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**FRONTIER AGRICULTURE, 1880-1910: AN AREA INVESTIGATION
OF HUMAN AND ENVIRONMENTAL FACTORS INVOLVED IN
THE PROCESS OF AGRICULTURAL EVOLUTION IN
DAVISON COUNTY, SOUTH DAKOTA**

By

Chak P. Lee

**A thesis submitted
in partial fulfillment of the requirements for the
degree Master of Science
Major in Geography
South Dakota State University
1986**

FRONTIER AGRICULTURE, 1880-1910: AN AREA INVESTIGATION
OF HUMAN AND ENVIRONMENTAL FACTORS INVOLVED IN
THE PROCESS OF AGRICULTURAL EVOLUTION IN
DAVISON COUNTY, SOUTH DAKOTA

This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable for meeting the thesis requirements for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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Date

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To write on the subject of the American frontier farming is itself an odd challenge to one whose childhood perception has been molded under the influence of one of the world's metropolises. Things read and heard about rural America have contributed to my initial knowledge for the preparation of the present study. In the end, nothing tends to aid this writer better than his actual experience with the place named South Dakota, its real people and events, in his capturing the sense of "rurality" and his consequent determination to elaborate on one such topic.

In the location and gathering of pertinent sources, local, state and school librarians and local officials offered me precious assistance. Special thanks are paid to Larry Hipsman, Archivist of the State Library of South Dakota, Rick Lieffort, my colleague at South Dakota State University, and then a practicing librarian at the State Historial Society of South Dakota and Allen Hatzenbeller, Assessor of Davison County, for their friendly receptions and valuable helps.

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C.P.L.

5/86

Chapter I: Introduction

Our curiosity about how an area has developed into what it is today invariably draws our attention to its initial situation. In the United States, the frontier serves as the logical locus upon which questions such as the latter can be laid. Frederick Jackson Turner has popularized the frontier concept by elevating its place in the history of the American national development (1). Its economic function as the labor valve and the unique environmental condition it furnished for the Americanization of old cultural and societal forms are only facets of its manifold significance. What Turner's frontier thesis has for special offer to geography lies in the observation of the frontier as a discrete areal unit, set off, as it was, from the settled area due to the differential pace in the migration process. This observation, besides adding historical insights to our old concept of the region, lays a solid foundation for many viable area studies.

Turner's view that the frontier society evolves through a sequence of increasingly complex economic stages, such as from fishing through hunting and farming to urban society, unaccidentally came about at a time when the evolutionist theory was in vogue. This organic theory of social change draws essentially on phenomena found in the biological world, and explains society in the same way a biologist does a living organism (2). Just as a biological organism evolves from a single cell to a complex structure with its specialized internal organs, societal change can be conceived of being a natural progress from a simple community of people to a complex society with its various institutions. Furthermore, since the ability to adapt to the external

environment is the key to the object's survival, a certain societal form, no less than any one particular life object, is more apt than another to dominate the scene at certain time and place. Environment, however, is not always the explanation of the origin of socio-economic phenomena. Historically, many cultural patterns in place can be traced to the phenomenon of earlier spatial diffusion; only a few from natural evolution of cultural practice within their own home environment.

From evolution to environment and spatial diffusion, theoretical argument becomes increasingly awkward to many. Such confusion, as analyzed by Berkhofer, stems from the failure of the critic to consider society's different sectors, on which environmental influences play differently. In the same writer's opinion, economic forms are more susceptible to environmental molding than political, social and religious ones (3).

Farming in the frontier represents a special facet of man-land relationship, a theme that will underly this study. By virtue of its natural resources, the northern interior was destined to become the agricultural heartland of America. To the building of this vast agrarian society, diverse human elements have contributed, as both foreign and native people intermingled. Early cultural differences were later overcome by common political consciousness and economic constraint. Over space, further differences exist in regional settlement pattern for reasons that can be traced to the very process of settling (4). Turner urged an examination of such differences and similarities, suggesting that this study could be a worthwhile undertaking.

Literature Review

The examples of three area case studies serve to demonstrate how the analyses of the frontier settlement can be approached in different areal and methodological contexts (5).

In "The Shenandoah Valley Frontier," Mitchell uses a historical survey to explore the three named themes of movement through space, development in place and changing relative location through time. Equal emphases are laid on cultural, social and economic processes in the evolution of settlement pattern in this 18th-century frontier. The result of his study shows that the nature of colonial land grant policy and the different cultural behaviors among the early migrants had initially contributed to the differentiation of settlement pattern between the upper (southern) and lower (northern) valleys. As the cultural solidarity of the settlers faded away, new economic functions took over to affect the later pattern. Agriculturally, specialization in livestock, tobacco, hemp and wheat was replacing the mixed type of farming that had dominated the pioneer phase. In the meantime, a hierarchy of urban functions emerged, though trading activities remained decentralized. In the final stage of development, regionalization set in with the building of east-west highways, and this ended the valley's long-time isolation from the coast. Consequently, the upper and lower valleys became functionally linked with the two respective coastal cities of Richmond and Alexandria. Figure 1 diagrammatically sums up his major points.

Mitchell has captured a few insightful points in spite of the coarseness of his survey. While not denying the classical view about

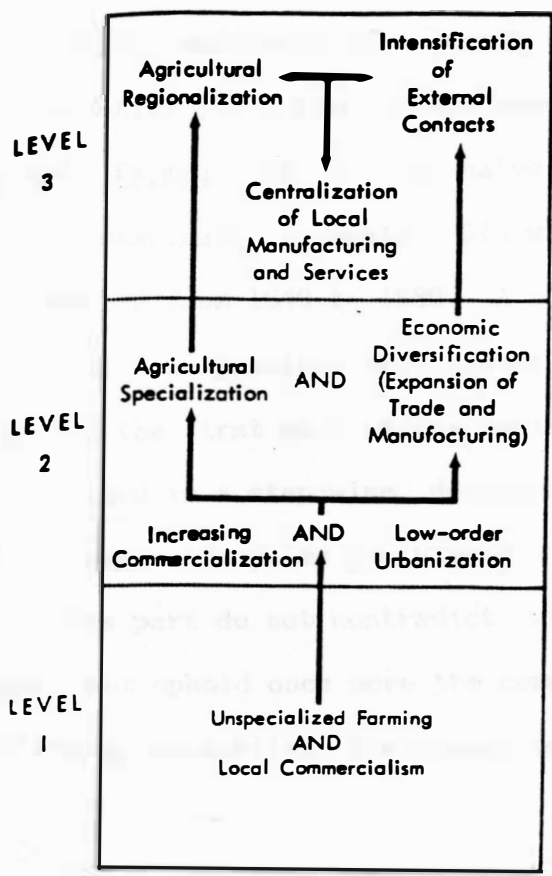


FIG. 1: DEVELOPMENTAL CHANGE

Source: Robert D. Mitchell, "The Shenandoah Valley Frontier," Annals of AAGS 62 (Sept. 1972), p. 475

the existence of an early subsistence phase, he also adds that the seed of commercialization was present from the beginning of permanent settlement owing to man's natural motive for profit. As a hypothesis, he further stresses the relative importance of cultural identity versus economic function in the over-time patterning of settlement.

Conzen's Frontier Farming is an intensive analysis of agricultural evolution in a Wisconsin township, Bloomington Groove, Dane County, during the period from 1840 to 1880. A number of social and economic models, borrowed from previous regional studies, serve as the principle guidelines for the first part of his research, in which selective census data, arranged in a step-wise decennial basis, are utilized to illustrate the basic trends as postulated in these models. His overall findings in this part do not contradict what has been hypothesized in the models, but uphold once more the common notion that of frontier agricultural change consisting of a steady progress through stages of adjustment.

As agricultural change involves associated changes in the social and economic sectors, so the study has extended its scope of analysis to cover such factors as the nature of workforce, community cohesion and mechanization. In the second part of his research, Conzen makes an original attempt to construct farm size and farm value (treated thereby as the indices of agricultural growth) models based on a number of social and economic variables. The results of his statistical tests show that these two indices initially interact strongly with the social variables (eg. age, ethnicity, tenure, etc.), while in the later years, they work better with the economic ones

(number of horses, value of machinery, and so forth). These findings, therefore, substantiate what Mitchell has earlier hypothesized.

In contrast to Conzen's study which deals primarily with the rural aspect of settlement, Miller's City and Hinterland focuses on the urban phenomena. Her general thesis is that urban growth interacts variously with factors of interregional transportation innovation and changes in marketing patterns to bear final effect on the hinterland's settlement pattern. This study also differs from the last one in that it chooses an open, instead of a closed system, approach to the areal development. In a more concrete way, she states in effect that the American urban growth is an integral part of the development of the surrounding region, as well as the development of the nation as a whole (6).

The city of Syracuse, New York, and its respective county, Onondaga, set the stage for this case study of city-hinterland relationship. From 1820 to 1860, the area had witnessed two major changes in transportation, each time with unsettling effects on the hinterland's settlement patterns. Initially, the tracts along turnpikes, the sites of raw materials and natural power, and the central locations of agricultural population served as focal points for the founding of towns and villages. Settlement was then highly dispersed. The building of the Erie Canal came as a major innovation in east-west interregional transport. Its immediate effect in Onondaga County was the growth of the city of Syracuse, which, because of its site advantage of commanding the canal traffic, had grown into a full-fledged regional center. As a result, trade, which previously had to

be conducted with the East on an itinerant basis, could now reorient itself locally around this new node. Furthermore, the city's new employment, financial, and transportation opportunities caused relocation and reorientation of the existing industries. This further helped set the trend of rural-to-urban migration, thus making the hinterland's economy more singularly agricultural in character. The coming of the railroad in the 1840's had brought less change as its route pattern ran largely parallel to the canal's. Nonetheless, its provision for a much faster transit to eastern markets began to encourage the cultivation of fruits, vegetables, tobacco and other valuable and perishable agricultural product.

Likewise, Miller has observed different developmental stages in her area, but her conception in this respect differs from both Mitchell's and Conzen's in that those stages were set off by some extraneous events, i.e., interregional transportation innovation, rather than being generically determined.

Purpose; Methodology; Limitation

The topic of the frontier farming is one of historical and geographical interests. The concept of agricultural region, for example, would lose much of its vigor if it is not to be understood in terms of its temporal development. Areal patterns of agricultural characteristics, therefore, should be viewed as the end product of the sum of individuals' adjustment effort. Even though individuals' cultural behaviors, initially, were as diverse as the kinds of place they came from, yet the common environmental, economic and historical

settings of the frontier area tend to bind them toward only a few agricultural goals. This study attempts to examine some of these human and environmental factors directed toward the purpose of revealing aspects of the frontier agricultural experience within a county area.

Davison County is chosen for this area investigation because of its small size, hence the practicability of the handling of the entire data set. The time-frame, set between 1880 and 1910, corresponds to a single generation, which has now become the accepted standard span of a typical frontier phase (7).

The model in Fig. 1, as prepared by Mitchell, will serve as the basic parameters for this study. While the structural relationships within this model are self-explanatory, it is doubtful whether the exact sequence of development can be applied to any area in the Great Plains. Because of the clear commercial motive behind early Plains settlement, it is possible that the subsistence stage would be totally absent from the scene. The Mitchell's model is used here because it remains to be the most workable one at hand (8).

In this study, temporal development will be examined alongside with the spatial one. The construction of trend-profiles for farm size, farm value and farm production is the most succinct way of outlining the temporal change pattern. On the other hand, the grand picture of the county can be further dissected and analyzed wherever data are available on the individual and township levels. Finally, it is worthwhile to compare the county's picture with the state's and the outside region's so as to highlight the distinctiveness of the former.

Incomplete census materials have prevented the possibility of

devising a more refined research design. Especially because of the unavailability of the Agricultural Census manuscript schedule, except for the year 1880, analysis concerning the middle-period will have to suffer (9). With the remaining sources, this study will attempt to piece together as coherent a picture as possible.

End Notes

(1) For Turner's frontier thesis, see, Frederick Jackson Turner, "The Significance of the Frontier in American History," in Frontier and Section: Selected Essays of Frederick Jackson Turner, ed. William B. Leuchtenburg and Bernard Wishy (Englewood Cliff: Prentice-Hall, 1961), pp. 32-57.

(2) The formulation of the organic theory in social sciences began with Herbert Spencer and other European scholars. See, Don Martindale, The Nature and Types of Sociological Theory (Houghton: Boston, 1981), pp. 55-57.

(3) See, Robert F. Berkhofer, Jr., "Space, Time, Culture and the New Frontier," Agricultural History 38 (Jan. 1964), pp. 21-30.

(4) An attempt to distinguish among types of the frontier settlement was made by Carl O. Sauer in, "Historical Geography and the Western Frontier," in The TransMississippi West, ed. J. F. Willard and C. B. Goodykoontz (Boulder: University of Colorado Press, 1930), passim.

(5) See: Michael Conzen, Frontier Farming in an Urban Shadow: The Influence of Madison's Proximity on the Agricultural Growth of Bloomington Groove, Wisconsin, (Madison: State Historical Society of Wisconsin, 1971), passim, Roberta B. Miller, City and Hinterland: A Case Study of Urban Growth and Regional Development (London: Greenwood, 1979), passim; Robert D. Mitchell, "Shenandoah Valley Frontier," Annals, Association of American Geographers 62 (Sept. 1972), pp. 461-86.

(6) Miller, ibid., pp. 1-6.

(7) Those who would agree on this one-generation criterion include Hudson and Shannon. See: John C. Hudson, "Two Dakota Homestead Frontier," Annals, Association of American Geographers 63 (Dec. 1973), p. 446; Fred A. Shannon, The Farmer's Last Frontier: Agriculture, 1860-1897 (Toronto: Rinehart & Co., Inc., 1945), pp. 35-6.

(8) Alternatively, the "Export-base theory" contends that regional economic growth is begot by outside source capitals invested in exportable industries in the developing region. This theory, however, would entail a scope of research that is unrealistic for the purpose of a small area study. See, Harvey S. Perloff et al., Regions, Resources, and Economic Growth (Baltimore: John Hopkins, 1930), pp. 52-62.

(9) Both the Federal Population and Agricultural Manuscript Censuses of the year 1890 were destroyed by fire, while the Federal Agricultural Manuscript census of the years 1900 and 1910 were disposed of. (Interview with Larry Hipsman, South Dakota State Library, Pierre, South Dakota, July 1984).

Chapter II: Physical Characteristics of Davison County

Climate

Climatic data have been collected at Mitchell since 1896 (10). The top diagram in Fig. 2 shows the average monthly temperatures and precipitation of the first fifteen years. July and February represent the hottest and the coldest months of the year with their respective average temperatures of 71.96 F (22.2 C) and 13.36 F (-10.3 C). Daily temperatures, however, far exceed this range, and 100 F (38 C) above and 30 F (34.5 C) below zero can be expected several days during a year. Annual precipitation averages at 23.64 inches (59 cm). Some 77 percent of this amount, mostly in the form of thundershowers, falls within the growing season that lasts from April to September. The wide seasonal range of temperatures and relatively low level of precipitation as has been experienced in Davison County is characteristic of the temperate-continental-type climate (Fig. 2).

Climatic values vary only slightly locally, whereas they do fluctuate a great deal more through the years (bottom diagram, Fig. 2). The means of the 15 years' annual averages are figured at 45 F and 24.31", corresponding to the standard deviations of 1.49 F (0.17 C) and 5.41" (12.2 cm), respectively. The greater variability of precipitation, in particular, constitutes a "danger factor" to farming in Davison County as elsewhere along the eastern edge of the Great Plains. Inasmuch as rainfall is already scanty, the uncertainty of its occurrence can undoubtedly tell us why crops fail in one year and succeed in another. Although the county still belongs to the subhumid portion of the state, in five years out of the 15 (1898, 1899, 1902,

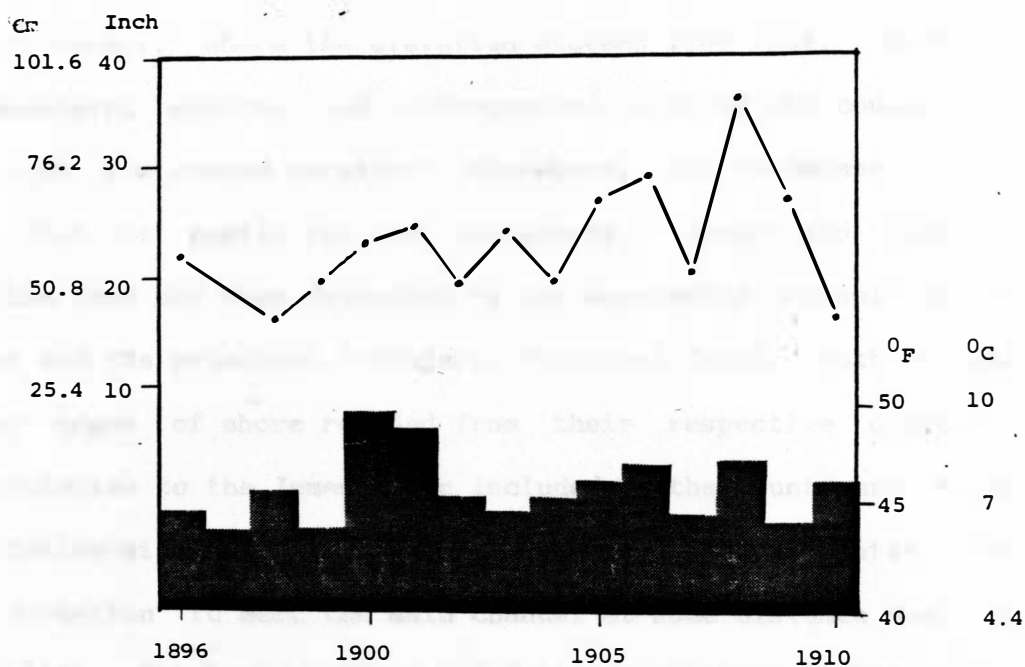
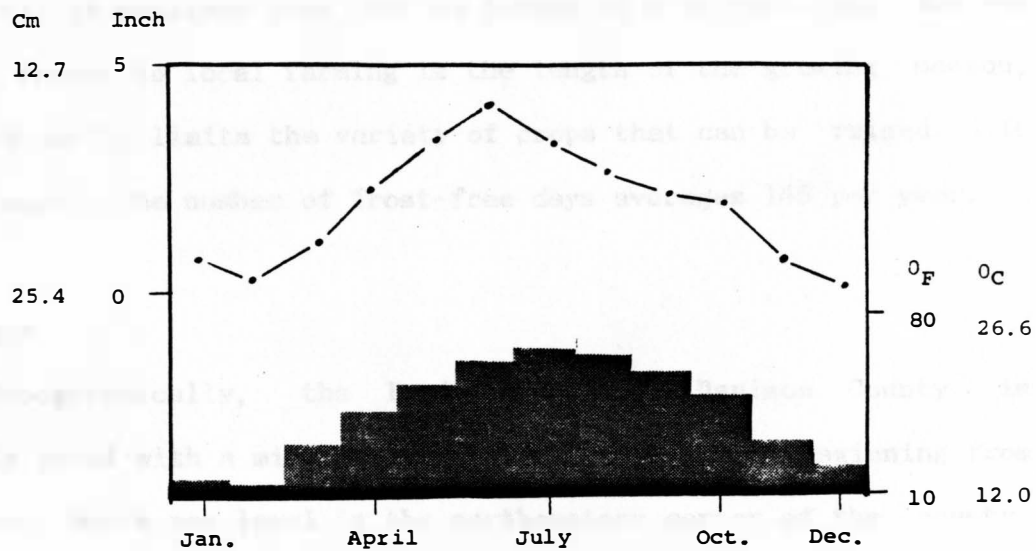


FIG: 2: CLIMATIC RANGES: MONTHLY AND ANNUAL

Sources: South Dakota, State Climatologist, compl., Climatological Summary, Mitchell, South Dakota, no. 4 ((Brookings, South Dakota:) South Dakota State University, Agricultural Engineering Department, September, 1966), leaflet.

1904, 1910) it received less than 20 inches of precipitation. Another limiting factor to local farming is the length of the growing season, as it ordinarily limits the variety of crops that can be raised. In Davison County, the number of frost-free days averages 145 per year.

Physiography

Topographically, the land surface in Davison County is relatively level with a minor relief of about 440 feet. Beginning from 1,225 feet above sea level in the northeastern corner of the county, the land rises gently upward to meet a hill-like structure in the southwestern corner, where the elevation exceeds 1600 feet. Much of the northwestern, central and south-central parts of the county are overlaid with low ground moraines; elsewhere, the landscape has a either a flat or gently rolling topography. North and east of Mitchell, the land has been dissected by the meandering channels of the James River and its principal tributary, Firesteel Creek. Both streams have steep edges of shore receded from their respective channels. Other tributaries to the James River included in the county are Enemy Creek and Twelve-mile Creek, and the streams flow intermittently in an easterly direction to meet the main channel at some distance east of the county line. The basic contour and drainage patterns in the county conform closely to the configuration of the three bedrock units (Inset, Map 1). These bedrocks were folded slightly to the west during to the so-called "Sioux Uplift" (11). Today, with the exception of a few spots, all of these bedrocks have been concealed beneath a continuous blanket of glacial till that has an average thickness of 40 feet (12).

Davison County had been subject to intense periods of glaciations during the Pleistocene Epoch. Over the county, physical evidences of glaciation abounds in the existence of pre-pleistocene channels that were abandoned in previous geological times. A low knoll located some five miles south of Mitchell has a peculiar north-west trend instead of the usual north-east trend that characterizes most of the morainic ridges in the surrounding areas. Further investigations of its underlying rocks had revealed that it once belonged to an ancient divide, thus named Mitchell Divide, that stood between two major drainages then being oriented from west to east (13). Many of these ancient streams had lost their channels due to the blockage by glacial lobes that came from the north and east.

The subsequent melting of the glacial ice, on the other hand, has created new channels. Initially, such melt-water spread out evenly over the countryside in a series of small floods, only to subside later in the season, leaving behind only loads of gravel and sand. Today, these coarse materials are found lying only a short distance below the surfaces of valley bottoms and high terraces, resulting in rapidly permeable soils (14). Ultimately, glacial melt-water was first ponded in a glacial lake and later overflowed the divide to create a new stream. The greater down-cutting effect from such funneled water could thus result in a deeper and more permanent channel. The present channel of the James River had been entrenched in this manner (15).

Soil

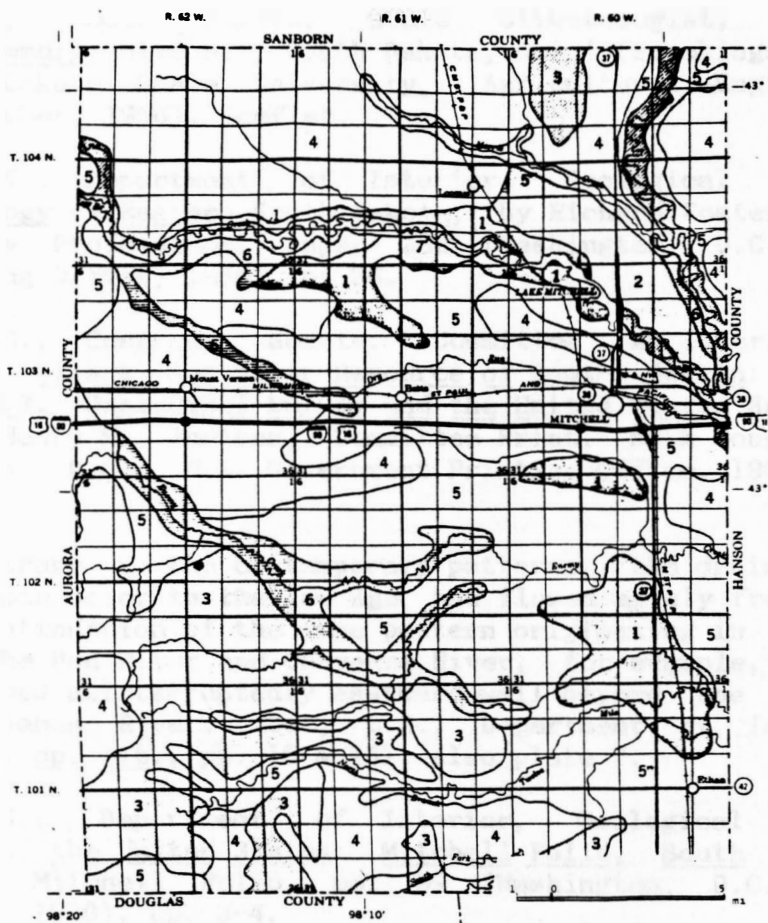
Soil formation is a lengthy process whereby the unconsolidated

mass of parent materials, which in the case of Davison County consist chiefly of glacial till, are converted into a friable substance through the active involvement of plants and animals. Although some soils had begun to form during the last Ice Age (16), considerable time elapsed until the total withdrawal of ice. The post-glacial climate, with its mild climate and the tall native prairie grasses, has been favorable to the accumulation of humus. The organic matter and the chemical compounds are further combined with the parent materials, resulting in distinctive soil profiles.

Locally, the rate of soil formation differs with relief (17). Due to the differences in run-off, soils form faster on level ground than on steep slope. In fact, many of the latter soils still lack distinctly developed profiles. Soil textures, likewise, change from place to place according to differences in topographical features. On steep slopes of the highland in the southwest, a substantial amount of boulders and gravel is found along streams and covering the general surface. In valleys within the morainic areas, soils tend to be clayey at the centers and loamy toward the margins. Over the rest of the area, soils are generally loamy but are occasionally overlaid by patches of clay or deposits of wind-blown sands (18).

Soils that have similar profiles, i.e., similar thickness and arrangements of major horizons, make up a soil series. The Soil Conservation Service of the United States Department of Agriculture has identified 23 such series in Davison County. These different series can be combined into seven soil associations. The latter, in short, represents an area that has a characteristic combination of soils, and

so is used as the basis for a general soil map (Map 2) (19). Of concern to farming, almost all of the soils from associations one through five can be cultivated for corn, small grains, sorghum and tame grasses; whereas soils from associations six and seven are either so poorly drained or lacking in organic matter that they are recommended only for grazing and hay purposes. Overall, it seems that the soils of Davison County are less important to farming than the nature of precipitation. If water is available at the right time, almost all local soils become productive.



SOIL ASSOCIATIONS*

- 1** Enet-Dalmont association: Nearly level to gently undulating, well-drained to somewhat excessively drained, loamy soils that formed in alluvium over sand and gravel on terraces and uplands
- 2** Blendon-Hand association: Nearly level to gently undulating, well-drained, loamy soils that formed in sandy and loamy glacial outwash on uplands
- 3** Houdek-Strickney association: Nearly level, well drained and moderately well drained, loamy soils that formed in glacial till on uplands
- 4** Houdek-Prosper-Teranka association: Nearly level, well drained and moderately well drained, loamy soils that formed in glacial till and somewhat poorly drained silty soils on uplands
- 5** Clarno-Houdek-Betts association: Nearly level to steep, well-drained to excessively drained, loamy soils that formed in glacial till on uplands
- 6** Redstar-Firesteel association: Nearly level to hilly, well-drained to somewhat poorly drained, calcareous, loamy and silty soils over siltstone on uplands
- 7** Clarno-Lama-Bon association: Nearly level, moderately well drained to poorly drained, silty and loamy soils that formed in alluvium on bottom lands

*Texture refers to the surface layer soils in each association.

Published 1972

MAP 2: GENERAL SOIL MAP

Source: U.S., Department of Agriculture, Soil Conservation Survey, Soil Survey of Davison County, South Dakota (Washington D.C.: U.S. Government Printing Office, 1973).

Endnotes

(10) See, South Dakota, State Climatologist, compl., Climatological Summary, Mitchell, South Dakota, no. 4 (Brookings, South Dakota: South Dakota State University, Agricultural Engineering Department, September, 1966), leaflet.

(11) U. S., Department of Interior, Geological Survey, Pleistocene Geology of Eastern South Dakota, by Richard Foster Flint, Geological Survey Professional Paper 262 (Washington, D.C.: U.S. Government Printing Office, 1955), p. 26.

(12) U. S., Congress, Senate. Committee on Interior and Insular Affairs, Mineral and Water Resource of South Dakota: Report Prepared by the U.S. Geological Survey and the United States Bureau of Reclamation, by Henry M. Jackson, Committee Print. 88th Cong., 2nd Sess. (Washington, D.C.: U.S. Government Printing Office, 1964), pp. 18-21.

(13) Contrary to the contemporary patterns, the drainage in eastern South Dakota prior to the Ice Age had flowed mainly from west to east as a continuation of the same pattern originating in western South Dakota. The Bad River and Cheyenne River, for example, in the ancient time flowed uninterruptedly eastward well beyond the present valley of the James River. See, U.S., Department of Interior, Geological Survey, op. cit., pp. 15 & 151, also plate 7.

(14) U. S., Department of Interior, Geological Survey, Geological Atlas of the United States: Mitchell Folio, South Dakota, library edition: Mitchell Folio, no. 99 (Washington, D.C.: U.S. Geological Survey, 1930), pp. 3-4.

(15) During the Mankato Substage in the Wisconsin Period, a prong of Ice, known as the James Lobe, extended southward to cover most of the James Valley. As it retreated, a glacial lake, known as Lake Dakota, was formed temporarily between the shrinking lobe and an ancient divide along the present Spink-Beadle County line. See, U.S. Department of Interior, op. cit., pp. 125-6.

(16) Ibid., pp. 1-2.

(17) U. S., Department of Agriculture, Soil Conservation Survey, Soil Survey of Davison County, South Dakota (Washington, D.C.: U.S. Government Printing Office, 1973), p. 64.

(18) U.S., Department of Interior, Geological Atlas, op. cit., p. 7.

(19) U.S., Department of Agriculture, op. cit., pp. 2-6.

Chapter III: Pioneering in Davison County

Permanent settlement in Davison County began in 1872 when Herman Greene and John Head erected their homes somewhere in Township 103 Range 60. At the time of their respective arrivals, a few individuals, like Henry L. Davison, after whom the county was subsequently named, had been ranging their cattle near the junction of the Firesteel Creek and James River (20). The area histories written on the county concerning the period before 1880 are mostly sketchy. Early settlement characteristics of the county fail to show any uniqueness. Rather, they lend themselves to a similar kind of interpretation applicable to a broader geographical area.

Once a restrictive county framework is discarded, the settlement event of the county can be seen as part of a developmental process originated in areas farther south and east. Namely, this process is one of westward migration which may be conceptualized as the passage of the frontier in time and space.

The historical sequence of pioneering activities had been altered little with every shift of the frontier's geographical center. The stories of how a few venturesome individuals violated the wilderness, leading the way to the establishment of an infant settlement, and of how the U.S. government became involved in the clearing of the Indian land for permanent white settlement, merely repeat themselves in the new frontier. As the frontier zone approached the prairie, however, the same activities became more organized in nature. Earlier the fur traders and townsite companies and, later, the railroad had outstripped the pace of common settlers in advancing civil

structures into new places. This phenomenon had resulted in strings of new towns radiating westward from the western margin of old settlement and, functionally, serving as inland entrepots for the new resources from one direction and the supplies of goods from the other (21). It is only after all of these preliminary networks had appeared that the rest of the country began to be populated.

In 1860, the edge of settlement had already reached the central part of Minnesota (22). There, along a line formed by the upper Mississippi River, the frontier had stopped advancing for a few years awaiting the future extensions of the railroads. In the meantime, a second type of settlement was reaching the Dakota land by moving up a narrow strip along the Missouri River. To this prong of settlement, Sioux City was added in 1865. From this point, townsite companies and fur trade interests began to spread their activities over the Dakota area, thus laying the foundation for further settlement in the Dakota land.

The Establishment of the Homepage

The historical incident that led to the direct settlement of the Dakotas took place in 1855. In that year, the Kansas-Nebraska Act created the territories of Kansas and Nebraska out of the unorganized area, thus giving sanction to those who already had been squatting around Sioux City. A few years later, settlers began to drift into Dakota along the Missouri Valley, giving rise to the formation of settlement at and around Elk Point, Vermillion, Bon Homme, Yankton and Sioux Falls. Being strategically located at major confluences,

Yankton, Sioux Falls and Vermillion enjoyed rapid growth and soon acquired the important function of regional supply centers for even further settlement inland. Nevertheless, the pace of settlement during the early 1860's had been slow, and much of this had to do with the sporadic appearances of drought and grasshoppers. Above all, up to this point, parts of the Indian question still remained to be solved.

The United States' military involvement in the Indian territory began as early as during the 1840's. Heretofore, the United States had respected the areas west of the Missouri River as the permanent Indian land and white trespassers were often discouraged. Nevertheless, the increasing traffic along the Oregon Trail plus a few incidents involving the killings of white travelers eventually prompted the U.S. Government to act. This resulted in the establishment of Fort Kearny (1848), Fort Laramie (1849), Fort Riley (1853) and Fort Randall (1853) along a defensive line. The last of these forts, in particular, symbolized the military control of the northern Plains (23).

East of the Missouri, the Yankton Sioux continued occupying the fertile agricultural lands of the upper James and Sioux River valleys. To clear these areas for the white settlers, the United States initiated a treaty with the Yanktonians in 1858 and soon it became accepted by both parties. By this treaty, the Yanktonians were to be relocated to a reservation newly created in what is now a part of Charles Mix County. As compensation, the Yanktonians would receive annual stipends from the United States. This opening of the Yankton land marks the beginning of permanent white settlement in South Dakota (24).

In a military assignment, Lieutenant G. K. Warren had, between 1855 and 1857, conducted a thorough reconnaissance of the upper Missouri and associated areas. His report furnishes one of the best sources of information about the original landscape and the state of native vegetation before their alteration by the white settlers. After traveling some 119 miles from Fort Pierre, he reached the locality of what is now Davison County and noted the following:

Cross Toka Kiya W. or Enemy's Creek (properly Enemy) in 10 miles; here are wood, water and grasses; stratified rocks are along its bank below the crossing...

...thence to Fire-steel (Chanka W.). 6 1/2 miles... cross it...here grass and water, but very little wood... ..proceed along the south side of Fire-steel Creek...over good road, camp 4 to 5 miles from James River. We were now on burnt prairie, which continued the rest of the journey, and grass could only be found in patches, in protected places (25).

The burnt prairie could have reinforced the lieutenant's image of the "Great American Desert," as he later recommended against settlement in these inland areas.

The last of the Indian troubles in Davison County arose from the so-called Santee Uprising that had spread from Minnesota. Besides retarding settlement temporarily, this incident also resulted in the building of a new line of forts from Sioux Falls to Fort Thompson. These include Fort James. Originally planned to be built near the mouth of the Firesteel Creek, its site was later changed to Rockport, several miles to the south since there was no suitable construction material available in the former locality. This fort measured at 152 by 1,200 feet and was designed to accommodate 80 men (26). Unfortunately, because of its short existence of only one year, this establishment

never gave rise to any substantial surrounding settlement.

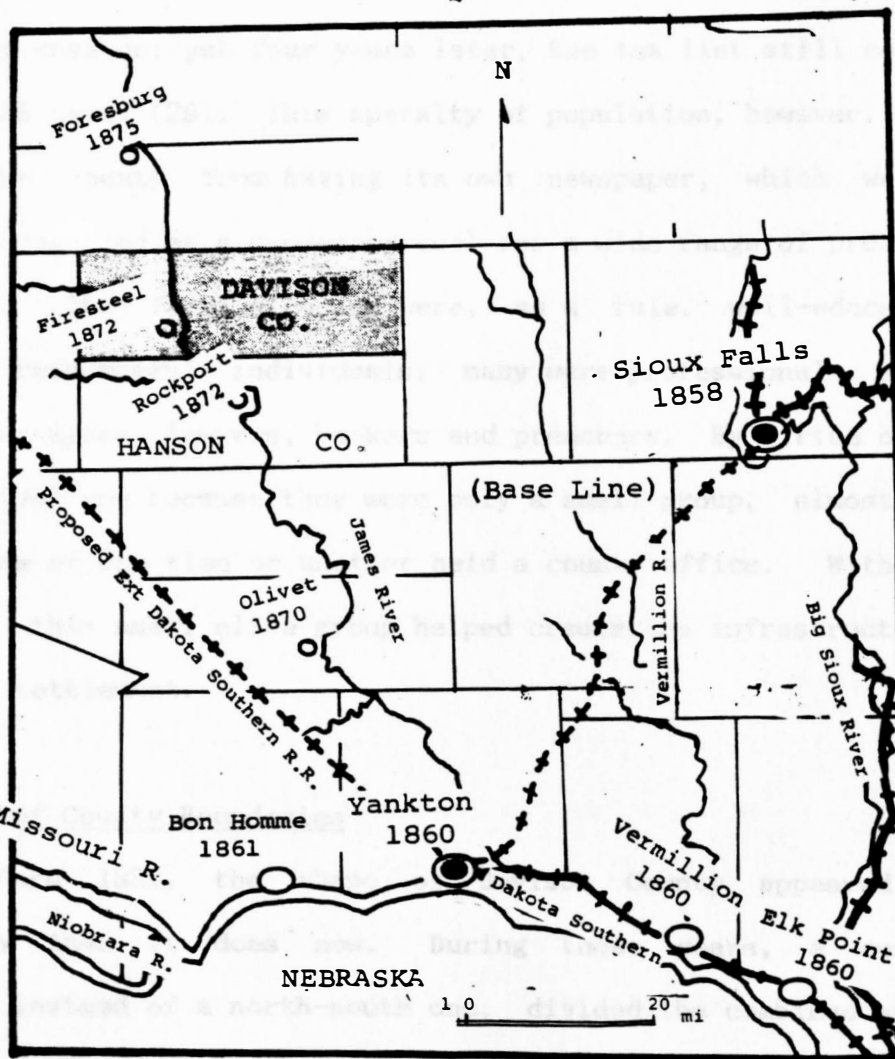
Penetration of the Hinterland

The emergence of the Firesteel settlement became an inseparable part of Davison County's early history. This small village owed its beginning in 1872 or 1873, to the establishment of a post office by Herman Greene. None of the early boomers, however, could realize that the town site was resting on a flood plain; neither could they foresee that one day the whole village would have to be moved "bodily" to Mitchell, where later the Milwaukee and St. Paul Railroad decided was a better site for a new junction (27).

The reason for Firesteel being located where it once was could have been based on its advantage of commanding coach-traffic on the east-west running Fort Thompson trail. Before the coming of the railroad, it had been used extensively to carry military supplies to Fort Thompson, in order to avoid the danger of navigating the Missouri. A second trail ran from Yankton to James Town via Firesteel, serving principally as a mail route. At one time, these two trails crossed each other near the site of Firesteel (28).

The penetration of the James Valley gave rise to a chain of small villages northward from Yankton. Besides Firesteel, these include Odessa, Olivet, Scotland and Rockport (Map 3), all having similar size and functional statuses. Despite the bareness of their civil establishments, they once had the importance of being the stopping places for the up and down-valley journey.

While it is clear that external connection was not lacking from



MAP 3: INAUGURATION DATES OF EARLY
POST OFFICES SHOWING THE RATE
OF INLAND SETTLEMENT

Adapted from: Parker, *op. cit.*; Geo F. Cram, Index Railroad and Township Map: Dakota (66 Lake Street, Chicago: By the author, 1879)

the beginning, the rate of settlement was slow during the early years. The formation of the county came as a result of the 1873-74 territorial legislative session; yet four years later, the tax list still contained as few as 38 names (29). This sparsity of population, however, did not prevent the county from having its own newspaper, which was then commonly recognized as a necessary tool for a wide range of promotional activities. The first pioneers were, as a rule, well-educated or otherwise resourceful individuals; many were professionals such as those of surveyors, lawyers, bankers and preachers. By virtue of their early arrival and because they were only a small group, almost every one of them at one time or another held a county office. With their knowledge, this small elite group helped create the infrastructure for subsequent settlement.

The Change of County Boundaries

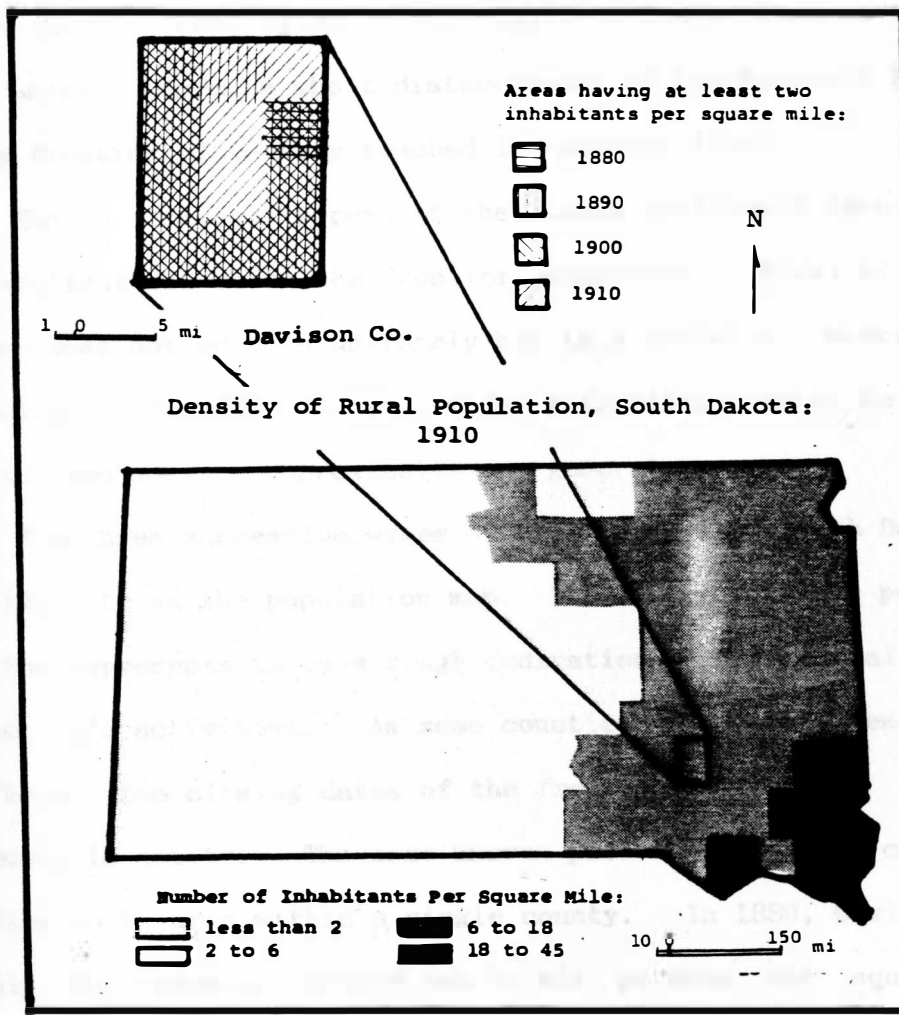
Before 1881, the shape of Davison County appeared quite differently than it does now. During those years, a east-west boundary, instead of a north-south one, divided the combined area of Davison and Hanson Counties into two equal portions, with Davison County occupying the northern half (T104N; T103N), while Hanson, the southern (T102N; T101N). The reason for this odd linear arrangement is because at that time, people were in the middle of promoting a railroad up the James Valley, and by so drawing the county lines they would have a county-seat town located every twelve miles along their tracks (30). In response to an 1880 territorial law urging the readjustment of counties, these two counties finally decided to convert their common

boundary into the present north-south alignment.

The Coming of the Farmer's Frontier

The U.S. Bureau of the Census defines the frontier as those areas that contain no less than two or more than six persons per square mile (31). From the population density map of South Dakota in 1910, most counties appear to be fully settled, while only a few are seen as still remaining in the frontier stage (Map 4).

In fact, historians have delineated three major periods of settlement in South Dakota, each being about a decade apart (32). The first of these periods began in 1867. In that year, rail connection to Sioux City for the first time enabled the Dakota settlers to market their produces externally, and this led to a moderate expansion to settlement. The activities during this period, however, had affected only a small number of counties in the extreme southeastern corner of the state. The second period of settlement coincides with the so-called Great Dakota Boom of the late 1870's and most of the 1880's. The new railroad networks extending from Minnesota succeeded in connecting the Dakota prairie to the settled area and providing the homeseekers a most direct and inexpensive means of transportation. The coming of these railroads also drew the Plains region into the commercial orbit of the northeast industrial centers. In the long run, the latter influence would totally eclipse those earlier which had been exerted from St. Louis. In Davison County, the displacement of Firesteel by Mitchell may be regarded as a local reflection of this contemporary process of regional realignment. The last land boom of



MAP 4: THE DISAPPEARANCE OF THE FRONTIER

Adapted from: U.S., Department of Commerce, Bureau of the Census, Thirteen Census of the United States, 1910: Abstract, with Supplement for South Dakota (Washington D.C.: U.S. Government Printing Office, 1913).

the 1900's was mainly a spinoff from the momentum built up from the previous one. At that time, popular pressure generated by a new land-fever forced the breaking-up of the remaining Indian land in the West-River country. Here, a short distance west of the Missouri River, the farmer's frontier ultimately reached its natural limit.

The historical spread of the Dakota settlement agrees with a few generalizations about the frontier phenomenon. First of all, the frontier does not advance uniformly but in a series of minor thrusts and stallings. Secondly, the time for a frontier area to be developed into a settled society approximates one generation.

The three successive waves of settlement into South Dakota left their imprints on the population map. The distributional pattern of population represents to us a rough indication of the spatial extent of each period's activities. As some counties were settled earlier than the others, the closing dates of the frontier will differ expectedly from county to county. The same uneven pace of settlement can further be applied to an area within a single county. In 1880, Davison County had only one township having two to six persons per square mile. Despite the influx of settlers during the 1880's, twenty years later the county still had three townships remaining for further development.

Parts of this spatial discrepancy in the settling process can be explained by the common behavioral pattern of the pioneer. As a rule, the early comers always pick the choicest sites and skip the poorer ones, and as long as the free lands are not confined to one special locality, the latter will remain unsought after until all the better land has been exhausted. In this way, it will again take up to

a whole generation for this selective spatial process to be completed.

The foregoing observations will have significant implications to the study of agricultural changes. Above all, it is clear that stages of agricultural evolution will be subject to variations according to time and space. In the following two chapters, such phenomena will be subject to further investigation.

Endnotes

- (20) Donald Dean Parker, compl., History of Our County and State (Brookings, South Dakota: South Dakota State College, 1959), p. 30-Da.
- (21) The idea of a merchantile model of settlement has been well-explored by James E. Vance, Jr., in The Merchant's World: The Geography of Wholesaling (Englewood Cliff: Prentice-Hall, 1970), passim.
- (22) Gibert C. Fite, The Farmer's Frontier: 1865-1900 (London: Holt, Rinehart & Winston, 1966), p. 2.
- (23) Herbert S. Schell, History of South Dakota (Lincoln: University of Nebraska Press, 1968), p. 69.
- (24) Charles Lowell Green, "The Administration of the Public Domain," South Dakota Historical Collections 20 (1940), p. 30.
- (25) State Department of History, (South Dakota), compl., "General Warren in South Dakota," South Dakota Historical Collections 11 (1922), p. 30.
- (26) Donn P. Sunby, "The Background, Growth and Principal Institutions of Mitchell, South Dakota" (M.S. Thesis, University of South Dakota, 1976), pp. 10-11.
- (27) Parker, op. cit., p. 28-Da.
- (28) Nellie M. Lindsay, "Early Pioneering in Davison County," Mitchell-History, Dakota Wesleyan University Library, Mitchell, South Dakota, pp. 13-4.
- (29) Parker, op. cit., p. 28-Da.
- (30) Lindsay, op. cit., p. 4.
- (31) Dudley L. Stamp, ed., A Glossary of Geographic Terms (New York: John Wiley & Son, Inc., 1961), p. 201.
- (32) See, for example, Schell, op. cit., Chaps. 7, 12, & 17.

Chapter IV: An Overview of Agricultural Change

Whatever kind of farming pattern that one may now affirm as being characteristic of this particular area, time, as a natural factor, is surely involved in its final molding. In this regard, the first few decades since the introduction of agriculture in a new place become the most critical, for herein lies the most intensive interaction between human actions and a new set of environmental stimuli. The very process of this interaction explains the uniqueness of the whole new farming experience which, in turn, can be expressed in the trend profiles of various agricultural characteristics.

Change in Farm Size

At the time Davison County was settled, the Homestead, Pre-emption and Timber-culture land disposal laws were in effect; each of them entitled a qualified individual head of household to 160 acres of land by various conditions. Legitimately, one could acquire 320 acres from the U.S. Government by exercising any two of these rights together, although the acquisition of 480 acres was sometimes possible through default. The most common method, as Schell points out, was to:

...file first on a pre-emption claim, acquire the title upon the payment of \$1.25 an acre at the end of a minimum period of six months, and then exercise the homestead privilege. If the homestead right was used first, five years of residence had to elapse before a pre-emption filing could be made, unless the homestead claim was commuted to a cash payment, payable after six months (33).

The fact that the pioneer farmers of Davison County were liberally allowed 320 acres of land shows that farm size is a ecological factor. The Legislators' intention of granting the new

settlers more land than before was largely based on their recognition of the harshness of the Great Plains' environment, in which to make a living off farming was not as easy as in the East. Likewise, the individual's decision whether to expand or contract his holding can be viewed in the same ecological context, since changes in the amount of rainfall and soil productivity over the years were good reasons for them to make such decisions. In a narrower sense, economic consideration also plays its role in the determination of farm size. This is especially true when it is realized that an existing level of labor and machinery inputs is best adapted to the operation within a certain size limit, beyond which additional outlay may not often be justified. The optimal level of farm size should, therefore, reflect the ~~maximum~~ adjustment of these two factors.

Farm size in Davison County had increased at a negligible rate in the first decade of settlement, during which time the net gain was merely about ten acres. The greatest increase had been experienced in the middle decade, during which the average farm size had increased from 221 to 339 acres. Henceforth, it began to stabilize toward its 1925 standard of 320 acres (Fig. 3).

The relative increase or the decrease in the number of farms belonging to the size-class 500 acres and over was an influential factor in effecting the average farm size of the county in a particular year. The numbers of these "extra-large" farms to the totals are calculated to be at 1.2, 3.3, 21.3 and 4.2% in the four decennial years. The highest percentage figure of these farms in 1889, besides having a boosting effect on the county's average farm size of that

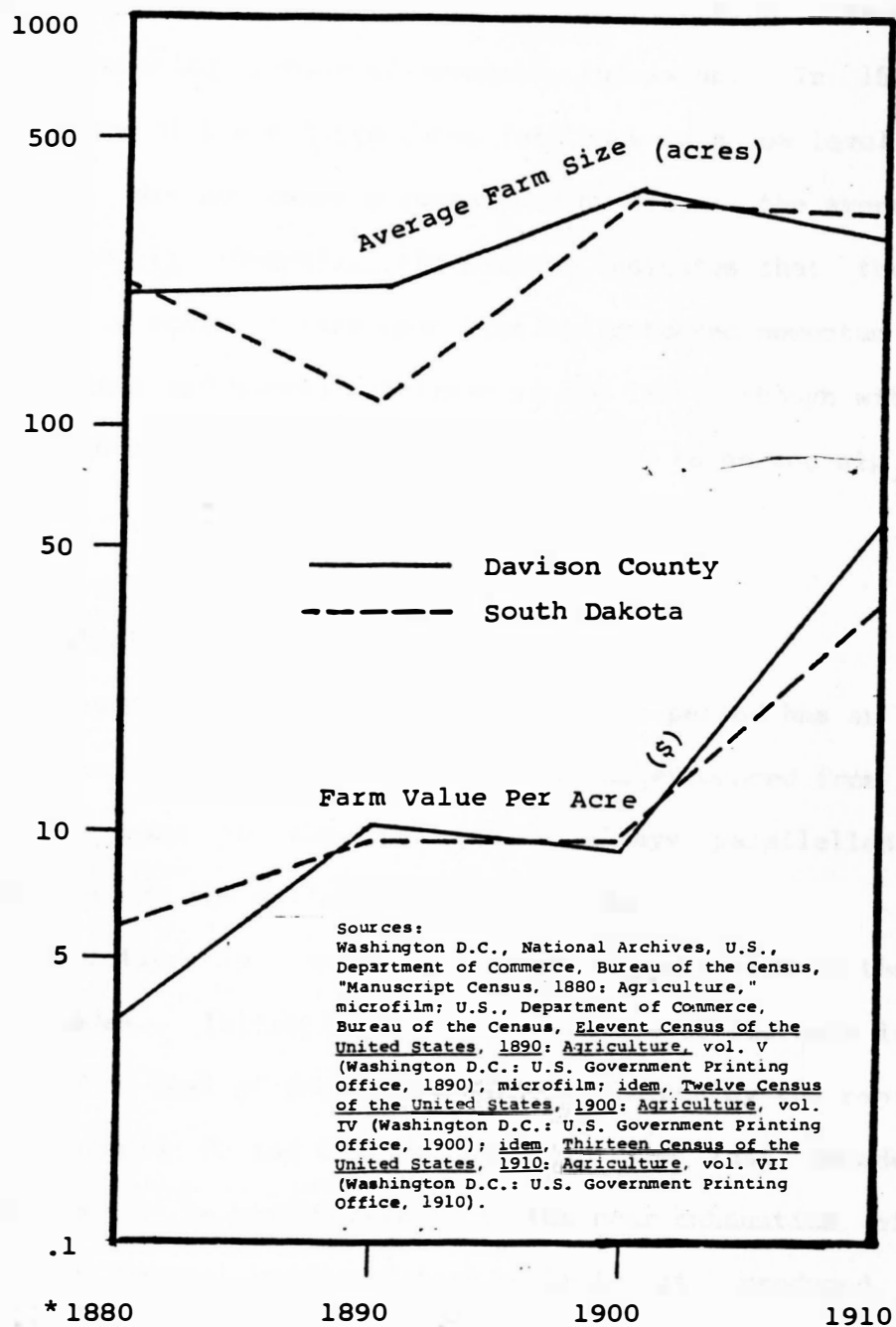


FIG. 5. FARM SIZE AND FARM VALUE

* In 1879 South Dakota was not yet a state. The "state" figures in this year are arbitrarily determined by dividing corresponding territorial figures into halves. Likewise, the county figures in this particular year need to be readjusted from the manuscript census information due to subsequent boundary change.

year, may also point to the phenomenon of consolidation of farm units during the preceding period of economic recession. In 1909, the percentage figure of these large farms fell back to a low level. This drop, however, did not cause a corresponding drop in the average farm size of the county. Overall, the picture indicates that the trend toward increasing scale of farm operation had gathered momentum during the middle decade and became stabilized in the last, though within the process, the 500-acre farms had proven themselves to be too big for the area's ecology.

Change in Farm Value

The change in farm value over the entire period has an almost reverse relationship with that of farm size. As evidenced from Fig. 1, a relative increase in the farm size is always paralleled by a relative decrease in the dollar value of the land.

This relationship, however, is out of proportion in the first and third decades. Initially, the steeper rate of increase in farm value relative to that of farm size can be explained by the rapid farm improvement enjoyed during this period. In the last decade, the similar phenomenon is mostly related to the near exhaustion of free land and the general psychological climate it produced. The inflationary nature of land prices during this last period of boom is well captured by McClaskey through the comparison between the contemporary market land price with the actual earning that one could accrue from the same piece of land (34).

Change in Agricultural Production

As a strong indication of rapid farm improvement, the acreage in all grain crops rose rapidly within the first decade to a level already matching that in 1909, though they had suffered a small shrinkage in the middle decade (Fig. 4).

In the first decade, corn acreage enjoyed the greatest expansion. Competition from wheat put it into the second place by the end of the second period. Toward the ending years, however, it regained its previous dominance.

The acreage in small grains remained stable at first, then experienced a slight drop. In the last decade, their acreage had increased about twofold.

In the first census year of 1879, hay represented more than 50% of the combined crop acreage. Yet, with more and more of the land having gone into grain crops, the general trend for the hay acreage had been on the decrease through the years. The general picture hints that the county's livestock industry had shifted increasingly from that of ranching to one of a feeding type.

An examination of livestock production over time in Davison County shows three stages of development. In the first decade, there was a sharp rise in the number of swine, paralleling the increase in corn acreage in this same period. In the second decade, the number of swine became stablized. The number of cattle and poultry, on the other hand, had been increasing. In the last decade, cattle had suffered a considerable decline in number. At the same time, the increase in poultry began to level off, while the number of swine has experienced

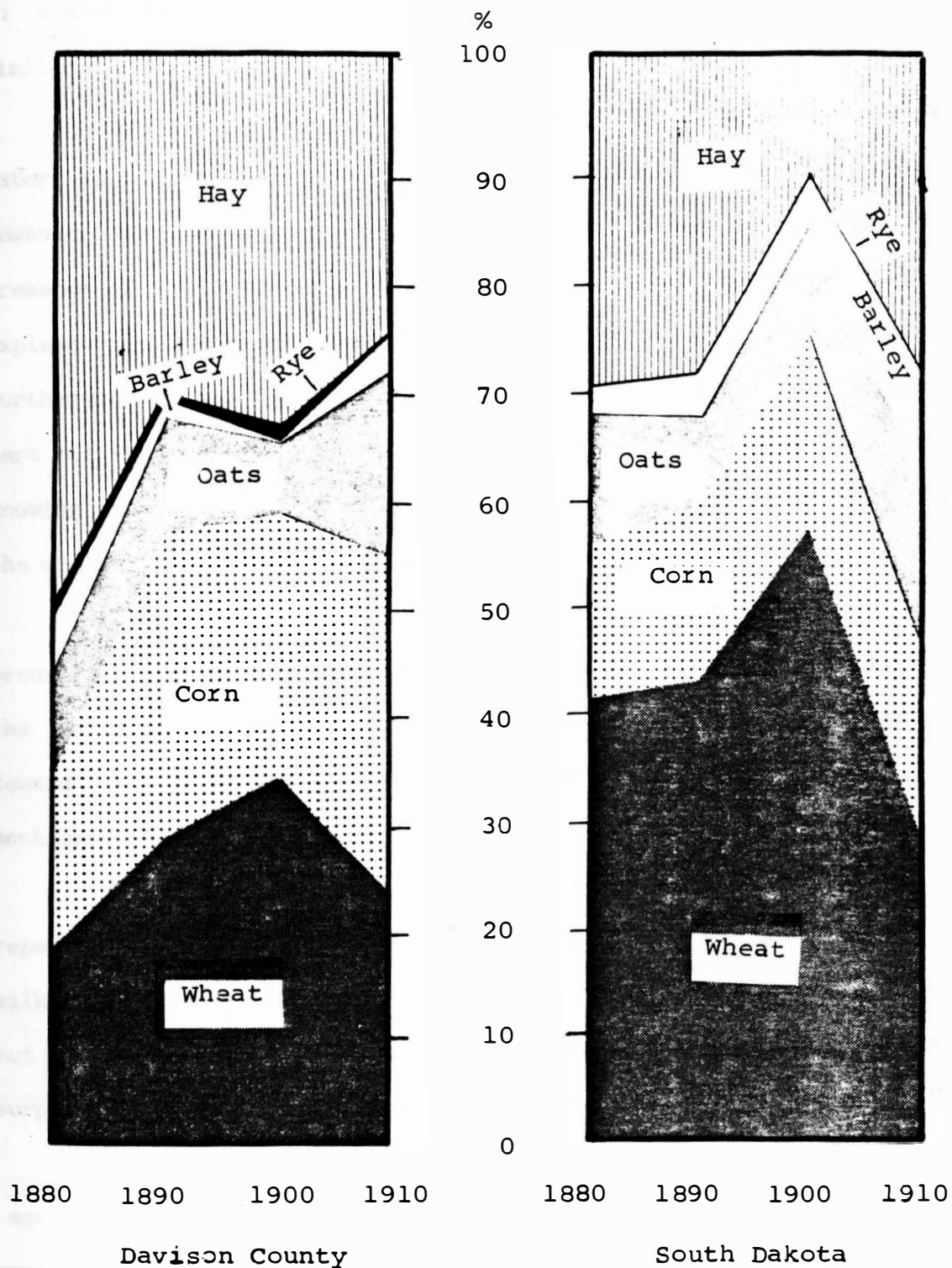


FIG. 4: PERCENTAGE AREA OF LAND DEVOTED TO PRINCIPAL CROPS

Sources: op. cit., Fig. 3.

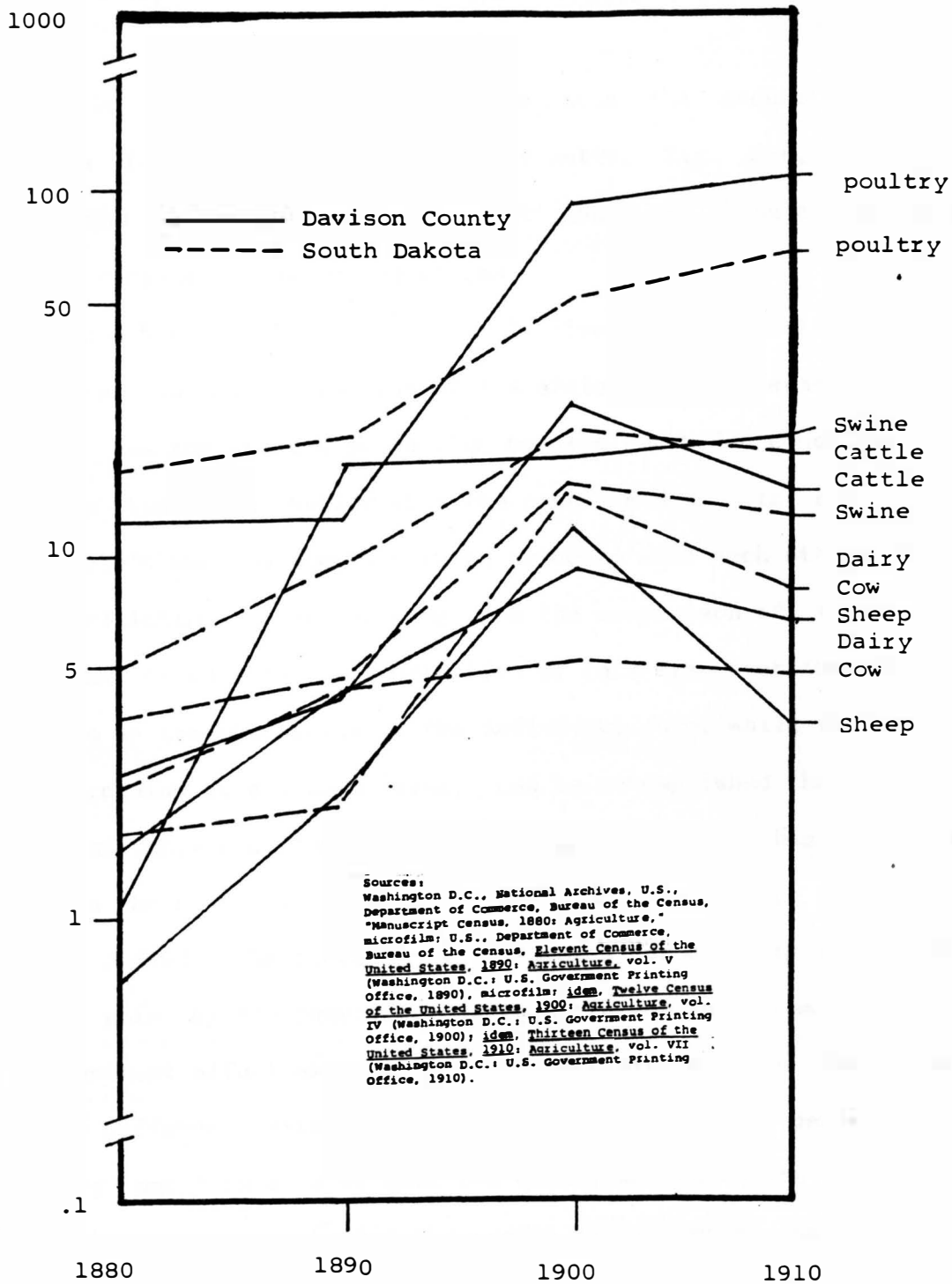


FIG. 5-A: LIVESTOCK PRODUCTION/
 Number Per Farm

advantage and convenience, virtually forced many home creameries out of competition.

Unlike Fig. 5-A, which illustrates the change in the individual's fortune in the livestock industry, Fig. 5-B, (with a slight change in the unit of measurement) shows the area's carrying capacity of various livestock industries.

Figure 5-B shows that the county's livestock production repeats basically the same trend as that of the state with the lapse of one generation, and the state's production by area reached a condition of stabilization ten years earlier than the county's did. In Fig. 5-A, both the state's and the county's trend coincide with each other. Much of the conflicting pattern arising from the comparison of these two diagrams has to do with the fluctuation of farm size over the years. The increase in the production on the individual farm, while the areas' production remains at a stable level, can be accomplished through the adjustment of individual farms into larger size units. This situation happened to the state in the decade 1889-1899. As for the county in this same period, the increase of its area's production continued; hence the gain by the county's individual farmer is due as much to their adjustment effort as to their farm improvement. In the final decade, a different situation developed. During this period, the productivity and farm size of both the county and the state increased little further or fell, showing the profit from farming, as a whole, was rapidly diminishing.

In conclusion, the county's agricultural development, typified by its livestock production pattern, remained below its natural

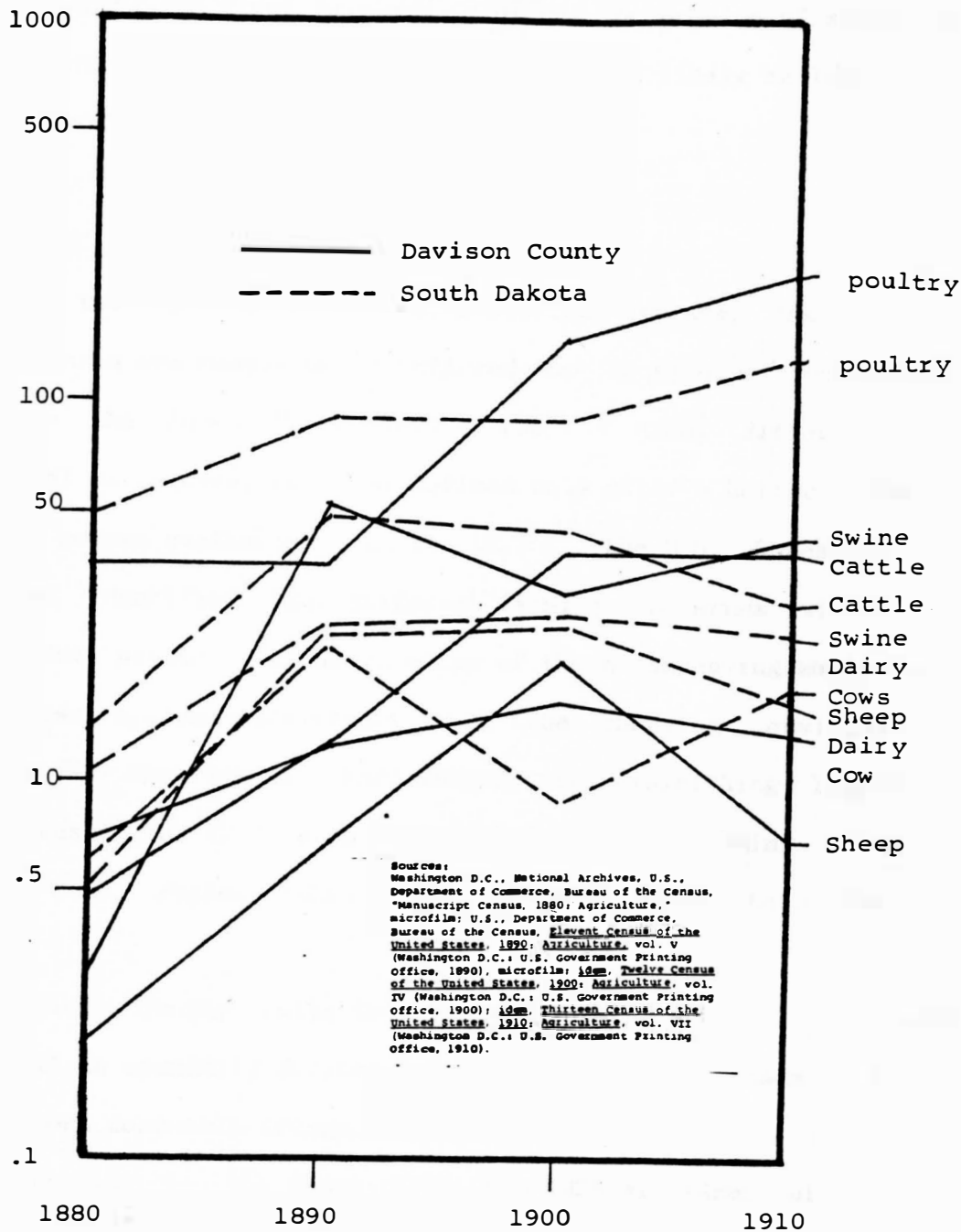


FIG. 5-B: LIVESTOCK PRODUCTION/
 Number Per Square Mile

potential during the first 20 years. Hence, the problem of adjustment with respect to environmental limitations would likely be less acute until in the final years of the frontier phase.

From Prairie to Corn Belt

In the numerous early local historical sources, the locale of the study area was consistently referred to, in a vague geographical sense, as the James River Valley (36). Areal differences in agricultural activities, could be defined only after a better volume of statistics became available. In the 1920's, the U.S. Bureau of the Census had identified eight different farming-type areas within the State of South Dakota. An examination of the accompanying map reveals their close spatial conformity with the changing environmental conditions in the state. For example, the diminishing length of growing season has to do with the northern counties being a wheat, instead of corn, region within the eastern part of the state (App. I) (37).

Davison County falls into type-of-farming area II in South Dakota. It is specially defined by the Bureau of the Census as a part of the western corn-belt fringe.

According to the description, in 1925 all farms within the central part of this area averaged at 184.8 acres, while the number of 320-acre farms represented only 25% of the total. The trend for the county's contracting farm size continued for another 15 years after the end of its frontier phase (App. II).

A direct comparison of agricultural production is difficult as

the description concerning the area is accorded to different size-classes instead of the grand average. Nonetheless, if we have to match one of the 1925 area's 320-acre farms with a 1910 "average farm" of the county (its size then approximated to 320 acres), the following statements can be made:

The county's acreages in corn and small grains had expanded further during this post-frontier period, while the acreage in wheat continued to dwindle. The level of livestock production maintained itself.

These facts lead to the conclusion that the livestock industry became dominant toward and after the end of the frontier phase. This particular phenomenon, as reasoned by the farm economist, is a direct consequence of the emergence of regional competition. Greater transport costs to central market, by present, had induced the local farmers into converting their produce into more valuable products.

Sound economic principles would become increasingly crucial in farm business as the ecological limit began to be recognized, but the same principles are also reflected in the thirty-year span presently covered. According to the contemporary profitable farming systems suggested by the farm economists to the area's farmers, small-size farms should specialize in corn and hogs or dairying, whereas medium to large-size farms should specialize in beef feeding (App. II.) (38). The past trends in the county's farm size and farm production characteristics come to terms with these basic principles.

From the foregoing observations, it becomes possible to generalize the county's first 30 years of farming as consisting of

three special stages of development: an initial stage specializing in corn and hogs; a second stage of the diversification of livestock, and, a final stage in which declining yield set in. In the meantime, in order to maintain the existing level of livestock production in order to meet the regional economic challenge, the acreage in corn, oats and barley expanded at the expense of wheat.

Studies on areas further east have indicated that a stage of subsistence farming, in which corn, hogs, potatoes and other miscellaneous items are important, had preceded the frontier phase (39). No such evidence is present in Davison County. Rather the earliest census figures show that the volume of cattle and hay was substantially higher than that of hogs and corn. This tends to identify the county as previously having been a ranching county, a point that is further supported by local historical accounts (40).

Over-optimism was a characteristic trait of the frontiersman's mentality. As Nature was viewed as being inexhaustible, cases of farm mismanagement became many. The numerous individual failures due to inability to pay off the debt accumulated through years of farm expansion added up to bring the ruin of local farm economy. The recession of the 1890's as described by historians, had its state-wide effect, but some counties were harder hit than the others. In the wheat farming area of Brown and Beadle Counties, the economic hardship had resulted in serious adjustment problems (41). In Davison County, the lack of historical accounts concerning this particular episode deprives us of the knowledge of the intensity with which the county was affected. Yet, in view of its early institution of the corn-hogs

combination pattern, it is surmised that the county could have fared better. On the other hand, the depopulation in at least one township (Map 4), the declining farm value and an abrupt rise in cattle production, hint to the county's adjustment problem during this period.

Chapter V: Internal Change

Through time, the county's agriculture had followed a definitive pattern of change. Yet such representation, by using the county-based statistics, is cursory and conceals many special circumstances. Social and environmental differences, for example, can cause agricultural characteristics to vary from individual to individual and from place to place, thereby explaining the special mode in which the area's agricultural settlement had evolved. Many of these vignettes form inseparable facets of the overall phenomenon and deserve special scrutiny.

Among the human factors considered here, the size of population and its composition are at all times connected to the extent of the economic exploitation of the county's agricultural resources. The differences in group behavior, in turn due to social, cultural and economic differences, are evident in farm production and the population's mobility patterns. Environmentally, the physical characteristics of the county necessitate different practices of general agricultural adjustment, eventually resulting in the existing areal differentiation of the farming pattern. These special developmental processes are the subject of this chapter. Lastly, over time, the ever increasing economic strength over the ethnic factors in the explanation of various agricultural settlement characteristics will underline the following discussion.

The Beginning

The take-off point for the county's agricultural history came

in 1879. The news of the railroad's proposed extension and the various promotional activities by the local agents began to lure many prospective settlers to the area. Before the railroad project was completed to Mitchell, many, like Mrs. Althen's family, had to detrain at Springfield - then the nearest rail terminal to the county - and continue the rest of their journey on stagecoach (42). Upon their arrival, they were received by the local "Big Injun," Herman Greene, whose home would become temporary lodging for the newcomers. Being a general surveyor, Greene played an active role in helping the newcomers with their locations of claim and various paper work.

Once the individual settlers were off into their individual claims, the serious business of agriculture began. Obviously, little time could be wasted in view of the yearly residence and improvement requirements specified in the Homestead Law. For this reason, many chose to arrive in the spring, so that by the time the winter came, they would have managed to have a sod house built and a few acres broken. They would then return to their former eastern homes to escape the winter, and by the time they came back to their claims the following spring, the new crops were growing in the field. For those who were serious about the permanent improvement of the land, the first few years were perhaps the most critical. If the crops were good, not only could they pay off the debts incurred through their journeys, but also they would have enough money saved for later investment. Historical documents reveal that the years 1882 to 1885 were good crop years thanks to fair weather conditions and prices. The beginning, therefore, was favorable indeed to the new farmers.

In 1880, the county's agricultural scene remained underdeveloped. As an indication of this, areas improved in farms varied from zero to only 80 acres. Most farms, at this time, were in the 160-acre size bracket, although 320-acre farms were also common. Presumably, most farmers at this stage were still in their first filings.

Areally, Mitchell Township (T103N, R60W) enjoyed the greatest concentration of farms at this time thanks to the early presence of the booming city of Mitchell. The appearance of numerous additions from the Tax Lists of the years immediately following, under the city of Mitchell, indicates the presence of speculative activities around the urban fringe (43). Many owners of these additions can further be identified by names as the "sooners," who were also distinguishable by their eastern backgrounds.

Studies on original land claiming pattern and the process of land alienation had been made on adjacent territory; consequently, this particular episode will be omitted from the present scope of investigation (44). Suffice it to say that the original claimants had their usual tendency to locate along the river course. Under the special conditions in which the land was available, different parcels of land had to be taken independently by the later comers, which resulted in a fragmented pattern of land-holding (45).

Any shift in the geographical center of the frontier will be matched by a new historical setting that the early settlers had to cope with initially. Besides, the original farming population was drawn from diverse social and cultural backgrounds, and so the same

adjustment problem would be faced with varying degrees of intensity. Knowledge of such commonality and diversity is necessary if the nature of subsequent change is to be understood.

The co-existence of both the Federal Agriculture and Population Census Manuscript Schedules in the year 1880 means that the original farming condition can be partially reconstructed, provided that such information can be presented in some systematic manner. Particularly, the inter-relationships among the agricultural, economic and social characteristics of the farming population should be sorted out. To this end, a representative sample of 55 is drawn from the total of 172 heads of households enumerated in the agricultural census, and their agricultural and economic characteristics are recorded accordingly. These same individuals are then retraced in the population census for their social identification. Finally, the sampled values among the eight selected variables are correlated with one another, and the results are compiled in Table I.

Using $r=.30$ as the critical value, the result shows that the two social variables have no relationship with each other. Contrary to what seems to be the normal case, older age is not always paired with larger family. One of the reasons lies in the chance that some members of an older family had by then become independent. As a more common explanation, most homesteaders at this stage did not have their entire family along, and the ones that showed up usually were the one most eligible to work. As an example, Alis McCoy of Beadle County accompanied his father to their new claim at the age of 13. The two managed to have a sod house built and a few acres planted in potatoes,

TABLE 1

A CORRELATION MATRIX OF SELECTED VARIABLES

	A	B	C	D	E	F	G	H
A	1							
B	.06	1						
C	.03	.13	1			$r = .30$		
D	.26	.17	-.04	1		$n = 55$		
E	.04	.40	-.12	.31	1			
F	.40	.33	.46	.31	.11	1		
G	.27	.34	.28	.52	.25	.56	1	
H	.28	.53	.29	.43	.21	-.79	.75	1

Social Variables:

A=age

B=size of household

Agricultural Variables:

C=farm size

D=farm value per acre

Economic Variables:

E=percentage of land improved in farm

F=values of farm implement and machinery

G=number of horses

H=livestock value

Sources: Washington D.C., Federal Archives, Department of Commerce, Bureau of the Census, "Manuscript Censuses, 1880: Agriculture; Population," microfilm.

and a whole year elapsed before he was reunited with his mother and sisters (46).

Household size correlates strongly with all four economic variables. This confirms the notion that the family functions as an economic unit in the frontier, and this also indicates the stronger intention among the larger families to make honest investments in the new land.

The older the individual, the more likely he was to have better or more machinery. The longer time of his involvement in farming furnishes a good explanation. On the other hand, such seniority fails to entitle him to similarly good performance in the other economic aspects. As is commonly the case, those who had been doing well in the older areas had less reason to move than those who had not, so that the frontier most often attracts the landless and the otherwise unfortunate. Among the pioneers, late starters were just as common as the early starters.

Farm value, like size of household, correlates with all four economic variables, yet these two variables themselves have no relationship with each other. Such a discrepancy points to the existence of some intervening variable(s). A possible suggestion for this is land speculation, which certainly boosted land price in some localities, but was less likely related to the participants' family size characteristics.

The percentage of farm land improved has no relationship with the other economic variables, meaning that the magnitude of farming operation still lagged behind the level of economic input at this early

date. Apart from this exception, all the other economic variables form a cluster of high correlation values. The strong relationships that the number of horses have with the value of farm implements and livestock value are self-explanatory, whereas the high negative correlation value between the value of livestock and farm implements appears to be the most striking. That farm investment tended to be put on either one of these two opposing items, and not on both, suggests that regular farming appeared side by side with ranching in the early scene. Recalling, also, the sharp increases of corn and hogs over cattle and hay during the first decade (Figs. 4 & 5), one can conceptualize the picture of an invasion by the Midwestern farmers into the cattleman's domain.

Equally noteworthy is that farm implement value correlates with all other variables except farm improvement. The result suggests that the investment in farm machinery became an intrinsic part of the general agricultural planning, regardless of its immediate usage. This phenomenon aptly reveals that the historical movement toward farm mechanization since the Civil War had been well-rooted by this time.

Ethnicity, while it can be regarded as a third social variable, is here treated in a separate category because of its overall importance in the farming scene. In fact, cultural differences in farming activities have long become an indispensable topic in most writings of agricultural history. Yet, frequently, such descriptions are so studded with indirect references and insinuations that the results tend to confuse more than to inform (47). In the present endeavor, it is hoped that a more factual statement can be made,

notably with the aid of the census data.

In 1879, the county's agricultural production was still in its infant stage; many farmers had no report on any commodity items. Yet, it is at this stage of primitive development that the differences in cultural practice can be most revealing. At the time when neighbors were miles apart, and when the process of acculturation had not yet taken effect, what one could do with his land could mirror anything but his own immediate cultural experience. In the following presentation, the total population of the foreign groups and samples of comparable size from the native-born population will be used (48). Farm production figures are recorded by individual and then averaged by group. The results are thus tabulated for comparison (Table II).

By using the individual's father's place of birth rather than his own for the criterion of ethnicity, we are focusing on the relatively stable element behind familial tradition while forgetting the possibility of the individual's newly acquired knowledge, which by nature, is more difficult to be captured. With this special definition, the group differences stand out well, and some conclusive statements can be made regarding the resultant pattern.

Between the foreign and the native groups, differences exist in all items of production with the exception of hogs. This latter animal, because of its general adaptability to different kinds of environments, again proved its utility to general home consumption needs among different household. Compared with the native group, the foreign group, at this time, possessed more cows and had proportionally more wheat than corn planted.

TABLE 2
ETHNICITY AND AGRICULTURAL PRODUCTION

Agricultural items produced	Individual's Father's Place of Birth								
	Scandinavia	Germany- Prussia	Ireland	Scotland- England	Europe	Eastern States	Midwestern States	Upper-lake States	Northern U.S.A.
Cattle (nos.)	44	17	3	1183	312	356	109	67	177
Dairy Cows (nos.)	111	80	80	483	181	122	100	33	85
Hogs (nos.)	33	50	--	233	79	83	83	33	65
Corn (acres)	167	133	40	--	85	105	45	333	161
Wheat (acres)	344	167	--	50	140	144	--	67	70

Note: all figures represent 100 times the actual values of the group averages.

Sources: op. cit., Table I.

The larger numbers of cattle and dairy cows kept by the foreign group, as a whole, are essentially due to the presence of the Scots and Englishmen within it. As an individual case, an Englishman by the name of Gabrilla Jordan then owned 65 cattle and 25 dairy cows, while at the same time managed to have only 10 acres tilled. There is little doubt that he is identified as more of a cattleman than a regular farmer. The fair size of his holding - 160 acres - had little restriction on his operation for as late as 1901 the county plat map still identified a large tract of land in meadow in the adjacent township (T102 R60) (49). The Scottish-English interest in commercial ranching over the West River is a case well-mentioned in the state's history (50). The present finding, however, shows that the same ranching activity by these same kinsmen, though in a smaller scale, was also prevalent in the eastern part of the state.

The eastern farmers had also kept sizable herds of cattle and dairy cows. But, unlike the Scot-English group, they also had considerable acres planted, hence, their ranching interest appears to have been less pursued single-mindedly.

The volume of livestock kept, as a sign of wealth, manages to distinguish these two groups from the rest. Farmers of lesser means could hardly afford to assume operation in such a grand scale at the beginning, so that, in general, they had to resort to more active planting.

Among our "common farmers," differences are evident between those of native and foreign origins. The northern interior farmers, at this time, preferred cattle to dairy cows, while the foreign farmers

and their immediate descendants show a reverse interest in these same stocks. The difference reflects not only the better expertise of dairying among the foreign groups but also their larger size of family for the provision of more intensive labor required of the caring of a dairying herd. As already mentioned, all foreign groups, with the exception of the Irish, had planted more wheat than corn, and this agrees with the same contention by Bogue (51).

The Irish farmers, at this time, did most poorly in comparison with all other groups. Apart from dairy cows, other agricultural items have little or no showing among them. Their total omission of hogs and disinterest in neat cattle represent, if not a pure neglect, a special emphasis that is fundamentally deviant from the normal pattern of Midwestern farming. Whether this poor showing is due to the tenacity of their traditional way, their difficulty in culturally adapting to the new environmental condition, or to their generally poor performance could alter little the likelihood of the greater adjustment problem they had to face in the future.

Between the Germans and the Scandinavians, the two most populous nationalities found within the county, the differences lie in the relative proportions of diverse agricultural items. While the Scandinavians had devoted about twice as much land to wheat than corn, the Germans had the two crops planted in equal acreage. In fact, their even-handed devotion to every farm item points to the versatility of the German farmers.

Differences among the American native farmers hinge on the question of the diffusion of regional agricultural patterns over the

continent. The significance of this process can be exemplified by the genesis of Midwestern agriculture, itself being the hybrid of the New England and southern types when these two cultural streams met in the eastern woodland area (52). Similarly, the different experiences of the different native groups always contribute to the enrichment of an area's agriculture.

Already mentioned is the predominant emphasis of the Yankee farmers on cattle raising. Quite unexpected is the fact that the farmers from the Upper-lake states, then consisting chiefly of the states of Michigan and Wisconsin, raised more corn than wheat, as this region has been well identified as a wheat-and-dairying region. Nonetheless, this region is also known to have had a subsistence stage of agriculture preceding the frontier phase, wherein corn and hogs were also involved. The present comparative figures may well point to their mere repetition of this same preliminary pattern. Compared with all other native groups, the Midwestern farmers planted the least corn but, at the same time, had the greatest number of hogs proportional to corn acreage, showing the premeditated manner in which they introduced the corn-hogs combination pattern into this area.

The sharp take-off rates in corn and hog production during the first ten years are likely credited to the influx of the Midwestern farmers in that same time, for as late as 1900 the states of Iowa and Illinois still ranked first and third as the suppliers of native migrants (53). Having had longer farming experiences in the prairie environment, they could best serve as local mentors of agriculture for others to imitate. For some foreign farmers, the early problem of

adjustment could be tough, but through time their acculturation to the standard mode of the area appears to be certain.

Before civil organizations were instituted in place, kinship relationships functioned as the principal community binding force, and this force was not the least lessened over the distance of migration. Settlement frequently involved the transplantation of a whole colony of the same kin and not the isolated movements of single families into a new area. While the Norwegians and Swedes were especially prone to settle in such organized manner, other groups might show a similar tendency.

Ethnic clustering between 1909 and 1910 is shown in Map 5, which is based on information from the Population Census Manuscript and the county atlas of the respective years. Lacking the earlier information, one does not know for certain how these ethnic areas had become so evolved. Nevertheless, one can reasonably assume that the core areas of the different ethnic groups remained relatively unchanged through the years.

As shown, the Germans were the most populous foreign ethnic group found within the county. Their highest concentration is found mainly in the southwest, making Baker and most of Tobin (T102, R60; T101 R61) almost solid German townships. Elsewhere, they dispersed themselves randomly in the forms of minor clusters and individual farmsteads. The different timing of their settlement, as well as the larger number of native-born among them, account for the diversity of their distributional pattern.



MAP 5: ETHNIC CLUSTERING: 1909-10.

Sources: Frank E. Peterson, compl., Twentieth Century Atlas of Davison County, South Dakota (Vermillion, South Dakota: By the author, 1910); Washington D.C., National Archives, U.S., Department of Commerce, Bureau of the Census, "Manuscript Census, 1900; Population," microfilm.

The Scandinavians, as the second most populous group, form more of a solid settlement pattern than the Germans. The two primary nationalities within this group show little tendency to band together but located themselves in opposite corners of the county. The Norwegians are found principally in the northwest, notably in Blendon and Mt. Vernon Townships (T104 R62; T103 R62), while the Swedes settled in the south and southeastern townships of Tobin, Rome (T101 R60) and especially Prosper. The Danes represent only a small number in Perry (T104 R60) and Rome Townships, but in both places, they associate themselves more with the Swedes than the Norwegians.

To a lesser extent, the fewer Canadians and Irish tend also to settle within their own groups. On the other hand, the Scots and English, together as a third English-speaking group, scattered themselves most widely apart, showing little if any kinship ties among themselves.

In addition to these major ethnic groups, there are also a few Dutch, and small numbers of French and Central Europeans that together make up the "other" category. Because of their small numbers, no particular pattern can be readily observed.

The manner in which the various ethnic members scatter is just as significant as the way they congregate, as the former is often a strong hint of social change. A separate farmstead from the core area of the same ethnicity can indicate the branching-off of the second-generation farmer, inter-cultural marriage and labor relationship. Many of these cases, in fact, had shown up during the identification process.

In a more exact way, the locational pattern of the ethnic phenomenon is easier described than explained. It is suggested elsewhere that some foreign groups tend to pick particular sites bearing resemblance to their own home environments. In the present situation, the most solid Norwegian concentration is found mainly within soil type 4 area, but whether this represents a general case about this particular group is not certain without special understanding of their folkways. Among all other ethnic groups, no such areal association is evident.

Population and Demographic Change

Rural population of the county in the four census years was reported as follows: 304; 3105; 3206; 4184. As evidenced from these figures, most of the gain had occurred in the first and final decades.

A suggested model of the frontier population change consists of initial periods of increase first due to in-migration and later through natural reproductive means. In the final period, the size of population becomes stabilized as the gain from natural increase barely manages to make up for the loss due to out-migration (54).

Testing of this model, however, requires information from vital statistics about this population in time and place. Such data unfortunately are largely incomplete (55). Even without being exact, the raw population figures as above presented are strong enough to dismiss the actual occurrence of the hypothetical pattern. Instead, these figures point well to the boom-and-bust nature of change captured by historians familiar with the region. Historically, high and low

settlement tides always tailed-off after good or bad crop years, making in- and out-migrations extremely sporadic phenomena.

As indication of the same phenomena for the county, the foreign-born components of the state's population were 31% in 1885, 26% in 1895 and 19.7% in 1905. Therefore, most of the foreign migrants who came to the state did so during the first decade. Since then, the decrease of their share was steady, not to be salvaged by the effect of the last boom. Despite the small percentage of the foreign-born to the total in 1905, some 54.3% of the state's population was only one generation removed from foreign birth. This latter phenomenon captured the attention of the state census superintendent because of its various social ramifications (56).

Urban population, unlike the rural, had increased consistently without being subject to wild fluctuation. The figures on the city of Mitchell alone stood at 2217, 4055 and 6515 in the three census years beginning in 1890. Urban population growth outstripped rural growth since 1900, reflecting the national trend toward increasing urbanism (57).

The evolution of the population pyramid of a sample township, Perry, conforms to a change pattern typical of a developing area. Through time, the sex and age cohorts showed a more balanced apportionment, and the pyramid's shape had gained further resemblance to the one hypothesized of a stationary population (Fig. 6).

Considerably more males, especially in the earlier periods, make up the frontier population. Sex ratios, expressed as the number of males per 100 females, were 116, 123 and 109 in the respective years of

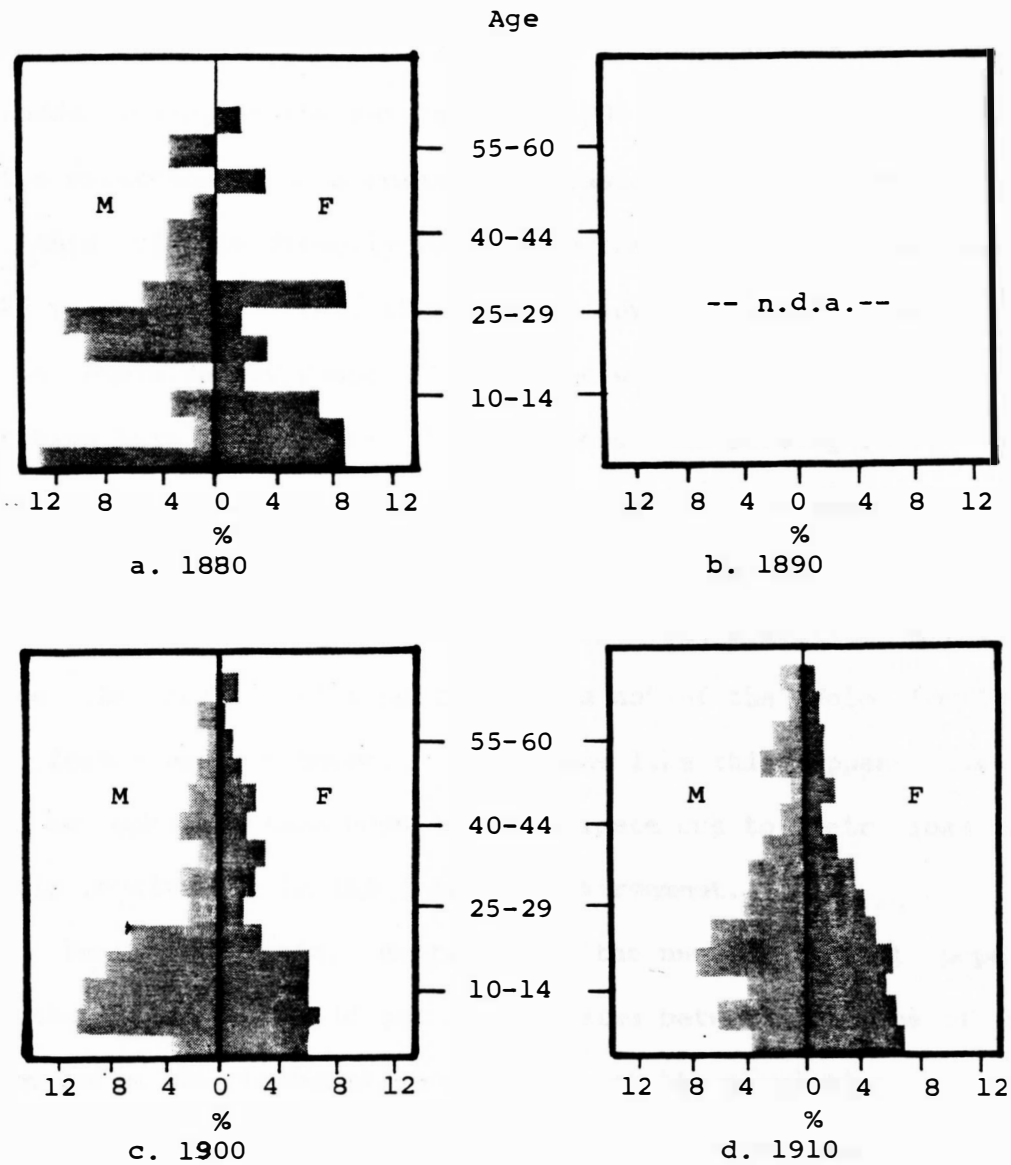


FIG. 6: SEX AND AGE DISTRIBUTIONS: T104N, ||| R60W

Sources: Washington D.C., National Archives, U.S., Department of Commerce, Bureau of the Census, "Manuscript Census, 1880; 1900; 1910: Population," microfilms.

1880, 1900 and 1910. In the first year, the predominant male population between the ages 20 and 29 make up most of the imbalance. The sudden rising of the sex ratio in 1900 is quite unexpected, hinting at the existence of some enigmatic situation. An examination shows that this rise is directly related to the fewer females between five and 29 years of age. That there were fewer young adult women than men can be explained by reasons associated with their marriages or their absorption into other kinds of occupations than farming (58). For the girls in their late childhood and early teens, the reason is not so explicit. As a possibility, it can be speculated that during the preceding period of economic hardship, out-migration might often involve the leaving of a part of, and not of the whole family, for their former eastern homes. When cases like this happen, the girls would be more apt than boys to participate due to their less active economic involvement in the frontier environment.

Fertility ratio, expressed as the number of that population less than five years old per 1000 females between the ages of 15 and 45, measures the regenerative potential of the population as a whole. The figures stand at 830, 556 and 494 in the three census years. In spite of the missing information in 1890, the large volume of natural increase during the first 15 years is explicit in the widening of the base of the 1900 population pyramid.

Indices of aging, expressed as the number of children under 15 per 100 persons over 65, are figured at 0, 2 and 4 at these same census years. While the population of the township as a whole had been aging consistently, the proportion of its labor force - between 15 and 65

years of age - had fluctuated somewhat, with the respective figures of 60, 57 and 61 in the three years. The last land boom notably revitalized the county's population by inducing more young people into the county.

Persistence

Among those who finally arrived at this new country, many had no intention to stay any longer than needed for the conversion of their new land titles into a salable commodity. Others did plan to reside permanently but failed to do so because of pure bad luck. In either case, the result is the creation of isolated but numerous instances of agricultural set-back that, except in some extraordinary time such as during the 1890's, had always been hidden from the county's statistics. These individual cases of successes and failures contain important information on the process of change and deserve proper gauging.

Whereas the continuance of agricultural growth is sustained through the act of persistence, the ability to do so varies from individual to individual. Presumably, the social, economic and cultural backgrounds of the individuals underline the difference. In addition to these passive elements, one would further want to know what the persisters themselves had successfully done to master the changing circumstances, and how well they had achieved in the end.

Because of the limited primary sources, the present theme of persistence concerns the original population only, while leaving out all later comers from the scope. To identify the persisters within the population, individual heads of households, together with their family

members, are retraced in the county tax books of the three subsequent decennial years. Secondly, in order to reduce the volume of work involved, the above identification process is followed within the township framework. Because of these special procedures, persistence acquires a conditional meaning. This is to say that some individuals who actually still resided in the county have to be omitted. These individuals include those who: 1) had failed to become a landowner, 2) had moved out of the township to another one within the county, and/or 3) had moved into towns within the county.

A total of 45 individuals can thus be identified as having had resided in the county for at least ten years. The actual number should be somewhat greater or smaller for the reasons explained above. To match this group of persisters, another 45 individuals are randomly selected from the rest of the 1880 population, termed as the quitters. The results of their various group characteristics were then compiled and tabulated in Tables III-A, B and C.

As can be expected, all persisters generally began with larger households. The average ages between the two groups show little difference, although their median ages do differ by two years. Overall, the social differences between the two groups are slight; yet the nature of these differences make clear suggestions.

Evidently, young married adults with two children approaching working age make perfect homesteaders. Not only do familial ties tend to bind them to their newly founded homes, but also their farm helpers are readily available, hence, the greater likelihood for their early agricultural success, which, in turn, reinforces their original

TABLE 3

PERSISTENCE:
A: SOCIAL CHARACTERISTICS

Social Character- istics	Groups				
	Persisters				Quitters
	to 1879	to 1889	to 1899	to 1909	before 1889
Age					
Mean	--	36.2	34.4	32.2	36.1
Median	--	35.0	33.0	32.0	33.0
Avg. size of household	--	4.1	4.0	4.3	3.7

Note: all values with respects to age and size of household are based on the 1880 Census description only; i.e., individuals who persisted to 1889 would age at 46.2 instead of 36.2 in 1889.

Sources: Washington D.C., Federal Archives, op. cit., Table I; Davison County, South Dakota, "Tax Lists; 1889; 1899; 1909" (1889, 1899, 1909).

TABLE 3 (Cont'd)

PERSISTENCE
B: ETHNICITY

Ethnicity		Groups				
		Persisters				Quitters
		to 1879	to 1889	to 1899	to 1909	before 1899
According to language Spoken	Esp./Esp	--	35	19	5	37
	Esp./Fsp.*	--	1	1	1	5
	Fsp./Fsp.	--	9	8	6	3
	Total	--	45	28	12	45
According to Individuals' Birth Places	Midwestern Sts.	--	8	6	3	10
	U.-lake Sts.	--	4	1	1	8
	Eastern Sts.	--	15	7	1	18
	Southern Sts.	--	1	0	0	1
	Canada	--	4	3	0	2
	Europe	--	13	11	7	6
	Total	--	45	28	12	45

* Esp/Fsp.= individuals who speak English with their parents still in foreign tongue.

TABLE 3 (Cont'd)

PERSISTENCE
C: ECONOMIC CHARACTERISTICS

Economic Character- istics	Groups				
	Persisters				Quitters
	in 1879	in *1889	in *1899	in *1909	in 1879
Avg. Farm size (acres)	213.7	240.0	267.4	340.5	192.6
Farm value per acre (\$)	3.4	3.8	4.6	10.1	3.2
Avg. Livestock value (\$)	215.4	332.6	--n.d.a.--		172.5

* Figures under these years are based on the descriptions from the county tax list.

intention to stay. On the other hand, single young men with their usual propensity to shift from place to place were numerous in the pioneer landscape, and their presence in the quitter group largely explains the group's lower average social values.

Among the persisters themselves, those who had resided the longest also had the youngest beginning ages. This is naturally the case because of the longer time they could spare before their deaths or retirements. The greater size of household among the longest persisters is mainly due to the present method of enumeration: the larger one's family is, the greater the chance that one or more of his offsprings can be picked up from the later tax books.

Economically, the persisters started out in better shape than the quitters in terms of both farm size and farm value characteristics. As shown in the previous correlation matrix, these two variables interact only with the economic variables. Farm value, in particular, correlates strongly with the number of horses, which is itself a strong indicator of wealth status in the frontier community. The fact that the persisters were presently owning larger and more valuable farms, therefore, tells of their relative economic well-being. Conzen's "Wisconsin Township Study between 1840 and 1880" shows that among the later comers to that township, the persisters also began with larger and more valuable farms (59). Together, these results can quite aptly reflect the historical trend away from small and toward increasing scale of operations. The whole phenomenon can be capsulized in the following statement:

It (the new farming) was an industry with many economic classes. On the top were the farmers with capital who could afford to expand their operations and purchase the latest machinery. On the bottom were the farm laborers, the sharecroppers, the tenants, the heavily mortgaged small farmers who had more in common with the underpaid factory workers than the upper-class or capitalist farmers. Agriculture became a highly competitive business, and many small farmers found it increasingly difficult to retain their place on the land (60).

Through time, the farm size of the persisters changed in a way similar to the average individual's (see Fig. 3). As for the farm value, the comparative pattern is not so readily discerned due to the inconsistency of the data sources. For various reasons, farm value assessed by the county official for tax purpose had been consistently lower than that reported in the censuses (61), but, in spite of this, the persisters' farm value showed signs of sure gain through the years. Their gain between 1889 and 1899 in contrast to the loss by the county's average individual, in particular, shows that the persisters themselves were little affected economically during the period of recession. Their subsequent gain, however, was at a rate less than that of the average farmer. The already higher value of their land, plus the fact that other farmers were now drastically boosting their land prices in keeping with the competitive demand in this last boom period, may explain the persisters' lower rate of gain. Paradoxically, the persisters had less than their fair share in the new prosperity after having had survived through the worst time.

That the burden of continuously upkeeping the land is unequally shared between the foreign and the native-borns is again indicated in the comparative figures in Table III-B. Among the foreign-born, more

than twice as many initially decided to stay on than to depart, a feat that has no parallel in any one of the native-born groups. Furthermore, their subsequent dropout rate is also the lowest among all groups by geographical origin of birth.

For the foreign-born who spoke no English, the persistence rate is even higher. Three times as many of them initially decided to stay as to leave.

The present categorization of groups by language spoken is predicated on the consideration of occupational mobility. The phenomenon of having secondary occupations has been widespread among the early homesteaders. Nearby, the railroad company and other service industries located in towns and cities had many offerings. As an unusual case, Mrs. Allen Johnson's father had kept his company job in Chicago, while he still managed, at the same time, to maintain his preempted quarter section a mile north of the county line (62). For those who could not speak any English, the chance to be involved in jobs other than farming was slight, hence, the greater likelihood for them to remain in the rural area. This contention gains further credence from the high initial dropout rate among their immediate descendants, who, no doubt, had perfected their language ability.

Among the native-born, the initial dropout rate between the Eastern and Midwestern groups is comparable to each other; both had slightly more of their members disappear by the end of the first ten years. On the other hand, of the Eastern natives remaining in the county, the number had been diminishing at a much sharper rate than did the Midwestern natives with the increasing length of time. This

phenomenon may again tie itself to the greater occupational mobility of the Eastern group.

Among those who were born in the Upper-lake states, there were twice as many quitters as persisters from the beginning, making this the least persistent of all groups. The reason for their poor performance was largely based on their poor adaptation to environmental conditions in this new home. Geographically, this region is still within the Eastern woodland area wherein the condition is uniquely different from what is found on the prairie. Recalling, also, their poor agricultural performance at this time (Table II), it may well appear that they still had not been able to catch up with the new trend toward increasing scale of farm operations.

Although it is clear that the persisters had throughout been doing well economically, it is not possible to find out in the context of this study how they managed to do so with their particular farming strategies due to the absence of individual agricultural information in the subsequent census years. The study by Conzen, however, shows that agriculturally the persisters normally participate early in the trend away from the former mode of farming (63). In other words, these individuals commonly belong to the most innovative element of the farming population.

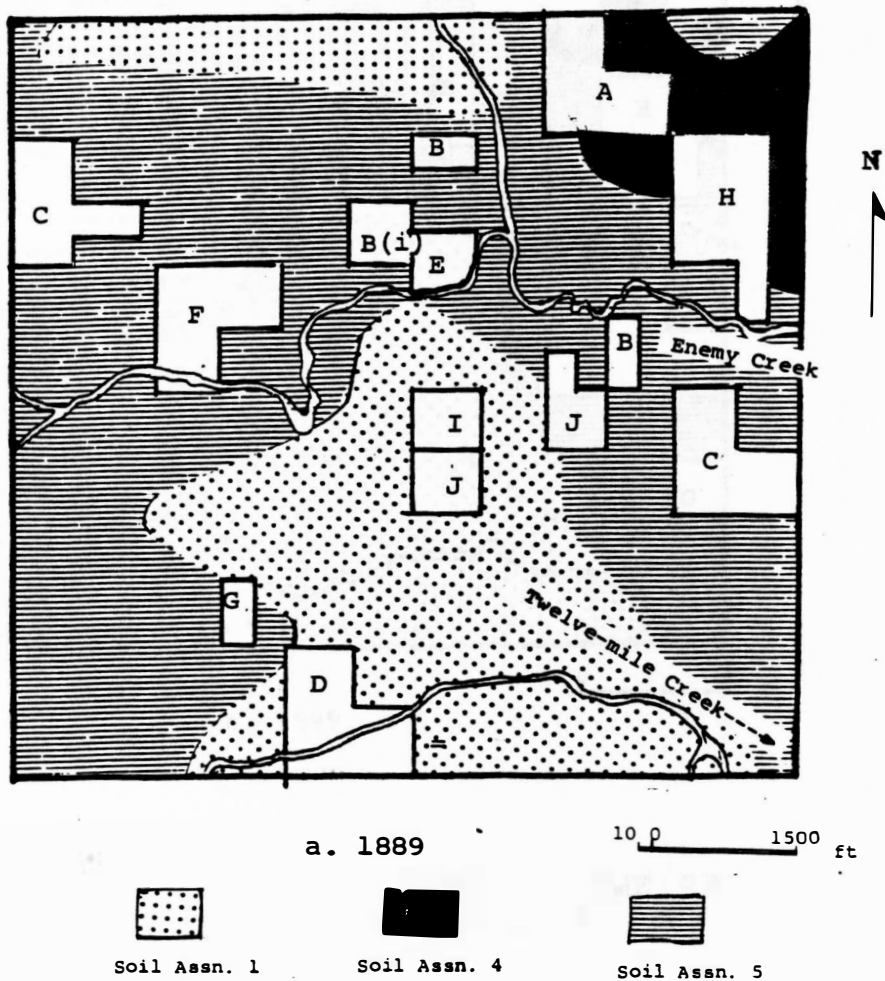
Even among the persisters themselves, continuously occupying the same farm site from year to year represents a case being more rare than ordinary. In an effort to reidentify the locations of the persisters' farms in a sample township, Prosper, it was discovered that considerable movement had taken place among them. When attention is

focused on their distribution instead, the temporal change in the clustering pattern stands out. A Chi-Square test of randomness in the distribution of the persisters' farms yields the results of $\chi^2 = 4.93$, 13.18 and 10.50 in the three respective years (App. III). At eight degrees of freedom, the 1899 Chi-Square value corresponds closely to 0.1 level of statistical significance, meaning that the degree of clustering in this particular year is least likely a result of chance occurrence alone.

In 1889 the locations of the persisters' farms were scattered most randomly about the township. By this time, the high tide of settlement had just subsided, and the crowded landscape precluded liberal action of locational adjustment. When new additions are made, adjacent lots were often not available, resulting in multiple holdings that spread miles apart. This is evidently the case for landowners B and C (Map 6-a).

From the vantage point of the persisters, the advantage of the economic depression is the creation of many vacant acreages obtainable through purchase and exchange (App. IV). This, coupled with the lowering of land price during this period, serves as a strong inducement for them to make timely site adjustments.

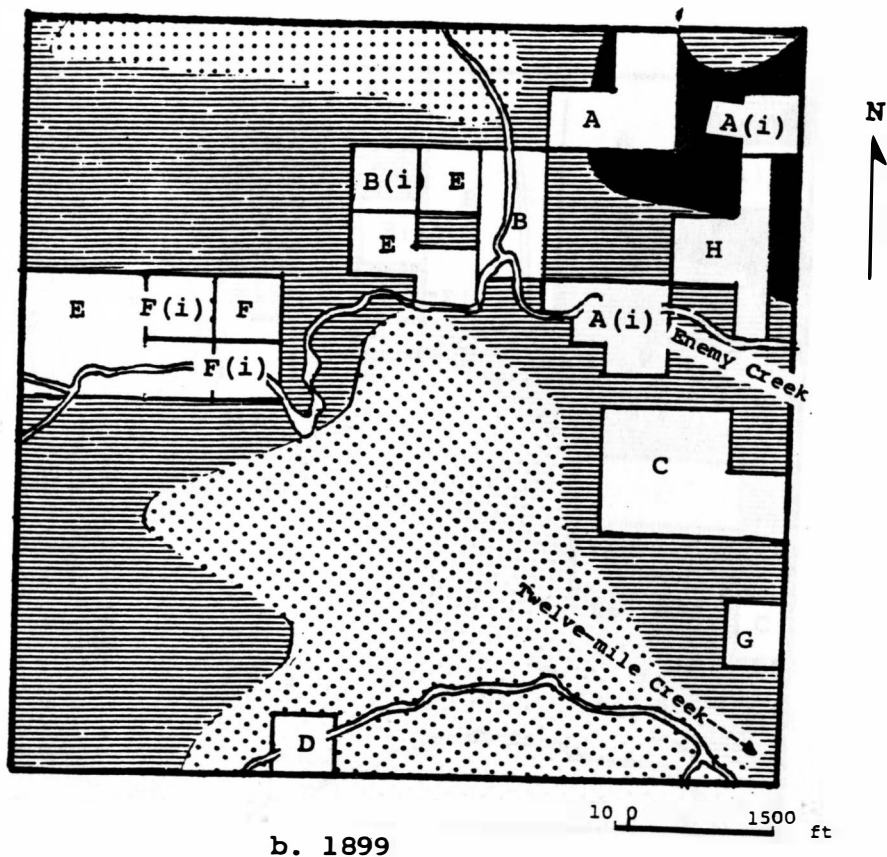
As can be seen, the new cluster pattern had a strong tendency to be formed along the course of the Enemy Creek and its tributaries. Among the persisters, landowners B, C, E and F(i) had either gained new access or maintained their existing ones to the water. Decidedly, access to the water had still remained as a primary factor of farm location after 20 years of pioneer experience.



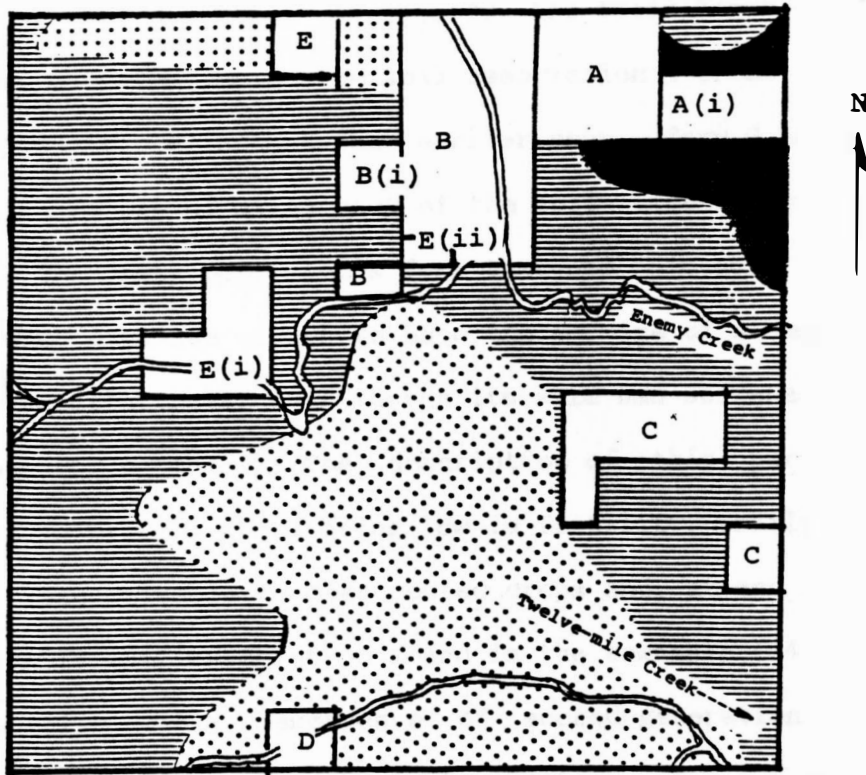
Note: offsprings of original heads of household are here identified by small Roman numerals in bracket.

MAP 6: SPATIAL CONFIGURATIONS OF THE PERSISTERS' FARMS: T102N, R60W

Sources: Davison County, South Dakota, Davison County, Tax List, 1889 (1889); idem, Original Tax List, 1899 (1899); idem, Davison County, Tax List, City Duplicate, 1909 (1909).



MAP 6: SPATIAL CONFIGURATIONS OF THE PERSISTERS' FARMS: T102N, R60W (Cont'd)



c. 1909

MAP 6: SPATIAL CONFIGURATIONS OF THE PERSISTERS' FARMS: T102N, R60W (Cont'd)

The desire to leave behind the poorer sites is just as strong as the striving to obtain the more favorable ones. Of the persisters found in 1889, two (Landowners I and J) had disappeared in the next ten years. Both, incidentally, previously had their farms, or parts of their farms, located inside the soil association 1 area. Of the other two farms found there in that same earlier year, farm G had later been relocated a couple of miles east of the soil association 1's areal boundary. The only persister's farm that had been able to hold fast (farm D) was fortunate enough to have the service of a small tributary to the Twelve-mile Creek, even though its size had suffered considerable contraction since then. The description of this particular soil association identifies it as being low in fertility, easily depleted in moisture, less suitable to deep-rooted crops and, at any rate, was the least favorable soil association found in the township (64).

Socially, the emergence of second-generation landowners contributes also to the highest cluster pattern. As is seen, landowner F(i) began partly by splitting off a portion of her parent's farm. Landowners B(i) and A(i) also had their farms situated close to those of their parents. In either case, the increase in farm units in an already narrowed area gives rise to the highest Chi-Square value in this particular year.

In 1909, the configuration of the persisters' farms remained pretty much the same as ten years previously. The smaller number of farm units remaining in this last year causes a related lowering of the Chi-Square value. In this concluding period, three more original farmers had dropped from the scene, presumably due to marriage and old

age. Of those remaining in 1909, almost all stayed at the same sites as they occupied in 1899. If these locational patterns of the persisters can be cited as being representative of the general population, it is seen that a state of stabilization had set in during the last decade, locationally as well as agriculturally. When diminishing soil productivity became a general areal phenomenon, many farmers also came to the realization that the mere acquisition of better and still better land brings no final solution by the way of profit. Instead, it may seem that more can be gained through shrewd management and by changing one's old mode of farming, if it need be, so as to take the fullest advantage of one's existing site.

Areal Differentiation of Local Agriculture: The End of the Beginning

At the eve of the 20th century, much of the area's agricultural pattern had been established. Hogs and cattle production, being representative of the apex of the Midwestern agricultural enterprise, remained stabilized at a high level. In order to sustain their top level of livestock yield, most farmers, at this time, would find it advisable to devote more of their fields to feed crops and less to wheat and hay, thus molding the area's modern farming pattern (65).

As already has been described, the county, as a statistical unit was soon incorporated into the state's farming area II, which, in turn, is regarded as belonging to the Corn Belt region. An essential factor to the speeding up of this regionalization process is that of the rising land price. In the earlier years when the land price was low, there was enough freedom for one to choose whichever item to be

raised from his farm and still he was able to make a profit. When the profit margin had become smaller through time, the farming options had narrowed down to a few that had proven to be the most viable ones. The geographical distance of the area to its external market and its special physical characteristics, to a great extent, define the ideal farming option for that area.

Yet the same factors that cause the areal coalescence of agricultural characteristics also lead to the discrimination of areally dissimilar patterns. In fact, areal differentiation and regionalization are the same phenomenon viewed from slightly different angles and in different spatial contexts. Even within an area as small as a county, sometimes the presence of an urban center and a transportation route, and the variation of local topography, can cause agricultural characteristics to vary in such a manner that certain associative characteristics can be observed.

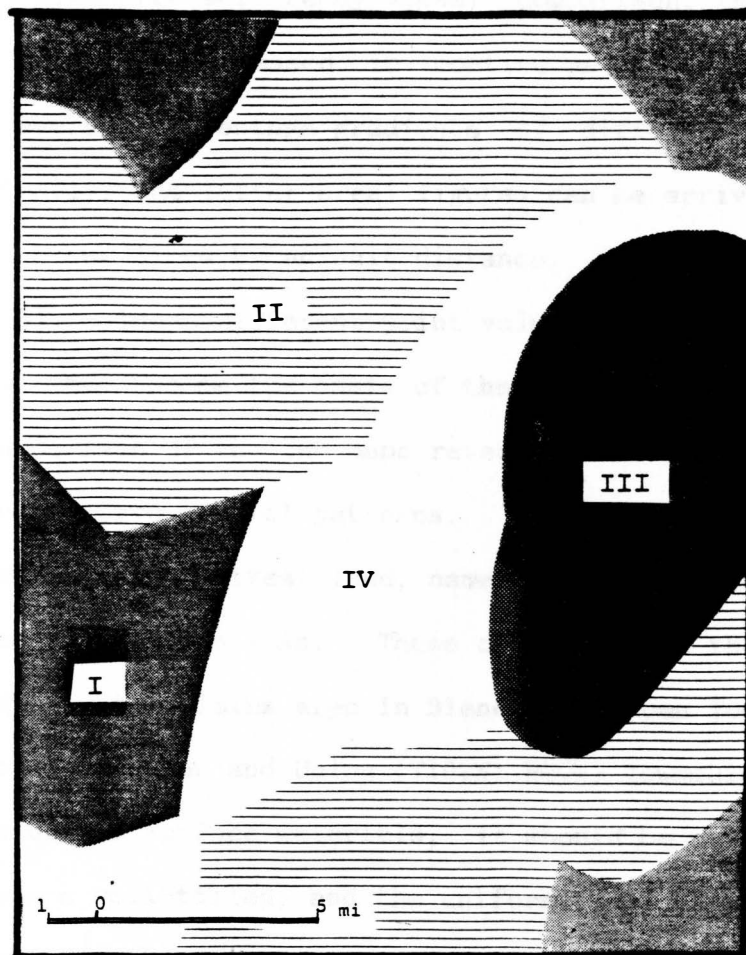
A simple cartographical method for the demarcation of homogeneous farming areas had been devised by Jones (66). In his related study of Midwestern agriculture, he was able to delineate four specially defined farming-type areas, namely, commercial livestock farming, commercial grain farming, livestock ranching, and dairying. Essentially, this method utilizes a series of isoline maps, each based on a carefully chosen criterion. Through superimposition of the map upon one another, and by observing appropriately the relative changes in the isoline gradient the different patterns can be segregated.

The weighing of different criteria varies in different cases. For the commercial farming type, for example, the percentage of

cultivated land to total land area should be weighed more heavily than the rest, and the same sense of judgment should be applied to the other cases (see App. V). Admittedly, this method contains many subjective and arbitrary elements. Specifically, this implies that such boundary lines were at best hazy ones, and they do not represent the sharp break of phenomenon to which they profess.

As the 1905 and 1915 State Censuses contain township agricultural data, it is possible to repeat the same exercise on the county, and the final result is now shown in Map 7. The criteria used presently remain the same as those in the previous study, while their combination characteristics in all four types differ due to the difference in the range of values between the present and the former studies. As a result of this, the particular farming areas in the present map have no exact correspondence with their counterparts in the previous one in the quantitative sense, in spite of their similar naming. Finally, it needs mentioning that these farming types are so named as to indicate their deviations from the area's norm to their patterns only in a relative, and not in any absolute sense. This leads to a further realization that these phenomena indeed deviate much less in a county area than do in a larger area such as the whole Middle West.

Explanation of the farming-type map will require its comparison with other areal sources, and the foremost among these concerns the physical landscape. Physically, the relative "roughness" of the land is especially important to the farming pattern because of its overall effects on both soil and machinery operation. Already, the nature of



I=Grain Farming
 II=Livestock
 Farming

III=Dairying
 IV=Livestock
 Ranching

MAP 7: FARMING-TYPE AREAS: 1905-1915

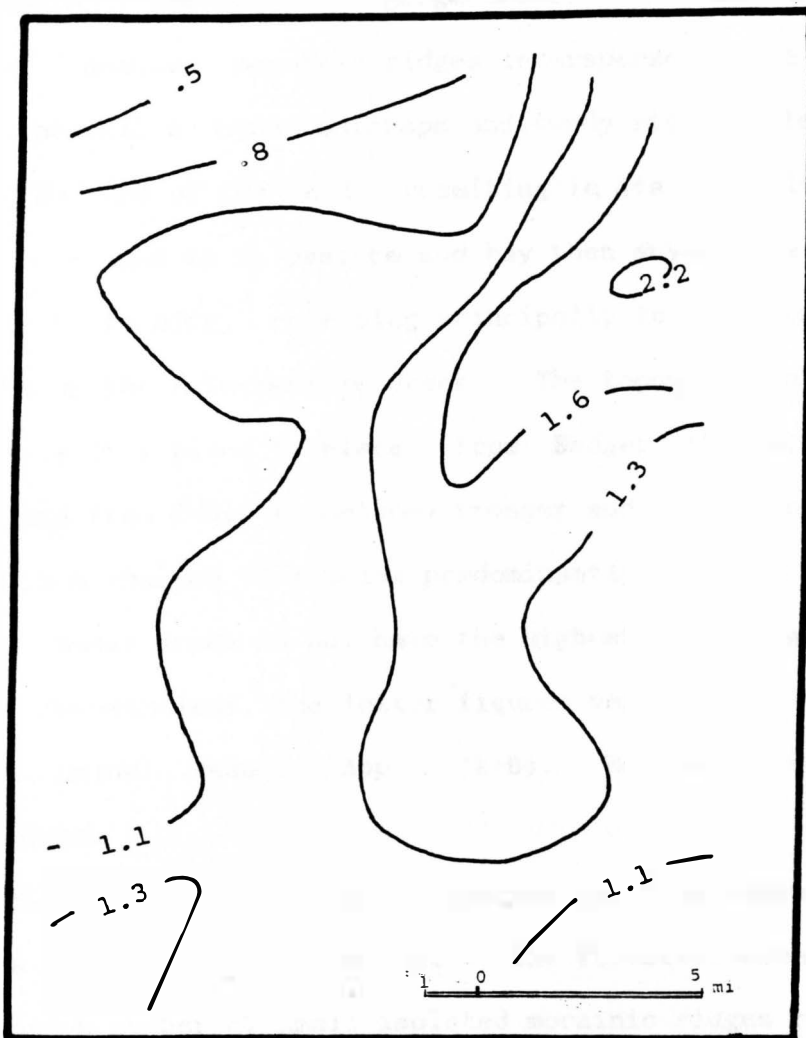
Sources:

Doane Robinson, compl., Second Census of the State of South Dakota: Taken in the Year 1905 (Aberdeen: New Printing Co., 1905); idem, Third Census of the State of South Dakota: Taken in the Year 1915 (Sioux Falls, Press of Mark D. Scott, 1915).

local terrain can be viewed from the basic contour map (Map 1), but for the purpose of a more precise, ready visual comparison, the local terrain should best be expressed in continuous point values representing the average percentage gradients of different locales (67). Methodologically, the latter areal figures can be arrived at by the counting of contour lines by an unit distance, and the use of a special formula (68). These different point values so obtained over the county area will then become the basis of the isoline map (Map 8).

A visual comparison of the two maps reveals an extremely strong conformity of the respective spatial patterns. Expectedly, the grain farming-type area covers the flattest land, namely, those places having the gradient values of 1.1% and less. These correspond to the delta area of Perry Township, the plains area in Blendon and Rome Townships, and the high flat area in Baker and Union (T102N; R60W) Townships. With reference to the nature of surface materials, it should be noted that most of these areas are well-tilled, and the uniformity of this pattern is interrupted only by the occurrence of narrow strips of ancient stream bed (App. VII). The general levelness of these areas lends itself to the suitability of more intensive cultivation. Among these four grain farming areas in the county, the one in the southwestern section, where the proportional wheat acreage is also the highest in the county (App. IX-C) stands out as the most typical one (69).

To the other extreme, the ranching-type area occupies only the roughest terrain in the county. From its center in Lisbon Township (T102N; R61W), it arcs narrowly northeastward to cross over the lower Firesteel Creek and covers the confluence of the James River with one



MAP 8: AVERAGE SLOPE IN PERCENT

Sources:

U.S., Department of Interior, Geological Survey, op. cit., Map 1; C.K. Wentworth, "A Simplified Method of Determining the Average Slope of Land Surface," American Journal of Science 20 (July 1930): 184-94.

of its distributaries. To the southwest, it fans itself off so as to conform its shape to the edge of a gorge there. In this farming-type area, heavily dissected morainic ridges interspersed with ancient stream beds, as well as stony outcrops and sandy river valley bottoms make up a good portion of the land, resulting in its high slope value. Consequently, more land is in pasture and hay than anywhere else.

Livestock farming, referring principally to hogs and cattle feeding, takes up the intermediate areas. The topographical features found herein vary from place to place. From Badger (T104N; R61W) to Mt. Vernon, and from Tobin to between Prosper and Rome Townships, the land surface has changed from being predominantly till to morainic. Interestingly, these areas do not have the highest percentage of their land in corn. Nevertheless, the latter figures vary only slightly over space and by actual amount (App. IX-B). No contradiction is, therefore, implied.

Likewise, different kinds of surface features appear in the dairying area. Here deep gorges cut by the Firesteel Creek and the James River, and a number of small isolated morainic ridges render some diversity to the general flatness of the landscape. The importance of dairying in this area is undoubtedly associated with the presence of the city of Mitchell and a north-south railroad line, and is little related to the area's topography.

Economically, land value also plays its role in the positioning of the local farming types. Although the State Censuses of 1905 and 1915 have no report on land value, it is possible to assume, for the moment, that land value decreases with increasing distance from the

central market, in a manner only to reiterate what is postulated in the economic theory of land rent. In the area most adjacent to urban center, land value is the highest. Here the farmer is forced to reduce the size of his holding while, at the same time, specializing in products and produces that will give him the highest economic return per unit of land. On the other hand, in the areas farther away, where land becomes less expensive, the farmer can afford to engage in a more extensive type of agriculture over a larger farm. In Von Thunen's locational model of agricultural activities, one will thus find concentric zones of agricultural types with decreasing intensity away from the urban center over a hypothetical homogeneous plain (70). By adaptation, the present farming types of dairying, livestock farming, grain farming and livestock ranching, in their right order, represent a decreasing scale of farming sophistication, and so the relative spacing among them should be in such a way as to be comparable to the above modelled pattern.

Following a line straight south from Mitchell, where the change in slope is gradual, the actual locational pattern had strong conformity with the hypothetical one as the dairing yields increasingly to the livestock farming, which, in turn, yields to the grain farming type. Yet, if this line is drawn northward, northwestward or southwestward across the county from the same point, the applicability of the locational model is no longer so evident as the change in slope becomes more abrupt and erratic along the way. The rough terrain in the central and northeastern sections of the county proves to be the most disruptive element precluding the ideal spatial pattern, so that

the ranching, instead of the livestock farming type, appears between the dairying and grain farming areas.

A further observation reveals that the ranching type area also coincides with the area of the latest settlement, and the suggestion is made that this particular farming type could be tied as much to the general primitive stage of areal development as to the particular topographical features. Particularly revealing is that the 1901 county atlas identifies a sheep ranch in sections 25, 35 and 36 of Beulah Township (T103N; R61W) with a person by the name of N. L. Davison, who would, in most likelihood, be an heir to the same pioneer individual who once ranged his cattle in the vicinity of the Firesteel Creek (71). This individual example may well be taken as a reflection of a general phenomenon in which the hard-core ranchers found themselves being cornered into this poorer area as the better land surrounding had, by now, largely gone into the hands of the regular farmers.

With a further lapse of time, even such a lingering trace of the ranching era would be erased from the scene. In fact, the census figures show that between 1905 and 1915 the acreage of farm land in Lisbon Township had increased from 11,324 to 19,838, a gain of 75%, to be compared with only 11.67% for the county in the same period. As for the acreage of plowed land, the gain is just as phenomenal, with the respective figures of 178% and 65% for the township and the county. Even without recourse to further census figures, it is still possible to believe that improvement in this area would continue at a similar greater rate for some length of time. The evidence, therefore, suggests that the ranching activity in this area was only transitional

before better use of the land was made, as though this was a repetition of the same process the county, as a whole, went through earlier.

On the other hand, the poorer quality of land and the smaller farm unit in the ranching-type area imposed a tight lid to its future growth. This area would likely remain distinguished from the rest of the county even after its land use adjustment was completed. On a first-come first-serve basis, those who arrived late found most of the better land was gone, so that the farming business became increasingly difficult to begin at the closing time of the frontier.

Representative land use patterns for the different farming-type areas are shown in Fig. 7. As a distinguishing feature from these diagrams, the absolute acreage in corn in all areas remains essentially equal regardless of the differences in farm size and other land use characteristics. For example, in the ranching and dairying areas, where the proportion of plowed land to the total is small, corn acreage is able to maintain itself through the shrinkage in wheat acreage. On the other hand, in areas specializing in grain farming, the overriding importance of the wheat crop cannot alter the fixed place for corn due to the already large proportion of land under the plough.

The various land use patterns shown in these diagrams basically reflect the particular nature of farming economies in the respective areas. The dairying and ranching areas, for example, have the greatest proportions of their farm land in hay and pasture.

With the exception of one area, farm sizes among the various farming areas differ in a way we expect. Large farms in grain farming areas, medium in the livestock farming areas, and small ones in

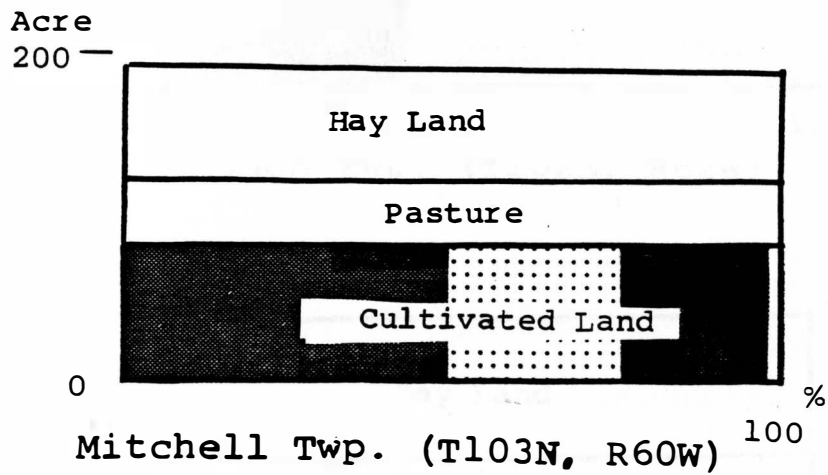
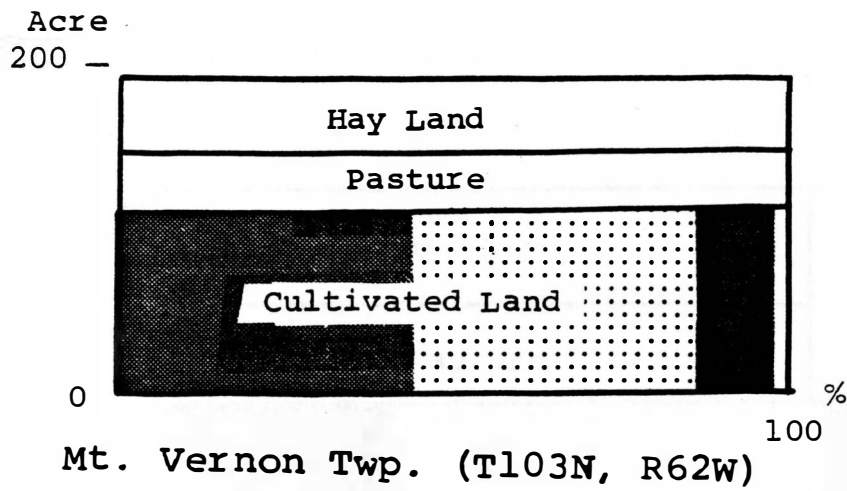


FIG. 7: AGRICULTURAL LAND USE

Sources: Doane Robinson, op. cit., Map 7

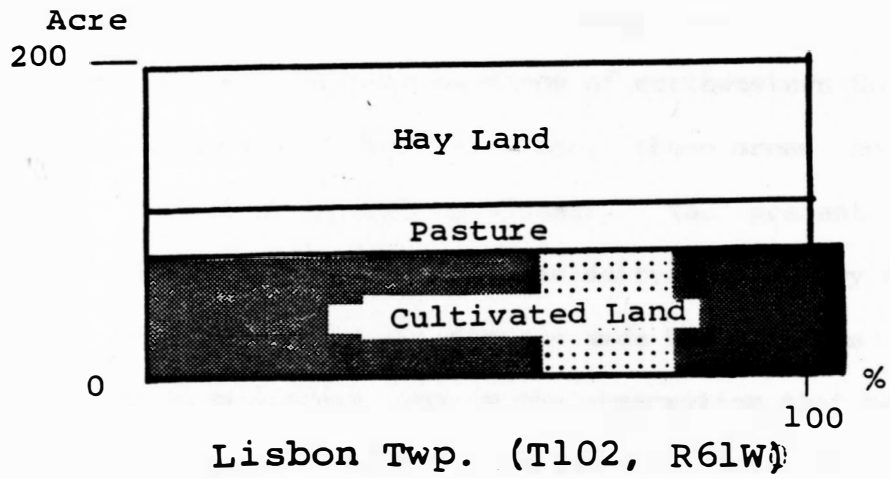
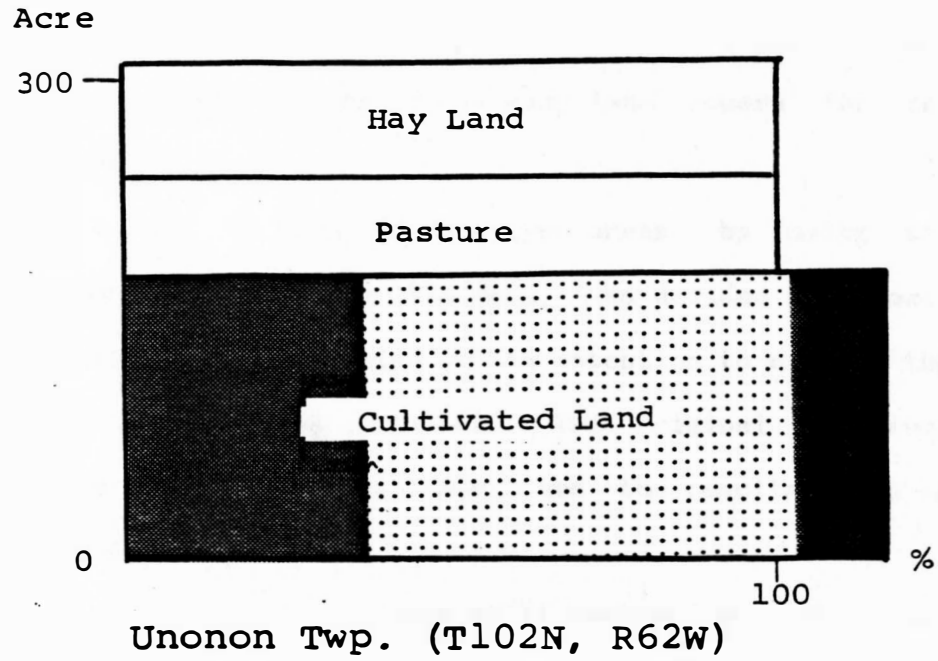


FIG. 7: AGRICULTURAL LAND USE
(Cont'd).

the dairying area merely reflect the gradation in the intensity of agricultural land use. The smallest farms found in the ranching area, however, are a contradiction to the economic principle. This abnormality is due to the competition of many late comers for the already limited space.

The present map of local farming-type areas, by using the running means between the 1905 and 1915 data, was decided upon only after further reflection, and is based on the intention to offset the temporal fluctuation of the data values. The original decision, however, was to use the 1905 figures alone, and the resultant map is now presented in Appendix X.

In 1905, the dairying area was still centered at Lisbon and western Prosper Townships. The highest milk production area, itself being the principal criterion behind this farming area, is actually much larger to the south and includes portions of northwestern Rome and northeastern Tobin Townships. Taken together, these areas coincide with the area of the densest Swedish settlement. The present areal association between the Swedish population and dairying industry merely helps in adding support to similar opinions made by numerous other writers. The present significance lies in the observation that between 1905 and 1915 the dairying area migrated eastward to cover the city of Mitchell and became elongated along the railroad line. The result, therefore, serves to illustrate that even in these closing dates of the frontier, the continuous transference of influence from cultural tradition to economic function on an agricultural activity was still in force.

Endnotes

(42) Oral History, Roll 876, University of South Dakota, Vermillion, South Dakota, audiotape.

(43) See, for example, Davison County, South Dakota, Tax List, 1885, Davison County (1885), passim.

(44) A geographic study of land alienation process had been made by Salonen on Brookings County. See, Debra R. Salonen, "Taking Hold: A Study of Land Acquisition, Land Ownership, and Community Development in Northeast Brookings County (1870-1916)" (M.S. Thesis, South Dakota State University, 1977). A mathematical model of rural settlement in Sanborn County had been attempted by Hudson, with special emphases on the rate and method of land acquisition. See, also John C. Hudson, op. cit., passim.

(45) Hudson, ibid., p. 446.

(46) Allis P. McCoy, Dakota Homestead (Chicago: Adam Press, 1974), passim.

(47) See, for example, Bogue, op. cit., pp. 236-8.

(48) The reason for this inconvenient arrangement is because the size of the native born population was then several times of that of the foreign one.

(49) Frank E. Peterson, compl., Twentieth Century Atlas of Davison County, South Dakota (Vermillion, South Dakota: By Frank E. Peterson, 1901), plat map of Prosper Township.

(50) Schell, op. cit., p. 244.

(51) Bogue, op. cit., p. 238.

(52) For the geographical origin of the Corn Belt and its early settlement condition, see, J. E. Spencer & R. R. Horvath, "How Does an Agricultural Region Originate?" Annals, Association of American Geographers 53 (Sept. 1963), pp. 74-92; also, Carl O. Sauer, "Homestead and Community on the Middle Border," in Land and Life: A Selection from the writings of Carl Ortwin Sauer, ed. John Leighly (Berkeley: University of California Press, 1963), pp. 32-41.

(53) Doane Robinson, compl., Second Census of the State of South Dakota: Taken in the Year 1905 (Aberdeen, South Dakota: News Printing Co., 1905), p. 16.

(54) Shannon, loc. cit.

(55) The South Dakota Historical Survey, Division of Community Service Programs, South Dakota Work Project Administration, Guild to Public Vital Statistics Records in South Dakota (Mitchell, South Dakota: The South Dakota Historical Record Survey, 1942), p. 11 and 18.

(56) Robinson, op. cit., pp. 13-5.

(57) The phenomenon of urbanism at the turn of the century and its functional analogy of the land frontier have been examined by Elazar. See, Daniel J. Elazar, Cities of the Prairie: The Metropolitan Frontier and American Politics (London: Basic Books, 1970), part I.

(58) If she was married to a young farmer, the chance is that they would start out somewhere else, as the land frontier had not totally disappeared then. On the other hand, one should also realize that women were increasingly involved in the labor force, especially in service industries, at the onset of this industrial age. And, this often leads to geographical mobility. Mrs. Althen, for example, was educated at the University of Chicago, and subsequently taught schools at the various cities of Aberdeen, Rapid City and Spearfish. See, Oral History, Roll 876, loc. cit.

(59) Conzen, op. cit., footnote 5, pp. 126-31.

(60) Maisie Conrat and Richard Conrat, The American Farm: A Photographic History (Boston: Houghton Mufflin, 1977), p. 7.

(61) The county assessed farm value had been lowered for several reasons. First of all, it concerns the land property only, whereas farm value in the censuses includes also the values of buildings and fencing. Nevertheless, the difference in the respective farm values caused by the addition of these two items is minor, as this can be figured out from later censuses that began to list them separately. Seemingly, the major source of the discrepancy lies in the fact that the county figures represent only a certain percentage of the current market price of the same land, as this is the way the assessment is being done contemporarily.

Given that the same percentage standard had been used by the county assessor consistently throughout the years, and further assuming that the individual when reporting his farm value to the census taker possessed the same knowledge of the market price, the two kinds of figures can, therefore, be compared with each other.

(62) Oral History, op. cit., Roll 878.

(63) Conzen, op. cit., p. 141.

(64) U.S., Department of Agriculture, Soil Conservation Survey, op. cit., p. 2.

(65) Facts concerning the county's contemporary agriculture are contained in, South Dakota Crop and Livestock Reporting Service, Davison County: Agriculture (Sioux Falls: South Dakota Crop and Livestock Reporting Service, n.d.), particularly p. 15.

(66) Wellington D. Jones, "Ratio and Isopleth Maps in Regional Investigation of Agricultural Land Occupance," Annals, Association of American Geographers 20 (Dec. 1930), pp. 177-95.

(67) Special credit is due to Gibson for the origination of this idea. See, Lyle E. Gibson, "Characteristics of a Regional Margin of the Corn and Dairying Belt," Annals, Association of American Geographers 38 (Dec. 1948), pp. 244-70.

(68) For details of the method and special procedures involved, consult Appendix VIII.

(69) The present areal correlation between this high flat area with wheat farming is no pure coincidence. Early corn planters who ventured into the prairie regarded the uplands as being inferior land and sought valley bottom land instead. Perception changed slowly but certainly, and soon local lore might have it that "On the upland where the white oaks grew was a pure wheat soil, that supporting yellow and red oaks differed somewhat, and where the bur oaks and hazels grew was 'perhaps the richest soil.'..." See, Bogue, op. cit., p. 124 for the quote; also, Martyn Bowden "Desert Wheat Belt, Plains Corn Belt," in, Images of the Plains, Brian Blouet & Merlin Lawson, eds., (Lincoln: University of Nebraska Press, 1975), pp. 189-98, for the historical change in perception.

(70) For Von Thunen's original dissertation, see, Johann Heinrich Von Thunen, Von Thunen's Isolated State: An English Edition of Der Isolierte Staat, trans. Carla M. Wartenberg, ed. with an introduction by Peter Hall (Frankfurt: Pergamon Press, 1966). Further exposition of the same treatise, with special emphases on the distinction between the industry and firm levels of agricultural activities and its various implications on the discrepancies in the locational phenomenon, is found in Edgar S. Dunn, Jr., The Location of Agricultural Production (Gainesville: University of Florida Press, 1954), particularly pp. 44-55.

(71) See text, page 21.

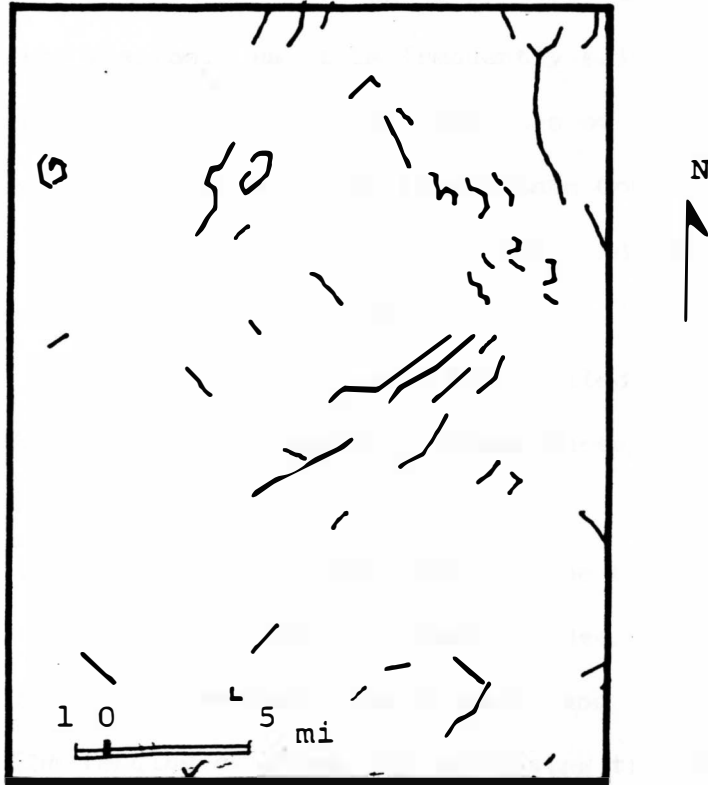
Chapter VI: Institutions

By the time most Midwestern states were developing their manufacturing bases, the Great Plains settlement had just commenced. Regional differences in economic function were immediately apparent as the eastern Plains became primarily a staple-producing region, whereas the final marketing of its produce and its general supplies had to be relied on the activities of big firms located far to the east. Terminal agricultural markets and big wholesale houses were then concentrated in the few cities of Chicago, Duluth and Minneapolis; thus, the new farm land of Dakota simply became a new tributary area to these eastern cities. The regular farmer, however, had no direct dealing with these eastern enterpreneurs. Rather, most of his transactions were done locally through the elevator man, banker and store owner, who functioned essentially as a mediator between the two.

Local Transportation

Locally, commodity movement was mainly from farms to towns, with the wagon being the main mode of transportation. Grain was stacked in sacks in the wagon carts, only to be carried to a nearby elevator. Livestock was driven in herds to local stockyards for shipping.

The earliest transportation routes were essentially footpaths developed along line of least physical resistance. With increasing usage, many of these paths were later widened into trails that were capable of accommodating wagon traffic. At one time, quite an extensive network of trails had existed within the county (Map 9).



MAP 9: LOCAL TRAILS, 1901

Source: Frank E. Peterson, Twentieth Century Atlas of Davison County, South Dakota (Vermillion, South Dakota: By the author, 1901).

Besides the historical mail route along the James River, others, like a particular one mentioned as running north-west from Ethan Village to Chameny Creamery in Prosper Township, were known by local inhabitants (72). Travel in the rainy seasons, as it is frequently said, was a nuisance upon these trails. Yet, the actual condition of these dirt roads was not as poor as claimed. A mail carrier in Lake County once commented that he still preferred the old prairie roads, adding that they were the best except where gravel was being used. Ironically, when gravel was laid, black dirt and clay were found piled up year after year on top of the road so that the road became worse than the original (73).

The indication is that up to at least 1886, these old trails were still in wide use (74). Increasingly, they yielded to a new network of access roads that ran essentially north-south and east-west along section lines. The fencing of farms and increasing tillage of fields undoubtedly uprooted some of the old trails. Yet, the county atlas of 1901 still shows remnants of them with some interesting patterns. Sometimes a trail is found running diagonally across a full section, terminating abruptly at the junction with the next access road. Conversely, the full length of an access road would be found discontinued in places, to be rejoined with both ends by a short, winding trail, especially where breaks in physical features are apparent. Taken together, these intermittent trails exhibit two most discernible patterns to the northwest and southwest of the city of Mitchell. Whatever their historical origins, there seems to be little doubt that their continuous usage of them by the herdsmen for the

driving of their herds helped their preservation.

Much of the work done on local roads was entrusted to local supervisors (members of village or township boards) who represented different road districts into which the township was conveniently divided (75). Before 1907, a state political code directed these supervisors to "assign" workmen and "warn" them to work (76). The looseness of these terms suggests the voluntary basis upon which most of the roadwork was then undertaken. As long as the roadwork was within the township, it would be regarded as a local problem, to be resolved among the board members and their constituents in some clannish way. Administrative problems developed only when a road lay along the township boundary. In this case, a common method was to divide the responsibility between the two township authorities for every one-and-a-half mile roadway (77).

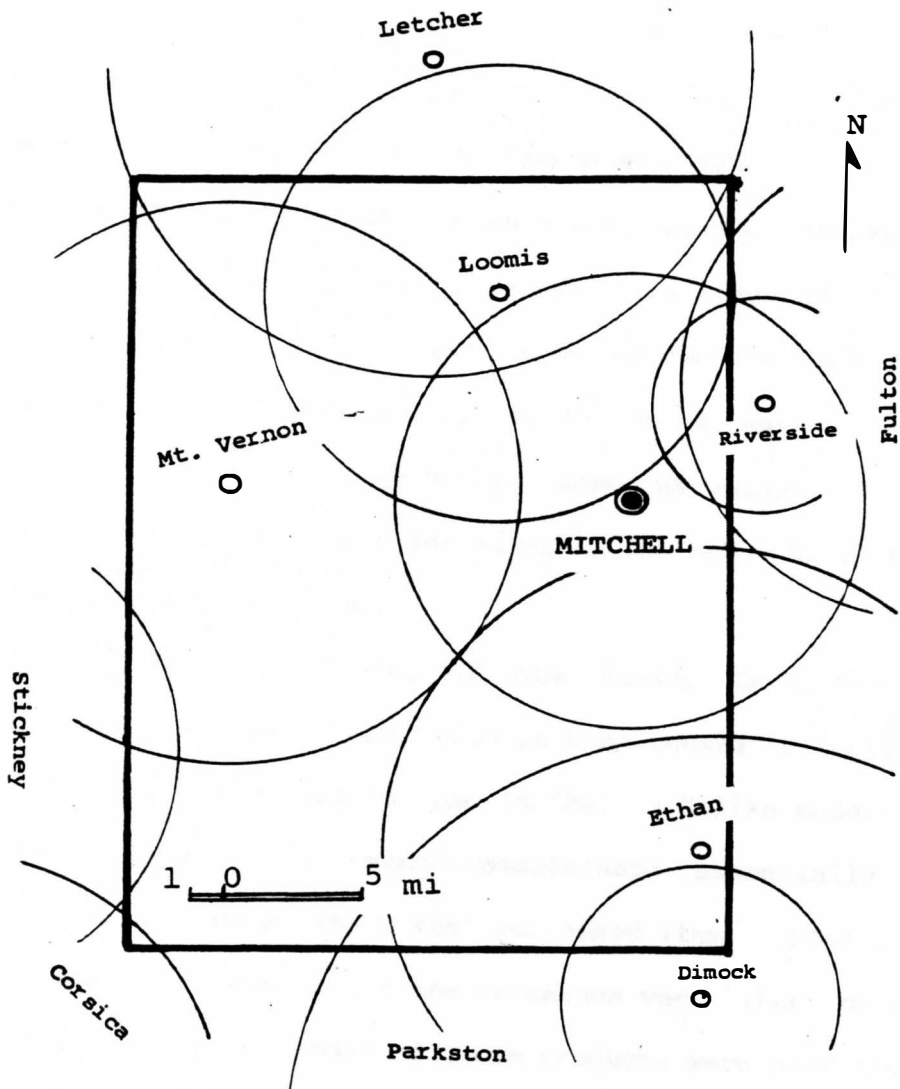
Marketing Facilities

In 1887 there were five grain elevators in the county with a combined storage capacity of 47,000 bushels. By 1911 these structures had increased to 17, including five in Loomis, a new railroad town erected since 1887. Together, these elevators could hold 350,000 bushels of grain (78). Grain stored in these elevators was shipped by rail to terminal facilities in Chicago and Duluth, or to millers in Minneapolis.

Originally, grain had to be marketed through the depot agents, but an elevator normally appeared a few months after the railroad arrived. Chain elevator companies usually operated by out-of-state

interests came in vogue early. As early as in 1887, the Bassett and Hunting Company already owned four out of five elevators in the county; the remaining facility was a private elevator operated by the Farmers' Alliance (79). These chain elevators did, in fact, monopolize the local grain trade, and their interests were tightly guarded by the railroad companies. Farmers who desired to ship grain on their own were usually denied use of the cars. Other abuses include unfair methods of grading through which the chain companies could easily rob four or five cents out of every bushel of grain the farmers brought to the market (80).

A storage capacity of 30,000 bushels serving one or two townships' area was held to be the minimum facility in most farming areas in the Plains (81). With reference to the latter scale, most of the county's area was well served in 1911, except only for an extremely "inland" area around Baker Township (Map 10). The medium-size towns of Mt. Vernon, Letcher and Ethan provided the largest service areas, showing their characteristically agricultural function. On the other hand, the city of Mitchell had only a small share in the local grain trade, as did the small-size towns of Loomis, Riverside and Dimock. Although the grain service areas provided by the medium-size towns show some regularity of spacing, the formation of central-place pattern is out of the question. The facilities were provided where the towns were located; the latter locations in turn were affected by the railroad alignment. Consequently, some farmers had to haul their grain for a long distance while others had several places to choose from within a short radius around them.



MAP 10: GRAIN MARKET AREAS, 1911

Source: Board of Railroad Commissioners, Annual Report, Board of Railroad Commissioners, South Dakota, 1911 (Pierre, South Dakota: Hipple Printing Company, 1911).

The shipping and marketing of livestock was done through local stockyards, which were frequently owned by the more prominent citizens of the local areas. C. L. Drake, owner of Ethan Stockyard, also served as the chairman of the first Ethan Village Board (82). A stockyard commonly employed different buyers for hogs and cattle, respectively, as the handling of these two kinds of commodities required different expertises. In addition, a third man was hired for the caring of the herds inside the yard. Although most of the stock was shipped to Chicago or Sioux City for slaughtering, some was shipped to other destinations as well. At one time for example, the Ethan Stockyard had contracts with buyers from Oregon.

Local packing houses also did some buying from the local farmers. By 1886, Mitchell had three packing houses in operation, while three others were planning to come in (83). Unlike modern meat packing plants, these early establishments were essentially local butcher shops with hogs being their most purchased item. Most killing of hogs was done in December, and the carcasses were then processed into pork, sausage and lard. Most of these products were sold locally, though some would be shipped out, usually as restaurant supplies, to eastern cities.

The dairying industry had an early beginning in Davison County. The establishment of H. T. Larson Creamery predated the coming of the railroad. Within a short time, at least three more dairying plants were established in Rome, Tobin and Prosper Townships.

Most of these early cheese factories and creameries in the county failed due to insufficient patronage. For a creamery to be run

economically, at least 1,000 cows were needed (84). Yet, most plants were run on a lesser basis. For example, an 1886 issue of Weekly Republican reported that a certain party stood ready to erect a creamery in Mitchell, if only it could be assured of the products from 600 cows (85). This report also suggests contractual basis upon which most of these private establishments ran their business. In fact, farmers were paid for their milk annually, rather than periodically, an arrangement that would be found to be disadvantageous to the farmer's benefit.

The stabilization of the dairying industry came with the adoption of the cooperative system of ownership. The Mount Vernon Cooperative Creamery was boosted as a great success since its inception in 1896 (86). A cooperative was organized usually by the largest farmer of the locality, while shares were taken by other patron farmers in proportion to cows owned by each. A few cents were charged to the farmer per pound of cheese and butter for their processing, selling and delivering, as well as for the maintenance of the plant. An Illinois example reveals that by the cooperative plan, the farmer could be paid one-fifth more than he could by a private company (87).

Skimming stations emerged side by side with the cooperative movement. An old county resident can still recall the spreading of the such stations between the year 1896 and 1897 (88). Up to that date, the so-called milk-gathering plan prevailed. By this plan, the farmers skimmed their milk on farms, while the cream was collected by company teams that drove their buggies from farm to farm. With the installation of the new facilities, farmers carried their milk to the

station, which served an area of 15 to 20 mile radius. Skimmed milk was fed to livestock, while the cream would be carried by the company employees back to the central factory for processing into butter.

Hierarchy of Urban Functions

Besides such basic institutions as elevators and stockyards, an even greater variety of merchantile and professional establishments appeared early in most Plains towns. Above all, specialization in retailing and other service industries had become an accepted way of business before settlement spread to the Plains. Consequently, early Plains farmers could, from the beginning, enjoy a greater variety of goods and services than were available in previous frontier communities. Spatially, the distribution among different kinds of businesses and their distance and hierarchical relationships make a popular topic in urban geography, and numerous theories and classification schemes have been developed to explain these phenomenon. Presently, only some cursory exploration along this line is possible with the materials at hand.

Of all urban and village places in the county, it is easy to recognize three different orders in terms of both size and function. In the lowest order are the so-called "inland towns", i.e., towns that were located well beyond the reach of any railroad (89). Essentially, these local hamlets originated as either ethnic or neighborhood communities, consisting of, at most, a church, a store, a post office and occasionally an elevator or a creamery. At a time when visits to towns were infrequent, these community centers had specific function

which were only antiquated with the coming of the automobile. Hillside, for example, originated as a German community, which in its hayday, housed a church, post office, store, and grain elevator. Today, the church is all that remains (90). The villages of Emsley, Worthen, Baker Center and Victor experienced similar decline.

In towns belonging to the second order, in addition to those features characteristic of hamlets one would find, at least, a hardware store, stockyard, hotel, drug store, lumber yard, bank and a law office (91). Towns of this size each had a population of several hundred, with a patronage area of a few townships. Served by a single track of rail, these towns were the most common over the Plains country, and were distinguished by their strong agricultural roles. The towns of Ethan, Mount Vernon and, to a lesser extent, Loomis, are of this class.

The city of Mitchell stands highest in the urban hierarchy within the county. Served by more than one railroad track, the city had already boasted of more than 200 business firms by 1884, including a number of men's clothing stores, machine shops, dentists, tailors and studios (92). The location of the U.S. Land Office there in 1880 came as a boom to the city's initial commercial growth, and helped the creation of a regional patronage for the city's businesses. From the beginning, a sense of metropolitanism had prevailed over its agricultural role.

Thus, local hamlets, established both before and after the railroad, were low-order central places whose functional characteristics were more social than commercial. Among the railroad towns, the most meaningful functional distinction can be drawn between

those that were served by one as opposed to more than one rail line, respectively. The former functioned essentially as staple-collection centers, as being evident in their greater number of grain storage facilities (Map 10). Other services in these towns, such as those of a bank, a law office and a hardware store likewise have a clear agricultural orientation. Cities that had rail accesses to more than one direction specialized early in government, speciality shopping and distribution functions.

The railroad and its planners determined both the spacing and alignment of urban facilities, as most towns were platted every eight or ten miles along the right-of-way. Where a junction was located, there was the certainty that the town would acquire some higher functions. Paradoxically, local hamlets with a very few basic functions to perform once existed for the opposite reason of not being served by any rail.

Endnotes

- (72) Leon W. Jenks, Ethan Centennial, July 1, 2, 3, 1983: 100 Years Old (n.p.: (Ethan Centennial), (1983)), p. 5.
- (73) Rural Mail Carrier, "Good Roads," Dakota Farmer, March 1, 1907, p. 16.
- (74) Ibid.
- (75) Atty. I. O. Curtis, "Regulation of Road Districts," Dakota Farmer, March 1, 1907, p. 48.
- (76) Board of Railroad Commissioners, Railroad Commissioners' Report, 1887 (Bismark, Dakota: Tribune Printer and Binder, 1887), pp. 187-9.
- (77) Davison County, South Dakota, Road and Bridge Record, No. 1. Davison County (n.d.), passim.
- (78) Board of Railroad Commissioners, op. cit., idem, Annual Report, Board of Railroad Commissioners, South Dakota, 1911 (Pierre, South Dakota: Hipple Printing Company, 1911), pp. 275-91.
- (79) Board of Railroad Commissioners, loc., cit.
- (80) Cleworth, op. cit., pp. 136-7.
- (81) See, P. Kelly, "Why a Union Elevator Should be Built," Dakota Farmer, June, 1886, pp. 14-5; John C. Hudson, "The Plains Country Towns," in The Great Plains: Environment and Culture, Brian W. Blouet and Frederick C. Luebke, eds., (Lincoln: University of Nebraska Press, 1979), p. 109.
- (82) Jenks, op. cit., p. 5.
- (83) "New Packing House," The Mitchell Weekly and Weekly Republican, vol. 7, no. 18 (page number uncertain).
- (84) Herbert S. Schell, South Dakota Manufacturing to 1900, Bulletin Number 40 (Vermillion, South Dakota: Business Research Bureau, School of Business Administration, University of South Dakota, 1955), p. 33.
- (85) "Creameries," The Mitchell Weekly and Weekly Republican, 26 March 1886, vol. 7, no. 29 (page number uncertain), microfilm.
- (86) Hon. F. D. Power, op. cit., p. 47.
- (87) James E. Coombs, "Co-Operative Creameries," The Dakota Farmer, June 1885, p. 6.

(88) Oral History, Roll No. 888, op. cit.

(89) Hudson, op. cit., pp. 112-3.

(90) Marvine Schrader Wiseman, Dakota Dateline, 1881-1981: The Story of Mount Vernon, South Dakota (Stickney, South Dakota: Argus Printers for Mount Vernon Historical Committee, 1981), p. 86.

(91) Ibid, passim.

(92) The Mitchell Centennial History Committee, Mitchell Re-Discovered: A Centennial History, 1981 (Mitchell, South Dakota: Mcleod's Printing & Office Supply, 1981), passim.

Chapter VII: Summary and Conclusion

Located in the south-central portion of the eastern part of South Dakota, Davison County occupies an area that belongs to the western corn-belt fringe. In this subhumid region along the eastern edge of the Plains, periodic droughts were historically common and had long discouraged any European settlement. Besides the uncertainty of rainfall, other physical aspects of the county posed little obstacle against the prospect of agricultural development. Local soils have developed through millennia from glacial till materials and possess various qualities. All of them are suited to agriculture.

Population movement into Dakota came in three major thrusts, each time affecting the county area on a different scale. The earliest settlers came before the arrival of the railroad. Prior to 1880, a small number of pioneers clustered around the village of Firesteel which they had founded, and appeared to be more interested in promoting the town than in cultivating their lands. In the next stage, settlers arrived by thousands, attracted by the coming of the railroad. In the next 20 years time, the more level lands on the low plains and highland had become increasingly settled. The eroded area in the central portion of the county, on the other hand, remained in an underdeveloped condition till the last land boom after 1900.

Agricultural development had an early beginning. The Preemption and the Homestead laws reduced a period of legal uncertainty with regard to land holding. The ready access to external markets further led to the early commercialization of agriculture.

The county's agricultural pattern evolved through three

stages: an initial stage of corn-hog combination; a second stage of livestock diversification and a final stage of agricultural regionalization. Similar sequences of change can be found in some adjoining eastern areas in the past, but a period of subsistence farming, which is said to have preceded the regular frontier phase in the east, is here replaced by a period of ranching.

Over time, change in farm size corresponds to changes in cropping and livestock emphases; the manner shows that the basic principles of farm management were at work. The regional economic atmosphere also affected changes in the agricultural scene. Periods of boom and depression were well expressed in the time curve of farm value. The depression of the 1890's, in particular, brought about the phenomena of farm consolidation and livestock diversification.

In the pioneer environment, both the geographical and historical conditions of farming were renewed, and the new farmer's ability to adjust themselves due to such change became the key of his survival. The lower yields of crops in this semi-arid area necessitated the need for larger farms. This ecological adjustment of farm size was most visible during the droughts of the 1890's. During this time, the average farm size of the county had jumped from some 220 to 320 acres.

With the increment of individual land holding, more work had to be done by machinery. Thus, the value of farm implement and machinery stands out as the most important factor in the new farming scene. The fact that the more successful farmers in the county were more likely to start with larger and better farms adds further support to this historical trend toward increasing scale of farming.

Early human elements present in the county had much commonality with those found in other frontier societies. Pioneering was undertaken overwhelmingly by men between 20 and 35 years of age, whereas the female and senior components of the population were under-represented. This initial sex-and-age imbalance, over time, tended to correct itself. In the beginning, the size of family had great functional importance, as the larger families tended to have more to contribute to the area's economic development and stability.

The examination of production patterns among the various cultural groups reveals many familiar images we may have about their special skills and non-skills. The respective emphases on livestock, dairying and corn-hog combination by the eastern, European and midwestern farmers, by and large, reflect old traditions of farming that members of these groups had acquired from their previous home environments. The large number of cattle owned by the English and Scots, and the relatively poor performances of the Irish and the Upper-Great-Lake-state farmers, on the other hand, tend to indicate more their differences in economic status than their particular heritages. The Germans, unlike other groups, did equally well in all items. This fact seems to reveal that the Germans' farming experience was indeed superior.

The economic recession of the 1890's, besides upsetting the local agricultural scene, also caused depopulation on the local scale. Demographic evidence further suggests that out-migration during this period tended to affect the less economically active, such as the younger female, more than any other segment of the population.

Through time, the foreign-born, Midwesterners, the larger-scale farmers and those with bigger families were more likely to survive in this new environment. The steady increase in value of the persister's farms contrasts sharply with the wild fluctuation in the value of the average farmer's land during the entire period. This contrast could indeed indicate the consistency with which the persisters had contributed to the economic betterment of the area.

Locationally, the initial fragmented land holding yielded increasingly to a cluster pattern at the end of the depression period. The common effort on the part of the persisters to acquire a few good sites left vacant during the time of the depression, gave rise to this cluster pattern.

At any rate, areal patterns of local agriculture became consolidated soon after 1900, whereas up to that date, the relative proportions of various agricultural items produced each year had remained unstablized. The spacing of local farming-type areas was influenced by the physical factors, the land value and the pace of settlement. Thus, the grain farming areas occupy the flattest and the highest land, whereas the dairying area, the most expensive land. The livestock farming areas lie in areas possessing a diversity of terrainic feature. The ranching area is found in the central portion of the county where the terrain is the roughest. Hence, this latter area became the last part of the county to be settled, making this the frontier within the frontier.

From the beginning, urban development went in a different way to the rural. The depression of the 1890's, which stunted the growth

of rural population, had none of the same effect on urban places.

Apart from a few inland towns, the locations of towns and cities and their hierarchical relationship in the county were dictated from the onset by the routes of rail communication. Towns that were served by one rail specialized early in agriculturally related activities. The city of Mitchell had rail access in more than one direction, and this locational advantage enabled the city to acquire the higher functions of government, distribution and various types of speciality shopping. Villages that were located well beyond the reach of the railroad had only a few neighborhood functions to perform, but even these lower order services quickly became antiquated.

How relevant is the evolutionist view in the interpretation of the area's 30 years of agricultural and economic changes? Agricultural production, over time, does show patterns of growth, differentiation and adaptation. Nevertheless, if the focus is on the linkage between the agricultural and the industrial and service sectors, such a theoretical viewpoint becomes out of place. Local economic institutions existed because the merchants and the industrialists wanted them to be there; they did not come as direct responses to the local demands of the time. From the merchants' point of view, the railroad towns contributed a frontier of its own in which they could try their special trades and skills. Whether it be the banker who was willing to sell loans on easy terms, or the creamery owner who was ready to install a new plant without sufficient patronage, the phenomena tend to exemplify a spirit of speculation based on hopes and fancies concerning a new market which they still had to uncover. Moreover, the hierarchical

relationship among all businesses and services was in place all at once from the beginning. Time might see the addition of more establishments of the same or different functions. These later inceptions, nonetheless, failed to cause any significant break from the original pattern.

The inadequacy of the census sources was a great handicap to the investigation of the persistence theme. Although this study was able to disclose a different set of social and economic characteristics for the persisters, a similar contrast between them and the general population is not possible in the matter of farm production patterns. This failure unintentionally presents a misleading notion that agricultural success relies only on one's own social and economic statuses, whereas in truth, it owes as much to the farmers' inventiveness and flexibility.

The phenomenon of persistence moreover, cannot be adequately dealt with by the method of group comparison alone. The main emphasis is on those who stay. Since the quitters are discovered to be a greater group than the persisters, the human scene was, in reality, more mobile than presently described in this study. As is commonly known, most migrant farmers had changed residence several times before they finally decided on a place to stay permanently; thus, the county was then more likely one of those stopping places than a final destination. If investigations are carried on along this line, we can perhaps better understand the different causes between persistence and movement. In fact, with information available from the local genealogical societies (93), along with the original manuscript census

data, the reconstructions of the migrants' characteristics and their migration routes are highly feasible.

The temporal change in the importance from the cultural to the economic factor in influencing agricultural activities and settlement is an idea that has become fairly well-grounded based on previous case studies. This transformation process is presently taken as the underlying theme of the whole study but is, unfortunately, without substantial development. Cultural solidarity in the earliest date of settlement is believed to be greatest because new knowledge acquired through interaction with the local environment was not yet powerful enough to affect the settlers' behavior and pattern. Rather than risking uncertainties, pioneer farmers stuck to their own culturally inherited methods. Hence, the original set of population, when grouped by ethnic origins, reveals meaningful cultural contrasts in the facts of farm production. As an assumption, when the potential of the land became fully realized, the regular farmer would alter his farming strategy through a recombination of farm size, cropping and feeding pattern in such a way as to enable him to make the greatest profit from his land. In fact, the end of the frontier phase saw strong sets of areal correlation between the local farming types on the one hand and the physical landscape and economic land-rent principle on the other. The details of such cultural and economic changes, regrettably, cannot be further dissected due to the existence of a data gap. Thus, such viable questions as the extent to which early cultural identity became blurred under increasing economic influences, and the relative rate at which each cultural group had proceeded with such changes, remain

unanswered.

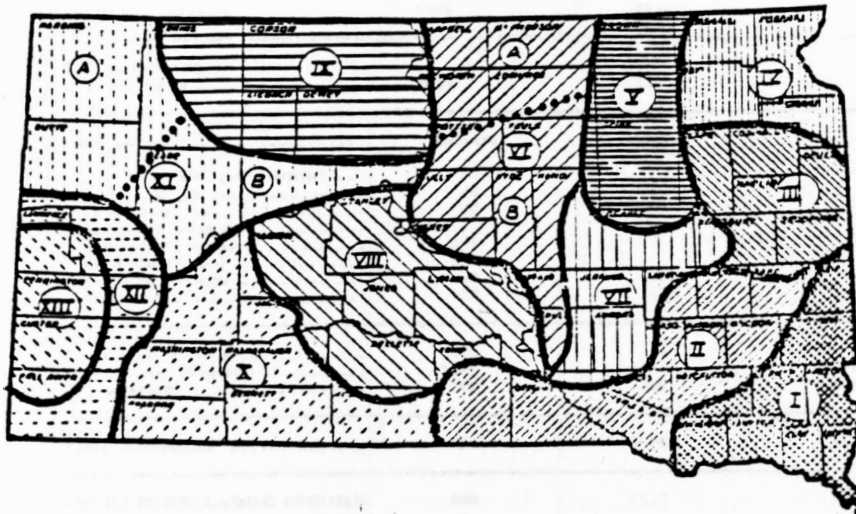
At last, it seems that the success of an area case study of this sort is determined by the amount and kinds of data available. The theory of social change and model of developmental growth provide the framework and direction for study but should not block our vision. Perhaps the lesson in historical geography is for us to be able to appreciate the complexity of human phenomena in place and time. During this particular exercise, one cannot help but raise many related questions, and this concluding chapter has already listed a number of them. It is hoped that these questions would contain clues to fresh approaches to future area researchers.

Endnote

(93) Local genealogical society, like Sioux Valley Genealogical Society, are able to answer queries pertaining to the pioneer's date and place of birth and his various places of residence. See, Pioneer Path Finder, Vol. 11, no. 1, by Hazel Hansen, editor (Lennox, South Dakota = Verlyss V. Jacobson for Sioux Valley Genealogical Society, 1985), passim.

APPENDIX I:
TYPE-OF-FARMING AREAS IN SOUTH DAKOTA

TYPES OF FARMING MAP - SOUTH DAKOTA.



APPENDIX II:

PROFITABLE FARMING SYSTEM IN EASTERN SOUTH DAKOTA

Table 33 (Cont.)—COMPARISON OF AN ACTUAL SYSTEM WITH TWO SUGGESTED SYSTEMS FOR 160-ACRE FARMS

	System No. 1 An Actual Farm in Kingsbury County		Suggested			
			System No. 2 Corn and Hogs		System No. 3 Hogs and Dairying	
Livestock Sales—	Amount	Dollars	Amount	Dollars	Amount	Dollars
Pork.....	10000 lbs	800	23000 lbs	1840	15000 lbs.	1200
Cows.....	---	---	1 head	40	4 head	160
Butterfat.....	1000 lbs.	400	700 lbs.	280	5000 lbs.	2000
Young cattle.....	4 head	135	3 veal	36	15 head	180
Poultry.....	370 lbs.	55	800 lbs.	120	400 lbs.	60
Eggs.....	490 dozen	92	1000 dozen	230	500 dozen	115
Total Livestock Sales.....		1482		2546		3715
Total Crop and Livestock Sales.....		2826		3201		3715
Cash Expense.....		Dollars		Dollars		Dollars
Labor @ \$50 per month*.....		75		100		600
Twine @ 13¢.....		26		2		12
Threshing.....		97		90		36
Livestock expense.....		---		---		---
Machinery repairs.....		131		100		100
Feed purchased.....		113		---		---
Building repairs.....		40		40		50
Taxes.....		144		165		150
Total cash expense.....		626		784		1048
Interest on investment.....		1000		1000		1150
Depreciation.....		300		300		300
Total deductions.....		1926		2084		2468
OPERATOR'S LABOR INCOME.....		900		1117		1217
Total hours of labor performed on farm.....		3266		3239		6100
Labor force required.....		One man and a small amount of family labor.		One man and a small amount of family labor.		2 men

*All labor performed by family other than the operator's labor is valued and included as hired labor.

APPENDIX II (Cont'd)

Table 33.—COMPARISON OF AN ACTUAL SYSTEM WITH TWO SUGGESTED SYSTEMS FOR 160-ACRE FARMS.

	Suggested					
	System No. 1 An Actual Farm in Kingsbury County	System No. 2 Corn and Hogs	System No. 3 Hogs and Dairying			
Crops raised—						
Corn -----	58	56	66			
Potatoes -----	7	--	--			
Oats -----	30	28	33			
Barley -----	24	14	--			
Flax -----	--	14	--			
Alfalfa -----	--	5	15			
Sweet Clover -----	--	28	33			
Wheat -----	16	--	--			
Wild Hay -----	2	--	--			
Unimproved land and permanent pasture -----	19	10	8			
Farmstead -----	4	5	5			
Total Crop Production—	Busheis or Tons	Busheis or Tons	Busheis or Tons			
Corn -----	1914	1848	2178			
Potatoes -----	700	--	--			
Oats -----	1050	980	1190			
Barley -----	600	350	--			
Flax -----	--	126	--			
Wheat -----	192	--	--			
Alfalfa -----	--	10	30			
Sweet Clover -----	--	3	15			
Hay -----	--	3	15			
Sweet Clover Seed -----	--	85	--			
Livestock kept—	Number	Number	Number			
Horses -----	6	6	6			
Cows -----	6	4	20			
Bull -----	--	--	1			
Young cattle -----	7	2	10			
Sows -----	8	16	11			
Poultry -----	100	200	100			
Crop Sales	Busheis	Value	Busheis	Value	Busheis	Value
Corn -----	960	522	--	--	--	--
Potatoes -----	600	360	--	--	--	--
Barley -----	560	275	250	125	--	--
Flax -----	--	--	115	230	--	--
Wheat -----	170	187	--	--	--	--
Sweet Clover Seed -----	--	--	80	300	--	--
Total crop sales....		1344		655		

APPENDIX III:

CHI-SQUARE TEST FOR RANDOMNESS IN THE DISTRIBUTION
OF THE PERSISTER'S FARMS

A: The Procedure:

1. Reduce patches of individual farms into dots by locating their approximate centers.
2. Divide the whole township into nine equal, convenient cells (N).
3. Record the observed value (O) by counting the number of dots in each cell.
4. Find out the expected value (E) by counting the overall number of dots by the total number of cells.
5. Repeat procedures 1 to 4 for each subsequent year.
6. Compute the values of χ^2 , with the formula $\chi^2 = \frac{\sum (O-E)^2}{E}$,

Example: 1889

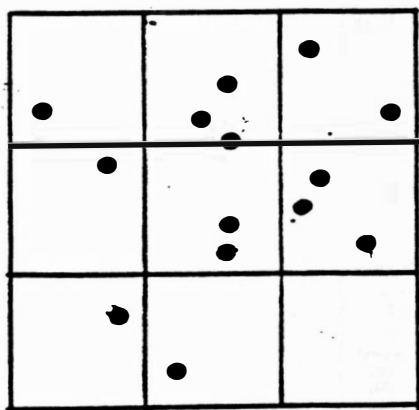
Cells	O	E	O-E	(O-E) ²
A	1.0	1.56	-.65	.37
B	2.5	1.56	.94	.88
C	2.0	1.56	.44	.91
D	1.0	1.56	-.56	.31
E	2.5	1.56	.94	.88
F	3.0	1.56	1.44	2.07
G	1.0	1.56	.56	.31
H	1.0	1.56	.56	.31
I	0	1.56	-1.56	2.43
			$\Sigma = 7.69$	

$$\chi^2 = \frac{7.69}{1.56} = 4.93$$

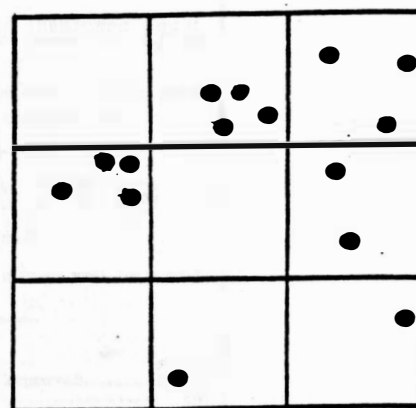
7. Find out the levels of statistical significance for each value of χ^2 at (N-1)=8 degrees of freedom.

APPENDIX III (Cont'd):

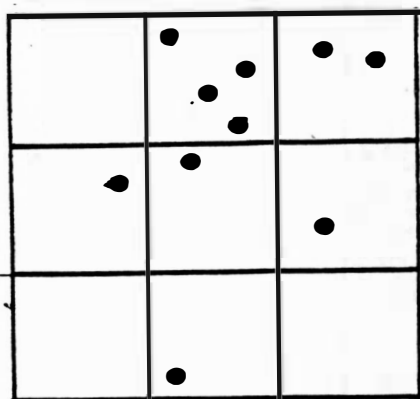
B: Dot Distributions of the Persisters' Farms



1889



1899



1909

APPENDIX IV:

A section of advertisement appeared in a 1895 local newspaper, showing the availability of farm land for sale.

JESSE HALE,
Real Estate, Loan and Insurance Agent.

For sale on easy terms and at prices never
before offered, the following

F A R M S,

Well located, and many of them well improved:

Acres.	Sec.	Twp.	R.	Price
150	31	104	60..Improved.....	\$1,500
150	23	101	59.....	800
100	25	106	59..Near Diana.....	900
320	30	108	64..Westington Sp'g.	1,200
180	24	137	65..Westington Sp'g.	600
180	6	105	62..Near Letcher.....	775
180	13	100	61.....	975
180	27	106	68..Great bargain.....	650
320	15	104	61.....	2,500
220	17	101	59.....	2,000
180	27	106	60..Near Mitchell.....	3,500
100	20	123	60...1/2 mile of Mitchell....	1,500
150	28	103	67..Near Yorktown.....	900
150	34	103	67..Near Yorktown.....	900
220	13	104	61..Improved.....	1,750

TO EXCHANGE:

FARM of 100 acres, three miles southeast of Letcher, for house and lot in the city.

HAVE HOUSE AND TWO LARGE LOTS, well located, to exchange for desirable farm in this or Hanson County.

STOCK OF CASH to exchange for real estate and cash as soon and secure a first-class bargain.

HOUSES AND LOTS FOR SALE:

Will show purchasers some of the best bargains in Mitchell.

Frame house, 6 rooms, First street	\$ 900
Frame house, 7 rooms, First street	1,000
Frame house, 4 rooms, Second street	550
Frame house, 6 rooms, Second street	800
Frame house, 3 rooms, Third street.....	250
Frame house, 5 rooms, Third street.....	500
Frame house, 6 rooms, Third street.....	1,000
Frame house, 6 rooms, Fourth street	900
Frame house, 3 rooms, Fifth street	450
Frame house, hotel building, Second street	1,500

APPENDIX V:

INTERNAL COMPOSITION OF FARMING-TYPE AREAS

Variables	Units	Farming-type Areas			
		I	II	III	IV
A	Percentage	42.5 & above	42.5 & above	42.5 and above	47.5 & below
B	Number	58.9 & above	58.9 & above	69.9-78.9	69.9 & below
C	Percentage	21.7 & above	21.7 & below	12.3-21.7	10.0-21.7
D	Lbs.	208.8-358.9	158.5-359.4	309.5 & above	208.8-309.5

Variables:

A=percentage of plowed land to total land area
 B=livestock units per acre
 C=percentage of horses and mules in total livestock units
 D=milk (lbs.) per acre of plowed land

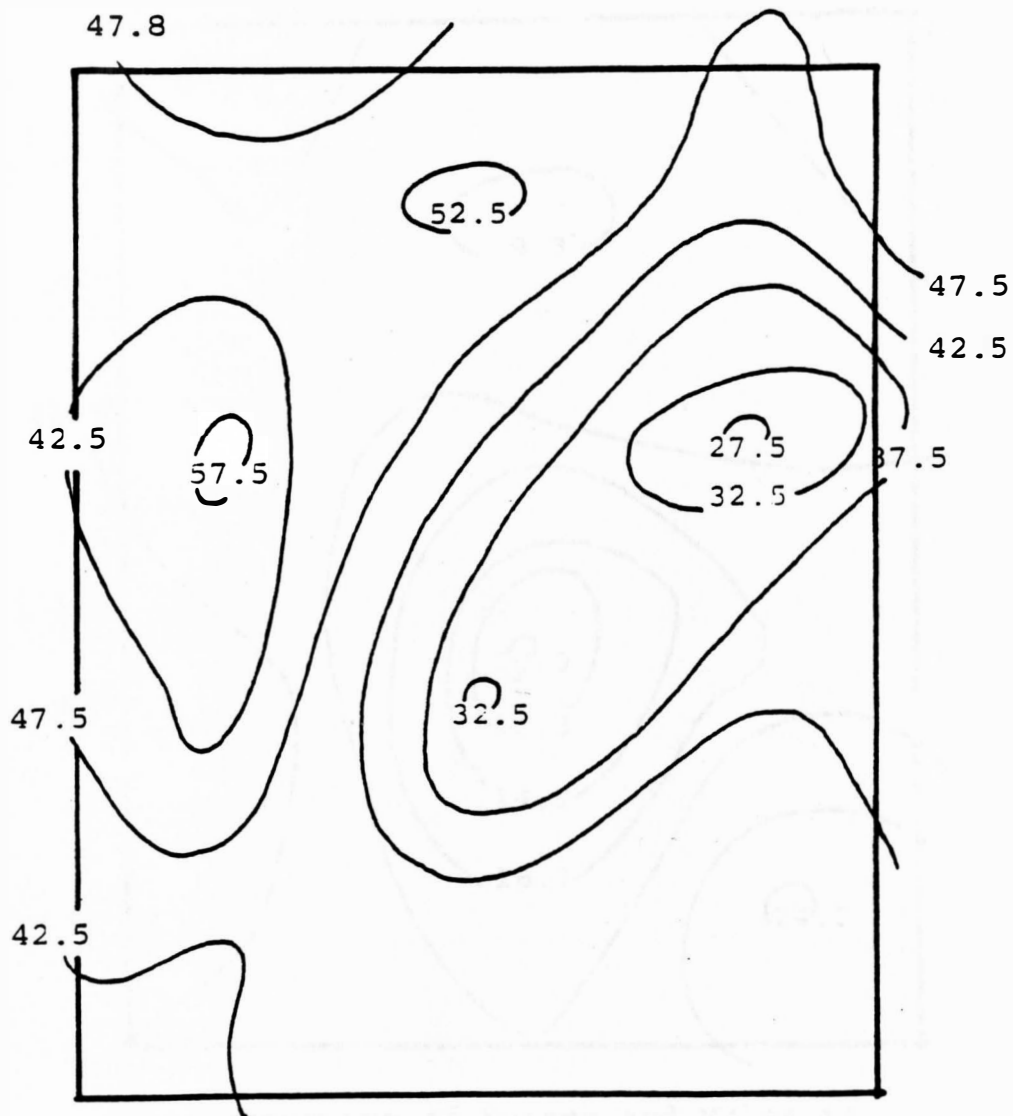
Farming-type Areas

I=grain farming
 II=livestock farming
 III=dairying
 IV=livestock ranching

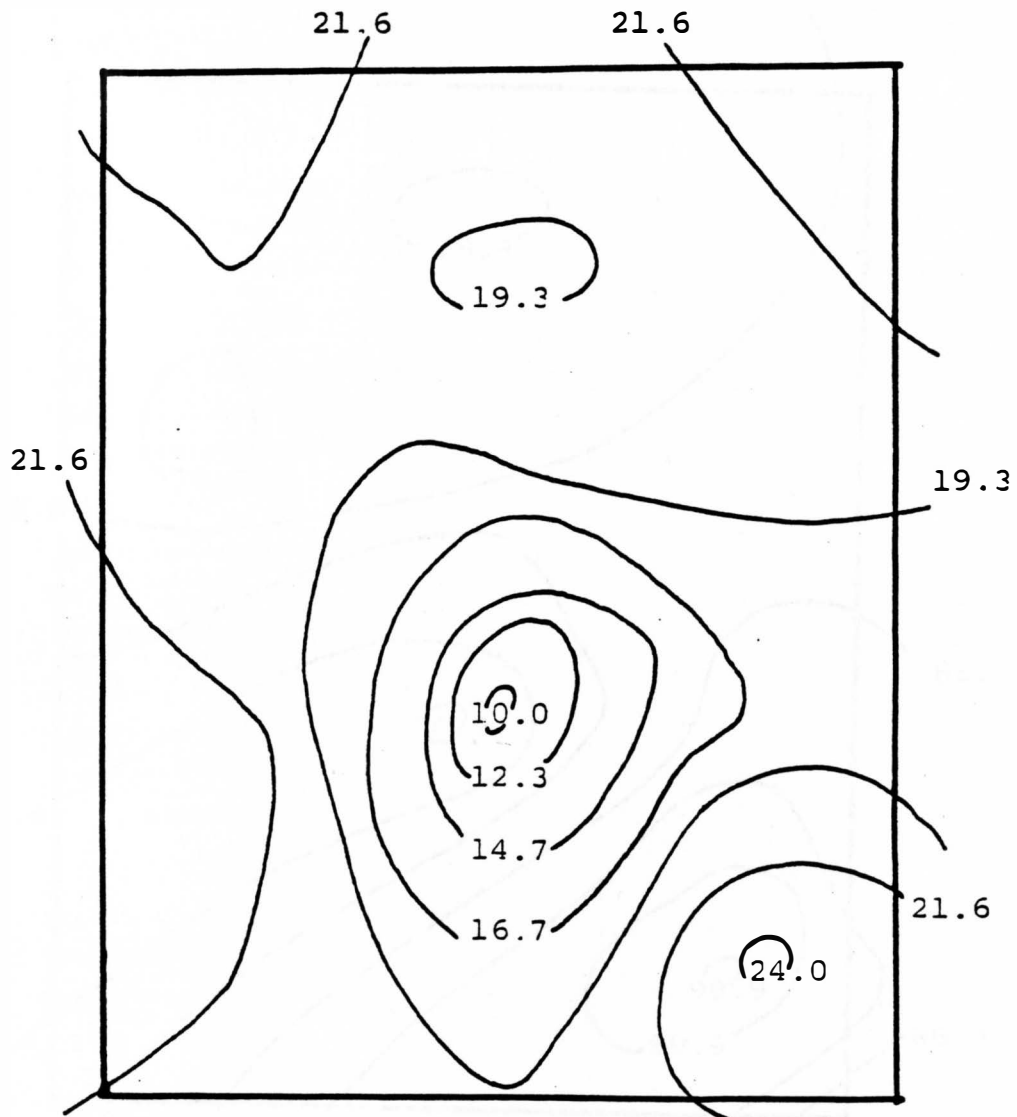
Note: all shaded items represent the principal criteria for the demarcation of the farming areas.

Sources: Doane Robinson, op. cit., Map 7.

APPENDIX VI:

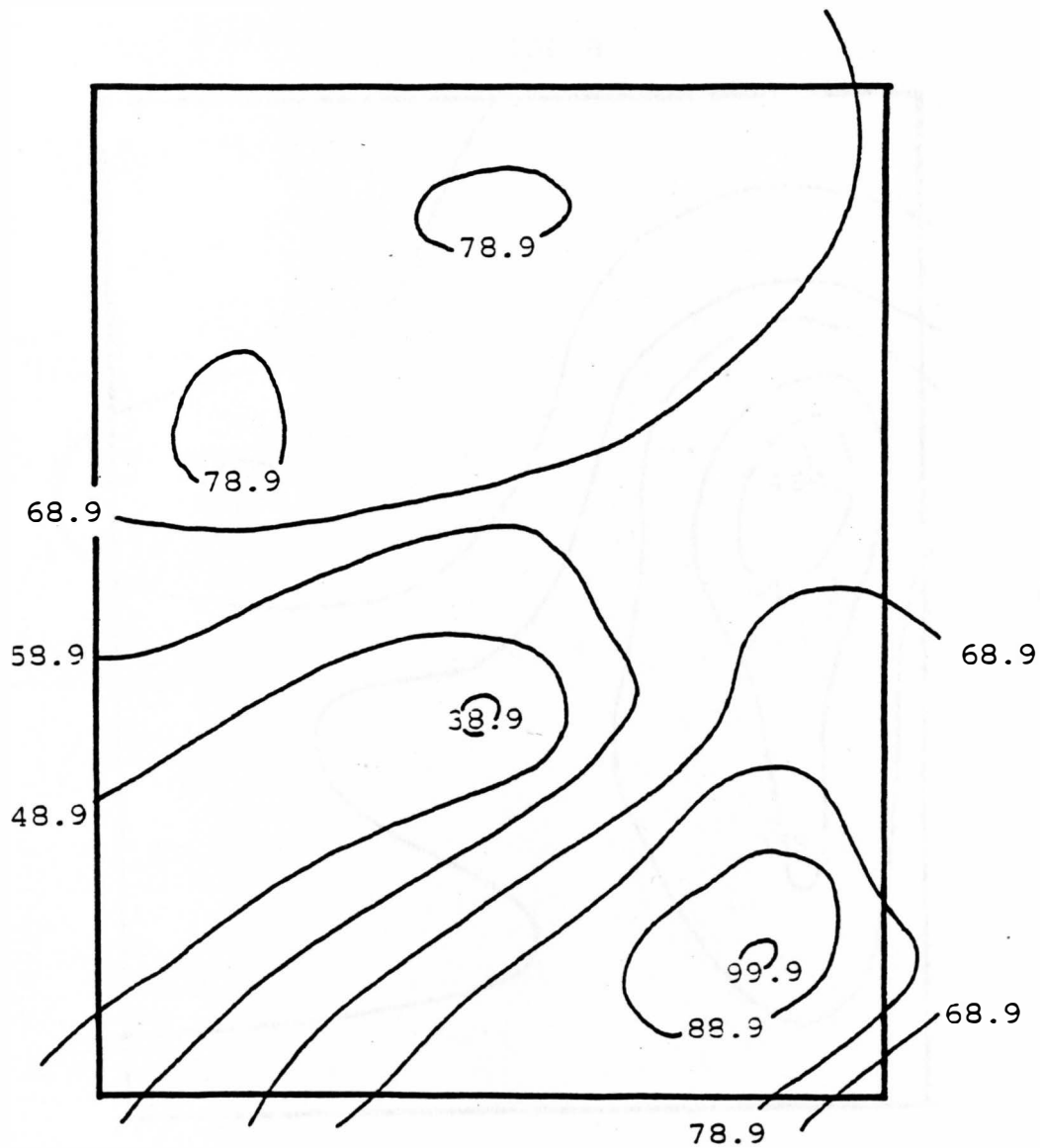
FARMING-TYPE AREAS: ITS CRITERIA
AND CHANGING CONFIGURATION: 1905-1915A: Percentage of Plowed Land to Total
Land Area.

APPENDIX VI (Cont'd).



B: Percentage of Horses and Mules in Total Livestock Units.

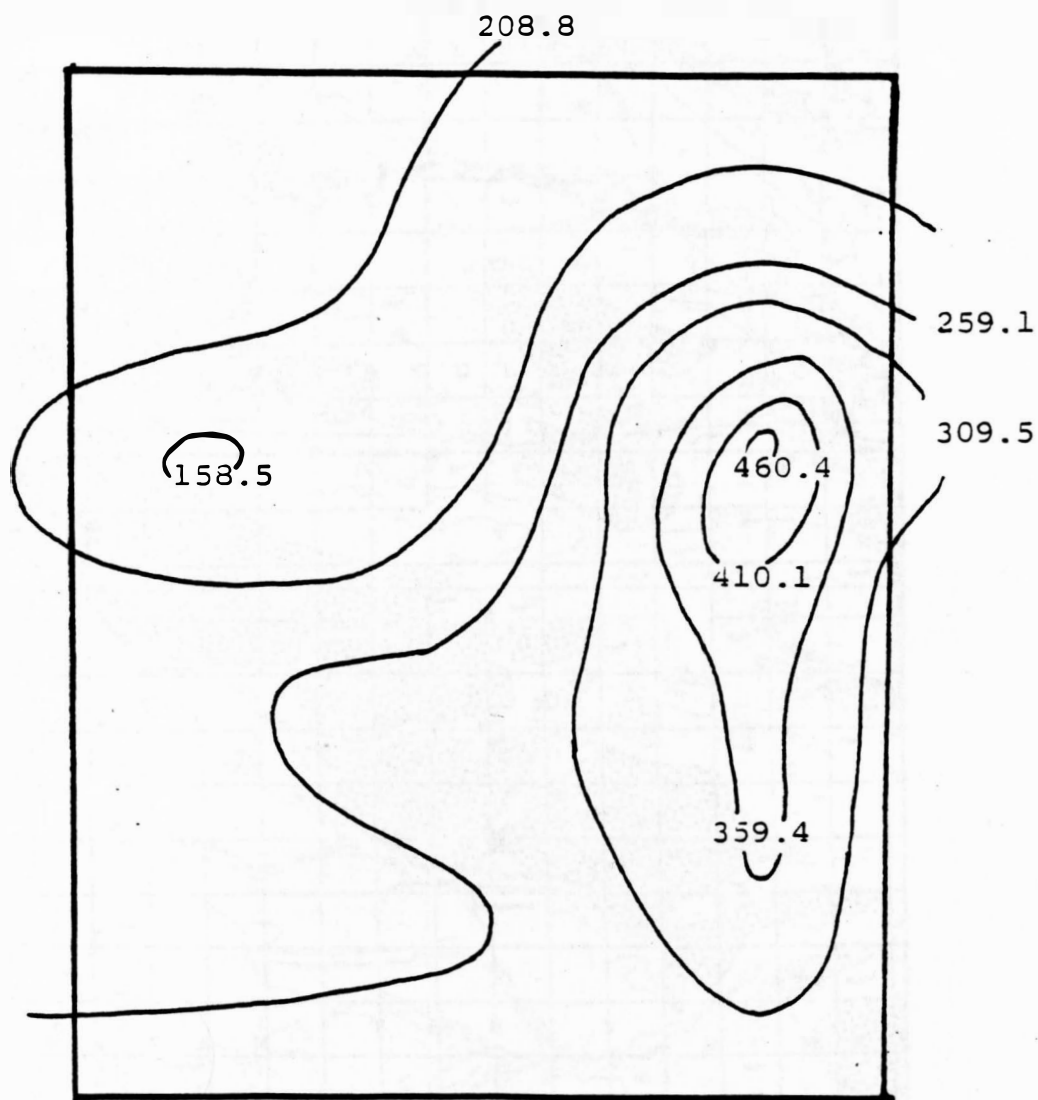
APPENDIX VI (Cont'd).



C: Livestock Units Per Square Mile

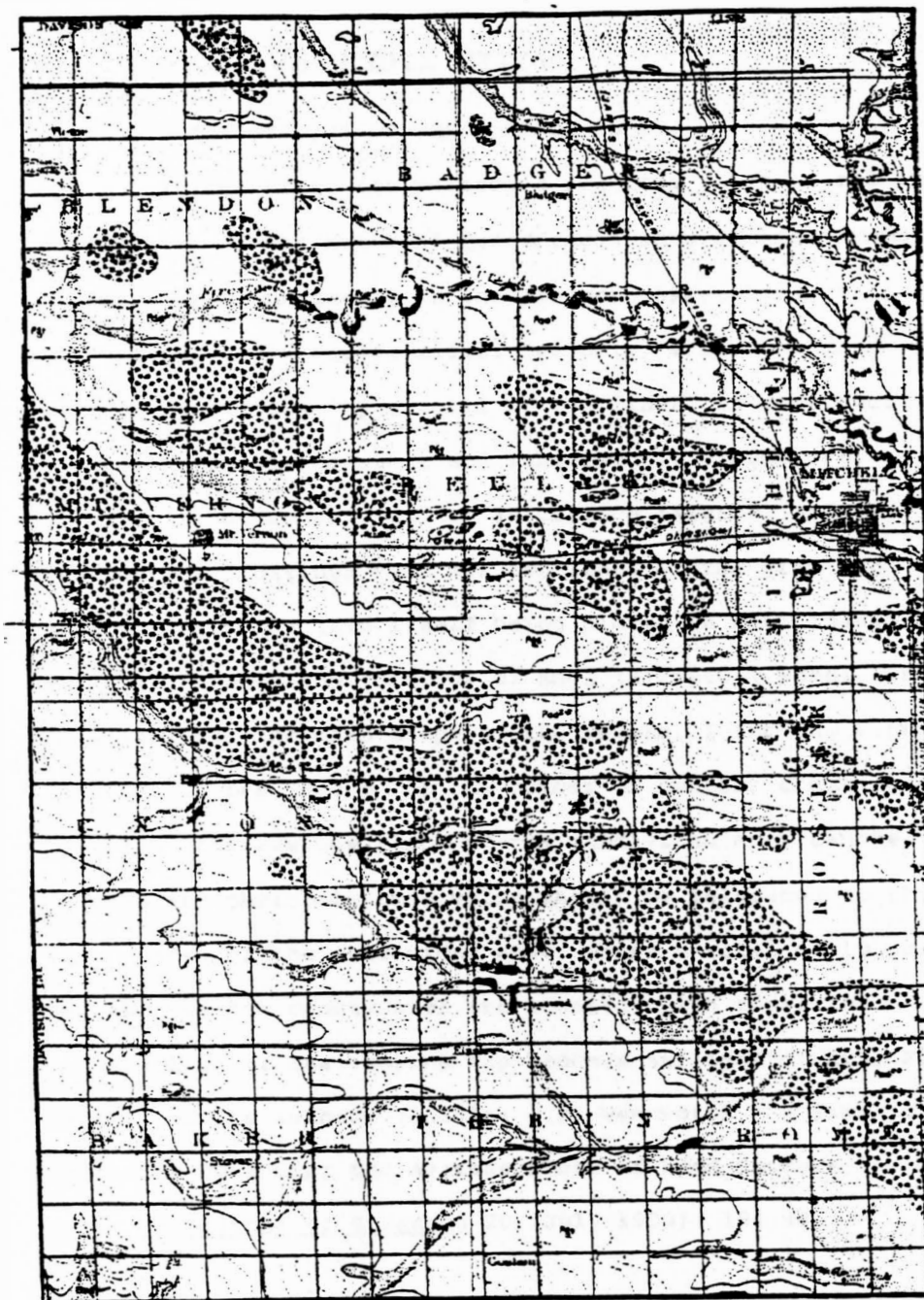
Livestock Unit: 1 horse=1 mule= 1 cow=
5 pigs= 7 sheep.

APPENDIX VI (Cont'd).



D: Milk Production (lbs.) Per Acre of Plowed Land.

APPENDIX VII: SURFACE MATERIALS.



█ Cary Morain █ Tills █ Old Stream Deposit

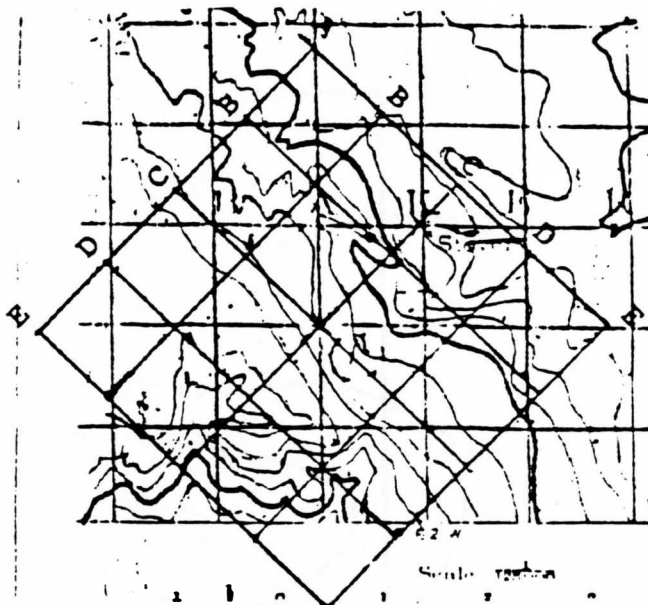
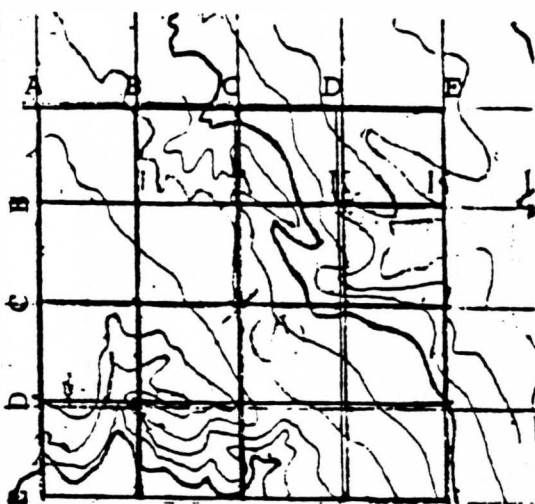
APPENDIX VIII:

COMPUTATION OF THE AVERAGE SLOPE

In practice, the procedure requires first of all the subdivision of the Mitchell Quadrangle into a large number of small areal units--18 in the present case, and each corresponds to 16 square miles. Secondly, a special grid of 16 squares and made up a total of ten lines, is constructed out of the subdivided unit and subsequently placed over it, first in a square and next in an oblique fashion. Thirdly, the contour crossings with all ten lines of the grid are counted, with the grid itself being placed in both fashions. Finally, through the formular of $S_m = I (N) / 5280 (.6366)$, where S_m stands for the mean slope of the locale, I for the contour interval in feet and N for the number of contour crossing per mile, the average slope of the subdivided area can be arrived at. Obviously this value should be relegated to the very center of the subdivided area. Hence a total of 18 point values over the county area are located; with these the construction of the isoline map becomes straightforward. For details of the method, consult: C.K. Wentworth, "A Simplified Method of Determining the Average Slope of Land Surface," American Journal of Sciences 20 (July 1930): 184-94.

APPENDIX VIII (Cont'd).

Example: Portion of T101 R62



Square

Oblique

Lines	Nos. of Crossing		Nos. of Crossing	
	N-S	E-W	NE-SW	NW-SE
A	9	7	5	6
B	12	11	8	11
C	8	15	17	3
D	14	11	14	11
E	10	<u>12</u>	8	<u>9</u>
	Total= 109			92

Total miles of lines..... 40

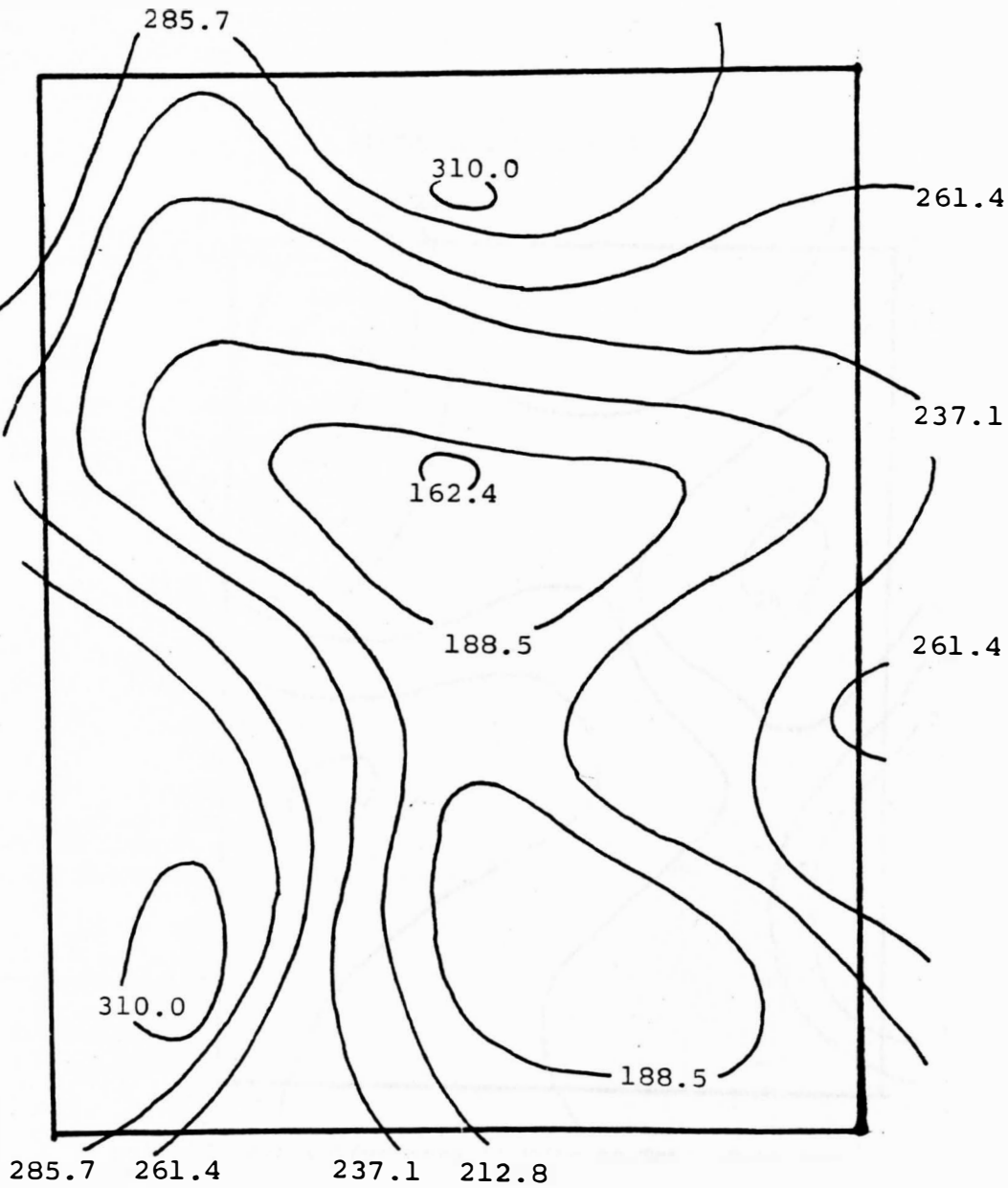
34.5

Average nos. of crossing

per mile..... $\frac{109+92}{40+34.5} = 2.7$

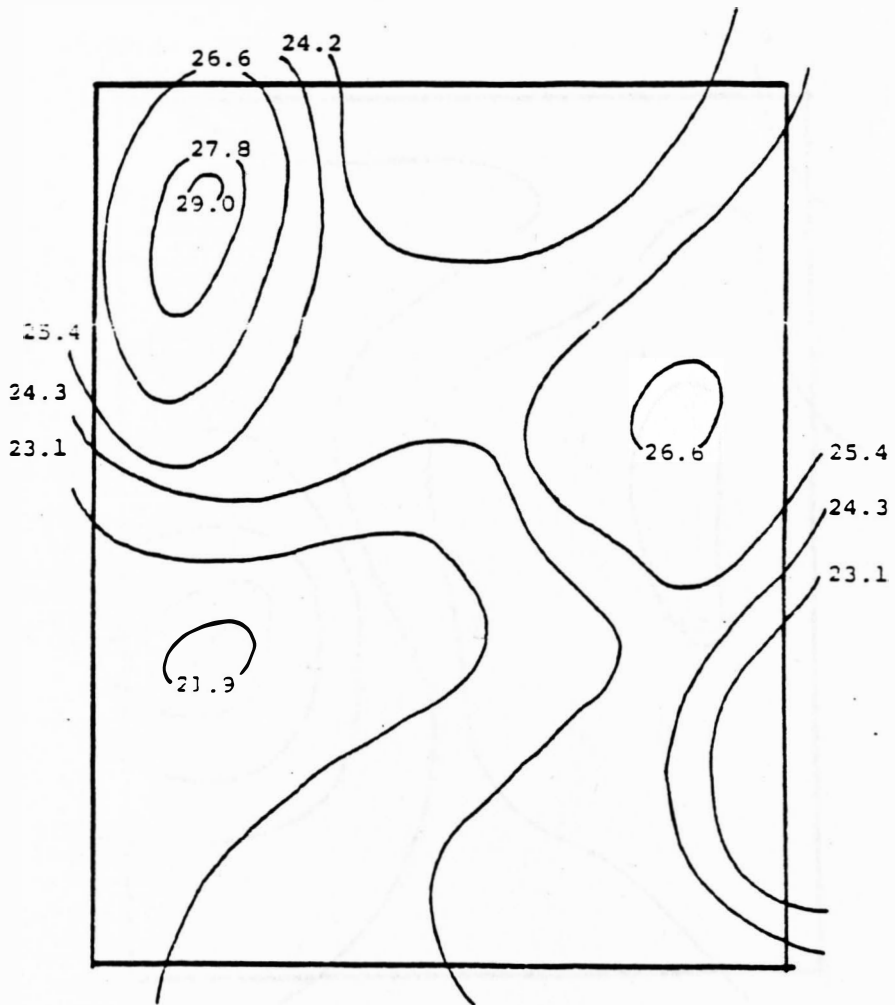
$$S_m = \frac{20 (2.7)}{3361} = .016 \text{ or } 1.6 \text{ per cent}$$

APPENDIX IX

SPATIAL VARIATION OF AGRICULTURAL CHARACTERISTICS:
1905-1915

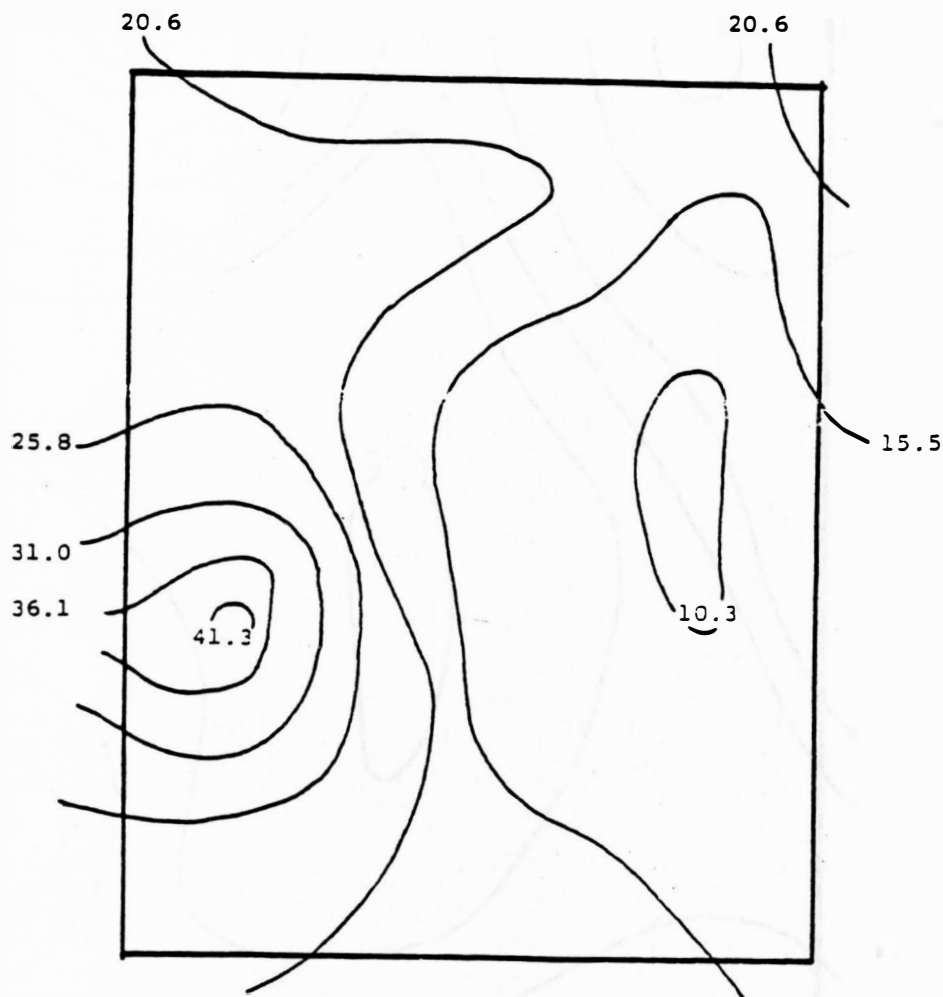
A: Average Farm Size

APPENDIX IX (Cont'd)



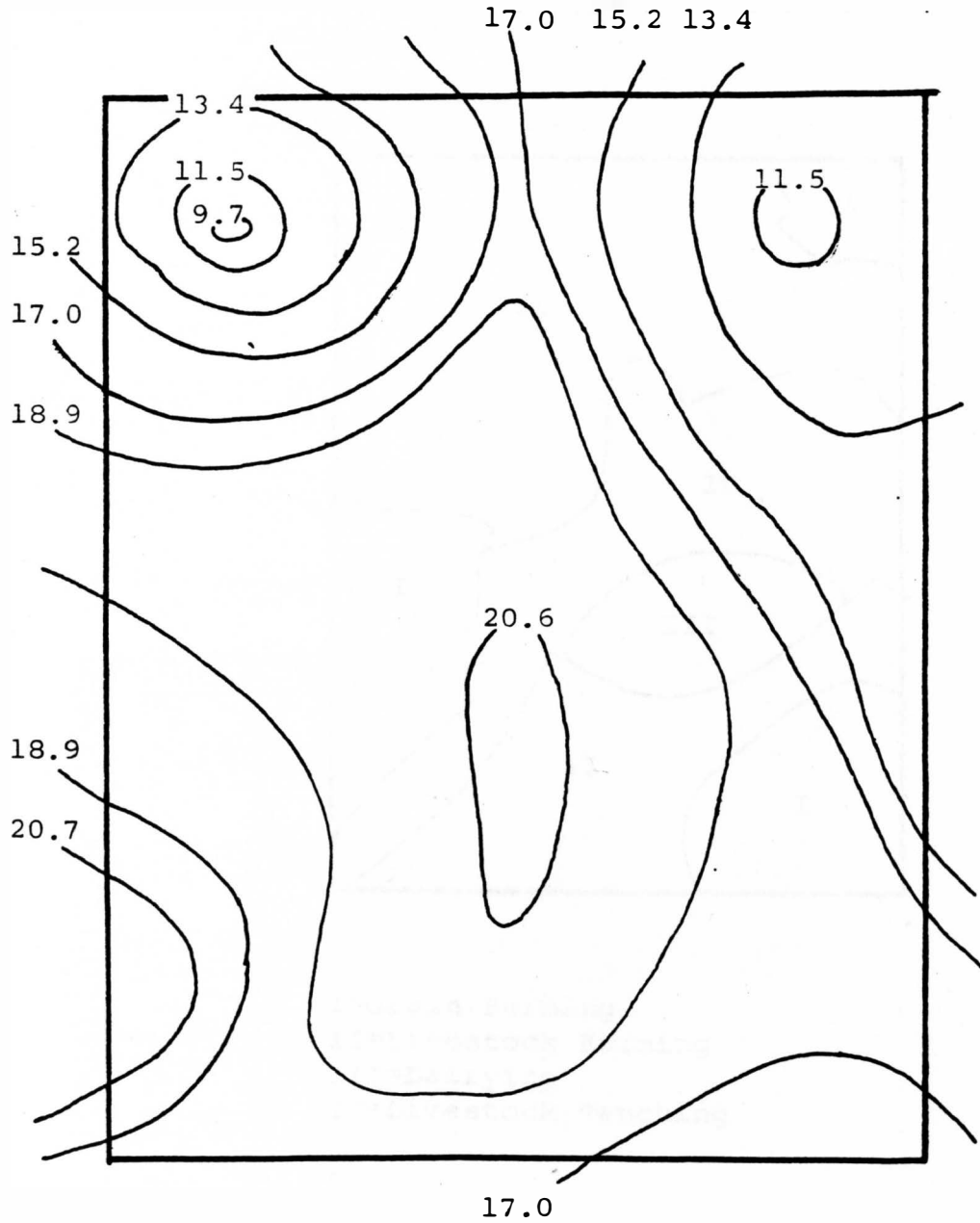
B: Percentage area in corn to Total Farm Area

APPENDIX IX (Cont'd)



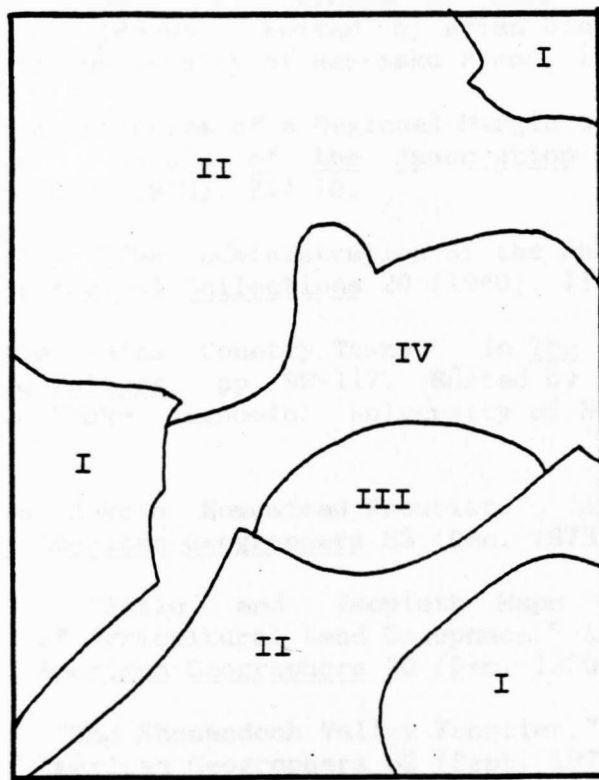
C: Percentage Area in Wheat to Total Land Area

APPENDIX IX (Cont'd)



D: Percentage Area in Hay to Total Land Area

APPENDIX X:
Farming-Type Areas: 1905



I=Grain Farming
II=Livestock Farming
III=Dairying
IV=Livestock Ranching

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