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A CATTLE RANCH COMPLEX NEAR JACKSON, MONTANA

Part I

Undergraduate Thesis in Architectural Design

By 441

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at

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need

CONDITIONS CREATING A NEED
FOR A CATTLE RANCH COMPLEX

1.1

There is a definite absence of a precedent in cattle ranch architecture. Until the settling of the Americas and primarily the western United States, the breeding and raising of beef cattle was secondary to the planting and raising of crops. Up to the industrial revolution, the ratio of rural population to urban population was large enough and wild game was abundant enough that the large scale raising of beef cattle was unnecessary.

With the industrial revolution, the rural population began moving to the city to answer the call for more manpower. There were less people raising cattle and more people needing meat. At the same time, the vast herds of wild game dwindled due to the mass killing for fur and hides.

In the early nineteenth century, there was suddenly a need for large scale production of beef. Instead of evolving, the cattle ranch in the United States was suddenly born. The crops on these ranches became restricted to the secondary role of cattle feed. During this sudden birth, the architecture of cattle ranches was mostly borrowed from other agricultural forms. The barns, shops, sheds, and other out-buildings were borrowed from crop-oriented farms and adapted to their new role. The ranch house was borrowed from whichever style pleased the owner, but almost inevitably borrowed. The advent of concrete block, corrugated metal, the quonset hut, and the prefabricated metal building saw the adaption of these new, economical forms into the ranch complex. All this bastardization resulted in the hodgepodge of eclectic ranch houses, dairy type barns, fallen down sheds, log buildings, quonset huts, and shiny steel buildings too often seen on any jaunt through our ranching areas. Occasionally one sees a conscious attempt to use all the same style structures or to paint all the buildings the same color. In spite of this consciousness, the result is still adaptation.

Since a ranch complex is very often the only concentration of man-made structures on a large expanse of land, it becomes important that the complex be the center of this land both functionally and aesthetically. From this, the location of the building site should



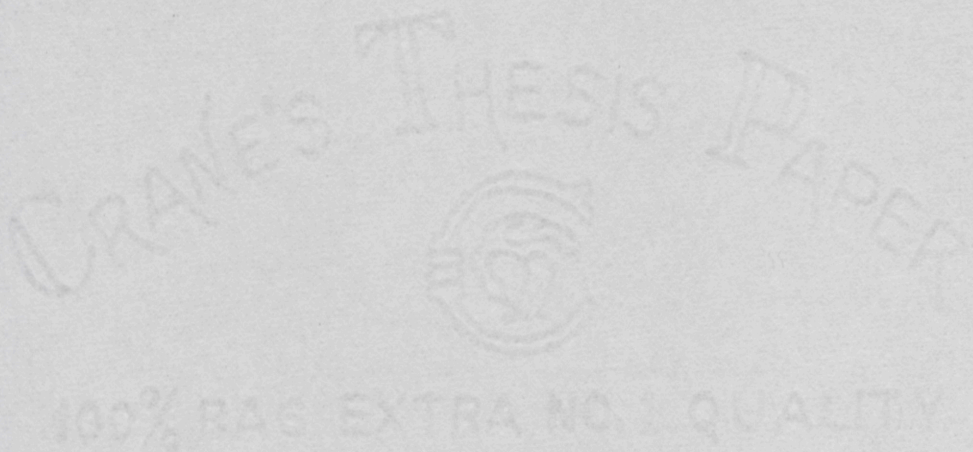
EXISTING BUILDINGS

be chosen with regard to visual, topographical, and functional opportunity.

Paul A. Johnson, a cattle rancher near Jackson, Montana, has recently purchased a ranch adjacent to his own. The building complex on the annexed ranch remains, but most of the operational machinery, furnishings, and tools were taken by the previous owners. The original and the new building complexes have served their respective lands efficiently in the past. Each complex was located in the nineteenth century with regard to certain conditions which no longer exist or can now be disregarded. They are both located in sheltered hollows near water springs. They sacrifice visual surveillance and functional centrality. Of course, with the relatively small original lands these locations sufficed, but with the expansive character of the combined lands, neither of the locations function suitably. At present, tools and machinery are at either one location or the other and never at the right one. The owner cannot afford to equip and man two locations when one central complex could do the job easily with the present equipment and men.

I believe, as the owner of the ranch does, that there is a definite need for a centralized ranch building complex. With much combining and enlarging of ranches being done now and to be done in the

future, this is probably not a very uncommon situation. However, I see within this experiment a response to an environment in which architecture has never played a large role. I must ignore precedent in my design and work entirely from the functional conditions and aesthetic considerations presented by all of the factors which bear upon this ranch.



local

LOCAL CONDITIONS

2.1 HISTORICAL:

In winter, nobody ventured there. In summer, the Shoshone, Nez Perce, and Flathead Indians set up their encampments amid the many lakes and streams to trade and to hunt the vast herds of elk and bison. They named this valley "La-im-tse-la-lik"¹ (the place of the ground squirrel).

In 1806, Captain William Clark, on his return trip from the Pacific Ocean, camped in the valley near what is now Ruby Creek. At noon, July 7, Clark and a small party, including Charbonneau and Sacajawea, ate a lunch of boiled meat. It was cooked in a natural hot springs at what is now Jackson, Montana.² Clark named the river "the Wisdom River" and the valley "the Hot Springs Valley". The Wisdom River was later changed to "Wise River" and much later

to "The Big Hole River". There is little available information about the name "Big Hole". Bob Fletcher writes in Montana Highway Historical Markers, "'Hole' was a term frequently used by fur trappers of the last century to designate a mountain valley. An extensive valley west of here drained by this river became known as "The Big Hole" and the name of the river was changed accordingly".³

In the 1820's and 1830's, the Big Hole was trapped by such men as John Colter and Alexander Ross. In the 1860's, gold was discovered in Montana and some placer mining was done in the Big Hole. In 1877, the Battle of the Big Hole was fought between the Nez Perce and the United States Cavalry near Ruby Creek.

Eventually, the cattle ranchers in the surrounding valleys pastured their cattle for the summers on the rich wild hay in the Big Hole. The 1880's and 1890's saw the first permanent homesteads. From there, cattle ranching in the Big Hole developed on an isolated scale from surrounding areas. The abundance of wild hay made plowing and planting unnecessary. The superb watershed made flood irrigating possible. The rocky, rough ground limited haying methods. The extreme cold and deep snow dictated special winter methods of work and travel.

2.2 PRESENT CONDITIONS:

At present, the Big Hole Valley is the home of some of the highest quality cattle ranches in the world. The ranchers who live there have considered the advantages and disadvantages of the life they lead. They remain there only after the unspoiled country, the friendly people, and the uncomplicated life have become more important to them than the discomforts of cold and snow, unpaved roads, and the isolation of miles and telephone lines. They are a hardy people who are largely naive about the problems of the outside world. They don't wish to see their valley exploited and spoiled.

Jackson is located on Montana Highway 278 about fifty miles west of Dillon. There is a country spur road which will serve the proposed site. It presently serves seven ranches (including the two ranches I am concerned with) and the U. S. Forest Service Campground at Miner Lake. Within the next five years, the Foot-hills Road, planned by the U. S. Forest Service to encircle the entire valley, will pass within a mile of the proposed site.

Jackson is served by one summertime airstrip, but local people rely on the airports in Dillon and Butte. Railroad and bus facilities are available in Dillon, Butte, and Hamilton. Dillon and Butte each operate a livestock auction in conjunction with railroad shipping facilities.

School facilities in the valley are a big problem. There is no kindergarten available. Grades one through eight are taught in a school in Jackson. Grades one through four are taught by one teacher and grades five through eight by another. Grades nine through twelve must ride the school bus fifty miles to the high school in Dillon each morning and return each afternoon. Roads must be kept open at all times because of this.

Cattle ranching in the Big Hole is becoming more and more mechanized. New methods of snow transportation and improved methods of haying, cattle feeding, and cattle care are making it possible for the rancher to handle ever increasing amounts of cattle and land. By the same token, the present government regulations and current price scales are making it necessary for the rancher to operate on a larger scale than before in order to be financially successful. On the other hand, decentralization of control and duplication of facilities are major hindrances to the expanding rancher. Because of the travel conditions and large disjointed ranches in the Big Hole, decentralization and duplication become primary considerations when expanding a ranch.

2.3 GEOGRAPHICAL:

The Big Hole Valley or Big Hole Basin is located in the extreme southwest corner of Montana. The headwaters of the Big Hole River

is about fifty miles west of Dillon, Montana. The valley opens into the Beaverhead Valley about 25 miles south of Butte, Montana. The Big Hole River joins the Beaverhead-Red Rock River near Twin Bridges, Montana to form the Jefferson River, which joins with the Madison and Gallatin Rivers at Three Forks to form the Missouri River. The main body of the Big Hole Valley is about 75 miles long and about twenty miles wide at the widest point near Wisdom, Montana. The valley follows a generally northerly direction, curving clockwise to form a crescent open to the east. The Continental Divide forms the outside of the crescent to the north, west, and south. The Pioneer Mountains form the interior or core of the crescent. The average elevation of the agricultural area of the valley is about 6500 feet. Some of the surrounding mountains reach into the 10,000-11,000 feet range.

There is very little absolutely level or plane land in the Big Hole. On the west side of the Big Hole River the land consists of many gently rolling hills rising to meet the mountains of the Continental Divide. These hills are interlaced with many streams and marshes. On the east side of the river the land is generally flat for two or three miles, after which it rises quickly into the foothills at the base of the Pioneer Mountains.

Montana Highway 278 enters the upper valley from Dillon over the

Big Hole Pass, about ten miles from Jackson. It follows the Big Hole River and rejoins U. S. Highway 91 at Divide. This is the main transportation route, although there are other roads which leave the valley. There is a U. S. Forest Service maintained road which follows the Big Hole River to its source and crosses into Horse Prairie. Gibbonsville and Lost Trail Passes cross into Idaho from Wisdom, but the Gibbonsville road is seldom used now. There is also another state highway which leaves Montana 278 near Wise River and emerges near Anaconda.

2.4 CLIMATE:

As there exist no official meteorological recordings concerning the Big Hole Valley, this information is largely from my personal experience.

The vicinity of Jackson receives 16-18 inches of precipitation a year. Maximum snow depths in the vicinity of the proposed site are about 25-40 inches (see figure 1).⁴ Most of the precipitation falls in the months of January, February, and June. July and August are usually quite dry. Winds blow generally out of the west and southwest. Occasional storms come out of the east. Wind velocities reach 30 miles per hour regularly. Temperatures reach 90 degrees in the summer and drop to -50 in the winter. However, with the high altitude, the summers seem much warmer, and with

MINER LAKE

Sec 9 T 6S R16W

LAT. 45-19 LONG. 113-34

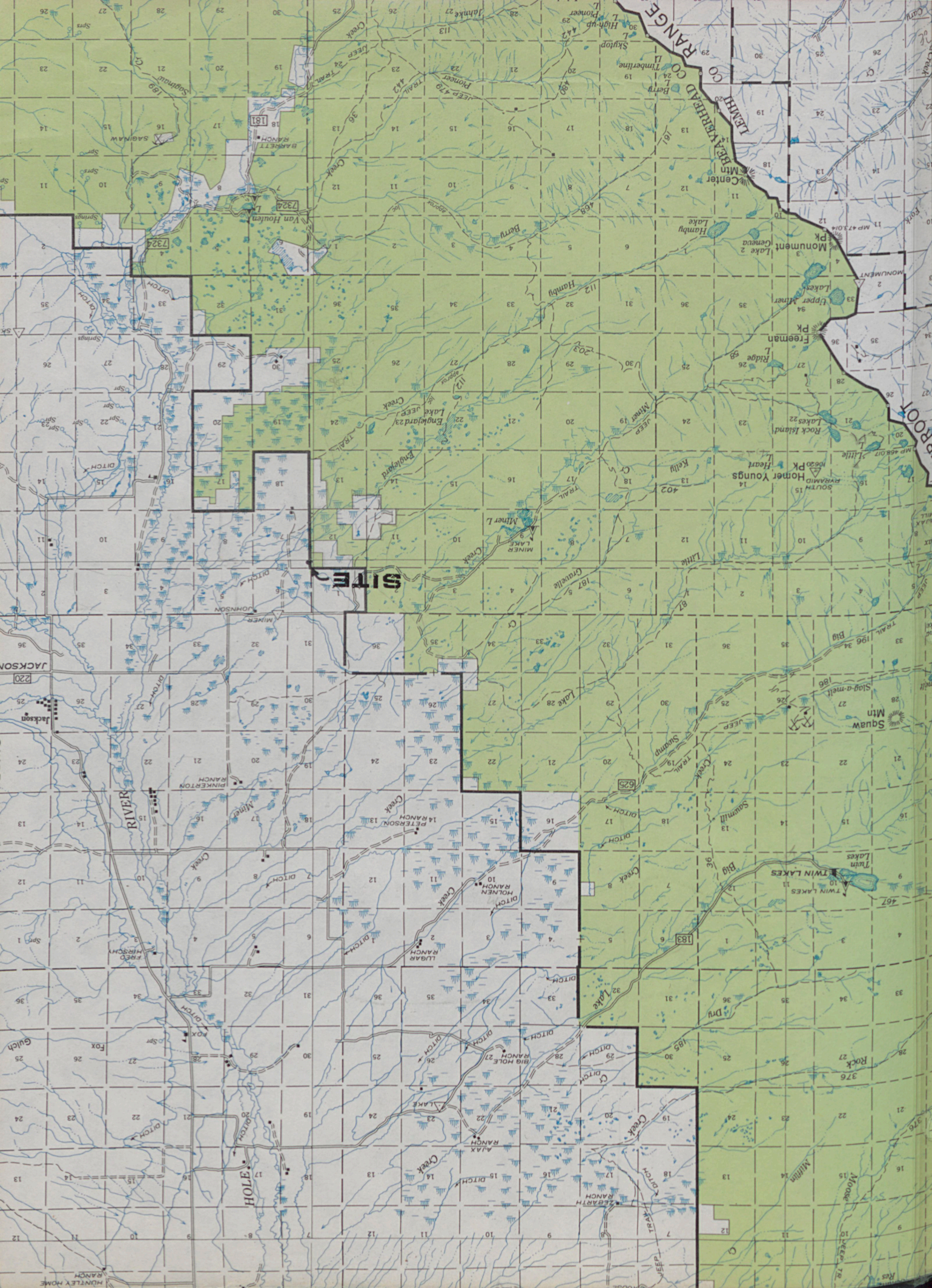
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MISSOURI - BIG HOLE

Year	Feb. 1			Mar. 1			Apr. 1			May 1		
	Date	Depth	Water	Date	Depth	Water	Date	Depth	Water	Date	Depth	Water
1945				2/28	21	4.0	3/30	23	5.5	5/01	7	2.4
1946				3/01	35	7.1	3/29	31	7.6			
1947				3/02	39	10.4	4/01	35	10.2			
1948	2/19	20	4.3	3/01	26	6.6	3/26	30	7.6			
1949				2/22	39	9.4	3/21	38	10.6			
1950				2/08	24	5.8	3/14	27	7.6			
1951				2/11	32	8.1	3/12	39	10.2	4/30	12	3.4
1952				2/15	31	7.6	3/14	37	9.9			
1953				2/14	26	6.9	3/14	36	9.6			
1954				2/14	32	6.9	3/14	32	9.8			
1955				2/13	19	3.4	3/19	28	7.5			
1956				2/17	37	9.9	3/16	44	12.4			
1957				2/16	30	5.6	3/16	42	9.6			
1958				2/15	24	5.2	3/15	27	6.0			
1959				3/01	27	7.0	3/31	30	10.8			
1960				2/27	28	5.7	3/25	26	6.5			
1961				2/28	25	5.0	3/24	23	5.9			
1962				2/28	36	7.3	3/27	35	8.6			

the low humidity, the winters seem much milder. Frost is usually seen every month of the year. The growing season is short. Snow remains until late April and falls again in September. Irrigating begins in early June, and haying begins in the last week of July. Any cultivated gardens or crops of unhardy variety need special care to survive the frosts.





site

SITE CONDITIONS

3.1

The land on which my proposed ranch complex is to be located was opened for homesteading in 1880. The filing charge was twenty-five cents per acre for 160 acres. The proving-up fee, after five years and certain improvements, was one dollar per acre for the title.⁵ "In 1912 the Montana Legislature passed the Enlarged Farm Act, increasing the original 160 acres to 320 for a homestead. The time was reduced from five to three years for proving up, with five months absence allowed from the claim each year."⁶

In time, people who couldn't take the cold and snow in winter and the mosquitos in summer, and people who just weren't ranchers moved off and sold their property. Some of the wealthier families

soon became very large land owners. By about 1920, after a certain amount of buying, selling, and trading, the shapes of most of the ranches were formed. These ranches occupy pretty much the same lands today, though ownerships have changed and many have been combined.

My proposed site is about six miles west of Jackson. It has an elevation of 6800 feet above sea level. It is located at 45 degrees, 20 minutes North latitude and 113 degrees, 30 minutes West longitude. Presently, the ranch consists of approximately 2960 acres. Of this, 1900 acres are in pasture, and 1560 acres are hayed. The ranch has U. S. Forest Service grazing permits for 325 cows and calves. The total cattle herd numbers about 550, including range cows, calves, bulls, special breeding stock, and feeder stock. This number sometimes drops to around 375 or jumps to around 725, depending on when the feeder stock is sold. The ranch supports about 25 head of work, riding, and breeding horses. A few dairy cows are maintained. Poultry and occasionally swine are raised.⁷

Jackson is the immediate source of staple food and clothing. Two garages are located in Jackson for machinery repair and maintenance. There is a post office in Jackson which is served once a day by motor stage from Dillon. Dillon is the closest source of train and bus transportation. Cattle are usually shipped to the stock-

yards in Dillon or Butte.

Wells have always been dug at random throughout the valley. It is only a matter of getting deep enough for suitable household water. Englehard Creek runs through the proposed site to provide water for the livestock.

The soil is usually 10 to 24 inches of loam over clean gravel or over a gravel clay mixture.⁸ The soil in the Big Hole is generally too rocky for plowing. Rocks which are pushed up by frost are picked up and stacked along the fences. The soil supports a lush crop of wild grasses with about a month of flood irrigating.

For the purpose of this paper, let me call the original complex, "the Johnson Ranch" and the recently acquired complex, "the Lightfoot Ranch". The complex was purchased from Frank Lightfoot.

The buildings on the Johnson Ranch are in sad disrepair. There is one concrete block garage which is about ten years old, but the rest of the buildings are mostly in the 50-60 year old range. The buildings on the Lightfoot Ranch are in somewhat better condition. The house and a few out-buildings are of peeled and varnished log construction. They are about twenty years old. The rest of the

buildings are of the sort to be found on the Johnson Ranch. There are, in addition, two abandoned ranch complexes and several abandoned cabins on the property.

I chose the site, with the help of Mr. Johnson, primarily for its commanding view of the work fields.

In addition, there is an adjacent downwind area with water for stock. There are aspen and evergreen thickets immediately to the west of the site. These trees and the hills to the west will afford some protection from the wind. A long, open ridge connects the site with the Lightfoot lane. This ridge never has much snow in the winter and might be a good location for an access road. Power and telephone lines are also located along the Lightfoot lane. The site is presently a sagebrush hill, so no hay land will be used for the complex other than for the access road.



1



2



3

SITE

I want to take these photos in May when the snow leaves. They will be similar to the winter photos.



RANCH LAYOUT

A+00

B+00

C+00

D+00

E+00

F+00

G+00

A+10

B+10

C+10

D+10

E+10

F+10

G+10

NORTH

A+20

B+20

C+20

D+20

E+20

F+20

G+20

A+30

B+30

C+30

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E+90

F+90

G+90

SITE CONTOURS

SCALE : 1" = 100'
CONTOURS = 5'-0"

function

FUNCTIONAL CONSIDERATIONS

4.1 INTRODUCTION:

Part of the definition of "function" found in Webster's New Collegiate Dictionary reads, "the action for which a person or thing is specially fitted or used or for which a thing exists". The thing which exists for the action could be a room, a space, an object, or any of an infinite number of preconceived ideas. The definition says the function is the action, and not the thing.

I believe design should be creative from the outset. I do not believe I should limit or even categorize, as yet, the things which perform the functions. I am not going to even try to estimate area requirements for a certain function. The only

size limitation will be based on the size of the persons or objects which perform the functions. For instance, the space taken by a person turning around will be naturally much smaller than the space taken by a tractor and wagon turning around. To follow an old cliché, form will attempt to follow function.

I shall, for the purpose of this paper, try to categorize and relate the many functions into two general areas, domestic and work.

This does not define areas, only activities.

4.2 FAMILY DOMESTIC FUNCTIONS:

Sleeping: The family presently consists of two adults. Three or four children are planned. Sleeping space should be provided for these people. Guest sleeping should be provided for two couples.

Connected storage: Space should be provided for extra bed linen and blankets.

Dressing: Changes of clothing are often required during the day at any time. Private dressing should be provided for each member of the family and for guests.

Connected storage: Space should be provided for keeping clothing and shoes for each member of the family. Space should be provided for guests to keep clothing brought with them.

Grooming: The members of the family will need to brush hair,

straighten clothing, set hair, put on make-up, etc.

Connected storage: Space is needed to store brushes, combs, curlers, make-up, etc.

Bathing: Bathing is usually necessary each day. Adequate bathing facilities should be provided so no member of the family must wait too long to bathe. Bathing facilities should also be provided for guests.

Connected storage: Space should be provided for storing towels, washcloths, etc.

Personal hygiene: Members of the family and guests will shave, wash, brush teeth, etc. each day.

Connected storage: Space should be provided for soap, washcloths, toothbrushes, etc.

Sanitary: Members of the family will need facilities for toilet functions. Often they will be coming in from outdoors for this.

Connected storage: Space should be provided for toilet paper, etc.

Cooking and food preparation: Three meals will be prepared by the wife each day for her family and guests. These meals are often quite large. Snacks are also prepared at any time. A wood stove is provided for power outages, which are quite common.

Connected storage: Space will be provided for necessary cooking and preparation equipment and utensils. Food storage of all kinds should also be provided.

Eating: The family and guests eat three organized meals per day. They may also eat snacks which can either be planned or impromptu. Some formal meals may be given.

Connected storage: Space should be provided for all dishes and utensils needed for eating.

Guest entertaining: Up to twenty guests may be entertained at one time. People in the Big Hole often give parties for all their neighbors. Mixed drinks are in order for these occasions. Some kind of food is usually served and cards are played. Much talk is exchanged. Children often come with their parents and play in a separate part of the house.

Connected storage: Space should be provided for liquor, glasses, trays, etc.

Television watching: The family often watches television in the evenings and on weekends.

Connected storage: none

Stereo listening: The stereo is often used in conjunction with other everyday functions.

Connected storage: Space should be provided for record storage.

Billiards: The family owns a regulation size pocket billiards table which is used quite frequently.

Connected storage: A cue rack should be provided.

Reading and writing: Some reading and letter writing is done

in the evenings.

Connected storage: Space should be provided for books, and writing materials.

Telephone use: Business and social calls are received at any hour of the day.

Connected storage: none

Children playing: Three or four children will need a place to play roughly on stormy days and in winter. They will sometimes entertain guests of their own.

Connected storage: Space should be provided for toys and play materials.

Children studying: The children will sometimes need isolation to read and do schoolwork.

Connected storage: Space should be provided for books, paper, etc.

Planting: The lady of the house enjoys houseplants and indoor gardens.

Connected storage: Space should be provided for small gardening supplies.

Sewing: The wife patches and sew her family's clothes. She also enjoys making her own clothes.

Connected storage: Space should be provided for sewing materials, cloth, etc.

Ironing: The wife has much ironing to do throughout the week.

Connected storage: Space should be provided for pre-ironed clothes.

Washing and drying: The wife will wash and dry clothes twice or three times a week.

Connected storage: Soiled clothing should be kept out of sight. Space should be provided for soap and bleaches.

House cleaning: Various parts of the house will have to be cleaned in varying degrees each day.

Connected storage: Space should be provided for vacuum cleaners, brooms, mops, pails, cloths, fluids, etc.

Wiping feet and removing wet clothing: When a person comes in from out of doors, he wants a place where he can wipe his feet, remove any wet clothing, and perhaps clean up a bit before he goes into the house itself.

Connected storage: A place should be provided to store coats, hats and overshoes. Sporting equipment could perhaps be stored in conjunction with this function.

4.3 HIRED COUPLE DOMESTIC FUNCTIONS:

Sleeping: A couple and one or two children will require sleeping facilities.

Connected storage: Space will have to be provided for extra blankets and bed linen.

Dressing: The couple and their children will dress in the morning

and will often require changes of clothing during the day.

Connected storage: Space should be provided for clothes and shoes.

Grooming: The couple and their children will brush and comb hair, set hair, straighten clothing, apply make-up, etc.

Connected storage: Space should be provided for combs, brushes, make-up, etc.

Bathing: The couple and their children will want to bathe on the average of once every two days.

Connected storage: Space should be provided for towels, washcloths, soap, etc.

Personal hygiene: The family will want to wash, brush teeth, etc. several times a day.

Connected storage: Space should be provided for washcloths, soap toothbrushes, etc.

Cooking and food preparation: The wife will prepare three regular meals per day for her family plus two hired men. She may also prepare various snacks for her family.

Connected storage: Space should be provided for food, cooking and preparation equipment.

Eating: Up to six people will eat three meals per day. Any of the four family members will want snacks at any hour.

Connected storage: Space should be provided for eating dishes and utensils, extra chairs, etc.

General relaxing: The family will want to sit around in the evenings and perhaps watch television, read, write, play cards, entertain guests, etc.

Connected storage: Space should be provided for books, trays, and general storage.

Sewing and Ironing: The wife will iron for her family any time during the week. She may patch and sew clothing for her family.

Connected storage: Space should be provided for sewing materials, and pre-ironed clothes.

Washing and drying: The wife will wash clothes for her family several times during the week.

Connected storage: Soiled clothing should be kept out of sight until wash time.

Sanitary: The members of the family will need toilet facilities at any time without too much waiting.

Connected storage: none

House cleaning: The wife will clean her house in various degrees each day.

Connected storage: Space should be provided for mops, brooms, cloths, pails, etc.

Wiping feet and removing wet clothing: There should be a place where people may enter from outdoors without messing up the main part of the living area.

Connected storage: Space should be provided for coats,

hats, and overshoes.

4.4 HIRED MEN DOMESTIC FUNCTIONS:

Sleeping: One or two men will work on the ranch year round. Up to twelve men will be hired during haying for a duration of three weeks. These men must have suitable sleeping facilities.

Connected storage: Space should be provided for extra blankets and bed linen.

Dressing: The permanent men should be able to dress in the mornings and change clothes during the day. The haying crews will want to dress in the mornings.

Connected storage: Space should be provided for the permanent men to store their clothing and shoes. Some space will be needed for haying crews to stow the clothing brought with them.

Personal hygiene and grooming: All of the men will want a chance to brush their hair, brush their teeth, wash before meals, etc.

Connected storage: Space will be needed for brushes, combs, toothbrushes, washcloths, etc.

Bathing: All of the men will want to bathe often because of the nature of their work. They should all be able to bathe in a three-hour period.

Connected storage: Space will be needed to store soap, washcloths, and towels.

Sanitary: The men will need sanitary facilities usually in a concentrated time period in the mornings and evenings. This is true especially for the haying crews. The permanent men will need a slightly nicer facility.

Connected storage: Space should be provided for toilet paper, etc.

General relaxing: The men will want to sit around in the evenings and talk, play cards, read, write, etc.

Connected storage: Some space will be needed for books, etc.

Washing and drying: Each man will usually want to wash his clothes once a week.

Connected storage: Some space will be needed for soap, bleaches, etc. The permanent men will want some space to keep their soiled clothing out of sight.

Wiping feet and removing wet clothing: The men will want a place to clean up a bit and remove their outdoor clothing before entering their living quarters.

Connected storage: A place will be needed to keep coats, hats, and overshoes.

4.5 WORK FUNCTIONS (SUMMER):

Irrigating: The men will irrigate in the fields every day during June. Shovels are used mostly. Sometimes a tractor with a

ditch spinner or a crawler with a blade is used, depending on the magnitude of the ditchwork to be done.

Connected storage: Space should be provided for shovels, a Farmall "H" tractor, and a Caterpillar D-5 crawler with blade.

Fence repair: Fence maintenance is kept up through the summer months. Fences are of the pole "jack fence" type and log serpentine fences.

Connected storage: Space will be needed for axes, eight pound hammers, kegs of spikes, etc.

Fence building: Logs and poles are cut on the forest. These are brought to the fence building site on wagons. Often feeder fence panels are built at the ranch site.

Connected storage: One Ford Tractor and pole wagon will often be at the ranch complex.

Cattle cutting and sorting: From time to time the rancher will want some cattle separated or reshuffled. This is done by people on foot in a network of corrals and gates.

Connected storage: none

Rock picking: In the spring, rocks which were raised by the frost have to be picked up and stacked along the fence lines. This is done with a skid behind a tractor.

Connected storage: Space will have to be provided for a three-feet by five-feet skid boat.

Brushing: In the spring, the matted down grass and manure have to be broken up in order to keep a full natural hay crop. This is done with a chain link mat dragged behind a tractor.

Connected storage: Space will be provided for hanging up a ten feet by twenty feet brush.

Machinery repair: Much machinery repair and maintenance is done at all times during the year. This includes every phase of repair work except engine overhauling. A particularly heavy repair load is encountered before haying in July. Engines are sometimes removed.

Connected storage: There will have to be space for welding equipment, scrap iron, spare parts, bolts and nuts, tools, etc.

Riding range cattle: The cattle are put on the Forest Service range in late May. They must be checked periodically and sometimes moved to better grazing.

Connected storage: Space should be provided for tack, horse trailer, etc.

Salting: The range and pasture cattle have to be supplied with salt several times during the summer. This is often done in conjunction with range riding.

Connected storage: Space should be provided for one hundred blocks of salt, one hundred sacks of salt, and one hundred sacks of assorted supplements.

Butchering and meat cutting: About five or six times in the warm months butchering is done and the meat is processed and packaged right on the ranch.

Connected storage: Places will be needed for knives, saws, packaging equipment, and meat storage.

Milking and separating: Twice a day, two or three cows are milked. The cows are fed grain at each milking. Part of the milk is saved for household use. The rest is separated. The cream is sold to the creamery in Dillon. The skim is fed to the chickens and swine.

Connected storage: Space will be needed for six one hundred-pound sacks of grain, milk buckets, etc.

Chicken keeping: About fifty hens are kept for eggs and eating. Eggs are partly used and partly sold or given away. The chickens are cared for once a day by the wife. They are usually fed wheat and milk.

Connected storage: Space should be provided for six one hundred-pound sacks of wheat.

Horse breaking: Yearling colts are usually broken to lead and ride each summer.

Connected storage: Space should be provided for training bridles, ropes, etc.

General horse care: Horses are often used during the warm months for many miscellaneous and pleasure uses. They must be fed,

grained and groomed.

Connected storage: Spaces should be made for loose hay, twelve one hundred-pound sacks of crushed oats, grooming equipment, etc.

Branding and vaccinating: Often there is a need for cattle to be held immobile and branded, castrated, dehorned, vaccinated, etc.

Connected storage: Space is needed for branding and veterinary equipment.

Supply and social travel: A trip is usually taken once a day to gather mail and immediate supplies. A cooperative system is used to get the children to school. Trips are made for major supplies about every two weeks. Social trips are made often. In winter, four-wheel drive vehicles must be used.

Connected storage: Space is needed to keep one car, two jeeps, and two half-ton pickups.

Ranch observation and office work: There should be a place where the rancher can look over most of his ranch. This should be closely connected to the bookkeeping and business end of the ranch.

Connected storage: A place should be available for books, papers, binoculars, etc.

4.6 WORK FUNCTIONS (WINTER):

Milking and separating: Twice a day, two or three cows are milked. The cows are fed grain at each milking. Part of the milk is

saved for household use. The rest is separated. The cream is sold to the creamery in Dillon. The skim is fed to the chickens and swine.

Connected storage: Space will be needed for six one hundred-pound sacks of grain, milk buckets, etc.

Chicken keeping: About fifty hens are kept for eggs and eating. Eggs are partly used and partly sold or given away. The chickens are cared for once a day by the wife. They are usually fed wheat and milk.

Connected storage: Space should be provided for six one hundred-pound sacks of wheat.

General horse care: Horses are often used during the winter months for many miscellaneous work uses. They must be fed, grained and groomed.

Connected storage: Spaces should be made for loose hay, twelve one hundred-pound sacks of crushed oats, grooming equipment, etc.

Swine raising: Four or five swine are raised for eating and selling. They are fed scraps and milk.

Connected storage: none

Firewood gathering: Wood for the supplementary woodburning stoves and for fireplaces must be gathered from a central storing place.

Connected storage: A place must be made capable of holding twenty cords of stove wood and twenty cords of fireplace

wood. Smaller storage places should be near each burning apparatus.

Feeding feeder stock: Feeder racks are filled with loose hay which is brought in from field stacks on horse drawn sledges. When there is not enough snow for the sledges, wagons are used. Sometimes the sledges are tractor drawn within the immediate packed area of the ranch.

Connected storage: Space must be provided to store four sets of work harness, pitchforks, three hay racks on sledges and three hay racks on wagons.

Feeding breeding stock: Breeding stock is fed with feeder racks built around the field stacks. The men go out to the various stacks by snowmobile or snowplane.

Connected storage: Space should be provided for snowmobile and snowplane storage.

Loading hayracks: The hay is put in the hayracks by a four-wheel drive double-claw loader.

Connected storage: A space is needed to store the loader.

Supply and social travel: A trip is usually taken once a day to gather mail and immediate supplies. A cooperative system is used to get the children to school. Trips are made for major supplies about every two weeks. Social trips are made often. In winter, four-wheel drive vehicles must be used.

Connected storage: Space is needed to keep one car, two jeeps, and two half-ton pickups.

Ranch observation and office work: There should be a place where the rancher can look over most of his ranch. This should be closely connected to the bookkeeping and business end of the ranch.

Connected storage: A place should be available for books, papers, binoculars, etc.

4.7 HAYING FUNCTIONS:

General: The haying crew consists of three mowers, two stackers, one hoist operator, three power buckrake operators, two straight rakers, and three clean-up rakers. The hay is stacked loose with a beaver slide stacker. The men work a ten hour day with an hour off for lunch.

Connected storage: Space is needed to keep three buckrakes, three dump rakes, two side delivery rakes, six tractors, one dump truck, and assorted pitchforks and accessories.

Machinery repair: In the evenings, the machinery which needs repair or maintenance is brought in and worked on. The other machinery is left in the field overnight.

Connected storage: Space should be provided for rake teeth, mower sickles, etc.

Cooking and eating: The hay crew is usually fed by the wife

of the hired couple in a special dining area.

Connected storage: Places are needed for eating utensils and dishes, and special large cooking equipment.

4.8 CALVING FUNCTIONS:

Night riding: A circuit is made of the expecting cows every hour during the night. This is done in shifts by the rancher and the hired men.

Connected storage: none

Cow and calf cold weather care: In extreme cold, the cows immediately expecting and cows with newborn calves are brought into a warm place for observation and care.

Connected storage: Space should be provided for hay straw, space heaters, heat lamps, etc.

Calf pulling: In case of difficult birth, the man may either help pull the calf by hand or use a pulling device which may be hooked to a hand winch, jeep, or horse. This may take place in the field or in the cold weather care area.

Connected storage: Space should be provided for pulling devices, hand winch, lubricants, antiseptic, etc.

Veterinary care: Sometimes the cow or calf may require medical treatment. Often this requires that they be kept immobile.

Connected storage: Space is needed for medicines, syringes, bawling guns, linaments, etc.

aesthetics

AESTHETIC CONSIDERATIONS

5.1

From the outset, the philosophy of aesthetics is a difficult subject to deal with. Being a subjective thing, this philosophy varies even from one person to another. However, there are certain considerations the designer must concern himself with which may limit his philosophy in each case. The designer's own philosophy of aesthetics gives him the original set of considerations. The client's idea of aesthetics will limit the designer's ideas to some extent. Consideration of the general and immediate public's idea of beauty or appropriateness may influence the designer's decisions. Other factors, such as precedent, local preference, and code requirements may also affect the end result. The designer may feel that a certain building could be anywhere from one story to forty stories high and not go against his beliefs concerning

aesthetics. The client may prefer it be between five and twenty stories high. Already the designers ideas are limited. The locality may have a preference for no buildings over ten floors high. The land coverage zoning may indicate that this particular building on its particular site will have to be at least five floors high. What was at first a range of forty floors is now limited to five. This is only a very crude example, but it illustrates my point.

I do not want to set any personal aesthetic qualifications for my design yet. I do have some thoughts, though, forming in my mind concerning the aesthetics of my design. These thoughts deal with joinery and character. There are some facts about joinery which are basic to good design. For a good joint, two forms or spaces should either have penetration or separation. A butt joint is a very unsatisfactory relationship. It leaves one with a sense of awkward indecisiveness. Treating not only the building forms, but also the land form, as design elements, I must consider this basic design fact. I have been thinking a bit about some of the character I would like the design to have. Because of the rugged life in the Big Hole, I would like it to have boldness and perhaps even brutality. Because of the unspoiled nature of the surrounding country, maybe some rusticity should be expressed. Because of the focal nature of the ranch complex, the design should

reflect this unity. These thoughts are in no way binding upon my final design. If better reason should present itself to override these criteria, I will not feel held by the original thoughts.

For the purpose of this design, let us say the client has given me free rein to use my own design judgment. Criticisms from the faculty in the School of Architecture will take the place of conference with the actual client. Perhaps I can even arrange to consult with him on one or two of my preliminary designs.

Public opinion will influence my design only to the extent that this design is meant to be an example of what cattle ranch architecture could be.

As far as I am concerned, there is no real precedent in cattle ranch architecture, so I do not feel bound to a precedent. I can say, I think, that the local people do not prefer any particular style. They will usually accept what is satisfactory to the client. The only code influence I will feel will be the fire insurance requirements.

economics

ECONOMIC CONSIDERATIONS

6.1

For the purpose of this paper, I am going to have to make some assumptions. I have not been able, nor did I think it necessary, to obtain an accurate idea of the family's financial situation. I am working on the fact that Mr. Johnson first mentioned the idea of a new complex and seemed quite eager to help when I mentioned I might possibly use this for my thesis. Mr. Johnson is quite young, in his twenties, and this complex seems to be in the area of a needed and desired family investment. He did not, however, seem very eager to go into any detail concerning finances. The ranch is connected financially with other Johnson family ranches in the Big Hole, and the arrangement is very complex. I do know that no mortgages are outstanding on any of their real estate, including the recently purchased Lightfoot Ranch.

I am basing my financial considerations on two factors. Mr. Johnson has explained in some detail just what functions are to be accomplished on his ranch. I also have some first hand knowledge of this, having worked several times on the original Johnson Ranch. The only place he wished for any luxury was in the family living area and, to a lesser degree in the hired family living area. I am also basing my financial considerations on the idea that I would like this to be an example of what can be done with ranch architecture. Cattle ranchers have a reputation for being "financially prudent", and I would hope for them to be interested in this project.

I also had a talk with Hugo Eck, Professor of Architecture. He said that since the Johnson's did not want to divulge their financial situation, there is really no basis to work from financially. The variety of situations of acreage, crops, production, etc. makes the formulation of a rule of thumb for the size of a complex impossible. All I can say is, Mr. Johnson has told me he can afford the functional facilities in the proportion and quality described in the function chapter.

There are some other things to be considered in accord with this desired economy. A part of the construction would be done by unskilled labor. Also, the material would have to be hauled

from Butte or Dillon over sometimes questionable roads. So no exotic or unusual materials should be used, and the materials used should be reasonably easy to transport.

I might have been able to estimate a space such as a house or a barn if I were sure there would be houses or barns per se. I may find various functions sharing a common roof or a common wall. Because of the complexity of the relationships within my design, I cannot give an estimate on any part of the complex.

SUMMARY

I set out to design a complex which would perform the special functions required for a cattle ranch. I tried to do this by writing a program which allowed me as much latitude as possible to do new things with my design. I did not designate any specific areas or square footage requirements for any function. I wanted to let the function make the space. I, also, did not feel myself limited by what had been done before in ranch design. Let me continue by stating where I think I have succeeded and where I think I have failed.

I found when a complex is so closely related to and dependent on the outdoors that the factors of that outdoors, such as wind direction, sun angle, and view, are very demanding on the planning of the complex. I feel I have done well in the consideration of these factors. The design became, in fact, quite restricted by these factors to the extent where things began to fall into place naturally.

The living facilities had to be designed for a greatly varying number of people. I feel I have succeeded

in doing this. I had to design for a projected family of six members plus guests and a number of hired people varying from three to sixteen. All of this required some flexibility which I think I have have given.

There is one area in which I feel I have failed my program, but succeeded in design. Many of the work functions on the ranch could dictate their own spaces which would perform the given functions very well. This would doubtless create a relationship of functional spaces which would be interesting, but hardly flexible. I found that flexibility was necessary because of the day to day changes in ranch work and year to year changes in ranching methods.

Aesthetically, I feel very satisfied. I have given the rusticity and brutalism I felt were needed. However, I found I was held by what a ranch looks like. I found that the old ranchers were a good deal smarter than I had given them credit for. The single pitch roof seems to have come about naturally through a century of adaptation.

FOOTNOTES

1. Bertha Agnes Francis, The Land of Big Snows, (Caldwell, Idaho, 1955), p. 22.
2. Francis, p. 42.
3. Francis, pp. 47-48.
4. H. D. Hurd and J. A. Asleson, Summary of Snow Survey and Soil Moisture Measurements for Montana, (Bozeman, Montana, 1964), p. 48.
5. Francis, p. 151.
6. Francis, p. 151.
7. From an interview with Mr. Paul A. Johnson, owner of the Johnson Ranch referred to, on February 2.
8. *ibid.*

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