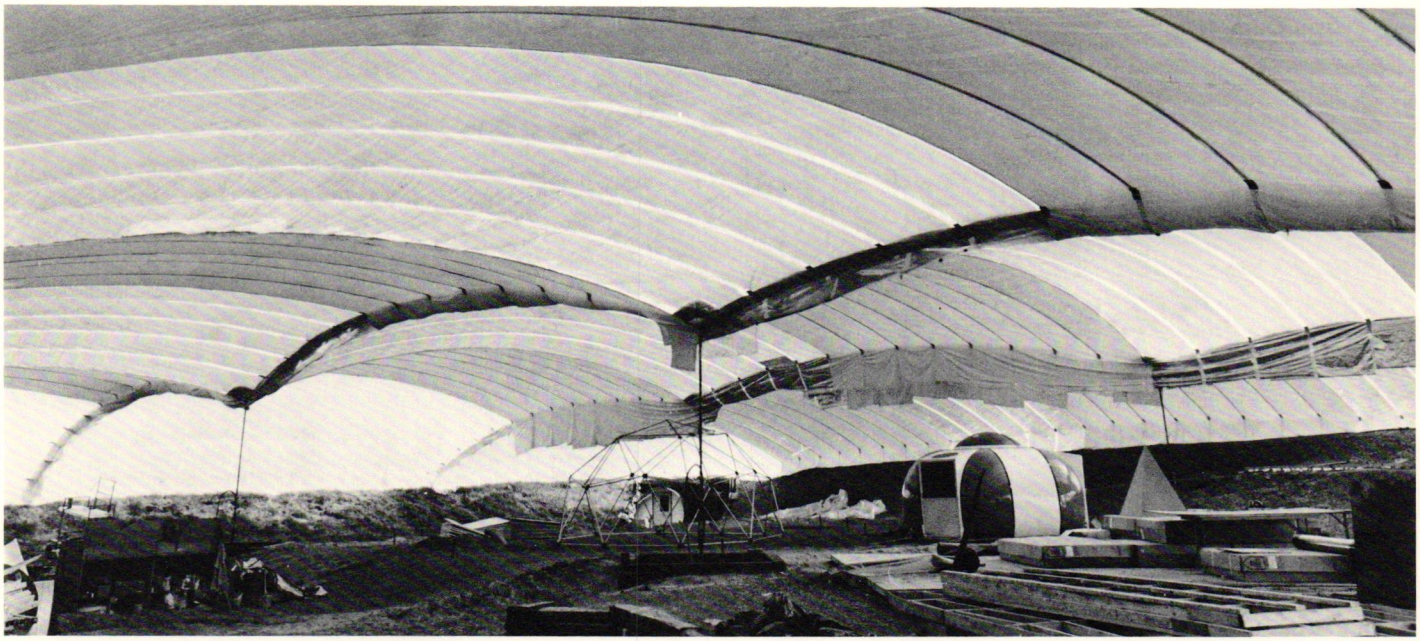
The final details of the building became terribly important on a personal level to the students and instructors who designed, created and built them. That the college and the students did not continue developing this structure and that it did not become the final home of an ongoing college program–necessary funding was unavailable–is unfortunate; but it in no way detracts from the significance of the learning experience which two years of design and construction represented.

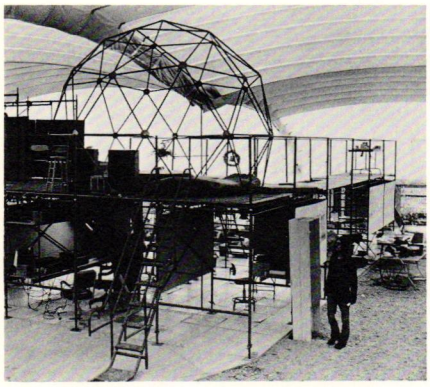
There is a difference between understanding and knowledge. To *understand* an abstraction intelligently does not guarantee personal ability. To *know* a reality requires the experience of that reality. The Antioch experience allowed a student to know in first-hand terms the realities of design and construction, to feel and see the abstractions of "pounds of pressure," "quality of light," or "density of usable space."

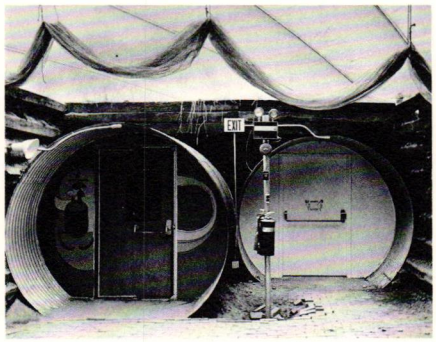
Many people have bemoaned the fact that the Antioch pneumatic campus was never used, but was merely an architectural model. What makes it unique is that fact–it was a model built at full scale. If, upon seeing that full size, the realization drove some students away from architecture, then I say, "How wonderful that they learned the limitations of the art at an early enough age so that they might pursue a different goal." If, as was the case for some students, the tangible experience of building the Antioch Bubble convinced young people that moving masses of force or weights and pressures around to enclose human activity was right for them, then every penny spent on the Bubble was worthwhile because of the rare and valuable commitment it extracted from those students.

The lesson of Antioch is at the same time aesthetic, social, technological, practical and ecological. Like so much wholistic experience, this lesson defies compartmentalization and must be taught as a comprehensive total, not as fractured parts of a whole. This is an expensive way to teach and yet the medical profession recognizes the worth of the intern's experience and the athletic coach recognizes that practice is the only route to competence. So too in the arts. Participation must replace observation. To the extent that it did at Columbia, the Antioch nomadic/pneumatic campus is an historic illustration of the future of education.

Ronald Beckman, Executive Director
Research and Design Institute







The dome rests on the site like a huge whale, graceful and light, yet enormous. Interior photographs indicate the diversity of components used for the housing of particular elements. The ground materials: bricks, carpeting, earth, are all as variable as the spatial enclosures.

James Bay New Town
James Bay, Canada

Architects: General Urban Systems Corporation;
Client: James Bay Development Corporation

James Bay New Town has been designed by General Urban Systems Corporation for the James Bay Development Corporation as the first of a new generation of resource towns to encourage settlement of northern Canada.

An initial population of 2,000 technical and managerial personnel is expected to grow to 35,000 in ten years, turning the town into a regional center for government administration, resource-based industry, and scientific research. This population will consist initially of young families with children, who must be offered considerable physical amenities in the midst of a dramatic but hostile environment of sunless days, frozen or muddy terrain, and in summer, voracious black flies.

The town's design is based upon a concept of communication and community development that includes a complete integration of the learning system with other institutional and commercial activities of daily life. Both programmatically and physically, the education components are inseparable from housing, circulation networks and recreation.

The principal design objectives included answering the problem of psychological isolation in the far north, as well as accommodating the need for family and individual privacy and identity within a close-packed community.

The solution chosen depends upon the communication-learning function as the programmatic "glue" of the community, generating physical expression in two ways: first, as a completely climate-controlled pedestrian network that gathers and distributes educational material along its trajectory; and second, as a hierarchy of nodal points found throughout the community where specific educational activities can freely take place. The home base of the educational system is located along the central spine of the town, permitting a sharing of facilities with neighboring commercial, institutional and recreational installations.

The compactness of the town, and more specifically the central spine, was designed not only to achieve the easy sharing of facilities, but to generate the critical mass of population density needed to alleviate the sense of isolation. Access to any point in the town can be achieved from any other point by means of a ten to fifteen minute walk in climate-controlled conditions–in effect, not different from the normal classroom change-time in a university. This compactness, in fact, permits the use of a universal high-amenity circulation system because distances and length of service runs have been drastically reduced. Economically, this town will cost no more than the traditional low-amenity northern settlement of sprawling isolated bungalows, overhead wires and snowed-in or muddy roads. The "hard-edge" design of the town will, in addition, minimize the ecological disturbance caused by its installation in a fragile environment.

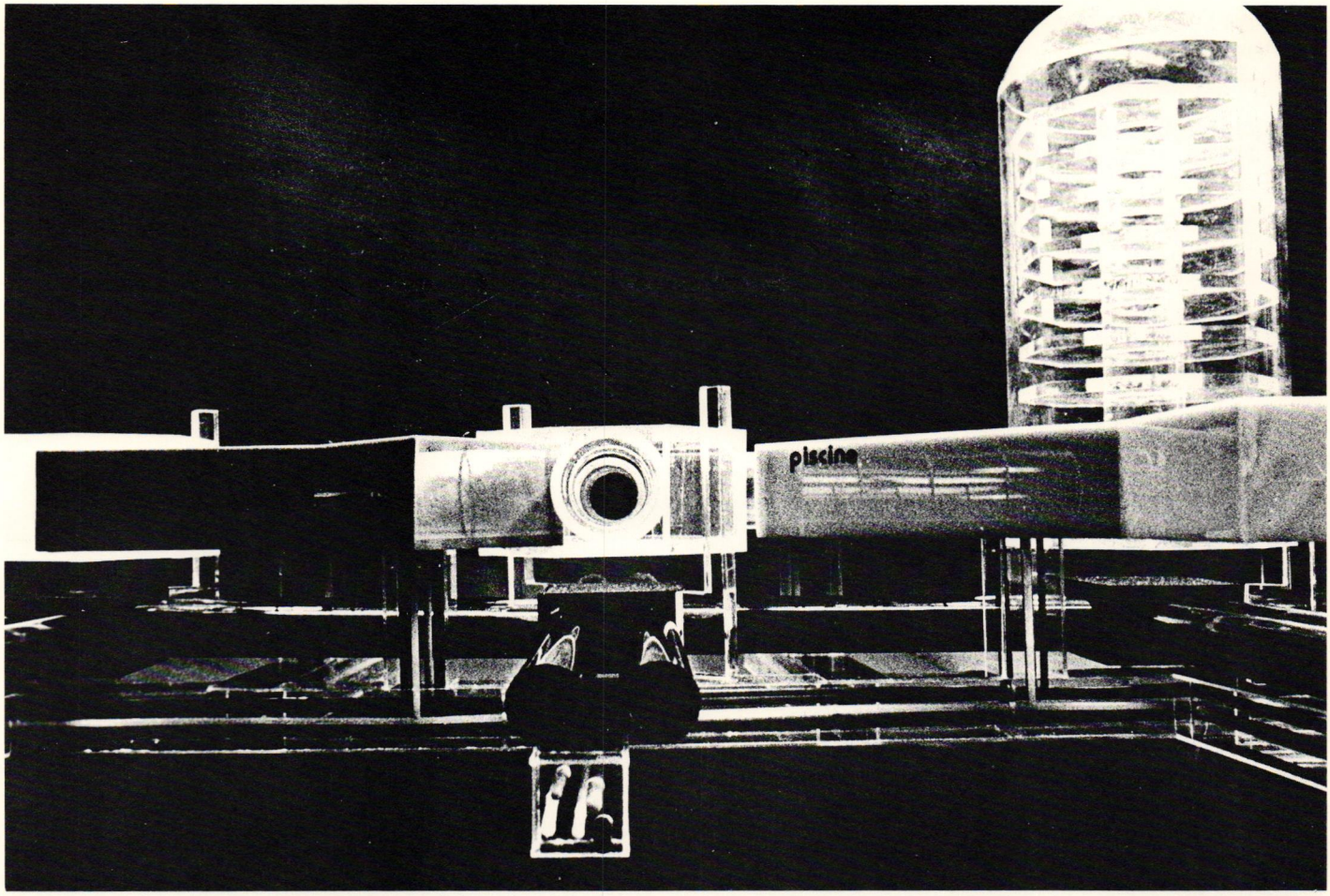
The open-space network of the town has also been considered a component of the learning system. As alternate movement paths, the open spaces continuously link each of the housing clusters, as well as the central activity spine, and contain a variety of outdoor recreational facilities available for education purposes as well as general use.

The learning system, in the largest sense of communication and continuing education, has been designed to serve as the principal marketing tool in encouraging a specific population to settle in this region. The north of Canada, rich in natural resources, energy potential and unique opportunities for scientific research will, in the future, be called upon to accommodate technicians, businessmen, and government administrators, as well as teams of scientists and even tourists.

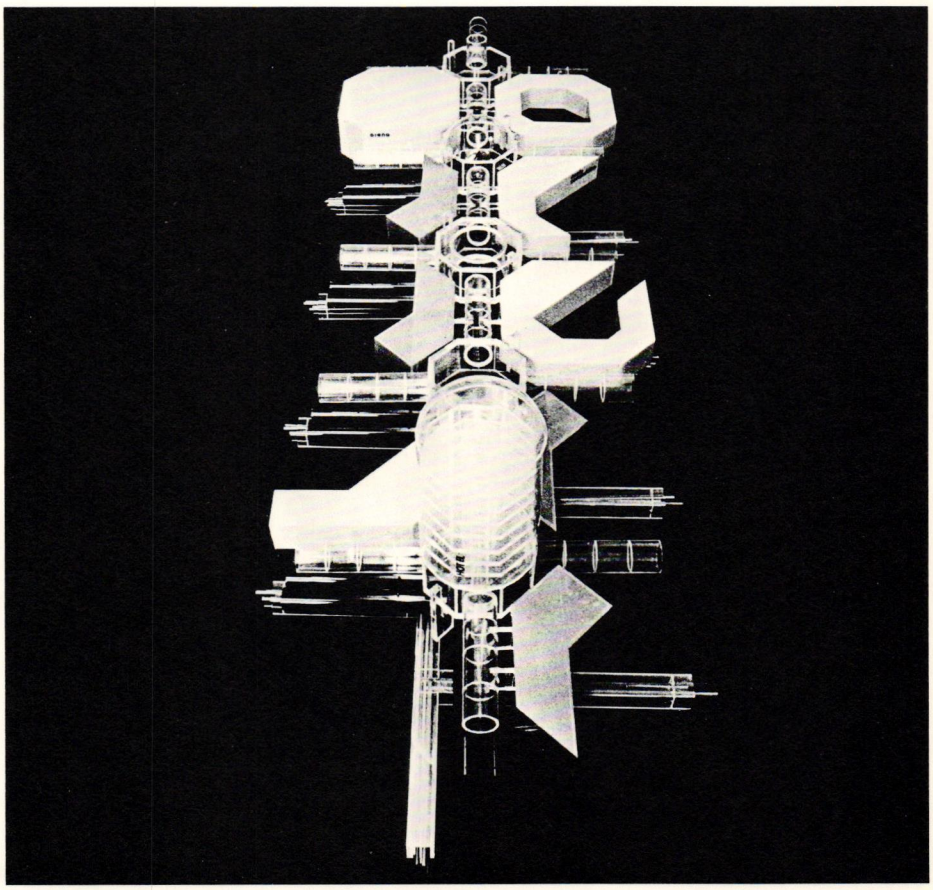
A new town in so vast a territory presents an opportunity to start anew, to rethink planning and social priorities and to conceptualize new urban life patterns and archetypes. It is a chance to place technology at the service of society without the usual constraints of an existing physical framework. This new town seeks to anticipate the sophisticated needs of a new northern citizenry while respecting the fragility and uniqueness of the existing natural environment.

Where is the school? It is everywhere.

Harry Parnass, Partner
General Urban Systems Corporation



Shown in model form the central activity spine (right) demonstrates the compactness of the plan. The survival of this physically closed community, to be located in what is essentially a hostile climate, will depend upon the ability of its residents to create a compensatory life-style within the town framework.



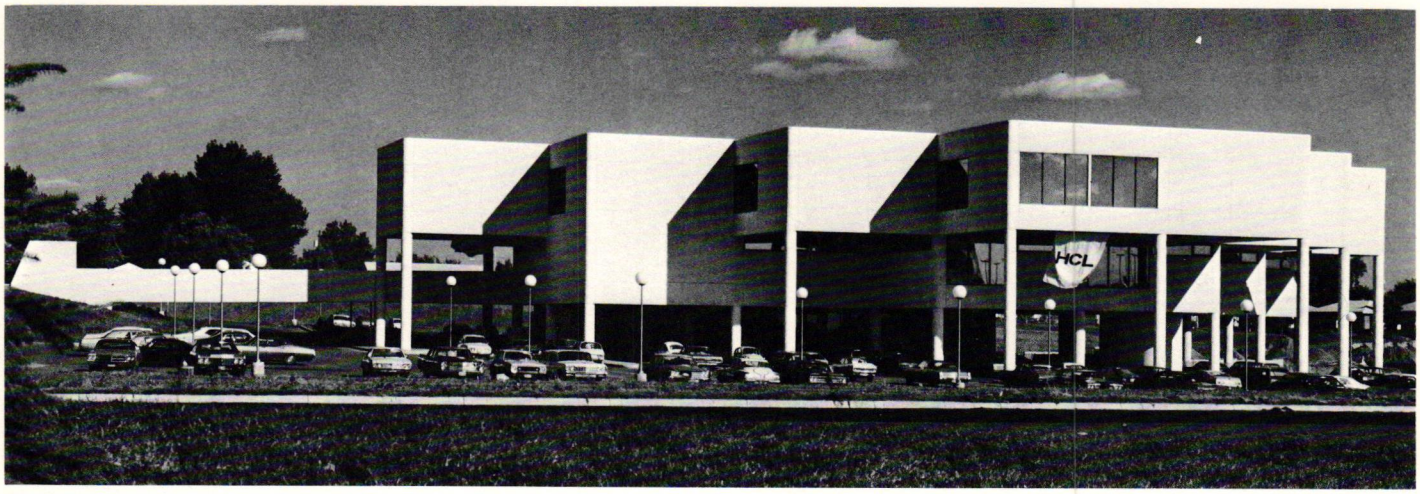
Hennepin County South Area Reference Library
Edina, Minnesota

Architects: The Hodne/Stageberg Partners, Inc.;
Client: Hennepin County Library System

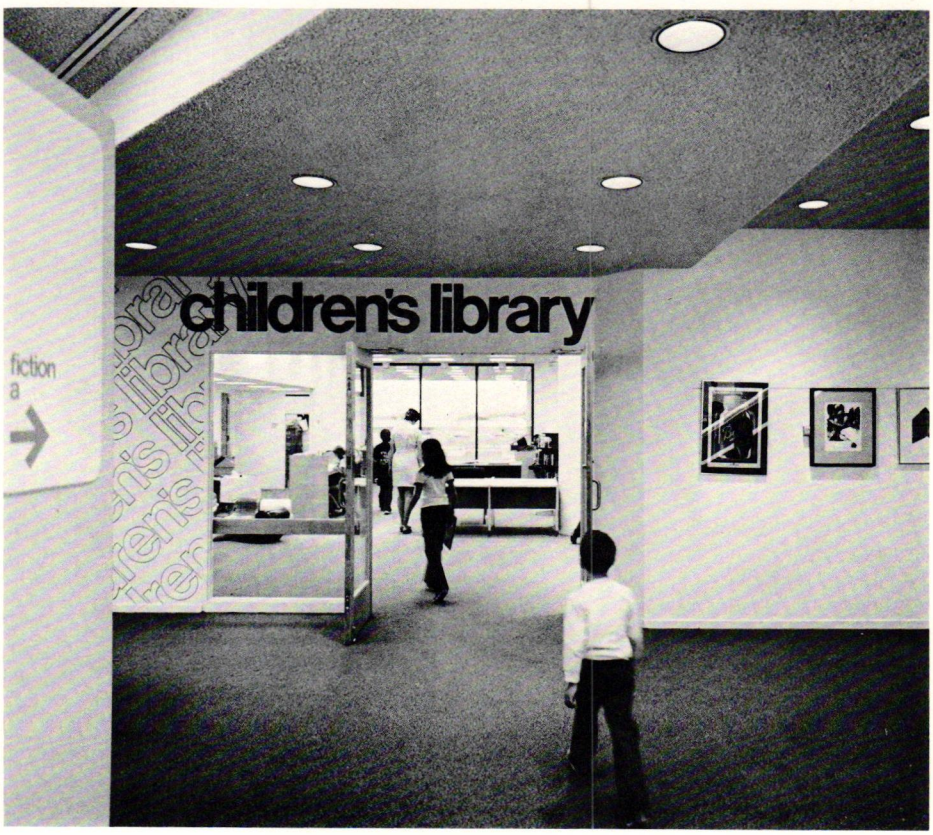
This learning place is a response to the dynamic program of a county library system. In addition to books and periodicals, heavy emphasis is placed on a wide variety of electronic and audio-visual resources.

A former mined-out gravel pit, the site is located within a large multi-diverse regional commercial center on the south edge of Minneapolis. Primary access is by auto (true of a majority of suburban institutions) and consequently, the two story building is placed over a parking lot. Over, for several reasons: first, to permit as much parking as possible close to the entrance in response to a difficult climate, and second, to allow expansion of the building without displacing required parking.

A 33 foot square modular design system creates highly flexible space for use variety and change. The system allows growth in three directions totally compatible with initial construction. Various technical systems—steel structure, stucco skin, mechanical and electrical—all complement this expansion potential, ensuring minimal disruption and minimal costs.



This suburban center is as much a community gathering place as it is a library. Its audio-visual access center, located on the ground floor (opposite) is used by adults and children for viewing videotapes, films and listening to audio-tapes and records. The seating area (foreground) is one of several comfortable lounge spaces in the building.



Designed by architects Hodne/Stageberg, the library offers its users a "recreational" learning experience. This does not imply a de-emphasis on books, but an application of new kinds of media learning resources to expand the kinds of information freely available to the community. Audio-visual devices throughout the building are as accessible as the usual books and periodicals in traditional libraries.

In addition to ingeniously planned access to professionally prepared audio and videotapes, films and slides, the library houses a media lab, operated by an audio-visual librarian and a technician. Open to everyone, this lab is equipped for the processing of films, videotapes and slides and has become a neighborhood workshop for the community, used by both children and adults in almost equal numbers. The library also has a 300 seat meeting room (divisible with sliding partitions into three spaces) in which films are shown and public lectures or meetings take place, during and after library hours.

With its broad user base and wide selection of learning tools, this library, capable of expansion and change, is a vital learning place for its community.

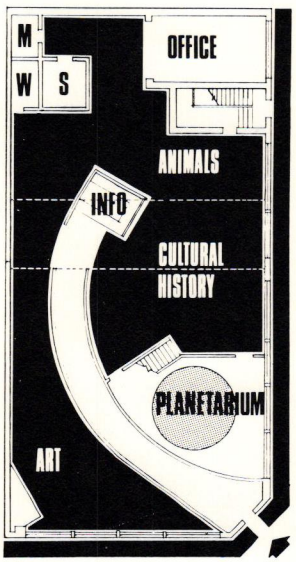
MUSE: Bedford-Lincoln Community Center
Brooklyn, New York

Architects: Hardy Holzman Pfeiffer Associates;
Client: Department of Parks, Recreation and Cultural Affairs, City of New York

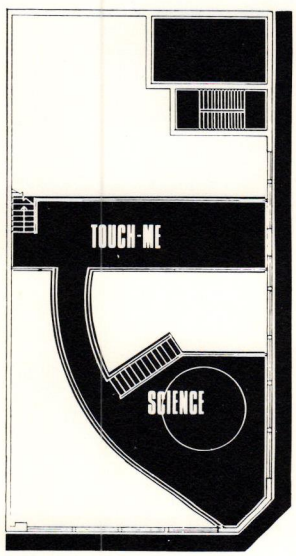
MUSE, a remodeled one-time pool hall and auto showroom, is a children's museum and a community center with a varied, active, participatory program in the arts and sciences. Originally a pilot project for a possible series of neighborhood museums, MUSE's "tunnel" entrance and open interior, filled with surprises, became the model for the new Brooklyn Children's Museum (replacing the multi-neighborhood scheme) to open this spring.

MUSE is open day and night and has become a community gathering/learning place that brings programs of excellent quality to what is an essentially depressed area. Neighborhood agencies and groups, such as Neighborhood Youth Corps and Youth in Action, participate in the planning and operation of the museum's programs, so the exhibits and activities are a true reflection of the needs and aspirations of the community. MUSE will continue in its present location even after the new Brooklyn Children's Museum opens nearby, as it has become a vital learning place, an essential element in the life of its community.

MUSE is not a museum in the usual sense of that term. It functions as a day and night meeting and learning place, with exhibitions of many kinds as only one part of its total community program.



First Floor



Mezzanine

Brooklyn Children's Museum
Brooklyn, New York

Architects: Hardy Holzman Pfeiffer Associates;
Client: Department of Parks, Recreation and Cultural Affairs, City of New York

Children like discovery and a sense of adventure. For them, the Brooklyn Children's Museum offers a continuous experience of exploration. The building is a half-buried strong box whose unassuming exterior acts as an extension of Brower Park which has served as the home for the Children's Museum, in various housings, since 1899. The park is located near other Brooklyn cultural and recreational facilities, is easily accessible to downtown Brooklyn's shopping and business district, and is one half hour's travel time from midtown Manhattan.

Seen from Brooklyn Avenue or St. Mark's Place, the new building appears as only an assemblage of free-standing one story pavilions, seating areas, and vertical shafts which stand on a textured plateau. Circulation across this plateau is encouraged with paths to other areas of the park, some of which lead to an Observatory Bridge which faces an Outdoor Exhibition Area twenty feet below. The specific cultural and recreational activities of the plateau are being developed in consultation with members of various community organizations to insure their direct involvement. It has already been established that an amphitheater can be provided through the arrangement of step-shaped skylights.

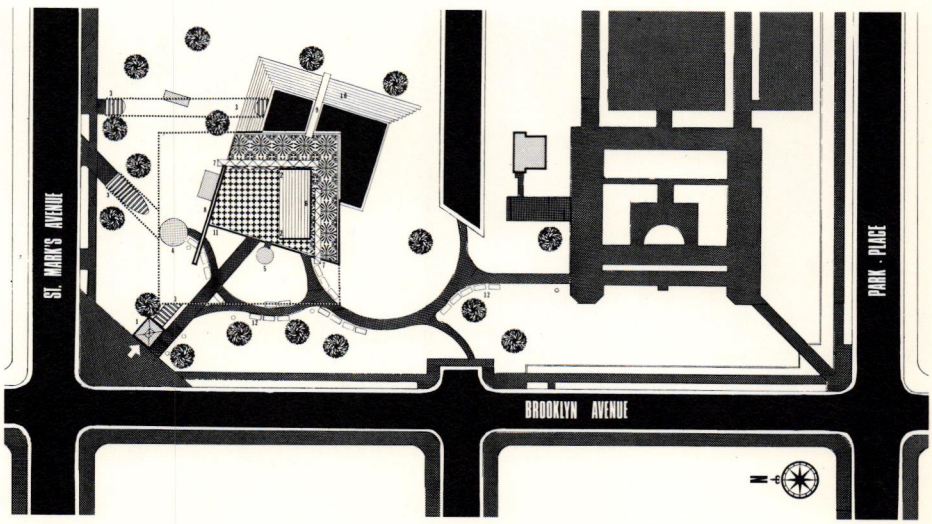
Basically a reinforced concrete box, the building supports the plateau on its top and contains five levels framed with a light steel structure. Mechanical work is organized into visible patterns of utility which run exposed throughout the structure. Phase II of construction will expand to the south and will contain a fully equipped planetarium and other enlarged services.

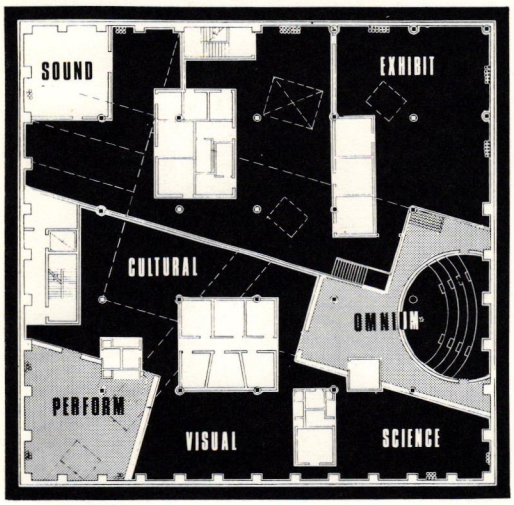
Divided equally between workshop space and exhibition areas, the building develops from a circulation scheme without corridors. Gathered around and over the four levels of exhibition space are the workshop and administrative activities of the structure. Interior glass walls allow various patterns of use to be always visible, and circulation through the exhibition space reinforces the programmatic links between workshop and exhibition activities.

With all the surprise and excitement of Alice's journey down the rabbit hole, a 180 foot long ramp takes visitors diagonally through the exhibition space from the glass enclosed kiosk entranceway to the outdoor exhibition area located at the lowest level. Direct access is thus provided to all the exhibitions. The ramp also serves as a short-cut route through the secondary exhibition structure.

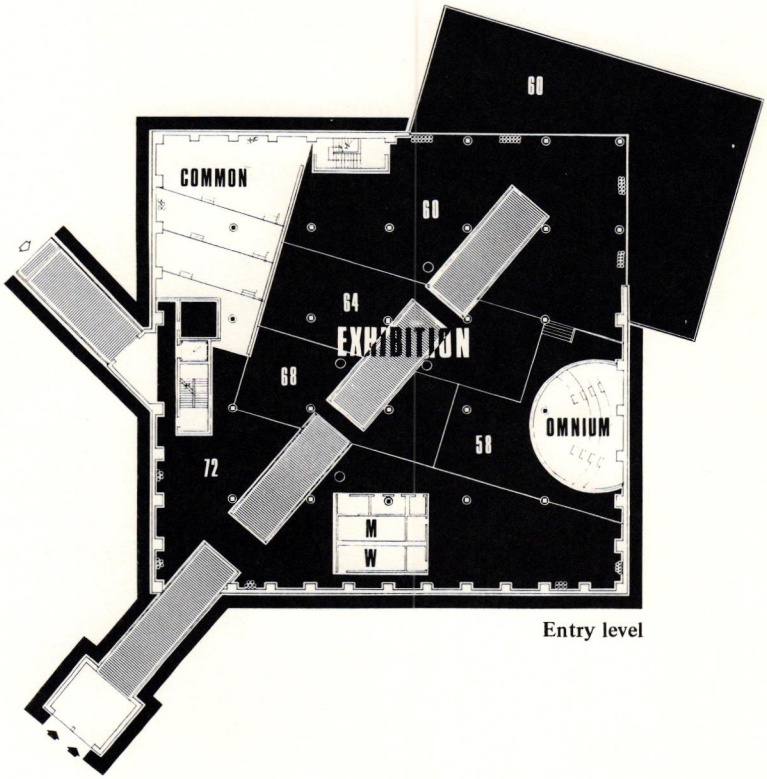
The multi-leveled exhibition space is designed to give access by half-levels to a flexible unit scaffolding that contains and defines each exhibition, thus eliminating the need for permanent partitions. "Who Am I?" will form the theme of the first presentation designed as "An Intelligent Environment." It will be organized to permit random circulation throughout and will be changed periodically to accommodate new exhibits and new ideas. The exhibition will be brought to life by the participation of the children who will modify it by their active presence.

The site plan (right), interior plans and collage (overleaf) give an indication of how spaces will function in the new Brooklyn Children's Museum. Two elements used here, sewer culverts and grain bins, are also employed in *New Learning Spaces & Places* as housings for learning experiences.





Lower level



Entry level

ADDENDA

The basic module of school construction is the classroom containing a teacher and 20 to 30 students. At some future time the module may become the individual student in his study carrell equipped with teaching machine, TV unit, and various information retrieval devices connected to a central computer.

Sommer, 1969
Personal Space

My mother always wondered why I didn't know any history or geography . . . She blamed it on "progressive education." She said that when she was in school they taught those things and now all they teach is social studies . . .

VIVA, 1971
Superstar

A Brief History of Learning in America

Horace Mann and John Dewey advocated a liberal education and learning by inquiry and investigation. Their theories were not widely understood and by mid-century, the institution of the school as sole educator held its own.

In 1642 the Massachusetts Bay Colony passed a law requiring apprenticeships for all children not otherwise occupied in learning or in labor "profitable to the Commonwealth." The same law insured the materials and tools for these apprenticeships. This first education law in America makes no reference to books, schools, teachers, or buildings. More than 300 years later, the Parkway Program in Philadelphia was hailed as revolutionary in its concept: "There is no school house, there is no separate building; school is not a place but an activity, a process . . . Where do the students learn? In the city. Where in the city? Anywhere and everywhere."[1]

The history of American education is closely tied to the history of the United States. Although the first formal step and the current trend share a community-oriented approach, this does not imply that the history of American education is static; rather, it has drawn an elaborate circle, only now arriving at its beginning point, which was established on pragmatic grounds.

Religion was the underlying motivation for educating the young in the Colonial period. The goal was the ability to read the Bible. The "textbooks" were the catechism, the Psalter and the Primer, which taught the alphabet through the now familiar rhymes, "In Adam's fall, We sinned all," and "Job feels the rod, Yet blesses God." The customs of the colonialists' mother countries were adopted and thus the practice of apprenticeship flourished.

It was not until after the American Revolution that education became an ongoing national concern. The ideas of the Declaration of Independence set the tone for public education, and national rather than religious concerns became the motivating force behind the education of children. To maintain the Union, preserve liberty, promote a good citizenry, preserve the natural equality of men – these were the goals of education. However, the ideal of free schools open to all was not realized during the Revolutionary period. Individual states gave education minimal financial backing and laws providing for schools were not enforced.

National priorities began to change in the 19th century and public education gained a more prominent position. With the Industrial Revolution and the formulation of labor unions came the need for a skilled, classless society. The election of Andrew Jackson epitomized this change in the national mood; the workingman and frontiersman gained a powerful new voice. Prior to this, the formal schools which had flourished were Latin schools, almost exclusively private, organized to prepare boys for Harvard and other universities. Public schools taught only minimal reading, writing, and arithmetic. With the westward movement and the elevation of the common man came new ideas and experimentation in education.

From 1806 to 1853 the Free School Society flourished. This was an organization of private schools in which the Lancasterian, or monitorial, system was used. It was an economical system designed to educate large numbers of students by rote, with one teacher instructing several older students who in turn would teach others. The strict punishments, stiff competition, and harsh pseudo-military order enforced by the monitors brought the Free School Society and Lancasterian system to an end when Pestalozzi, a Swiss educator, introduced his ideas of individual development and learning through concrete experience to America.

The mid-19th century was a period of enlightenment for public education in America. Horace Mann and John Dewey advocated a liberal education and learning by inquiry and investigation. Their theories, seriously re-examined in recent years, were not widely understood, and by mid-century the institution of the school as sole educator held its own. The concept of the Massachusetts Bay Colony and the system of apprenticeships and religious instruction at home were gone.

Textbooks, the manufacture of school furniture, and books on teaching evidence this change in the concept of education.

Americans were proud of their schools. In 1868, an international exposition of prototypical schoolhouses was held. The report issued by the U.S. Government Printing Office concludes:

> In considering the question with these, and only these, specimens before me (Swedish, Prussian, Swiss, American), as to what, if anything, can be learned from other nations in the way of constructing buildings, or rooms, for educational purposes, I am forced to the conclusion that we can learn nothing to advantage, but, on the contrary, that other nations, if they choose, may learn from us.[2]

The report applauds, in particular, the lighting and ventilation of the one-room schoolhouse. The furnishings as well were judged superior:

> In the American schoolhouse, the desk and seat of each pupil is distinct and separate, and both are fitted up with a special view to comfort as well as convenience. Not only are they comfortable and convenient, but neat withal, and the most thoughtless or mischievous pupil would never think of using his penknife to deface either.[3]

This prototype schoolhouse, called the Common School, served a range of ages. Its goal was the Americanization or cultural unification of emigrants in eastern cities and in the new western settlements. Publicly supported and open to all children, the Common School instilled nationalism, provided a utilitarian education for the rising middle and working classes, and ensured the American dream of social improvement and economic development for all.

The School also saw itself as a moralizing force. Massachusetts law of 1853 reads:

> . . . all instructors of youth shall exert their best endeavors to impress on the minds of children and youth committed to their care and instruction, the principles of piety, justice, and a sacred regard for truth, love to their country, humanity and universal benevolence, sobriety, industry and frugality, chastity, moderation and temperance, and those other virtues which are the ornaments of human society . . .[4]

Free public education was not accepted without fear and criticism: cost to the public, loss of ethnic identity, obliteration of classes, political take-over through brainwashing by government-funded schools, godlessness in schools where religion was not taught, were all real concerns and grounds for controversy.

Nevertheless, the Common School held its ground. By the 1890s, free town libraries were commonplace, Froebel had introduced the kindergarten, male suffrage had been established, the commercial and industrial boom allowed children the luxury of school rather than work, and most states had compulsory school attendance. (Massachusetts was first, in 1852; Minnesota in 1885; Mississippi last, in 1918.) During the years from 1880 to 1920, public education was made available to all American youth, girls as well as boys. Transportation, books, supplies, and lunches–all provided through the schools–made schooling through the secondary level accessible to all socio-economic classes, rural and urban.

By 1930, the Comprehensive High School was the typical structure for secondary education. The school itself became a microcosm of the community; within its walls, the student was to learn about the world beyond. In one high school, vocational, liberal, and college preparatory curricula were offered. Extensive facilities were necessary and the high school building became a huge megastructure. The school became an intermediary through which the student learned. During World War II, "life adjustment" education was introduced into the Comprehensive High School. The major goal of secondary education was pinpointed at a 1947 education conference in Chicago, as the "training of citizens" by offering a wide range of subjects aimed toward the social and cultural integration of students of different abilities with differing goals. In 1959, James Conant, in *The American High School Today*, expressed satisfaction with the Comprehensive School. But in 1961, in *Slums and Suburbs,* he recognized its breakdown. The suburban school had become entirely academic, the urban slum school, vocational. The Comprehensive High School was no longer a viable form in concept or practice.

Judith Hoos

1. John Bremer and Michael von Moschzisker. *The School Without Walls,* Chicago: Holt Rinehart & Winston, Inc., 1971, p 277.
2. *Report on School Houses and the Means of Promoting Popular Education,* Washington D.C.: Government Printing Office, 1868, p 6.
3. *Ibid.*
4. Christopher C. Andrews, *Reflections on the Operation of the Present System of Education.* Boston: Crosby, Nichols and Co., 1853. Mass (Rev. Stat. Chap 23 section 7), pp 10-11.
5. Bremer, p 4.

Curriculum Profile: 1880–1970

Today's high school program appears to be quite different from its 1880 counterpart. The addition of special programs for the handicapped, of extra-curricular activities and benefits, and of electronic teaching techniques accounts for the differences. However, these differences in appearance are somewhat superficial. In fact, few changes have occurred in the basic curriculum of secondary education over the past one hundred years. Essential requirements for graduation have remained fairly constant.

However, it is incorrect to assume that the same course title in 1880 and 1970 indicates that the same material is being presented for the same end. Vast changes in the social scene over the past century, the rise in the educational level, and the changes in occupational patterns beg the question: have the processes and goals of education changed?

In 1880, a sequence of courses in geography could attempt to cover a majority of the available facts in and surrounding the field; the known universe was small, defined, and comprehensible. Today, however, one would not try to encompass the infinite directions and implications of geography or any other discipline in a series of classes; rather, an educator would concentrate on the questions to pursue and on the methodology or processes to be employed for such investigations. Knowledge has never been a consequence of an accumulation of facts. To comprehend and deal with the vast universe of the 20th century, a solid foundation curriculum remains essential. However, this foundation which was the end product of the 1880 educational process, is now a tool in the process of education.

Have the goals of the present educational system changed to correspond with today's challenges or are mathematics, languages, and science still being presented as ends in themselves? Has the conceptual change in teaching and learning methods necessary to facilitate this conceptual change in educational goals occurred? A list of course titles is no more than a clue. The answer lies in an assessment of the learner's ability to use basic skills and processes as the means toward the development of a flexible and creative mind.

Minneapolis Public High Schools
Constants:

Latin
German
English
American literature
English literature
Algebra
Plane geometry
Advanced algebra
Solid geometry
Physics
Chemistry
Trigonometry
Civics
World history
Geography
Home economics
Manual training

Additions to core curriculum and supporting programs by 10 year intervals. If a course was dropped at a later date, that year is indicated in parenthesis following the entry.

1880

Greek (1910)
Rhetoric (1910)
Penmanship (1910)
Astronomy (1910)
Botany (1910)
Entymology (1910)
Natural philosophy (1910)
Mental philosophy (1910)
Evening education for English and Citizenship
1885–Compulsory attendance for ages 8–16 for 12 weeks of the year, 6 of which must be consecutive.

1890

Cooking
Classes for the deaf

1900

Ungraded school for delinquents
Summer school
Sewing
Physical culture and hygiene

Medical exams and smallpox inoculations given to students
1909—Compulsory attendance for ages 8—16 for the duration of the shortest term offered or demonstration of knowledge through the 8th grade level

1910

Zoology (1920)
School for the handicapped
Vocational high schools
Agriculture classes
1st swimming pool
School lunch program

1920

French
Norwegian
Swedish
Spanish
Industrial history (1930)
Economics
Art
Music
Commercial course
3 yr. junior high initiated
Part time classes for working students
State and county aid to special education
Eye, dental and heart clinics, with free glasses and toothbrushes to needy
Transportation for physically handicapped children and for children living in outlying areas

1930

Public speaking
Newspaper writing
Debate
Modern drama
Sociology

1940

Creative writing
Vocational evening schools

1950

Radio workshop
Physiology (1960)
Occupational relations (1960)
Library courses
Team teaching initiated
Homogeneous grouping of students
TV used in teaching
Cooperative program-courses related to afternoon job in technical vocational courses
1959—Compulsory school attendance for ages 7—16 for a maximum of 10 months or demonstration of knowledge through the 9th grade level

1960

Mass media
Visiting poets in schools
Twin City Talented Youth summer program
Modular scheduling of classes
Urban transfer program—voluntary shifting to improve racial balance
Minority task force established
Indian Affairs consultant hired
Community use of school buildings
Summer school for educationally disadvantaged

1970

Speed reading
Best sellers
Film study
Leisure reading
Semantics
Russian
Calculus
Math analysis
Science of life
Science of energy
Science of matter
Psychology
Area studies
History of labor
School broadcasting to classrooms and community
Automated pupil accounting system (roll)
Urban Arts Program
Work program for handicapped
Time sharing computer terminals
Mobile learning centers
Alternative schools
Lunch program for senior citizens at school sites
Color video recorders and receivers in use
Involvement of city parks to teach surveying
Involvement of HUD and craftsmen to learn building skills
Dance
Role of women in society
Courses in transportation careers
Teacher center opened

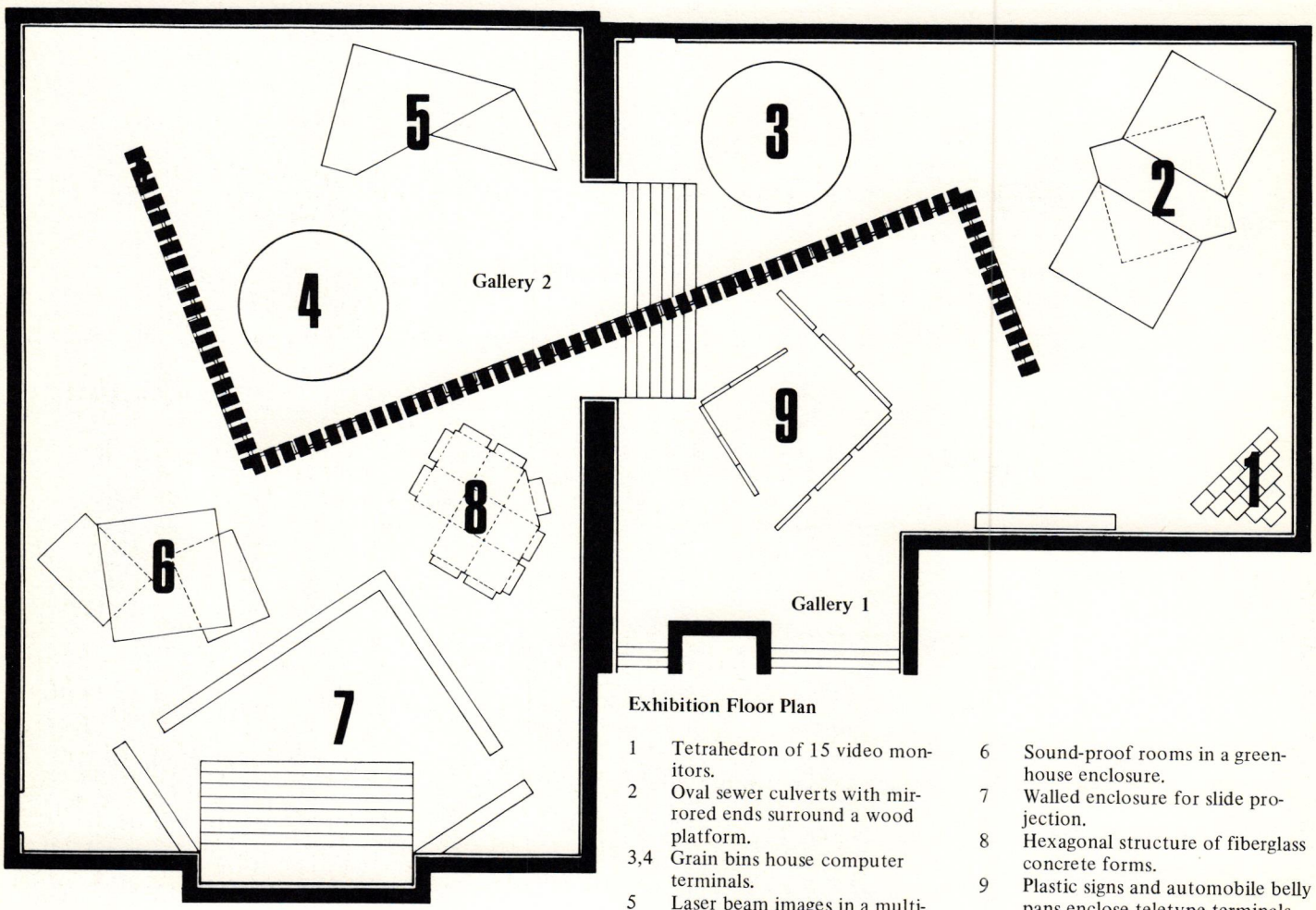
A Conference on Learning

To develop a solid basis for the ideas expressed in *New Learning Spaces & Places,* a two-day conference on physical facilities and learning was held at Spring Hill Conference Center, near Minneapolis, in March, 1973. These sessions involved a broad range of professionals—designers, architects, educators, media experts—whose collective experience in working with learning environments gave us a core of data and opinion on which to build ideas for the exhibition.

Participants:

Robert Bartholomew, Assistant Professor, Northern Illinois University, De Kalb
Ronald Beckman, Director, Research and Design Institute, Providence, Rhode Island
Ann Burns, Graduate student, Wells College
Robert Crawford, President, Spring Hill Conference Center
Sue Christopherson, Instructor, Urban Design, University of Minnesota
Donald Ferguson, President, Telecom Associates, Montreal
Mildred S. Friedman, Editor, *Design Quarterly*
Hugh Hardy, Architect, Hardy Holzman Pfeiffer Associates, New York
David Lewis, Architect, Urban Design Associates, Pittsburgh
Walter Netsch, Jr., Architect, Skidmore, Owings & Merrill, Chicago
Nathaniel Ober, Superintendent, Amityville Public Schools, Long Island
Harry Parnass, Architect, General Urban Systems, Montreal
Robert Propst, President, Herman Miller Research Corporation, Ann Arbor, Michigan
Michael Schunk, Photographer-filmmaker, Minneapolis Public Schools
Marvin Tenhoff, Director of School Building Planning, Minneapolis Public Schools

A z-shaped wall bisects the two galleries and is the information spine of the exhibition, containing thousands of books, CBS newsclips on videotape, photographs, school furnishings and memorabilia. Billboard-size photographs of the learning environments described on pp 41-72 cover the peripheral gallery walls along with quotations about learning. Housings for the nine learning experiences are described below. (See p 13 for content of learning spaces.)



Exhibition Floor Plan

1 Tetrahedron of 15 video monitors.
2 Oval sewer culverts with mirrored ends surround a wood platform.
3,4 Grain bins house computer terminals.
5 Laser beam images in a multifaceted environment.
6 Sound-proof rooms in a greenhouse enclosure.
7 Walled enclosure for slide projection.
8 Hexagonal structure of fiberglass concrete forms.
9 Plastic signs and automobile belly pans enclose teletype terminals.

The City as Educator:
A Proposal for the Boston Public Schools

One quarter of Boston's school-age children will soon attend classes in places other than school buildings. A plan called "The City as Educator" is now being implemented which will tie the school system directly to the city's rich variety of resources. Art and science museums, the zoo and aquarium, performing arts schools, colleges and universities, the business community, and government agencies are among the participating resources. Many of these have been under-used and unexploited by the schools, but tied into the schools, they can provide a rich, first-hand, on-the-spot learning opportunity and at the same time revitalize the school system.

Children from kindergarten through high school will spend at least half their school years in resource centers. These experiences will not be field trips. Rather, The City as Educator redefines "school" and "schoolhouse." Pieces of the educational system will be located all over the city, built into or next door to existing institutions.

For example, the new Boston zoo is being built with this program in mind. The first phase of construction, a birdhouse, flight cage and migratory bird pond, will contain 2,000 square feet of special space to serve as the zoo-school resource center. Here, collections of bird and plant life will be accessible for immediate study as well as books, AV materials, microscopes, laboratory instruments, and furnishings for all kinds of teaching and learning.

Similar arrangements are being made with the Theatre Company of Boston, to teach theater arts; with the National Alliance of Businessmen and the Federal Reserve Bank, to teach the principles and practical operation of economics; and the Charles River Watershed Association, New England Aquarium and Boston Museum of Science, among others, to teach environmental studies. Utilizing the Boston Architectural Center, the Children's Museum, The Massachusetts Horticultural Society, and the Museum of Fine Arts, to name a few of the city's potential resource centers, many more disciplines can be studied at their source.

The City as Educator program will cost no more than the present school system. Instead of new school buildings, facilities at the resource centers will be built. No additional teachers will be needed since the centers will be staffed by regular teachers reassigned from their home-base schools, and by personnel from the partner institutions.

As the program is itself revolutionary in educational terms and in its celebration of the potentials of the city, its total implementation, slated for 1976, is altogether appropriate.

The Boston Commision on
Secondary Education

Bibliography

This bibliography is organized in four sections, dealing with aspects of education as reviewed in the catalogue. They are: 1) Human Resources, 2) Information Resources, 3) Physical Resources, and 4) a General Information category which lists journals and indexes. A cross section of the printed resources available on the subject of education, it is intended to provide suggestions and provoke thought on the various and changing aspects of the educational process.

1) Human Resources

Books

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