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AN ELEMENTARY SCHOOL FOR BOZEMAN, MONTANA

by

STANLEY VERBISKY

Submitted in partial fulfillment of the requirements for
Architecture 490

MONTANA STATE UNIVERSITY

Bozeman, Montana

August 16, 1967

418 West Harrison
Bozeman, Montana
August 17, 1967

Professor J. D. Gough
School of Architecture
Montana State University
Bozeman, Montana

Dear Professor Gough:

I am submitting this study for a new elementary school for Bozeman, Montana as a partial fulfillment of the requirements of Architecture 490.

The information in this report was obtained from sources in the Montana State University Library, from personal interviews outside the faculty and faculty members. All this information will be the basis for design of an elementary school during winter quarter of 1968.

I would like to thank Mr. William W. Carver, Mr. William C. Figgins and Mr. Milton K. Negus for their valuable assistance and suggestions.

Respectfully submitted,

Stanley Verbisky

SV/bh

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CONDITIONS CREATING A NEED

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Conditions Creating a Need

With the completion of Bozeman Junior Highschool in 1965, the 788 students in grades seven, eight and nine which were housed in Willson were moved to new quarters. Wilson's classrooms began to be used to house the fifth and sixth grade students. Emerson, which had formerly housed grades five and six, was now available for use as kindergarten and K-4 classrooms, thus allievating classroom shortage in this (K-4) category. From data of K-6 schools (based on the recommended 25 students per classroom) in Table I there are now 194 spaces available in K-4 schools. Surplus classrooms in Emerson are being renovated to take care of the present shortage of space in Willson and in other K-4 classrooms which may become overcrowded in the immediate future.

Figure 1, which is a graph of K-6 projected enrollments for Bozeman, indicates that enrollments will gradually increase until at last 1985. This will unquestionably cause a shortage of classroom space, and result in overcrowding if action is not taken. By 1969, at the present rate of growth, Emerson and all K-4 elementary schools will be filled to capacity.¹ By 1979 at the present rate of growth, Emerson school will be filled with fifth and sixth graders, and all other K-6 elementary schools will be filled to capacity.¹

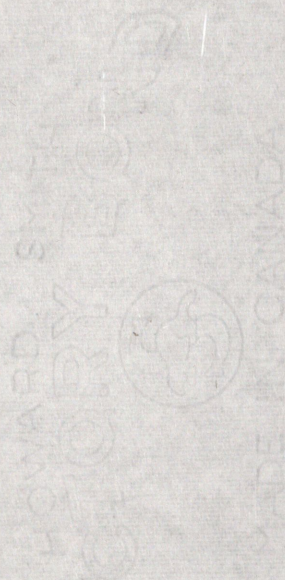
A K-4 elementary school built by 1969, with provisions for an additional school on the same site by 1979, would assure adequate K-4 classroom space for the immediate area, and adequate fifth and sixth classroom space for Bozeman. This arrangement would also simplify administration problems and costs.

¹Reference 8.

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Geographic

Bozeman is located in the southern part of the state in the Gallatin Valley. Bozeman is the county seat of Gallatin County, 143 miles west of Billings, Montana and 192 miles east and south of Great Falls, Montana. Bozeman is at the junction of two major highways: U. S. #10, (Interstate 90) an east-west arterial; and U. S. #101, a major entrance to Yellowstone Park.

Bozeman is at $45^{\circ} 42'$ latitude, and $111^{\circ} 03'$ longitude. Elevation is 4793 feet above sea level.

Bozeman presently has an area of 4835 acres, or 7.55 square miles.

Climatic

Bozeman's climate is mild and dry. The average mean temperature is 43°F ; the average yearly rainfall is over 17 inches. The growing season is approximately 107 days with the last killing frost about May 28, and the first killing frost about Sept. 12. Bozeman's prevailing winds are from the southwest; storm winds are generally from the east.

Social Conditions

The population of Bozeman is steadily increasing; the 1940 census showed a population of 8,665, the 1950 census 11,325, the 1960 census 13,361.² During the period 1909-1960, the city population

²Reference 1.

increased an average of 25.6 percent over each ten year period.²

The current estimate is that there are 15,700 people within the city limits and 18,000 in greater Bozeman.² The figures include married students at Montana State University, but not the single students.

Bozeman is the sixth largest city in the state.²

The medium age of Bozeman residents is 24.3 years. Persons over 65 years of age constitute 9.8 percent of the population, while 0.5 percent of the total is non-white. Average school attendance in Bozeman is 12.4 years, the highest of any city in the state.²

Economic Conditions

The economy of Bozeman is built on revenue income from the agricultural, tourism, and forest industries. The agricultural industries are divided among grain production, dairying, and livestock breeding and raising. Another major source of income to the community is Montana State University which employs hundreds of people for faculty and staff and brings an estimated \$22,000,000.00 annually.² The Bozeman area also has a few small plants engaged in cement manufacturing, food processing and grain milling.

²Reference 1.

TABLE II

Month	Mean Temperature	Precipitation
January	20.2°F	.94 in.
February	23.2	.77
March	27.8	1.58
April	42.5	1.70
May	51.1	2.31
June	57.3	3.07
July	66.4	1.10
August	64.9	1.19
September	55.8	1.72
October	46.0	1.45
November	32.1	1.12
December	24.8	.90
Annual	42.9°F	17.85 in.

-- U. S. Weather Bureau

COZD-T-OZOC

S-T-E

MADE IN CANADA

Site Location

Since Bozeman is expanding primarily to the west and south, a school site has been acquired in the Thompson Sub-division #4 by Bozeman School Division #7 in anticipation of a need for a school in this general area (see figures 3 and 4).

After the land had been acquired by the school division, two new proposals regarding a new school site were put forth by the City Engineering Department. One calls for Mason Street to run diagonally north-east to come out at the north-east corner of the site (see figure 5). This would eliminate a bad intersection at Mason and Black. All the land south of this new street, plus block #3 would be used for a school site.

The other proposal calls for the construction of a school in block #4, which is just west of block #3. So far no definite decision by the City Engineering Department, or the school board has been reached on which of the two sites to use.

BOZEMAN

MONTANA.



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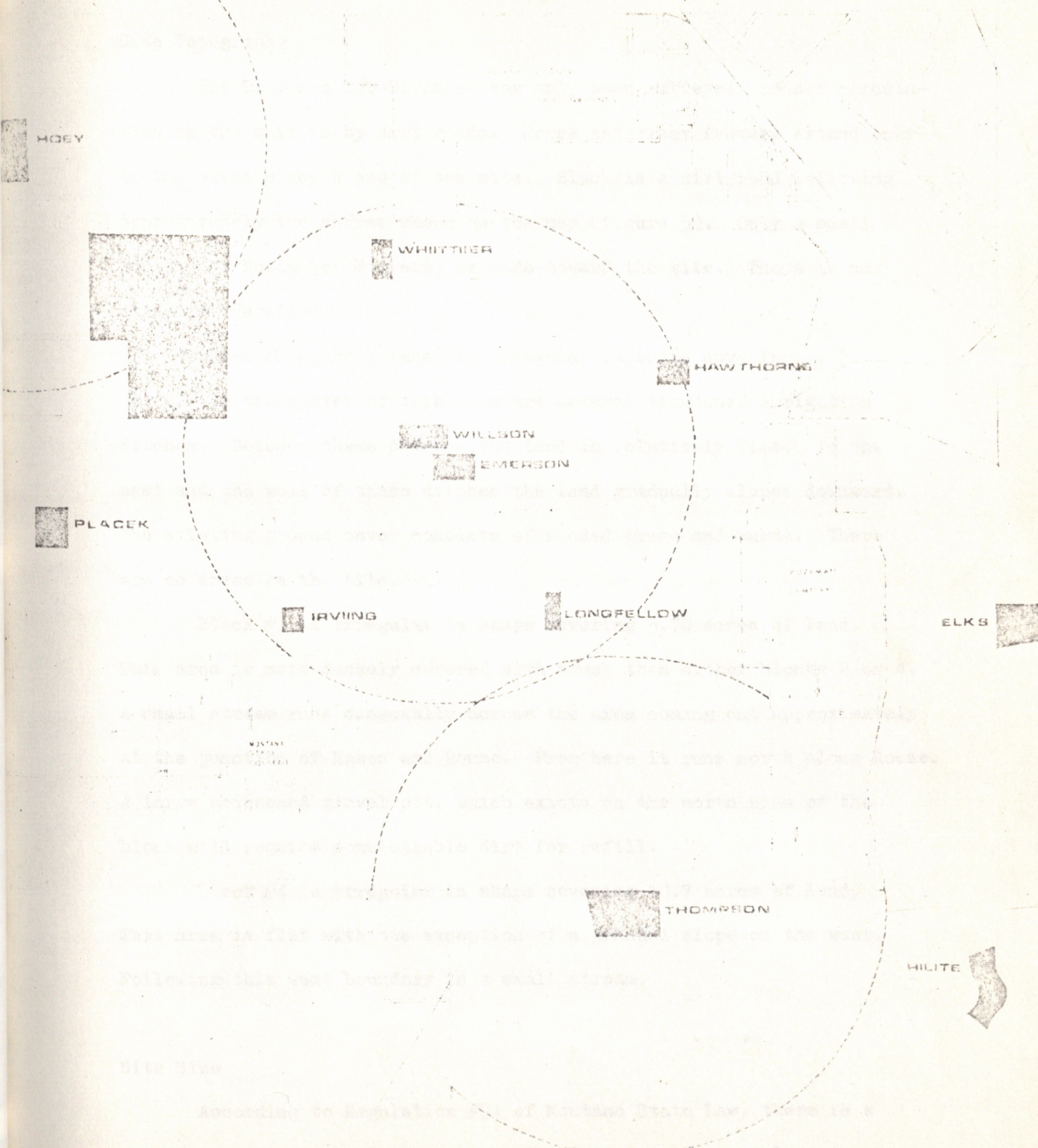


FIG. 4

5-6TH SCHOOL SITES

Site Topography

The Thompson Sub-Division has only been surveyed, so all circulation on the site is by dirt roads. Rouse and Tracy Avenues extend only to the extreme north end of the site. Black is a dirt road following approximately the course shown on the map (figure 5). Only a small portion of Mason (of Willson) extends toward the site. There is no street at Hereford.

Block #2 (school land) is irregular in shape covering 6.45 acres. In the center of this area are several abandoned irrigation ditches. Between these ditches the land is relatively flat. To the east and the west of these ditches the land gradually slopes downward. The existing ground cover consists of seeded grass and weeds. There are no trees on the site.

Block #3 is irregular in shape covering 5.78 acres of land. This area is more densely covered with brush than either blocks 2 or 4. A small stream runs diagonally across the area coming out approximately at the junction of Mason and Rouse. From here it runs north along Rouse. A large abandoned gravel pit, which exists on the north side of the block will require considerable dirt for refill.

Block #4 is irregular in shape covering 10.7 acres of land. This area is flat with the exception of a gradual slope on the west. Following this west boundary is a small stream.

Site Size

According to Regulation #91 of Montana State Law, there is a definite minimum school site size. The land area for an elementary

school should be five acres to serve up to 300 students, plus an acre for each additional 100 students, except that one, two and three room elementary schools should be a minimum of two acres.³

The initial building program for the Thompson area calls for the construction of nine classrooms with an anticipated enrollment of 300 students. The second stage of construction calls for an addition of a fifth and sixth grade school consisting of twelve classrooms. The expected enrollment for this addition is about 350 students.

Total enrollment for the school complex will be about 650 students. Area need for school site to fulfill Montana Law would be 8.5 acres. Since Mason Street would cut off no more than three acres from block #2, leaving approximately 3.5 acres. Block #3 has 5.87, making the total of the two areas more than nine acres. Block #4 has 10.7 acres. Both sites would be of acceptable size.

Traffic Patterns

Willson Avenue and Kagy Boulevard are to be the main arterial streets. Black and Tracy will only be secondary streets. Since the area will be primarily residential, with the possible exception of a motor business in the southern part of block #6, there will be little heavy traffic anywhere on the Thompson site.

³Reference 11.

Utilities

At the moment there are two water mains following Black. The sewer runs south on Black to Mason. From this intersection it runs on Mason to Tracy, then south on Tracy. There is gas and power on the north and west edges of the site.

TEST-IT-C

CON-DEATH-ONS

VICTOR

MADE IN CANADA

The Relation of the Building to the Students

A properly designed school environment will fulfill the students physical and emotional needs. The physical needs will be fulfilled by a purely necessary or physical portions of the environment: lighting, heating, and ventilation. The students emotional needs are fulfilled by those portions of the environment that pertain to the aesthetic. These two environmental factors are interdependent: a student may react physically to an emotional upset, or he may react emotionally to a physical upset.⁴

During the first years of schooling one of the student's major learning situations is the extension of his interest beyond his own intimate life into larger social groups which the school can provide. In this new environment the student may often feel lonely and left out. He needs a sense of security and belonging which can be provided to a certain degree with proper aesthetic environment.

Children are capable of responding to beauty. It is therefore important that the building they use have a strong basic concept to give the students a sense of order, and that it have interesting textures, and forms. Colors used in the building should be warm and cheerful. Sculpture should be present both inside and outside the building. Paintings should be part of the interior decor. All these amenities help arouse the student's interest in his environment, and help overcome a feeling of loneliness.

In schools with inadequate facilities, children tend to spend considerable time standing in line to get into classrooms, washrooms,

⁴Reference 6, p. 48.

and other facilities. Competition for use of these facilities causes small children to feel left out and depressed. Sizes of all facilities must be adequate for the school enrollment.

In poorly constructed structures, noise from the outside and from other classrooms often interferes with the teacher's words. Due to the lack of communication between teacher and student, the student tends to lose interest in his school work. Good acoustics in the school will be assured if an architect properly designs it.

Since the activity of the elementary school student is closely linked with the use of chalk-boards, chairs, desks, etc., it is self-evident that the size of these facilities must be adapted to the student's body proportions. This helps make the students conscious of the fact that the facilities in the school are for their use and enjoyment. It also gives the students a feeling of belonging, and that someone cares for their comfort.

For both physical and psycholocial reasons, things simply look bigger to a six year old than they do to an adult. The long hallways confuse him; and he becomes unsure of himself. His self-confidence suffers. For this reason, first grade students should have their classrooms near entrances, bathrooms next to classrooms, and playgrounds close at hand.

Adequate space should be provided for wholesome play, both indoors and outdoors. Children gain in self-confidence as they become more conscious of their accomplishments. The feeling of loneliness leaves them as they become more aware of other students and their activities.*

* All above data are based on conclusions I reached after completing my research on the subject.

Materials and Character

Bozeman has no well defined architectural style.

The closest manufacturers and suppliers of building material are at Billings and Great Falls. Freight rates on materials shipped from these cities is quite high. For this reason, building materials which may be readily acquired locally are predominantly used. The building materials are wood, brick, block, concrete, stone and some structural steel.

The structural systems most frequently used in Bozeman are the skeletal or post and beam. Pitched roofs are common in the area because they are practical in shedding heavy snow.

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Economic Considerations

"Nothing in the world is too good for our kids."

-- Anonymous

"What are we building anyway, a palace?"

-- Anonymous

Since the earliest days of public education, these two cries have been an inevitable sound in the building processes . . . Few entire school plants, fully equipped, cost as much as a mile of super-highway, for example, and yet it is the schools that are under sterner pressure. In some cases the pressure is squeezing much of the juice out of schoolhouses, leaving them stripped, temporary, and in fact uneconomical -- that is unable to meet the long-range challenges.⁵

Economic Fundamentals

Three economic fundamentals -- cost, size, and quality -- react upon one another. Two factors can be predetermined, but there must be some freedom to adjust the third to the other two. Most frequently, the enrollment determines the size of the school, and cost is determined by the maximum funds a community will allot for the structure. Adjustments must be made on quality. This financial climate often leads to construction of buildings that are less appealing, less functional, and of poorer construction than the community may have wished; but these are the facts of most school planning situations.

⁵Reference 16, p. 81.

One Story versus Two Story

Those who favor multi-storied school structures argue that these structures use less site space and are more impressive and appealing in appearance.

The Dearborn, Michigan school system adapted the one story structure for their schools because there was no definite difference in costs between the two systems (one story and multi-story), and there were many advantages to the one story structures.⁷

Some of the advantages reported by the Michigan Department of Public Instruction include:

1. Easier clearing of building in case of fire or panic.
2. Economics bought about by simple, light-framing material.
3. Elimination of stairway construction costs.
4. Less congestion in corridors and entrances.
5. Opportunity to isolate activities which produce noise, or chemical and cooking odors.
6. Opportunity for better arrangement of the functional elements of the plan.
7. Easier maintenance. No expensive scaffolding for repainting, glazing or other repairs.
8. Easier in-moving furniture and equipment within as well as into and out of the building.

⁷Reference 9, p. 62.

Means of Achieving Lower Initial and Operating Costs

Since population shifts do not happen overnight, a comprehensive land use and projected population study for at least a period of ten years in advance may be a good investment to a community. On the basis of this study, sites for new schools may be purchased. Purchasing at a later date may be reflected in increased land costs, and a choice of less desirable or limited sites.

It is equally important that the architect be given enough time to study the problem and weigh comparative techniques and materials. Extra time allotted would allow more precise preparation of architectural preparation of architectural specifications and issue close bidding by contractors. It would also insure that contracts be awarded on an intelligent basis. Prices are often driven up when building projects are dumped on a saturated market at one time.

The principal source for financing new schools in the United States is through bond issues. Shopping for bonds calls for proper timing, as there are times when market is flooded with other issues. The importance of good shopping for bonds cannot be overemphasized. The difference between economical financing and expensive financing can amount to as much as 15 percent of the total construction costs.⁸ Often as much as one third of the community's school debt service cost is in interest rates.⁸

Most school buildings are planned for a duration of 25 to 30 years. During this period many innovations in teaching practices may take place.

⁸Reference 13.

A school building must be planned for a certain degree of flexibility to minimize expensive changes in room arrangements and room functions.

Architectural flexibility may be achieved by the following methods:

1. Expansionability: Planning the structure for expansion in the foreseeable future, but building for the present. A modular structural system lends itself well to expansion.

2. Convertibility: Planning and constructing interior spaces in a manner that changes in area may be readily accomplished. These changes in area may be achieved with use of moveable partitions.

3. Versatility: Planning interior spaces in a building to accommodate a variety of functions. For example, a history classroom may be used for science, or a cafeteria may be used for a classroom.

In school planning, the basic unit that is considered is the classroom. Size of these rooms are based on the maximum number of students that will use these facilities. In a school plant these are also non-productive areas which are needed. These are the administrative offices, corridors, toilets, storage areas, etc. Their areas should be kept to a minimum consistent with the needs of the attending students and teachers.

In school planning there is frequently a tendency to strive for lower initial costs by using poor quality building material. What the planners frequently overlook in this aspect is the continuing costs of operation, maintenance, and repair.

Anything that can be included in a school which limits custodial services, reduced consumption of fuel and power, or minimizes repair and refinishing is useful.

Materials and finishes should not be chosen on the basis of low initial cost, but rather on the overall costs. All materials and finishes should be durable and of good quality.

It is the business of the architects and school administrators to keep abreast of new techniques, studies, materials and changing conditions in the building industry. The "gingerbread" facades of half a century ago is both expensive and a poor way to build today. The form of contemporary school is usually well designed for our educational processes, and to provide economy. Today's school buildings are attractive workshops rather than the grim monuments of fifty years ago.

The universal solution schemes are stock plans or prefabricated building products available today which can compete in quality, or in price with school buildings designed and built according to local needs. These structures are not adapted to local soil conditions, contours, drainage characteristics, utility connections, etc. To modify these stock plans or the prefabricated structures often may cost more than individual planning.

Cost Comparisons

The three most commonly used cost comparisons are:

1. Cost per square foot.
2. Cost per cubic foot.
3. Cost per pupil.

Practically every new school plant is subjected to one of the above comparisons. People who make these comparisons overlook the fact

that schoolhouses are built for different places, at different times where various materials and methods are used in building structures for differing needs. If any of the above cost comparisons are to be used, they must be used on the basis that all conditions are equal, or that proper adjustments are made for variations. Comparisons made on any other basis are invalid and of little merit. The Marshall Valuation System which is used in subsequent comparisons, is more accurate than the preceding cost comparisons because it takes into consideration regional, climatic, and economic conditions. The final costs include built-in equipment, architectural fees, contractor's overhead and profit. The costs do not include moveable equipment and furnishing. The Marshall Valuation System is bought up-to-date monthly.⁹

⁹Reference 7, pp. 15-3.

CLASS

QUALITY

*Good School

Exterior: Steel columns, web or bar joists, ornamental or face brick.

Interior Finish: Plastic acoustic fill, ceramic or vinyl wainscot, vinyl asbestos.

Lighting and Plumbing: Good fluorescent fixtures, good plumbing, extra features.

Heat: Hot water.

Cubic Foot Cost -- \$1.91

Square Foot Cost -- \$19.10

*Average School

Exterior: Steel or bearing walls, brick block or concrete, some trim.

Interior Finish: Plaster, acoustic tile, vinyl asbestos or hardwood.

Lighting and Plumbing: Adequate.

Heat: Hot Water.

Cubic Foot Cost -- \$1.61

Square Foot Cost -- \$16.10

*Low Cost School

Exterior: Brick, block tilt up panels, bearing walls, wood joists, some trim.

Interior Finish: Painted walls, acoustic tile or dry wall ceiling, asphalt tile.

Lighting and Plumbing: Minimum.

Heat: Hot water.

Cubic Foot Cost -- \$1.27

Square Foot Cost -- \$12.74

CLASS

QUALITY

*Good Classroom

Exterior: Steel columns, web or bar joists, ornamental block or face brick.

Interior Finish: Plaster, acoustic tile, hardwood or vinyl asbestos.

Lighting and Plumbing: Good fluorescent fixtures, good plumbing, extra features.

Heat: Hot water.

Cubic Foot Cost -- \$1.93

Square Foot Cost -- \$19.30

*Good Gymnasium

Exterior: Steel columns and girders, face brick, best ornamental block.

Interior Finish: Plastic wainscot, basketball floor, vinyl asbestos, good detail.

Lighting and Plumbing: Good lighting and outlets, tiled shower and restrooms.

Heat: Forced air.

Cubic Foot Cost -- \$1.84

Square Foot Cost -- \$18.46

*Multi-Purpose Building

Exterior: Steel frame, brick, block concrete, some ornamentation.

Interior Finish: Plastic, acoustic tile, vinyl asbestos, hard wood.

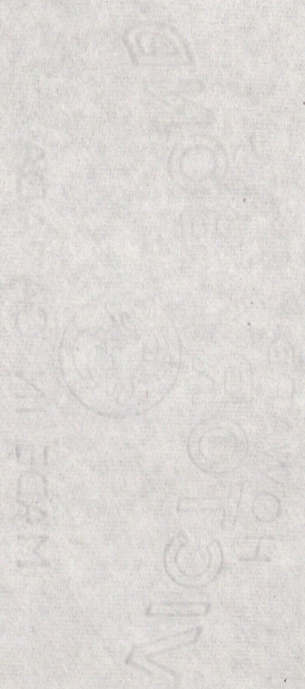
Lighting and Plumbing: Adequate.

Heat: Hot air.

Cubic Foot Cost -- \$1.74

Square Foot Cost -- \$17.49

FUNCTIONS OF THE BOARD



Building Considerations

Frequently for reasons of economy or lack of immediate need; the planning and construction of school classrooms is done over two or more building periods some years apart. In such a situation the question inevitably arises as to size and the type of facilities to be provided with the initial stage, and what facilities may be left for later construction. Such a situation exists in the planning of a school for the Thompson site. Initial construction calls for a building of nine classrooms and all other needed facilities. A twelve classroom school for grades five and six is planned for a later date.

To provide facilities which would only be adequate for the initial stage (nine classrooms) would result in lower initial cost and a maximum utilization of spaces.

There is, however, another side to the question. Additions to such areas as a multi-purpose room, band room, or kitchen often results in costly tearing down of existing walls and structure to achieve the desired size and orientation in the structure. Utilities for the school and use of many of the spaces would be disrupted if the school were being built during the school session. The finished school may end up possessing an added-on feeling and being more costly.

To facilitate easy and economical adaptation of the second stage, I have decided to provide K-4 classrooms and most other needed areas for K-6 (see building program) in the initial stage.

Types and Uses of Spaces

In the design of kindergarten class, emphasis should be on good planning. Areas for small groups and large group studies should be richly decorated to provide a fascinating environment for the children. Classrooms may be partitioned permanently, or have temporary walls to provide some of the following amenities to arouse a student's curiosity:

General Work Area: This would be the largest area in the room. It would have chairs and tables for about 30 students.

Study Space: It would provide space for eight to ten children. The area would have a circular table and chairs, and serve mainly as a story-telling area.

Art Area: An area where four to eight children may be able to work simultaneously at easels, while an equal number may be at the tables modeling clay.

Block Area: The space should be about 60 or 70 square feet. The area will be used by children to build block structures.

Natural Science Area: Children may participate in planting, and in observing of animals. Cages, see beds, and an aquarium should be provided for this area.

Wood-Working Area: The space should have a moveable work bench and tools for the children.

Motion Picture Area: The area should have a screen and projector for groups of children up to 15 in number.

In addition, to the educational areas, the room should have a direct access to two toilets (one for each sex), a common wash basin with a towel, and soap. Storage should be provided for the children's clothes and their projects.

Teachers over the years have found that a reading program for children between the ages of $5\frac{1}{2}$ and $6\frac{1}{2}$ were not too efficient, and as a result most of the activities carried on by kindergarten are continued by first grade students. The first grade students, in addition to their play activities, are expected to learn to recognize numbers, and letters of the alphabet. This small amount of academic study justifies smaller classrooms for the first grade students. All facilities for kindergarten and first grade students should be separate. First grade students should have their washrooms (one for each sex) adjacent to the classrooms.

Grades two, three and four will have children ages seven to nine. Since emphasis in this group will tend more to the academic and less on play, their classrooms will be much smaller than either kindergarten or first grade classrooms. Washroom facilities for these students will be outside (in the hallway) of the classrooms.

Beside taking such regular subjects as reading, mathematics, science, writing and spelling, they will have music and art. These are provided by their room teacher.

Since a dining room for the school lunch would be used about 90 minutes a day, a use of space that was found to be inefficient, and as a result the multi-purpose room will be used as a dining room. In addition to a dining room, the multi-purpose room will serve as a community room and a large play area for the children. Basketball and physical education activities start with the fifth grade, so the multi-purpose room will achieve maximum usage when the second state is complete.

The music area which will consist of an instrument practice room, a vocal practice room, individual practice rooms, a sheet music library will have only a limited use during the initial stage. The K-4 music program in Bozeman covers six basic areas: singing, rhythmic activities, listening, creative activities, reading music, and playing instruments. The instrument and vocal practice rooms could be used for some of the above activities. Fuller usage of music areas would be achieved when the fifth and sixth grade school is added, as band and orchestra classes are available to students in these grades.

Other areas where spaces will not be used to a maximum are the general office areas and the kitchen area. These areas will be enclosed, finished and equipped to carry out their primary functions. When the second stage is completed, there will be very little additional work needed to finish them.

MARGO RUT

GZ-JD-CB

<u>Space</u>	<u>Quantity</u>	<u>Area</u>
<u>Kindergarten:</u>		
Function: to provide recreation and learning space for five year-old children	1 @ 1500	1500
Equipment: See discription		
Finish: Durable, lively, but not gaudy, acoustic treatment.		
Related: Separate from other classrooms. Separate entrance and outside playground.		
Capacity: 30 to 40 students.		
<u>First Grade Classroom:</u>	2 @ 1200	2400
Function: To provide recreation and learning space for six year old children.		
Equipment: See description.		
Finish: Durable, lively, but not gaudy. Acoustical treatment.		
Related: Close to playground.		
Capacity: 30 students per classroom.		
<u>Second, Third and Fourth Grade Classrooms:</u>	6 @ 900	5400
Function: To provide lecture space for second, third and fourth grade students.		
Equipment: Tablet arm chairs, chalkboard, teacher's desk and chair,		
Finish: Durable with acoustic treatment.		
Related: Near multi-purpose room.		
Capacity: 30 students per classroom.		

area that may be included in first stage of construction or left for the second stage.

<u>Space</u>	<u>Quantity</u>	<u>Area</u>
<u>Multi-purpose Room:</u>	1 @ 4000	4000
Function: To accomodate indoor physical education and serve as dining, community room, auditorium and assembly room.		
Equipment: Permanent stage, fold-away chairs, in-wall tables and chairs.		
Finish: Durable.		
Related: Close to classrooms, kitchen, and exit.		
Capacity: Two classrooms for physical education; about 400 for dining.		
<u>Instructor's Rooms:</u> *	1 @ 500	500
Function: To provide office, conference and a smoke room for instructors.		
Equipment: Easy chairs, tables, desks.		
Finish: Good quality.		
Related: Close to multi-purpose room.		
Capacity: Used by about 10 people.		
<u>Instructor's Wash Rooms:</u> *	2 @ 50	50
Function: To provide segregated toilet space and shower space for instructors.		
Equipment: Shower, water, closet, lavitory, closet.		
Finish: Good quality.		
Related: Adjacent to instructor's office.		
Capacity: for use by instructors.		

* Areas that may be included in first stage of construction or left for the second stage.

<u>Space</u>	<u>Quantity</u>	<u>Area</u>
<u>Dressing Rooms:</u> *	2 @ 1000	2000
Function: To provide segregated areas for student preparation for physical education.		
Equipment: Four shower heads, 3 water closets, 3 lavatories, adequate locker space (for each dressing room).		
Finish: Durable, waterproof.		
Related: Near multi-purpose room.		
Capacity: About 60 students per classroom.		
<u>Health and Physical Education Storage Rooms:</u>	2 @ 150	300
Function: To store equipment used for physical education.		
Equipment: Storage shelves.		
Finish: Rough.		
Related: Adjacent to multipurpose room.		
<u>Instrument Practice Room:</u> *	1 @ 1500	1500
Function: To provide space for large group or band practice.		
Equipment: Chairs, music stands.		
Finish: Durable with acoustic treatment.		
Related: Near practice rooms and storage area.		
Capacity: 50 students.		
<u>Vocal Practice Room:</u> *	1 @ 1500	1500
Function: To provide space for vocal music practice.		
Equipment: Chairs		

* Areas that may be included in first stage of construction or left for the second stage.

<u>Space</u>	<u>Quantity</u>	<u>Area</u>
Finish: Durable with acoustic treatment.		
Related: Adjacent to both practice rooms.		
Capacity: One person.		
<u>Sheet Music Library:</u> *	1 @ 100	100
Function: To provide storage space for all sheet music.		
Equipment: Storage shelves.		
Finish: Rough.		
Related: Adjacent to both practice rooms.		
<u>Instrument Storage</u>		
Function: To provide storage space for all instruments.		
Equipment: Storage shelves.		
Finish: Rough.		
Related: Adjacent to instrument practice room.		
<u>General Office:</u>	1 @ 300	300
Function: To provide space for carrying out school administration.		
Equipment: Three desks, chairs, file cabinets, inter-school communication.		
Related: Close to major entrance.		
Capacity: Used by 3 or 4 people. Waiting area for 4 or 5 people.		
<u>Principal's Office:</u>	1 @ 150	150
Function: To provide private space for principal.		

* Areas that may be included in first stage of construction or left for the second stage.

<u>Space</u>	<u>Quantity</u>	<u>Area</u>
Equipment: Good quality chairs, tables, filing cabinets.		
Finish: Richly finished.		
Related: Adjacent to main office.		
Capacity: Room for 3 or 4 people.		
<u>Assistant Principal's Office:</u> *	1 @ 150	150
Function: To provide private space for assistant principal.		
Equipment: Good quality, chairs, table, filing cabinets.		
Finish: Richly finished.		
Related: Adjacent to main office.		
Capacity: room for 3 or 4 people.		
<u>Vault:</u>	1 @ 80	80
Function: To provide a safe place for school records.		
Equipment: Shelves, drawers.		
Finish: Rough.		
Related: Adjacent to main office.		
<u>General Supply Room:</u>	1 @ 300	300
Function: To provide storage space for office supplies and reproduction equipment.		
Equipment: Shelves and table.		
Finish: Rough.		
Related: Adjacent to main office.		

* Areas that may be included in the first stage of construction or left for the second stage.

<u>Space</u>	<u>Quantity</u>	<u>Area</u>
<u>Health Unit:</u>	1 @ 150	150
Function: To provide temporary space for minor sickness or injury.		
Equipment: One or two cots, first-aid equipment, chairs, shelves.		
Finish: Durable.		
Related: Near main office.		
Capacity: For 1 or 2 people.		
<u>Teacher's Lounge:</u>	1 @ 500	500
Function: To provide recreation and conference space for teachers.		
Equipment: Good quality chairs and tables.		
Finish: Good quality.		
Related: Close to kitchen and washrooms.		
Capacity: 22 teachers.		
<u>Teacher's Work Area:</u>	3 @ 150	450
Function: To provide space for parent-teacher conferences, and work space for teachers and assistants.		
Equipment: Desks, chairs.		
Finish: Good quality.		
Related: Adjacent to main office.		
Capacity: Used by 3 or 4 people.		
<u>Teacher's Washrooms:</u>	2 @ 100	200
Function: to provide segregated toilet facilities for teachers.		
Equipment: (for men) one water-closet, one urinal and one lavatory; (for women) one water closet, one lavatory.		

<u>Space</u>	<u>Quantity</u>	<u>Area</u>
Finish: Good quality.		
Related: Adjacent to lounge.		
Capacity: Used by 12 people of each sex.		
<u>Kitchen:</u>	1 @ 800	800
Function: To provide space for food preparation.		
Equipment: Ranges, ovens, freezing, miscellaneous, equipment.		
Finish: Good quality.		
<u>Serving Area:</u>	1 @ 400	400
Function: Provide area for serving cafeteria style.		
Equipment: Steam tables, coolers for beverages, storage for utensils, trays.		
Finish: Durable.		
Related: Adjacent to kitchen.		
Capacity: 400 people per hour.		
<u>Dishwashing room:</u>	1 @ 250	250
Function: To provide space for washing dishes and other utensils.		
Equipment: Small commercial dish-washer.		
Finish: Durable.		
Related: Adjacent to kitchen and close to multi-purpose room.		
Capacity: Operated by one person.		
<u>Food Storage:</u>	1 @ 100	100
Function: To provide storage for dry foods.		

<u>Space</u>	<u>Quantity</u>	<u>Area</u>
Equipment: Shelves		
Finish: Rough.		
Related: Near kitchen and unloading area.		
<u>Non-Food Storage:</u>	1 @ 100	100
Function: To provide storage for kitchen utensils and other hardware.		
Equipment: Shelves.		
Finish: Rough.		
Related: Adjacent to kitchen.		
<u>Cleaning Equipment Closet:</u>	1 @ 50	50
Function: To provide space for mops and brooms.		
Equipment: Service sink, shelves.		
Finish: Rough.		
Related: Near kitchen.		
<u>Garbage Area:</u>	1 @ 100	100
Function: To provide isolated space for garbage cans.		
Equipment: Garbage Can, washing hose, drain.		
Finish: Rough.		
Related: Adjacent to kitchen and unloading area.		
<u>Kitchen Office:</u>	1 @ 100	100
Function: To provide space for meal-planning and bookkeeping.		
Equipment: Desk, chair, file cabinets.		
Finish: Durable.		

<u>Space</u>	<u>Quantity</u>	<u>Area</u>
Related: Adjacent to Kitchen.		
Capacity: Used by one person.		
<u>Library Reading Room:</u> *	1 @ 3000	3000
Function: Provide space for books, pamphlets, magazines, librarians desk, audio-vision.		
Equipment: Bookshelves, tables, chairs, desks.		
Finish: Good quality.		
Related: Close to main office.		
Capacity: 50 students.		
<u>Reading Room:</u> *	1 @ 500	500
Function: To provide separate studying space for students using library.		
Equipment: Tables and chairs.		
Finish: Durable.		
Related: Near library.		
Capacity: 40 Students.		
<u>Library Work Room:</u> *	1 @ 250	250
Function: To provide storage for books and for book repair.		
Equipment: Sink, work bench, shelves.		
Finish: Rough.		
Related: Adjacent to library.		
<u>Study Cubicles:</u> *		

Function: To provide space for isolated study.

* Areas that may be included in first stage of construction or left for the second stage.

<u>Space</u>	<u>Quantity</u>	<u>Area</u>
Equipment: A 2 foot by 4 foot study desk.		
Finish: Durable.		
Related: Near library.		
Capacity: Two per desk.		
<u>Student's Washrooms:</u>	2 @ 250	500
Function: To provide segregated washroom facilities for students in grades 2, 3 and 4.		
Equipment: (total boys) 4 water-closets, 3 lavatories, 5 urinals; (total girls) 8 water closets, 3 lavatories.		
Finish: Durable.		
Related: Centrally located in school.		
Capacity: Each used by about 100 students.		
<u>Mechanical Room:</u>	1 @ 500	500
Function: To provide space for mechanical equipment such as boiler, air-condition unit and for burning rubbish.		
Equipment: All heavy equipment such as boiler, air-conditioner units and an incinerator.		
Finish: Rough.		
Related: Away from classrooms.		
<u>Janitor's Closets:</u>	3 @ 50	150
Function: To provide space for janitorial equipment.		
Equipment: Service sink, storage shelves.		
Finish: Rough.		
Related: Centrally located throughout building.		

<u>Space</u>	<u>Quantity</u>	<u>Area</u>
<u>Main Lobby:</u>	1 @ 500	500
Function: To provide space for a public and student entrance.		
Equipment: Chairs, couches, magazine racks, water fountain.		
Finish: Good quality.		
Related: Near Main office.		
Capacity: to handle 200 people.		
<u>Fifth and Sixth Grade Classrooms:</u> *	10 @ 900	9000
Function: to provide lecture space for 10 classrooms (2 math, 2 English, 2 social studies, and 4 regular).		
Equipment: Tablet arm chairs, moveable speaker's platform, chalk-boards.		
Finish: Durable with acoustic treatment.		
Related: Near library and reference material.		
Capacity: 30 students per classroom.		
<u>Science Room:</u> *	2 @ 900	1800
Function: To provide lecture space and to carry out science experiments.		
Equipment: Standard experiment tables, tablet arm chairs, sinks, natural gas and electric outlets.		
Finish: Durable and acid resistant.		
Related: Adjacent to science store room.		
Capacity: 30 students.		

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<u>Space</u>	<u>Quantity</u>	<u>Area</u>
<u>Science Store Room:</u> *	1 @ 150	150
Function: To provide storage space for the apparatus and chemicals used in science experiments.		
Equipment: Storage Shelves.		
Finish: Rough.		
Related: Adjacent to science classrooms.		
<u>Student's Washrooms:</u> *	2 @ 300	600
Function: To provide segregated toilet facilities for the students.		
Equipment: (total boys) 5 water closets, 6 urinals, 3 lavatories; (total girls) 9 water closets, 3 lavatories.		
Finish: Durable.		
Related: Close to classrooms.		
Capacity: used by 180 of each sex.		
<u>Art Classroom:</u> *	1 @ 1500	1500
Function: To provide space for art lectures and practice in using various art medias.		
Equipment: Sinks, tables, easels, chairs chalkboard.		
Finish: Durable.		
Related: Adjacent to storage room.		
Capacity: 30 students.		
<u>Art Store Room:</u> *	1 @ 500	500
Function: To provide storage space for art equipment.		

* Areas that may be included in first stage of construction or left for the second stage.

<u>Space</u>	<u>Quantity</u>	<u>Area</u>
Equipment: Shelves.		
Finish: Rough.		
Related: Adjacent to art classroom.		
<u>Janitor's Closets:</u> *	2 @ 50	100
Function: To provide space for janitorial equipment.		
Equipment: Service sinks, storage shelves.		
Finish: Rough.		
Related: Centrally located throughout building.		
<u>Halls:</u>	15% of enclosed area	
Function: To provide a means of circulation between areas in the school.		
Equipment: Drinking fountains.		
Finish: Durable.		
Related: Pass by each useable area.		
Capacity: Handle circulation for entire school.		

* Areas that may be included in first stage of construction or left for the second stage.

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Stanley V. ...

AN ELEMENTARY SCHOOL FOR BOZEMAN, MONTANA

The basis for my design thesis was a two stage planning program for an elementary school on Thompson Site in Bozeman, Montana. The initial stage (K-4) is to consist of eight classrooms, a kindergarten, and all needed facilities. The second stage (5th & 6th grades), which is planned for eight to ten years later, is to consist of approximately fourteen classrooms plus all other needed facilities. Site of my school is not on land presently owned by Bozeman School Division. Reason for choosing alternate site was that the present site is too small for anticipated enrollment, and a park is planned for the western side of my site.

In planning for the initial stage the following factors were considered:

(1) Such facilities as a multi-purpose room, mechanical room, and administration offices would serve later additions with a minimum of costly renovation, and a minimum of disruption of school activities during the school year.

(2) A separation of kindergarten and grade one students from other classes with separate entrances, washroom facilities and playgrounds.

(3) Service and circulation areas on school site planned in such a manner that there would be a minimum of alteration needed when addition was built.

For second stage, besides the obvious need for proper size and placement of classroom and other facilities, consideration was given to eliminate congestion at any point in the school enclosure and on sidewalks after dismissal of classes.

Stanley Verbisky

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