Meadow, Millard County, Utah: the Geography of a Small Mormon Agricultural Community

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Brigham Young University - Provo

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MEADOW, MILLARD COUNTY, UTAH: THE GEOGRAPHY
OF A SMALL MORMON AGRICULTURAL COMMUNITY

A Thesis
Presented to the
Department of Geography
Brigham Young University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by
Richard H. Jackson
August 1966
ACKNOWLEDGEMENTS

Sincere appreciation is expressed for the help of many who contributed to this thesis, both directly and indirectly. Special gratitude is expressed to Doctor Alan H. Grey of the Geography Department, whose guidance and suggestions greatly facilitated writing of the thesis. Appreciation is also expressed to Doctor George M. Addy of the History Department, and to the members of the Geography Department, who offered welcome encouragement.

The author also acknowledges the assistance of the residents of Meadow, whose cooperation provided valuable information for this study. The encouragement of my wife, Mary, and the importance of her role in typing this thesis are also recognized.
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>LIST OF TABLES</strong></td>
<td>vi</td>
</tr>
<tr>
<td></td>
<td><strong>LIST OF ILLUSTRATIONS</strong></td>
<td>vii</td>
</tr>
<tr>
<td>Chapter</td>
<td><strong>I. INTRODUCTION</strong></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Purpose and Scope</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Location and Extent of the Area</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Methods and Procedures</td>
<td></td>
</tr>
<tr>
<td>II.</td>
<td><strong>THE HABITAT</strong></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Pavant Valley</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Pavant Mountain Range</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Canyon Range</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Volcanic Remnants</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Sevier Desert</td>
<td></td>
</tr>
<tr>
<td>III.</td>
<td><strong>HISTORY OF THE MEADOW AREA</strong></td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>The Indians</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mormon Settlement</td>
<td></td>
</tr>
<tr>
<td>IV.</td>
<td><strong>THE AGRICULTURAL SYSTEM: ITS DEVELOPMENT</strong></td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>AND ITS INTERACTION WITH THE HABITAT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Development of Meadow's Agricultural Pattern</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Interaction Between the Agricultural Pattern and the Habitat</td>
<td></td>
</tr>
<tr>
<td>V.</td>
<td><strong>CHARACTERISTICS OF THE PRESENT VILLAGE</strong></td>
<td>89</td>
</tr>
<tr>
<td></td>
<td>The Present Economic Base of the Community</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Resultant Population and Physical Structure</td>
<td></td>
</tr>
</tbody>
</table>

*iv*
Chapter VI. FUTURE PROSPECTS OF MEADOW

Summary
The Viability of the Town

APPENDIX A

APPENDIX B

BIBLIOGRAPHY
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Average Monthly and Annual Snowfall in inches</td>
<td>9</td>
</tr>
<tr>
<td>2.</td>
<td>Annual Average Precipitation and Distribution</td>
<td>11</td>
</tr>
<tr>
<td>3.</td>
<td>Annual Precipitation at Fillmore, 1892-1945</td>
<td>11</td>
</tr>
<tr>
<td>4.</td>
<td>Average Precipitation at Black Rock and Garrison</td>
<td>28</td>
</tr>
<tr>
<td>5.</td>
<td>Percent of Precipitation at Black Rock and Garrison</td>
<td>29</td>
</tr>
<tr>
<td>6.</td>
<td>Animals in Millard County</td>
<td>55</td>
</tr>
<tr>
<td>7.</td>
<td>Minimum and Maximum Stream Flow at Meadow Creek in Second Feet</td>
<td>71</td>
</tr>
<tr>
<td>8.</td>
<td>Discharge of Meadow Creek in Second Feet</td>
<td>71</td>
</tr>
<tr>
<td>9.</td>
<td>Estimated Annual Discharge from Wells in the Meadow Area in Acre Feet</td>
<td>77</td>
</tr>
<tr>
<td>10.</td>
<td>Major Cloudburst Floods in Meadow</td>
<td>86</td>
</tr>
<tr>
<td>11.</td>
<td>Average Size of Farms in Millard County, 1890 to 1959</td>
<td>92</td>
</tr>
<tr>
<td>13.</td>
<td>Percent of Farms in Each Size Range in Meadow, 1966</td>
<td>93</td>
</tr>
<tr>
<td>14.</td>
<td>Average Acreage of Crops Per Farm Produced in the Meadow Area</td>
<td>94</td>
</tr>
<tr>
<td>15.</td>
<td>Average Temperatures at Fillmore, Utah in Degrees Fahrenheit</td>
<td>119</td>
</tr>
<tr>
<td>Table</td>
<td>Page</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>16. Absolute Maximum and Minimum Temperatures in Fillmore, Utah in Degrees Fahrenheit</td>
<td>119</td>
<td></td>
</tr>
<tr>
<td>17. Precipitation and Snow Depth in Inches at Chalk Creek-Pine Creek Snow-Gaging Station East of Meadow - Elev. 8500 Ft.</td>
<td>121</td>
<td></td>
</tr>
<tr>
<td>18. Precipitation and Snow Depth in Inches at Pine Creek Snow-Gaging Station East of Meadow - Elev. 8700 Ft.</td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>19. Precipitation and Snow Depth in Inches at the Bear Canyon Snow-Gaging Station East of Meadow - Elev. 7200 Ft.</td>
<td>123</td>
<td></td>
</tr>
</tbody>
</table>
# List of Illustrations

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Location of Meadow with Respect to the State of Utah</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>Physiographic Map of the Pavant Valley</td>
<td>21</td>
</tr>
<tr>
<td>3.</td>
<td>Location of Meadow Grazing Allotment</td>
<td>82</td>
</tr>
<tr>
<td>4.</td>
<td>Outline Map of Meadow</td>
<td>105</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Purpose and Scope

The agricultural village was the basis of the economy of early Utah. The Mormon settlers, like most pioneers, were confronted with the necessity of wresting a livelihood from the wilderness around them, but in Utah the struggle was intensified by the fact that the land was too dry to produce most crops without supplementary water. Utah's mountains, catchment areas by virtue of their altitude and orientation, provided this necessary water. With the passage of time, settlements were established on most streams that emerged from the mountains, the size of the settlement varying according to the amount of water provided by the stream. These agricultural villages were the cornerstone of the economy of Utah from 1847 into the early twentieth century, but have since been supplanted in economic primacy by the development of large industrial and commercial centers in the Wasatch Front communities of Salt Lake, Weber, and Utah counties.

The diminishing role in Utah's economy of these villages outside of the three metropolitan counties leads directly to the question of the future status of these
rural settlements. It is evident from census reports that those small villages that are almost exclusively dependent upon agriculture have experienced a declining population during the past several decades, and it appears that they will continue to do so in the future. The settlement geography of the state is changing to one of greater areal concentration along the Wasatch Front. The exact nature of the role that Utah's small agricultural communities will play in the future is unclear, and any attempt to define the role must depend on the information gained from detailed studies of representative villages.

The village of Meadow was chosen as an example of a small farming village removed from industrialized northern Utah, and has been studied from a geographic standpoint in an attempt to determine its future. The physical setting, history and development, economic base in agriculture, and the resulting community characteristics have been analyzed, and conclusions regarding the community's future made. Although these conclusions apply specifically to Meadow, the author considers that they also hold true for other Mormon agricultural villages with similar characteristics.

Location and Extent of the Area

The village of Meadow is located in central Utah near the eastern border of Millard County and is seven miles south of Fillmore, the county seat. The nearest major
Figure 1.—Location of Meadow with Respect to State of Utah.
centers are Salt Lake City, 160 miles to the north, and Las Vegas, 275 miles to the south. The area of most intensive study was Meadow itself and the farmland in Meadow precinct. Because the mountains east of Meadow and the desert to the west play an important role in the economy of the town, they were also studied, but less exhaustively.

Methods and Procedures

The first step in studying Meadow consisted of locating all available written material pertaining to the area, and abstracting applicable information from this written material, which consisted of diaries, church records, histories, government publications, newspapers, and periodicals. Field work was undertaken during February and March of 1966 to supplement the written material. This field work centered around a questionnaire taken to all families in the community, (Appendix A); interviews with the county agent, the Soil Conservation Service, and the Bureau of Land Management in Fillmore; interviews with several older residents of the community; and personal reconnaissance of the area on several occasions. The data compiled from written materials, and the results of the field research serve as the basis for this study.
CHAPTER II

THE HABITAT

The Pavant Valley, in which Meadow is situated, is in the extreme eastern edge of Millard County. Geologically, the valley is the eastern part of the Sevier Desert, with only a small discontinuous ridge of cinder cones and lava flows separating the two. The eastern and southern edge of the valley is formed by the Pavant Range, which is the western edge of the Colorado Plateau, and the northern boundary is the Canyon Range. All of Millard County is in the rainshadow of the Sierra Nevada to the west, and consequently the climate is semi-arid to arid. Orographic intensification of precipitation is considerable in the mountains forming the boundaries of the valley, and the resulting streams flowing westward and southward are the basis for the existence of Meadow and her sister communities in the Pavant Valley. The mountains, with the streams flowing from them, are only one of several major physiographic elements that have played an important role in the development of Meadow. The following pages present a detailed examination of each of the major physiographic elements—which together form the physical setting of Meadow.
Pavant Valley

Pavant Valley is located in the eastern part of the Great Basin section of the Basin and Range Province, and it may be considered to be the extreme southeast arm of the Sevier Desert.\(^1\)

The valley is characterized by flat bottom lands, and alluvial fans at the mouth of each canyon in the Pavant Range to the east. The southern half is a basin closed by basalt flows.\(^2\) From north to south the valley is approximately thirty-four miles in length, and it is from eight to twelve miles wide from east to west.\(^3\) There are approximately three hundred square miles of land in the Pavant Valley, including bench lands that rise gently eastward to the base of the Pavant Mountains. The valley floor is about 5,000 feet above sea level, with the 5,000 foot contour line passing through the town of Meadow.

During the existence of Lake Bonneville, Pavant Valley formed a shallow arm of the lake. The highest shore line was formed at an elevation of 5,130 feet, and as the lake remained at this level for an extended period of time, the shoreline is quite prominent when viewed from the west.

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\(^3\) Mower, p. 12.
This level is known as the Bonneville shoreline, and it forms the dividing line between the gently sloping lake plain below, and the steep, rugged alluvial fans above.\(^1\) On the lake plain are numerous relic features of Lake Bonneville, such as beaches, spits, and bars.\(^2\)

The floor of the valley is composed of lacustrine deposits that are overlaid in places by a thin veneer of alluvium deposited by streams flowing into the valley in the post-Bonneville period. The oldest known unit of the valley fill is the Sevier River (?) Formation of late Pliocene or early Pleistocene age. It is a conglomerate of poorly sorted pebbles and boulders that were eroded from older formations in the mountains. Most of this material is angular in nature, and the entire formation probably exceeds 800 feet in thickness. Overlying this formation are lake beds predating Lake Bonneville. These range from 0 to 800 feet in thickness. Covering some of these beds are basalt flows from two volcanoes. The Black Rock Volcano is eight miles southwest of Meadow, and its flow covered an area with a radius of about four miles. The Pavant Volcanic flow occurred at approximately the same time, and it was extruded from the Pavant Butte in the northwest corner of the valley. This flow extended the

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\(^2\)Dennis, p. 7.
full length of the valley and was four to five miles wide. The youngest deposits on the valley floor are those of Lake Bonneville. These were deposited during Pleistocene time and are mostly clay and sand layers that do not exceed twenty feet in thickness.\(^1\) These latest deposits form the surface of the valley floor which rises gently and uniformly towards the Pavant mountains to the east. This uniform nature of the valley floor is reflected in the climate.

Climate

The climate of the valley is uniformly dry, the entire area being classified as semi-arid to arid. Meadow is located just seven miles south of the 39th parallel and is under the influence of westerly depressions during the winter season. It is during this time that much of the precipitation occurs. Fillmore and Kanosh, located respectively seven miles north and five miles south of Meadow and in almost identical surroundings provide the climatic data. During the months of October through March, Fillmore receives 8.05 inches of an annual average of 14.44 inches of precipitation. During the same period, Kanosh receives 8.38 inches of an annual average of 15.01 inches of precipitation.\(^2\)

\(^1\)Mower, p. 19.

There are two major weather situations bringing precipitation to the Pavant Valley, depressions and local convective storms. The depressions cover very large areas and are the major storm type during the winter, precipitation from them generally being snow. During the winters there is an average of 78.6 inches of snowfall in Fillmore. However, the ground is not covered with snow during the entire snow season. There are usually about fifty to eighty days of continuous snowcover in the Pavant Valley.\(^1\) Table 1 shows the average snowfall per month at Fillmore and Kanosh.

### TABLE 1

**AVERAGE MONTHLY AND ANNUAL SNOWFALL IN INCHES\(^a\)**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Fillmore</td>
<td>14.7</td>
<td>13.3</td>
<td>14.2</td>
<td>8.6</td>
<td>.6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Kanosh</td>
<td>13.9</td>
<td>16.0</td>
<td>12.6</td>
<td>6.2</td>
<td>.3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fillmore</td>
<td>0</td>
<td>0</td>
<td>4.3</td>
<td>8.5</td>
<td>14.4</td>
<td>78.6</td>
</tr>
<tr>
<td>Kanosh</td>
<td>0</td>
<td>0</td>
<td>3.9</td>
<td>10.3</td>
<td>13.3</td>
<td>76.5</td>
</tr>
</tbody>
</table>

\(^a\)U.S. Department of Agriculture Weather Bureau, 
**Climatic Summary** . . , pp. 13, 16.

The local convective storm is by far the most common weather situation in the summer and usually consists of violent thunderstorms.\(^2\) These thunderstorms may occur

\(^1\)Ibid., p. 31.

singly, but very often come in groups with several localized areas of intense rainfall and with lesser rainfall over a wider area. As a rule these thunderstorms cover only a small area, with the average being twenty-one square miles.\(^1\) From these summer storms, Fillmore receives an average of 3.22 inches of precipitation, and Kanosh receives an average of 3.65 inches.\(^2\) The intensity of these storms sometimes causes cloudburst floods to pour from the canyon mouths. The average annual precipitation at Fillmore for the eighty-one years of record from 1896 to 1963 is 14.30 inches.\(^3\) As of 1946, the average at Kanosh was 14.31 inches and at McCormick, at the north-west edge of the valley, 10.58 inches.\(^4\) The average annual precipitation, the average distribution, and the secular variation of precipitation are shown in Tables 2 and 3 on page 11. It is important to note that the amount of precipitation received in the Meadow area fluctuates widely from year to year. The maximum ever recorded for Fillmore was 21.28 inches in 1906, and the minimum was 6.72 inches in 1934.\(^5\) As another example of these fluc-

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\(^1\)Ibid.

\(^2\)Climatic Summary, pp. 13, 16.


\(^4\)L.A. Stoddart, Seeding Arid Ranges to Grass, Circular 122, Agricultural Experiment Station (Logan, Utah: Utah State Agricultural College, April, 1946), pp. 18-29.

\(^5\)Dennis, p. 12.
TABLE 2
ANNUAL AVERAGE PRECIPITATION AND DISTRIBUTION
AS A PERCENTAGE AND AS AN AMOUNT IN INCHES\textsuperscript{a}

<table>
<thead>
<tr>
<th>Location</th>
<th>Elevation</th>
<th>Growing</th>
<th>Location</th>
<th>Total</th>
<th>Growing</th>
<th>Location</th>
<th>Total</th>
<th>Growing</th>
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<tr>
<td></td>
<td></td>
<td>Season</td>
<td>Spring</td>
<td>Summer</td>
<td>Fall</td>
<td>Winter</td>
<td></td>
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<tr>
<td>Fillmore</td>
<td>5250</td>
<td>43.30%</td>
<td>33.95%</td>
<td>15.41%</td>
<td>23.58%</td>
<td>27.06%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kanosh</td>
<td>5250</td>
<td>42.91%</td>
<td>31.94%</td>
<td>17.54%</td>
<td>23.48%</td>
<td>27.04%</td>
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<td></td>
</tr>
<tr>
<td>McCormick</td>
<td>4850</td>
<td>42.63%</td>
<td>35.07%</td>
<td>12.85%</td>
<td>24.67%</td>
<td>27.41%</td>
<td></td>
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</table>

\textsuperscript{a}Stoddart, p. 25.

TABLE 3
ANNUAL PRECIPITATION AT FILLMORE, 1892 TO 1945\textsuperscript{b}

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
<th>Year</th>
<th>Amount</th>
<th>Year</th>
<th>Amount</th>
<th>Year</th>
<th>Amount</th>
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<tr>
<td>1892</td>
<td>13.78</td>
<td>1906</td>
<td>21.28</td>
<td>1920</td>
<td>20.17</td>
<td>1934</td>
<td>6.72</td>
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<td>1894</td>
<td>13.37</td>
<td>1908</td>
<td>18.43</td>
<td>1922</td>
<td>17.65</td>
<td>1936</td>
<td>20.72</td>
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<td>1895</td>
<td>16.36</td>
<td>1909</td>
<td>17.25</td>
<td>1923</td>
<td>15.44</td>
<td>1937</td>
<td>13.43</td>
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<tr>
<td>1896</td>
<td>11.16</td>
<td>1910</td>
<td>13.27</td>
<td>1924</td>
<td>15.59</td>
<td>1938</td>
<td>13.08</td>
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<td>1897</td>
<td>17.04</td>
<td>1911</td>
<td>13.14</td>
<td>1925</td>
<td>12.70</td>
<td>1939</td>
<td>10.59</td>
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<td>15.69</td>
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<td>13.97</td>
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<td>1900</td>
<td>9.32</td>
<td>1914</td>
<td>12.03</td>
<td>1928</td>
<td>10.86</td>
<td>1942</td>
<td>10.30</td>
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<tr>
<td>1902</td>
<td>11.90</td>
<td>1916</td>
<td>12.48</td>
<td>1930</td>
<td>16.49</td>
<td>1944</td>
<td>15.28</td>
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<tr>
<td>1903</td>
<td>11.97</td>
<td>1917</td>
<td>11.52</td>
<td>1931</td>
<td>10.02</td>
<td>1945</td>
<td>20.23</td>
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<td>1904</td>
<td>12.14</td>
<td>1918</td>
<td>14.63</td>
<td>1932</td>
<td>14.41</td>
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<td>1905</td>
<td>16.16</td>
<td>1919</td>
<td>13.94</td>
<td>1933</td>
<td>12.93</td>
<td></td>
<td></td>
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</tbody>
</table>

\textsuperscript{b}Dennis, p. 12.
tuations, the average for the decade 1951 to 1960 fell over an inch and one-half to 13.60 inches. Table 16, on page 119 of Appendix B further illustrates these fluctuations.

Although the yearly precipitation varies widely, there have been only three major periods of drought. These extended periods of drought were during the years 1898 to 1905; 1912 to 1918; and 1930 to 1939.\(^1\)

High temperatures in the summer increase the effects of the drought in years when rainfall is deficient. Although the average temperature of the warmest month, July, is only 75.9 degrees Fahrenheit, this does not give an accurate picture of the summer heat. This average is computed from the average maximum temperatures of 90 F. to 95 F., coupled with an average minimum for the same months of 50 F. to 60 F. The absolute maximum temperature ever recorded during the summer months of June through August was 115 F. on July 5.\(^2\) The absolute minimum for these same summer months was 22 F. on June 3.\(^3\) Thus we can see that the diurnal range is very great, with the average range being 25 F.\(^4\)

Winter temperatures also vary a great deal, but seldom

\(^1\)\textit{Ibid.}
\(^3\)\textit{Climatic Summary}, Part 20, p. 35.
\(^4\)\textit{Ibid.}, p. 31.
drop below zero for extended periods. The average temperature for January, the coldest month, is 29.5 F. The coldest temperature on record for Fillmore in January is -23 F. and the highest January temperature is 74 F.\(^1\) A complete summary of the course of temperatures at Fillmore can be found on page 119 in Appendix B.

The frost free season in the Pavant Valley averages about 130 days, with the average date of the first killing frost in the autumn at Fillmore being September 27, and the average date of the last killing frost in the spring being May 18. The latest date of a killing frost in the spring at Fillmore was July 2, and the earliest killing frost in the fall was August 23.\(^2\)

Winds in the Pavant Valley are predominantly from the southwest in the summer, and in the winter they are from the northwest and the southwest. Minor winds occur at the mouth of each canyon during the summer due to convection currents. The winds from the southwest during the summer are almost always dry and desiccating. These dry winds combined with the high summer temperatures result in high evaporation rates for the Pavant Valley. Evaporation from a U.S. Weather Bureau Class A land pan for the years 1953 to 1960 averaged eighty-five inches per year. Estimated evaporation from ponded water for the same period averaged

\(^1\)Ibid.
\(^2\)Ibid., p. 36.
59.5 inches, and evaporation from running water averaged 63.75 inches.¹

Drainage

The low average annual amounts of precipitation combined with the high rate of evaporation result in only small amounts of surface drainage in Pavant Valley itself. The valley is a part of the Great Basin which is an area of interior drainage,² so eventually the surface water of the valley is lost through evaporation and/or absorption. The southern half of Pavant Valley is a closed basin and much of the surface drainage here is to the north and northwest to a sink area located nine miles northwest of Meadow. The main drainage channel is Meadow Slough, which acts as a channel for most excess water flowing into the valley from the mountains. Meadow Slough flows from the extreme south end of the valley to the sinks area in the northwest. However, there is rarely water flowing in Meadow Slough now.

A gyspsite playa with an area of fifteen square miles is located west of Meadow, and it receives some of the drainage from the southwestern part of the valley. In the north half of Pavant Valley the water drains northwestward to an area known as Mud Lake. Only in times of extremely heavy runoff does water now reach Mud Lake, as the Central Utah

¹Mower, p. 15.
Canal, built in 1916, intercepts the entire drainage in all but the wettest years. In the northwest part of the valley is an area of sand dunes that has not developed a drainage pattern as a result of a high permeability that allows infiltration of almost all of the precipitation received. As the water from the mountains has flowed into the valley, or into Lake Bonneville when it existed, it has carried the material from which most of the soils of the valley have developed.

Soils

The soils in Pavant Valley are developed almost exclusively in lacustrine materials. These soils vary greatly in depth, texture, and structure, but they can be classified into three major groups. The soils on the margins of the valley are developed in alluvium deposited by the streams and Lake Bonneville. In this area they are called the Box Elder Series, and are widely used for agriculture, being the most fertile soils in the area.\(^1\) The Box Elder Series is classified as a chestnut brown earth. Adjoining this chestnut earth to the west are soils of lesser fertility of the brown earth type. West of the brown earth types and covering much of the valley floor are soils of the gray desert classification. Much of this

soil in the lower parts of the valley is alkali.\textsuperscript{1} West of Meadow is an area of some fifteen square miles where there is no soil as such, as the surface is made up of impure gypsite from an old playa.\textsuperscript{2}

Vegetation

The vegetation of Pavant Valley is influenced a great deal by the soil and climatic types found in the valley. Several major vegetative types are discernible, and they are found in a zonal arrangement from west to east. In the lowest depressions of the valley, where the water table is high but drainage is adequate enough to prevent alkali, there is a good growth of salt grass. If these damp areas have an accumulation of alkali, the dominant growth is greasewood. When alkali conditions are especially severe in these damp depressions even greasewood will not grow, and it is replaced by rabbit brush. On the drier portions of the valley floor the dominant vegetation is shadscale. This plant covers large areas of the valley on the gray desert soils. Sagebrush covers all of the area where there is sufficient moisture and non-alkaline soils. Sagebrush requires at least eight inches of precipitation and soil that is relatively well drained. The sagebrush zone

\textsuperscript{1}Harris defines alkali as "The word alkali...as applied to the soil...refers to any soluble salts that make the soil solution sufficiently concentrated to injure plants." (Ibid.)

\textsuperscript{2}Mower, p. 12.
normally has a good undergrowth of grasses such as bunch grass and native short wheat grass. These sage lands are found on the eastern and western parts of the valley in the brown earth soils where the elevation is somewhat greater than it is on the valley floor. The increased elevation results in a slightly higher average annual precipitation.

The Pavant Mountain Range

The rugged Pavant Mountain Range borders the Pavant Valley on the east and south. By strict definition the Pavant mountains are not actually a mountain range as they are really a segment of the dissected western escarpment of the Colorado Plateau. This escarpment trends north-south to a point about eight miles south of Meadow where it veers sharply westward. The Pavant range is included in the Utah High Plateaus of the Colorado Plateau Province. The mountains rise rather abruptly to elevations exceeding 10,000 feet, and the irregular crest is commonly above 9,000 feet elevation. The highest peak in the range is Sunset Peak east of Meadow, which reaches an elevation of 10,300 feet, which is 5,300 feet above the valley floor.


3 Dennis, p. 17.
The alluvial fans at the mouths of the mountain canyons are steep and rugged and are generally made up of poorly sorted boulders, cobbles, pebbles, and sand, silt, and clay. In general the fine materials serve to cement the other material loosely together. In some localities there are one or more layers of hardpan within 20 feet of the surface and here the gravels are well-consolidated and hard. All of the material on the fans is poorly rounded and sub-angular in nature. Most of the material in the alluvial deposits was deposited at the same time as the lacustrine beds of the valley floor.\textsuperscript{1} The mountains themselves are composed entirely of sedimentary rocks.\textsuperscript{2} The Pavant mountains are of prime importance to the Pavant valley because of the higher rate of precipitation on their slopes.

Climate

The climate of the Pavant mountains ranges from semi-arid on the alluvial fans to sub-humid at the higher elevations. This sub-humid climate in the higher elevations is a result of the increased precipitation caused by orographic lifting of air masses. The average precipitation on the mountain slopes varies from fourteen inches near the base to over thirty-six inches near the summits of the higher peaks. The Bear Canyon measuring station at 7,200 feet elevation

\textsuperscript{1}Maxey, pp. 342-43.

\textsuperscript{2}Woolley, p. 34.
receives an average of twenty-one inches of precipitation per year. The Pine Creek-Chalk Creek station at 8,500 feet has an average of 32 inches per year for the 26 years of measurement, 1930 through 1955, and the Pine Creek station at an elevation of 8,700 feet receives 34 inches of precipitation per year.¹

Much of this precipitation in the mountains is received as snowfall during the winter months. Of an annual average precipitation of 21 inches at the Bear Canyon station, 9.89 inches is deposited as snow; of the 32 inches of precipitation received at the Pine Creek-Chalk Creek station, 12.6 inches is in the form of snow; and 15.5 inches out of an average 34 inches received at the Pine Creek station is snow.² A complete summary of the precipitation, snowpack, and water content of the snowpack for all years of measurement can be found in Tables 17, 18, and 19, on pages 121 to 123 in the Appendix.

It is impossible to overemphasize the importance of this snowpack to the residents of the Meadow area. The snowpack begins accumulating each fall and does not melt off until the summer of the following year. The melting of the snowpack feeds the streams flowing from the mountains,


and these streams provide the basis for the agricultural economy of Meadow and the Pavant Valley. The snowpack is literally the reservoir that supplies the life-giving water for the semi-arid land in the valley.\(^1\)

**Drainage**

Runoff from the melting snowpack, as well as from heavy summer storms, is carried into the Pavant Valley by several small streams. There are nine of these streams and from north to south they are: Wild Goose Creek, Maple Hollow Creek, Pioneer Creek, Chalk Creek, Dry Creek, Pine Creek, Meadow Creek, Walker Creek, Cottonwood Creek, and Corn Creek. These streams are shown on the map on page 21. The streams drain 270 square miles of the Pavant Range.\(^2\) Chalk Creek, Meadow Creek, and Corn Creek are the most important of these streams. Chalk Creek has a drainage basin that covers 36,000 acres at an average elevation of 7,980 feet and contributes an average of 25,100 acre feet of runoff to Pavant Valley each year. Meadow Creek drains 8,700 acres but at an elevation of 8,130 feet, and it yields 5,800 acre feet of runoff each year. The Corn Creek drainage basin is 50,000 acres in extent at an average altitude of 7,590 feet, and it produces 11,800 acre feet of runoff per year.\(^3\)

1. Details about the depth and water content of the snowpack can be found on page 121 in the Appendix.
2. Dennis, p. 19.
3. Mower, p. 27.
Figure 2.—Physiographic Map of the Pavant Valley
Creek and Walker Creek are of most importance to Meadow, but Corn Creek also provides some water for the Meadow area during periods of heavy runoff, primarily in the spring. All of the principal drainage basins in the Pavant mountains are roughly oval in shape, and except for the Corn Creek area occupy an area of very rugged topography.

Soils and Vegetation

The rugged nature of the Pavant Mountains limits the development of the soils and as a result the soils in the mountains and on the alluvial fans are generally medium to shallow in depth and poorly developed. They range from brown steppe earths on the upper parts of the alluvial fans to very dark acidic soils at the higher elevations.¹

The vegetation of the slopes of the alluvial fan was originally native grass with scattered Utah juniper and sagebrush. Due to overgrazing, the vegetation at present is almost entirely Utah juniper and sagebrush. The sagebrush is most abundant on the lower slopes, and it is replaced by juniper on the upper slopes of the alluvial materials and the lower parts of the mountain range proper. Pinion Pine is intermingled with the juniper in its upper edge and gradually replaces it. Also found in isolated spots from 5,500 to 9,000 feet above sea level are White Fir, Douglas Fir, and Aspen. These trees are not prominent

¹Maxey, pp. 342-43.
except in the higher parts of this elevation range. Black Fir and Engelman Spruce are present from 7,000 to 10,000 feet elevation, and the limber pine from 8,000 to 10,000 feet. All of these trees are found essentially on the north facing slopes, while juniper, scrub oak, and native grasses are located on the south facing slopes at nearly all elevations. Grass grows at all elevations in the Pavant mountains, but becomes more dense with increased elevation.¹ These mountains were originally good natural pasture for the livestock of the settlers.

The Canyon Range

Adjoining the Pavant mountains at the northeast margin of the valley is the Canyon range. The Canyon range of mountains forms the northern boundary of the Pavant Valley, and is separated from the Pavant mountains by Scipio Pass over which Highway 91 passes. The Canyon mountains are a small range some twenty-five miles long in a north-south direction, and from four to twelve miles wide. This particular range is in the shape of a wedge, with the wide, blunt south end of the range forming the north boundary of Pavant Valley.² The mountains are rugged and the southern end rises almost precipitously from the valley floor to peaks that reach a maximum of 9,240 feet. The range is


made up of sedimentary rocks, which are essentially the same as those in the Pavant range in the upper levels. The lower beds of the Canyon range are older than those in the Pavant range.¹

Climate

Just as the physiography of the Canyon range is essentially the same as that of the Pavant mountains, climatically the two are similar also, and although no records have been kept of precipitation and temperature in the Canyon range, they are assumed to be much the same as those in the Pavant range. Precipitation on that part of the Canyon range bordering the Pavant Valley is, however, estimated to be somewhat less than that in the Pavant mountains because the southern slope of the former range parallels rather than intersects the tracks of the prevailing storms. Consequently, there is not as intense an orographic effect.² The southern exposure of these mountains combines with the reduced precipitation to prevent the accumulation of a deep snow cover, but a limited snowpack does develop in normal years.

Drainage

Runoff from this snowpack contributes only small

¹Mower, p. 18.

amounts of water to the Pavant Valley. Only two streams
drain from the southern end of the Canyon mountains and
empty into the Pavant Valley, Whiskey and Eightmile Creeks.
Whiskey Creek has a drainage basin that covers 17,200
acres at an average altitude of 6,060 feet. Eightmile
Creek drains some 20,800 acres at an average elevation of
6,290 feet. The drainage basin of Whiskey Creek yields
4,800 acre feet of runoff in an average year, while that of
Eightmile Creek produces 5,800 acre feet.\(^1\) Although these
two streams are extremely important to agriculture in
northern Pavant Valley, they are unimportant to Meadow
except as a source of groundwater that supplies the springs
on the desert grazing areas to the west.

Soils and Vegetation

Soils on the sedimentary materials of the Canyon
mountains are generally shallow and incompletely developed.
They vary from brown earths at the lower elevations to dark
acidic soils in the higher altitudes. The vegetation is
very similar to that of the Pavant range, but with fewer
and smaller trees. The dominant vegetation is brush and
scrub oak and Utah juniper. Sparse grass grows in the
lower elevations and this becomes more luxuriant with
increased elevation.

\(^1\)Mower, p. 27.
Volcanic Remnants

The western boundary of the valley is made up of a low ridge of lava flows and cinder cones. This ridge rises from 50 to 400 feet above the valley floor, with Pavant Butte in the north end of the valley being the highest point with an altitude of 800 feet above the valley. This lava ridge is essentially made up of a basalt flow that is over four miles wide and extends from the Pavant Butte to the southern end of the valley. It was extruded in late Tertiary times. Superimposed upon this ridge are several more recent flows. The Tabernacle flow, seven miles west of Meadow is of late Pleistocene time correlating with the Provo stage of Lake Bonneville. The Ice Springs flow, eight miles west of Fillmore, was extruded within the Recent Epoch, and possibly within the last several hundred years.1

Climate and Drainage

This lava ridge is so low that its climate is essentially the same as that of the western part of the valley. The major importance of the lava ridge is its effect on drainage in the valley. Originally all of the surplus water moved northwest out of the area that is called the Pavant Valley, and into the Sevier Desert. The lava flows formed the valley boundary and prevented water from escaping, thus creating the sinks area northwest of Meadow. The lava ridge itself has no streams of any kind flowing from

1Ibid.
it into the valley. During the period of snow melt in the spring, some runoff from the lava flow enters the valley, but it is in very minor amounts. Even lesser amounts flow from the western side of the lava ridge into the Sevier Desert.

Soils and Vegetation

The recent extrusion of much of this lava ridge has prevented the development of any soil upon it. Soils on the older parts of the lava were deposited by Lake Bonneville, and are the same as those in surrounding areas except that they are usually better drained. Several miles west of Meadow is an area of nearly pure gypsum sand, and just north of it is the Ice Springs Crater flow that is so recent that it remains as blocky, angular lava. The vegetation reflects the climate and the soils existing at that particular point, and may or may not be similar to that on the valley floor around it. The primary vegetative types are shadscale and greasewood, with small areas of sagebrush intermixed where local conditions of sufficient moisture and well drained soils permit.

The Sevier Desert

Until the extrusion of the lava ridge, the Pavant valley was just an arm of the Sevier Desert. The Sevier Desert is a broad, level plain that was once part of the bed of Lake Bonneville. Slopes on the desert average
about ten feet to the mile, with some areas so flat that during times of heavy precipitation the water stands in broad lakes a few inches deep. Shallow dry channels of washes crisscross the surface of the desert in places, and basaltic volcanoes occur at scattered intervals. In places, sand dunes cover large areas of the floor and modify the landscape by their presence.¹

Climate

The climate on the Sevier Desert is much drier than within the Pavant Valley itself. Precipitation decreases as one moves west from the Pavant mountain range. At Black Rock, about twenty miles west of the mountains, the average annual precipitation is 8.68 inches, while at Garrison, some seventy miles west, the average is only 6.95 inches.² The majority of the precipitation at both Garrison and Black Rock comes in the spring and fall. Tables 4 and 5 show the average precipitation and distribution of precipitation at Black Rock and Garrison.

**TABLE 4**

**AVERAGE PRECIPITATION AT BLACK ROCK AND GARRISON**²

<table>
<thead>
<tr>
<th>Location</th>
<th>Growing Season</th>
<th>Spring</th>
<th>Summer</th>
<th>Fall</th>
<th>Winter</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackrock</td>
<td>4.18</td>
<td>2.83</td>
<td>1.59</td>
<td>2.37</td>
<td>1.89</td>
<td>8.68</td>
</tr>
<tr>
<td>Garrison</td>
<td>3.30</td>
<td>1.87</td>
<td>1.44</td>
<td>2.04</td>
<td>1.60</td>
<td>6.95</td>
</tr>
</tbody>
</table>

²Adapted from Stoddart, pp. 18-29.

¹Woolley, p. 45.

²Stoddart, pp. 18-29.
TABLE 5
PERCENT OF PRECIPITATION AT BLACK ROCK AND GARRISON\textsuperscript{a}

<table>
<thead>
<tr>
<th>Location</th>
<th>Growing Season</th>
<th>Spring</th>
<th>Summer</th>
<th>Fall</th>
<th>Winter</th>
<th>Elevation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackrock</td>
<td>48.10</td>
<td>22.60</td>
<td>18.32</td>
<td>27.31</td>
<td>21.77</td>
<td>4860</td>
</tr>
<tr>
<td>Garrison</td>
<td>47.48</td>
<td>26.91</td>
<td>20.72</td>
<td>29.35</td>
<td>23.02</td>
<td>4850</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Adapted from Stoddart, pp. 18-29.

The maximum amount of precipitation received at Blackrock was 14.28 inches in 1905. The maximum at Garrison was 11.69 inches in 1916.\textsuperscript{1} Temperatures on the Sevier Desert have essentially the same magnitude and pattern as those in the Pavant Valley.

Drainage

The drainage pattern of the Sevier Desert contributes to its value as a grazing area. Since the Sevier Desert is an area of interior drainage, there are large areas with a high water table, and in some of these areas, there are small springs or wells that make grazing on the desert possible. Eventually, all of the precipitation that is not evaporated drains southwest to what remains of Sevier Lake.

Vegetation and Soils

The limited rainfall during the growing season results in only sparse vegetation on the desert, which in turn prevents development of fertile soils. The soils are

\textsuperscript{1}Climatic Summary, pp. 10, 14.
primarily gray desert soils and are often poorly drained. On the poorly drained soils, the dominant vegetation is greasewood, and in the drier areas, shadscale is dominant. Scattered through the greasewood and shadscale are clumps of grasses and other vegetation that is palatable to animals, and it is the desert's importance as a grazing area that ties it to the Pavant Valley.

The habitat of the Meadow area, as described in the forgoing pages, provided the essential elements that eventually led to settlement of the area. The level valley floor facilitated irrigation, with which the settlers were familiar, and the mountains provided the life-giving water that made it possible to farm the valley. The desert areas to the west provided pasture for their animals, and the mountain slopes provided logs for houses, barns, and corrals. However, some of the same factors that initially prompted settlement of the area also limited the expansion of that settlement and eventually contributed to the decline of the community. The hot, dry summers made irrigation essential to agriculture, but the streams flowing from the mountains never provided enough water to irrigate more than a small fraction of the valley. The lack of sufficient water for irrigation, coupled with the hot, dry summers and cold winters, combined to make Meadow's environment a difficult one for man. The Indians, who occupied the area first, mirrored the harshness of the
environment, as evidenced by their impoverished condition on the arrival of the settlers, and had the Mormon settlers not been looking specifically for a place to settle that would be undesirable to others, the area might not have been settled until a much later date, and then probably only for grazing purposes.
CHAPTER III
HISTORY OF THE MEADOW AREA

The Indians

The early history of the area around Meadow is the history of the Pavant Indians, part of the Pahute tribe, which was one of the independent branches of the Ute Indian tribe.¹ The Pavant Indians' name comes from their name for the valley in which they lived. The most important feature of the valley was Sevier Lake, which was much larger then than it is now. The Indian word "Pavant" means "on the water", or "near the water", and it was this name that was applied to the Indians living throughout the Sevier Lake area.² The Pavant Indians were primarily hunters and gatherers and roamed the Pavant Valley and the desert to the west in search of food. They gathered wild berries and hunted rabbits, deer, and antelope, but in addition to hunting and gathering, these people also engaged in some primitive agriculture. At one time or another they farmed most of the land near the streams entering the valley, the shores of Sevier Lake, and the smaller


lakes and ponds which dotted the valley at that time. In December of 1850, a group of Mormon settlers going south to the present Iron County reported some of the agricultural activities of the Indians. About three miles south of Meadow, on a small stream, they found fields of corn, wheat, and beans, with part of the crops still standing in the fields. The major crop seems to have been corn, and the Mormons named the creek "Corn Creek" because of the corn found there.¹ In the foothills just east of these fields was the major Indian encampment in the Pavant Valley. When the Iron County pioneers passed through, there were approximately six to seven hundred Indians living in this village.

Indian-Settler Relations

These Indians were a considerable problem to Meadow and its inhabitants for the first sixty years of the town's history not so much because of their numbers and ferocity but rather because their presence limited expansion and led to friction. Treaties were arranged with the Indians of Utah almost immediately after the arrival of the pioneers. The first treaty, signed in December of 1849, brought the lands of the Indians in Southern Utah under government control. However, it did not prevent the Walker

¹Ibid.

War of 1853-54. Chief Walker, who had previously shown friendship to the settlers, attempted unsuccessfully to drive the Mormons out. This war was relatively unimportant in the Meadow area as it was not yet settled by the Mormons, but one man was killed in Fillmore, seven miles to the north. ¹ At the conclusion of the war, during the winter of 1854-55, Chief Walker and his band camped on Meadow Creek just above the present town. It was here on Meadow Creek that Chief Walker died in late January of 1855, and he was buried in the cliffs above town along the present Walker Creek. ²

In 1856, the Superintendent of Indian Affairs for Utah Territory, Brigham Young, negotiated a new treaty which applied specifically to the Pavant Indians. This treaty called for peace and cooperation between the whites and the Indians, and established the Corn Creek Indian Farm three miles south of the site of Meadow on the stream of that name. ³ This Indian farm was essentially operated by the settlers but the produce was turned over to the Indians. In 1865, a treaty was proposed between the Government of the United States and the Pavant Indians providing for the removal of the Indians to the previously established Uintah reservation in the Uintah Basin of eastern Utah.

¹Kate B. Carter, Heart Throbs of the West (2nd ed.; Salt Lake City, Utah: Daughters of the Utah Pioneers, 1939), I, 125-26.


Under the provisions of this treaty, all of the Indians would be removed within one year and the government would sell the lands the Indians owned around Meadow for $0.62 an acre. In return, the government would provide them with annual annuities and protection in their new homes. However, the expected removal of the Indians did not take place as the treaty was never ratified.¹

The failure of the treaty of 1865 was a bitter blow to the Mormon families who had settled in Meadow by this time, as they had counted on it to remove the Indian threat from their village. The pioneers felt that removal of the Indians would rid them of one of their chronic problems. The settlers were not afraid of being massacred by the Pavants as the Pavants were not strong militarily and showed a particular aversion to violence.² The main problem created by the Indians lay in their begging and stealing. The Indians would visit the village each day and go to each home begging for food. Furthermore, they felt no qualms about stealing any edible thing they came across. From all indications, the Indians prospered from this method of gaining a living as a letter to the Secretary of the Interior on their condition in 1872 states that there were 1200 of them living in the Indian village three miles south of Meadow, and that they were existing chiefly on what

¹Ibid.
²Palmer, "Utah Indians Past ...", p. 47.
they begged and stole from the whites. The problem was alleviated to some extent as time passed and some Indians were convinced of the benefits to be derived from moving to the reservation at Uintah. In 1902, Congress authorized the allotment of eighty acres of land to each Indian who was the head of a family, which also helped.

The problem of the Indians was "solved" permanently with the influenza epidemic of the winter of 1918-19. When the epidemic struck the Indian village south of Meadow it was disastrous, for nearly two-thirds of the three hundred Indians living there died. With the coming of spring, many of the survivors moved to the Uintah Reservation where they had family and friends who could aid them. When the census of 1920 was taken, the Indian population of the area had declined from the high of 1200 reported in 1872 to only 65. The population of Indians continued to decline until there were only 35 in the whole county in 1940, and these were essentially located at the Indian village just south of Meadow. At the present time there

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2Carter, p. 129.

3Day, p. 143.

are only a few Indians living at the old Indian village, and there are two Indian families living in Meadow.¹

**Mormon Settlement**

Although the Indians created a problem this was not sufficient to deter initial white settlement in the Meadow area in 1857. The circumstances surrounding the settlement of Meadow vary somewhat from those of most Utah villages in that the initial settlement was made by a family from Fillmore acting on their own initiative without church sponsorship. This group was not highly organized, and thus lacked many of the skills normally found in a Mormon settlement.² Most Mormon villages were settled under the guidance of the church leaders who would appoint a man with both secular and ecclesiastical authority to take a hand-picked group of people to a chosen area and establish a settlement. Each group was carefully organized and had carpenters, blacksmiths, masons, mechanics, and other people with skills necessary for founding a pioneer community. Once at their destination, the people were allotted enough land for their own needs. All extra land and all of the water was a community possession, and settlers who came later received an equal share.³

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¹Personal Census of Meadow, conducted February 12, 1966.
³Larson, pp. 59-69.
The Meadow settlement was atypical in one other important aspect, the location of the town. Many of the Mormon settlements in Utah were located on alluvial fans where it was easy to divert water from the streams. By way of contrast, Meadow was located on the gently sloping floor of the valley below the alluvial fan because the alluvial fans above proved too steep for settlement or agriculture.

At first, because of limited physical and social resources, Meadow was settled on a seasonal basis. In the spring of 1857, James Duncan rode south from Fillmore in search of summer pasture for his cattle. Arriving at Meadow Creek, he found a large expanse of good grass with a stream flowing through it. Realizing that the area held real possibilities as a town site, he returned to Fillmore, got his wife and two children and their meager possessions and moved to Meadow Creek. When the Duncans arrived at Meadow Creek, they established themselves on a ridge about one mile below the present townsite,\(^1\) probably because the main road at that time ran just below the ridge.\(^2\) The Duncans built a dugout in the side of the ridge and had just moved in when four other families from Fillmore arrived. The newcomers built dugouts side by side with the Duncans, and all worked together to clear land above the

\(^2\)Day, p. 312.
settlement and divert water for agriculture. In this first season, there was only water enough to produce thirty-five acres of wheat, which they harvested in the fall.\textsuperscript{1} When winter came, these early settlers moved back to Fillmore for protection from the Indians who lived in the foothills to the south. With the arrival of spring, the original settlers returned to Meadow accompanied by three new families.\textsuperscript{2} The new settlers at Meadow Creek built homes of logs, with the first being built by Ephraim Tompkinson.\textsuperscript{3} Other settlers wished to move to Meadow Creek, but the seven families already there refused permission as they thought there was insufficient water to support more. In 1860, Brigham Young visited Meadow and asked the people to divide the water equally with all those who wished to move there. He promised them that if they would do this there would be sufficient water for all.\textsuperscript{4} His wishes were followed and several other families moved to the settlement.

The pioneers soon learned that they had not chosen a good site for their homes. Since their farms were above the village and all of the water in the stream during the summer months was used for irrigation, they had to haul culinary water from upstream. When water did reach the

\begin{footnotes}
\item[1]Records of Meadow Ward and Branch, Church Historian's Office, Church of Jesus Christ of Latter-Day Saints, Salt Lake City, Utah. Documents filed by year, n.p.
\end{footnotes}
village, it was too muddy to drink. The settlers met together in 1861 and decided that the best way to solve this problem would be to move the townsite upstream beyond the farms, to its present location. Moving from their homes was nothing new to these people as most of them had continued the custom set the first year of settlement of returning to Fillmore during the winter. The new townsite was surveyed by James Duncan, and in 1862 all of the families moved to the present town.

The Economic Basis of Early Meadow

The settlers of Meadow, like most pioneers, were primarily concerned with providing themselves with food, and lived very nearly at the subsistence level. Although there was some game in the locality, the main food supply lay in the crops they produced. The staple crop in Meadow was wheat which was grown on land cleared of sagebrush and irrigated from Meadow Creek. In addition to the wheat, the early settlers also produced some irrigated corn and barley. All of the settlers had cattle that ranged in the foothills to the east in summer and in the desert to the west in the winter. Each family raised a garden to help supply themselves with food, and each family kept one or two cows to provide milk for the family. The crops were harvested cooperatively by all of the able bodied.

1 Meadow Ward Records, 1860.

members of the community, but the food that the pioneers produced was rarely more than enough to feed the population of the village. Any surplus was almost unsalable as the nearby settlements raised exactly the same things and transportation beyond the Pavant Valley was uneconomical at first.  

The problem of providing sufficient food was only one of many problems faced by the pioneers, but it was the major one for a crop was not assured. If there was sufficient water for irrigation and the crops were good, the grasshoppers might destroy all of the grain. Church records state that in 1868 nearly all of the crops in the area were destroyed by these insects. Rabbits were numerous in the area, and often destroyed part of the crops. Sudden thunderstorms bringing heavy rain or hail at the wrong time of the year sometimes completely ruined crops. The ever-present problem of insufficient water often resulted in only poor yields from the crops that did mature. Often when there was sufficient water there was apt to be too much, resulting in spring floods.

The fact that Meadow was not settled under church sponsorship created the problem of lack of essential skilled men such as blacksmiths and other mechanics. The lack of trained medical aid and medicines often resulted

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1 Day, pp. 313-14.
2 Meadow Ward Records, 1868.
in needless deaths, and the Indians were a threat. Although all of these problems threatened the small pioneer settlement, it still continued to grow with the passage of time.

Growth of the Town

As the population of Meadow increased, schools, stores, blacksmith shops, and other services were established. By 1864 there were enough children in town of school age to prompt Martha S. Bennett to organize and teach school in the front room of her home. The continued growth of the new community with its attendant church organization, led to the need for a public building. In 1866, a log building eighteen feet long with a plank floor and chalk roof was completed, and it was used for church meetings, school, and community events such as dances and theatricals.¹

By 1870 there were 193 people residing in Meadow.² The small log building was now much too small to hold all of the people who wished to attend the various functions held there, so the people decided to build a brick church house. This building was to be forty feet by thirty-six feet and would cost $3,200. Work was begun on it in 1873, but the members of the community were unable to gain enough

¹Ibid., pp. 313-15.
funds to do more than begin the work, and the project was abandoned at the end of the summer. The following summer, the community undertook the more modest project of enlarging the one room log building. Using logs obtained in the mountains nearby, they added a twelve foot addition, after first removing the east end of the old building so that it would still contain just one large room.¹

About 1875, the leaders of Meadow saw that the need for a store was becoming acute. It was decided that a cooperative store would best meet the needs of the people, so all joined together to build the one room building. The store was stocked with a few bolts of cloth, pins, needles, pepper and a few other spices, matches, thread, and similar items. These goods were obtained by taking home-made cheese, butter, hides, and dried fruit to Salt Lake City and trading for the desired items. This trip normally required twenty days with the slow ox teams used. The back part of the store was made into a blacksmith shop for repairing farm implements.² A few years later a community sawmill was erected above town where Meadow Creek emerged from its canyon. This mill operated whenever there was sufficient water in the creek, but was washed away by a flood a few years later.³

In 1877, with the continued growth of the town, the

¹Meadow Ward Records, 1864.
²Day, p. 325.
³Ibid., p. 326.
Meadow Creek Branch was organized into a ward.\(^1\) The census of 1880 showed that the population had increased to 212 people.\(^2\) Once again the need for a larger building for community functions was felt. Work commenced on a brick church house in 1884. Brick for the building was molded by some of the townsmen, and all of the labor was supplied by members of the community. This building was completed in 1884 and is still in use today as part of the Meadow Ward Church house. When first built, all community functions formerly held in the old log house were held in the new building.\(^3\)

The population continued to grow, and by 1890 there were 344 inhabitants in the town.\(^4\) During the 1890's another sawmill was erected in the canyon, this one using a penstock to provide water to the water wheel which enabled it to operate during much of the year. In 1896, work was commenced on a school house. One member of the community was a stone cutter, and he dressed the rock that was used in the construction of the building. This building was completed in 1897 and had two classrooms on the bottom floor and an amusement hall covering the entire second

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\(^1\)Jensen, p. 485.


floor.\textsuperscript{1} By the end of the century there were several other establishments located in Meadow. On the eastern edge of town was a planing mill that produced excellent lumber, and on the northern edge of town a creamery had been built.\textsuperscript{2}

The number of people in Meadow remained relatively stable in the twenty year period following 1890. In 1900 it had decreased to 343 from the 344 of 1890. In 1910 it showed a slight increase to 375.\textsuperscript{3}

By 1912, the problem of culinary water for the population was acute. There were a few wells in town, but most of the people took their water directly from Meadow Creek. During times of high water in the spring, the water was so muddy that everyone had to try and get water at the few wells. The town fathers proposed that they incorporate the town and bond it for $4,600. With this money a pipe would be constructed to bring water three miles from a spring in Walker Canyon. Additional money for the project would be supplied by charging $200 for each hydrant installed. The proposal was passed overwhelmingly by the people, and by the fall of 1912 there were 100 hydrants installed in Meadow.\textsuperscript{4}

\begin{itemize}
\item \textsuperscript{1}Day, p. 328.
\item \textsuperscript{2}Meadow Ward Records, 1900.
\item \textsuperscript{3}U.S. Bureau of the Census, \textit{Twelfth Census of the United States: 1910, Population}.
\item \textsuperscript{4}Deseret News, February 12, 1950, p. 1.
\end{itemize}
In the period from 1910 to 1920, the population of Meadow continued to increase as new farming methods and new crops enabled the same amount of land to support a greater number of people. By the end of the nineteenth century, horses had completely replaced oxen for farm work, and new breeds of animals were introduced to the area.\(^1\) The animals originally brought by the settlers were replaced by types that were more adapted to one specific function. New crops were introduced to the area, such as rye and sugar beets. Alfalfa, introduced to the Meadow area late in the nineteenth century, was particularly important during the early decades of the twentieth century as there was an almost unlimited market for alfalfa seed.\(^2\) Arrival of the railroad at Fillmore in May of 1923 provided the Meadow farmers with an expanded market for their cash crops.\(^3\) However, the improvement in types of animals, crops, and communication facilities was not matched by improvement in use of labor. Although horses had replaced oxen, it still required many man hours to cultivate an acre of land, and the need for this labor was a major factor in the town's growth during this period. When the

\(^{1}\)For a complete discussion of the new types of animals and crops see pages 58 to 66.

\(^{2}\)Day, p. 698.

\(^{3}\)Ibid., p. 48.
1920 Census was taken it noted an increase in population of 20%, from 375 in 1910 to 450 in 1920.¹

Decline of the Town

The population of Meadow in 1920 was the greatest in its history, but by 1930 the town had entered a state of decline that is still in progress today. The 1930 Census reported 429 people living in Meadow, the 1940 Census 422, the 1950 Census 378, and the 1960 Census 244.² The population in 1960 was only 30 more than eighty years previously in 1880. One of the most important causal agents of this decline was the mechanization of farming that began in the decade of 1920 to 1930.³ Increased use of inanimate power enabled one person to do work that had previously required several people, and thus there was no need for the large labor force required before. Coupled with the impact of mechanization on the town's economy was the extended period of low prices for farm goods that began with the depression in 1929. This period of reduced farm income lasted until the beginning of World War II, leading many people to leave farming in pursuit of more lucrative occupations. These outside economic activities exerted even greater drawing power on the residents of Meadow with the beginning of World War II. As a result of the war a

²Ibid.
steel mill was constructed at Provo, Hill Air Force Base at Ogden was greatly expanded, and a camp for American Japanese was built in western Millard County. Following the war the economy of Utah was characterized by increased industrialization, especially in the Wasatch Front counties of Davis, Salt Lake, and Utah, and this provided even greater job opportunities for residents of Meadow. Mechanization of farming, low prices on farm products, and the drawing power of economic activities outside of Meadow, combined to cause a population reduction of nearly 50% in Meadow between 1920 and 1960.
CHAPTER IV

THE AGRICULTURAL SYSTEM: ITS DEVELOPMENT AND ITS INTERACTION WITH THE HABITAT

When Meadow was first settled, agriculture formed the sole basis for the settlers' livelihood, a condition that in somewhat lessened degree still exists today. An examination of the development and limitations of this basis is essential, therefore, in any study of the viability of Meadow.

The agricultural system upon which Meadow depends is a complex having its origin in a changing cultural pattern and a habitat limited not only by its intrinsic character but also by the modifications brought about through interaction with man's activities. The crops now grown and the livestock now raised are a legacy of the development of the settlement in its geographical framework. As Utah grew and communications improved, the farmers of Meadow changed from subsistence to commercial agriculture. With this change and through the accompanying improved circulation of goods and ideas, varieties and breed of crops and animals changed to meet the new market needs and to utilize in a higher degree the restricted physical environment.
This environment, however, not only limits the types of agricultural opportunity available in Meadow, but also limits the total amount of such opportunity. Crop agriculture in Meadow is restricted by shortages of both available land and water. Arable land is confined to approximately 3500 acres below and near the Bonneville high shoreline,\(^1\) in the eastern part of the valley. The foothills to the east are too rugged and the soils in the lower part of the valley to the west are too alkaline for crops. Because Meadow is located in a region with a semi-arid climate, the growing of most field crops is almost entirely dependent on irrigation. The early settlers relied exclusively on the small streams coming from the Pavant Range for water for this irrigation. The two largest of these, Meadow and Walker Creeks, still provide the greatest proportion of the water used, but in recent years wells have provided an increasingly greater share of the total supply.

Cultural modification of the habitat, however, was not always beneficial, and the productive capacity of the land has been accordingly reduced. In Meadow, as in most Utah communities, the trial and error methods used in the establishment of the irrigation system led to spoiled soil, while the immoderate use of mountain range lands brought not only a diminishing supply of forage but also intensified floods. Both of these ill effects placed an additional burden on a community that for most of its life

\(^1\)See pages 6 and 7.
seems to have operated on the margins of viability.

The Development of Meadow's Agricultural Pattern

In its earliest years, Meadow, although not a church-sponsored settlement, reflected the Mormon origin and experience of its settlers. An emphasis on the cooperative use of the town's resources, the division of the communal lands on the basis of need, and the nucleated settlement pattern, all found a mirror wherever the Latter-day Saints settled in isolation in the Great Basin.

This very isolation, involving as it did only a very slow transmission of goods from the rather meager selection available at the Mississippi-Missouri outfitting towns, contributed to a limited and oftentimes unsuitable range of agricultural plant and animal varieties and breeds. In the earliest period of Mormon settlement, Utah's communities were confined to crops and livestock of limited and rather low yielding kinds having their origin in an assortment hastily gathered from the frontier at the time of the Nauvoo exodus and augmented but slowly by the immigrants who followed. This condition contributed in some measure to the precarious nature of settlements such as Meadow. When communications improved, especially after the completion of the transcontinental railroad in 1869, new and improved crops and livestock were rapidly made part of the farming pattern of Meadow and other Utah communities.
The Earliest Agricultural System

When the settlers of Meadow first arrived, they established an agricultural settlement that initially was largely communal in its use of the level lands below the rugged foothills of the Pavant Range. All of the settlers worked together to clear and prepare one large field for crops and when this field had been planted, all worked together to fence it. As more settlers arrived, other fields were cleared to meet the increased need for food. When the crops ripened, all of the able bodied community members worked together to harvest, thresh, and store it, the division being on the basis of need. The moist low-lands in the center of the valley provided natural grasses for winter feed for the dairy cows. All of those who kept cows for milk worked together to cut and haul this grass which also was divided among the people on the basis of need. Those with more cattle needing feed for the winter received more of the grass hay.\(^1\) All of the land not being used for crops or for the production of grass hay was open range, and all of the livestock of the community grazed upon it. Those grazing lands nearest the community were reserved for work and dairy animals that had to be brought in each day.\(^2\)

This communal agriculture practiced during the first

\(^1\)Day, pp. 43, 312, 315.

\(^2\)Andrew Love Neff, History of Utah, 1847-1869 (Salt Lake City, Utah: Deseret News Press, 1940), p. 766.
years of Meadow's history was replaced rapidly by a system of small farms. By 1870, the people of Meadow had divided their large communal fields into smaller plots tilled by individual families.\(^1\) It is interesting to note that despite the fact that Meadow was not a church-sponsored settlement, the division of the large fields was based on a plan originated by Brigham Young and Heber C. Kimball shortly after the Mormons arrived in the Salt Lake Valley. Brigham Young felt that land was God's gift to the community and not to the individual. Therefore, land was distributed in the manner that would do the most good for the community. The Bishop was in charge of land distribution, and he allotted each man all of the land he needed to provide for his family, but no more than he could profitably cultivate. Only the cropland was distributed to individuals at this early date, while the grazing areas continued to be community property.\(^2\)

Livestock production was an important part of the agricultural economy of early Meadow. The first settler decided to move to the Meadow area because of the abundant grass located along Meadow Creek. The other early settlers brought their horses, cattle, hogs, poultry and oxen with them when they came to Meadow. Sheep were introduced into the little settlement in 1862 as they could provide meat,

\(^1\)Day, p. 315.

tallow, and wool for clothing.¹

Horses were extremely valuable during pioneer days as they could be used for relatively rapid transportation when ridden or hitched to a light wagon. Horses were also important as sources of power for the early sorghum mills and threshing machines. Nearly every family had at least one horse during these early years of settlement, but it is important to note that these were not large draft horses. All of the early horses brought to Utah were light breeds. Nearly all of these light horses were either Morgan, Thoroughbred, or American Saddler. It was not until the late 1880's that horses suitable for heavy work were introduced to Utah.

Oxen were very important to the economy of Meadow before these large draft horses were introduced. The oxen were capable of pulling heavy wagons of hay or other freight, plowing, and other work that the light horses were unsuited to. These early oxen were nearly all of the Devon or Shorthorn breeds. Shorthorns comprised the majority of the oxen because the breed was not only large enough for heavy work, but also provided fairly good dairy and beef animals. During the time Meadow was settled, the Shorthorn was the most popular breed of cattle in the world.²

The importance of cattle, horses, and oxen to the

¹Day, p. 313.
early economy of Meadow is indicated by Table 6 below, which shows the number of horses, milk cows, oxen and other cattle in Millard County for the years 1860 to 1910.

TABLE 6
ANIMALS IN MILLARD COUNTY

<table>
<thead>
<tr>
<th>Year</th>
<th>Horses</th>
<th>Milk Cows</th>
<th>Oxen</th>
<th>Other Cattle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1860</td>
<td>215</td>
<td>631</td>
<td>265</td>
<td>627</td>
</tr>
<tr>
<td>1870</td>
<td>1555</td>
<td>2041</td>
<td>142</td>
<td>2773</td>
</tr>
<tr>
<td>1880</td>
<td>1013</td>
<td>440</td>
<td>11</td>
<td>552</td>
</tr>
<tr>
<td>1890</td>
<td>4318</td>
<td>1553</td>
<td>4</td>
<td>6444</td>
</tr>
<tr>
<td>1900</td>
<td>4159</td>
<td>2288</td>
<td>0</td>
<td>7538</td>
</tr>
<tr>
<td>1910</td>
<td>5321</td>
<td>3256</td>
<td>0</td>
<td>10478</td>
</tr>
</tbody>
</table>

\(^{a}\text{U.S., Census of Agriculture, 1860 to 1910 inclusive.}\)

In addition to horses and cattle, the pioneers also kept chickens, swine, and sheep. Little is known about the specific breeds of chickens kept, but each family normally kept a flock of from fifty to 100 fowls to provide eggs for the family. All of the early swine were white, possibly Chester Whites, and most families kept a brood sow or two and each fall butchered several of the animals and cured the meat. Some sheep were kept in early Meadow, but they did not become important until a later date.\(^1\)

Field crops of various types made up the other segment of the agricultural economy of Meadow. Little is known about the early crops, as the pioneers did not refer

\(^1\text{U.S., Census of Agriculture, 1860 to 1910 inclusive.}\)
to them by a specific name but only as wheat, corn barley, or oats. We have no knowledge of the specific strains to which these terms were applied. However, Lofthouse, a soft red winter wheat was introduced to Utah after the pioneers arrived, and was widely distributed by 1890. Kofod, a winter-hardy, drought-resistant, soft white winter wheat was important in the Meadow area by the same time.

We know even less about oats and barley and other grains than we do about wheat. Two major types of oats were common, a white variety and a brown variety. The pioneers often mixed these two varieties and planted them as if they were one. Barley was introduced to Utah soon after the arrival of the Mormons, and quickly spread throughout the state. Although we know little about the actual variety, we do know that it was subject to winter kill and was planted almost entirely in the spring. Corn was referred to as either dent or flint, but apparently all of the corn was a fairly large-eared flint type as there are no records of dent corn existing in Utah before 1900. The only type of rye that existed was winter rye, and it was probably the same type as that grown under the same name today.

Most of the pioneers also grew gardens to provide vegetables, and one of the important vegetables they produced was the potato. These early potatoes were of two types: Early Rose (red skinned, flat, oblong, early),
and Meshanock (skin mottled white and blue, shape very irregular, late). Potato yields were high when planted on soil with sufficient moisture.\textsuperscript{1} Sorghum cane was raised fairly extensively in Meadow until near the turn of the century. This sorghum was crushed by horse driven rollers, and the juice was made into molasses which was used as sweetening in place of sugar.\textsuperscript{2}

Fruit trees were also planted extensively by the pioneers. A nursery was established at Fillmore just one year after the settlement of Meadow, and it provided the necessary trees.\textsuperscript{3} When Andrew Jenson, church historian, visited the area in May of 1893, he found orchards growing throughout the area.\textsuperscript{4}

Changes in the Early Pattern

As time passed, new breeds of animals and new crops were introduced into the Meadow area. Better communications brought a change from subsistence to commercial farming and made possible the ready importation of livestock and crops that were better than the limited range

\begin{itemize}
\item \textsuperscript{1}Sutton, pp. 106-08.
\item \textsuperscript{2}Day, p. 113.
\item \textsuperscript{3}Volney King, "Millard County, 1851-1875," Utah Humanities Review, I, 175.
\item \textsuperscript{4}Ward Records, 1893.
\end{itemize}
available at first to Meadow's settlers. With the increasing availability of improved animals and crops, and the introduction of commercial farming, with its emphasis on efficiency and profit rather than on subsistence, the pattern of Meadow's agriculture changed in the latter part of the nineteenth century as the farmers selected stock, seed, and new crops which seemed to offer the best hope of profit within the limitations imposed by the habitat of the town.

The Devon was the first breed affected, it being completely replaced by superior breeds. Oxen could not compete with the Hereford as a range animal, nor with the Shorthorn in production of meat and milk. As a result of an inability to compete, the number of oxen decreased steadily from the time of the arrival of the pioneers, as shown in Table 6 on page 55, until they had completely disappeared from the entire county in 1900.

Light horses were replaced, except for riding and light work, by heavier breeds. In the 1880's heavy draft horses of the Norman, Clydesdale, and Percheron varieties were

1Draft horses were not nearly as able to survive the journey across the plains as oxen, and so the latter were all that most early settlers had. "The Oregon Trail and Union Pacific Railroad: A Contrast in Purpose," Annals of the American Association of Geographers, LI (December, 1961), 365.

2Improved or pedigreed cattle and many of the now common breeds of cattle were virtually unknown at the middle western outfitting points until some decades after the Nauvoo exodus. Sutton, p. 144.
introduced to the state, and were widely distributed within a few years.

The multi-purpose Shorthorn cow was also supplemented by other breeds. In the 1880's the first Holstein dairy cows were introduced to Utah, and although they did not spread as rapidly as the draft horses had, they appear to have reached Meadow by 1900. The Shorthorn was also supplemented as a range animal by the Hereford. The Shorthorn was not a good range animal because it produced too much milk, more milk than a calf could use, and as a result, the cows often lost part of their udders. In addition, the Shorthorn also produced milk for too long a time. Because they were such persistent milkers they often went into the winter too thin. Consequently, winter losses were always high with the Shorthorns, and the very severe winter of 1886 destroyed entire herds. When the people began to rebuild their herds, the Hereford was introduced as a replacement. These were crossed with the surviving Shorthorns to produce a much superior range animal.¹

The history of changes in crops and crop varieties is very similar to that of the animals. All of the original field crops have either been replaced by entirely new crops or by new strains that are superior in at least one respect to the old varieties. Spring wheat is now largely Federation, bred in Australia, and essentially all of the winter

¹Sutton, p. 147.
wheat is made up of the Turkey Red strains imported from southwest Russia. The flint corn of the pioneers was replaced by superior varieties shortly after 1900, and in more recent years by hybrid strains. The major varieties of barley are now Trebi from Trebizond, Turkey, and Velvon, which was developed in Utah. Sorghum and rye had almost completely disappeared as field crops by 1915, and since 1915 there has been change after change in crop varieties as the farmers have replaced older varieties for newer, superior ones.¹

Alfalfa.-- Alfalfa is one crop that has persisted largely unchanged since it was introduced to the Meadow area late in the nineteenth century. Alfalfa was first brought to the United States from Chile by gold seekers journeying to California by the Cape Horn route. These forty-niners introduced it to California, and Mormon immigrants traveling to Utah by way of the west coast brought the seed with them to Utah.² This seed was apparently introduced to the Salt Lake Valley in 1860, but was not widely accepted.³ Brigham Young was the first to give widespread publicity to the new forage crop. In the October General Conference of the church in 1865, he pointed out the advantages of utilizing alfalfa locally. Referring to the heavy losses of animals

¹Ibid., p. 108.
³Neff, p. 766.
each winter and the increasing difficulty of finding sufficient grass for work and dairy animals, he encouraged the settlers to plant the new crop. Even with this official endorsement, the use of alfalfa still spread very slowly. By 1875, there were only 3,578 acres of alfalfa harvested for hay in the entire territory of Utah as compared to 112,529 acres of grass hay harvested. As the population increased, however, the natural grasses became insufficient to provide the necessary feed, and the amount of alfalfa grown began to increase rapidly. In 1880, there were only 610 acres of alfalfa in Millard County, but by 1890 this had increased to 4,093 acres, and when the 1900 Census was taken there were 14,129 acres of alfalfa harvested for hay and only 1,789 acres of all other kinds of hay crops.

Alfalfa rose to a position of dominance as a hay crop in the Meadow area in only twenty years as a result of several factors. The increased need for livestock feed has already been mentioned, and alfalfa was admirably suited to meet this need. Alfalfa also did well on newly cleared lands, and once planted it produced good crops for several years before needing to be replanted. Alfalfa was well adapted to the semi-arid conditions in the Pavant Valley as the roots can extend to depths of twenty to forty feet at maturity and are able to tap ground water unavailable to the shallow-rooted grasses. Furthermore, because

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1Ibid., pp. 771-72.
2U.S. Agricultural Censuses.
it is a nitrogen fixing plant, it does not deplete the soil's supply of this vital plant food. The alfalfa hay produced on the mineral rich soils of this semiarid region was of such superior quality that work animals thrived on it without grain supplements. The climate was well suited to alfalfa as the hot, dry days of the summer hastened curing of the green tops and made it possible to cut many acres before stopping to rake the mown hay into piles. In addition, the yield of an acre of alfalfa was much greater than that of any of the other forage crops the settlers had been using, as the alfalfa almost always produced three cuttings when there was sufficient water for irrigation.

Another advantage of alfalfa was that when there was insufficient water during the summer months, one cutting could be made in the spring, and then the alfalfa would be allowed to develop seed, which was then harvested. The seed crop is very sensitive to slight variations from the optimum in temperature and moisture conditions from the beginning of growth until the harvest. Too much moisture at the budding time will induce a heavy growth of foliage rather than seed, and too much rain when the plants are in bloom hinders pollination. Cool summers prevent full development of the crop, and frost at any time during the growing season results in damage to the seed. The climate of the Pavant Valley meets the necessary requirements during

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1State of Utah, "Second Report...", p. 73.
most years. There is sufficient moisture during the spring to establish plant growth, and the hot dry summers are normally long enough to provide for maximum seed production.\textsuperscript{1} Alfalfa for both seed and hay continues to play a very important role in the economy of Meadow at the present.

\textbf{Dry Farming.--} At the same time alfalfa was beginning to be adopted widely in Meadow another important agricultural practice that contributed greatly to expanding the agricultural base of the community was introduced. This innovation was dry farming of wheat, and it was first practiced extensively in the Meadow area during the early part of the 1890's. The early pioneers had irrigated all of their crops, but not many years had passed before they began attempting to grow crops "above the ditch".\textsuperscript{2} The first recorded dry farming of wheat was near Bear River City in northern Utah in 1863. From here it spread south to the Juab Valley and then to the Pavant Valley. This early dry farming was not done on a scientific basis, but consisted merely of planting the wheat in the fall to take advantage of the winter precipitation and then harvesting it in July or August after letting it mature without any irrigation. Although crude, these early attempts at dry farming showed that a good crop of wheat could be harvested most

\textsuperscript{1}"The Climatic Asset of Millard County," \textit{The New West Magazine}, XI (Sept. - Oct., 1920), 14.

years without irrigation, and gradually all of the wheat was removed to dry lands. Other crops, such as alfalfa, that could not produce adequately without irrigation, replaced the wheat on the irrigated lands.¹

During the early part of the twentieth century, more scientific methods were adopted by dry farmers. One method consisted essentially of planting only on alternate years so that the tilled soil was able to accumulate moisture. Dry land wheat in the Meadow area provided a major part of the farm income until government controls were introduced.

Sheep.-- Dry farming was not the only new pattern the people of Meadow introduced in their efforts to build an adequate economy, for they also introduced sheep in large numbers just prior to 1890. The earlier settlers had kept a few sheep to provide meat, tallow, and wool for home consumption, but it was not until after 1890 that they were raised commercially. The sheep industry complemented the already existing cattle industry in Meadow, because the sheep thrived in the high, rough ranges of the mountains where cattle could not.² Furthermore, in the winters they were able to live in the desert far from the water holes as they obtained their water from vegetation and snow. Cattle, on the other hand, were restricted to areas where

²Sutton, p. 159.
they could supplement the supply of moisture in the plants from wells or springs. Because the sheep were able to make use of feed supplies not previously being exploited, their numbers increased very rapidly. The agricultural census of 1890 shows that the number of sheep in Millard County had increased from 4,125 in 1880 to 48,024. The 1900 Census showed another large increase to a total of 63,691, but this marked the peak of the sheep industry. Due to two major factors the number of sheep decreased rapidly during the next few years.

The first factor centered around the market for the wool. The majority of the wool produced had been sold to the Beaver Woolen Mills at Beaver, sixty miles south of Meadow. This mill had been constructed during the 1870's and was greatly expanded in 1889 and 1890. The mill had trouble selling its manufactured goods, and was forced to close shortly after 1900.2

Coupled with this loss of market was the problem of overgrazing created by the large herds of sheep. The farmers did not have any accurate basis for determining the carrying capacity of the range, but simply increased their flocks as long as they were able to sell the wool profitably. This led to serious overgrazing with its accompanying erosion. Devastating floods near the end of

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1U.S. Agricultural Census.

the nineteenth century pointed out the dangers of the injudicious use of the range, and focused community attention on the matter. These two factors combined, loss of market and overgrazing, led to a rapid decrease in the sheep population until there were only 16,129 in Millard County in 1910. The decrease in the number of sheep, however, did not remove the problem created by overgrazing.

The Interaction Between the Agricultural Pattern and the Habitat

It is apparent from the previous discussion that agriculture in the Meadow area is not only limited by the habitat, but agriculture has also modified this habitat both favorably and unfavorably. The present agricultural conditions represent the combined effect of the natural and modified elements making up the habitat.

Perhaps the most serious problem presented by the habitat was that of the harsh climate of the area. The ever present possibility of drought haunted the early settlers, and to a lesser degree haunts the inhabitants of Meadow today. In 1859, the settlers at Meadow Creek reported that they were experiencing a drought so severe that the water in the creek had disappeared before it reached the settlement. The summer of 1879 was so dry that nearly all of the crops in the entire Pavant Valley

1U.S., Agricultural Census, 1910.
2Day, p. 313.
were destroyed. During 1889, L.D.S. ward records report that there was no water, and that the county was purchasing well drilling rigs in an effort to provide enough water for culinary and livestock purposes.\(^1\) Precipitation during 1900 was only 9.32 inches, or 65.35% of the average of 14.26 inches from 1892 to 1960. In 1926, only 9.50 inches fell, and in 1934 only 6.72 inches or 47.12% of average. This drought of 1934 was the worst on record for Meadow. During it the water in Meadow Creek disappeared shortly after emerging from the canyon and the springs that provided culinary water for the town started drying up. To help alleviate this problem, a large new storage tank was built to store water during the night when there was not such a demand on the springs. When this failed to provide the necessary culinary water, the federal government donated four to five miles of three and four inch pipe to bring additional water from springs in Sunset Creek Canyon south of town.\(^2\) In 1935, precipitation increased to 14.24 inches, just two hundredths less than the average for the years of record. However, in 1942 it again declined to 10.30 inches.\(^3\)

The fact that most of the precipitation falls during the winter and spring, and very little during the summer, helps

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\(^1\) Ward Records, 1889.

\(^2\) Ibid.

\(^3\) For a complete summary of annual precipitation see Table 3 on page 11 of the text.
to increase the severity of the drought in years when precipitation is low. Even in years when the amount of precipitation received is average or above, the seasonal distribution of it makes it impossible to grow most crops without irrigation.

Stream Irrigation in Meadow

The Mormon pioneers in Utah were the first English-speaking people in the United States to practice irrigation on a large scale. The arid nature of the land they settled made irrigation essential if they were to occupy the area successfully. Many of the settlers of Meadow had practiced irrigation agriculture at other places in Utah before moving to Meadow, and the first crops they produced at Meadow were made possible by irrigation. These early attempts at irrigation in Meadow were very crude and consisted of diverting Meadow Creek onto the land. Because the pioneers had no idea of the actual amount of water a given crop needed, they often applied too much, which resulted in large areas of the bottom land becoming water-logged and alkaline. Furthermore, as long as the settlers were over-irrigating, they were not using the available water efficiently. Under these conditions, ditches and canals were of the simplest nature and no provision was made to prevent seepage or to prevent high flow in the spring from destroying the structures. No provision was made for equitable distribution among the farmers, and
those at the foot of the stream often received less than those further upstream.¹

On February 20, 1865, the Utah Water District Law was passed, and it provided a means whereby some of these above-mentioned problems could be overcome. This law gave all landowners in a county or part of a county the right to organize themselves into a water district, and when so organized to supply themselves with the water at the minimum cost of diverting the water to the land. This provided the way for building adequate distribution systems through each person that would benefit, paying his proportionate share of the cost.² On March 2, 1887, the landowners of Meadow took advantage of this law and were incorporated as the Meadow Irrigation Company. This company had a capital stock of $7,128, achieved by selling 297 shares of water at $24 a share.³ All of the water that came into the district was then divided into 297 equal parts, and each person received an amount of water commensurate with the shares he owned.⁴

The Meadow Irrigation Company originally obtained its water from two major and several minor sources. The major sources were, and are today, Meadow and Walker Creeks. In

²Ibid., p. 37.
³Ibid., p. 196.
⁴Ibid., p. 37.
addition to these perennial streams are several that flow only in the spring, such as Sunset Creek just south of town. No records are available that report the amount of water received in the Meadow Irrigation District from the minor streams, but Meadow Creek yields approximately 7,000 acre feet of water per year, and Walker Creek yields about 3,000 acre feet per year.¹

The farmers of Meadow were faced with many problems in their use of the streams flowing from the mountains. One of the most serious problems was the fact that too much water flowed in the spring when the snowpack was melting and thus went to waste, and too little water flowed in the summer and fall when crops were maturing. The seasonal nature of stream flow is shown in Tables 7 and 8 on page 71. From these charts we can readily see that the peak flow of water is usually in the latter part of May, and this dwindles rapidly until there is very little left by July.

The irrigation company tried a number of methods in their attempts to use efficiently the available water. It was impossible to build a reservoir in the canyon above town because the steep profile of the canyon would have called for an excessively high dam.² Small reservoirs, therefore, were constructed to store water during the night so that it could be used during the day when it could be

¹Dennis, p. 78.
TABLE 7
MINIMUM AND MAXIMUM STREAM FLOW AT MEADOW CREEK IN SECOND FEET

<table>
<thead>
<tr>
<th>Date</th>
<th>Sec. ft.</th>
<th>Date</th>
<th>Sec. ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 12, 1914</td>
<td>113</td>
<td>July 16, 1914</td>
<td>8.5</td>
</tr>
<tr>
<td>May 26, 1938</td>
<td>75</td>
<td>Sept. 15, 1938</td>
<td>.5</td>
</tr>
<tr>
<td>May 22, 1940</td>
<td>45.2</td>
<td>Aug. 31, 1940</td>
<td>1.5</td>
</tr>
<tr>
<td>May 24, 1945</td>
<td>35.8</td>
<td>Aug. 4, 1945</td>
<td>7.4</td>
</tr>
</tbody>
</table>

Adapted from Woolley, "Utilization of Surface Water . . .", p. 78.

TABLE 8
DISCHARGE OF MEADOW CREEK IN SECOND FEET

<table>
<thead>
<tr>
<th>Date</th>
<th>Sec. ft.</th>
<th>Date</th>
<th>Sec. ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 21, 1938</td>
<td>40</td>
<td>April 27, 1944</td>
<td>11.3</td>
</tr>
<tr>
<td>May 26, 1938</td>
<td>75</td>
<td>May 24, 1944</td>
<td>61.0</td>
</tr>
<tr>
<td>June 9, 1938</td>
<td>20</td>
<td>June 16, 1944</td>
<td>38.5</td>
</tr>
<tr>
<td>Sept. 15, 1938</td>
<td>.5</td>
<td>July 20, 1944</td>
<td>9.9</td>
</tr>
<tr>
<td>Nov. 10, 1938</td>
<td>.7</td>
<td>Aug. 22, 1944</td>
<td>3.9</td>
</tr>
<tr>
<td>May 9, 1939</td>
<td>14.4</td>
<td>Oct. 14, 1944</td>
<td>2.6</td>
</tr>
<tr>
<td>June 2, 1939</td>
<td>6.6</td>
<td>Nov. 14, 1944</td>
<td>2.6</td>
</tr>
<tr>
<td>March 5, 1940</td>
<td>3.6</td>
<td>Dec. 10, 1944</td>
<td>2.0</td>
</tr>
<tr>
<td>April 29, 1940</td>
<td>25.3</td>
<td>Jan. 31, 1945</td>
<td>1.8</td>
</tr>
<tr>
<td>May 18, 1940</td>
<td>27.2</td>
<td>Mar. 14, 1945</td>
<td>5.0</td>
</tr>
<tr>
<td>May 22, 1940</td>
<td>45.2</td>
<td>April 26, 1945</td>
<td>17.6</td>
</tr>
<tr>
<td>Oct. 31, 1943</td>
<td>1.5</td>
<td>May 24, 1945</td>
<td>35.8</td>
</tr>
<tr>
<td>Dec. 9, 1943</td>
<td>1.2</td>
<td>June 28, 1945</td>
<td>20.2</td>
</tr>
<tr>
<td>March 30, 1944</td>
<td>4.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adapted from Dennis, p. 23.
most efficiently handled. However, the reservoirs lost more water through seepage than they were saving, and when efforts to seal them failed, they were abandoned. The problem of too much water in the spring and too little in summer and fall remains as one of the major problems facing agriculture in Meadow today.

The seasonal nature of the water supply also created another important problem for the Meadow Irrigation Company. In the spring when the stream flow was high, it washed great amounts of sand and gravel downstream. This material was brought down in sufficient quantities that it would almost completely fill irrigation ditches and canals. During periods of excessive runoff, many men had to work night and day to keep the ditches clear. During the 1930's, men from town used hand plows to create crude terraces on the steeper slopes of the drainage basin to retard the runoff and thus minimize the problem.¹ In 1945, 1946, and 1951, the Forest Service used large machines to terrace much of the drainage basin of both Meadow and Walker Creeks, and this has lowered the maximum discharge of Meadow Creek to the point that relatively little material is deposited in canals and ditches today.²

Coupled with the small flow of the stream in summer

¹Interview with Clifton Beckstrand, former Water Master, February 22, 1966.

was the problem of water loss through seepage before the water reached the town. Where the streams flow through channels of permeable sand or gravel above the Provo Shoreline of Lake Bonneville, a large proportion of the water disappeared. Below the Provo Shoreline, the streams flow through impermeable clay beds that prevent seepage losses.\footnote{Dennis, p. 23.} The water lost through seepage enters the ground water reservoir, and much of it used to emerge in springs in the center of the valley below the farm land. The excess flow during periods of high water in the spring also flowed into the center of the valley to the old discharge channel, and then northwest out of the area. This old stream channel where the springs were located and the waste water flowed was known as Meadow Slough. In an effort to gain more use from the water, the irrigation company constructed a dam across the slough southwest of town. This created a reservoir from which the farm land toward the center of the valley could be irrigated, but did not solve the problem of getting sufficient water, as it provided for only a small part of the farm lands in Meadow. As wells were drilled extensively in the Meadow area the runoff in Meadow Slough ceased, and the reservoir was largely abandoned, it providing irrigation water only in extremely wet years at present. The problem of seepage was largely alleviated in 1955 when a cement canal was constructed to carry the water across that stretch of creek bed containing the most permeable
Distributing the water received in the Meadow Irrigation District is a problem that has not yet been solved. The system that has been in use since the pioneers started irrigation consists of each farmer taking all of the available water for a given length of time. This length of time varies with the amount of water flowing at the time, and may vary from eight hours during periods of low water to less than one hour during periods of peak discharge. The problem arises if the amount of available water declines before each shareholder has had a chance to take his turn. In order to be perfectly equitable, those receiving their share when the water is low should have the entire stream long enough that they receive the same amount as those who took their water turn during the high water period. However, if this is done, it might take so long for the water to go to each farmer that by the time it returned to the first ones, their crops would have been damaged by lack of water. The only way to prevent this is to limit the time it takes for the water to make a complete circuit of each farmer, whether each receives the same amount of water or not. In actual practice, a water master hired by the irrigation district distributes the water as equitably as is possible while still getting it to each farmer regularly enough to provide

1Meadow Ward Records, 1953.
for his crops.¹

Ground Water Irrigation in Meadow

The problems associated with irrigation in the Meadow area have been somewhat alleviated through increased use of wells for irrigation. The first well drilled in the Meadow area for irrigation purposes was sunk two miles west of town in 1919 by William Blake. This well was drilled adjacent to several ponds in an area of springs, and went to a depth of 250 feet. The well casing was eight inch pipe perforated to collect water from all water bearing strata it passed through. At the time it was drilled, this was an artesian well and produced enough water for irrigating 200 acres, and had sufficient pressure to run an over-shot water wheel which produced all of the electricity for the home and other buildings until 1939.²

By 1939, there were thirty-four wells in the Meadow Irrigation District, all located west of town and all artesian in nature. Some of these wells were small and were used largely as a source of stock water. During 1939 these wells yielded 1500 acre feet of water as compared to 17,000 acre feet from Meadow and Walker Creeks.³

However, at that time, the greater part of the ground water entering the Meadow area was being allowed to escape

¹Interview with Clifton Beckstrand, former Water Master of Meadow, February 22, 1966.
³Dennis, p. 78.
as surface runoff. Most of this water was escaping through several springs and seeps west of town, and from springs along Meadow Slough. One major spring about six miles west of town was about thirty feet in diameter and provided enough water to keep much of the lowest part of the valley floor covered with one to two inches of water. Meadow Slough had a stream of water averaging from four to five acre feet per day running in it all year round as late as 1945, as indicated by measurements taken in June of 1944 and 1945\(^1\) and the reports of local residents.

However, as more wells were drilled and pumping became prevalent, the amount of water escaping into the slough decreased, and the springs ceased to flow. At the present time, Meadow Slough is completely dry and has had no water in it for the past ten or twelve years. The previously mentioned large spring west of town now has a water level that is from one to three feet below the surface of the land, depending on the time of year. All of the artesian wells have declined drastically in yield, and most have ceased to flow except in the winter when pumped irrigation wells are not being used. Water levels in the wells currently start to decline about April 1st when irrigation begins, and they continue to do so until the first of September when the irrigation season ends. During the ten year period 1950 to 1960, the water table declined an average

\(^{1}\)Ibid., p. 55.
of sixteen feet, with the greatest decline being in the area of greatest withdrawal by wells.\(^1\) It is significant to note that the great decline during these ten years correlates with the ever-increasing quantities of water pumped from the wells. Table 9 below readily reveals the rapid decrease in flow from artesian wells as the amount of water obtained from pumped wells increased.

**TABLE 9**

**ESTIMATED ANNUAL DISCHARGE FROM WELLS IN THE MEADOW AREA IN ACRE FEET\(^a\)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Flowed</th>
<th>Pumped</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1946</td>
<td>2,000</td>
<td>200</td>
<td>2200</td>
</tr>
<tr>
<td>1947</td>
<td>2,100</td>
<td>500</td>
<td>2600</td>
</tr>
<tr>
<td>1948</td>
<td>2,100</td>
<td>600</td>
<td>2700</td>
</tr>
<tr>
<td>1949</td>
<td>2,200</td>
<td>1100</td>
<td>3300</td>
</tr>
<tr>
<td>1950</td>
<td>2,100</td>
<td>1700</td>
<td>3800</td>
</tr>
<tr>
<td>1951</td>
<td>2,000</td>
<td>3300</td>
<td>5300</td>
</tr>
<tr>
<td>1952</td>
<td>1,900</td>
<td>2000</td>
<td>3900</td>
</tr>
<tr>
<td>1953</td>
<td>2,000</td>
<td>4600</td>
<td>6600</td>
</tr>
<tr>
<td>1954</td>
<td>1,800</td>
<td>5200</td>
<td>7000</td>
</tr>
<tr>
<td>1955</td>
<td>1,700</td>
<td>5400</td>
<td>7100</td>
</tr>
<tr>
<td>1956</td>
<td>1,400</td>
<td>5600</td>
<td>7000</td>
</tr>
<tr>
<td>1957</td>
<td>1,600</td>
<td>6000</td>
<td>7600</td>
</tr>
<tr>
<td>1958</td>
<td>1,500</td>
<td>5900</td>
<td>7400</td>
</tr>
<tr>
<td>1959</td>
<td>1,000</td>
<td>9100</td>
<td>10100</td>
</tr>
<tr>
<td>1960</td>
<td>700</td>
<td>9600</td>
<td>10300</td>
</tr>
<tr>
<td>1961</td>
<td>400</td>
<td>11000</td>
<td>11400</td>
</tr>
<tr>
<td>1962</td>
<td>300</td>
<td>8000</td>
<td>8300</td>
</tr>
</tbody>
</table>

\(^a\)Adapted from Mower, pp. 56-57.

During the decade of the 1950's, the amount of irrigation water obtained from wells increased greatly as shown in Table 9. Although the exact amount fluctuates each

\(^1\)Mower, p. 45.
year depending on the amount of water available from Meadow and Walker Creeks, wells normally provide from thirty to forty percent of the water used for irrigation in the Meadow area. Wells as a source of irrigation water will continue to increase in importance as not all wells for which permits have been issued have yet been drilled. It is estimated that during future periods of deficient water supply the wells will provide up to sixty percent of the water used for irrigation.\footnote{Ibid., pp. 16-17.}

The increased use of ground water for irrigation has already resulted in a sharp decline in the level of the water table, and it will probably continue to lower it as pumping continues. However, a serious depletion problem will not arise unless the amount of water removed each year by pumping is increased a great deal, as there is still a large amount of ground water lost each year through natural discharge. This loss is estimated to be about equal to the amount removed for irrigation, and as the water table declines an increasingly large proportion of this natural discharge will be intercepted by the wells. When the water table has been lowered to the point that the wells are able to intercept all of the water now escaping as natural discharge, the water table should become relatively stable unless withdrawal by wells is further increased.\footnote{Ibid., p. 73.}
The increased pumping of wells does present a problem that may become critical in the future, as all indications point to a lowering of water quality accompanying the lowering water table. The suitability of water for irrigation is essentially determined by the amount of dissolved sodium in proportion to the amount of calcium and magnesium. A high proportion of sodium tends to break down the granular nature of the soil and renders the soil impermeable and saline, while water with a high calcium and magnesium content maintains good tilth and texture in the soil. Ground water generally has a greater mineral content than surface runoff because it remains in contact with the soil and rocks for a longer period of time. In most parts of the Meadow area this problem is not acute because the ground water is only used to supplement surface water, and the less mineralized surface water flushes out most of the undesirable elements deposited by the ground water. However, in farm lands toward the center of the valley the poor drainage prevents adequate flushing of the soil, and the more impermeable saline soil is already showing declining yields.\(^1\)

Although increased use of ground water will present a new problem to the farmers of the Meadow area, the necessity of providing sufficient water for irrigation will force them to rely more on the wells in future years of

\(^{1}\text{Ibid., pp. 65, 70.}\)
deficient precipitation. Unless the economic base of the town is changed, the water problem will maintain its position as the chief limiting factor in Meadow's growth.

Although wells have helped to offset the problem created by the arid nature of Meadow's habitat, some of man's attempts to make profitable use of the elements of the environment in the area have resulted in modifications of the habitat that are not favorable. The abuse of one element of the environment sometimes interacts with other environmental elements to create additional problems for man.

Range Problems

One of the major problems created by injudicious use of the environmental elements of Meadow revolves around the livestock which play such an important role in the economy of the area. The problem presented by extensive livestock operations in a semi-arid area centers around overgrazing. Overgrazing has greatly reduced the carrying capacity of the grazing area in the desert and in the foothills east of town. Destruction of desirable vegetation has permitted the invasion of range land by several undesirable plants, principally halogeten in the desert areas, and juniper in the hill areas east of town. Areas around water sources in the desert that are subjected to heaviest use have been almost completely destroyed as grazing lands.¹ Areas of

¹Interview with Lynn A. Aitken, Bureau of Land Management, Fillmore, February 12, 1966.
the bottom lands that have sufficient moisture to support ample grass have been overgrazed to the extent that greasewood and rabbit-brush have largely replaced the grasses. At the present time, salt-cedar, or tamarisk as it is sometimes called, is beginning to infest the grazing areas. This particular plant is potentially the most dangerous because it uses so much water and is capable of rapid infestation once it gains a foothold.¹ The problem of overgrazing is particularly acute on the Meadow grazing area in the desert west of town. These lands are part of the public domain, and are controlled by the Bureau of Land Management in Fillmore. The Meadow allotment is the only one issued for summer grazing, while all of the land around this allotment is grazed in the winter. A group of sheepmen from Ephraim have two winter grazing allotments, one on the north and one on the south of the Meadow allotment, and as there are no fences between and the sheep have to be herded from one to the other across the Meadow allotment, the Meadow area is essentially grazed both summer and winter.² The Bureau of Land Management would like to stop all grazing on the area and attempt to rejuvenate the forage, and then use it only for winter range. Winter use would allow the animals to graze much of the area that is only lightly grazed at present because it is too far removed from summer

¹Mower, pp. 72, 73.

Figure 3. -- Location of Meadow Grazing Allotment
water holes. A successful re-seeding program would allow
the desert grazing area to support twice the number of
animals it now does. At present it takes twenty acres of
desert range in the Meadow allotment to support one cow
for one month, and it takes five acres per month per
sheep.\footnote{Ibid.} Although a re-seeding program would increase the
carrying capacity of the range, it would force the farmers
of Meadow to reduce their herds greatly during the time the
range was closed. Furthermore, the Meadow farmers do not
want to see the range limited to winter grazing. At the
present time they are able to enclose their cattle in their
fields during the winter when the land is idle and feed
them on alfalfa produced the summer before, when the fields
were being used for crops. Winter grazing would force them
to provide feedlots and corrals to keep the animals in,
in the summer, and also the animals would be scattered
throughout the desert during calving time in the spring
when the rancher needs to keep close check on his animals.
In short, the program of re-seeding followed by winter
grazing would probably increase the costs of production of
livestock in the Meadow area, and thus impair the economic
base of the town. On the other hand, unless the problems
created by overgrazing are corrected, the economy of the
area will be even more seriously weakened.
Flood Problems

Overgrazing of the Pavant Mountains east of Meadow in the late nineteenth century increased the intensity of flash floods originating in them, but this was only one of several factors that made such floods likely. Another is the heavy precipitation on the mountain slopes during summer thunderstorms. The precipitation from these convective storms, normally very heavy over small areas, is greatly intensified by orographic lifting in the mountains. Moreover, these heavy summer rains fall on an area of steep slopes that channel the runoff into steep, narrow canyons. Once much of the vegetation was removed from the catchment basins of these canyons there was little to retard the runoff, which flowed down the canyon and poured out on a relatively small area adjacent to the stream, thus greatly multiplying the effects of direct precipitation. It is unfortunate that the area most suited for settlement at Meadow is also the area most subject to the damaging effects of cloudburst floods. When the pioneers settled the area, their choice of a settlement site was largely conditioned by their need for water. That area below the mouth of Meadow Creek canyon along the stream's banks at the time seemed to be the ideal location as it would enable them to get culinary water from the stream, and irrigation would be facilitated by the gentle slope of the land. As new settlers arrived, they made their homes further upstream, and utilized all the level land in the stream valley for crops. By the time it
experienced its first major flood, Meadow was so well established that it seemed out of the question to move to a new location, so the settlers merely rebuilt and hoped each succeeding flood would be the last. The first flood of record in Meadow occurred sometime during the 1880's, and destroyed some crops, corrals, and the sawmill in the canyon.\(^1\) Other floods occurred as the years passed, but most were minor in nature. Severe floods, resulting in extensive damage, occurred on July 13, 1896, August 4, 1916, July 30, 1934, and in the summers of 1938 and 1940. The flood of 1896 occurred at the time the sheep industry was at its height, and was the most destructive flood ever experienced at Meadow.\(^2\) Meadow Creek, which normally has a discharge of 40 to 45 cubic feet per second during the peak of its spring runoff, was discharging 1200 cubic feet of water per second, plus a large load of mud, boulders, logs, and trees.\(^3\) The flood destroyed a sawmill and all of the larger pine trees in the canyon, irrigation canals, stables, barns, corrals, and haystacks in the town, and deposited a thick layer of mud, rocks, and logs over much of the town and its croplands. In 1916, another very destructive flood struck Meadow. Although small floods had

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\(^1\) Day, p. 326.


\(^3\) Ibid.
occurred in the intervening years, this was the most destructive flood since 1896. Meadow Creek discharged 1,000 cubic feet of water per second from its canyon, and again severe damage was done to the town and crops. The floods of 1934, 1938, and 1940 were similar to those already described, but were somewhat less extensive. Table 10 below presents the rate of discharge and estimated amount of damage caused by these major floods.

TABLE 10
MAJOR CLOUBURST FLOODS IN MEADOW

<table>
<thead>
<tr>
<th>Date</th>
<th>Discharge of Meadow Creek in Cubic Feet per Second</th>
<th>Damage from Cloudburst Floods at Meadow in Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Agriculture</td>
</tr>
<tr>
<td>July 13, 1896</td>
<td>1200</td>
<td>2530</td>
</tr>
<tr>
<td>Aug. 4, 1916</td>
<td>1000</td>
<td>2020</td>
</tr>
<tr>
<td>July 30, 1934</td>
<td>800</td>
<td>1520</td>
</tr>
<tr>
<td>1938</td>
<td>670</td>
<td>1190</td>
</tr>
<tr>
<td>1940</td>
<td>750</td>
<td>1390</td>
</tr>
</tbody>
</table>


The decline in the number of sheep herded on the Pavant mountains helped somewhat to overcome the flooding problem, but it was not until the government strictly enforced regulations concerning grazing in national forests, of which the Pavant Range is a part, that the overgrazed vegetation began to return. As the vegetation returned, it increased

1Ibid.
the ability of the soil to retard runoff, and thus helped reduce flooding. Not only does the rejuvenated vegetation retard runoff, but it also prevents large scale erosion; and as it was the debris load of the flood that did the most damage, this has largely alleviated the damage caused by the cloudbursts.\textsuperscript{1} When floods now occur they do not carry the amount of material that early floods did, and a debris dam constructed at the mouth of the canyon in the 1940's catches most of the material which they do carry. In addition, a flood channel of 1200 cubic feet per second capacity below the spillway of the debris dam carries the flood waters to the south of town where their effect is minimized.\textsuperscript{2}

Although man cannot prevent the floods from Meadow Canyon, he has been able to largely negate the damaging effects of all but the most severe.

Man has also been able to overcome some of the other problems faced by the early settlers. Crop diseases such as weevil and aphids in alfalfa and smut in wheat can now be prevented through use of insecticides or resistant crop varieties. The livestock losses caused by coyotes, mountain lions, and other predators have become negligible as the population of these animals dwindled under man's pressure. Another of the early settlers' most serious problems, winter kill among their livestock, was alleviated as they

\footnote{1}{Ibid.}
\footnote{2}{U.S. Department of Agriculture, \textit{Survey Report, Sevier Lake Watershed} \ldots , pp. 58-60.}
came to realize that livestock could not survive the winters without supplementary feed. The problem of markets for the agricultural goods produced in Meadow was solved by the coming of the railroad to the area early in the twentieth century, and later by the introduction of truck transport. Lying athwart the major north-south highway in Utah, Meadow is easily able to ship its products to market at the present time.

The increased availability of technical and scientific knowledge with its attendant improvement in methods and varieties has enabled the residents of Meadow to live profitably in their habitat. These same improvements have, however, created a new problem as they allow and even force one man to farm more and more land, and thus remove the means of livelihood of part of Meadow's population and hasten the community's decline.
CHAPTER V

CHARACTERISTICS OF THE PRESENT VILLAGE

Although the village of Meadow has been declining in numbers in the decades since 1920, its economic base in agriculture has changed but little. As an agricultural village it has been reliant upon the resources previously described, and its level of prosperity has been strongly influenced by changes in the physical and cultural environment. Meadow, unlike some larger agricultural settlements, has not developed the second role of a service center for the surrounding area. This function was pre-empted at an early date by Fillmore as a result of its position as the political and religious center for the surrounding communities. Consequently, Meadow's growth has been closely coupled to agricultural conditions, and its decline mirrors the relative and absolute decline of the agricultural population of the United States. The reasons for Meadow's decline, however, are found in local conditions.

The Present Economic Base of the Community

Some of the most critical threats to Meadow's continued existence as a viable community are presented by the nature of the economy of the area. In order to determine accurately the importance of agricultural activities to Meadow's
livelihood a survey of the community was made. Information was obtained from a questionnaire completed by 78% of the heads-of-households of Meadow in February of 1966. The tabulated information revealed that 78.3% of those replying were completely or partly reliant upon agriculture for a livelihood. Although the survey revealed the dominant position of agriculture, it also pointed out the types of economic activities other than farming that are available to residents of Meadow, and even though these are of minor importance to the economy of Meadow when compared to agriculture, they do provide a livelihood for part of the town's residents.

The Dominant Position of Agricultural Activities in Meadow's Economy

The dominant role that agriculture plays in Meadow's economic base is brought out by the fact that of sixty families reporting, all but thirteen were either entirely or partially dependent upon agricultural activities for their living. The forty-seven families engaged in agricultural pursuits were made up of thirty-one who relied upon agriculture exclusively, and sixteen who held other employment to supplement their farm income. The residents of Meadow own 18,237.76 acres of the land in Meadow Precinct, and the forty-one farmers who reported the size of their

1The complete questionnaire is included in the Appendix on pages 114 to 118.
farms owned 16,466 acres of this amount.¹

A significant point to note is that of the thirty-one heads-of-households that reported they were dependent on agriculture alone for their income, only twelve were below the age of sixty-five. The high proportion of older people actively engaged in farming is indicative of one of the problems facing Meadow. As these people become too old to farm and are faced with the problem of disposing of their land, they nearly always sell to a younger farmer in the general area. This places control of more of the available farm lands in the hands of fewer people, and if this trend continues, and all indications are that it will, Meadow will be unable to support even the small population it presently does.

The tendency for fewer parties to own the farm land of Meadow is a result of the increasing mechanization of farming which enables one person to cultivate more land. The average amount of land owned by the individual farmer in Millard County increased from 132 acres in 1890 to 656 acres in 1959. Table 11 indicates the increase in size of farms in Millard County during the seventy years from 1890 to 1959. It is important to note that by far the majority of each figure given in Table 11 consists of dry land

¹Unless otherwise indicated, information in this chapter was gained from questionnaires filled out by sixty of the seventy-seven heads-of-households of Meadow in February of 1966, and from field observations.
farming areas, or land suitable only for grazing. Because the figures given are averages they do not give a true picture of the actual size of the farms.

TABLE 11

AVERAGE SIZE OF FARMS IN MILLARD COUNTY, 1890 TO 1959

<table>
<thead>
<tr>
<th>Year</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1890</td>
<td>132</td>
</tr>
<tr>
<td>1900</td>
<td>171</td>
</tr>
<tr>
<td>1910</td>
<td>226</td>
</tr>
<tr>
<td>1920</td>
<td>178</td>
</tr>
<tr>
<td>1930</td>
<td>216</td>
</tr>
<tr>
<td>1940</td>
<td>298</td>
</tr>
<tr>
<td>1945</td>
<td>447</td>
</tr>
<tr>
<td>1950</td>
<td>414</td>
</tr>
<tr>
<td>1954</td>
<td>482</td>
</tr>
<tr>
<td>1959</td>
<td>656</td>
</tr>
</tbody>
</table>

aMaterial tabulated from U.S. Census Reports

Table 12 gives the percent of farms in each size group for 1954 and 1959.

TABLE 12

PERCENT OF FARMS IN EACH SIZE RANGE, MILLARD COUNTY, 1954 AND 1959

<table>
<thead>
<tr>
<th>Year</th>
<th>Under 10</th>
<th>10-49</th>
<th>50-99</th>
<th>100-179</th>
<th>180-259</th>
<th>260-499</th>
<th>Over 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>1954</td>
<td>10.9</td>
<td>11.0</td>
<td>15.4</td>
<td>18.1</td>
<td>12.8</td>
<td>14.2</td>
<td>18.3</td>
</tr>
<tr>
<td>1959</td>
<td>6.5</td>
<td>13.0</td>
<td>13.8</td>
<td>19.1</td>
<td>9.8</td>
<td>14.6</td>
<td>23.1</td>
</tr>
</tbody>
</table>


From the table we see that farms in the groups under 100
acres in size accounted for 36.6% of the total farms in Millard County in 1954, and only 33.3% of them in 1959. The number of farms over 100 acres in size increased from 13.4% to 66.7% during the same five year interval. Although the foregoing figures are based on the entire county, they also indicated the trend in the Meadow area. Figures compiled from field work in Meadow in the spring of 1966 indicate that farms in Meadow may have been somewhat smaller than the county averages. This can be attributed to the fact that nearly all of the western half of Millard County is suitable only for grazing purposes and thus acreages are larger, which would increase the county average. Table 13 illustrates the percentage of farms in Meadow in each size group.

TABLE 13
PERCENT OF FARMS IN EACH SIZE RANGE
IN MEADOW, 1966

<table>
<thead>
<tr>
<th>Size Range</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 10 acres</td>
<td>3.13</td>
</tr>
<tr>
<td>10-49 acres</td>
<td>18.75</td>
</tr>
<tr>
<td>50-99 acres</td>
<td>18.75</td>
</tr>
<tr>
<td>100-179 acres</td>
<td>12.5</td>
</tr>
<tr>
<td>180-259 acres</td>
<td>6.4</td>
</tr>
<tr>
<td>260-499 acres</td>
<td>25</td>
</tr>
<tr>
<td>Over 500 acres</td>
<td>15.62</td>
</tr>
</tbody>
</table>

The percent of farms in the lower size groups is higher for Meadow than for Millard County because a much greater proportion of land in Meadow is irrigated, and the smaller farms are used entirely for intensive irrigation agriculture. The average farm in Meadow is 514.56 acres in extent, of which 95.06 acres are irrigated, 167.28 acres
are used for dry farming, and 252.22 acres are suitable only for grazing. The average value of the irrigated land in Meadow is 145.65 per acre, with the highest values being $200.00 an acre, and the lowest value being $100.00 an acre. Land used for dry land agriculture is valued at an average of $50.71 an acre, with values ranging from a minimum of $40.00 an acre to a maximum of $60.00 per acre. No value was set on range land, but interviews with local residents indicated a value of from $5.00 to $10.00 an acre depending on the quality of the land.

The Role of Field Crops.—The farms of Meadow are becoming increasingly specialized as to the number of crops produced. Prior to World War II each farm produced a variety of crops, including rye, oats, corn, alfalfa, wheat, barley, and alfalfa seed. Today the farmers of Meadow specialize in only one or two crops. Only one person indicated he produced any rye, oats, or corn, and he only produced a small amount of each. The balance of the farmers produced only alfalfa, alfalfa seed, wheat, and barley, with barley being of minor importance. The average amount of each of these crops produced is indicated in Table 14.

<table>
<thead>
<tr>
<th>Crops</th>
<th>Alfalfa</th>
<th>Alfalfa Seed</th>
<th>Wheat</th>
<th>Barley</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres</td>
<td>90.32</td>
<td>49.2</td>
<td>64.38</td>
<td>16.3</td>
</tr>
</tbody>
</table>
These field crops provide an average of 46.06% of the farm income of the farmer in Meadow. The balance of the average farm income in Meadow, 53.94%, is received from the sale of livestock and livestock products.

The Role of Livestock.—Livestock play an important role in Meadow's economy because so much of the land around Meadow is only suited for grazing. At the present time beef cattle make up essentially all of the livestock in the area; the only exceptions being a few sheep, a few riding horses for use in herding cattle, and a family milk cow or two at the majority of the homes in the village. The average rancher in Meadow owns sixty-two head of beef cattle and these are essentially made up of Herefords and Black Angus breeds, with a scattering of other breeds intermingled. The fact that so large a part of Meadow's agriculturally based economy relies on livestock creates an additional threat to the community's viability.

The Minor Position of Non-Agricultural Activities

Although agriculture plays the dominant role in the economy of Meadow, as pointed out in the preceding pages, other economic activities supply a minor part of the town's economic base. Those farmers in Meadow who received only part of their income from agriculture hold a variety of other jobs, which provide varying proportions of their income. Two are merchants, and farming is only of minor
importance to them as their farms consist only of seven and twenty-seven acres respectively. Three are truck drivers, and farming provides one-half of the yearly income of two, and one-third of the income of the third. Three are employed at the Utah State Road Commission maintenance shed located in Meadow, and proceeds from agriculture represent only about one-fourth of their total income. One works as a farm implement salesman part-time, and this provides one-third of his income, with agriculture providing the balance. One of those relying on outside work is essentially a full time farmer as his other job consists of being Board President of the Millard School District, which provides only a minor part of his yearly income. Another man works as a post office employee in Salt Lake City and farms on weekends, with farming providing about one-third of his yearly income. One part-time farmer does custom machine work in the area and this provides one-half of his annual income, and another drives the school bus which provides one fourth of his income. The other farmers who reported that they held jobs supplementary to their farming did not report the nature of their other work. The income derived from these outside jobs makes up only a small part of the economic base of the town.

Another small part of the economic base of Meadow is supplied by nine men who work full time and do not farm, and by seven wives who work part-time or full time. The men who work full time are engaged in the following occupations:
1. Teacher at Fillmore. (one)
2. Logger and truck driver. (one)
3. Mechanic in Fillmore. (one)
4. Welder (one)
5. Service station attendant at Meadow. (one)
6. Utah Highway Commission maintenance shed at Meadow. (one)
7. Prospector in the area south of Meadow. (one)
8. Truck driver at Fillmore. (one)

The wives who work are employed in the following jobs:
1. Secretary at Fillmore. (part-time) (one)
2. Waitress at Fillmore. (part-time) (one)
3. Town clerk of Meadow (part-time) (one)
4. Clerks at stores in Meadow. (part-time) (two)
5. Nurse At Fillmore Hospital (part-time) (one)
6. Deputy County Clerk at Fillmore. (full time) (one)

In addition to this small proportion of people who hold jobs apart from agriculture, there are a few retired people who receive all or part of their income from some other source than farming.

It is significant that the majority of the non-agricultural occupations are either located outside of Meadow, or are the result of outside influence. Only those employed as clerks in the two Meadow general stores and the clerk of Meadow itself have jobs that are an outgrowth of the influence of the community. Even the large new service station at Meadow was constructed and is owned by Fillmore interests.
Although there has never been an abundance of job opportunities in Meadow, there have been more in the past. At one time there were such activities as a sawmill, a creamery, and a lumber planing mill in the town, and these, along with a larger service industry, provided jobs for part of Meadow's population. As the population of Meadow declined there was insufficient business for these activities and they were forced to leave also, thus weakening the community's viability further. Coupled with the population decline has been the increasingly greater competition offered by larger centers, primarily Fillmore, in a day of rapid and easy movement. These factors together, a declining population and competition, have resulted in a dearth of non-agricultural activity in Meadow proper, and this in turn seriously weakens the viability of the community.

The Resultant Population and Physical Structure

The limited nature of the agricultural base of Meadow and the lack of non-agricultural activity have resulted in some very evident characteristics in the town's human and physical structure. Some of these characteristics, such as the numerous vacant homes and the overall impression of physical age of the buildings, are apparent from the most cursory examination, while others reveal themselves only on close examination.

Population Structure

Although a brief survey of the town indicates that
there is a large population of older people in the community, only a detailed survey reveals the exact nature of the age structure of the village. Other aspects of the population structure, such as education, cannot be discovered without information from the people themselves. For this reason, the questionnaire taken to each family contained detailed questions concerning such aspects of the population structure as age and education of household members.

**Age Structure and Education.**—The age and educational structure of Meadow reflect the limited opportunities provided by the town. As a result of these limited opportunities there is a continuous migration of the young to areas where they can profitably use their education and skills, and where there is a wider variety of opportunities available, both in number and kind. The effect of this migration is to leave a large proportion of older people residing in Meadow. At present there are 248 people living in Meadow,\(^1\) 135 of whom are over the age of 18. Percentagewise the population is made up of 20.57% 65 years old or over, 33.89% between the ages of 18 and 64, and 45.56% below age 18. By way of comparison, figures for the state show that 6.5% are 65 or over; 47.5% are between the ages of 20 and 64, and 46.0% are 19 or under.\(^2\) The preponderance

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\(^1\)Personal Census, February 22, 1966.

of older people is graphically illustrated by the fact that the percentage of people 65 or over in Meadow is over three times that of the state average.

With regard to education, 35.5% of the adult population did not graduate from high school, while 64.5% are high school graduates. Although twenty adults had attended college, only two had graduated, but it is interesting to note that the one male college graduate owned the largest farm, (4,000 acres), and reported the largest income, ($35,000).

As previously mentioned, the majority of those graduating from high school or college are forced to leave the area to find work. The area having the largest drawing power on the youth of Meadow is the industrialized Wasatch Oasis of northern Utah. At present 47.43% of the grown children of Meadow parents live in northern Utah, and another 28.57% reside in Millard County. California has the greatest drawing power of the other 49 states, luring 12.57% of Meadow children; with Nevada next at 4%, and southern Utah and Idaho having equal percentages of 1.72%. The remaining 3.99% are scattered throughout the western United States and Florida and Michigan.

Connections with Fillmore and Other Towns.—Even those people who remain in Meadow feel the drawing power of outside centers, primarily Fillmore. The community is populated by a group directed outward economically,
politically, and religiously. The average family in Meadow, for example, makes 3.9 trips to Fillmore each week. The major reasons for these trips are as follows:

1. Shopping 58.03%
2. Church work 15.75%
3. Work 13.19%
4. Visiting 6.83%
5. Other 2.20%

Under the category "other" the main reason given was medical which is a result of the high proportion of old people in the community.

The role that Fillmore plays as a service center is evident from the reasons given for trips to Fillmore. The importance of Fillmore to the inhabitants of Meadow is further brought out by response to questions on the questionnaire concerning where they made certain purchases. It was found that 34.75% of the people did the majority of their grocery shopping at Fillmore, with the remaining 65.25% doing their grocery purchasing in Meadow. With regard to purchases of clothing and household furniture, 80.79% reported that they bought these items at Fillmore, 15.38% obtained them at Salt Lake City, 1.92% indicated they purchased them at Provo, and an identical number bought them at Richfield. The dominant position of Fillmore as a service center is even more clearly brought out by the fact that 92.50% bought their automobiles and farm equipment there, while Salt Lake and Provo were the sources of
these items at 4.25% each. Fillmore is also the only source of medical aid in all of eastern Millard County, and it provides this service in all cases except those requiring specialists, which services are provided in Provo and Salt Lake City.

The people of Meadow not only journey to Provo and Salt Lake for specialized medical services and to shop, but also for visiting. The people of Meadow average four trips a year to Provo, and 3.42 trips a year to Salt Lake City. About one-half of the people gave visiting as the major purpose for their trips to these two cities. This is largely due to the fact that many of the grown children of Meadow parents live in these areas, as mentioned above.

Another half of the people reporting listed church work as the major reason for their trips to Salt Lake, and of those listing shopping or visiting as the major reason, many also indicated that church work was a minor reason.

Position of L.D.S. Church.—The L.D.S. Church plays a vital role in the life of the residents of Meadow. It is the major unifying factor in the community, as every permanent resident of Meadow is a member of the church. The church provides not only spiritual activities, but also provides much of the social life of the village through activities such as dances and parties. In a small village of this sort where there are so many older people the church plays a vital role through providing help when sickness or other inability prevents a person from carrying out his
normal activities. The church, in addition to its spiritual and social duties, is essentially responsible for upkeep of the community, as it is here that arrangements are made for local clean-up and building campaigns. It would be very difficult to overstate the importance of the L.D.S. church in the lives of the residents of Meadow, and to the viability of the town itself, for it is the main vehicle for a sense of continuity with the past.

Physical Structure of the Town

**Age of Buildings.**—The two general stores in Meadow indicate the one most evident characteristic of Meadow, that of age. Both buildings are extremely old, and the one at the corner of Center Street and Highway 91 is occupying the building which housed the first cooperative store established about 1875. Although this building has been remodeled it is still connected to the old log extension that was the first community blacksmith shop. The homes in the town are uniformly old, with 75.56% of those answering the questionnaire indicating that their homes were built prior to 1940. From information gained from the questionnaire it was found that 40% of the homes were built prior to 1920, 35.56% were built between 1920 and 1940, 8.89% between 1940 and 1950, and 15.56 since 1950.

**Concentration on Highway.**—All of the homes built since 1950 except three are located along Highway 91, indicating a locational preference based on accessibility.
of rapid transportation routes. Another indication of the importance of the major transportation artery is that 86% of the vacant homes in the town are located in the peripheral areas of the town. In addition, all of the community activities, except the church house and school, are located on the highway, including the stores, post office, service station, and state road shed.

**Lack of Community Amenities.**—The town of Meadow offers little in the way of advantages found in most communities, as indicated by the meager number of commercial establishments mentioned above. The fact that there are no industries or commercial establishments of importance in the town contributes to the unstable nature of the economic base of the town. There are two small general stores located along U.S. Highway 91 that goes through town, one of which also has a gasoline pump in front and serves as post office; one modern service station at the north edge of town on Highway 91; and a Utah State Road maintenance shed about one-fourth of a mile north of town on Highway 91. These are the only commercial establishments in town at present although there have been others when the population was larger, as indicated by one abandoned service station, one vacant cafe, and two vacant stores. There is also an elementary school and the church in the community. Adjacent to the church is an excellent dance pavilion which has been abandoned and has fallen into a state of disrepair, and the elementary school will
probably end up in like manner as it will not be used after the 1965-66 school year. Starting in the fall of 1966, all students will be bussed to Fillmore to school. Meadow has had a community school since 1864, and its closing raises a question as to whether or not the town itself might not be on the way to dissolution.

The past forty years have witnessed a continued decline in Meadow in population, commercial establishments, and economic opportunity. If this decline continues in Meadow it will eventually lead to community dissolution, unless something can be done to reverse the trend. The problem of how to stop the decline is one of paramount importance to Meadow residents, but it is one for which no solution as yet appears. The question that is raised, then, is whether or not Meadow is, and will continue to be, a viable community.
CHAPTER VI
FUTURE PROSPECTS OF MEADOW

Summary

The village of Meadow is faced with a bleak future for several reasons, one of which is the limited resources available in the area. There are no known minerals that could foster a mining industry, no important stands of trees to encourage lumbering on a commercial scale, and no other natural resources, other than the land itself, to augment the economy of the area. Meadow, furthermore, has no special advantages that would encourage commercial activities to migrate into the area. It has nothing unique to offer industries in the way of location, labor, market, transportation, or raw materials, and consequently is unable to attract new firms.

Meadow was established as an agricultural village, and in the hundred-plus years since its settlement there has been no change in the primacy of the agricultural pattern in the economy of the area. This economic base in agriculture provides another of the causal agents that pose a threat to the viability of the community. Agriculture in the area is very limited, in terms of both present production and future expansion. Profitable production of field crops is restricted to a strip of land below the
alluvial fans of the mountains and above the level, alkaline valley floor. In addition, the lack of sufficient water for irrigation during years of drought, and the limited amount during normal years, means that agriculture is precarious at best. These two factors, water and available land, combine to make possibilities for expansion of Meadow's agricultural economy almost impossible under existing conditions.

The Viability of the Town

As a result of Meadow's limited resource base and essential dependence upon agriculture, its economic base is extremely restricted and there is little opportunity for expansion of the town's economy. In an age of increased mechanization of agriculture, with its attendant trend towards increased size of holdings, the limited nature of Meadow's economic base in agriculture raises a serious question regarding the continued existence of Meadow as a community. The lack of economic activities in the area, apart from agriculture, tends to encourage people to migrate to areas offering a wider number and variety of occupational opportunities. There are only a few forces active in Meadow at present that are counteracting this drawing power of outside areas, and they are insufficient to completely offset the centrifugal effects.

Centripetal Forces in Meadow

One of the strongest and most evident of the centri-
petal forces at work in Meadow today centers around the church and the common heritage of the occupants of the town. All of the permanent residents of Meadow belong to the Latter-day Saints Church, and it plays an important role as a unifying force in the community. The church essentially plays the role of the town meetings common in smaller communities in the eastern United States through sponsoring such community activities as organization of celebrations for state and national holidays, dances, parties, and other social activities; clean-up and construction projects in the town; and provision for the welfare of the indigent. In addition, the common heritage of church membership and beliefs provides for an integration of Meadow's residents into a group whose members are reluctant to leave. Most people would rather reside in that area in which they were born and brought up, and this feeling is intensified in Meadow due to the common heritage mentioned above.

Coupled with the effects of church and heritage in Meadow is the factor of inertia. People are reluctant to commence something that is unfamiliar and often will remain in a depressed area rather than face the unknown by migrating. That this is important in Meadow is indicated by the fact that 78% of those who responded to the question as to why they lived in Meadow reported that they had lived there all their lives, and another 10% indicated they had lived there in youth and later returned. However, inertia has a limited effect as a centripetal force because the
town has such a large number of older people and new residents are not moving in rapidly enough to offset the population decline caused by death.

Another factor that attracts people to Meadow is the availability of cheap housing. The numerous vacant houses in the community can be purchased or rented cheaply, and this attracts some people. However, there is also an abundance of cheap housing in Fillmore due to its declining population, and it appropriates most of the new residents to the area, but the availability of this cheap housing in Meadow does act as a centripetal force.

Multiple Centrifugal Effects

Opposed to the centripetal forces discussed above are a number of factors tending to destroy the community. One of the most important of these is the concentration of lands in the Meadow area in the hands of non-Meadow residents. At the present time 28% of the land in Meadow precinct is owned by people residing elsewhere, primarily in Fillmore.¹ This trend towards control of the agricultural land by Fillmore residents further undercuts the economic base of Meadow, and the process will continue as older farmers retire or die and their land becomes available to others. Combined with this absentee land holding is the decline in relative importance of agriculture, in the United

¹Tabulated from records of Deputy County Assessor of Millard, Clifton Beckstrand, March 18, 1966.
States and Utah, which also negatively affects Meadow's economy.

Another factor that makes Meadow's continued existence as a viable community doubtful is its dependence on outside communities for most goods and services. As previously mentioned, Meadow provides only grocery stores and service stations, and many of the town's residents go to Fillmore even for these goods. Such things as automobiles, furniture, farm equipment, medical services, and clothing are available only at Fillmore or other outside centers. Not only do these centers provide most of the community's goods and services, they also hold a great attraction for the younger people of the town. As a result, the population of Meadow has no younger generation that can replace the older people as they die. The combined effect of Meadow's reliance upon outside centers for goods and services, and the migration of the town's youth to these centers, is to greatly weaken the community's viability.

Meadow's dependence on outside areas is made possible by modern communication systems that enable residents of the town to visit Fillmore and other centers to purchase those things not available locally. These same communications systems have made it possible to use Meadow's resources without residing in the town. Because Fillmore is at most only ten minutes away, farmers are able to reside in Fillmore and commute to the farms in the Meadow area.
Since Meadow has little to offer in the way of the "civilized amenities" that are expected in our society, this method of utilizing the resources of the Meadow area is becoming increasingly attractive. With the passage of time and the continued decline in Meadow and its facilities this alternative will undoubtedly attract even more people.

The Combined Effect of Centrifugal and Centripetal Forces

The centripetal and centrifugal forces discussed above are quite evidently of unequal weight, as the centrifugal forces greatly outnumber the centripetal forces. The combined effect of these forces can only lead to an inevitable decline in numbers that may eventually end in community dissolution. Because there are few incentives to keep young people in the community, dissolution will probably take place as the present generation passes, unless a new economic base or a more viable variant of the present base is found. At present the only hope of a new base lies in turning Meadow into a summer retreat for retired people, a hope generated by purchase of homes for this purpose by three couples from California during 1964 and 1965. However, this prospect, as well as any other growth that might be useful to Meadow, is more easily appropriated by Fillmore. Thus, the most likely future facing Meadow is that of eventual community dissolution.

It is important to note, however, that while Meadow
as a community may cease to exist, the economic activity and importance most probably will not. The agricultural and range lands of Meadow will be utilized in the future, the only difference being that they may be operated from Fillmore or other outside centers. The Meadow area, and other farming communities facing a similar future, will continue to play an important role in the economy of Utah even though they may no longer support a local agricultural village.
APPENDIX A

MASTER'S THESIS QUESTIONNAIRE

The following information will be used in writing a Master's Thesis on Meadow. The information will be held confidential and will only be used to form generalizations concerning the economic base of the town. Your cooperation in filling out the following questionnaire will be greatly appreciated.

A. Occupation

1. Farming only
2. Farming and other employment (specify) __________________
3. Other employment only (specify) __________________________
4. Wife employed. What employment? _________________________
5. Retired

B. Occupational information

1. Farming only
   a. Approximate income per year from farming.
      Under $3,000
      $3,000 to $4,000
      $4,000 to $5,000
      $5,000 to $6,000
      $6,000 to $7,000
      Over $7,000
   b. Total income per year (nearest 1,000) _______
c. Approximate size of farm _______ (acres)
   irrigated _______ (acres)
   dry farm _______ (acres)
   grazing only _______ (acres)

d. Major crops—in acres
   wheat _______
   alfalfa _______
   barley _______
   range _______
   other _______ (specify) ____________________

Do you usually produce alfalfa seed? Yes__ No__
How many acres average? __________

e. Amount of land owned _______ (acres)

f. Rented or leased _______ (acres)

g. Value of irrigated land per acre __________

h. Value of dry land per acre __________

i. Amount of land in land bank or other government
   land programs _______ (acre)

j. Fallow _______

k. Approximate value of farm
   Under $10,000
   $10,000 to $20,000
   $20,000 to $25,000
   $25,000 to $30,000
   $30,000 to $35,000
   $35,000 to $40,000
   $40,000 to $50,000
2. Farming and other employment.
   Where is job located? __________________________
   Approximate income __________________________ (yearly)
3. Have you increased the size of your farm during the time that you have been farming? _____ (yes or no)
4. Other employment only
   Where is job located? __________________________
   Approximate income __________________________ (yearly)

C. Age of household members (Please list number in each group)
   1. Under 10 ______
   2. 10 to 20 ______
   3. 20 to 30 ______
   4. 30 to 40 ______
   5. 40 to 50 ______
   6. 50 to 60 ______
   7. 60 to 65 ______
   8. Over 65 ______

D. Education
   1. Less than 8 years _____
   2. 8 to 10 years _____
   3. High school graduate _____
   4. Some college _____
   5. College graduate _____
E. Age of home
1. Built before 1920
2. Built between 1920 and 1940
3. Built between 1940 and 1950
4. Built between 1950 and 1966

F. Reason for living in Meadow
1. Lived here since childhood
2. Lived here in childhood, moved and later returned
3. Other

G. Relationship to other towns
1. Approximate number of trips to
   Fillmore per week
   per month
   Richfield per month
   per year
   Provo per month
   per year
   Salt Lake per month
   per year

2. At which town do you do most of your grocery shopping?
   Fillmore ___ Richfield ___ Provo ___ Salt Lake ___ Meadow ___

3. At which town do you buy purchases such as furniture and clothing?
   Fillmore ___ Richfield ___ Provo ___ Salt Lake ___

4. At which town do you buy heavy equipment such as cars and farm equipment?
   Fillmore ___ Richfield ___
Provo ___ Salt Lake ___

5. What is the major reason for trips to Fillmore?
Work ___ Shopping ___ Church work ___ Visiting ___
Other (specify) ___________________________________

For trips to Provo
Work ___ Shopping ___ Church work ___ Visiting ___
Other ____________________________________________

For trips to Richfield
Work ___ Shopping ___ Church work ___ Visiting ___
Other ____________________________________________

H. Approximate percent of farm income from livestock _____
    from field crops _____

1. Number of beef cattle owned _________
    dairy cattle _________
    sheep _________
    chickens _________
    horses _________

I. Family distribution
   Residence of grown children. (number)
   Millard County _________
   Southern Utah _________
   Northern Utah _________
   California _________
   Other (specify) ___________________________________
APPENDIX B

TABLE 15

AVERAGE TEMPERATURES AT FILLMORE, UTAH
IN DEGREES FAHRENHEITA

<table>
<thead>
<tr>
<th></th>
<th>Annual Average</th>
<th>Maximum Average</th>
<th>Minimum Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan.</td>
<td>29.5</td>
<td>42.4</td>
<td>16.5</td>
</tr>
<tr>
<td>Feb.</td>
<td>34.3</td>
<td>47.2</td>
<td>21.5</td>
</tr>
<tr>
<td>Mar.</td>
<td>41.6</td>
<td>55.2</td>
<td>27.9</td>
</tr>
<tr>
<td>Apr.</td>
<td>49.2</td>
<td>65.1</td>
<td>34.3</td>
</tr>
<tr>
<td>May</td>
<td>58.4</td>
<td>74.9</td>
<td>41.3</td>
</tr>
<tr>
<td>June</td>
<td>68.3</td>
<td>86.9</td>
<td>49.6</td>
</tr>
<tr>
<td>July</td>
<td>75.9</td>
<td>93.8</td>
<td>57.9</td>
</tr>
<tr>
<td>Aug.</td>
<td>74.5</td>
<td>92.1</td>
<td>56.8</td>
</tr>
<tr>
<td>Sept.</td>
<td>65.0</td>
<td>82.9</td>
<td>46.7</td>
</tr>
<tr>
<td>Oct.</td>
<td>52.6</td>
<td>69.6</td>
<td>35.6</td>
</tr>
<tr>
<td>Nov.</td>
<td>41.2</td>
<td>55.9</td>
<td>26.3</td>
</tr>
<tr>
<td>Dec.</td>
<td>29.6</td>
<td>42.0</td>
<td>17.3</td>
</tr>
<tr>
<td>Average</td>
<td>51.7</td>
<td>67.3</td>
<td>36.0</td>
</tr>
</tbody>
</table>

aAdapted from Burnham, p. 59.

TABLE 16

ABSOLUTE MAXIMUM AND MINIMUM TEMPERATURES
IN FILLMORE, UTAH IN DEGREES FAHRENHEITB

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>74</td>
<td>74</td>
<td>80</td>
<td>92</td>
<td>103</td>
<td>106</td>
<td>115</td>
<td>109</td>
<td>104</td>
<td>95</td>
<td>86</td>
<td>67</td>
</tr>
<tr>
<td>Minimum</td>
<td>-23</td>
<td>-17</td>
<td>-2</td>
<td>7</td>
<td>19</td>
<td>22</td>
<td>32</td>
<td>32</td>
<td>9</td>
<td>13</td>
<td>-11</td>
<td>-20</td>
</tr>
</tbody>
</table>

bAdapted from Climatic Summary, Section 20, pp. 33,34.
SNOW PACK IN THE PAVANT MOUNTAINS

The snow pack is measured each April at snow-gaging stations east of Meadow on Pine Creek, and east of Fillmore in Bear Canyon. At the Pine Creek-Chalk Creek station during the years of record, 1930 to 1956 inclusive, the average snow depth during April was 41 inches, at the Pine Creek station the average depth for the years 1954 to 1963 was 46 inches, and at the Bear Canyon snow-gaging station the average for the 10 year period, 1954 to 1963 was 31.1 inches. The greatest depths on record for April were at the Pine Creek-Chalk Creek station, 71 inches in 1952; at the Pine Creek station 87 inches in 1957; and at Bear Canyon, 48 inches in 1955. At the Pine Creek station east of Meadow, the average snow depth in November is 11.4 inches, and in June it is 25 inches. The water content of this snowpack is very high. At the Pine Creek-Chalk Creek station, 3.2 inches of snowpack yields one inch of precipitation. At the Pine Creek station, 2.97 inches of snowpack equals one inch of moisture, and at Bear Canyon 3.3 inches yields one inch of moisture.¹

¹Pearson, p. 72.
TABLE 17

PRECIPITATION AND SNOW DEPTH IN INCHES AT CHALK CREEK-PINE CREEK SNOW-GAGING STATION
EAST OF MEADOW - ELEV. 8500 FT.\textsuperscript{a}

<table>
<thead>
<tr>
<th>Year</th>
<th>April Snowpack Measurement</th>
<th>Annual Precipitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Snow Depth</td>
<td>Water Content</td>
</tr>
<tr>
<td>1930</td>
<td>29</td>
<td>11.1</td>
</tr>
<tr>
<td>1931</td>
<td>50</td>
<td>10.8</td>
</tr>
<tr>
<td>1932</td>
<td>48</td>
<td>14.8</td>
</tr>
<tr>
<td>1933</td>
<td>41</td>
<td>14.3</td>
</tr>
<tr>
<td>1934</td>
<td>23</td>
<td>7.2</td>
</tr>
<tr>
<td>1935</td>
<td>45</td>
<td>10.9</td>
</tr>
<tr>
<td>1936</td>
<td>44</td>
<td>10.7</td>
</tr>
<tr>
<td>1937</td>
<td>58</td>
<td>16.2</td>
</tr>
<tr>
<td>1938</td>
<td>52</td>
<td>15.7</td>
</tr>
<tr>
<td>1939</td>
<td>28</td>
<td>11.0</td>
</tr>
<tr>
<td>1940</td>
<td>43</td>
<td>15.3</td>
</tr>
<tr>
<td>1941</td>
<td>31</td>
<td>11.2</td>
</tr>
<tr>
<td>1942</td>
<td>41</td>
<td>13.1</td>
</tr>
<tr>
<td>1943</td>
<td>20</td>
<td>8.5</td>
</tr>
<tr>
<td>1944</td>
<td>46</td>
<td>15.2</td>
</tr>
<tr>
<td>1945</td>
<td>55</td>
<td>15.8</td>
</tr>
<tr>
<td>1946</td>
<td>24</td>
<td>7.0</td>
</tr>
<tr>
<td>1947</td>
<td>30</td>
<td>10.9</td>
</tr>
<tr>
<td>1948</td>
<td>58</td>
<td>17.2</td>
</tr>
<tr>
<td>1949</td>
<td>no meas.</td>
<td>no meas.</td>
</tr>
<tr>
<td>1950</td>
<td>29</td>
<td>9.2</td>
</tr>
<tr>
<td>1951</td>
<td>14</td>
<td>3.6</td>
</tr>
<tr>
<td>1952</td>
<td>71</td>
<td>21.4</td>
</tr>
<tr>
<td>1953</td>
<td>45</td>
<td>14.3</td>
</tr>
<tr>
<td>1954</td>
<td>43</td>
<td>12.5</td>
</tr>
<tr>
<td>1955</td>
<td>40</td>
<td>16.3</td>
</tr>
<tr>
<td>1956</td>
<td>40</td>
<td>15.5</td>
</tr>
<tr>
<td>Average</td>
<td>41</td>
<td>12.6</td>
</tr>
</tbody>
</table>

TABLE 18

PRECIPITATION AND SNOW DEPTH IN INCHES AT PINE CREEK SNOW-GAGING STATION EAST OF MEADOW - ELEVATION 8700 FEET

<table>
<thead>
<tr>
<th>Year</th>
<th>April Snowpack Measurement</th>
<th>Annual Precipitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Snow Depth</td>
<td>Water Content</td>
</tr>
<tr>
<td>1949</td>
<td>53</td>
<td>16.4</td>
</tr>
<tr>
<td>1950</td>
<td>33</td>
<td>11.3</td>
</tr>
<tr>
<td>1951</td>
<td>18</td>
<td>6.2</td>
</tr>
<tr>
<td>1952</td>
<td>83</td>
<td>28.4</td>
</tr>
<tr>
<td>1953</td>
<td>41</td>
<td>16.2</td>
</tr>
<tr>
<td>1954</td>
<td>40</td>
<td>12.2</td>
</tr>
<tr>
<td>1955</td>
<td>48</td>
<td>19.1</td>
</tr>
<tr>
<td>1956</td>
<td>32</td>
<td>12.3</td>
</tr>
<tr>
<td>1957</td>
<td>87</td>
<td>28.7</td>
</tr>
<tr>
<td>1958</td>
<td>57</td>
<td>19.7</td>
</tr>
<tr>
<td>1959</td>
<td>30</td>
<td>10.4</td>
</tr>
<tr>
<td>1960</td>
<td>39</td>
<td>16.1</td>
</tr>
<tr>
<td>1961</td>
<td>50</td>
<td>12.6</td>
</tr>
<tr>
<td>1962</td>
<td>54</td>
<td>18.8</td>
</tr>
<tr>
<td>1963</td>
<td>27</td>
<td>9.7</td>
</tr>
<tr>
<td>Average</td>
<td>46</td>
<td>15.9</td>
</tr>
</tbody>
</table>

Adapted from Pearson, p. 72.
TABLE 19

PRECIPITATION AND SNOW DEPTH IN INCHES AT
THE BEAR CANYON SNOW-GAGING STATION
EAST OF MEADOW - ELEV. 7200 FT.\(^a\)

<table>
<thead>
<tr>
<th>Year</th>
<th>April Snowpack Measurement</th>
<th>Annual Precipitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Snow Depth</td>
<td>Water Content</td>
</tr>
<tr>
<td>1954</td>
<td>33</td>
<td>9.6</td>
</tr>
<tr>
<td>1955</td>
<td>35</td>
<td>12.6</td>
</tr>
<tr>
<td>1956</td>
<td>22</td>
<td>6.1</td>
</tr>
<tr>
<td>1957</td>
<td>25</td>
<td>9.6</td>
</tr>
<tr>
<td>1958</td>
<td>44</td>
<td>13.5</td>
</tr>
<tr>
<td>1959</td>
<td>28</td>
<td>8.6</td>
</tr>
<tr>
<td>1960</td>
<td>35</td>
<td>12.4</td>
</tr>
<tr>
<td>1961</td>
<td>35</td>
<td>9.2</td>
</tr>
<tr>
<td>1962</td>
<td>42</td>
<td>13.4</td>
</tr>
<tr>
<td>1963</td>
<td>12</td>
<td>3.9</td>
</tr>
<tr>
<td>Average</td>
<td>31.1</td>
<td>9.89</td>
</tr>
</tbody>
</table>

\(^a\)Adapted from Pearson, p. 72.
BIBLIOGRAPHY

Public Documents


__________ Eleventh Census of the United States: 1890. Agriculture.

__________ Twelfth Census of the United States: 1900. Agriculture, Vol. VI.

124


Newspapers and Periodicals


Deseret News (Salt Lake City, Utah), February 12, 1950.


Books


Carter, Kate B. Heart Throbs of the West. Vol. I, 2nd ed. Salt Lake City, Utah: Daughters of the Utah Pioneers, 1939.


Unpublished Materials


**Other Sources**

Personal Census taken during February of 1966.

Personal interview with Clifton Beckstrand, former Water Master, Deputy County Assessor, President of Millard School Board, age 69, lifelong resident of Meadow, February 22, 1966.


Personal interview with William Blake, 75, resident of Meadow for the past sixty years.

Records of Meadow Branch and Ward. Church Historian's Office, Salt Lake City, Utah, yearly reports.
ABSTRACT
ABSTRACT

The agricultural village was the basis of the original economy of Utah established by the Mormon settlers, but it has since been supplanted in importance by the industrial and commercial activities of the large centers of the Wasatch Front counties of Salt Lake, Weber, and Utah. This study was conducted in an attempt to determine the future of those communities removed from industrialized northern Utah. The village of Meadow, Millard County, was chosen as an example and it was subjected to a detailed geographic analysis. From this analysis conclusions have been drawn regarding its future.

Meadow is a small farming village located in east-central Utah. Its population of some 250 people is almost completely reliant upon agriculture for a livelihood, a condition that has existed since the village was settled. The dominant role of agriculture in Meadow's economic base is of primary importance in determining the future of the community.

Mechanization of agricultural production has enabled fewer people to operate the existing crop land in Meadow, thus reducing the number of people that can derive their income from the town's economic base. This economic base
in agriculture cannot be expanded under existing conditions because of the limited amount of water and arable land in the area. The decline in population resulting from fewer people operating the land has been accelerated by the lack of other economic activities in the area. The majority of the younger people of the community migrate to communities offering a wider number and variety of occupational activities upon completion of their schooling, thus leaving a preponderance of older people in the population of the community.

The probable future of Meadow is one of continuing decline that may eventually lead to community dissolution as the present generation passes away. An alternative to community dissolution may develop if a more viable variant of the present economic base, or a new base, can be found.

However, even though Meadow may cease to exist as a community, the economic activity and importance of the area most probably will not; for modern communications systems will enable operators to reside in Fillmore or other outside centers and commute to the agricultural lands of the Meadow area.

APPROVED

Chairman, Advisory Committee

Member, Advisory Committee

Chairman, Major Department