

TIMOTHY R. EDDY
Development and Expression.

P378
.Ed26

LIBRARY
MONTANA STATE UNIVERSITY
BOZEMAN

**DEVELOPMENT AND EXPRESSION
COTTONWOOD ACADEMY**

In presenting this thesis in partial fulfillment of the requirements for a degree at Montana State University, I agree that the Library shall make it freely available for inspection. I further agree that permission for extensive copying of this thesis for scholarly purposes may be granted by my major professor; or, in his absence, by the Director of the Libraries. It is understood that any copying or publication of this thesis for financial gain shall not be allowed without my permission.

Signature _____

Date _____

DEVELOPMENT AND EXPRESSION
COTTONWOOD ACADEMY

by

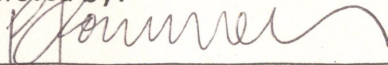
TIMOTHY R. EDDY

An undergraduate thesis submitted in partial
fulfillment of the requirements for the degree

of

Bachelor of Architecture

Approved by:



Peter Kommers, Thesis Advisor



Robert Utzinger, Director

MONTANA STATE UNIVERSITY
Bozeman, Montana

June, 1981

~~710.8~~
~~M76~~
EWD

P378
Ed26

For my family and friends

TABLE OF CONTENTS

Introduction	1
Statement and Text	3
Architectural Program	19
Site	31
Context	40
Project Documentation	50
Footnotes	60
Bibliography	62

Introduction

My intent in this thesis investigation is to discuss what it is that makes an architectural endeavor come together in my mind and on paper. I want this thesis to be a personal contribution and not an overall process investigation that might work universally. In fact, one of the items I am most skeptical of and fear the most are set methods and processes. This fear could be due to inexperience; but I don't think so. Things that become rote, as step by step processes often do, tend to become somewhat impersonal and make room for oversight where none can be accommodated. This sacred place is the realm of the idea and imagination. My earliest thesis conclusion is that even personal methodology should be applied very carefully and be kept very open to alteration.

In this thesis I don't intend to pass judgement on any approaches to architecture or the ideas behind them. I will attempt to present them as I understand and interpret them.

Thesis Statement

Program and context are often dealt with as pragmatic rational concerns. Ideas are often seen as intuitive things. Physical ordering devices, tangible things that need not be pragmatically determined, can be used to synthesize the rational and intuitive notions and provide a framework in which ideas can effectively be expressed.

Ideas

Imagination is more important than knowledge. For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution.

Albert Einstein¹

Ideas are the fruit of man's imagination; they are the documentation of his dreams. Ideas are the necessary intangibles of architecture. Throughout the ages these statements have been reiterated time and time again. Louis Kahn recognizes the value of the idea as the source of the final tangibles of architecture. He sums up the process from the intuitive to the tangible by relating Wonder and Realization. "With the sense of Wonder comes Realization. Realization is born out of the intuitive. Something must be just so, and it has a definite existence though you cannot see it. You strive because that existence makes you think of what you want to express, you make a distinction between existence and presence. When you give something presence, you have to consult nature, and that is where Design begins."² Paul Jacques Grillo puts it forth in a narrower manner: "The idea, suggested by the program, may be strong or weak, commonplace or brilliantly original, clever or poor. But *no creative work has any value if it does not represent an original idea.*"³ Now that we realize that without "an original idea" our work has no value. It seems that architecture must be the resting place for the ideas of the architect. This must be the *built conversation*.

This uniqueness described by Grillo is a somewhat widespread position believed by many to be true. I am rather suspect of uniqueness for its own sake. This striving for a uniqueness of creativity often leaves behind the inherent importance of pragmatic concerns and constraints in architecture. In my opinion the uniqueness is a small portion of the creative value of an architectural endeavor.

Kahn seems to equate man with his vision of the idea. Man becomes an intangible in Kahn's statement: "There is nothing about a man that is really measurable. He is completely unmeasurable, and he employs the measurable to make it possible for him to express something."⁴ We can now feel comfortable with man's insatiable desire to express himself since he is made of the same "*substance*" as ideas. If we were to say that man is made of his own dreams and he takes his desire to express and makes architecture with it; it would seem plausible that the architecture is the manifestation of those ideas and dreams.

Now that we have the architect out of the way and we have his *built ideas* in front of us we are confronted with the user. Whether or not the user can relate to the ideas and dreams of the architect, he too is made of similar intangibles. How do we accommodate the ideas of the user? It is illogical to excuse the architect's ideas and allow in only the user's when a facility is in its developing stages. The variable of time eliminates both the original users (possibly even the original uses) and the architect. The ability of a piece of architecture to accommodate dreams and ideas (that is, what man is made of) over the variable of time is most important. This is not a plea for universal space as in the Modern Movement but for something much richer and deeper.

Architecture should not be seen as only a manifestation of the dreams and ideas of the architect but as a framework within which the user can realize his own imagination, dreams, and ideas. Hence it is not only the desire of the architect to express that must be satisfied but also the user's longing for expression that must be accommodated.

... , if I were asked to name the chief benefit of the house, I should say: the house shelters daydreaming, the house protects the dreamer, the house allows one to dream in peace.

Gaston Bachelard⁵

Metaphors

For one to enter into any discussion of the synthesis of the rational and intuitive in the forming of a framework for the expression of ideas in architecture one cannot avoid reference to the relation between metaphors and models.

A dictionary definition of metaphor reads as follows: "A figure of speech in which a term is transferred from the object it ordinarily designates to an object it may designate only by implicit comparison or analogy."⁶ Charles Jencks claims that most current attempts to use metaphors in architecture are somewhat anthropomorphic in nature. He cites Stanley Tigerman's Daisy House, mapped with parts of the male and female anatomy, as an example of this anthropomorphism. Jencks then cites Michael Graves' devout attention to human scale and perception in the design of doorways, windows, and etc. . . . as a less blatant use of an anthropomorphic metaphor.⁷ Jencks goes on to say that, "In architecture, to name a metaphor is often to kill it, like analysing jokes."⁸ In the more obvious cases, that has obviously been done. The metaphor becomes static after a short while and dies.

Metaphors have been used as architect's tools throughout the ages. The simplest and most universal ones seem to cause the largest problems. We are still being subjected to Modern Movement architecture developed with the machine metaphor. It was just too simple and too universally adopted to provide the opportunity for the kind of richness that incites a user's imagination rather than his temper.

All too often an architect is groping for something that is not there when he uses a metaphor too literally. The literal approach seldom works and most often produces an intellectually decrepit building. Hence, Robert Venturi's "Duck" is realized. Where metaphors are used it seems that a safer and more valid approach than putting too much weight on one image is to have several metaphors of which none are too literally interpreted. This *non-obviousness* can only add to the richness of the architecture and fuel the user's dreams and interpretations.

Models

Models are used for more direct architectural referencing than are metaphors. Although some architects may never use metaphors it is safe to say that all have used models to some extent. Almost all architects research situations similar to ones they are presented with and sometimes reinterpret parts of the past solution into their own solution. Models are used in several different ways to varying degrees.

The direct replication of buildings as is done by fast-food outlets and suburban home buildings need not even enter this discussion. So little thought is given to the usage of these universal buildings that it is questionable whether their repetition should even be thought of as modeling.

Examples of almost direct replication are available throughout the revival periods of architecture. Chiswick House, a Palladian revival building in England, built by Lord Burlington, is quite similar to Palladio's Villa Rotunda built almost 160 years earlier in Italy. Though Chiswick House is not an exact replica the modeling from the earlier building is very obvious in both form and intended meaning.

Modeling out of context is similar to the type of modeling done in the case of Chiswick House except the meanings are changed. The nineteenth century classical revival brought classical elements out of context and adorned the facades of banks, schools, and governmental buildings with them. Architecture that originally meant *temple* was interpreted as a sort of homage to democracy, education, and the fidelity of our financial institutions. This borrowing of elements changes their original meaning and attaches new meanings.

A more pluralistic approach to modeling employs a type of combination model-metaphor. Here the architect researches past solutions to similar situations and attempts to glean from these solutions tangible elements and configurations with inherent symbolic values. He then reinterprets these elements and ideas into an architectural language of his own. Often a model is interpreted rather literally in an attempt to bring the metaphors and ideas present in the model to the surface in the situation at hand. In a desire to create a rich and suggestive architecture a number of divergent models are interpreted to varying degrees of expression.

Context as a Model

Context provides some of the most important models to be applied in an architectural endeavor. Context not only involves the architectural typology of an area or region and a site's specific features but also time.

A response to context is crucial in a society as mobile as the one we live in today. Without it, all sense of an individual's identity might be lost. In Aldous Huxley's book, *Island*, about the forbidden island of Pala the mynah birds are taught to say, "Here and now, boys," and, "Attention," so that one does not forget to pay attention to what's happening. And that's the same as not being here and now."⁹ Contextual response in architecture should be an attempt to remind the user of his environment and bring him into the *here and now* of his particular situation.

It is the response to the context of a locality that knits a building into that locality. Christian Norberg-Schulz relates the phenomenon of *place* to locality in the following statement: "A concrete term for environment is *place*. It is common usage to say acts and occurrences *take place*. In fact it is meaningless to imagine any happening without reference to a locality. Place is evidently an integral part of existence."¹⁰ He goes on to relate architecture even more deeply to its context and environment by saying, "The existential purpose of building (architecture) is therefore to make a site become a place, that is, to uncover the meanings potentially present in the given environment."¹¹ The goal of architecture should be to strengthen existing context and regionality rather than dilute it. This is not to say that we should limit ourselves to contextual copying. Existing symbols and identity should be used as models to help a building take place in its locality.

The context of architecture as it relates to the variable of time supports the desire to bring the user into the *here and now* of his situation.

Architecture has always been the chronology of history. Wright felt that "Every great architect is—necessarily—a great poet. He must be a great individual interpreter of his time, his day, his age."¹² Unless compared to the architecture of yesterday, the architecture of today does little to put us into our own time frame. The architecture we are creating now will project those who use it in the future into their own time frame.

Appropriateness

Architects have at their disposal limitless sources of metaphors, models, and contextual input. The difficult question remains; to which should he respond? Which metaphors, models, and bits of contextual information are the appropriate ones to use in the formulation of ideas in a particular situation? The chosen components, both tangible-architectural and intangible-esoteric, are the building blocks for a formalizing framework.

It should be understood that an architect needs to know why he adopts certain metaphors and models, whether or not he ever tells the client. The client and user may never know for sure what metaphors and models have been used, it is possibly best if they don't. The user's understanding should come from his delight.

At the heart of Kahn's architecture there is a link to a concept he calls "Volume Zero". The essential whys and wherefores of a form or idea lie at its birthplace, described in the volume that was never written, *Volume Zero*. Bachelard refers to a deep primitiveness in "the humble home, . . . a primitiveness which belongs to all, rich and poor alike, if they are willing to dream."¹³ If it is true that all people have in common an understanding of this primitiveness then *Volume Zero* is indeed one of the keys to the appropriateness question. If a metaphor or model is still understood and seems appropriate in its primitive sense then there is a good chance it will when it is reinterpreted.

It has become obvious that appropriateness relates to the accommodation of many models and metaphors. Robert Venturi feels that "A valid order accommodates the circumstantial contradictions of a complex reality. It accommodates as well as imposes."¹⁴ This inclusion allows the architect a multitude of models and metaphors to choose from but the creative task of what to ignore and what to include rests upon his shoulders alone.

Synthesis

It is our desire to synthesize these metaphors and models into a comprehensible whole. Norberg-Schulz describes a three step process man uses to relate man-made places to nature. He *visualizes* his comprehension of nature by building in its image and fills in the gaps by *complementing* the situation at hand. Then he symbolizes his comprehension of nature. The meaning is relieved from the instance at hand by symbolizing and creating a "cultural object" which may be moved or become part of a more complicated situation. "All of the three relationships imply that man *gather* the experienced meanings to create for himself an *image mundi* or *microcosmos* which concretizes his world. Gathering evidently depends on symbolization, and implies a transportation of meanings to another place, which thereby becomes an existential 'centre'."¹⁵ Norberg-Schulz realizes the steps of visualizing, complementing, symbolizing, and gathering as the basis for the concept of *genius-loci*, the individual nature peculiar to a man-made *place*.¹⁶

One must avoid the mistake of thinking that the tangible framework comes first and the idea is mysteriously injected into it. Allowing for a certain amount of mystery as to their assemblage the ideas and the framework must *become one* before the injection of either into a semblance of built form.

We are trying to synthesize a whole similar to Venturi's "difficult whole." "The difficult whole in an architecture of complexity and contradiction includes multiplicity and diversity of elements in relationships that are inconsistent or among the weaker kinds perceptually."¹⁷ Our goal is a valid, inclusive synthesis of components both strong and weak, tangible and intangible. No set methodology or process will synthesize these components.

The creative act of the architect, his reinterpreting of various models and metaphors into something tangible is a step toward the whole. Synthesis is the creative melting pot of metaphors and models. The *idea* is not a singular entity but an esoteric embodiment of the synthesis of metaphors and models into a physical ordering framework. The creative act of synthesis becomes the idea.

Approach

I intend to begin the construction of a framework for the expression of ideas by gathering. I will gather not only the appropriate pragmatic information but also I will gather images, both architectural and non-architectural. I have images and experiences gathered throughout my life, stored in my memory, that cannot avoid being included.

I will evaluate these images as to their appropriateness as models and metaphors for the *Cottonwood Academy*. Together with the pragmatic information I will use the adopted metaphors and models in the formulation of a faceted idea and subsequent to that a tangible-architectural framework.

Cottonwood Academy

The chief medium for learning and exploration in a school is the imagination. If one were to name a theme basic to the conception of a school it would be the idea. A school should be a place for ideas to exist in a transient state, the students being the real dwelling place for the ideas. If it is the architect's position to create a framework for ideas this is only amplified in the case of a school. The school wants to be a place for intense dreaming.

The Greek word *skole* and the Latin word *scola* both mean leisure. The English equivalent of these two words is *school*. School, our learning place, does not necessarily mean school, but leisure.¹⁸ When an architect conceives a school it should be a place for leisure, not leisure in the normal American suburban sense, not the weekend trip to the beach or mountains; but leisure as a constructive state for the mental worker.

"Compared with the exclusive ideal of work as activity, leisure implies (in the first place) an attitude of nonactivity, of inward calm, of silence; it means not being 'busy', but letting things happen."¹⁹ This suggests to the architect that the framework for a place of leisure, in this case a school, should be flexible and suggestive. This is not to imply that a school should be without spatial designation. A characterless void for the adventures of the mind needs to be avoided. The spaces themselves need to be flexible and not experientially ascetic, they need to incite and accommodate the dreams and ideas of the user to a high degree.

A school should be a place for leisure. It should be a place for letting things happen rather than forcing them. Imagination and ideas should be exalted in a school.

In reference to knowledge and its mysterious acquisition Louis Kahn made the following statement:

I am not impressed by education. Learning, yes. Education is something which is always on trial because no system can ever capture the real meaning of learning.²⁰

Schools, more often than not, accommodate a simple *education*, a cycle of ingestion and regurgitation that often quells the ripples of the imagination. The concept of leisure as a basis for learning relies on the imagination rather than rote. The flexibility

and suggestivity of the architecture of a school should draw the spiritual climate of the place toward freer thought and more learning.

The architect is committing an act of bravery when he attempts to create a suggestive environment with a school rather than creating a void for teachers, books, and pupils. This act of bravery can allow the ghosts called ideas to inhabit the architecture.

Historical Background

Kahn traces the history of schools back to a time when a school was a man sitting beneath a tree "discussing his realization" with others. The man did not know he was a teacher and the others did not know they were students. The offspring of those students urged their offspring to listen to the same sort of man. From this small beginning came the erection of the first schools and from that, what we have today evolved. Kahn contends that the "existence-will" existed even before the man sat beneath the tree. From this he concludes that "the beginnings of any established activity is its most wonderful moment."²¹

Formal education has been with us in America since colonial days. The first educational goals were religiously oriented and after the revolution they become more oriented toward a type of nationalism.

Several formal private schools were founded on the East Coast shortly after the American Revolution. *Phillips Exeter Academy* was founded in 1781 in New Hampshire. In 1797 *Deerfield Academy* was founded in Massachusetts. *Exeter* and *Deerfield* are two of the oldest and most highly regarded private boarding schools in the United States today. Compared to this the founding of boarding schools in the Rocky Mountain region has occurred recently. There are only a few existing and most are founded in the mid-1900s. The *Colorado Rocky Mountain School* in Carbondale, Colorado, is relatively representative of the boarding schools of the region and it was founded in 1951.

Educational Program

In my research of private boarding schools I investigated nine schools on the East Coast and two in the Rocky Mountain region. The educational program of the *Cottonwood Academy* is not patterned after any one school in particular. It is intended to be a hybrid of several schools.

Kahn felt that there were three inspirations served by institutions: "the inspiration to learn, the inspiration to meet, and the inspiration for well being." Through these inspirations, institutions serve "the will to be, to express." According to Kahn this is "the reason for living."²² The nurturing of the will to express is a major goal of *Cottonwood Academy*. The goal of the architecture is to provide a suitable framework for this expression of the school community's individual ideas. A community of youth and their mentors living, learning, dreaming, and growing together is the ultimate goal of *Cottonwood Academy*.

The foothill setting of the school provides an excellent opportunity for the investigation of many crucial issues at hand today. Being in close proximity to not only forest land and mountainous terrain but also in the midst of producing agricultural land provides a great opportunity for youth to begin to realize their position in the world in relation to food production and also the productive use and preservation of natural resources.

Mark Terry, a writer on environmental education, credits environmental education with two things: producing "an enlightened electorate" regarding the "Management and understanding of natural resources" and instilling in youth the "Endowment of an appreciation for nature in our society."²³ *Cottonwood Academy* has the opportunity to excel in both of these areas due to its location.

The location provides the opportunity for the academic community to not only observe but to participate (on a small scale) in agricultural endeavors. The inclusion of an equestrian program lends the opportunity for direct relation to livestock and adds to the imagery of a *school in the West*.

A strong program of mountain sports (mountaineering, skiing, climbing, canoeing, backpacking, and etc. . . .) brings the community into direct contact with diverse natural environments. The intent of this contact is not purely recreational but to develop an appreciation for the limited natural resources involved and to give the school a unique appeal and educational mission.

The more traditional educational values will be dealt with also. It would be foolish to neglect the traditional educational concepts since that are what the world operates by.

This program of traditional elements combined with a strong environmental education thrust and a wide ranging outdoor recreational program cannot fail to prove popular to many youth and their families.

There will be provisions (co-educational) for one hundred boarding students and twenty day students in grades nine through twelve. A small number of students helps to provide a closeknit community. Each student is needed to keep the school operating, so each student feels really needed.

Students will be held responsible for a great deal of the janitorial, maintenance, and general upkeep work required. This inclusion of the students in work projects is not only to instill community responsibility but to keep the cost of tuition, board, and room at a reasonable rate.

A faculty to student ratio of less than one to ten will be achieved by using department heads for eight general areas of study and staffing six to ten supportive faculty members. The effective ratio can be bolstered by employing multidisciplined faculty. The one to ten faculty to student ratio is about half that of a typical public school.

The format for academic discussion and investigation will be centered around small groups, eight to fourteen students to a group. This system is patterned to some extent after the *Harkness Classroom* concept at *Exeter*. The *Harkness Classroom* consists of "twelve to fourteen students and a teacher seated around a table for the purpose of forming and expressing ideas rather than dispensing and receiving information," Exeter equates this with a "Socratic" classroom.²⁴

To accommodate this system in the architectural program small seminar rooms will be provided rather than classrooms typical to a public school. Larger groups and assemblies will be accommodated in large communal spaces.

A boarding school should not be a place to set oneself apart from society. It should be a part of society from which the students and teachers can prepare one another to enter or re-enter different portions of society in a more understanding position. It should be a place to seek the road to self actualization.

A boarding school should not perform the same functions that a public school does. It should stress different things and present them in different ways. Economic status should not be the primary image of a boarding school. Cottonwood Academy will act as an alternative to public school in that it will offer community life, interdependence and stress the intensity of the learning experience.

Program

One need not redefine education to build a school. By building a school that has been conceived around the value of the imagination and the idea one may redirect education and learning to its investigative roots. The school forms the backdrop for learning.

The program will show some unique decisions and emphasis but it is not extraordinarily conceived. It doesn't want to do the whole job by itself.

LIVING SPACE

Space	Capacity	Schedule	Equipment	Area	Remarks
Student Rooms (10 rooms/dorm)	2	9:00 PM - 7:00 AM Intermit- tent use rest of day	2 beds 2 desks 2 storage closets 2 chairs	190 s.f.	Furniture must be movable A homelike atmosphere should be provided Escape windows * **
Student Baths (2/dorm)	1-6	Heavy use: 6:00 AM - 8:00 AM, 9:00 PM - 11:00 PM	2 lavs 1 shower 1 tub/ shower 2 toilets	120 s.f.	Avoid being too institutional * **
Laundry Room	1-2	Heavy use: 7:00 PM - 10:00 PM	1 washer 1 dryer 1 utility sink 1 ironing board	100 s.f.	Central location * **
Living Area	1-22	Heavy use: 9:00 PM - 10:00 PM	Table/chairs Casual seating	400 s.f.	Near entry and faculty apartment Fireplace *
Faculty Apt.	2-3		Main bedroom Bath Living/kitchen 2nd bedroom	650 s.f.	Living area suitable for entertaining students 2nd bedroom for child, student or guest * **
Storage				100 s.f.	
Entry, Circulation & Mechanical				15% = 490 s.f.	*Minimum of 2 exits

FACULTY HOUSING

Director Plant Supervisor	1500 s.f. each	Small three-bedroom dwellings
------------------------------	-------------------	-------------------------------

*Natural Light & Ventilation

**Sound Isolation

***View

****Outdoor Access

DINING

Space	Capacity	Schedule	Equipment	Area	Remarks
Dining Cafeteria/Banquet ** Style	110	7:00 AM - 7:50 AM 11:30 AM - 12:50 PM	Tables Chairs Dispensers Buffet	15 s.f./ person 2100 s.f.	Informal to elegant atmospheres Sense of procession at entry * **
Divisible Banquet	<u>+30</u> 140	6:00 PM - 7:00 PM	table space		Used for study also
Kitchen	8	6:00 AM - 8:00 PM	Cookers Dishwashing & waste area Cafeteria serving area	500 s.f.	Compact as possible **
Cook's Office	1-3	6:00 AM - 8:00 PM	Desk 3 chairs Storage	150 s.f.	Meal planning, organizational * **
Restrooms (2)	1	6:00 AM - 8:00 PM	1 water closet 1 lav. Clothes rack	50 s.f. each	* **
Storage			Walk-in freezer Walk-in cooler Dry storage	250 s.f.	Loading dock adjacent

INSTRUCTIONAL SPACE

Seminar Rooms (5)	12-14	7:00 AM - 6:00 PM	Conf. Table Chairs Projection & graphic space	300 s.f. each	Flexible space Framework for discussion and investigation of all types * ** ***
Biology, Environ-	4-18	7:00 AM - 10:00 PM	Greenhouse area Storage Experiment tables	700 s.f.	Room for large experiments * ** *** ****

INSTRUCTIONAL SPACE (cont.)

Space	Capacity	Schedule	Equipment	Area	Remarks
Chemistry Lab	4-18	7:00 AM - 10:00 PM	Storage Experiment tables	600 s.f.	* ** ***
Darkroom	1-5	7:00 AM - 10:00 PM	4 enlargers Communal sink	200 s.f.	
Photo Workroom	1-6	7:00 AM - 10:00 PM	Lockers Print washer & dryer	200 s.f.	
Language Lab	1-12	7:00 AM - 10:00 PM	Audio Stations Discussion space	320 s.f.	* ** ***
Computer Lab	1-8	7:00 AM - 10:00 PM	Computer 8 terminals	320 s.f.	** ***
Drawing Studio	2-12	7:00 AM - 10:00 PM	Desks Model platform Sink	380 s.f.	* ** ***
Ceramics/Sculpture Studio	2-12	7:00 AM - 10:00 PM	Sink Kiln 2 wheels Storage Work tables	380 s.f.	* ** *** ****
Print Studio	2-12	7:00 AM - 10:00 PM	Sink Presses	380 s.f.	* ** ***
LIBRARY					
Librarian's Office	1-3	7:00 AM - 9:00 PM Weekdays Sat. Mornings Sun. Evenings	Desk 3 chairs Storage Typing	150 s.f.	* **

LIBRARY (cont.)

Space	Capacity	Schedule	Equipment	Area	Remarks
Control Area	1-2	" "	Card files Reserve area	150 s.f.	Must have a view of as much of the library as possible Near entry *
Multi-Media Area	1-6	" "	Microfilm Audio library Copier Work tables	225 s.f.	**
Book Stacks	20,000 volumes @ 16/s.f.	" "	Shelves & ladders	1250 s.f.	High ceiling, lofty feeling with possible use of ladders for access to high shelves
Periodicals and casual reading area	1-8	" "	Periodical racks Seating	280 s.f.	More casual than study areas Sound separated—moderately * **
Study Carrels	1-20	" "	20 desks/ chairs @ 15 s.f. each	300 s.f.	* ** ***
Entry & Circulation				15% = 350 s.f.	* **

LECTURE HALL

Main Hall Stage/Backstage	20-200	Intermittent use through- out week. Dormant 10:30 PM - 7:00 AM	Theater/desk seats Sound system Theater Lighting	3000 s.f.	Stage and backstage complete must feel comfortable for small and large groups 2 exits minimum Stage entry
Projection Room	1-3	" "		100 s.f.	**
Restrooms (2)		" "	3 w.c. 3 lav.	120 s.f. each	* **

LECTURE HALL (cont.)

Space	Capacity	Schedule	Equipment	Area	Remarks
Foyer/Exhibition Space		" "		500 s.f.	Gallery space Works should be featured Ceremonial space 2 exits minimum * ***
Music Practice Rooms (4)	1-3	" "	Piano	180 s.f. each	* ** ***
ADMINISTRATIVE					
Administrator/ Director's Office	1-4	7:00 AM - 5:30 PM Weekdays	Desk 3 chairs Storage	150 s.f.	Relatively formal space * ** ***
School Secretary	1-4	" "	" "	200 s.f.	Relatively open, informal space * ***
Registrar/Director of Development	1-4	" "	" "	150 s.f.	Relatively formal space * ** ***
Filing Space	1-2	" "	Files Computer terminal	150 s.f.	Central location *
Conference Room	14-18	" " Evenings	Conf. table Chairs	300 s.f.	* ** ***
Faculty Offices (8 offices one/ subject area)	1-2	7:00 AM - 5:30 PM Weekdays	Desk 2 chairs Storage	120 s.f.	Not necessarily located all together * ** ***

ADMINISTRATIVE (cont.)

Space	Capacity	Schedule	Equipment	Area	Remarks
Faculty Cubicals	1-2	" "	Desk/chair Storage	60 s.f.	Not necessarily located all together *
SPECIAL					
Infirmary					Basic quarantine and first aid
Examination and First Aid	1-3		Storage Exam table Sink	150 s.f.	* **
Overnight Rooms (2)	1		Bed Chair Closet	90 s.f. each	* ** ***
Bath	1		Tub/shower Lav. W.C.	50 s.f.	* **
School Store	1-6	Weekday Afternoons	Storage Money handling Display	250 s.f.	Sundries and some supplies (along the line of a newsstand) Vending
Lounge	1-20	6:00 AM - 10:30 PM	Casual seating	300 s.f.	* ***
ATHLETIC					
Gymnasium		6:00 AM - 10:30 PM	Backboards Etc.	84' x 50' 4200 s.f.	*
Circulation		" "	Running track	2000 s.f.	*
Handball Courts (2)	2-4	" "		23' x 46' 1058 s.f. each	Provide gallery for small group of spectators
Dressing Rooms (2)	25	" "	75 lockers Benches 4 showers	1000 s.f. each	*

ATHLETIC (cont.)

Space	Capacity	Schedule	Equipment	Area	Remarks
			4 w.c. 4 lavs. 1 sauna		
Director's Office	1-3	" "	Desk 3 chairs Storage	150 s.f.	*
Laundry	1-4	" "	Large washer Large dryer Utility sink Storage	150 s.f.	
Exercise Room	1-6	" "	Weight machine Exercise equipment	400 s.f.	* **
Whirlpool Area		" "	Small therapy Whirlpool	300 s.f.	* **

OUTDOOR

Tennis Courts (2)				60' x 120'	
Large Multiuse Playing Field					Double as ice rink in winter
Amphitheater	Seating for 50		Small stage Seating		Used for small outdoor gatherings, lectures and presentations

EQUESTRIAN

Stalls (12)	1 horse ea.	24 hours	Automatic waterer Feed and mineral dispensers	12' x 12' each	Covered South exposure
Paddocks (4)		Day use		16' x 40' each 640 s.f. each	Mesh wire fences, steel pipe

EQUESTRIAN (cont.)

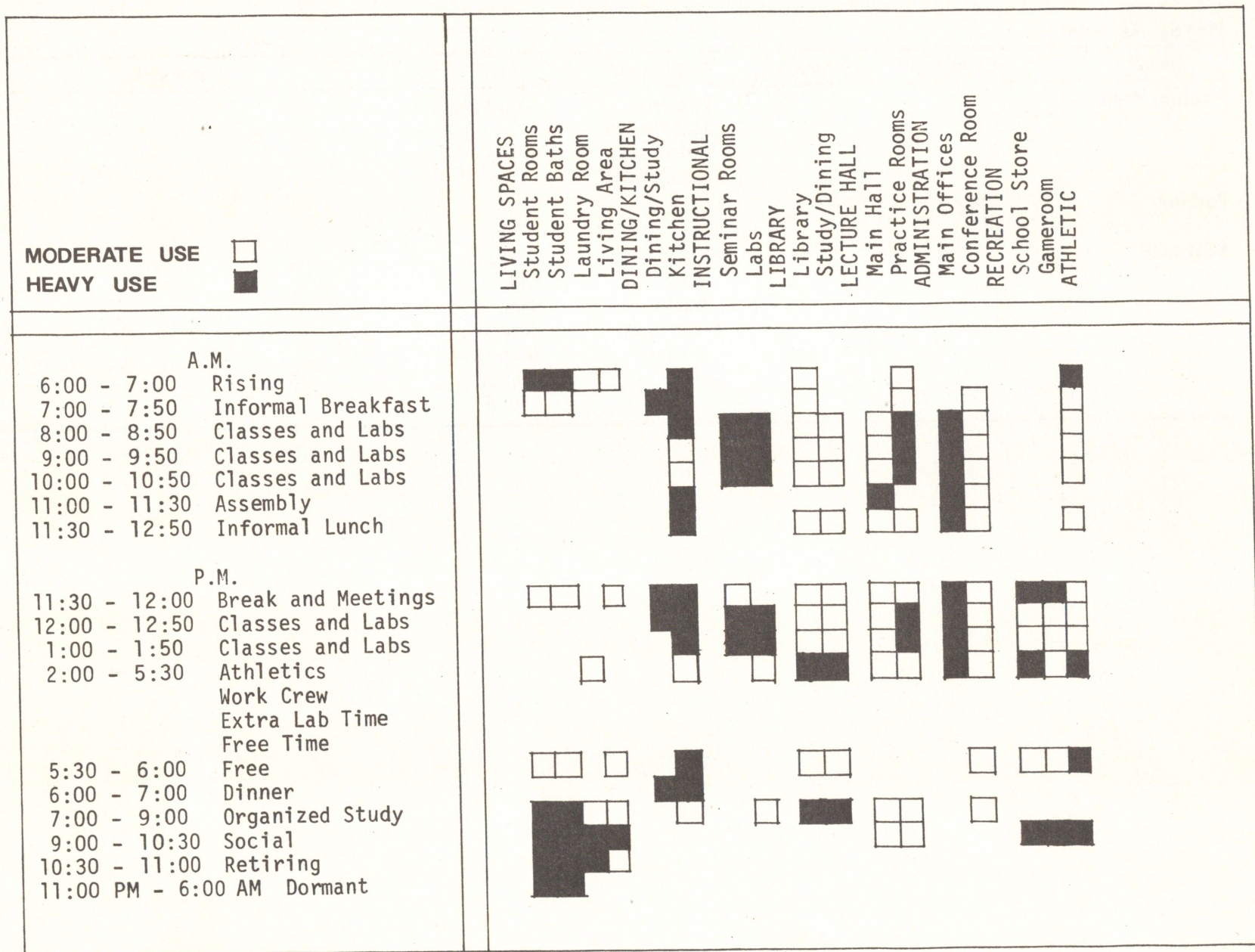
Space	Capacity	Schedule	Equipment	Area	Remarks
Training Ring		Day use		900 s.f.	Mesh wire fences
Tack Room				375 s.f.	Finished floor
Grooming Area			Wash rack Vacuum	360 s.f.	
Equipment Storage			Horse trailer Skid steer loader Hand tools Training equipment	12' x 16' 192 s.f.	Loader and tools inside Trailer outside
Feed Storage	5 tons straw 10 tons hay 300 bushels grain 500 lbs. supplements			16' x 20' x 16' - covered hay & straw 6.5 F ³ 30 s.f. sacks	Moisture and rodent proof

PHYSICAL

Garage			Van/bus 4x4 pickup 2 snowmobiles Utility vehicle Small maintenance tractor	1240 s.f.	Used as maintenance space for vehicles *
School Shop (Lab also)		7:00 AM - 6:00 PM	Woodworking Metalworking	500 s.f.	*
Restrooms (2)	1	" "	1 w.c. 1 lav.	30 s.f. each	*
Recreational Equipment Storage & Checkout		" "	Ski maintenance	400 s.f.	Backpacks, skis, etc.

PHYSICAL (cont.)

Space	Capacity	Schedule	Equipment	Area	Remarks
Heating Plant			2 boilers Coal feeders Distribution equipment	1000 s.f.	*
Parking	25 cars				
SEWAGE	200		Septic tank for each facility Sand filter & drain field	250 s.f. open sand filter/ 50 people 10,000 s.f. total	



TIME SCHEDULE

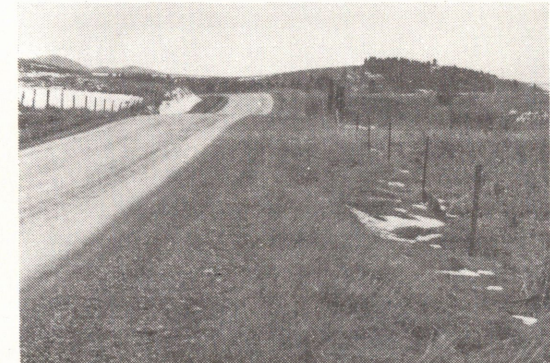
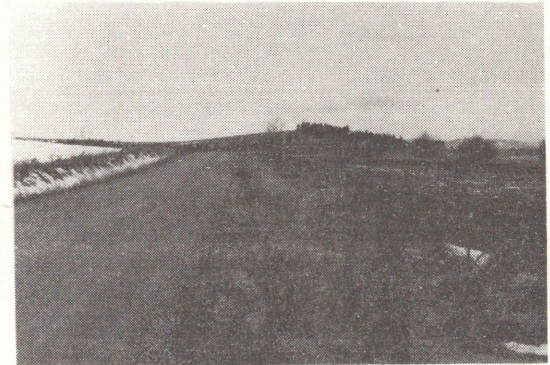
Site

The Montana landscape is a very unique and extremely special entity. The landscape speaks for an entire way of life. The land is so expansive that not even its small cities can begin to dominate it. The objects man puts on the landscape in Montana either work with it or against it, but none dominate it.

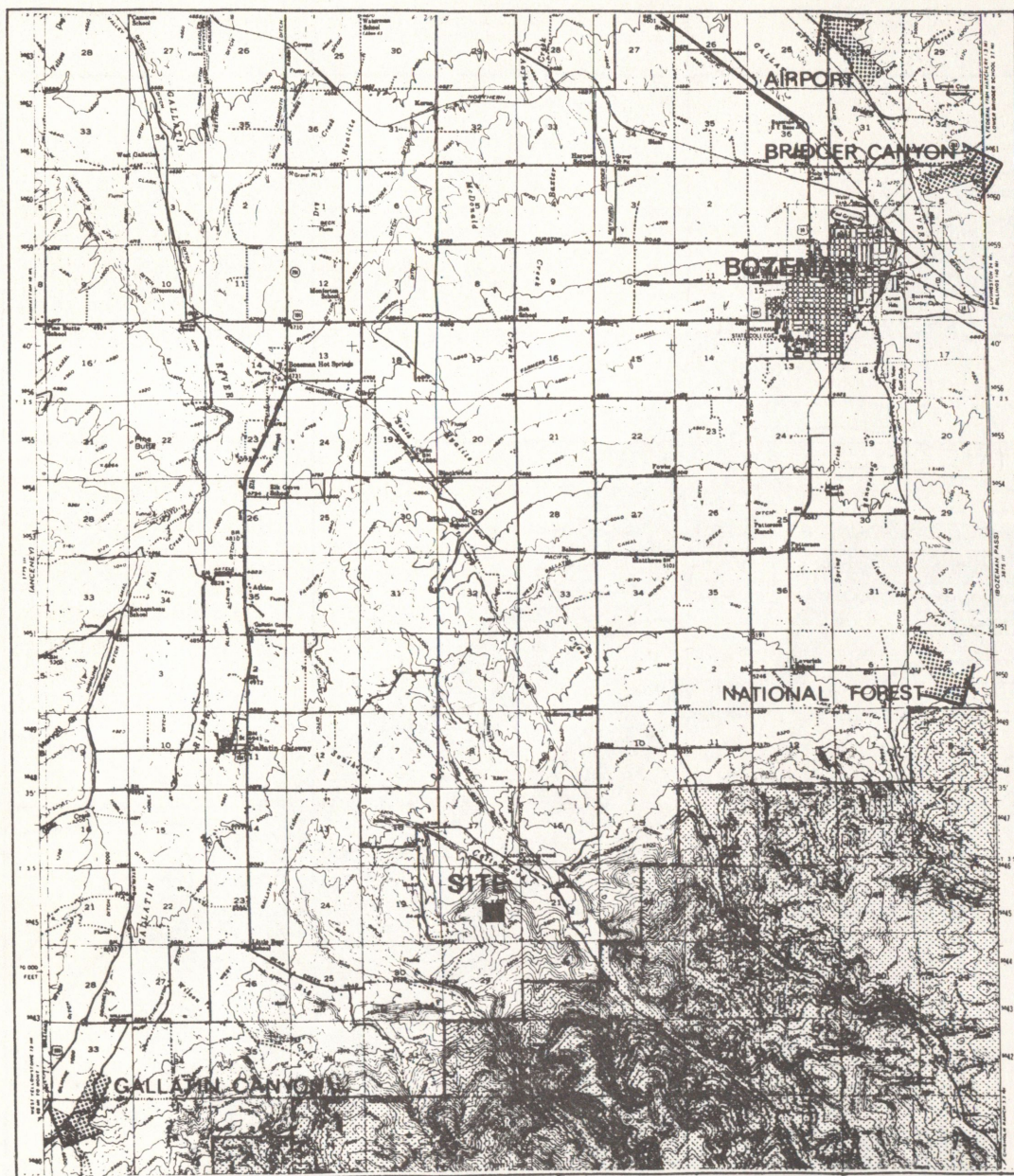
When I set out to choose a site in the Gallatin Valley for this project, I had some major concerns in mind:

1. A location in an unforested spot that would allow the school to sit on a plain as do many of Montana's agricultural communities;
2. The site had to be suitable for the use of passive solar architectural design;
3. Site access must be easy to develop;
4. The site should be relatively centrally located between the two major mountain sports areas of the Gallatin Valley: the Gallatin Canyon and the Bridger Canyon; and
5. The site should have direct or near-direct access to mountain recreational land.

One I had satisfied all of these concerns I was looking for something else. That something else was the spirit a special place has before man-made objects are placed on it. This spirit is made of things hidden beneath the surface of a place, that which is the "genius" of it. This site, with its magnificent vistas and scenarios of approach, has the feel of a sort of acropolis. The certain seclusion and aloneness of the site is assured by the surrounding National Forest land and other unavailable or relatively unbuildable land.

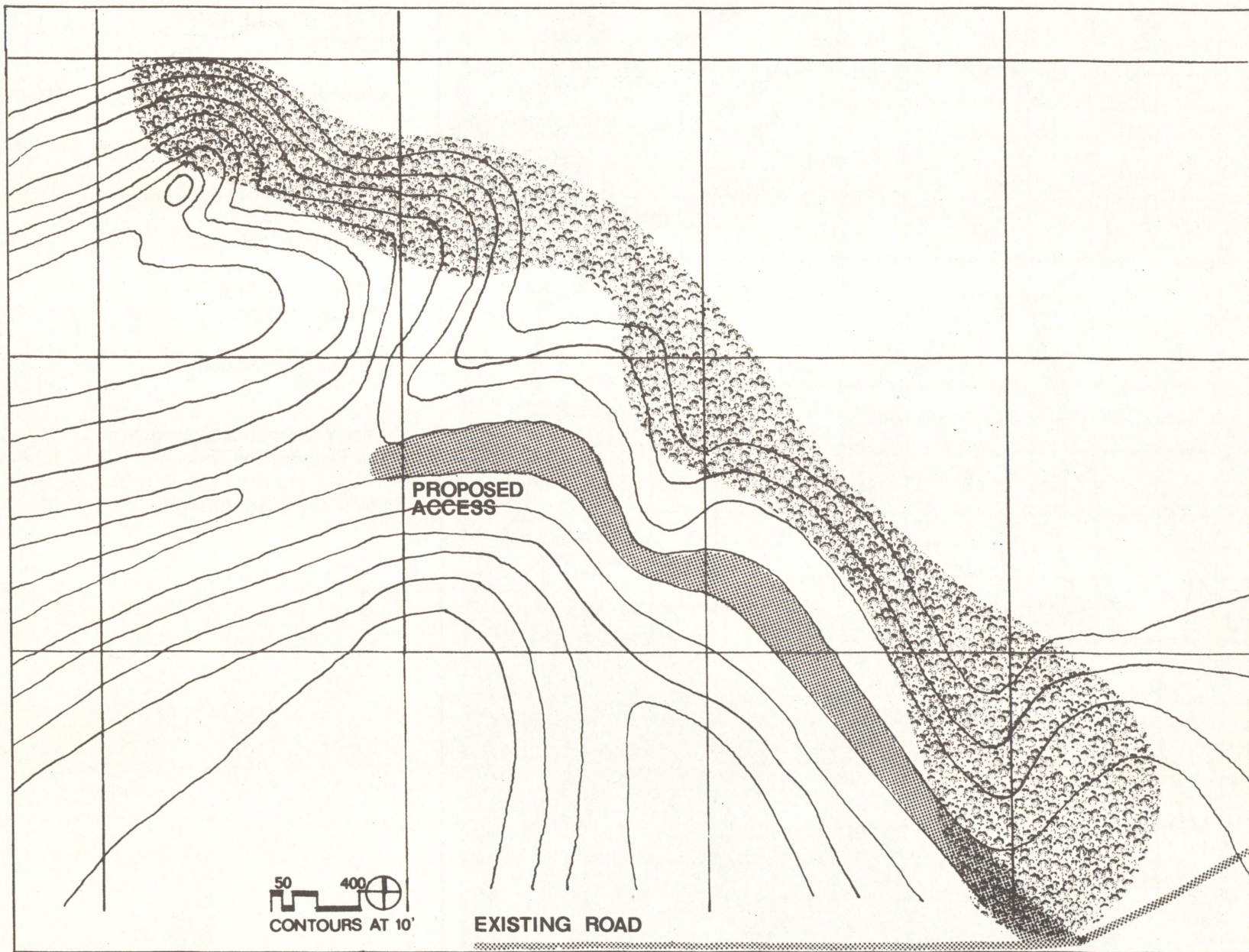


Approach to Site from East
(Cottonwood Road)

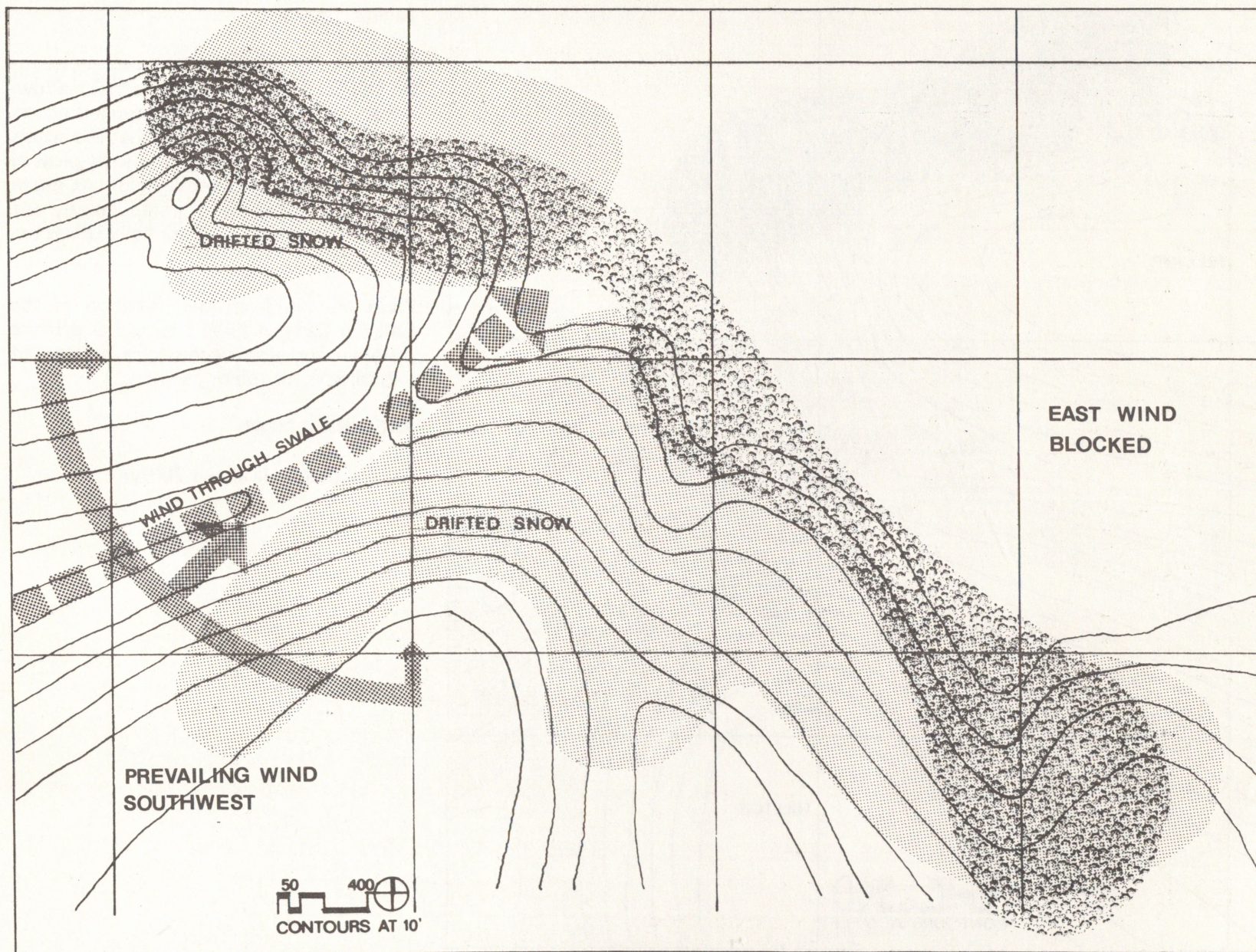


VARIOUS MILEAGES FROM SITE:

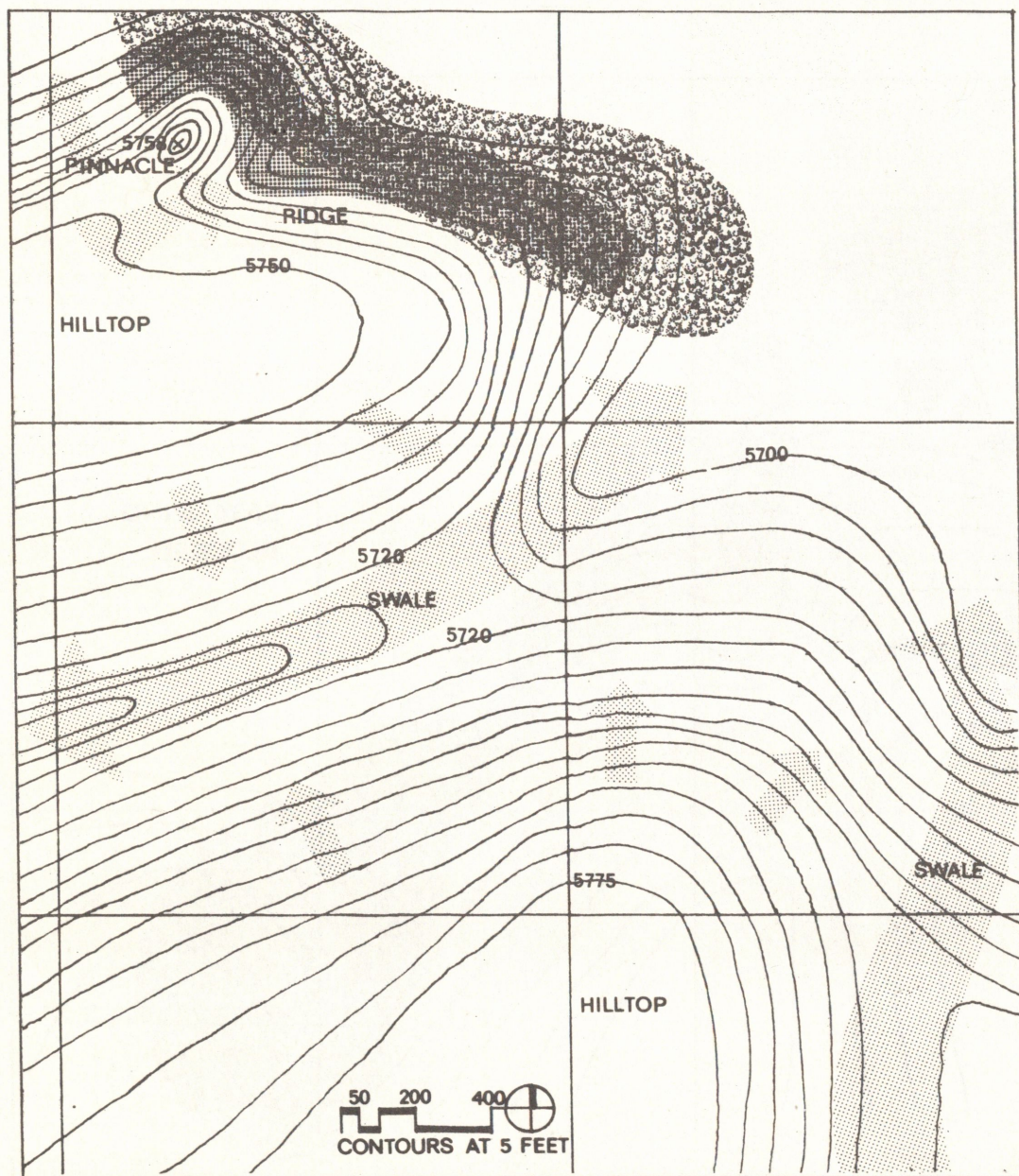
Bozeman	10½ mi.
Gallatin Gateway	.7 mi.
Bridger Bowl Ski Area	26½ mi.
Gallatin Field Airport	.21 mi.
Headwaters of the Missouri River	.41 mi.
Big Sky Recreational Complex	.32 mi.
West Yellowstone Entrance to Yellowstone Park	.82 mi.
Lewis and Clark Caverns	.55 mi.



Site Access



Wind and Drifting



Site Drainage

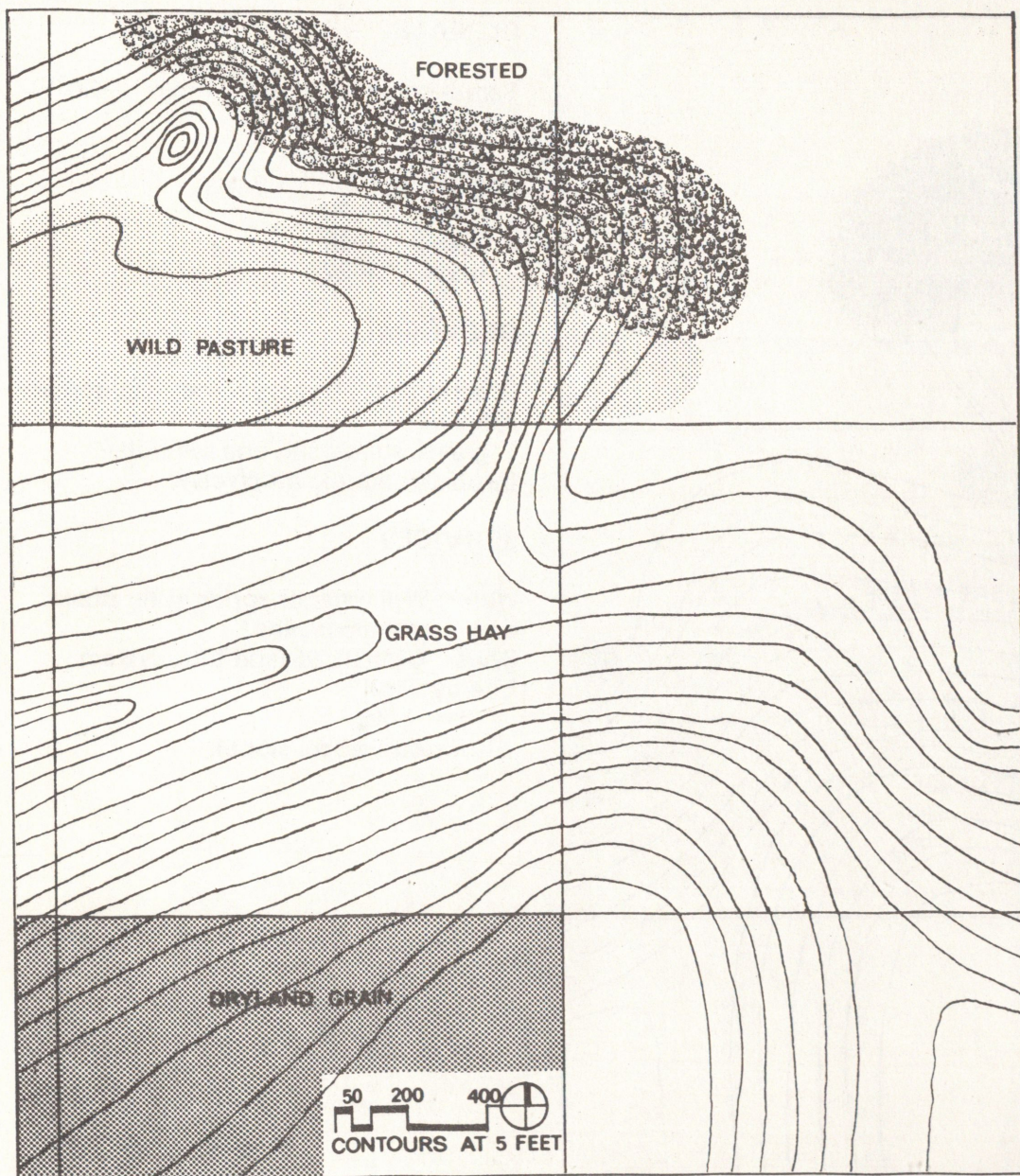
WIND & SNOW

Snow and Drifting can be severe problems on this site. It is necessary to make allowances for this in site planning and access configuration. It is possible that the access will have to be elevated and kept plowed and protected with snowfences. As much as two feet of snow may stand at any one time in the winter. Occasionally this is exceeded.

Wind coming from the direction of the Gallatin Canyon (SW) creates the drifting problem and also necessitates the use of windbreaks for the dry season.

PRECIPITATION:

Annual precip. is about 20"/yr.

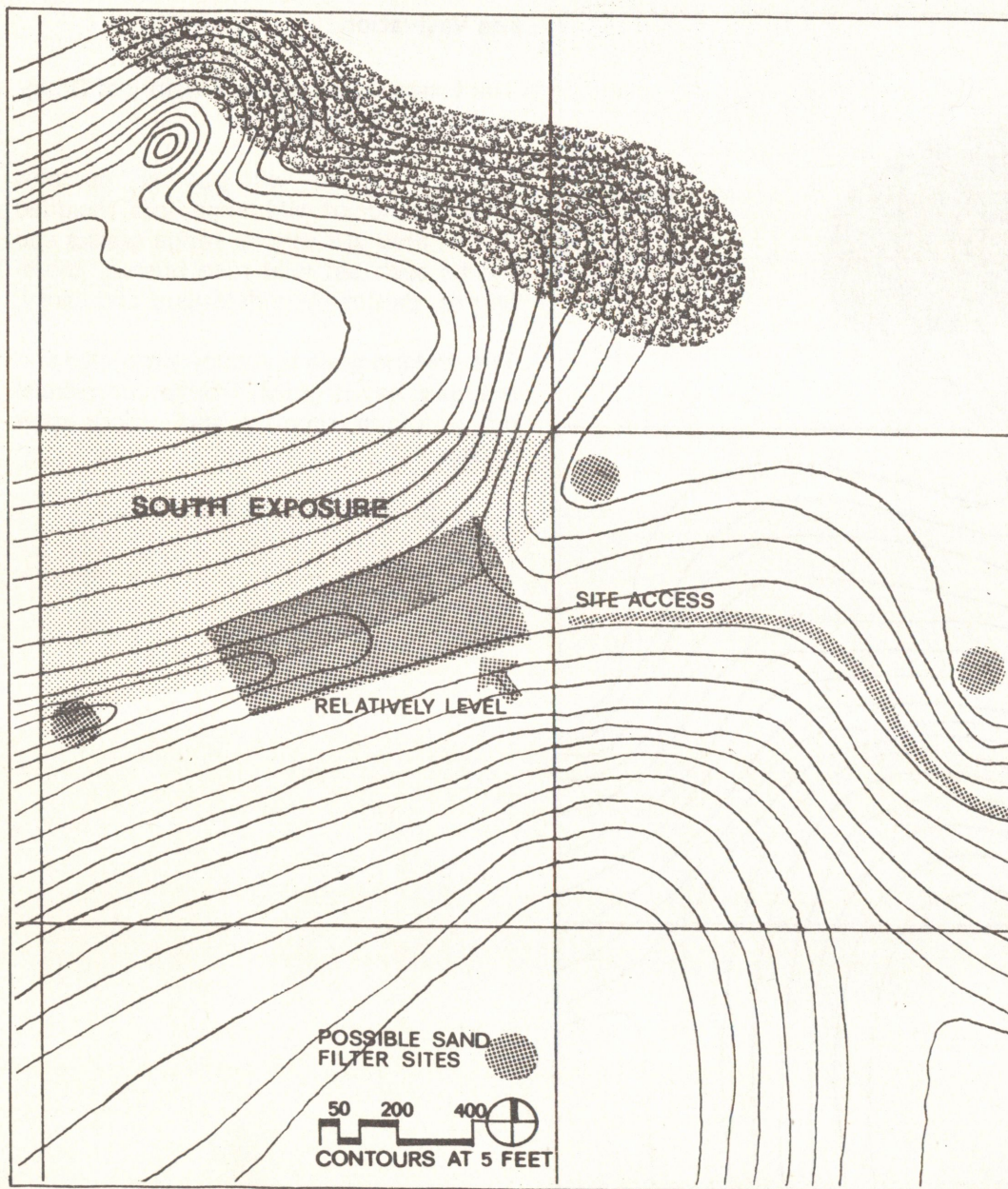


Site Vegetation

The forested area consists mainly of Douglas Fir and some Pine.

The area termed "wild pasture" contains an abundance of wild range flora. Included in this area are various range grasses and shrubs such as: wild rose bushes, gooseberries, daisies, houndstongue and tansy.

The dryland grain is annually cropped and the grass hay is grown from a commercial mix of alfalfa, timothy, and various other grasses.



CLIMATE

Temperature Ranges From -30°F — $+105^{\circ}\text{F}$.

Recommended R-Values:

ceilings: R-30

walls: R-19

floor: R-22

GEOLOGY

Unstratified Tertiary and Quaternary Alluvium.

gravel, stones, silt, and some clay
(probably not too much clay)

SERVICES

Water: Well water or spring water piped down from mountains.

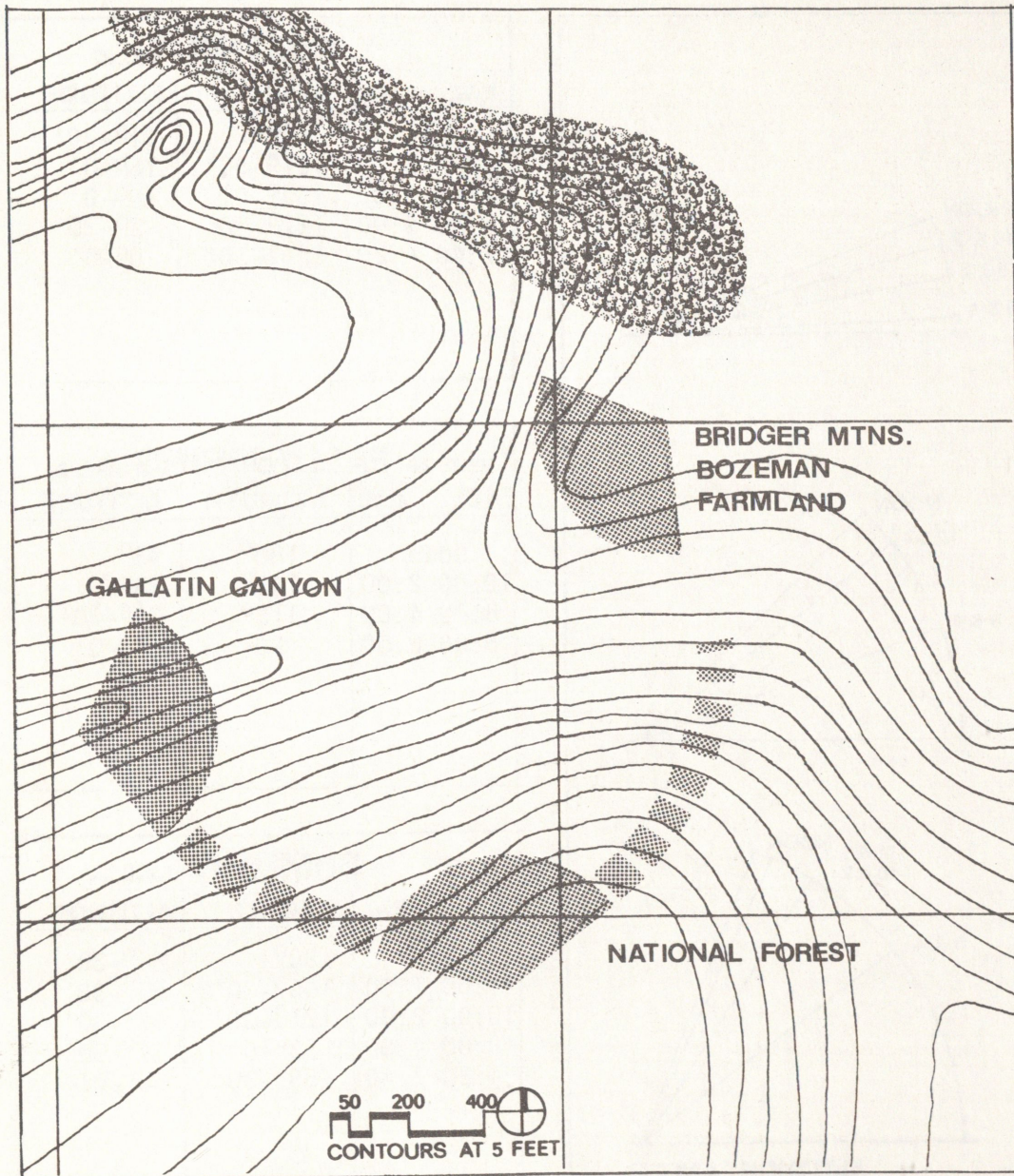
Sewer: Centralized sand filter system.

Energy: Coal

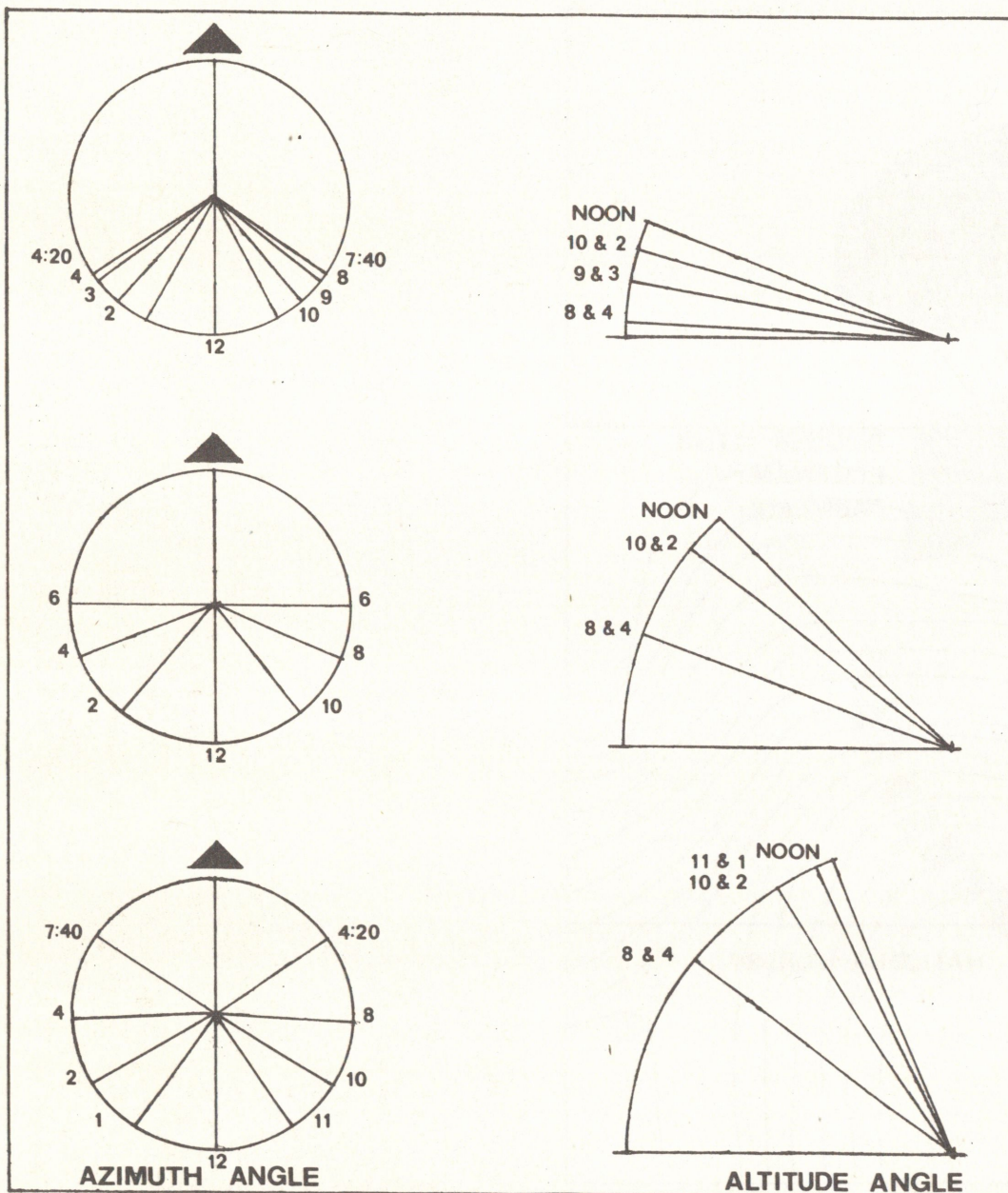
Solar

(unrestricted so. slope)

Organizational Determinants



Views from Site



SUN ANGLES FOR THE 45TH N PARALLEL

		WINTER DEC. 22	
A.M.	P.M.	AZIMUTH	ALTITUDE
Noon		180°-0'	21°-30'
10:00	2:00	151°-30'	16°-0'
9:00	3:00	139°-0'	10°-0'
8:00	4:00	127°-30'	2°-30'
7:40	4:20	124°-30'	0°-0'

		FALL / SPRING SEPT. 23 MAR. 21	
A.M.	P.M.	AZIMUTH	ALTITUDE
Noon		180°	45°
10:00	2:00	141°	38°
8:00	4:00	112°	20°-30'
6:00	6:00	90°	0°-0'

		SUMMER JUNE 22	
A.M.	P.M.	AZIMUTH	ALTITUDE
Noon		180°	68°-30'
11:00	1:00	145°-30'	65°-30'
10:00	2:00	121°-30'	57°-30'
8:00	4:00	93°-0'	37°-30'
4:20	7:40	55°-30'	0°-0'

Context

Farm and Ranch Yards

The contextual mood of the Cottonwood Canyon area is primarily an agricultural one. Small groupings of agricultural buildings form farms and ranches. I feel that this type of architecture contains some valid contextual cues.

The building forms used in these farm and ranch groupings are a generally accepted indigenous type. They are for the most part simple shed, gable, or hiproofed buildings with an occasional attached lean-to. The buildings are mostly utilitarian as is their overall relation to one another.

The planning may at first glance seem haphazard. The composition of a farm or ranch yard occurs over time. The buildings are usually related in a hierarchical manner in relation to their utility and the order in which they were built. The sequential nature of this development could be the basis for another complete thesis.

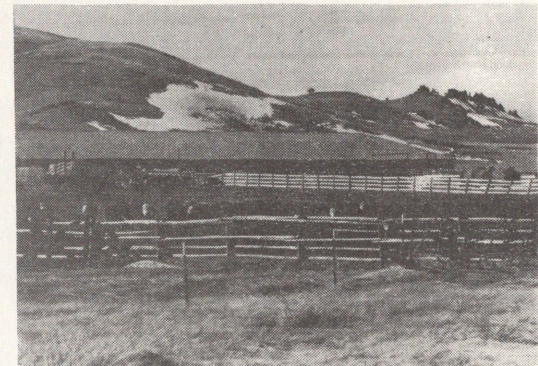
One element of a farm or ranch yard that tends to remain consistent throughout the development of the rest is the windbreak. The windbreak is used to protect the yard from high winds and direct drifting snow. Usually planted with the first buildings, the windbreak is a sort of formal ordering device for the rest of the farm yard.

Military Establishments

An investigation of regional context provides a more refined and diverse type of information. Western military establishments of frontier days seem to have a special significance. I will deal with one in particular with which I have had an extensive relationship.

Fort Shaw, a military fort of 1867, has undergone a metamorphosis from fort to school in the past century. This metamorphosis makes it a particularly interesting source of information in the case of this thesis. I have a great deal of firsthand mental imagery of the place since I attended eight years of elementary school there.

The innate formalism of a military establishment tends to turn inward on a landscape so expansive as that of Montana. An enclosure is formed and the buildings are inside of that, facing inward, once again, onto the parade ground. The main life



Simple linear hiproofed barn near Wolf Creek, MT



Farm/Ranch yard near site



Farm/Ranch yard near site. Refined (dwelling) on left and progression to rustic barns on right.

functions are contained within while the ancillary elements (stables, trading, and workshops) are placed on the outside where less security is required.

Of primary interest to me are the parade ground and the structures that face onto it. Some of the same hierarchies are present here that are present in the farm yard. The further inward a building is located and the more it relates to life's daily functions, the more refined its forms and finishes are. An obvious attempt is made to import more refined, citified, imagery in the composition and detail of these buildings. The parade ground forms a strictly ordered foreground for the buildings to look out onto, and from where they can be viewed.



Storehouse at Fort Shaw



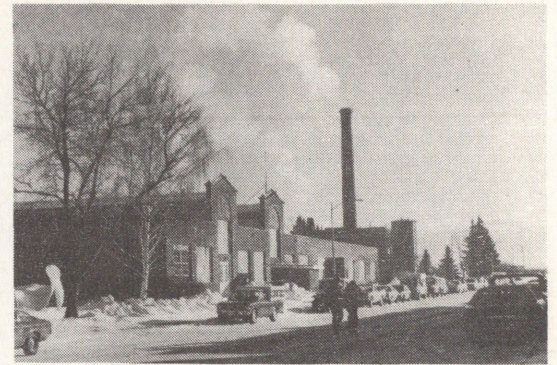
Officer's Quarters at Fort Shaw



Refined dormers on Officer's Quarters

Object on the Landscape

A very strong regional image is that of the, more or less, foreign object on the landscape. This object is usually a silo, grain elevator, or haystack standing off in the distance by itself. This rather surrealistic agricultural imagery makes a link between the expanses of land and sky. Its aloneness on the landscape provides a reference point for the sky and horizon, and almost creates the image of a shrine off in the distance.



Ryan Labs and heating plant at Montana State University, Bozeman, MT.

Materials

There is an extensive variety of materials that have been used in the "vernacular" building of the region. If one were to try to pinpoint the genuine vernacular architecture of this region they would turn to the architecture of the American Plains Indians. The Plains Indians were nomadic and lived in temporary structures that are for the most part unsuitable for modern use. What we accept and use as contextual and "vernacular" building types are those that were imported by the white man in the nineteenth century.

Agricultural

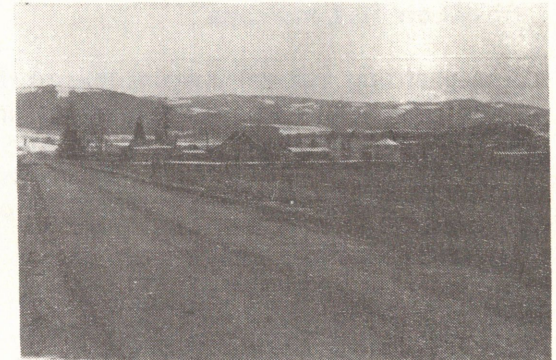
The materials used in the agricultural realm range from rough cut siding and expansive sheet metal roofs on barns and sheds to more refined and finished materials on the house. This indicates a desire, even in a rough setting, to refine the place used for the most intimate human contact. The place for living is made special and stands out against the other structures.

The wood frame agricultural buildings have a temporary air about them. In fact many smaller ones are built on skids and are moved from one site to another occasionally. The steel skin buildings are more durable and have a much lower maintenance factor making them very economically desirable. Moderately sized farms and ranches are usually struggling economic entities so few stone or brick buildings are seen in this agricultural region.

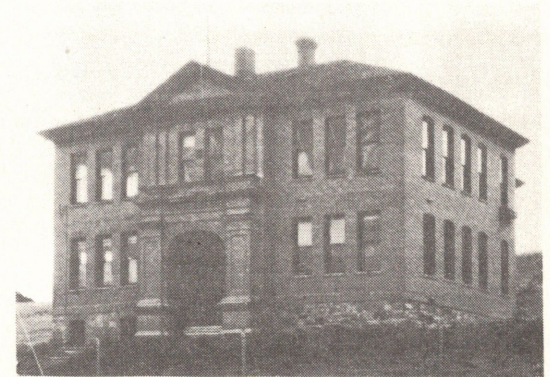
Small Towns

Circumstances allowed some small towns to utilize more permanent materials such as brick and stone in their major buildings. As an example I will use Pony, Montana, a mining town established in the 1870s.

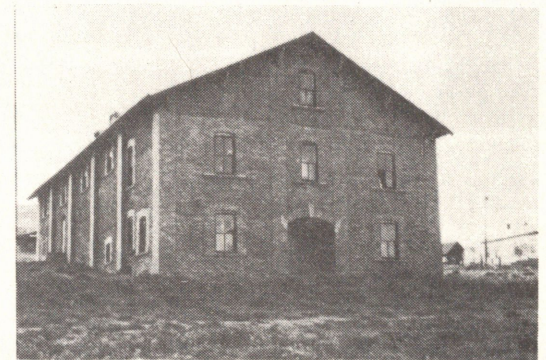
Much of the town has fallen away since its mining heyday. Even though most of the early wood frame buildings are gone, several substantial brick and stone buildings of 1900 vintage remain. These buildings are engulfed in an air of permanence that seems to reconcile them as man-made objects with the mountains that are their backdrop.



Hierarchical Farm/Ranch yard near site
(dwelling on left)



Public school at Pony, MT

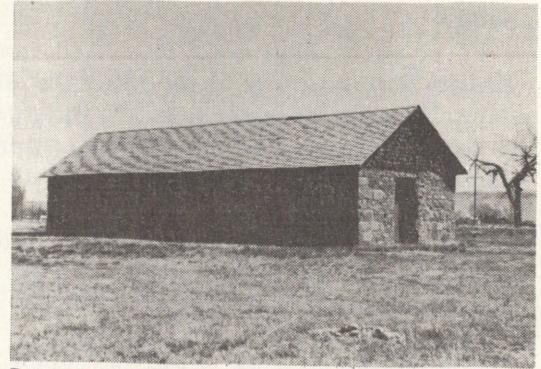


Masonry frame/infill building at Pony, MT

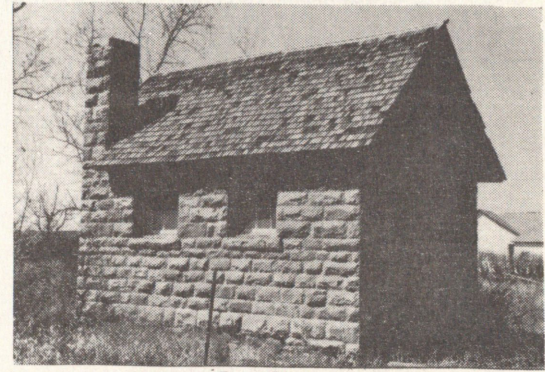
Fort Shaw

In the case of Fort Shaw the majority of the buildings that remain were built from adobe bricks or stone. These materials were readily available and lumber was some harder to come by.

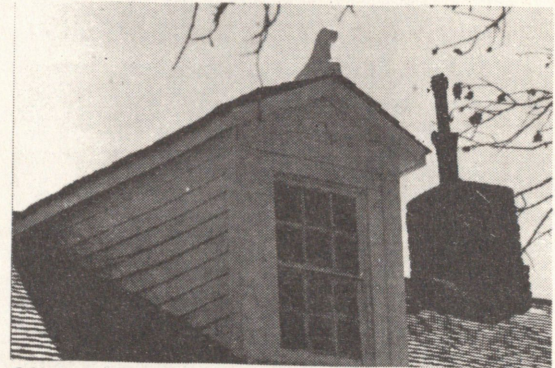
In the case of the residential buildings the adobe was covered with lapsiding. This covering of a "primitive" material with a more refined one indicates a general desire for refinement. Some of the remaining buildings were built with rough cut stone and others with fieldstone. The use of cut stone on buildings occurring closer to the parade ground further exemplifies the concept of an underlying hierarchy of form and materials.



Random Rubble Bldg. at Fort Shaw



Cut Stone Bldg. at Fort Shaw



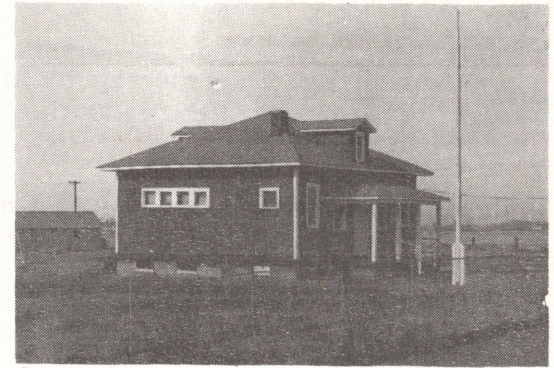
Officer's Quarters at Fort Shaw

School

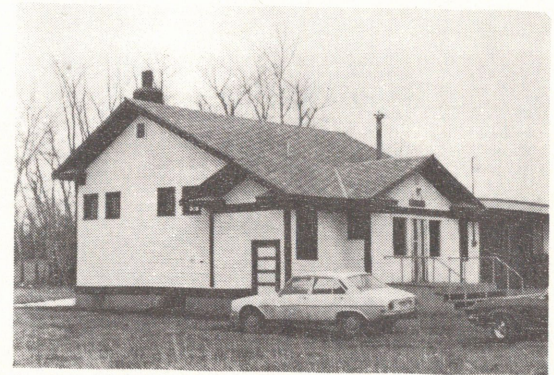
The contextual image of school is that of the one room schoolhouse. The one room schoolhouse is an image that is clearly understood throughout the region. There are two one room elementary schools operating in the immediate vicinity of the site. In the days gone by there were several more.

The nearest school to this site is the *Cottonwood School*. It is a frame building built in 1922 with a standardized set of plans issued by the State Department of Health and Public Instruction.²⁵

The *Anderson School* is located about three and one-half miles away. *Anderson School* is a frame building built in 1916. The *Anderson School* shows strong influence of the bungalow style of that period.²⁶



Cottonwood School



Anderson School

Boarding Schools

Eastern Schools

The Eastern boarding schools are, almost as a rule, conceived in a shadow of solidarity and pretentiousness. The architecture usually amplifies this image. These "halls of learning" are often characterized by a small group of original buildings. These buildings are usually of the revival period in vogue at their time of construction be it Gothic, Classical, Palladian, or Georgian.

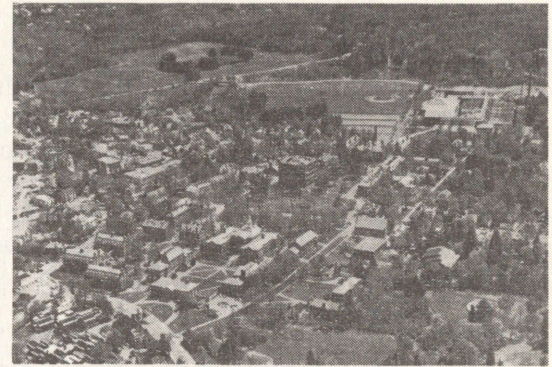
The solemnity that is instilled in these old structures permeates the image of the prestigious Eastern boarding school. This institutional elegance is all part of the image of these boarding schools.

Rocky Mountain Region Schools

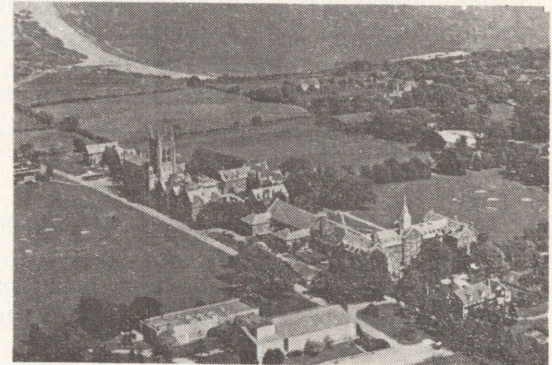
The boarding schools of the Rocky Mountain region tend to stress a sort of humbleness. This humbleness is backed by a gravitation toward a regional style of architecture. The buildings are often rather rustic.

Cottonwood Academy should display a degree of solemnity and institutional elegance but it need not have the image of an overly pretentious and status oriented school. It should indeed be somewhat humble before it is pretentious.

The architecture of *Cottonwood Academy* needs to stress the "development and expression" of ideas and an intense concern for environmental awareness and education.



Phillips Exeter Academy



St. George's School

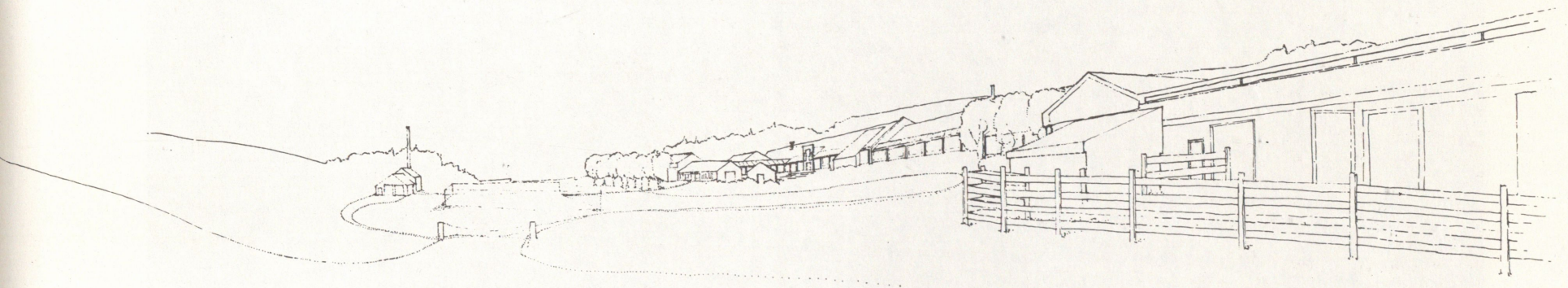
Hierarchy

The contradiction of the rustic-humble imagery versus the refined or elegant-pretentious imagery is one that can be resolved and exploited through the architectural solution. I see a correlation between the hierarchies discussed in the cases of the farm/ranch yard and the frontier military establishment, and the aforementioned contradiction. I feel there is an opportunity to address this contradiction through a metaphorical use of the hierarchies present in the farm/ranch yard and the frontier military establishment.

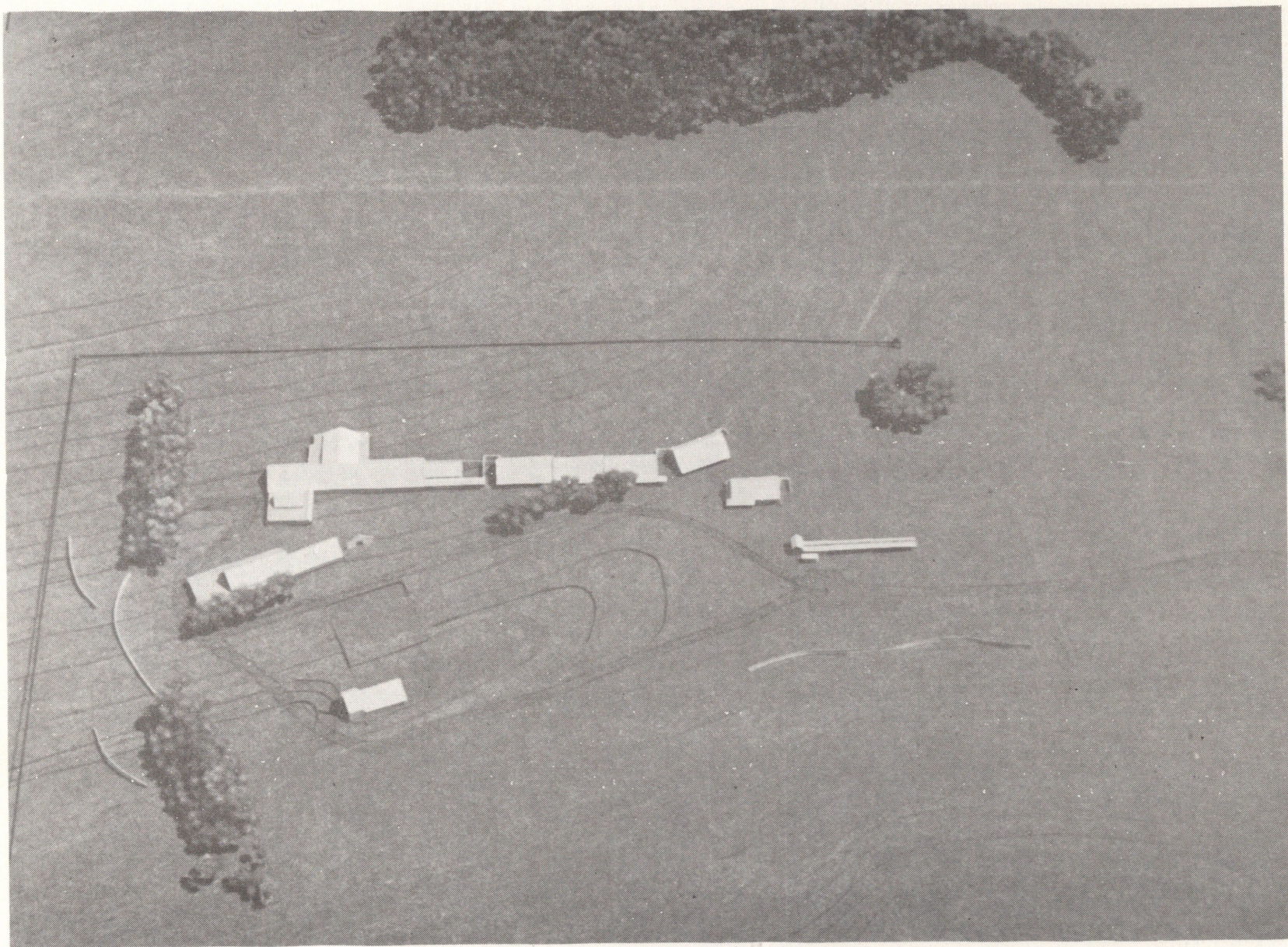
The false fronted building is a simple historical example that addresses a similar conflict. Pitched roofs in this region are often used as a rustic, utilitarian symbol on residences and a multiplicity of other building types. Flat roofs and parapets usually designate a more refined, civilized structure. The Western false front is a reconciliation of the parapet and the utilitarian pitched roof.

In addressing these conflicts and hierarchies there is an opportunity to use a variety of materials and make a diverse formal statement in the development of this academic community.

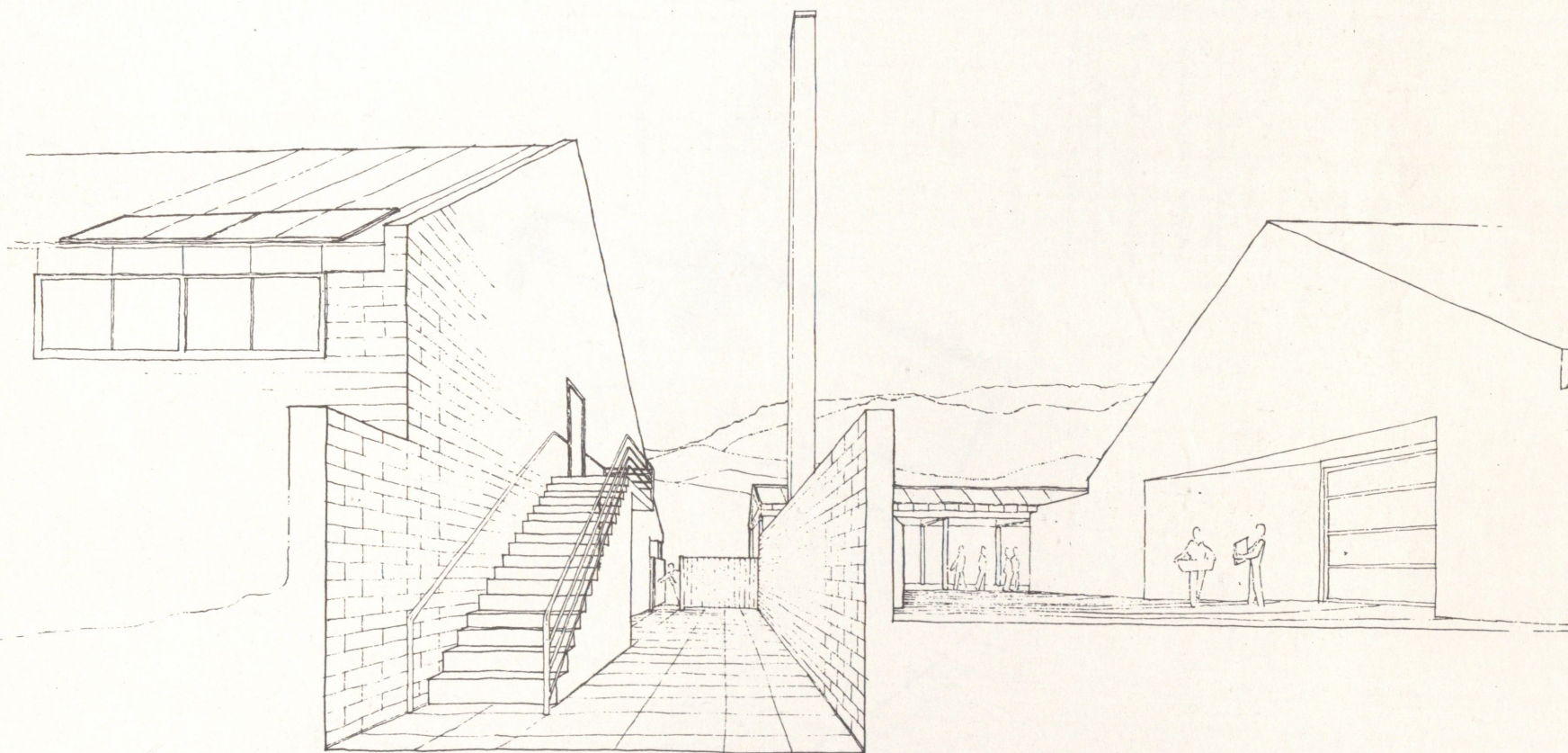
The use of masonry materials can bolster the permanence and institutional elegance in parts of the community. Simple utilitarian materials such as sheet metal can express those parts of the community that are analogous to that utilitarian portion of a farm/ranch yard. Wood frame construction is a softer material that can express the more residential and transient aspects of this community. Even though divergent materials and forms may be used the underlying ordering framework must carry through the entire school forming an ordered collage.

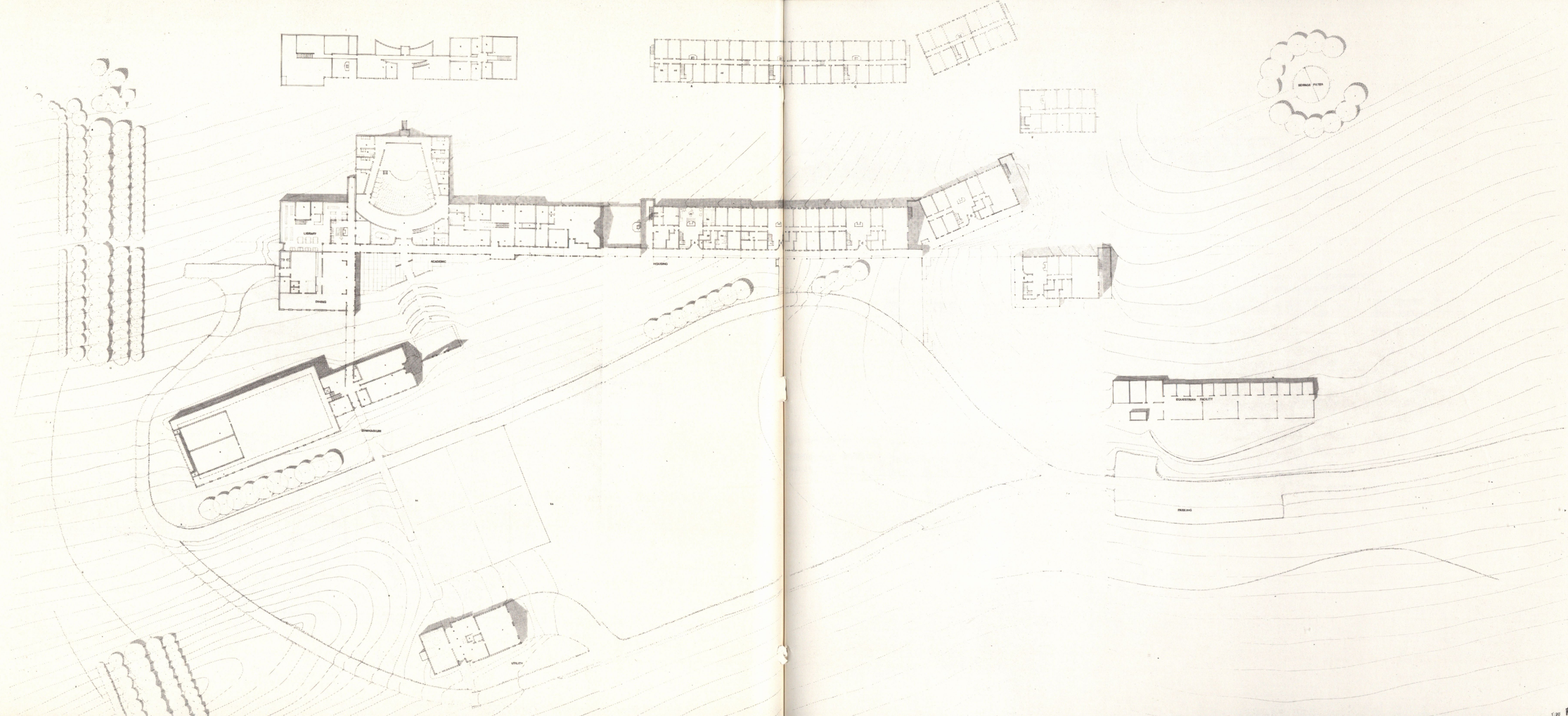


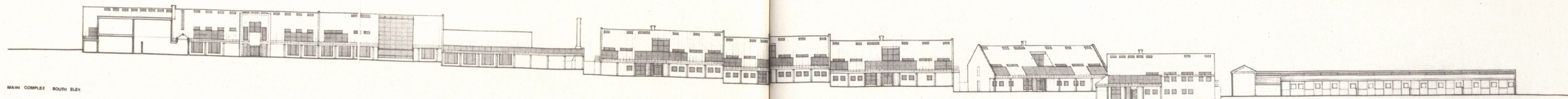




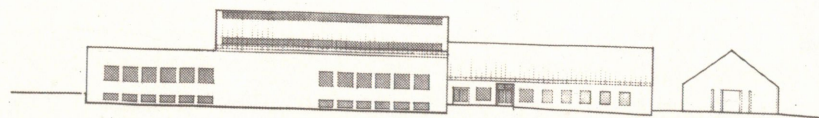




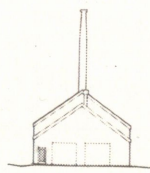




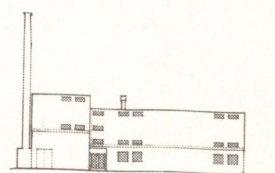
MAIN COMPLEX SOUTH ELEV.



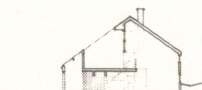
GYMNASIUM SOUTH ELEV.



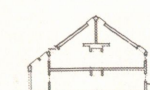
UTILITY EAST ELEV.



SOUTH ELEV.



SECTION AT HOUSING ENTRY



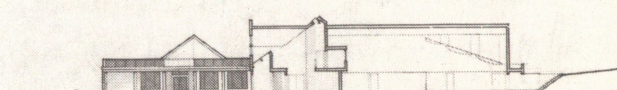
ROOMS



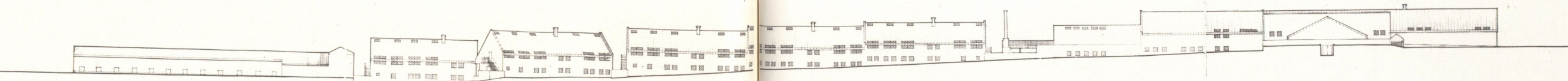
WEST ELEV. E.



GYMNASIUM EAST ELEV.



SECTION AT AUDITORIUM



MAIN COMPLEX NORTH ELEV.

Footnotes

¹ P. J. Grillo, Form, Function and Design (Chicago: Paul Theobald and Company, 1960), p. 226.

² J. Lobell, Between Silence and Light (Boulder, CO: Shambala Publications, Inc., 1979), p. 28.

³ Grillo, p. 225.

⁴ Lobell, p. 14.

⁵ G. Bachelard, The Poetics of Space (New York: Orion Press, 1964), p. 6.

⁶ New College Edition, The American Heritage Dictionary (Houghton Mifflin Co., 1976).

⁷ C. Jencks, The Language of Post Modern Architecture (New York: Rizzoli, 1977), pp. 113-117.

⁸ Jencks, p. 45.

⁹ A. Huxley, Island (New York: Harper and Row, 1962), p. 12.

¹⁰ C. Norberg-Schulz, Genius Loci, Towards a Phenomenology of Architecture (New York: Rizzoli, 1980), p. 6.

¹¹ Norberg-Schulz, p. 18.

¹² Lobell, p. 3.

¹³ Bachelard, p. 4.

¹⁴ R. Venturi, Complexity and Contradiction in Architecture (New York: Museum of Modern Art, 1966), p. 41.

¹⁵ Norberg-Schulz, p. 17.

¹⁶ Ibid., p. 58.

¹⁷ Venturi, p. 88.

¹⁸ Pieper, Leisure the Basis of Culture (New York: Pantheon Books Inc., 1952), p. 26.

¹⁹ Ibid., p. 52.

²⁰ Lobell, p. 16.

²¹ Ibid., p. 47.

²² Ibid., p. 44.

²³ G. Coates, Alternative Learning Environments (Stroudsburg, PA: Dowden, Hutchinson and Ross, Inc., 1974), p. 12.

²⁴ Phillips Exeter Academy, The Catalog of Phillips Exeter Academy (Exeter, NH: Trustees of Phillips Exeter Academy, 1980), p. 38.

²⁵ Bishop, Heath, and Miner, "Thematic Nomination of One Room Schools in Gallatin County" (Bozeman, MT: Montana State University, School of Architecture, 1980).

²⁶ Ibid.

Bibliography

Bachelard, Gaston The Poetics of Space. New York: Orion Press, 1964.

Baird, George Alvar Aalto. New York: Simon and Schuster, 1971.

Bishop, Heath & Miner "Thematic Nomination of One Room Schools in Gallatin County" (Bozeman, MT: Montana State University School of Architecture, 1980).

Ching, Francis D. K. Architecture: Form, Space and Order. New York: Van Nostrand Reinhold Company, 1979.

Coates, Gary Alternative Learning Environments. Stroudsburg, PA: Dowden, Hutchinson and Ross, Inc., 1974.

de Caso and Saunders Rodin's Sculpture. Rutland, VT: Charles E. Tuttle Co., Inc., 1977.

Federal Construction Council Proceedings of a Symposium/Workshop on Underground Heat Distribution Systems. Washington, D.C.: National Academy of Sciences National Research Council, 1966.

Grillo, Paul Jacques Form, Function and Design, Chicago, IL: Paul Theobald and Company, 1960.

Guinness and Sadler Palladio, A Western Progress. New York: Viking Press, 1976.

Hubbard, William Complicity and Conviction: Steps Toward An Architecture of Convention. Cambridge, MA: MIT Press, 1980.

Huxley, Aldous Island. New York: Harper and Row, 1962.

Jencks, Charles The Language of Post Modern Architecture. New York: Rizzoli, 1977.

Legget, Stanton Planning Flexible Learning Places. New York: McGraw-Hill Inc., 1977.

Lobell, John Between Silence and Light. Boulder, CO: Shambala Publications, Inc., 1979.

Moore, Charles The Place of Houses. New York: Holt, Rinehart, and Winston, 1974.

New College Edition, the American Heritage Dictionary. Houghton Mifflin Co., 1976.

Norberg-Schulz, Christian Genius Loci, Towards a Phenomenology of Architecture. New York: Rizzoli, 1980.

Page, Russell "An Equestrian Facility" (Bozeman, MT: Montana State University School of Architecture, 1974).

Pearson, Paul Alvar Aalto and the International Style. New York: Whitney Library of Design, 1978.

Phillips Exeter Academy The Catalog of Phillips Exeter Academy. Exeter, NH: Trustees of Phillips Exeter Academy, 1980.

Pieper Leisure: The Basis of Culture. New York: Pantheon Books, Inc., 1952.

Preble, Duane Artforms. San Francisco, CA: Harper and Row, 1973.

Saarinen, Eliel The Saarinen Door. Cranbrook, MI: Cranbrook Press, 1963.

Venturi, Robert Complexity and Contradiction in Architecture. New York: Museum of Modern Art, 1966.

Wrede, Stuart The Architecture of Erik Gunnar Asplund. Cambridge, MA: MIT Press, 1980.

List of Boarding Schools Investigated

Eastern Schools

Brooks School, North Andover, Mass.
Choate Rosemary Hall, Wallingford, Conn.
Cranbrook Schools, Bloomfield Hills, Mich.
Deerfield Academy, Deerfield, Mass.
Keuts Hill School, Keuts Hill, Maine
Phillips Exeter Academy, Exeter, New Hampshire
St. Georges School, Newport, Rhode Island
Taft School, Watertown, Conn.
Westminster School, Simsbury, Conn.

Rocky Mountain Region Schools

Colorado Rocky Mountain School, Carbondale, Colo.
Whiteman School, Steamboat Springs, Colo.

MONTANA STATE UNIVERSITY LIBRARIES
stks 720.6.M76Ed26
Development and expression : Cottonwood CA

3 1762 00155098 5


~~NA 2540~~
~~720.6~~
A76
Ed 26

